

Ashok K. Dutt · Allen G. Noble
Frank J. Costa · Rajiv R. Thakur
Sudhir K. Thakur *Editors*

Spatial Diversity and Dynamics in Resources and Urban Development

Volume II: Urban Development

 Springer

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Editors

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Preface

One of the most significant characteristics of urban development is uneven spatial development both in the core and peripheral regions of the world. This has caused a pronounced restlessness in both the core and peripheral regions. Conventional wisdom about urban development is fast undergoing sea changes and urban geographers are addressing these changes, helping us understand the diversity and dynamics in contemporary urban development issues. This book is a result of a project initiated by Ashok K. Dutt with his colleagues Allen G. Noble and Frank J. Costa (Department of Geography and Planning, University of Akron, Akron, Ohio) to provide a Festschrift in honor of Professor Baleshwar Thakur, former Vice-Chancellor of L. N. Mithila University, Darbhanga, Bihar, and Professor of Geography at the Delhi School of Economics, University of Delhi. Baleshwar Thakur has been a collaborator and contributor on several projects initiated at Akron. During the past more than four decades, Thakur has established his national and international credentials as one of the leading exponents of resource management and urban development. He has been recognized for his research contributions by the Association of American Geographer's Regional Development and Planning Specialty Group Distinguished Scholar Award, besides other recognitions such as the Commonwealth and Fulbright Scholarships and a Shastri Indo-Canadian Fellowship, among others. We take this opportunity to thank all the contributors to the volumes(s) and the family members of the editors in bearing the burden of being away from responsibilities while working on this project.

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Part I
Introduction

Chapter 1

Introduction: Urban Development

**Rajiv R. Thakur, Ashok K. Dutt, Allen G. Noble, Frank J. Costa,
and Sudhir K. Thakur**

Abstract This book is the second volume of a two-volume festschrift in honor of Professor Baleshwar Thakur – titled “Spatial Diversity and Dynamics in Resources and Urban Development.” The volume is intended to provide an opportunity for specialists in urban development who utilize urban development processes to understand urban practices, policy, and politics both in the metropolitan and peripheral regions of the world. The volume recognizes that the locus of urban development now lies in the transforming of peripheral regions of the world, which has caused a paradigm shift in regional and local decision making. Given this overview of urban development, this volume revisits our understanding of interdependencies between places and among scales. Beyond the applied nature of chapters, this volume engages with dynamic issues of urban development that can be approached from diverse perspectives. Consequently, contributions use cutting-edge theories and spatial techniques to examine dramatic changes in issues such as: urban growth in developing and transforming regions, infrastructure growth as an urban land shaper, proliferation of housing and squatter settlements, our changing perceptions and quality of urban life, impact of rural to urban migration on land use dynamics, impact of spatial division of labor on ethnicity in cities, the impact of locational decisions at the local and regional scales on metropolitan retail and wholesale space and structure, and the cumulative impact of all of this on future urban planning regulations.

Keywords Asian urbanization • Clusters • Glocalization • Metropolitan regions • Peripheral regions • Urban development • Urban space • Urban sustainability • Urban systems

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Urban development, as a process, is undergoing fundamental shifts in both the metropolitan and peripheral regions of the world. Under the impact of economic restructuring, since the 1990s, these changes have manifested in the uneven development of places, reregulation of commodity chains, spatial impacts of technology, and commodification of environmental degradation, among many others. All this has caused dramatic changes in the form and function of the Fordist cities of North America and Europe and the urban landscapes of the global south, requiring citizens, businesses, scientists, and policymakers alike to rediscover the connections between urban practices, policy, and politics (Scott 2012). To contextualize the foregoing comments, half the world's population is now urban (World Bank 2009). Clearly, the challenge for both metropolitan and peripheral regions of the world are different, even as the relationship between both demands competition and cooperation. To that end, urban development, as a process, practice, and profession, will require revisiting our understanding of interdependencies between places and among scales (Scott 2012). At local and regional scales, geographers have been assisting decision makers by providing information and analyses related to issues such as the management of hazards, the management of complex urban systems, and resource allocation, often wrestling with their overlapping roles as scientists and citizens.

Results of the dynamic growth of cities include our increased attention to issues such as urban growth in developing and transforming regions, infrastructure growth as an urban land shaper, proliferation of housing and squatter settlements, our changing perceptions and quality of urban life, impact of rural to urban migration on land use dynamics, impact of spatial division of labor on ethnicity in cities, the impact of locational decisions at the local and regional scales on metropolitan retail and wholesale space and structure, and the cumulative impact of all this on future urban planning regulations. Whether the issue at hand is assessing the financial vulnerability to climate related natural hazards or assessment of housing for low-income groups, all these changes are affecting urban development outcomes that decision makers must consider. Geographers along with other social and applied scientists for long have been contributing to urban policy decision making in a variety of ways, such as creating planning initiatives and providing spatial decision support systems.

Considering that the locus of urban development is in the peripheral regions of the world, to meet the challenges of rapid urbanization city leaders must move quickly to plan, network, and finance sustainable growth. The experience of urban demographic shifts in Asia, Sub-Saharan Africa, Latin America, and the Caribbean already shows that much of the transformations in terms of urban growth is happening in the small- and medium-sized cities of these regions (World Bank 2009). In Ethiopia, Ghana, Tanzania, and Uganda, redistribution of agricultural land and the reforms in land administration have already brought about social reengineering and computerization of land information systems (Byamugisha 2014). As a result, land policy, administration, and management have become areas of demand for technical and operational support in many parts of the world.

Cities themselves are functional regions connected with other places by networks of transportation, communication, finance, and trade. Effective urban policy

making requires an understanding of these spatial and functional characteristics. Bangladesh is an example of a country that has been working toward structural transformation of its economic production, thereby affecting its urban development outcomes in the long run. An aspect of this change is the creation of a globally competitive urban space through its successful garment industry (Muzzini and Aparicio 2013). Similarly, several Sub-Saharan African cities confront vast economic, social and environmental challenges, as a result of which both local governments and the international community have begun to work together to close the gap between infrastructure and services. Anticipating accelerated urban growth in African cities, there is a need for the following, namely, (a) a clear understanding of urbanization and sectoral policies in African cities, (b) focus on issues such as decentralization, basic services provision, and local governance issues, and (c) creation of a financial framework to address strategic and operational growth of infrastructure and local investment financing (Paulais 2012).

Rural to urban migration, whether in China, India, Brazil, Russia, the broader Asia-Pacific or Sub-Saharan Africa, has caused a paradigm shift in regional and local decision making (World Bank 2009). The Chinese experience of rural to urban migration in the past two decades has played a significant role in shaping the economic and demographic landscape of their cities (Yusuf and Saich 2008). In fact, China's mobility rate, their sheer size, and the dramatic economic and social consequences have been well documented in literature and in the media too. *Last Train Home* is a 2009 documentary film directed by Lixin Fan that has depicted how Chinese cities plunge annually into chaos when nearly 130 million migrant workers travel to their home villages for the New Year's holiday (Fan 2009). Although this discussion of urban policy provides us a perspective, the implications are that cities, of course, are more than built environments where people are primary components, and significant inequities exist among city dwellers with respect to the basic necessities of life.

Urban development in the metropolitan regions and that in peripheral regions have a systemic relationship. Many scholars have written about the economic crisis of late Fordism in North America and Europe in the 1970s, resulting in the rise of post-Fordism, which not only influenced the urbanization processes in the global north but also influenced the same processes in the global south after the 1990s (Sassen 2001; Scott 2012). In other words, the economic restructuring and competitiveness that followed the economic turbulences of the 1970s to the 1990s created a new geography of urban development. A significant characteristic of this new geography of urban development was that many regions moved away from pursuing large manufacturing facilities toward the redeployment of local assets, including a recognition of the potential of some service activities to foster economic growth, even in rural areas. As old manufacturing regions in the global north succumbed to competition from newly industrializing regions in the global south, a new wave of urban development occurred that was characterized by a new international division of labor (Coe et al. 2007). In other words, urban development in the newly industrializing countries was largely the product of the search for cheap and profitable locations. As such, steel mills closed in the mature industrial regions of the former

metropolitan world while semiconductor production moved to the newly industrializing world in places such as Malaysia and Thailand and peripheral regions of the global north, such as the M4 Corridor west of Central London and in the Silicon Glen near Glasgow, Scotland. With these changes in the geography of urban development comes the challenge of accelerated demand for basic urban services in the form of infrastructure, employment, land, energy, and affordable housing by the billions who are adding to the cities (Coe et al. 2007).

Given this overview of urban development, this volume is a festschrift in honor of Professor Baleshwar Thakur for his contributions to research in urban development and resource management in developing countries. Through his research, teaching, and services, Professor Thakur, during the past more than four decades, has established his national and international credentials as one of the leading exponents of resource management and urban development. He has been recognized for his research contributions by the Association of American Geographers' Regional Development and Planning Specialty Group's Distinguished Scholar Award, besides other recognitions such as the Commonwealth and Fulbright Scholarships, and a Shastri Indo-Canadian Fellowship among many others. In this spirit, the editors asked contributors to contextualize their research on issues and topics within urban development that Professor Thakur had pursued himself over the past more than four decades. The contributors examine cutting-edge theories explaining diversity and dynamics in urban development. Topics covered include human vulnerability to hazards, space and urban problematics, assessment and evaluation of regional urban systems and structures, and urban transformations as a result of structural change, economic development, and underdevelopment. The significance of these topics lie in the pace and volume of change as is happening in geography, reflecting continued development within established fields of inquiry and the introduction of significantly new approaches during the past decade. The book contains 25 chapters organized under eight parts: (1) Introduction, (2) Theoretical Basis, (3) Quantitative Analysis, (4) Economic Impact, (5) Infrastructure Development, (6) Housing, (7) Planning, and (8) Cities. Although this chapter organization may be dubbed as contentious and problematic, the editors argue that the articulation of what constitutes 'urban' is embedded in how we describe, interpret, and analyze a process, event, meaning, experience, and institutions within the urban arena.

The introductory part consists of two chapters. The first chapter is an overview on the theme of urban development and the second is a review of Professor Baleshwar Thakur's academic background and contributions to resource development in developing countries and urban development, with a particular focus on India. The second part, on theoretical basis, contains four chapters beginning with Sudhir Thakur's review of regional urban systems in India. The author identifies the trends in the existing literature. Drawing on evidence from four broad macro-regional urban systems, namely Delhi, Kolkata, Chennai, and Mumbai, the author takes regional differences into account to further understand trends, patterns, and implications. Given India's rapid urban growth, this chapter makes wonderful reading as the author presents several research directions for urban systems in India. Chapter 4 by Swapna Banerjee-Guha presents a critique of neoliberal urbanism in

the context of recent urban policies of India. This chapter is followed by two chapters with the central theme of ‘urban sustainability.’ In Chap. 5 Jitender Saroha analyzes sustainable urbanization in India, highlighting problems and limitations, and in Chap. 6 Chris Cusack and Kathryn Bill examine Nairobi’s engagement with sustainable urban planning through the lens of ‘glocalization’ even as it plays a unique role as both capital and primate city for Kenya. Cusack and Bill advocate the need to develop strategic planning initiatives combining community knowledge with advanced technology through public participation GIS.

The third part, on ‘quantitative analysis,’ is composed of three chapters, two of which focus on aspects of Asian urbanization; the third chapter examines spatiotemporal patterns in Asian Indian settlements in major gateways of the United States. All three chapters use large data sets to provide an in-depth empirical analysis. Chapter 7, by Dutt, Costa, and Tetley, uses three different statistical techniques to establish that Asian urbanization is correlated with development and expenditure on development. The authors argue that because urbanization is believed to have been caused by migration from rural to urban areas, the best intervention may be by arresting urban explosion through policies that would manage socioeconomic development in rural areas. Chapter 8 is a unique contribution by Brunn, Devriendt, Boulton, Derudder, and Witlox who provide a very timely analysis of the impact of global financial crisis on urbanization processes in South and Southeast Asia. The uniqueness of this chapter lies in the use of the Worldwide Web as an alternative source of real-time urban rankings to understand the recent financial crisis at global and regional scales. The last chapter in this part, by Harvey, Butler, Henry, and Frazier, uses the concept of ‘gateways’ to examine the successive settlement patterns of Asian Indians in the United States. In many ways this chapter fills a gap in the under-researched topic of Asian Indian immigration to the United States. The authors break new ground as they draw upon case studies from the metroplexes of Dallas–Ft. Worth, Metropolitan Phoenix, and Austin, Texas, to conclude that Asian Indian immigration represents a significant and continuing current wave of immigration to the United States providing seeds to socioeconomic change.

Composed of four chapters, the fourth part of the book addresses the economic impact of urbanization processes, particularly in the non-Western context. In Chap. 10, Neil Reid and Jay Gatrell address the challenges experienced by ‘clusters’ in some non-Western contexts such as Brazil, India, and Nigeria. They also point out that the dynamics of economic development and urbanization in developing countries are distinct. After Sudhir Thakur’s very elaborate review of regional urban systems in India in Part II, Chap. 11 engages the concept of ‘urban systems’ in India with a distinction. Dahiya studies growth and evolution of Indian urban systems with an emphasis to include all urban places with greater than 20,000 population, at national and macroregional levels, for a 100-year period, and relates urban size with economic development in each macroregion. His research contributes to our understanding of the changing structure and behavior of the national and macroregional urban systems in India, through successive time periods during the past century. In Chap. 12, Chatterjee and Noble contextualize the impact of the twin processes of globalization and urbanization on higher education in India. In other words, this

chapter advances the argument that Indian cities are evolving into a significant stock of human capital assets. The last chapter of this part, by Chatterjee, proposes a framework to understand the socioenvironmental aspects of risks that exist in urban India and their effects on the production and distribution of risks for the marginal population in its cities.

Part V provides three chapters that focus on the role of two key infrastructures, namely, high technology and transportation systems, on contemporary urban development. Infrastructure and contemporary urban development provide an extremely fertile ground to reflect upon issues such as sustained growth. Infrastructure is a true enabler for countries such as India through competitiveness, yet infrastructure development itself will not drive economic growth unless it is aligned with the country's economic, social, and environmental priorities. In Chap. 14, RajRani Kalra brings out findings from her research on the sociospatial impact of high technology in Bengaluru (formerly Bangalore). Kalra concludes that although high technology has proven to overcome the constraints of space and time, there is a distinct locational bias that has increased the gap between the haves and have-nots in the Bengaluru region. In Chap. 15, Ranjan, Lal, and Susaeta analyze the space-shrinking nature of Delhi's mass rapid transit system. They use a multinomial logit model to determine the effects of rider characteristics on mode choice. The last chapter in this part, by Gopa Samanta, is provocative. She examines critical issues of mobility and marginality for the 'cycle rickshaw' as a non-Western mode of transportation in South Asian cities. Samanta is bold in her research questions and lays bare the practice of using research methods to understand our urban social world.

Part VI contains three chapters that cover the dynamics of housing in a peripheral region. In keeping with the theme of housing but focusing on ethnic variables, José R. Díaz-Garayúa in Chap. 17 researches how they might influence housing values in metropolitan San Juan. His study helps to understand race, ethnicity, and place in the context of the island of Puerto Rico. In Chap. 18, Satya Prakash Kaushik examines the socioeconomic implications of extensive urban growth in the surrounding areas of Delhi, leading to large scale conversion of agricultural land into "farmhouses" for the rich. Many push-and-pull factors in the form of capital-intensive manufacturing activity and increased presence of multinational corporations has led to an overall increase in affluence and has caused the skyrocketing of real estate values. In the process of his research, the author examines the relationship between social capital, economic performance, and uneven regional development. The last chapter in this part, by Braj Raj Kumar Sinha, examines human migration in Bolpur Town. The chapter underscores the importance of decisions to relocate as a significant decision of households with far-reaching implications for the links between places. The significance of this study lies in the fact that as geographers learn more about demographic influences and economic circumstances on migration, population analysts should become better able to inform public policy at both national and local scales.

The seventh part of the book addresses urban policy and planning in the context of Indian cities such as Rohtak in Haryana, Varanasi in Uttar Pradesh, and Calcutta in West Bengal. Chapter 20 by Sangwan and Sangwan addresses the importance of

intracity use mobility in the city growth direction, laying emphasis on the planning of various land use components so that balance can be maintained among them within the city limits. Chapter 21 by Rana P.B. Singh provides an in-depth examination of the urban planning dynamics of the cultural and natural heritage of Varanasi City. The author presents the rationale for proposing Varanasi as a heritage city in the World Heritage list. The last chapter in this part, by Halder, Dutt, and Shi, focuses on an examination of the socioeconomic characteristics of Calcutta slums. The authors study the urban policy dynamics of slums in a hyper-urbanizing Calcutta (or Kolkata) whose socioeconomics is guided by an extensive informal economy and sizeable demographics that finds linkages to Bangladeshi migrant and refugee populations and the historical and geographic circumstances that are inevitably mired in poverty and desperation. Even though the three chapters deal with urban planning issues in the Indian context, yet these particularities most certainly merit treatment on their own terms and in their own right.

In the final part of the book, the chapter collection on ‘cities’ as a genre demonstrates that there is not, nor should there be, consensus in the urban arena. Beyond demonstrating rude diversity for its own sake, the author’s intention is that the different positions articulated here become the basis for critical reengagement. In Chap. 23, P.R. Sharma, A.N. Tiwary, and G.N. Singh examine the following for Lucknow and Mirzapur City: (1) how the spatial structures of Indian cities are affected by socioeconomic variations; (2) how the socioeconomic variations among Indian cities are manifest in their changing internal structure, population characteristics, and social patterns; and (3) how changes occur in the spatial patterns of the Indian cities in general with the analysis of the two cities representing different size categories of urban centers to evaluate spatial similarities and contrasts. Although the subject of urban futures is often associated with speculative scenarios, there will undoubtedly be some order through technological, innovation, and exclusionary social geographies. In Chap. 24, Annapurna Shaw examines the informal sector in the Kolkata metropolitan region to articulate a role for them in the process of local economic development. Considering that the growth and integration of the informal sector in local economic development assumes exploring a range of spatial strategies, Shaw compels the reader to reflect on the possibilities for alternative or non-capitalist informal sector geographies. The last chapter in this part and also in this volume, by Basu and Murnaghan, demonstrates how certain kinds of urban spaces are excluded in conventional policy planning. More specifically, the chapter demonstrates through case studies from New York City and Fatehpur Sikri in India how children become vulnerable and marginalized even in organized policy planning, revealing the complex connections between workplaces and homeplaces.

As you read the chapters of this book, you will agree the book is centrally concerned with dynamic issues that can be approached with diverse perspectives within the field of urban development and the related social science disciplines within which it is increasingly embedded. We hope that this book, and both volumes, will provide scholars and practitioners with a broad range of issues with multiple perspectives in both metropolitan and peripheral regions.

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Chapter 2

Baleshwar Thakur: Professional Career and Contributions

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Professor Baleshwar Thakur, 2013

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Abstract This chapter is a discussion of the growth, evolution, and contribution of Baleshwar Thakur (B.T.) to Indian geographic research. He is a doyen among Indian geographers and has been an acclaimed teacher, scholar, and administrator throughout his illustrious career of four and a half decades. He made immense contributions to the discipline and strived for its popularization both within and outside India. His research career can be divided into two phases: 1964–1980 and the post-1980s. During the first phase he was interested in understanding the long-term processes of urbanization in its regional context in developing countries, focusing on India, using quantitative methods. After accepting the position of Reader in Geography at the University of Delhi, his interests shifted to the study of natural resource management and the history of Indian geography, although he pursued his interest in urban geography as well. His contributions during the past five decades can be subdivided into four broad areas: urban geography, quantitative geography, natural resource management, and history of Indian geography. He continues to be actively engaged in research and publications, and his contributions serve as a model for young Indian geographers aspiring to become scholars.

Keywords Urban geography • Quantitative geography • Natural resource management • History of Indian geography

2.1 Background

Baleshwar Thakur (B.T.), nicknamed ‘*Bale*’ by his parents, is a doyen among Indian geographers. He has worn several hats to his distinction and has been an acclaimed teacher, scholar, and administrator through his illustrious career of four and half decades. He is among the few selected Indian geographers who transcends beyond the parochial boundaries of academic pursuit. He can be characterized as an ‘erudite knowledge seeker,’ and a ‘knowledge distributor’ to those who are passionate about knowledge and understanding the world through the lens of a perceptive geographer. He transmitted immense affection to his students and served on the graduate committees and doctoral dissertations of several dozens of students at Patna and Delhi University. He has an insatiable passion to push the ‘frontiers of academic knowledge’ beyond its boundaries. Although he retired from the University of Delhi in 2008, yet he spends hours reading journals, engaging in research, visiting the Ratan Tata Library at the Delhi School of Economics (DSE), University of Delhi; and would meet with students to advise them on their research projects. His commitment and dedication to research shows that one can retire from a university position but does not retreat from an academic life. Throughout his long career, he has been very much a field geographer and has traveled every nook and corner of the Indian subcontinent.

He was born on July 16, 1943 at Sarabey village of Madhubai district in North Bihar in a working-class family. He is the second of three siblings. His father and cousin uncle were influential in his early education that led him to obtain a first divi-

sion in his matriculation (10th grade) examination. He received his early school education at Khajauli and intermediate education at R.K College, Madhubani, affiliated with Bihar University. In 1960 he was placed in the top ten merit list for his excellent performance in undergraduate studies. During his undergraduate studies, the late Professor Arun K. Dutt (Principal of R.K. College, Madhubani, and uncle of the senior editor of the volume, Professor Ashok Dutt) recognized his academic performance and provided a scholarship for higher education.

2.2 Education and Academic Career

He obtained first class in both BA Honors (1962) and MA (1964) in geography from Patna University where he was awarded the Merit Scholarship and National Scholarship in Humanities. Soon after completing his master's degree, he obtained his first employment as a Lecturer at Ranchi University in 1964–1965. Simultaneously, he started preparing for the coveted Indian Administrative Service (IAS) examination. One fine morning a chance event changed his trajectory forever. A young and astute professor of psychology (Dr. Jaiballav P. Sinha), who had returned from The Ohio State University in 1965 after obtaining a doctoral degree, convinced the young B.T. of the excellent and world-class academic programs in geography in American universities; and the resulting contribution one could make to knowledge after receiving training from such an acclaimed program. These thoughts mesmerized the young and ambitious B.T., and the very next day he disposed of all the books related to the IAS examination and started applying for a graduate fellowship and admission to academic programs in North America and Great Britain. Professor Ashok Dutt was instrumental in advising and writing recommendation letters for admission to graduate programs in North America. Finally, he was awarded a Commonwealth scholarship to attend a Canadian university and studied for a second master's in geography at the University of Waterloo, Canada, during 1970–1972. He took courses with distinguished urban geographers and resource management specialists. It was there that he became acquainted with Professors Richard E. Preston, Lorne H. Russwurm, and Bruce Mitchell. He worked with the late Professor Lorne H. Russwurm, who became his graduate advisor. At Waterloo University, he completed path-breaking work on the topic of hierarchically structured urban places over space and time in South Western Ontario's complex hierarchical regional systems. This research on urban system dynamics was published in the *Canadian Geographer* journal in 1981 with his advisor as coauthor. Later, he obtained his Ph.D. degree from Patna University in 1978 on "Entropy Analysis of Changing Urban Patterns in Eastern India" under Professor P. Dayal, former Vice-Chancellor of Magadh University, Bihar. During the 1970s and 1980s his research focused on the long-term processes of urbanization in its regional contexts in developing economies, especially in India.

Subsequently, he was a Visiting Fulbright scholar at the University of Akron, Ohio (USA) in the summer of 1992 and a Visiting Professor in 2000 where he had

the privilege of working under the tutelage of Professor Ashok K. Dutt on “Urban Structure and Processes in India.” Professor Ashok Dutt would often introduce B.T. to his colleagues, students, and friends as his ‘first-generation student,’ as he was indeed his teacher at Patna University during 1960–1962 at the undergraduate level. Further, he has guest lectured at the Geography Department, University of North Dakota in Grand Forks (USA) during the spring of 2005. His epistemological foundations have been influenced by illustrious luminaries in geography in both India and North America such as L.N. Ram, P. Dayal, A.K. Dutt, A.G. Noble, F. Costa, R. Ramachandran, R.P. Misra, Savitri G. Burman (late), A.B. Mukherji (late), V.K. Verma, Gerard Rushton, and Bruce Mitchell. In the past two decades he has cherished his association with the ‘Akron School of Geography and Planning’ (Thakur 2011b) through which he worked on several book projects and scholarly works with his colleagues at the University of Akron, Ohio.

B.T. was hired as a lecturer in geography at the University of Ranchi (1964–1965) and Patna University (1965–1980), respectively. He relocated and accepted the coveted position of a Reader in Geography at the prestigious and very illustrious Delhi School of Economics (DSE), University of Delhi (1980–1990); Professor of Geography, University of Delhi (1990–2005); and reemployed as Professor of Geography, University of Delhi (2005–2008). He was a Commonwealth Research scholar at the University of Waterloo (1970–1972) and Fulbright Visiting Scholar at the Department of Geography and Planning, University of Akron (1992). He was invited as Visiting Professor at the University of Akron (2000) and Guest Speaker at the Department of Geography, University of North Dakota (Spring 2005). He was Shastri Indo-Canadian Fellow, Department of Geography, York University, Toronto, Canada during 2004. He was the recipient of several awards and honors, such as University Grants Commission Awards (1969, 1976, 1986), Distinguished Scholarship Award, Regional Development Planning Specialty Group of the Association of American Geographers (AAG) in Washington, DC (2005), and Bhoovigyan Samman by Bhoovigyan Foundation, Delhi (2005).

He was ambitious, determined, and truly committed toward achieving the highest accolades in higher education and worked hard to reach the highest echelon in higher education. He earned a Professorship in one of the most reputed institutions of higher education in Asia, the Delhi School of Economics. Although he spent a major part of his academic career living and working in urban areas, his heart was rooted in understanding the rural sector of India. He never missed an opportunity in visiting rural parts of his home state and thinking about issues pertaining to resource development and emancipation of the marginal population of Indian society.

B.T. has been a devout ‘Guru’ in the proverbial sense of the term and has been a mentor to several generations of students at Ranchi, Patna, and Delhi University. As a mentor, he was conscientious and thoughtful and put much effort in preparing his lectures. His courses contained very current readings on the topics of discussion and included readings from cognate fields as well. He had a remarkable ability to appreciate and expose students to alternative debates on the topic, particularly in his conceptual developments in geography course. He has been an excellent teacher who meticulously did his research before entering the classroom. He motivated

students to do research and would spent countless days, months, and years to train them in their research endeavors. His energy, enthusiasm, generosity, and strong commitment to graduate students produced many budding professionals over the past four decades.

His published works are rich in both ideas and empirical data. Many of his publications are coauthored with younger colleagues and graduate students whom he advised over the years. His students and colleagues have been strongly influenced by his inspiration, guidance, and exemplary influence in the pursuit of knowledge. Several of them followed the academic path of going abroad to North American and European doctoral programs to continue seeking higher education and hold academic positions in the US, Canada, Europe, and Australia. Several others accepted teaching positions at home in regional and national universities. Many of the students competed for coveted positions with the government and in private sectors.

B.T. has accomplished 44 years of teaching and research experience at Ranchi, Patna, Waterloo, Delhi, Akron, and North Dakota. He successfully supervised 21 doctoral dissertations, 35 master of philosophy dissertations, and 62 master's theses. He has been associated with teaching and research at the Department of Geography, Delhi School of Economics, for the longest duration of his career, approximately 28 years (1980–2008) and was the Chairman of the department during 1996–1999. Later, he also served as the Vice-Chancellor of L.N. Mithila University in Bihar during 2001–2003.

He has been passionate about acquiring knowledge, and his home in Delhi is a testament with the most current research books in geography and social sciences. He spent most of his career engaging in intriguing discussions with his students regarding their research and with colleagues on the frontiers of geographic research. He has a strong interest and an understanding of the philosophy and methodology of geographic debate, enabled by cerebral power that allowed him to remember details of what he observed, read, and synthesized. He has a phenomenal ability to think systematically, juggling through multiple complex variables and analyzing the cause-and-effect relationship of a spatial phenomenon. During conversations he would often cite references with intricate details. His success can be attributed to the sacrifice, dedication, and congenial atmosphere provided and nurtured by his wife, Chanda Thakur. Most of the visitors at his home are students of geography and colleagues who are engaged in promoting the knowledge sector across various disciplines. During perennial visits by students and colleagues his wife Chanda would provide excellent cuisine, snacks, and delicacies in the *Maithili* tradition that made the academic conversations irresistible, tempting, and oftentimes jovial.

Those who believe in genetics might attribute his influence on his children in pursuing an academic career in geography and related disciplines. His elder son Sudhir earned a doctorate in geography from The Ohio State University and is currently an Associate Professor in the College of Business Administration, California State University, Sacramento (USA); his younger son Rajiv earned a doctorate in geography from Indiana State University and is an Assistant Professor at Missouri State University, West Plains in Geosciences. Similarly, his elder daughter-in-law

Rajrani Kalra (also his former student at the University of Delhi) earned a doctorate in geography from Kent State University. She is an Associate Professor in geography and environmental studies at California State University at San Bernardino. B.T. has nurtured not only a family of geographers but generations of geographers, as his younger brother is a Professor in Geography at the B.R. Ambedkar College, University of Delhi, and his niece a Lecturer in Geography at Dayal Singh College, University of Delhi. This roster truly is an example of the direct and induced effects of his influence in his immediate and extended family.

2.3 Professional Contributions

B.T. has been actively associated with and devoted to the cause of Earth Systems Science of the Indian Science Congress Association (ISCA) for more than three decades and has served the Sectional Committee as its Recorder (1990–1992) and as Local Secretary (1997) in the ISCA held in Delhi. His name is familiar among geographers and geologists because of his decade-long association with the National Association of Geographers, India (NAGI) as Joint Secretary (1990–1995) and as Secretary General (1997–2002). Besides holding these illustrious positions he has been associated with the Association of Geographical Studies, University of Delhi as its Treasurer (1984–1988), Editor (1988–1994), and President (1994–1998). He was also the Vice-President of the Indian Council of Geographers (1990–1994), Institute of Indian Geographers (1995–1997), Indian Regional Science Association (1997–1998), and Institute of Geomorphologists (1998–2000) and as Chairman of the Commission of Natural Hazard and Resource Management, NAGI (1993–1998).

His significant contribution in the field of urban geography earned him the position of a member of the International Board of Directors of Asian Urban Research Association (AURA) based at the University of Akron (USA). He is also on the editorial board of the *Indian Geographical Journal*, *Journal of Region, Health and Care*, *The East-west Geographer*, *The Social Profile*, *Aryabhatta Research Journal of Physical Sciences*, and *Regional Symbiosis*. He has been a member of the Governing Board of A.N. Sinha Institute of Social Studies (1994–1996), Dr. Bhim Rao Ambedkar College (1992–1995), Shivaji College (1997–1999), and Rajdhani College (1999) of Delhi University, as also of the Board of Research Studies of Kurukshetra University, Banaras Hindu University, Chaudhari Charan Singh University, Himachal Pradesh University, and Sri Sahuji Maharaj Kanpur University. He was also a member of the Academic Council, University of Delhi, for a 3-year term (1996–1999).

He has worked extensively for the popularization of geography. He was the first Indian geographer to be interviewed for a video interview on Indian Geography (Geographers on Film) as part of a venture of the 27th International Geographical Union (IGU) meeting in Washington, DC, during August 1992. He has presented papers at numerous workshops/refresher courses/seminars/confer-

ences. He has organized four national and international conferences in Delhi: (1) 10th Indian Geographer's Meeting, Annual Conference of Institute of Indian Geographers, February 17–19, 1989; (2) 11th Indian Geographical Congress, Annual Conference of National Association of Indian Geographers, India (NAGI), October 3–5, 1989; (3) 29th Annual International Regional Science Conference, January 31–February 2, 1997; and (4) 9th Annual Conference of Indian Institute of Geomorphologists, January 30–February 1, 1998. He continues to attend international conferences in the United States. He has presented papers in organized sessions and panel discussions at the Association of American Geographers (AAG) meetings in Denver (2005), San Francisco (2007), and Las Vegas (2009).

He attended several quantitative method workshops that exposed and sustained his interests in quantitative geography. Notably among the advanced school attendances are the Summer Institute in Quantitative Geography at the University of Gauhati (1973), Summer Institute in Statistics, Department of Statistics, Patna University (May–June 1977, 1978), and the Workshop on Location Analysis for Social Services at the Institute of Development Studies, University of Mysore (August 1978). Later, he was invited as the Resource Person in Quantitative Geography, Department of Geography, Patna University (1986) to deliver the keynote address. Also, he delivered a number of prestigious lectures, including those at University of Rajasthan, Jaipur (2003) and Professor R.N. Dubey Memorial Lecture, Allahabad (2008), where he insisted upon interdisciplinary thinking in geography. He has held the view that geographic knowledge is an outcome of its intersection with other social and natural sciences horizontally and not vertically such as physics, psychology, economics, or engineering. His presentations draw ideas from cognate spatial disciplines concerned with space–time processes such as history, geology, regional science, behavioral psychology, and urban sociology.

B.T. has published 35 peer-reviewed journal articles in national and international journals, 70 book chapters, and 21 written or edited books. He has several different projects on which he is currently working. His publications have appeared in the journals *Transactions of the Indian Council of Geographers*, *Journal of Bihar Research Society*, *Geographical Outlook*, *Indian Geographical Studies*, *National Geographic Journal of India*, *Geographical Review of India*, *The Deccan Geographer*, *The Canadian Geographer*, *Transactions of the Institute of Indian Geographers*, *Geo Journal*, *Annals of the National Association of Geographers India*, *Regional Symbiosis*, and *Indian Geographical Journal*.

2.4 Major Contributions

His four and a half decades of research contribution can be classified in four subareas within geography: 'urban geography,' 'quantitative geography,' 'natural resource management,' and 'history of Indian geography.' His publications can be divided into four time periods: 1968–1978, 1979–1988, 1989–1998, and 1999–2011. The

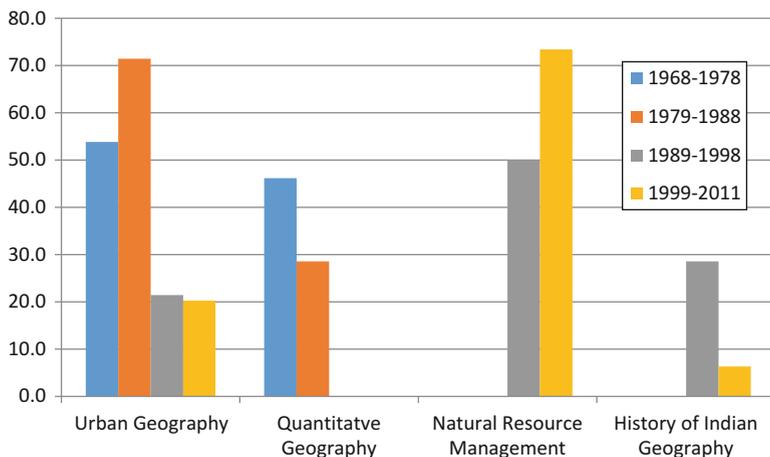


Fig. 2.1 Publication patterns (in %) of Professor Baleshwar Thakur: 1968–2011. (Source: Chapter authors)

remainder of this chapter reviews his research contributions to these broad subfields of geography. His research career can be divided into two phases: 1964–1980 and post-1980s. During the first phase he was interested in understanding the long-term processes of urbanization in its regional context in developing countries focusing on India and quantitative geography applications. After relocating to the University of Delhi, his interests shifted to the study of natural resource management and history of Indian geography, although he pursued his interest in urban geography as well.

2.4.1 *Urban Geography*

B.T. received his higher education in geography at the University of Patna and Waterloo. At both institutions his focus of study was urban geography. In retrospect his research follows the evolution of urban geography as a systematic field during the past five decades. He has mainly contributed to four broad areas within the sub-field of urban geography: *land use and morphology dynamics*, *internal structure of cities*, *urban structural change*, and *urban system dynamics*. Figure 2.1 shows that in the area of urban geography he has published a little more than half his total publications, that is, 53 % (1968–1978) which increased to 71.4 % (1979–1988) and then declined to 21.4 % and 20.3 % during the 1989–1998 and 1999–2011 periods respectively.

2.4.1.1 Land Use and Morphology Dynamics

In the early period the role of environmental determinism was paramount and this led a focus on studying the impact of physical features such as site and situation in determining the urban growth. First, he investigated the evolution and ecological structure of four cities in Bihar, namely, Darbhanga, Gaya, and Patna (Thakur 1968a, 1972; Ram and Thakur 1972, 1998) and the spatial structure of the Delhi metropolitan region (Rana and Thakur 2000; Thakur and Sagu 2007; Dahiya and Thakur 2007).

Darbhanga City occupies an important place among the towns of North Bihar Plains. Thakur (1968b) traced the role of successive dynasties and rulers in the evolving urban pattern of the city. In the post-Independence period the city has been characterized by new residential development, ribbon development of government hospitals, and establishment of industrial estates.

The evolution of the city of Gaya cannot be explained by any classical model of land use but a combination of all three: concentric, sector, and multiple nuclei models. The actual location of land use has been strongly determined by site and physical characteristics rather than cultural factors. Singh et al. (2005) studied the problems of planning in Darbhanga City and suggested the need for social facilities such as posts and telegraphs, police station, cinema house, dispensary, colleges, and children's parks. The folk culture of Mithila region in its geographic, historical, and sociological realms has been addressed by Thakur (2007a). This research focuses upon the unique paintings and folk music in the region. The glory of the paintings is based on both human and natural resources of the region. Land, soil, water, and rich biotic resources are the bases of its growth. Also, the mental perception of the original geometric design of floor, wall, and paper paintings are the strengths of Mithila women. However, the future and existence of Mithila paintings is threatened by the growing popularity of urban and Western culture.

Further, the sprawl and functional segregation has been largely influenced by religious, transportation, and administrative factors (Ram and Thakur 1973). Patna is the capital of the state of Bihar and has been characterized as a great city in peril (Ram and Thakur 1998). The city has a poor location that has inhibited proper development of the city (Thakur 1972). The implication of a mixed land use pattern has led to a chaotic pattern of unorganized development. The city has an East–West contrast in its morphological and social structure with a directional bias in the growth of population density toward the west. The city needs to provide low-cost housing as well as high-rise apartments in congested areas to provide sustainable metropolitan growth. The condition of infrastructure supply and its maintenance is pathetic, perhaps because of the underassessment of taxes and poor collection; thus, maintenance and repair are in dilapidated condition. Further, land management in the rural urban fringe needs priority as there are frequent demands for zoning change.

Large metropolitan cities in India are a conundrum of land uses (residential, commercial, industrial, office, agricultural, and open space). In particular, the various consumers of usable land compete for land and bid to pay the highest price to

put the land to the highest and best possible use. Thakur and Sagu (2007) examined the sociospatial pattern of elite residential colonies in the metropolitan Delhi region during early 1980s. Their analysis identified 76 elite residential colonies, divided into four groups: 'super elite colonies,' 'elite colonies,' 'marginal elite colonies,' and 'peripheral elite colonies.' The samples of elites were categorized into nine occupational groups and their absolute and relative distributions across elite residential colonies were mapped. Analysis revealed that location of elite colonies and distance from the core is positively related, as well as elite colonies are located close to major transport infrastructure lines. The spatial distribution of super elite colony locations depicts a sector pattern as the major concentration of elite colonies are located in two sectors, one dominated by diplomats and the other dominated by industrial or business households. Most of the elite colonies show a dominance of elite business or government officials. The marginal elite colonies do not show similar characteristics. The peripheral elite samples do not allow such generalizations. Further, Thakur and Chauhan (2005) made a comparative analysis of Delhi and Mumbai's location of elite residential colonies. Their analysis suggested that in both cities an overall pattern of decentralization and suburbanization of elite colonies and occupational groups has shown a phenomenal growth.

Rana and Thakur (2000) have evaluated the land use planning in Delhi emphasizing commercial areas, the nature of its composition, and its spatial growth. There has been a preponderance of commercial sector growth during 1961–1981, especially in the areas of retail business, wholesale trade, and warehousing and storage facilities. The wholesale and warehousing businesses have a tendency to cluster around retail centers in the central business districts of Delhi. Thus, the objective of decentralization of business activities was defeated. Concomitant to this trend has been the unauthorized conversion of residential buildings into shops or godowns. This trend has led to mixed land uses becoming an inseparable part of the urban landscape in Delhi. The Delhi Master Plan has been criticized because it has adopted the old British model of urban planning based on strict zoning regulations and compartmentalized land uses. It has failed to recognize the more indigenous elements of the urban landscape, that is, informal trade and mixed land uses. However, the Delhi Master Plans did promote some important concepts of commercial land use planning, such as land use planning in a regional perspective, introduction and planning of multipurpose building complexes, the community centers, and the hierarchical planning of commercial areas on the basis of residential neighborhoods.

The rural–urban fringe is an area of mixed rural and urban land uses and population between the continuously built-up urban and suburban areas of the central city and rural hinterland. The fringe begins at the point where agriculture land uses starts near the city and extends to the point where village land use can be seen. The fringe displays a changing mix of land use and social and demographic characteristics. Dahiya and Thakur (2007), in a study of selected villages around Delhi, observed that as the city approaches urban fringe the behavior and norms of the native people change radically in terms of: household characteristics, occupation structure, economic and social linkages, and values. With urban contact the Jajmani salaried system is substituted by modern salaried employment, the joint family system is

substituted by the nuclear family, average size and age of the household decreases, and peasants working as domestic or manual workers increase as the city is close to the rural hinterland.

The fringe region is marred with such issues as location of large-scale urban amenities, the problem of fringe agriculture, the acquisition of land banks for future development, and the social integration of commuters in the urban realm. Thakur (2010a) has intensively studied the structure and dynamics of the urban fringe of Delhi and has addressed the issues of spatial spread of the urban fringe in Delhi and the impact of urbanization on the natural resources in the fringe of Delhi, and has evaluated the programs and policies of Delhi's fringe development. He concludes that the expansion of the city has not been regular and uniform in all directions for physical and administrative reasons. The directional bias in the spatial spread of Delhi is constrained by its relief features. Khadar is a low-lying area with recent river deposits and Bangar is composed of older deposits that cover the northwestern portion of the state. The fringe development is agriculture based in the north, northwest, west, and east and scenic and luxury based in the south and southwest. The expansion of the city has impacted the natural resources, leading to a sharp fall in the level of groundwater and water quality. Also, the fringe development is a dynamic and expansive process thereby leading to changes in boundary.

2.4.1.2 Internal Structure of Cities

The term internal structure is defined as the location, arrangement, and the interrelationship between social and physical elements in the city. The city performs an important role in the location of economic activities by way of site selection, the expression of the layout and transport network, and its central location. An important theme of city structure analysis has been the study of spatial and functional structure of urban business patterns. Commercial ribbons refer to the analysis of city shopping centers on the basis of their location and functional characteristics. Thakur and Dayal (1976) analyzed the commercial ribbons in Patna and classified the business establishments on the basis of their morphological characteristics. The commercial ribbons in Patna were influenced by river-borne trade along the Ganga River and later by railroad development. The physical distance between the old and new ribbons has increased with development. The commercial ribbons may be classified as old, central, new commercial, and isolated ribbons on the basis of morphological characteristics. The ribbons have developed as specialized centers of commercial activities, such as old ribbons as wholesale marts, central ribbons as centers of higher-order shopping goods, new commercial ribbons as financial and auto-related services, and isolated ribbons as convenience goods center. This arrangement supports the hypothesis that as commercial ribbons develop in a certain direction, differences emanate among the old and new ribbons, as the old ribbon specializes in wholesale goods and shopping goods are in newer ribbons.

2.4.1.3 Urban Structural Change

As regional economies develop, the nature of the interaction between economic sectors changes. The economy is primary sector-oriented in the beginning, then it becomes manufacturing sector-oriented and finally tertiary sector-oriented, leading the way to quaternary and quinary sector-dominated growth patterns. Thakur (1974a) in this context has explored the relationship between urbanization and economic development. The structural aspect of urbanization deals with the spatial organization of economic activities. Two models predominate in this theme: (1) center-periphery model, and (2) stage model of growth. The first model recognizes that the space economy must be viewed as an interacting system of relationships among developing and depressed regions. The model is more powerful as it articulates the national economic space as an interdependent system of cities. The second model describes the different stages of urban growth. Thakur (1979a) investigated the spatial changes in the concentration of industries in Kitchener-Waterloo during the period 1951–1970. He opined that growth industries do not disperse at a faster rate and that this is devoid of any association with shift from the center of gravity. Also, the female participation rate does not explain the shift from the center of gravity in a statistical sense.

Thakur (1974b) evaluated models of intraurban consumer travel behavior with respect to its ability in revealing the explanatory and predictive power of the models. He utilized four criteria to evaluate the models: ‘logical consistency,’ ‘measurable behavior in real world,’ ‘dynamic and feedback effects,’ and ‘easily tested empirically.’ He posited that the retail gravity model is a highly generalized model of aggregate human behavior and does not capture the behavior of individual consumers. The central place theory places emphasis upon the nature of physical retail location and becomes important with respect to the analysis of spatial patterns of individual behavior and shopping patterns. He also suggests that micro models of consumer travel behavior hold more promise in explaining intraurban consumer travel behavior.

2.4.1.4 Regional Urban Systems

The term urban system refers to the interdependence and interconnection between urban places. This concept was introduced by Brian Berry as part of his study and application of general systems theory to urban and regional systems analysis. Nations and large regions are organized into a set of urban places and their hinterlands that exhaust the land area such that goods, services, people, capital, information, and ideas travel up and down the hierarchy through networks connecting the city and its hinterland. A national territory consists of regions that have their own urban systems at the subregional levels and are called intraregional systems. Similarly, regions interact with other regions and form interregional systems. As development takes place, the relative role of cities vacillates. Thakur (1978) examined the relationship between urban dynamics and general systems theory and

examined the basic concepts related to general systems theory, such as ‘closed and open systems,’ ‘entropy and negentropy,’ ‘stability and instability,’ ‘equilibrium,’ and ‘feedback mechanisms.’ He pointed to the inappropriate delimitation and definition of boundaries in the empirical study of urban systems. He also suggested the necessity of ensuring the functional wholeness of the urban system in an analysis of spatial interdependence.

Russwurm and Thakur (1981) in their pioneering work analyzed the functional change and stability patterns in the hierarchic order of central places in Ontario’s regional settlement system during 1871–1971. The study area extended from the Western extent of Toronto to beyond the city of London. In their analysis they utilized the Davies index. A spatial analysis suggested that ‘surging areas’ were characterized by faster growth than their long-term means and were concentrated near large cities. This pattern was similar to 1871 except that the concentration was near Toronto in the latter period. The middle years during 1901–1941 were the most stable. Further, ‘slowing places’ occurred in the northern periphery in 1871, from Toronto to Hamilton during 1901–1941, and in the rural area West Kitchener by 1971. The study further stated that the notions of centrality and nodality in understanding stability characteristics are important. Centrality refers to the surroundings of a place in a region and nodality to the competitive position of a place within the urban system. In the aggregate, since 1901 cities have gained and towns have lost with respect to nodality in the Ontario urban system.

Thakur (1968b) identified various types of rural settlements in North Bihar with a view of understanding the relationship between human groups and natural environments. He identified four types of settlements: ‘compact,’ ‘semi-compact,’ ‘hamletted,’ and ‘dispersed, sprinkled, or disseminated settlements.’ Further, his interests shifted to the analysis of dynamic aspects of urban settlements. The growth trends and characteristics of urban settlement systems of Bihar for a 100-year period (1872–1971) were analyzed. The region was delimited into two regions: the Bihar plains and the Chhota Nagpur plateau. Rank–size relationships depicted a trend toward regularity and orderliness and were dominated by Patna in the Bihar Plains and Jamshedpur-Ranchi in the Chhota Nagpur plateau. The rank–size relationship has not been stable in either region. The position of primacy has not changed in the intervening period in the Bihar plains while the position of the most dominant city in the Chhota Nagpur plateau has shifted from Ranchi to Jamshedpur. The application of the entropy method detected changes in urban systems of different physical and economic characteristics (Dayal and Thakur 1982). Thakur (1979b and 1981) further extended his geographic coverage and explored the urban settlement patterns in Eastern India during the 100-year period 1872–1971 and in Northeastern India during 1901–1971 using entropy analysis. He identified a center–periphery dichotomy in the evolution of urban patterns in Eastern India. Also, the hypothesis of an increase in uniformity of urban places in Northeastern India been observed to be true.

Thakur et al. (2000) edited the felicitation volume for Professor A.K. Dutt titled *Geographic and Planning Research Themes for the Millennium*. It contains papers on urban and regional planning, economic geography, and social and cultural geography. He also edited a three-volume anthology on *City, Society and Planning*

(2007) commemorating the life and professional achievements of Professor A.K. Dutt. The first volume focuses upon urban structure and problems ranging from national to international in scale. The second volume addresses issues related to social and cultural aspects of human life from different geographic areas around the globe. The third volume draws on papers on various aspects of regional planning. Further, he edited another opus with his colleagues at the University of Akron, a volume of scholarly papers honoring the life and contributions of Professor A.G. Noble. The book, titled *Facets of Social Geography: International and National Perspectives* (Dutt et al. 2011), is a collection of scholarly papers on the nature, scope, evolution, and problems in social geography.

2.4.2 *Quantitative Geography*

In the area of quantitative geography, he published a little less than half of his publications, that is, 46 % during the decade 1968–1978, which declined to 28.5 % during the period 1979–1988 (Fig. 2.1). In the early 1970s he was influenced by the quantitative revolution and its impact on geography. His graduate training at the University of Waterloo had a strong impact on his epistemological foundations in the methodological approaches in geography. After he became a faculty member at the University of Delhi in 1980, his interests shifted to conceptual developments in geography and natural resource management issues, and so his contributions in the area of quantitative geography took back stage. His publications in the field of quantitative geography can be classified into three areas: exploratory application in geography, sampling and geography, and nearest neighbor and entropy analysis.

His earlier publications involved exploratory applications of statistical methods in geography in cartography and urban applications. Thakur and Thakur (1982) traced the development of modern techniques in statistical mapping and posited that by combining statistical and cartographic methods the complex geographic data can be presented with ease and greater interpretative value. Thakur (1976) reviewed the theory and applications of the Spearman–Rank correlation coefficient and its limitations with reference to urbanization and central place studies.

Sampling is an important tool in geographic studies often utilized to make inferences about the population when the population is too large for enumeration. Thakur (1974c) discussed the types of sampling techniques and the limitations of its application in geographic research. Random sampling is not suitable when linear trends are present in the data, and the assumption of independence of observations is violated when we analyze the behavior of consumers in a complex cultural region. He evaluated the efficacy of the sampling methods for surveying the manufacturing firms in the twin cities of Kitchener-Waterloo, in Ontario (Thakur 1975). Further, he also alludes to the confusion regarding levels of measurement and the use of appropriate statistical techniques. He draws attention to the notion of power efficiency and robustness in inferential statistics (Thakur 1977).

Nearest neighbor analysis is a tool in geographic analysis utilized to determine the spatial arrangement of a pattern of points in a region. The distance of each point to its neighbor and the average nearest neighbor distance of all points are measured. The spacing within a point pattern is analyzed by comparing it with a threshold distance. Thakur (1973) analyzed the spatial pattern of urban places in southwestern Ontario during 1971. He tested the hypothesis that different levels of urban places in the region were uniformly spaced. He also pointed to two inadequacies in the use of nearest neighbor analysis. The first is the interpretation of the R statistic, which measures whether the distribution tends toward clustering, randomness, or uniformity. The value of the R statistic ranges from 0 to 2.1459 for an ideal distribution, but what values constitute the measurement of clustering, uniformity, and randomness is not clearly defined. The second problem concerns the issue of drawing boundaries around the study area.

The entropy analysis is a measure of the amount of uncertainty in a probability distribution of a system subject to constraints. Two concepts central to the entropy method are the notions of macro- and micro-states. A macro-state can be defined as an aggregate frequency distribution of urban places in a region; and the micro-state can be defined as the various ways in which these urban places can be distributed in a region corresponding to the same macro-state. Thus, the entropy approach measures the relationship between a given macro-state and the possible micro-state that corresponds to it. Thakur (1979b) is the first Indian geographer to apply this approach to explore the urban settlement systems in Eastern India in the five regions: Bihar plains, lower Ganga plains, Chota Nagpur plateau, Utkal coastal plain, and Orissa highland region. He tested the hypotheses if uniformity increased over time in the urban settlements across the region. The analysis indicated an increase in entropy over time across all the regions during the period 1872–1971. In the analysis he also ascertained center–periphery dichotomy in the evolution of urban patterns in Eastern India. The lower Ganga plain was considered as the central region and the others as peripheral regions. In the central region the urban places have shown a trend toward randomness, whereas the peripheral regions have shown a uniform pattern of growth over time. Further, Thakur (1981) extended the analysis to Northeastern India for the period 1901–1971 with the same hypothesis. His analysis confirmed a trend toward greater conformity consistent with the assumptions of the Christallerian and Loschian urban landscape. Thus, the two studies lend support to the thesis of a center–periphery dichotomy in the evolution of the Indian regional urban system. He has suggested the exploration of other regional settlement systems in India using similar methodologies to understand the dynamics and evolution of regional urban systems in India. He also collated a bibliography on entropy studies in geography that is a wealth of resources for researchers in geography (Thakur 1979c).

2.4.3 *Natural Resource Management*

B.T. developed an interest in natural resource management (NRM) in the post-1980s. He was particularly influenced by the ‘*BKW* (Ian Burton, Robert Kates and Gilbert White) *school of natural hazards*’ and ‘*MOSS* (B. Mitchell, T. O’Riordan, T.F. Saarinen, and W.R.D. Sewell) *school of PAVE (perceptions, attitudes, values and emotions)*’ in his research and teaching endeavors. The *BKW* school was rooted in the behavioral, perceptual, and institutional responses to flood hazards. The *MOSS* school was an outgrowth of the *BKW* school extending the behavioral geographic approach to natural resources management. He was in particular motivated by the coursework he had completed with Professor Bruce Mitchell at the University of Waterloo. During the decades 1989–1999 and 1999–2011, he has published mostly in the area of NRM. Figure 2.1 depicts an increase in publications from 50 % during 1989–1999 to 73.4 % during 1999–2011 in the area of NRM. His publications can be broadly classified in the following three areas: conceptual developments in NRM, land and scenic resources, and water management.

2.4.3.1 *Conceptual Developments in NRM*

Zimmerman (1964) stated “Resources are not; they become.” As development takes place, the needs of human being change and with that the means of satisfying the needs change as well. The rapid development of the global economy has put tremendous pressure on the natural resources of the Earth. Thakur (2008) examined the various theories providing an understanding of the interrelationships between population trends, resource use, and its concomitant development impacts. NRM is broadly defined as the management of renewable and nonrenewable resources by private, public, and community-based organizations. Thakur (2003) did a substantial review of the theoretical literature examining the decision-making approaches in NRM. In particular, he examined the role of perceptions, attitudes, values, and emotions in resource management decision making. He is critical of geographic contributions to decision making in NRM. Several locational, behavioral, economic, and social variables affect the decision-making process in NRM, and the possibility in variations among these relationships is unbounded. Thakur (2012) delivered the Presidential address on “Research Perspectives on Resource Management in India” at the Annual Conference of Institute of Indian Geographers held at Agartala Central University, Tripura. His address analyzed the status of research done in the field of resource management in India in the last 50 years. He has also seen the growth of resource geography in the context of paradigms development in India. This is a very exhaustive review of resource management studies in India and has also presented future directions of research for young geographers.

Further, Thakur (2007b) examined the trends in resource development in India and its implications for sustainable management. He posits that although India has

progressed in attaining higher agricultural productivity, this development is restricted to selective crops and geographic areas because of problems such as land resources and their conservation. Much of India's agricultural land is subject to erosion, salinity, leaching, waterlogging, urban encroachment, and unregulated mining of land. India has made tremendous progress in harnessing rivers to distribute water to deficit regions and developing groundwater resources. Although India has a national water policy, problems of availability and adequate distribution exist in urban areas of the country. Deforestation has been the most serious and widespread problem in India. The nation lags in the enforcement of forest regulations although many efforts have been made toward enhancing forest cover to sustain environmental conservation. Prospects of energy resources will not be bleak if there is continued emphasis on nonconventional energy resources.

2.4.3.2 Land Resources

Land is a basic natural resource upon which most of our productive sustenance depends. It is an important factor of production in agriculture, forestry, grazing, fishing, mining, and real estate development. It is an important input to the economic production process. An important theme that has been addressed is the ecological degradation of land. The overarching themes that have been addressed are land encroachment, reclamation of wasteland, degradation of land, land–man relationship, and caste and land ownership patterns.

Thakur (2010b) in his notable R.N. Dubey Memorial Lecture addressed the theme of the causes and consequences of land degradation in India. In particular, he focused upon the spatial and temporal variations of agricultural land and land–man ratio, spatial pattern of land degradation, efforts of reclamation and reforms of land development and management, challenges facing land development, and how effective has been public intervention in mitigating land degradation. He posits that the land–man ratio varies in accordance with agrarian and social environments. A high land–man ratio is found in the Thar Desert, Chambal badlands, the Malwa Plateau, the Deccan lava plateau, and Karnataka plateau. A low land–man ratio is found in productive areas such as the Indo-Gangetic plains and the eastern fringe of the Deccan peninsula. This pattern is an outcome of direct positive relationship between rural population density and intensity of land use. Almost two thirds of the total land area suffers from land degradation and is characterized by: soil erosion, desertification, mining, deforestation, salinization, alkalinity, waterlogging, landslides, overgrazing, and physical, biological, and chemical degradation of the land. Further, the Government of India has set up the National Wasteland Development Board to enunciate reclamation efforts through a massive program of afforestation. Despite public intervention, the depletion of land resources via such trends as: formation of deep gullies in north-central India, coastal sandy land in the eastern and western coasts, spreading sand dunes, land affected by shifting cultivation, and derelict land in mining areas add to the adverse trends. In conclusion, his analysis suggests that

the land degradation trends can be reversed by enhancing access to land, improving tenancy, putting ceiling on land holdings, and redistributing land to less endowed classes.

Kapoor and Thakur (2008) analyzed the problem of land acquisition in Delhi. Their analysis suggested land acquisition is an outcome of the processes of growth and urban development in large cities such as Delhi. The expansion of urban land use will curb the agricultural land, and hence quality of land foregone for urban expansion has to be sacrificed cautiously. Thakur and Bajpai (2008) examined the problem of classification and reclamation of wasteland in Uttar Pradesh. No uniform intervention can be implemented as there are different types of wastelands and thus different reclamation methods are required. They make recommendations for reclamation of saline soil, ravine land, waterlogged land, degraded forest land, and reclamation of uplands.

The land–man relationship and its spatial distribution pattern for East Sikkim revealed interesting trends during 1981 (Thakur and Bhushan 1992). First, agricultural land use is the most predominant in the region. Second, the density of population is the highest around urban centers, along the Tista River and valley bottoms. Third, the spatial variations in the quality of per capita land are largely determined by topographic and climatic conditions as well as ethnic characteristics. Fourth, and last with respect to surplus and deficit land, the Western, Southern, and revenue blocks situated along higher slopes and in the river valleys are surplus in character. Thus, valley bottoms, flat land, and proximity to urban centers have a significant role in differentiating between surplus and deficit land. The relationship between caste structure and land ownership has been explored (Thakur and Vir 2003). The study revealed the role of the control of rural land resource and the spatial aspects of resource alienation. They further opined caste and spatial expression of rural landscape in terms of distance and direction, land quality, and land security in understanding the reasons for low agricultural productivity in central Bihar plain.

2.4.3.3 Water Management

Water management is an interdisciplinary field of study concerned with planning, distributing, and managing the optimal use of water resources. Every competing user of water needs to be satisfied in an ideal world, but the availability of consumable water varies across space and time. Some regions are endowed with excess supply and others are faced with drought conditions. Thakur and Inderjeet (2000) studied the determinants of groundwater depletion in Eastern Haryana. A multivariate analysis revealed that groundwater quality and net annual draft were significant factors leading to the depletion of groundwater in the region. A rapid increase in the cultivation of water-intensive crops, well construction, and pumping machinery has led to the exacerbated depletion of water levels in the region. This trend advocates public intervention for reversing the loss of groundwater. Thakur and Sachar (2003

and 2004) assessed the spatial and temporal availability of water resources in the Hindon basin of Upper Ganga-Yamuna Doab during 1980–1992. They utilized the water balance technique developed by Thornthwaite to calculate the spatial and temporal availability of water resource. They posited that the availability of water is satisfactory but there are marked spatial and temporal variations in water utilization. Also, there is a need for optimum and efficient utilization in water resources. The efficient utilization of water by small farmers is affected by such factors as water rates, distance of the farms from the water source, and the socioeconomic conditions of the farmers. The impact of limestone quarrying on water resources in the Dehradun district was investigated by Thakur and Kurl (1996). Their objective was to understand the spatial distribution and utilization of water resources for domestic irrigation and industrial use. The analysis suggested wide fluctuations in water discharge, heightened impact of quarrying on water depletion, and ecological degradation.

B.T. has edited a 13-volume opus in *Resource Management in Developing Countries* (published by Concept Publishing Company). A brief summary of the volumes are provided in the next several paragraphs.

Vol. I: Resource Management: Theory and Techniques

This volume gives the practitioner access to the most practical and recent thinking on the subject of natural resources management including theories, models, and paradigms. This immensely stimulating volume is essential reading for those concerned with the resource management process as it operates in both developed and developing countries. It elaborates the concepts of renewable and nonrenewable resources, ecology, and sustainable development and emphasizes approaches to resources management. It also demonstrates the use of Geographic Information Systems and Remote Sensing techniques in inventory and appraisal of natural resources, to improve the quality of decision making as well as in monitoring and evaluation of public policy.

Vol. II: Population, Resources, and Development

Pressures on natural resources caused by increasing populations and their quest for high standards of living in developing countries are growing at a rate that is increasingly difficult to manage. This volume, therefore, addresses the complex interrelations between population, resources, and development, including massive quantitative expansion in population size and their concomitant pressure on natural resources, penultimate problems of human survival, and development opportunities and constraints. It also brings to light new information on the depletion of common property resources and probes into the questions of resource adequacy.

Vol. III: Ecological Degradation of Land

The volume provides a series of essays on various facets of land degradation, focusing on wasteland identifications, distribution, mapping and remedial measures. It gives special attention to environmental conditions and trends in desertification and takes account of critical issues and the emerging problems. It then examines processes and policies of loss of agricultural land on the urban fringe and the depletion of common land in the tribal areas.

Vol. IV: Land Appraisal and Development

This volume is a collection of empirical studies focusing on methodological approaches to land appraisal of mountainous, desert, and deltaic areas. It provides a comprehensive and in-depth analysis of the dimensions of agricultural development and production potential for poverty alleviation. In addition, the volume provides an understanding of the relationship between land values, land use planning, and development policies reflecting the changing needs of the urban community.

Vol. V: Soil Deterioration and Conservation

The volume fills a critical void in the soil resource literature by providing the necessary scientific background for a comprehensive understanding of soil deterioration resulting from increased human activity, particularly from the use aspect. It is concerned primarily with contemporary patterns of soil utilization, estimation of magnitude and extent of soil deterioration, erosion control, and conservation policy. It also presents a few in-depth case studies on shifting cultivation as a soil management system for subsistence farming in low-populated tropical areas.

Vol. VI: Water Supply and Quality

The volume has special significance in the context of current urban water supply and quality problems because of increasing demand for water in the face of rapid industrialization, growing population, and urban migration. The chapters are centered around water supply and demand, impact of agricultural and industrial activities and waste disposal on water quality, spatial pattern of drinking water quality, eutrophication, and water balance. The volume also addresses the strategies for controlling water pollution in rivers and lakes.

Vol. VII: Water Utilization and Management

In this volume, researchers present empirical evidence on the environmental, bureaucratic, and socioeconomic constraints in water resource utilization and management. It offers specific strategies for water management in health resort towns, metropolitan cities, canal irrigation, rice cultivation, dairy industry, refineries, and ponds and tanks. It concludes that both public officials and the general public should have enough awareness of both water problems and management options.

Vol. VIII: Groundwater Assessment and Development

Succinct, yet comprehensive in its coverage, this volume focuses on groundwater exploration and development in hard rock and alluvium areas, including the determination of durable and efficient setting of wells, assessing the groundwater potential of the aquifers for management, delineation of the freshwater–saline water boundary, rates and magnitude of groundwater depletion, and local subsidence. In addition, the volume concentrates on the analysis of spatial and temporal variations in groundwater quality and economics of irrigation with groundwater.

Vol. IX: Bioresource Depletion and Conservation

This volume contains a wealth of information on the patterns and processes of bioresource depletion. Through empirical evidence, it provides unique insights into the underlying economic, social, and political forces that encourage forest conversion to other less valuable uses. The book offers an extensive discussion of the strategies to conserve biodiversity, educate the public, and contribute to sustainable development. The book also explores the extraordinarily rich potential for livestock and fisheries development to resolve economic problem.

Vol. X: Environmental Hazards

Based on a wealth of empirical detail, this volume provides a balanced perspective on the occurrence, causes, and impact of environmental hazards on society and natural resources. These topics include resource utilization and managerial problems arising from flood, drought, landslip, landslide, riverbank erosion, tropical cyclones, volcanoes, and earthquakes.

Vol. XI: Scenic Resources and Tourism

This comprehensive volume focuses on scenic resources and tourism development studies conducted by the individual researcher at the microlevel and by tourism development agencies at the macrolevel. It examines the theories in its full diversity and manifestation including scenic sites, pilgrimage-based tourism, ecotourism and agro-tourism, structure of tourism development and impacts, and some of the major components of the tourism planning process.

Vol. XII: Energy Resources and Environment

This interesting and thought-provoking volume examines the distribution, production, and utilization of both conventional and nonconventional energy resources. It provides new insights into energy demand, problems, and prospects, focusing on energy policies and programs for sustainable development. It explores techniques of mineral resources appraisal, showing their use in mineral conservation and management. In addition, this volume sheds new light on the environmental degradation and planning caused by our resources use.

Vol. XIII: Integrated Watershed Development

Drawing on empirical studies, this final volume in the series presents an inventory of watershed resources, their utilization, development, and management, with particular emphasis on identifying problems in humid tropical uplands and river basins. It establishes a mechanism for community participation in decision making in formulating strategies for integrated development of resources to bring enhanced resource productivity on a sustainable basis.

2.4.4 History of Indian Geography

B.T. has published nine papers on the history and development of Indian geography. Approximately 28 % of his publications in this area were published during the 1990s and roughly 6 % during the 2000s. For almost 30 years he taught a course on the 'History of Geographic Thought' and 'Conceptual Developments in Geography' at Patna and Delhi University, respectively. Geography in the Western world evolved as a field focusing upon the study of geographic phenomenon at various scales utilizing man-land relationships, area study, and spatial organization approaches (Taaffe 1974). Currently, the field of geography is undergoing turmoil, with a tussle between the dominance and survival among multiple approaches such as quantitative versus qualitative, quantitative versus post-positivist, and theoretical versus casual observation.

Thakur (2011a, b) classifies Indian methodological developments in geography into three phases: prequantitative, quantitative, and postquantitative. The first phase existed during the 1930–1960s and was a period when the method of geographic inquiry was purely descriptive: things were described as observed such as relief of land use, urban form, and architecture of settlements. The second phase emphasized fieldwork, and there was immense focus upon data collection and processing of data: this was an expansionary, more diversified, analytical, and scientific phase in the development and application of methodologies in Indian geography. Several alternative statistical methodologies were utilized such as descriptive statistics, non-parametric statistics, spatial statistics, multivariate statistics, and an effort toward model building. During the third phase of evolution, that is, the postquantitative phase, Indian geographers responded to various criticisms made by different schools within geography, such as Marxism, humanism, critical social theory, post-modernism, post-structuralism, and neo-quantification. This phase also embraced the development of spatial statistics and the geographic information system (GIS), which is often called the modern spatial analysis; and also the development of qualitative methods and mixed methods approaches.

Thus, Indian geography is characterized by abuse of statistical methods, declining fieldwork, and model construction. The methodological sphere of Indian geography is further characterized by a lack of reliable and robust hypotheses, creative research questions, and appropriate conceptual framework. The adoption of spatial quantitative methods to test spatial hypotheses is on the decline, although Indian geographers have made rapid application of thematic, computer, statistical, and GIS mapping, which has contributed to the success of Indian geography in understanding the regional dimensions of Indian geography (Thakur 2011a, b).

In his two-part opus on Indian geography, Thakur (1994a, b) reviewed and critically analyzed the development of Indian geography during the post-Independence period. He further provided several directions which has relevance to contemporary Indian society, planning, and policy making. He divides the development of Indian geography into three periods: pre-1950, 1951–1970, and post-1970. During the first phase the primary emphasis was on teaching geography in schools, rapid expansion of the teaching of geography at undergraduate levels in colleges, the formation of geographic societies, and publication of geographic journals to promote research and teaching. During the second period there was greater emphasis upon analytical focus. Further, during the third phase there was expansion in teaching and research as grants from the government increased.

A critical analysis of the developments of Indian geography suggests that (1) geography is a distinct field of study focusing upon national and regional planning and utilizing maps as a tool of regional analysis, (2) research work on physical geography problems are weak and theoretical contributions are limited, (3) there is increasing use of quantitative spatial analysis and synthesis, (4) geographic inquiry suggests a lack of the ability to move from micro- to macrolevel generalizations, (5) there is a lack of indigenous model building based on local assumptions and reality, (6) interest in topical division prevails, (7) knowledge regarding spatial organization is given greater attention at the cost of spatial approach, (8) the temporal

dimension has been ignored and the static approach favored, (9) excess reliance is placed on secondary as opposed to primary data, (10) focus on systems or behavioral approach is limited, and (11) to a large extent research is conducted in isolation in a descriptive style with limited focus upon a theoretical and conceptual framework (Thakur 1994b).

Thakur (2005) traced the development of geography at the University of Delhi at the postgraduate level. He meticulously documented the contributions of the 15 chairpersons and the faculty in fostering and scaling the department to national and international fame in teaching and advances in geographic research. In particular, the department has offered specializations in three areas: urban and regional planning, resources and environment, and social, medical, and political geography. He provides the major milestones since the formative stage, to the teething years, and to the takeoff phase, via the stage of consolidation and tasks ahead.

Urban geography is one of the most dynamic and active fields within Indian geography. Thakur and Parai (1992) reviewed the contributions to urban geographic research in India during the 1980s to 1990s. Urban geographers have explored in great detail macroregional urbanization through space–time analysis and empirical studies. Indian geographers have explored challenging topics in intraurban and sociocultural patterns and problems. B.T. opined that only a few geographers have made an effort toward indigenous model building. His evaluation of urban geographic research in India suggests the following areas for future research: (1) analysis of structure, function, and behavior of regional systems, (2) spatiotemporal analysis of periodic markets and rural development, (3) rural service development planning, (4) reformulation of classical land use models to suit Indian conditions, (5) spatial and temporal variations in urban informal market, (6) emphasis on socio-cultural aspects such as language, crime, education, health, and pilgrimages, (7) conservation and management of the urban water supply, (8) land management in the urban fringe, and (9) macrolevel national analysis (Thakur and Parai 1993).

He is currently working on various research projects including “Urban Structure and Processes in India” (with Professor Ashok Dutt), and “India: Land, People, and Economy” (with Professor R.P. Misra). The remainder of the book consists of chapters contributed by Professor Thakur’s colleagues, students, and esteemed friends. The book is divided into eight parts and constitutes 25 chapters covering a wide gamut of topics and themes. As editors, we wish to thank the contributors for writing scholarly chapters for this volume.

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Part II

Theoretical Basis

Chapter 3

Recent Studies in Regional Urban Systems in India: Trends, Patterns and Implications

Sudhir K. Thakur

Abstract An urban system is defined as a network of towns, cities and its hinterland characterized by exchange and interdependence. These cities and towns are arranged in a hierarchical settlement pattern within the development continuum in which people, goods, services and capital flow in the city system hierarchy. A national urban system comprises regional urban systems (RUSs) which is dominated by a large urban area. The Indian RUS can be delineated into four broad macro-regional urban systems: Delhi, Kolkata, Chennai, and Mumbai. Given this background this chapter addresses three questions: (1) What are the broad trends of RUSs research in India? (2) What insights have the various conceptual approaches provided to the understanding of Indian regional urbanization? (3) Is there a new approach that can manifest an alternative insight to Indian RUS? Four observations can be made: (1) Indian cities have grown rapidly followed by polarization reversal, (2) hierarchic studies have sparked an interest in regional service development planning utilizing location-allocation models (3) Indian urbanization is characterized by a lack of national primacy but the presence of state primacy and regional rank-size tendency, and (4) complexity approach is a novel approach to model macro-behavior such as city development or urban sprawl using micro-motives or local interaction such as land use changes.

Keywords Colonial space economy model • Hierarchic models • Indian urbanization • Non-hierarchic models • Regional urban systems • Urban development theories

3.1 Introduction

India has been urbanizing since the pre-independence period and rapidly increasing the share of urban population during the post-independence period (Fig. 3.1). India's urban population has increased from 62.4 million in 1951 to 286.1 million in 2001

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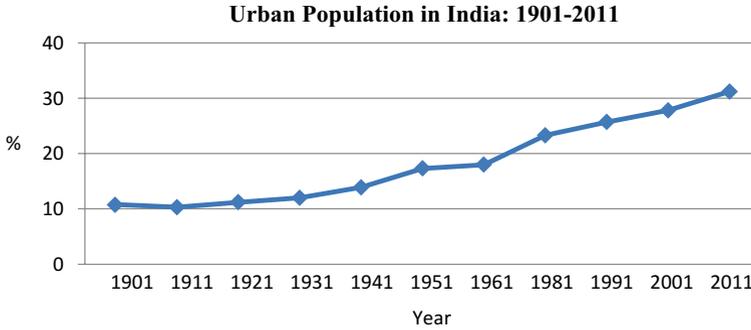


Fig. 3.1 Urban population in India: 1901–2011 (Source: Statistical Outline of India (2008–2009), Tata Services Limited, and Selected Socio Economic Statistics in India, 2011)

and further to 370.7 million in 2011 in absolute terms i.e. over a sixfold increase during the period. This leads to the question what pulls the labor force from rural to urban areas? It is argued that agglomeration economies, employment opportunities, better education, health services, and housing amenities attracts people from rural and relatively smaller urban areas to larger cities. The Indian economy since the adoption of the new economic policy (NEP) of 1991 has unleashed a vast potential of economic growth. This is expected to increase employment and location of tertiary sector activities in urban areas further fuelling rural–urban migration. An urban system consists of a network of towns, cities and its hinterlands. It constitutes a system since it depends upon the movement of goods, services, people, information, capital, and financial flows through the network of cities. The Indian space economy is a grid of urban system nested within macro regional urban systems (RUSs). Broadly speaking four RUSs can be delineated in India: Delhi, Mumbai, Kolkata and Chennai RUSs (Fig. 3.2).

3.1.1 Research Questions

Given this conception of a RUS the overarching question addressed in this chapter is why have some cities (Delhi, Mumbai, Chennai, and Bengaluru) experienced tremendous urban growth, while others (like Kolkata) have experienced urban decline during the past 60 years? Can analytical models identify a pattern of relationship between population size and ordering of cities? This paper is an attempt towards identifying the trends in research on Indian RUSs with scope for future research. A survey of urban systems research in the West documented various unifying themes that have been addressed during the past 60 years such as: ‘interdependence’, ‘structure of spatial relationships’, ‘diversity and complexity of growth processes’, and ‘temporal paths of change’, (Bourne 1980; Simmons and Bourne 1981). The Canadian Regional Science Association published a set of discussion papers on the ‘Past, Present and Future’ of Urban Systems Research (Coffey 1998).

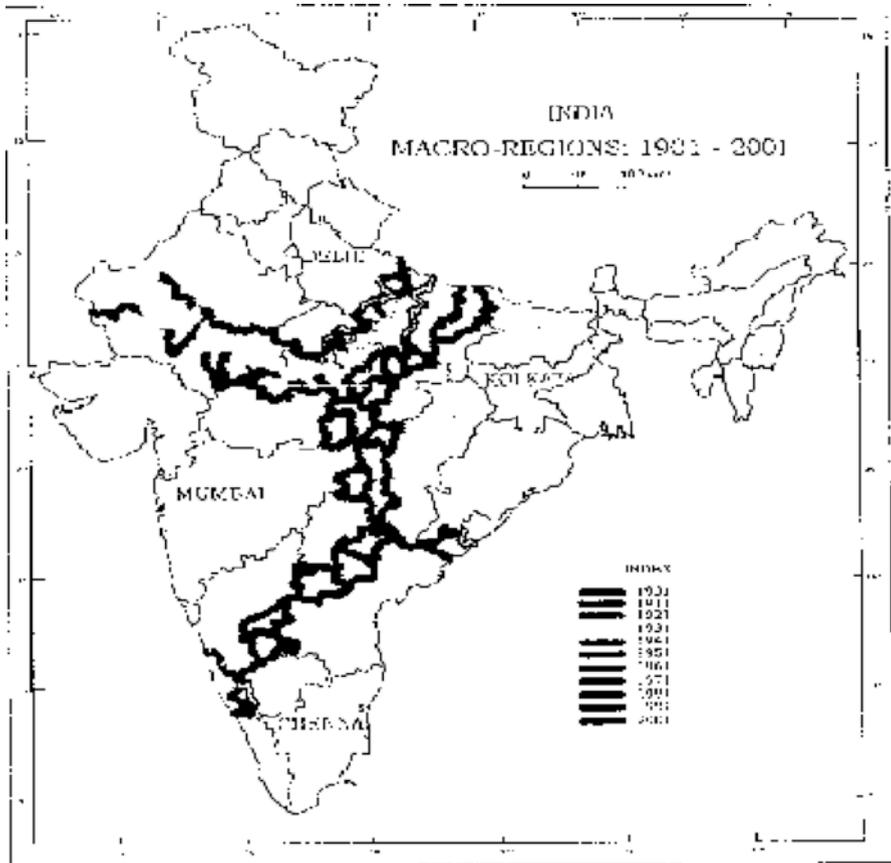


Fig. 3.2 Macro-regional urban systems in India (Source: Dahiya (2005))

In this discussion Bourne (1998) reckoned the marginalization of urban systems research due to 'analytical difficulty', 'lack of theoretical framework', 'lack of dialogue among government and planning bodies', and 'a failure to market ideas in a competitive marketplace for research'. Whitelaw (1983) reiterated the importance of urban systems research more so in times when regional agencies have dwindling resources. Also, Goddard (1977, 1978) placed importance on the role of technology and large corporations in shaping the urban and regional systems.

Several others have analyzed the Indian urban system. Ahmad (1965) argued that the Indian urban system is characterized by a hierarchical arrangement of cities. Indian cities are interdependent and interacting and have been the focal points of manufacturing, transportation function and administrative roles. Dahiya (2005) posited large-size of the Indian economy does not permit a primate city at the national level, but regional primacy exists within three of the four macro-regional urban systems (Delhi, Mumbai, Kolkata and Chennai). The eastern region is dominated by Kolkata; northern by Delhi, western by Mumbai and southern has no primate city as

Chennai is competed by Bengaluru. Further, Dahiya (2005) observed that national or regional primacy is inversely related with the level of economic development. Thakur and Parai's (1993) review of Indian urban geography emphasized the importance of studying structure, function and behavior of urban systems at both the regional and national scales.

With this overview this chapter addresses the following three research questions: (1) what are the broad trends of RUSs research in India? (2) What insights have the various theoretical and conceptual approaches to RUSs analysis provided to the understanding of Indian urbanization? (3) Is there a new theoretical approach that can manifest an alternative insight to Indian RUSs? To answer these questions, this chapter is divided into seven sections. The second and third sections deal with definition(s) of urban systems and overview of urbanization and urban systems in India. The fourth and fifth sections deal with hierarchic and non-hierarchic models and its application in India. The sixth part deals with a new approach called the complex systems approach to urban analysis followed by conclusion.

3.2 Urban System and Urban Hierarchy: Concept and Definitions

An urban system consists of a collection of innumerable *elements* (such as central places) such that each element directly or indirectly is interacting and interdependent with every other element in the system. The element occupies space and has *attributes* (such as population, business types, traffic counts, production, distribution, and exchange). A national urban system is characterized by exchange and interdependency among cities that produces a well-articulated and balanced urban system (Bourne and Simmons 1978). A system is characterized by *functional wholeness* which implies cities within an urban system are interrelated with other cities within a geographical boundary called *system boundary*. The interrelationship between cities can be at a mid-point between two cities, or there could be uniform spacing within a system of cities. Cities outside an urban system are part of another urban system. Thus, the elements of an urban system are interconnected and articulated into a network via which goods, services, people, information and finance flow in the city system hierarchy (Thakur 1978). Thus, a city can be viewed as a 'system within the larger system of cities' (Berry 1964).

An urban system can be *organized or disorganized* (Thakur 1978). The entropy measure describes the tendency of a system organization and measures the randomness contained in an urban system. The larger the randomness, the greater the entropy and the higher the disorder the larger the disorganization contained in the system. The inverse of this process is reckoned as organization. The presence of a high degree of complexity in an urban system implies larger degree of organization in the system. The systems approach has been utilized to analyze, explain the structure characterizing the urban system at different geographical scales. The system analysis has its own language of inquiry. For instance, a system can be classified as

open and closed. A closed system is where there is no exchange of energy or matter across their boundaries. This implies interactions between various elements and the attributes of an urban system take place within the system boundary. An open system is where there is continuous flow of energy and matter across the system boundary. An example of an open system is where a city located in an urban system is interacting with a city located in another urban system via exchange of goods and services. Also, an urban system is characterized by *stability and instability* of its system. The notion of stability implies the continuance of structure in a temporal sense. Structure is defined as the location pattern of the various elements and attributes of a system as they exist at a given site and as they change over time. The perpetuation of structure does not negate change in time or space in a system. A stable system is where change occurs but it is recognizable. An instable system is characterized by growth and evolution. The state of the system changes through a sequence of unrepeated states and may attain a new preferred state (Thakur 1978).

Also, a system is characterized by *equilibrium*. The notion of equilibrium signifies a state in which a balance exists in the totality of interaction and interdependencies of the elements and attributes representing a system. A systems behavior is governed by the type of *feedback mechanisms*. Feedbacks are of two types: *positive and negative*. Positive feedback is defined as a state where the effect of a feedback loop is to magnify an initial disturbance to the system. In contrast, a negative feedback is where the effect of a feedback process is to minimize the impact of a disturbance to the system such that the output remains constant. Finally, a system has the characteristic of either being *static or dynamic*. The urban system evolves with time as growth occurs and new conditions sets in due to changes in the attributes of the urban system. An example could be improvement of transportation infrastructure, new routes, and land use changes would lead to economic transformation. A lack of any change in the attributes of the system will force the system to remain static. An analysis of such mechanisms allows for a deeper understanding of the organization of an urban system (Thakur 1978).

Implicit in this view is the notion of urban hierarchy. Hierarchy implies that various cities within a region are of different population sizes and varying economic power and thus cities could be ranked utilizing this ordering process (Kaplan et al. 2009). The development of modern transport infrastructure, communication technology, internet, and mobile phones has led to a stronger interaction among urban places. It is the quality of interrelatedness among urban centers that is important. The urban system changes constantly in response to external stimuli of the environment (Thakur 1978). This conception of an urban system provides an understanding of the long-term processes of urbanization at different geographical scales.

3.3 Urbanization and Urban Systems

Urban growth pattern can be analyzed as the space-time variations in percent of urban to total population in a region. Figure 3.3 shows Delhi and Chandigarh have urbanized rapidly. Haryana, Rajasthan, and Andhra Pradesh urbanized at

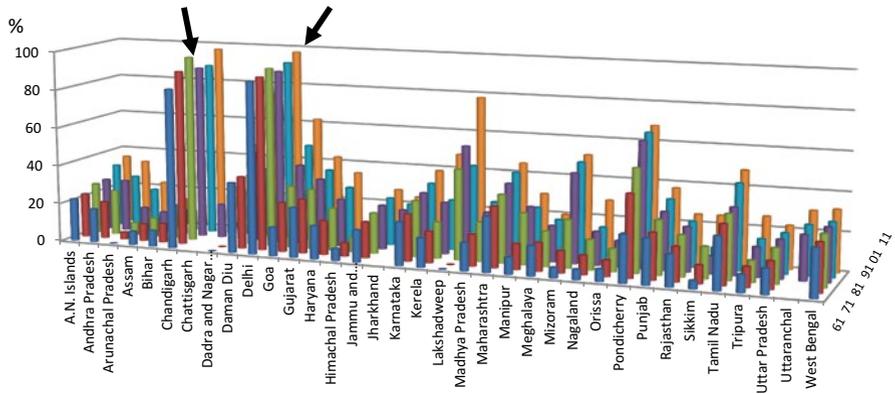


Fig. 3.3 Regional pattern of urbanization in India: 1961–2011 (Source: Selected Socio-Economic Statistics India 2008, 2011)

intermediate levels and the North Eastern states of Mizoram, Nagaland, Assam, Sikkim, Bihar and Himachal Pradesh in the East and Northern parts of India have undergone slow urbanization. This section addresses three themes: *urban development theories*, *colonial space economy model*, and *regional urban growth patterns* in the Indian context.

3.3.1 Urban Development Theories

The urban development process can be understood by exploring two selected theories. The first theory is referred to as *differentiated urbanization model (DUM)* (Geyer and Kontuly 1993). The DUM postulates large, intermediate-size, and small cities undergo successive periods of alternating fast and slow growth in a cycle of development. During this process of urban development a major proportion of population and economic activities cluster in a few dominant cities. Simultaneously, suburban nodes, the nuclei of a future multimodal city begin to develop rapidly with their advantageous locational attributes. Subsequently, the largest city becomes unsustainable due to agglomeration diseconomies leading to the growth of a metropolis. In sum, the large cities retain their urban dominance along with a group of intermediate-sized cities as part of a larger urban system (Pacione 2009). The DUM thesis has been applied in the Indian context (Mookherjee 2003; Mookherjee and Hoerauf 2004; Mookherjee and Geyer 2011). Using Indian Census data for 1971–2001 an overall dominance of large cities has been identified. Mookherjee and his colleagues further observed several states (Andhra Pradesh, Bihar, Gujarat, and Karnataka) showed a trend of growth in intermediate cities outstripping million plus cities suggesting a polarization reversal. These trends suggest that Indian urbanization has been characterized by large city growth (during 1961–1981) and

polarization reversal during 1981–1991. A concentrated urbanization of Delhi metropolis has been followed by polarization reversal to satellite towns (during 1971–2001) in the NCR due to regional dispersal of manufacturing, trading, and tertiary sector activities (Mookherjee and Geyer 2011). Lall and Thirtha (1971) echoed a similar observation that large cities grew disproportionately during 1931–1951 due to increased private and public investments in cities and, hence, satellite towns were necessary around major metropolises.

The second theory is called the '*stages of urban development model*' (SUDM) (Klaasen et al. 1981; Van Den Bergh et al. 1982). The SUDM postulates four stages of urban development in which the urban core and fringe grow at different rates and relative direction: 'urbanization', 'suburbanization', 'counter-urbanization', and 're-urbanization'. In the first stage settlements grow at the cost of fringe; during the second stage fringe grows at the cost of urban core; at the penultimate stage population loss in urban core is larger than the gain in the fringe; and, finally, in the last stage the urban core regains population and the fringe loses population (Pacione 2009). In the context of Indian urban–rural fringe development, a stage model has been proposed consisting of five stages: (a) rural stage, (b) stage of agricultural land use change, (c) the stage of occupational change, (d) the stage of urban land-use growth, and (e) the urban village stage (Ramachandran and Srivastava 1974). Dixit (2011) has recently examined the historic development of suburban areas for selected large cities in India and its urban expansion. This book explores the rural–urban dichotomy, facets of acceptable and unacceptable changes, and the overall impact of urban expansion on people's lives.

3.3.2 *Colonial Space Economy Model*

Late Moonis Raza and his colleagues articulated the *colonial space economy* model to understand the political economy of urbanization in India. His approach was to select urban development indicators, map it, and apply statistical tools to identify causal patterns. A dynamic model of India's colonial economy has been elaborated with a view to link dependent enclaves of the hinterland areas to the British metropolitan economy. This approach sheds significant light on the spatial analysis of urban and regional inequalities in India (Chattopadhyay and Raza 1975). The notion of urbanization and development are intertwined and interlinked. His approach opines that Indian urbanization has been characterized by 'urban atrophy', 'growth of satellite primates', 'deindustrialization' that has all led to tertiarization of the urban economy in India. These attributes are an outcome of a long drawn dominance-dependent relationship promoted during the colonial period (Raza et al. 1980c). This theme has been further explored by examining the fragmentation of the urban–rural continuum as a direct consequence of the historical hiatus between the twin processes of industrialization and urbanization; and between *vertical shifts and horizontal mobility* within the labor force in the development process. Their analysis revealed an agglomerated and dispersed pattern of regional industrialization in

India. The former is characteristic of capital-intensive and large-scale manufacturing and are concentrated in big cities, while the latter is relatively less capital-intensive and is spread across small towns and rural settlements. Further, both the patterns are considered to be partial and fragmented due to technological and spatial considerations. An agglomeration without dispersion pattern produces dysfunctional enclaves; and dispersion without agglomeration pattern leads to technological stagnation. The integration of the two patterns along a rural–urban continuum can generate a balanced urban and regional development. The development planning efforts in India have not been able to produce this outcome during the past 60 years (Raza and Kundu 1982).

3.3.3 Regional Urban Growth Patterns

The processes of urban growth in India, encapsulating the past and present trends are highly complex and varied. These trends are interplayed by socio-cultural, political administrative, economic, and geographical forces. Ramachandran's (1989) seminal book – *Urbanization and Urban System in India* has successfully established an inter-relationship between micro-level studies and macro-level generalization to the analysis of urbanization and structure of urban system. His substantive contribution is a creative work shedding light on the processes of urbanization and the nature of interdependence among urban centers, and between urban centers and their hinterlands.

Upon dividing India at three levels of urbanization: urban (more than 31 %), intermediate (17–31 %), and rural-based on the percent urban of the districts; this categorization reveals a north–south regional association of urban correlates (Dutt et al. 1989). The study demonstrates higher density of population and higher proportion of non-agricultural workers, female literacy, and sex-ratio associated with districts that are highly urbanized. In the northern region female literacy is a stronger indicator of urbanization than male literacy; and male household workers are strongly correlated with urbanization than female household workers. Concurrently, in the southern region male literacy is a better indicator of urbanization and household workers correlate strongly with intermediate districts. These relationships have been synthesized in a descriptive model of rural–urban continuum (Dutt et al. 1986) and its north–south variations for Indian sub-continent (Dutt et al. 1989).

The adoption of new economic policy (NEP) by policy-makers in India has encouraged higher private investment in cities especially in such areas as: automobile production, consumer electronics, computer software, information technology, chemicals, petrochemicals, and steel production. Such an investment pattern has led to the generation of new urban cores like: Ahmedabad-Pune urban corridor, southern urban triangle of Bengaluru-Chennai-Coimbatore, northern region centered upon Delhi, Rajasthan, and Punjab; and new hubs of growth in the south focusing on Hyderabad, Vishakhapatnam and Kochi. The remaining urban centers seem to have been neglected thus creating urban and regional disparities (Shaw

1999). In the past few decades Bengaluru has become an exemplar due to the agglomerative effect of information and communication technology (ICT) production and services and its effect on urban growth. Its growth has been driven by six factors: 'historical growth and cluster of electrical and electronics industries', 'the availability of highly skilled, communicative and low-cost technical manpower', 'the growth of external demand for ICT services', 'generous public policy incentives and concessions', and 'competitive advantage in both the business environment and investment climate' (Narayana 2011). This model of ICT driven urban growth can be emulated by other comparable urban economies in India to promote development in a global environment.

Several studies have investigated the theme of structural patterns of urbanization in India and its determinants. Chapman and Wanmali (1981) noted that Indian urban system is marked by a rural–urban dichotomy. Utilizing 1971 Census data they implemented a population potential surface analysis at the national and district levels. Their conclusion purports a lack of small-sized towns that can perform the integrative function between urban and rural regions. Further, they posited there are places of high urban growth that are push-created by outmigration from impoverished rural regions. In contrast, there are regions such as: Punjab, Haryana, Rajasthan, Tamil Nadu, Western Uttar Pradesh and South Bihar where urbanization is pull created due to dynamic urban expansion. In a similar paper Chapman (1983) identified a dichotomous growth pattern of urbanization between modern industrial centers and traditional centers based on trading activities. The former is associated with high rates of growth, organized industry, industrial specialization, and high employment rates. The latter is associated with balanced sex ratio, low growth rates, high levels of unemployment, high levels of literacy and a higher proportion of employment in trade and services. He utilized selected variables from the 1971 Census data (size, growth rate, and specialization) for mapping across space to identify regional patterns. The analysis suggested strong regionalization delineating India into two parts: (a) an emerging system of dynamic interdependent cities, and (b) areas of stagnation that are deficient in specialization. In an analogous paper Misra and Chapman (1991) examined the patterns of Indian urban growth in large cities utilizing 15 variables related to employment structure. An important conclusion is that forces affecting urbanization operate upon interlinked sets of cities. Thus, regional policies relying upon singular growth poles will be ineffective. Their analysis suggested the continuation of growth in larger centers of North and West India and stagnation in the Eastern region. Sridhar (2010) analyzed the determinants of city growth and output in India at the district and city levels. Her analysis suggests a higher proportion of manufacturing to service employment, proximity to large cities, and public services such as primary school coverage per population causes cities to be larger. The human capital as measured by literary rate has a significant impact upon city-level non-primary output per capita.

Sivaramakrishnan et al. (2005) identified four trends of spatial-temporal urbanization in India. First, during the 1950s the three metropolises – Kolkata, Mumbai, and Chennai maintained highest share of urban population and the same continues. Second, during the period 1950–1991 the level of urbanization in developed states

remained high although they experienced medium or low urban growth. In contrast, less developed states experienced high urban growth and low percentage of urban population. Further, the 1990s witnessed a significant departure in this trend as the developed states observed urban growth above the national average, and the less developed states experienced urban growth either below or equal to national average. Third, the class-size distribution of towns and cities has shown a change in pattern across space and time. The class I cities in developed states grew at a higher rate relative to less developed states prior to 1990. Also, in less developed states the smaller towns have grown at similar or rapid pace relative to class I cities. This pattern changed during the 1990s as many of the less developed states showed high urban growth among their class I cities. Fourth, the share of class II and III towns have shown stability in growth in most of the states as well as at the national level. Overall, the rapid growth of one million plus cities has increased to 53 during 2011 relative to 35 in 2001 (Census of India 2011). This tends to locate an overall sub-optimality in investment planning since the widening gap between urban areas and lagging regions affect adversely the development of human capital resources and produce social tensions (Chakravarty 1989).

3.4 Hierarchic Models

There are two classes of theories that are significant in the study of RUSs and they are: hierarchic and non-hierarchic. The former comprises the Central Place Theory (CPT) pioneered by Christaller (1966); and the latter constitutes rank-size rule and primacy in the context of settlement system analysis. This section is an overview of the notion of hierarchy through the lens of CPT in the Indian context. CPT portrays a hierarchic structure of settlements in a macro-region. It presumes that metropolitan city at the apex with several settlements of various sizes in the hierarchy which it serves by providing goods and services of different values. The central place analysis is the theory of the inter-relationships among different settlements of varying size classes (Ramachandran 1989). CPT was popular amongst Indian geographers as a theoretical construct to evaluate urbanization patterns during the 1970s and 1980s (Thakur and Parai 1993). Several scholars have tested the notion of hierarchy of central places in India against the theoretical formulation of CPT in the search for central place systems (Mayfield 1967; Berry 1969; Dutt 1969; Wanmali 1970; Vishwanath 1972; Dutt and Banerjee 1970; Singh 1968). The concept of range of a good in CPT has been empirically investigated based on field study in the Indian Punjab. The question of travel behavior has been analyzed by taking into account 'price willingness', 'distance factor', and 'type, quantity, and price' of a good (Mayfield 1963). A similar study was conducted utilizing primary survey data to understand the mobility patterns and the consumer travel behavior of rural folks in Uttar Pradesh. Four factors were identified that explain consumer behavior: 'rural folks discriminate among central places in the purchase of consumer items', 'central places differ in the mix of purposes for which they are visited', 'endowed

population tend to skip lower order central places', and 'choice of central places are influenced by multiple purposes and price differentials' (Prakasa Rao and Ramachandran 1971).

An articulated analysis of the Kanpur region suggested a strategy of attaining a complete spatial system of urban centers arranged in a hierarchy from 'village' to 'market towns' and 'metropolis'. Christaller's administrative principle suggested growth impulses could be transmitted across Kanpur's urban system (Berry 1969). A pioneering analysis was delivered on the planning of social facilities for the Vidharba and Nagpur regions in Eastern Maharashtra utilizing Christaller's framework of analysis (Wanmali 1970). A common policy advocated by both Berry (1969) and Wanmali (1970), i.e. hinterlands in India need more market villages at closer proximity for transmitting economic stimulus to rural areas. An analysis of the relationship between urban centers and rural development has been investigated in the context of growth centers and growth points in the South East Resource region in India (Sen et al. 1975; and Ramachandran 1976). Later, an exceptional analysis was delivered by Wanmali (1970, 1983, and 1987) in providing insights into the application of central place concepts and the analysis of spatial and temporal nesting of service centers in India. Diddee (1988) provided an in-depth analysis of the micro-central place systems of the Pune region. A similar delineation of Siwan region provides substantive insight to the understanding of structure and perspective function of micro-regional central place systems developed in the periphery of Patna urban system (Thakur 1985). Thakur (1979, 1981) utilized entropy approach to analyze the settlement system in Eastern India comprising five macro-regions and North Eastern India. His study focused upon spacing of urban centers and a pattern analysis. His analysis concluded an increase in entropy during the 1872–1971 and 1901–1971 time periods. The analysis identified a center-periphery dichotomy in the evolution of urban patterns in Eastern India.

These studies have generated further interest in urban development especially from an urban planning perspective. The first interest is in the spatial organization, periodicity, and synchronization of markets and consumer preferences and perceptions in rural areas (Wanmali 1983, 1985) and a second theme is that of service development planning (Rushton 1984, 1988; Wanmali 1992). The theme of improved accessibility of amenities and service facilities in rural areas has been addressed taking Bellary district of Karnataka as an example. The analysis of Miryaguda taluk in Andhra Pradesh and Nagpur metropolitan region have concluded that spatial intervention in a region does improve the articulation of settlement system and improves access to services in rural areas (Wanmali 1987). Wanmali (1992) applied CPT in the analysis of infrastructure planning and distribution of goods and services in North Arcot, Tamil Nadu. His analysis suggested the investment in new fertilizer establishments in larger settlements so that smaller settlements could be adequately served. The urban functions in rural development and location-allocation approaches have been used extensively in the provision of health services, school location, and regional settlement planning (Rushton 1984, 1988; Tiwari 1992). However, in recent times Indian urban geographers have shifted their interests from CPT based analysis due to the stringent assumptions of the model and paucity of relevant data.

3.5 Non-hierarchic Models

A German geographer postulated that if settlements were arranged in order of size, the population sizes of some regions would be related (Auerbach 1913). Thus, the population of the n th city is $1/n$ th the size of the largest city's population. This inverse relationship between the population of a city and its rank within a set of cities is termed the *rank-size rule*. The population size is depicted on the y-axis and the rank on the x-axis of a two-dimensional graph. If the values on the axes are transformed to logarithmic scale, then the curve becomes a straight line. Zipf¹ (1949) presented a general theory of human behavior to explain the frequency distribution of different aspects of human behavior. In the context of cities he addressed two pertinent questions. Firstly, why are there small number of large cities and large number of small cities in a nation? And secondly, what is the relationship between population of cities and their ranks? Two opposing forces control the size and number of settlements in a region and these are: diversification and unification. The former produces a large number of settlements which are small in size, and the latter results in the emergence of a few large settlements. A balance between the two forces results in the regularity of settlement size and number. Further, Jefferson (1939) developed the theory of primate city which focused on the forces of agglomeration and its cumulative effect in the growth of large cities. These forces have a snowballing effect once the city attains a dominant position in a region. The largest city will overshadow all other cities in the region and may even retard its growth. Another empirical regularity observed by Gibrat (1931) states that the growth rate of city population does not depend upon the size of the city.

The slope of the rank-size equation has been postulated as the equilibrium slope of a general growth process (Simon 1955). Simon, an organization behavior theorist interpreted this growth process in which each city initially has a random size, and henceforth, grows exponentially that is proportional to the initial random size. He further reiterated that processes of this kind tend to produce distributions that approximate rank-size form. His analysis suggested that lognormal distribution is produced as a limiting case by stochastic growth processes based on the notion of general systems theory. Simon's (1955) approach introduced the element of time in urban development and rank-size models and the effect of a few powerful forces that produced distortions in the national urban system (Haggett 2001).

Berry (1961) evaluated Simon's hypothesis in urban terms. He analyzed the rank-size distributions of towns with population of 20,000 or more in 38 countries. The analysis identified 13 countries in the sample that showed rank-size distribution. Examples among them were: US (largest country), India (with a long history of urbanization), and South Africa (politically complex). Of the samples, 15 showed

¹Zipf (1949) postulated the mathematical formulation between size and number of settlements. This relationship can be expressed as: $(P_r = P_1 / r^q)$ where P_r is the population of the ranking city P_1 is the population of the 1st ranking city, r is the rank of the city and q is an exponent which can assume any value. Its value is assumed to be equivalent to 1 implying equality between the forces of diversification and unification. If the value of q is within 0–1 then the decline of population with rank is gradual. Further, if the value of q is larger than 1 there is rapid decline in size of settlements with its rank.

Fig. 3.4 Spatial and temporal non-hierarchical models of urbanization

	Rank-Size	Primacy
Temporal	Temporal Rank-Size	Temporal Primacy
Spatial	Spatial Rank-Size	Spatial Primacy

primate city distributions. His analysis identified three kinds of city-size distributions: lognormal, primate and intermediate. A lognormal distribution appears as a straight line on a double logarithmic graph. Primate city distributions show a distinct gap between the largest city and smaller cities and the intermediate shows the dominance of small cities. Berry's (1961) study proposed a testable hypothesis: increasing entropy is accompanied by a closer approximation of a city-size distribution to log-normality. Likewise, Curry (1964) asserted that rank-size distribution is the outcome of an entropy maximization process.

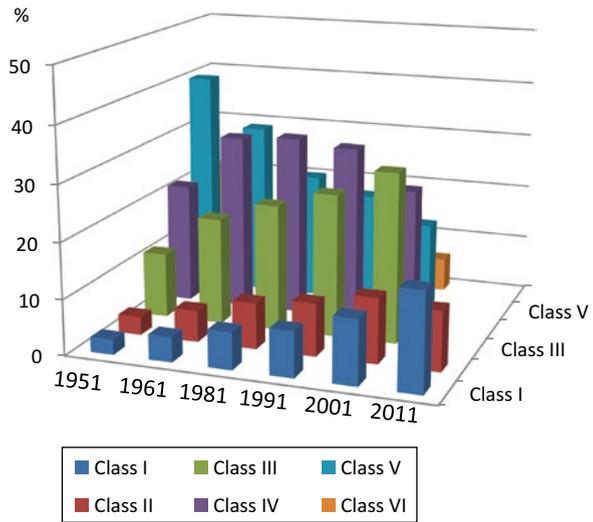
Fewer forces will affect the national urban structure if it is smaller than average, has a shorter history of urbanization, and has simpler economic and political structures. In a subsequent study Rosen and Resnick (1980) were the first to test for a possible deviation from the linear relationship postulated among the logarithms of the size of cities and its rank. The analysis tested negative for 36 of the 44 countries sample set using 1970 dataset. Their analysis showed that city-size and its rank approximates a parabolic curve that can be studied by adding a quadratic term to the Zipf's equation (Rosen and Resnick 1980). Further, Soo (2005) utilized data set for the period 1972–2001 and tested Zipf's law for 73 countries. Utilizing Rosen and Resnick's equation he found that 2/3rd of the countries in the sample had a quadratic term significantly high (convexity) or lower (concavity) than zero, while 1/3rd of the countries in the sample showed a quadratic term significantly in proximity to zero.

A temporal and spatial non-hierarchical model of urbanization can be conceptualized for a space economy (Fig. 3.4). It is possible that within different types and levels of space economy rank-size and primacy may or may not exist or overlap at different geographical scales. The existence, non-existence or overlapping of these models in an economy could provide similarities, differences in mechanisms that generates rank-size and primacy tendencies at various geographic scales. It can be conjectured that rank-size rule and primacy are relevant at the regional and state levels in India but not necessarily at the national level. However, India may be progressing towards national primacy in the long-run.

3.5.1 National Trends

Several studies have examined the Indian urban system using longitudinal (Raza and Habeeb 1988; Thakur 1979, 1981; Das and Dutt 1993; Sharma 2003), cross-sectional (Ahmad 1965; Alam 1980) and panel data (Dahiya 2005). Ahmad (1965) postulated that rank-size relationship holds good for the Indian cities with one-lakh

Fig. 3.5 Size distribution of towns and cities in India: 1951–2011 (Source: Statistical Outline of India 2008–2009)



(lakh is a measurement unit equivalent to one hundred thousand) population during 1951 and 1961. This interpretation has been criticized as all Class I cities according to the 1981 Census of India data have population much larger than estimated according to the rank-size rule. However, Das and Dutt (1993) have shown that during 1911–1981 the value of exponent (q) has been increasing with a slope value of 0.893 in 1981. This implies the force of diversification has been more influential than unification in defining the size and number of settlements. But that influence is diminishing since the magnitude of the slope term (q) increased during 1991 implying the number and growth of settlements are being determined by tertiary sector activities. It is expected that the magnitude of the slope term during 2011 and 2021 would even further accentuate. The tertiary sector activities happen to be market-oriented and have an agglomerative as opposed to dispersive effect (Ramachandran 1989). Further, Das and Dutt (1993) suggest the empirical city-size distribution in India at the national level is tending towards the rank-size rule as postulated by Zipf.

Also, Fig. 3.5 shows that the percentage of Class I cities have increased almost six times during 2011 relative to 1951 and has increased almost three times in 2011 relative to 1981. It also shows the preponderance of Class I, II and III cities during the period 1951–2001 and relative decline of Class IV, V and VI during the same period. An implication of such a pattern is the lack of a balanced development of settlements at the national level. This pattern is quite expected in a heterogeneous and diverse economy like India (Ramachandran 1989). The Indian urban system does not have a primate city at the national level. The absence of urban primacy is due to colonial rule, large-size of the nation and lack of the forces of nationalism in the country. During most of India's urban evolution Kolkata was the leading metropolis followed by Mumbai and Delhi. Delhi has been growing rapidly and it is expected in the next few decades to supersede Kolkata and Mumbai. The reason for

a lack of urban primacy in India is the political set up of the country. India has a partial federal political set up with the Center and State sharing power. This constitutional set up allows for the development of national and state level urban primate cities (Ramachandran 1989).

Indian urban geographers have investigated the structural aspects of Indian urban system utilizing flows, networks, graph theory, and system of cities approaches. However, researchers have been frustrated by the paucity of data required in utilizing these approaches. Nevertheless, several substantive works have been accomplished utilizing these methodologies. The Indian urban system is highly distorted being dominated by large cities leading to hypertrophy of metropolitan centers. This was a direct outcome of the colonial rule to concentrate investment, administrative and political functions in a few large urban centers such that raw materials could be siphoned off and shipped to Britain, while manufactured goods could be sold in the hinterland in India. This pattern of colonial capitalist development arrested the diffusion of technology, caused stagnation of the hinterland economy and prevented the articulation of a hierarchical system of settlement (Alam 1980, 1984; Alam and Reddy 1987). This trend has been an outcome of the weak linkages among urban centers and its hinterlands (Ramachandarn 1989).

Reed (1970) utilized inter-city airline flow data to reveal hierarchical structure of connectivity amongst cities and groups of cities in India. A dominant city is one which is held to mediate the flows of subordinate cities amongst themselves and between them and the rest of the urban system. He identified layers of connectivity amongst cities and a set of regional hierarchies. In the first tier the most dominant cities were located: Mumbai, Kolkata, Delhi, Chennai and Hyderabad in each of the four macro-regional urban systems. The importance of metropolitan centers has been analyzed utilizing the Indian railways based commodity flow data (Raza et al. 1980b). The organization of the Indian space economy and the consequent integration of the home market have been constrained by the inherited characteristics of an underdeveloped regional urban structure. The large metropolitan cities and its hinterland have been engaged in a dominant-dependent metropolis-satellite exchange relationship. The imbalances in the space economy have been generated by the distorted role of the metropolis and have been themselves sustained by these distortions. The weakness of the metropolis lies in the economic base, with a weak secondary sector and a bloated tertiary sector. This economic characteristic has made the metropolitan cities weak in the production system and has essentially made them centers of consumption albeit centers of production. The strength of this malaise shows signs of greater intensity as we drop down the urban system hierarchy. Further, analysis reveals that population size, share of manufacturing sector, and transport sector strongly influence the levels of spatial linkages (Raza et al. 1980a). Later, Raza and Aggarwal (1986) conducted a substantive study of the commodity flows in relation to the regional structure of the Indian economy. They used point to point flow data generating flow matrices to further enhance their colonial space economy model to the understanding of Indian regional structure and space economy.

Several urban economists have analyzed the rank-size and city growth theme in India. Schaffar and Dimou (2012) raised two pertinent questions: firstly, does city-size distribution follow Zipf's rule? And secondly, does Gibrat's law hold that is whether city growth depends on city-size? The analysis utilized dataset for 1981, 1991 and 2001. They made three generalizations. Firstly, Indian city-size distribution for million plus population follows a Pareto law. This finding contradicts with observations of other scholars who posit that city-size distribution is log-normal. Secondly, the Indian city-size distribution rejects Zipf's law as there is substantial dominance of small cities relative to a small presence of large cities. Gangopadhyay and Basu (2009) utilized Kolmogorov-Smirnov statistic to obtain an inverse conclusion, i.e. city-size distribution follows Zipf's law for a restricted sample with large cities. Thirdly, Gibrat's principle cannot be rejected, and urban hierarchies show a higher degree of stability revealing parallel growth patterns. Further, Sharma (2003) examined the Indian urban growth during the period 1901–1991. She rejected Gibrat's Law when studying the long-term effects of India's partition on urban hierarchies in relation to city-size, and in relation to city's relative growth. Her analysis suggests that there is persistence or stability in city growth. Any increase or decrease in the pace of population growth rate is a short-run phenomenon. During the long-run every city converges to its natural growth rate, i.e. to the overall population growth rate. Short-run fluctuations in population sizes are accounted due to exogenous shocks such as: influenza epidemic in the post-World War I period and the partition of India that led to influx of population in Indian cities.

3.5.2 Regional Trends

The rank-size rule focuses upon the regularity in city-size distributions, while the primate city construct emphasizes upon abnormally large city in a nation or region. Berry's (1966) study of commodity flows among India's trading block identified a set of four RUSs. The Indian RUSs envelops its largest metropolitan cities: Kolkata, Delhi, Mumbai, and Chennai to form a functional entity. The metropolitan areas constituted the principal manufacturing areas, through which import–export trading goods such as: agricultural, manufactured and other commodities were traded inter-regionally. This regional interaction allowed for the integration of the regions and integrated the regional economies into a national urban system. A similar study was delivered by Reed (1967) in his microanalysis of commodity flows in the Bengal-Bihar region. He concluded that commodity trades in the area were found to vary inversely with the distance shipped and directly with the demand and supply conditions in India. Both of these studies utilized flow data which is difficult to obtain and estimate. The former utilized regional input–output tables and the latter commodity shipments and receipts data for India.

Ramachandran's (1989) analysis of settlement systems provides insights to the state level trends of rank-size and primacy characteristics in India. During 1981, 13 of the 25 states in India had primate cities. West Bengal is an ideal example of state

level primacy where Kolkata is five times larger in population size relative to the second largest city Asansol. Chennai and Mumbai urban agglomerations dominate Tamil Nadu and Maharashtra states but relatively to a lesser extent. All three examples of state primacy are the outcome of colonial rule. However, during the post-independence period Indian policy-makers adopted structural reforms and NEP (1991) that led state capitals to assume importance in economic and political decision-making. Such a trend has manifested the generation of state primate cities. It is asserted that India does not have rank-size relationships at the national level but prevails in selected states such as: Rajasthan, Haryana and Uttar Pradesh. In the Indian context rank-size rule seems to be an exception though primate city characteristics are more commonly identified.

Das and Dutt (1993) examined the historical changes in city-size distribution in India. They argued that the Indian urban system is devoid of a primate city at the national level but regional systems are characterized by primacy. Further, Dahiya (2005) analyzed the spatial-temporal behavior of the rank-size rule and primacy for the four regional urban systems (Fig. 3.2). These RUSs have traversed through structural changes during the past century. Kolkata, Delhi and Mumbai in the Eastern, Northern, and Western RUSs have been the regional primate cities. Kolkata's regional primacy was at the apex in 1951. However, its primacy has been declining relative to the other three cities within the three RUSs. Chennai was never a primate city except during 1911. Mumbai during the period has shown considerable oscillations. Delhi's regional primacy has continuously increased during the past century except in 1941 when Kanpur became the second largest city in the Northern regional system.

3.5.3 *Northern*

In Northern India, Delhi had the lowest primacy index till 1951 as compared to Mumbai, Chennai and Kolkata regional macro-urban systems. It attained primacy status during 1971, and since then its primacy level has been increasing rapidly (Dahiya 2005). It is expected to exceed Kolkata primacy level by 2021. The most populous states of Uttar Pradesh, Punjab and Haryana have not shown any tendency towards primate city formation in the Northern region since its growth has been inhibited by its proximity to Delhi (Ramachandran 1989). The dominance of Delhi in the northern region can be explained due to the following five reasons: (1) it is the capital city with federal powers to make investment decisions, (2) Delhi has displayed rapid growth of industrial and information technology clusters, (3) Delhi houses the most important publication centers, (4) Most premier research and educational institutions are located in the capital city and (5) people have the perception that Delhi is a national city capable of becoming a national and regional primate city (Das and Dutt 1993). Likewise, Madhya Pradesh has grown rapidly but its capital city Bhopal has not shown a trend towards primate city growth. Further, Jain's (1982) rank-size rule analysis for Malwa plateau (Madhya Pradesh) during 1971

showed a lognormal distribution. It showed an ascending upper part and abruptly descending tail end leading to an S-shaped curve. His analysis showed Bhopal had 56 % excess population in relation to rank-size rule estimate.

3.5.4 *Western*

Mumbai is the largest urban agglomeration in the Western RUS. The primacy level of Mumbai was the highest during 1901, then decreased during 1911 and 1931, increased during 1961, 1971, and 1981 and further declined during 1991 and 2001 (Dahiya 2005). This checkered growth pattern is due to the presence of two million-plus cities competing with Mumbai and they are: Ahmadabad and Pune. The analysis of Class I cities during 1901–1971 in Maharashtra suggested varying degrees of instability in the urban growth process. The growth pattern of cities was turbulent in North Konkan and near Mumbai and was modest in the remote areas of southern and eastern Maharashtra. Greater Mumbai retained its apex position along with improvements in the ranks of Class I cities close to Mumbai such as: Nasik, Pune and Malegaon (Malshe 1982). Sita and Phadke (1982) recognized the positive relationship between accessibility and centrality in the growth of Mumbai metropolitan region. Further, Spodek (1981) identified dichotomous urban growth pattern, i.e. ‘generative’ and ‘parasitic’ in Saurashtra region. The former is associated with cities having favorable economic growth in the region and the latter with economic decline. The cities in Saurashtra have played a generative role as the bourgeoisie linked the agrarian sector with the urban–rural market economy.

3.5.5 *Eastern*

Kolkata is an example *par excellence* of a primate city in the eastern region. Its primacy index increased between 1901 and 1951, and has been declining since then (Dahiya 2005). Two reasons for Kolkata’s eminence as a primate city were: (1) it was selected by the colonial power for administrative, military and business activities, and (2) other cities could not compete since Kolkata’s hinterland (Western Odisha, Southern Bihar, and North East India) were located in a hilly terrain which discouraged high levels of urbanization (Das and Dutt 1993). A political-historic approach has been utilized to understand the distortions in the settlement system and the roots of colonial urbanization in India with reference to Hyderabad and Kolkata (Alam 1980; Raza and Habeeb 1988). The colonial power concentrated its investment in selected cities leading to hypertrophy and unbalanced growth among the primate city and its hinterland. Raza and Habeeb’s (1988) analysis concluded that Kolkata’s primacy during the early twentieth century distorted the settlement system hierarchy in relation to its catchment area. Further, it developed not as the node but at the cost of it. Such development was not an instrument of urbanization

but of urban atrophy. Two other states in the region – Bihar and Odisha could not promote primate cities due to its proximity to Kolkata (Ramachandran 1989).

Dayal and Thakur (1982) studied the settlement systems of Bihar plains and Chotanagpur plateau. They observed similar systems characteristics during 1872–1971 periods. A rank-size analysis indicated a trend toward regularity and orderliness in both systems. The Bihar plain was dominated by Patna and Jamshedpur-Ranchi has dominated the Chotanagpur plateau. The position of primacy has not changed in the former but the position of the largest city has changed in the latter region. Bihar is one of the most natural resource rich yet impoverished states in India. The appalling state of Bihar is an outcome of a long drawn process of colonial drain and acute under-urbanization. Saha's (1987) analysis of rank-size rule for Bihar during the period 1901–1981 observed the largest cities were located in the Gangetic Plains of North and Central Bihar, but this position showed a reversal, and by 1981, the largest cities were located in Southern plateau of Chotanagpur region. The division of Bihar in 2000 into two separate states (Bihar and Jharkhand) has deprived of the mineral rich resources of southern Bihar and the fertile and natural resources of northern Bihar to the states of Bihar and Jharkhand respectively. This division will generate a distinct urban system trajectory in the two states over time. For the northeast region, Singh (1968) delivered a study of the urban settlement systems of Manipur region. Rank-size analysis reveals lack of regularity and continuum in the hierarchy of settlements. The urban system is focused around Imphal city and is characterized by a weak economic base that lacks spatial linkages with smaller towns.

3.5.6 Southern

The primacy index for Chennai was highest during 1911 and since then it has been declining through 2001 (Dahiya 2005). This can be broadly explained due to two reasons: (1) the hinterland of Chennai has a limited areal extent, and (2) the ascendancy of Bengaluru due to the ICT-led development has inhibited Chennai's formation into a primate city. In an earlier study, Reddy (1969) identified weak rank-size regularity in the Krishna and Godavari deltas in Southern India. This implied lack of any evidence of log-normal distribution. Kumaran and Ramesh (1982) discerned an association between the size of towns and the extent to which they deviate from rank-size rule. Further, an analysis of the Rayalaseema region in Andhra Pradesh suggests the applicability of rank-size predictions during the period 1901–1971.

In sum, the decline of the regional level dominance of the three colonial cities (Mumbai, Chennai, and Kolkata) has been due to the ascendancy of a large number of new urban centers (Class I and II) in various parts of post-colonial India as centers of production, consumption and exchange. These cities have become centers of employment, private sector development, hubs of multinational corporations and information technology clusters. The colonial primate cities were built to serve the economic necessities of the colonial state to siphon off raw materials and industrial surplus and sell its manufactured products in the Indian hinterland.

3.6 Modeling Complex Urban Systems

Urban planners have often taken an isolated and a ‘top down approach’ to the planning of infrastructure, economic activities and social amenities in urban areas. Such an approach is ineffective and counterproductive leading to a loss of financial resources. The process of urban development can be exemplified using a ‘bottom up approach’, such that the aggregate level spatial pattern can be well understood and efforts made to generate an ideal urban structure. Cities can be treated as complex systems since the local interaction amongst objects can produce an ordered pattern in the aggregate such as large scale spatial clustering of different socioeconomic groups in various residential localities (Torrens 2000). A novel approach to understand the integrative, quantitative, science-based understanding of the dynamics, growth and organization of cities is called the complexity approach (Miller and Page 2007; Bettencourt and West 2010). Two types of models have been utilized to stimulate urban development: cellular-automata (CA) and agent-based models (ABM).

Cellular-Automata (CA) offers a framework for the exploration of complex adaptive systems. This approach contains five principal elements: a lattice, cells, neighborhood defined by the lattice, transition rules and a temporal component (Torrens 2000). It mainly utilizes cells and agents as interrelated elements in the process of simulating city formation. The cells represent the physical and spatial structure of the city, and the agents represent the human, social, agencies and actors involved in motivating development and growth in the city. The cells are fixed and agents are mobile. In the simplest CA model cells compare location of activities, in which change is generated by agents which influences the behavior of the nearest neighboring cells. The cells represent an attribute of urban environment such as land use, population density, and land cover to stimulate the phenomenon of urban sprawl. Such a behavior generates spatial regularity at a macro-scale that is initiated by the action of agents at the local level (Batty 2002). The formation of cities typically depends upon location and agglomeration effects. The former determines proximity and access to natural resources and hence value and prices. The latter attracts agents to cities that can have positive and negative feedbacks. Therefore, small events at the local level can generate large and unpredictable global outcomes giving rise to complex spatial structure. Thus, micro-motives can lead to macro-behavior such as city development (Miller and Page 2007). Further, AB models are a type of computational model for simulating the actions and interactions of agents in a system with the purview of assessing their effect on the system as a whole.

Bettencourt and West (2010) have proposed a ‘scaling theory of city’ in which cities are presumed to be an idealized networks of distribution that supply people, households and institutions with infrastructure and urban amenities and discard unwanted byproducts. Their work suggests that cities are scaled versions of each other implying Paris and Delhi to a surprisingly and predictable degree, are non-linearly scaled up version of London or Mumbai cities. Such similarities suggest commonness in mechanism, dynamics and structure in the formation and growth of

all cities. Further, they reckon population as a measure of city-size that does produce scaling relations for different urban attributes (Bettencourt et al. 2009). The CA and Markov Chain Models were applied to analyze land use and transportation infrastructure interaction in the Delhi metropolitan area; and discrete choice models were applied to predict local level changes. It was revealed that the central area is 'densifying' and outskirts are 'intensifying' in urban growth and land use changes. The analysis further suggests that Delhi metropolitan region faces larger expansion and intensification in terms of the use of its land area. The process of land use expansion would be significantly affected by such factors as: industrial, office, district centers, residential land uses, highway locations, population density, and road density (Srinivasan 2005). This approach has been utilized to generate planning outcomes for future urban development with the assumption of a ring road development in Mangalore city a fast urbanizing region in Karnataka. The case of urban sprawl dynamics has been studied and shown using cellular automata and agent-based models for spatial visualization of patterns of growth in relation to the drivers of urban growth (Sudhira 2004).

3.7 Conclusion and Future Directions

India has undergone rapid urban growth and regional urbanization since the post-independence period. Delhi and Chandigarh have urbanized rapidly; Haryana, Rajasthan and Andhra Pradesh urbanized at intermediate levels; and North Eastern States, Bihar, and Himachal Pradesh urbanized at the lowest levels. An urban system is defined as a set of cities, towns and its hinterlands as part of a network in which people, goods, services, information, and capital flow up and down the hierarchic arrangement of cities. The Indian urban system can be delineated into four broad macro-regional urban systems focused upon Delhi, Kolkata, Mumbai and Chennai the largest cities within the regional economies. A review of Indian RUSs with respect to four themes manifests revealing insights.

First, with respect to *urbanization and urban systems* analysis three sub-themes have been addressed: *urban growth theories*, *colonial space economy*, and *regional urban growth patterns*. The differentiated urban model (DUM) suggests that Indian cities have undergone rapid growth followed by polarization reversal. For example Delhi metropolis has experienced concentrated urbanization followed by polarization reversal towards the National Capital Region due to regional dispersal of manufacturing, trading and tertiary activities. Also, in response to stages of urban development a rural-urban fringe model has been proposed in the Indian context comprising of five stages: rural stage, stage of agricultural land use change, occupational change, urban land use growth, and urban village stage. Further, Raza articulated the colonial space economy model to shed light on the political economy of urbanization in India. He argued that India's urban economy is characterized by urban atrophy, growth of satellite primates, and deindustrialization. These attributes are an outcome of a long drawn dominant-dependent relationship between the

hinterland and metro pole during colonial rule. The adoption of NEP during early 1990s has encouraged higher private investment in cities in consumer durable goods. Such an investment pattern has led to the generation of new urban cores like: Ahmedabad-Pune, Bangalore-Chennai-Coimbatore, Delhi, Rajasthan, Punjab, Hyderabad, Kochi, and Vishakhapatnam.

Second, there are two classes of theories that are significant to the study of RUSs. These are hierarchic and non-hierarchic. The former comprises the CPT and the latter rank-size rule and primacy studies. The CPT portrays a hierarchic structure of settlement in a macro-region. It presumes that metropolitan city is at the apex and serves settlements of various smaller sizes in the hierarchy by providing goods and services of different order. The CPT analysis has generated two implications from a planning perspective. The first, interest is in spatial organization, periodicity, and synchronization of markets; and the second, interest is in improved accessibility of amenities and social facilities. However, paucity of flow data and stringent assumptions of CPT has led to the decline of interest in CPT-based analysis of urbanization in India. The rank-size rule focuses upon the regularity in city-size distributions, while the primate city construct emphasizes upon abnormally large city in a nation or region. In the Indian urban system, urban primacy is devoid at the national level but is tending towards it in the long-run. It is hypothesized that Delhi would attain the status of a national primate city by 2021 or 2031. At the subnational level two trends can be identified. At the regional level Delhi, Mumbai, Kolkata and Chennai have dominated the four macro-regional urban systems due to regional agriculture, manufacturing and trading activities. Likewise, at the state level Chennai, Mumbai and Kolkata show primacy tendencies due to colonial rule and adoption of NEP giving state capitals power and control in economic and political affairs.

Third, complex system is a novel approach to understand urban systems. It is based on the premise that local interaction among agents can generate ordered outcomes at the global levels such as the large scale spatial clustering of various socio-economic classes by income, ethnicity, and education criteria. The complex systems approach has three potential applications in RUSs research: to explore spatial complexity, test inter-disciplinary theories, models and hypotheses, and apply it as an operational planning tool in urban management.

Several research directions for urban systems and urban complexity analysis can be made. First, with advancements in geographic information system it is possible to analyze large scale data in delineating system boundaries of the major macro-regional urban systems in India. It is difficult to collate flow data yet several researchers have utilized airline data, commodity flows, telephone contacts, newspaper circulations to delineate urban system boundary. Additional variables such as financial, migration and internet or communication flows data can be utilized in conjunction with gravity and spatial interaction models to delimit urban systems boundary. Second, the historical system boundary should also be delimited for different periods such that the declining influence of Kolkata and increasing spheres of influence of Delhi and Bengaluru can be measured. Third, urban analysts should examine the structure, function and stability or instability of RUSs and identify the processes that explain stable, growth or decline of urban systems. Fourth, a spatial-

temporal analysis of periodic markets and regional service development planning using location-allocation models can improve accessibility and optimum location of facilities. Fifth, identify the processes of ICT led-growth in Bengaluru such that it can be emulated in cities of similar levels of urban development. Finally, a focus on micro-level analysis such that it can generate macro-level generalization of urban processes utilizing modeling and theory-building framework.

Further, there are six directions in which future work on urban analysis can be undertaken utilizing complexity approach. Firstly, CA models can be put to serve three purposes: First, it can be used by both academicians and planners as an approach to understand regional urbanization in a theoretical sense and develop operational plans for combating burgeoning urban problems such as: congestion, crime, urban sprawl, and segregation. This tool can be further utilized in the exploration of urban phenomenon such as: traffic simulation, regional scale urbanization, land use sprawl dynamics, polycentricism, and historic dimensions of urban development. Secondly, models can be utilized to explore theories and hypotheses originating in cognate disciplines such as: urban economics, urban sociology, urban planning and urban management to push the frontiers of interdisciplinary knowledge. Thirdly, CA models can be used to construct hybrid models of urban growth. In this framework the best elements of a top down and bottom-up approach can be collated to generate an operational optimum urban growth model. The top down approach can use aggregate models from regional science techniques such as: regional input–output, spatial interaction, spatial optimization and demographic and forecasting techniques with given zonal constraints. These constraints can be imposed upon a bottom-up type CA or ABM models. This would link the parsimonious aggregate level constraints with the finer details at the local level through theoretically informed dynamic engines to generate a hybrid model. Fourthly, there is a need to link modeling with theory building in the context of emerging markets and developing economies taking into account the dual economy assumptions of development. Lastly, there is opportunity for incorporating and implementing concepts such as: path dependence, bifurcation, and phase transitions in complexity analysis in the CA framework for urban systems studies.

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Chapter 4

Contemporary Urban Policy in India: A Critique of Neoliberal Urbanism

Swapna Banerjee-Guha

Abstract In the era of contemporary globalization, the ‘urban’ is being redefined just as dramatically as ‘global’ with new orientations in urban activities and their role in the national and global economic changes. Earlier, in the Keynesian cities of advanced capitalism, the state agreed to share a considerable part of social reproduction, from housing to welfare, transportation, and infrastructure, expressing a peak in the relationship between social reproduction and urban scale. The contemporary cities need to be analyzed in their contextualities in terms of the wider economic restructuring, weakening of the State at the national scale, and its response to the priorities of market. The process is closely connected with the neoliberal doctrine sweeping across the world characterized by an uneven and problematic inclusion of the urban process of the South in the global urban system and generalization of gentrification as a universal global urban strategy. Cities of the South have started showing signs of intense spatial crisis, reflecting contradictory processes of inclusion and exclusion. The foregoing crisis is characterized by constraints in social planning, withdrawal of the State from and increasing involvement of international financial institutions in urban development and projects, privatization of basic urban services, heightening gentrification, and conversion of a larger city space for elitist consumption and a growing exposure to a global competitive framework leading to extensive place-marketing. In the light of the foregoing, this chapter offers a critical analysis of the contemporary urban policy in India and examines its socioeconomic implications at a wider scale.

Keywords Dispossession • Gentrification • Neoliberalism • Restructuring • Space • Urban policy

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4.1 Introduction

The consolidation of the worldwide regime of ‘disciplinary neoliberalism’ (Gill 1995) at the urban scale has been examined substantially by scholars (Amin 1994; Harvey 1989; Smith 1996; Mitchell 2001, 2002; Brenner and Theodore 2002a) from the North. Few opinions, however, have originated from the South and fewer from South Asia on the specificities of policies, institutional framework, and consequences of urban neoliberalism. Discussions are also extremely scanty on the contemporary city-centered strategies of multilateral financial institutions (MFIs) such as the World Bank (WB), International Monetary Fund (IMF), and the Asian Development Bank (ADB) that, in recent years, have been systematically redirecting investment from ‘region’ to ‘urban’ to promote neoliberalism in these countries as part of their ideological and functional sustenance: it is evident in the extraordinarily renewed metropolitan bias in the urban policy of these countries, the predatory nature of the growth of large cities, and, finally, the current vigorous pursuit of their economic regeneration. An adequate understanding of the contemporary neoliberal urban process, especially in these countries, hence requires not only a grasp of its politicoeconomic ideological framework but, equally importantly, its multiscalar institutional forms (Banerjee-Guha 2002a, 2009b; Brenner and Theodore 2002b), its diverse sociopolitical links, and the multiple contradictions.

With the foregoing background, I intend to examine the active engagement of neoliberalism in the current urban policies in India that is not only molding the entire concept of urban but simultaneously intensifying unevenness in interurban and intraurban development almost as a structural component. The following section briefly examines the recently launched Jawaharlal Nehru National Urban Renewal Mission (JNNURM, henceforth mentioned as NURM) of the Central Government, and its various implications. This point is followed by a discussion on the contemporary neoliberal praxis in urban planning and governance in a few cities of India, including Mumbai, the country’s budding international financial center, with a focus on its redevelopment. The conclusive section examines the imperatives of neoliberal urbanism in the Indian context, the associated urban policy, and its contradictions.

4.2 Practicing Neoliberal Urbanism in India: Jawaharlal Nehru National Urban Renewal Mission (JNNURM)

Since Independence, externally assisted urban sector projects in India have accounted for more than U.S. \$230 million. In the mid-1990s, following the introduction of the New Economic Policy, the infrastructural facelift of cities was identified as a major panacea to reduce urban decadence by the pro-liberalization forces in the country. Consequently, in 1996, the Expert Group on Commercialization of

Infrastructure estimated a requirement of about Rs. 2,50,000 crore¹ investment in urban infrastructure for the coming 10 years. This expectation made the entry of private capital an imperative in the urban development scenario with the public sector, as announced, lacking funds. Accordingly, a major overhaul of the administrative and legislative frameworks of the government was suggested that smoothed the process of involving MFIs such as WB, ADB, and development aid agencies such as the United States Agency for International Development (USAID) and the Department for International Development (DFID) in the drafting of the urban reforms mandate. This stage marked the beginning of a new regime of regulation in the Indian urban sector and also cleared the ground for vigorous implementation of state-sponsored neoliberal programs in a number of cities in subsequent years. All this had a diverse impact on sectors such as municipal finance, infrastructure, basic services, the land and housing market, land use, urban form, and most importantly, the shelter and livelihood of the millions of urban poor. Reproduction of urban space in this manner reflected the contradictions of economic globalization at a local scale (Sassen 1991), exposing a deep structural imbalance (Banerjee-Guha 2004, 2006). A point that needs to be mentioned here is that since the 1990s, the MFIs have vigorously taken part, more than before, in drafting the policy framework of several nations. The agreements and treaties signed at their behest at cross-country levels have enforced a mandatory 'opening up' of the governance of these countries that has drastically gone to replace the State and democratic policymaking framework by non-state bodies, sacrificing general welfare, labor security, and environmental protection at various levels.

To tackle the acute urban crisis resulting from the unrelenting urbanization process, the Indian Central Government launched its largest post-Independence urban planning initiative in 2005, entitled the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), henceforth referred to as NURM (National Urban Renewal Mission). Essentially aiming at putting the cities on a fast track of development through urban reforms, the primary evil that the Mission identified was the gap between the disproportionately fast pace of urban growth and urban infrastructural development. Hence, the primary thrust of the program to date has been gigantic infrastructural projects that are being administered at a fast-track pace, indicating the severe structural anomaly that exists between the two submissions, that is, the modern infrastructure and gentrification projects on the one hand and the Basic Services for the Urban Poor (BUSP) on the other. Although the infrastructure budget has increased from nearly Rs. 260 crores in 2007–2008 to a whopping Rs. 574 crores (approximately) in 2011–2012, even after 3 years of the introduction of the Mission, either funds for BUSP have not been released, in most cities, or the released funds have remained unutilized.

In the same vein, the Mission has labeled urban poverty as the chief cause for unregulated urban growth, environmental damage, and growing crime rates in cities. The *raison d'être* for the Mission echoed the rationale of a neoliberal order: creating a global, secure, and homogenized urban society. That the premise of this

¹ 1 crore = 10 million.

homogenization rested on an acute contestation of the urban space (Banerjee-Guha 2002b) and a selective “first worlding” of certain areas (Katz 2001) has remained hidden. A careful examination shows that Indian cities are fast emerging as critical zones of contest (Banerjee-Guha 2009a), with a miniscule but exceedingly powerful global society and a huge majority of the marginalized, standing spatially anchored and creating backgrounds of intense conflict and utterly contradictory/competitive urban landscapes.

Although a classification of reforms into optional and mandatory was made, essentially, in practice, all NURM-prescribed urban governance reforms seem to be mandatory for cities undertaking the Mission programs. In addition, all urban local bodies (ULBs) need to prove financial stability for accessing capital market funds (Jamwal 2006). A further precondition for the states to access funds is that they need to set up para-statal, nonelected nodal agencies that will be made responsible for evaluating projects, releasing funds to ULBs/para-statal units, managing the same funds and monitoring projects. Projects with private sector participation are to be given priority over projects submitted by the ULBs/para-statal units by themselves. In the Eleventh Plan draft, Public-Private Partnership (PPP) had already been accepted as the prime alternative to fund infrastructure projects. Public-private partnership models now were projected as the ultimate panacea in NURM for providing basic services that went at par with Central Government’s National Common Minimum Programme (NCMP). Actually aiming at removing all impediments to land and housing markets, this direction in urban policy in search of economic growth and competitiveness not only embodied the new politicoeconomic regime introduced in 1991, but also emerged as a catalyst of urban and political change in the country.

To be eligible, the municipal corporations were required to prepare City Development Plans (CDP), a 25-year-vision document defining the direction of development in their respective entities. All previous central government funding and urban development schemes, such as the National Slum Development Programme, Swarna Jayanti Sahakari Rozgar Yojana, Valmiki-Ambedkar Aawaas Yojana (for housing the socially marginalized urban poor), and National Transport policy, were brought under the Mission. Projects that received priority were mega-infrastructure projects, gigantic commercial complexes, shopping malls, cultural facilities, and urban spectacles. One by one, cities started joining the bandwagon and pledged commitment to private capital for transforming their physical and institutional landscapes. Several NGOs in different cities were also co-opted to sway people about the efficacy of public-private partnerships.

A careful look at NURM proves that it is essentially a reform-linked investment program of the private capital targeting Indian cities. The key items are (i) privatization/commercialization of basic services through public-private partnership with an introduction of user fees; (ii) liberalization of land and real estate market through repeal of Urban Land Ceiling Acts and change in Rent Control Acts; (iii) development of a stronger mortgage market, 100 % FDI in housing and real estate; (iv) easier land use conversion norms; (v) reforms in property tax and reduction in stamp duties; (vi) financial and administrative restructuring of municipalities through

implementation of the 74th amendment of the Constitution; (vii) rationalization and outsourcing; (viii) introduction of e-governance; (ix) valorization of private sector and private credit rating agencies over elected civic bodies; (x) co-opting the middle class through high-flown rules such as the right to information, public disclosure law, citizens' participation law, etc.; and (xi) bringing the urban poor into the orbit of the pay-and-use framework, for example, user fee for basic services (CASUMM 2006). The sweeping transformation of urban governance is meant to create a functional impotence of democratically elected bodies and encroach upon the constitutionally devolved areas of state government jurisdiction.

NURM redevelopment projects are legitimizing a developmental logic that views mega projects and place-marketing as means for waging a competitive struggle to attract investment capital. Their impact is felt at all levels: local, regional, national, and international, illustrating the actual concrete process through which postmodern forms, post-Fordist economic dynamics, and neoliberal systems of governance are crafted, producing a new articulation of regulatory scales. The associated new urban policy, developing in parallel with the neoliberal economic policy, thus squarely revolves around recentering the city, replacing old forms, functions, and organizational configurations by a new urbanity and assertive entrepreneurial urban governance (Fig. 4.1). Simultaneously, the re-imagining of the city space is made keeping in mind the consumption pattern of the investor, the developer (Swyngedouw et al. 2002), and the rich, and least of all the common people whose sweat and toil have contributed to the city's growth in different phases. With this perspective, let us have a brief overview of the recent redevelopment initiatives in a few Indian cities.

4.3 Neoliberal Urbanism, NURM, and Indian Cities

It is quite apparent that NURM is more a requirement for big capital to invest in Indian cities for making profit. The urban local bodies and State governments, as part of the reforms, are required to take loans from commercial institutions such as WB, ADB, Infrastructure Development and Finance Corporation (IDFC), and Housing Development Finance Corporation Limited (HDFC) for infrastructural funding that is given high priority. Hyderabad had to restructure a number of public sector enterprises in accessing a fund of Rs. 1,500 crore for infrastructure from the WB. The globally funded large infrastructure projects, which are being artificially injected (Baran 1958) into the existing socioeconomic structures of several cities for the benefit of a small section of the population, have already started impacting the poor in a negative manner by displacing them from their occupation and homes that cannot be compensated by any rehabilitation package. Above all, the ominous link between NURM and global capital as a part of a larger neoliberal capitalist agenda is being exposed by the urgency of implementing such projects that have close involvement with global consulting firms such as McKinsey in their formulation in several cities.

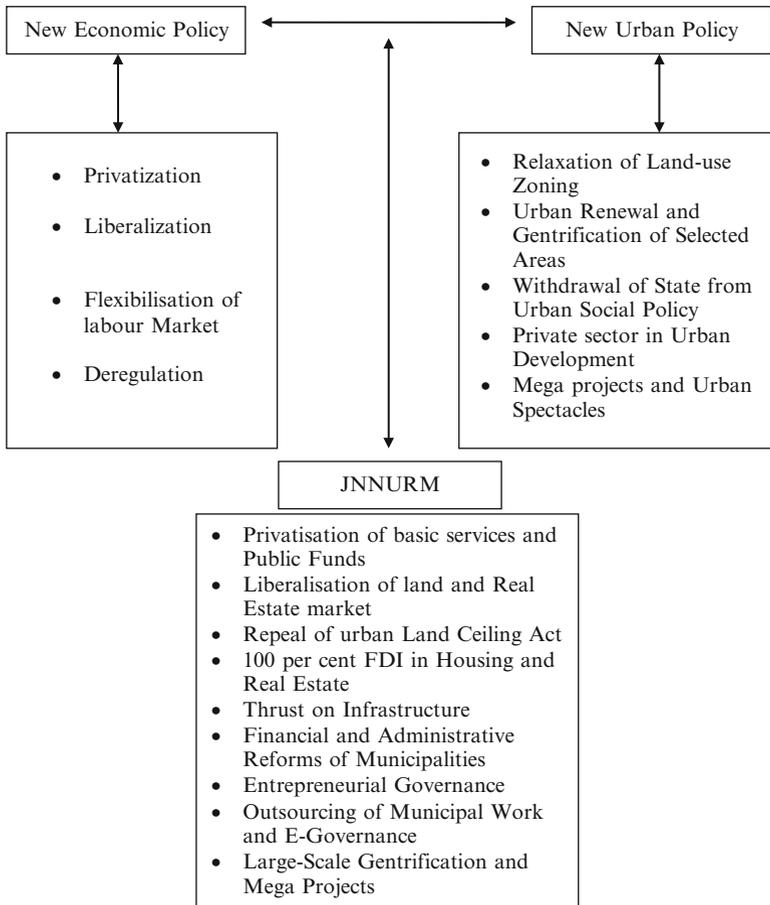


Fig. 4.1 Relationship between NEP, NUP, and Jawaharlal Nehru National Urban Renewal Mission (JNNURM) (Adapted from Swyngedouw et al. 2002)

Take, for example, Pune's city development plan. It was drafted by the Credit Rating Information Services of India Limited (CRISIL) with technical assistance from the Financial Institutions Reform and Expansion-Debt (FIRE-D) Project of the USAID or, for that matter, the formation of the Municipal Association of West Bengal, a product of the same FIRE-D project (Banerjee and Mukherjee 2008). Along with the MFIs, key policymaking academic institutions in the country that are funded by international development organizations have also been made a part of formulating mission policies, to make the subsequent process of intervention easier.

In and around Kolkata, abolition of the Urban Land Ceiling and Regulation Act, has opened up possibilities of recreating huge spaces for upscale activities for which, similar to the mill lands of Mumbai, former industrial areas are being cho-

sen. For example, the Calcutta Riverside Project coming up in Batanagar, to the south of the Kolkata metropolis on 262 acres of land, covers more than 80 % land area of the former Bata India Limited and Batanagar industrial township. As a consequence of outsourcing of production, a practice the factory has been following for a long time, the organized workforce has dwindled from 15,000 to 1,600 workers in recent years. The Riverside Project aims at developing a nine-hole golf course (that will use an enormous amount of water from the surrounding region), high-end villas (where a duplex flat will cost about Rs. 1.11 crore), condominiums, hotels, an Information Technology Park [for which a special economic zone (SEZ) is being planned], hospitals, schools, and a shopping mall that would be one of the largest in eastern India. The 1.2-km riverside is being developed for recreational activities for residents and visitors. For developing the project, Bata Company has set up Riverbank Holdings Private Limited, a joint venture with Calcutta Metropolitan Group Limited (an alliance between Kolkata Metropolitan Development Authority and United Credit Bellani Group).

Similar developmental activities are found to have taken over the 400-acre Hindustan Motors land in Uttarpara, located north of Kolkata. With real estate stepping in, not only the former workers (Hindustan Motors has been long since defunct) but many neighborhood communities have faced eviction. The former Annapurna Glass factory in Jadavpur (in South Kolkata) has been recently converted into a gigantic residential complex, and the defunct Joy Engineering Works nearby is presently housing eastern India's largest real estate complex with four 35-story residential towers and a mall occupying an area of 1,000,000 ft².

Large market complexes, formerly owned by Kolkata Municipal Corporation, each occupying 3 to 4 acres, are being handed over to private capital under the pretext of lack of maintenance and resource crunch. The state government has declared that within 2 years Kolkata and the adjoining city of Howrah will have 12 more multiplexes (Bandyopadhyay and Mukhopadhyay 2009). All these developments that are coming up under NURM projects have an underlying logic of urban renewal that aims to create economic regeneration in declining industrial areas, promote a postindustrial international city, foster diversification of the urban sectoral mix, and support job creation in presumably 'dynamic' sectors such as culture and leisure. To preclude resistance, systematically poorer affected groups such as petty traders, hawkers, or vendors are being labeled as encroachers or illegal occupants of public spaces.

Similar to Kolkata, in Hyderabad most of the NURM housing projects for the poor are systematically located in the outskirts of the metropolis, contributing toward a process of making "slum-free" cities in India. The relocated settlements, devoid of basic infrastructure, have no socioeconomic livelihood base on which the poor can depend to continue or renew their struggle for survival. Moreover, increase in the gaps between the plan budgets and the actual expenditure incurred proves the real purpose of the Mission (Varma 2008). What is more, the scrapping of ULCRA in the city has come up as a significant means to 'reclaim' lands on which slums were built. In addition, the Hyderabad metro rail project coming under the head of

infrastructure is going to demolish huge pedestrian shopping areas such as Sultan Bazar and Badi Chawdi that are almost historical landmarks. The project, by the way, will also deface about 27 of the 137 listed heritage precincts of the city. Interestingly, the successful bidder of the project, the Navbharat-Maytas-Ital Thai (ITD-Thailand)-Il&Fs consortium, has not asked for any viability gap funding; rather, it has offered a royalty of Rs. 30,311 crore to the state government for which it is even proclaimed that Hyderabad is going to get the metro rail 'for free' with a 'negative subsidy' (Ramachandraiah 2009). In reality, the so-called viability gap funding cannot match the concessions that are being offered to Maytas. According to the corporate group's demand, real estate development (RED) and rail-related infrastructure have been accepted as a part of the rail system development for which 538 acres in various locations are being handed over to Maytas. If the state government fails to hand over these lands, alternative sites of comparable size and potential are being kept ready. Local taxes will not be applicable to RED that would receive all benefits under the Andhra Pradesh Infrastructure Development Enabling Act (2001). The huge economic and social costs that thousands of people displaced by the project will have to bear in addition to the cost of land acquisition are also not mentioned (Ramachandraiah 2009).

The foregoing story of inequitable real estate activities becoming intrinsically entrenched with urban infrastructure projects has become a common feature in the contemporary Indian urban planning scenario. In Bangalore, for example, under the guise of public-private partnerships, the current development policy is prioritizing the concerns of a new middle class, especially the information technology (IT) professionals, in taking up huge real estate projects (Mukherjee 2008). Development plans of smaller cities such as Bhopal or Kochi are also using similar rhetoric of transforming cities with modern lifestyle, healthier environment, and better quality of life for the poor (Singh 2008). In Bhopal, slums are actually being shifted to distant peripheries, and heavy user charges are levied on basic infrastructure in the city slums. The actual number of slum dwellers in this city has been reduced in the official statistics (slum population of 3.99 lakhs in 1991 came down to 1.26 lakhs in 2001) by which huge sections of the urban poor are labeled as encroachers (Singh 2008). Cities such as Chandigarh, Ahmedabad, or Jaipur with an average population of 15 lakhs are also hit. One third of the 300 new malls in the next 5 years are going to be located in these cities (TOI 2009) that have started experiencing a tremendous real estate boom. A growing interest from a peripatetic capital is manifested that hopes to reap profit from comparatively cheaper land, labor, and infrastructure costs of all these cities.

Let us look closely at Mumbai, the budding international finance center (IFC) of the country. The task of reconstituting the status of Mumbai as a globalized city was initially achieved through production disaggregation and flexibilization of labor (Sassen 1991; Banerjee-Guha 2002b) that reflected a wider restructuring of the economy. Together, it reconstructed a new image of Mumbai as a 'world-class' finance center, seemingly more attractive than its former identity of being the industrial capital of the country. In 1993, McKinsey, the international consultancy firm, made a strong case for developing Mumbai as a global financial center and voted for

a relaxation of land acquisition rules and disciplining labor. Following suit, in 1995, turning back from its previous agenda of decentralization and balanced urban development, the MMRDA (Mumbai Metropolitan Regional Development Authority) advocated a more centralized investment (MMRDA 1995) in the metropolis. The Plan had an eerie resemblance to the 10-year 'Vision Plan' of Bombay First (an NGO of the Bombay Chamber of Commerce and Industry); with flamboyant ideas about Mumbai's crucial role in India's liberalization process (Bombay First 2003). The same was subsequently echoed by the Maharashtra government in its Mumbai Transformation Project and City Development Plan of Mumbai. A careful examination of all these plans makes it clear that through them the notion of neoliberalism as economic regeneration and governmentality was legitimized in Mumbai, following which the distinctions between state, civil society, and the market (MacLeod 2002) became considerably blurred, and city space, in the name of planning, was mobilized as an arena for both market-oriented economic growth and elite consumption practices.

Targeting four "high-end" services for the city, namely, financial services, health care, IT-enabled services, and media/entertainment/telecom for the coming years, the plan advocated either total privatization or public-private partnership for projects in all these sectors. Job potentiality for the next 10 years was identified in construction, hotel/tourism/recreation, and modern format retail, particularly in upgraded museums, multi-purpose indoor stadiums, and convention centers (in line with Madison Square Garden), in cafés and restaurants in western and eastern seafronts, and restaurants, and bars, in supermarkets and hypermarkets to be located inside the city and on highways. Nowhere there is a mention of Mumbai's potential as a strong production center or the million jobs it had lost. A shift of capital from production to built environment underlies the basis of these plans that have identified Mumbai as the future consumption center of the country. Growth of the city, targeted at 8–10 % per year, is envisaged through the services market, financial sector, entertainment and health sectors, and, last but not the least, the IT sector.

The state government in its Mumbai Transformation Project has come up with a promise to transform Mumbai into an IFC with world-class infrastructure, 'sunrise industries,' citizen-friendly services, and a business-friendly environment. Accordingly, the mill areas in the heart of the city, the dock lands in the eastern parts, and the huge slum of Dharavi, located to the north of the mill lands, are getting gentrified, displacing millions. Neoliberalism has become an overarching frame of reference for contradictory discursive events linking livelihoods and everyday aspirations of individuals to a new conceptual of urban. In the process, this idea is legitimizing dispossession of the poor and a simultaneous integration of the urban bourgeoisie into the competitive city governance through the 'revanchist' (Smith 1996) methodology of urban restructuring that intends to make Indian cities beautiful and slum free. With an entrepreneurial planning model facilitating speedy conversion of land use, financial institutions and private banks are found to come out as active partners and buyers of the renewed infrastructure and assets, initiating fast-track gentrification in the city.

The segregated gated communities, shopping malls, and publicly subsidized corporate plazas essentially represent the living embodiments of ‘interdictory spaces’ (Flusty 2001), designed to exclude those adjudged to be unsuitable and threatening, whose class and cultural positions diverge from the targeted consumers of the new space. The ensuing urban forms manifest a disturbed and uneven patchwork of micro spaces that Soja (2000) identifies as splintering ‘post-metropolitan’ landscape, an archipelago of enclosures that both voluntarily and involuntarily barricade individuals, inscribing an entirely new urban geography and a new generation of spaces in Mumbai, the financial capital of the country.

In spite of differences between the projects from one city to another and the diversity in political background of the regional governments, the urban planning methods instanced here have emerged as a general practice, clearly indicating a shift from distributive policies, welfare provisions, and direct service provisions to a more market-driven and market-oriented approach aimed at promoting competitive restructuring. In most cities, urban redevelopment and gentrification are projected as an opportunity to change economic hierarchies within the urban region. Going by the impact in several cities, a persistent fact that is being reiterated about NURM is its systematic tendency toward increasing social inequality. That this attitude constitutes the fundamental core of neoliberalism (Harvey 2005), and not its by-product (many researchers are imploring that NURM needs to be more inclusive and committed toward the poor), is something that needs a thorough exposure.

4.4 Conclusion/Logic and Imperatives of Neoliberal Urbanism in India

To understand the logic of remaking Indian cities, we first need to look at the changing position of the Indian economy with the introduction of the New Economic Policy and the role of ‘urban’ therein. In the Seventh Plan (1985–1990) thrust was put on private investment in urban development that went against the previous policy of urban decentralization. The National Commission on Urbanization in 1985 also advocated private sector entry in the provision of urban services and centralization (Kundu 1989) in large cities. The 74th Constitutional Amendment Act in 1992, although it brought in political decentralization, made the urban local bodies politically weaker and functionally restricted with reduced budgetary allocations. Their additional responsibility of raising funds from the capital market (Banerjee-Guha 2002c) led to compromises on pro-poor projects. Following the introduction of the New Economic Policy in 1991, the Mega City Programme of the Central government (Banerjee-Guha 2002c) was launched with an objective to develop infrastructure of large cities (identified as GEM: generating economic momentum) that again led to renewed investment in mega-cities at the cost of depriving the medium and small urban centers.

The foregoing focus on large cities actually fills the bill of a larger neoliberal world order and the first issue becomes linked with the second; that is, the ascendancy of neoliberalism as the contemporary global order with its thrust on the entrepreneurial model of governance, economic regeneration, and urban restructuring (Brenner and Theodore 2002b). This notion is again intertwined with the increasing role of MFIs such as WB, ADB, and DFID in India's urban scenario. The foregoing global-local nexus and a much greater involvement of the private sector in contemporary urban development have surfaced as almost a structural element of NURM, symbolizing a State-supported neoliberal urbanism initiated as a market imperative. As a result, cities are being restructured on all fronts: land use, infrastructure, and governance. The third issue focuses on the materialization of entrepreneurial cities representing the praxis of 'neoliberal' at a local scale. It shows how the contemporary neoliberal urban political arena is being ever more influenced by powerful business interests through public-private partnerships having less concern toward wealth distribution and welfare. India's current entrepreneurial regime is all set to perk up the competitive position of urban economies through privatization, demunicipalization, and recommodification of social and economic life (Leitner 1990) at an unprecedented large scale. Here lies the significance of making Mumbai the country's future IFC (HPEC 2007), robbing millions of their homes and livelihood. All these three issues are simultaneously entangled with the restructuring of a welfare state into a more vociferous and market-friendly structure, abetting the foregoing processes.

The shift described here essentially expresses the contradictions of a globalized space featuring contestation and differential claims. Further, a metropolitan dilemma lies at the heart of the processes signifying the shift. The shift works toward the segmentation of society and space at both global and local levels, having a systematic inclination toward marginalization of the poor and disadvantaged. In contemporary cities across the world, globalization of capital, labor, and culture has been found to have produced extreme heterogeneity rather than a mere dualism, to be legitimized as a metaphor of diversity by the postmodern. Almost every facet of economic and sociocultural life, from the disaggregated labor market, marginalized poorer sections, hyper form of architecture, and bourgeois-dominated urban politics, right up to the media-promoted liberated lifestyle, goes to make these cities spaces of contradiction, simultaneously reflecting the processes of accumulation and dispossession (Banerjee-Guha 2004).

Implantation of such global processes in cities of the South gives rise to a range of impacts on the city space and on the vast terrain of the peri-urban as well. Although the metropolis experiences several contradictory articulations of growth and decline at the same time, the peri-urban, containing settlements of various orders and levels, is becoming simultaneously unhinged from and again distortedly connected with the metropolis through a subcontracting chain of the emergent transnational economic system, that directly works toward a narrow sectoral development of a high-technology and information-based order, restricting redistribution of income in the larger metropolitan regions. Flight of capital from manufacturing to services, deindustrialization of certain areas with transformation of some others

into corporate enclaves, and destruction of the traditional working class and the organic livelihoods of a huge number have become leitmotifs of the current urban transformation. Examples of sociospatial disparity arising out of these disruptions are found abundantly in several metropolises and across countries. Understanding the emerging spatiality of this 'new urbanism' is the need of the hour. It is equally important to link this understanding with a proper vision of social justice and right to the city.

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Chapter 5

Sustainable Urbanization in India: Experiences and Challenges

Jitender Saroha

Abstract Urbanization brings about a variety of spatial, economic, social, demographic, and environmental changes. Some of these are positive whereas others are negative. Despite the tremendous potential of cities to provide quality of living conditions, urban problems limit their sustainable growth. Sustainable urbanization requires a balance between the development of the urban areas and protection of the environment with an eye to equity in employment, shelter, basic services, social infrastructure, and transportation in urban areas. The present urban chaos in India is mainly the result of ineffective and inefficient urban management, multiplicity of authorities, inadequate revenue base, lack of coordination between various municipal agencies, and the nonparticipatory attitude of stakeholders. Therefore, the objectives of the present chapter are (i) to analyze trends of urbanization in India, (ii) to highlight the problems and limitations of the urbanization process in India, and (iii) to suggest measures to make urbanization sustainable.

Keywords Crime • Sanitation • Slums • Sustainable urbanization • Transportation

5.1 Introduction

Sustainable urbanization refers to attaining social equity and ecological balance along with economic growth. It specifically means achieving a balance between the development of the urban areas and protection of the environment, with an eye to equity in employment, shelter, basic services, social infrastructure, and transportation in urban areas. By and large, the nature and extent of growth of Indian cities is unplanned and unanticipated; the provision of services is not proactive but reactive (Jain 2008). The demand for services, such as transport, water, and sewerage, continually outstrips supply, resulting in a situation of perpetual scarcity and shortages.

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Therefore, the objectives of the present chapter are (i) to analyze the trends of urbanization in India, (ii) to highlight the problems and limitations of the urbanization process in India, and (iii) to suggest the measures to make urbanization sustainable.

Urbanization often brings about a variety of spatial, economic, social, demographic, and environmental changes. Some of these are positive and others are negative. Cities offer job opportunities, provide better infrastructure, and promote social and economic mobility; their impact is revealed in improved indicators of quality of life. Urbanization is an indicator of economic development. Urban agglomerations afford economies of scale in both manufacturing and services activities and also in provision of infrastructure services. Urbanization should be seen as a positive factor for overall development, as is manifested in the increasing contributions of the urban sector to the national economy. For instance, in 1950–1951 the contribution of the urban sector to India's GDP was only 29 %, which increased to 47 % in 1980–1981; presently, it is contributing 62–63 %, and is likely to be 75 % by 2021 (Ministry of Urban Development 2006a).

In contrast, Indian cities suffer from acute housing shortages, environmental pollution, water and power shortages, and a crowded and inefficient transport network. The big cities are leaving ecological footprints on their hinterlands by vast consumption of both nonrenewable and renewable resources such as water, forests, and land. The present urban chaos is also caused by ineffective and inefficient urban management, multiplicity of authorities, inadequate revenue base, lack of coordination between various municipal agencies, and the nonparticipatory attitude of the stakeholders. Despite the tremendous potential of cities to provide quality of living conditions, the foregoing constraints limit their sustainable growth. Unless some serious legal, institutional, governance, and economic planning interventions are initiated, the future of Indian cities will remain unproductive, unhealthy, and unsustainable (Nath 2007).

5.2 Trends of Urbanization

In the twentieth century (1901–2001), the population of India increased about 4 fold whereas the urban population increased 11 fold. The urban population constituted 27.75 % of the total population of India in 2001. As compared to the world level of urbanization (50 %), the level of urbanization in India is low and the process is slow (Bhagat 2007). In absolute terms, however, the size is large, that is, 285 million (Table 5.1). Average annual rate of change (AARC) of the total population in India during 2000–2005 is estimated at 1.41 %, with 2.81 % for urban and 0.82 % for the rural sector [Report of 11th Five-Year Plan (2007–2012) Working Group on Urban Housing with Focus on Slums, Ministry of Urban Development 2006b]. AARC for urban areas during 2005–2030 will increase to 2.25 % whereas the rural population will decline to –0.40 %, showing a clear shift of population from rural to urban in the twenty-first century.

Table 5.1 Trends of urbanization in India (1901–2001)

Year	Urban population (in millions)	Urban population as % of total population	Decennial growth rate (%)	Annual exponential growth rate (%)
1901	25.85	10.84	–	–
1911	25.94	10.29	0.36	0.03
1921	28.08	11.18	8.27	0.79
1931	33.45	11.99	19.12	1.75
1941	41.15	13.86	31.97	2.77
1951	62.44	17.29	41.42	3.47
1961	78.93	17.97	26.41	2.34
1971	109.11	19.91	38.23	3.21
1981	159.46	23.34	46.14	3.83
1991	217.55	25.72	36.19	3.09
2001	285.36	27.75	31.20	2.71
2011	377.10	31.16	31.80	2.81

Source: Census of India, 2001, Provisional Population Totals, Census of India, 2011

Table 5.2 Urban population (%) by size class in India (1901–2001)

Year	Class I (100,000 or more)	Class II (50,000–99,999)	Class III (20,000–50,000)	Class IV (10,000–20,000)	Class V (5,000–10,000)	Class VI (<5,000)
1901	26.00	11.29	15.64	20.83	20.14	6.10
1951	44.83	9.96	15.72	13.83	12.97	3.09
2001	62.29	12.04	14.72	7.90	2.76	0.29

Source: Census of India, 2001

The Census of India, on a population size basis, divides the urban population into six classes. Class I, with a population of 100,000 and more, dominates the urban scenario. It constitutes around 62 % of the total urban population of India. The relative share of different class towns shows different trends (Table 5.2). The relative share of class I has increased exponentially, the share of class II and III has remained almost stationary, and the share of class IV, class V, and class VI has declined from around 47 % to just 11 %. As per the Provisional Population Totals of Census of India 2011, class I has 265 million persons, constituting 70 % of the total urban population. Urban growth and pattern are characterized by uneven distribution with few larger (metropolitan and mega) cities growing at a faster rate and containing a disproportionately large share of urban population whereas the numerous small- and medium-sized towns exhibit slow and sluggish growth with a low share of the total urban population.

Of 468 urban agglomerations (UAs)/towns belonging to class I category, 53 have a population of one million or more each and they constitute 42.6 % of the urban population in 2001; their number was 35 (Census of India 2011). There are three

very large UAs with more than ten million persons in the country, known as mega-cities: Greater Mumbai UA (18.4 million), Delhi UA (16.3), and Kolkata UA (14.1 million). The trend of urbanization in India is toward centralized urbanization although the decision makers wanted it to be decentralized. The trends of urbanization in India in recent decades indicate the following key features: (i) continued concentration of urban population in larger cities and existing urban agglomerations; (ii) slowing of urbanization during 1981–1991 (36.2 %), 1991–2001 (31.2 %), and 2001–2011 (31.8 %), as compared to 1961–1971 (38.2 %) and 1971–1981 (46.1 %); and (iii) large variations in the spatial patterns of urbanization across the States and cities.

The pattern of population concentration in large cities reflects the spatial polarization of employment opportunities. This phenomenon has led to a tremendous pressure on civic infrastructure systems: water supply, sewerage and drainage, solid waste management, parks and open spaces, transportation, etc. It has also led to deterioration in the quality of the city environment. In several cities the problems of traffic congestion, pollution, poverty, slums, crime, and social unrest are assuming alarming proportions. However, there is also another side of population concentration in cities. The large cities are engines of growth and generators of resources for rational economic development.

The role of cities in economic development is divided into two broad categories, the parasitic and the generative cities. Parasitic cities are those that drain the resources from their surrounding regions without giving much in return. The generative cities permeate their influence into the surrounding regions stimulating change and development with socioeconomic growth in the region and the city itself (Hoselitz 1960). In India, the centralized urbanization trend is an indicator of growing regional imbalances. The polarization effects are indicator of a parasitic role. Even in the National Capital Region the planned efforts have failed to decongest the main city, Delhi. Metropolitan region planning has failed, and metropolitan centers have emerged as primate cities.

What, therefore, we need in the country is a balanced urban system with a large metropolis at the apex supported by and, in turn, supporting a large number of micropolises and intermediate towns and cities. Such a system must be organically and generatively linked to the hundreds of thousands of rural settlements both vertically and horizontally. Thus, the question that needs to be posed is how to make the urban system of a country balanced so that the large cities play a generative role. It is unfair to brand large cities as parasitic without giving due consideration to the fact that the constraints within which they operate play an important role in social and economic transformation (Misra and Dung 1998).

The half-hearted attempts to slow down growth of the large cities, based on strategies such as industrial dispersal to underdeveloped regions, have proved to be ineffective. The results have been threefold: (i) increasing unemployment and underemployment in the cities and very low productivity in their informal sectors, which have had to absorb most of the in-migrants; (ii) acute housing shortages and increasing pressures on urban services, which have led, in turn, to increasing congestion and the proliferation of slums; and (iii) progressive deterioration of the

physical environment. The strategies for management of rapid urban growth must satisfy two essential conditions. First, they must meet the needs for gainful employment, housing, and essential services of the rapidly increasing urban population at acceptable economic and social costs. Second, they must ensure that urban growth contributes to national and regional economic growth, particularly through growth-inducing urban–rural interactions (Nath 2007).

The studies of Hoselitz (1960), Sovani (1964), and Bose (1978) have suggested that urbanization has gone ahead of economic development, leaving a wide ‘development gap’ that appears in two different forms: (i) in the form of over-urbanization, that is, urbanization exceeding the range of economic development, and (ii) in the form of a marked deficiency of urban facilities and services.

5.3 Problems of Urban Development

Urban problems and urban development are admittedly important national issues in India, but ultimately much of the burden of solving these problems lies on local administration—municipalities and corporations—and most of the money has to come from local or municipal finance. At the local level, political pressurization, municipal corruption, and administrative inefficiency perhaps play a much more important role than at the state level or the central level. At the heart of India’s urban problems are grossly inadequate inputs of finance and management needed for efficient functioning of urban government and for expansion of housing and services to keep pace with the rapidly growing urban population. Provision of adequate finance will not be easy because of the great demand. But steady progress toward reducing the present inadequacy can be made, if there is greater perception of the interdependence between urban and rural development. The present shortages of urban housing and the inefficiency of urban services not only cause great hardship to the urban population but also result in enormous losses of output. They act as a major disincentive on productive investment. The latter effect is most apparent in the case of services, such as electric power, because prolonged cuts and erratic supplies have become a daily occurrence in most cities. India’s cities and urban regions face a difficult future. Urban infrastructure and housing are inadequate and cannot absorb the massive numbers of newcomers. Urban economic and social conditions are deteriorating, which results in higher levels of unemployment and social unrest. Migration from the countryside continues unabated and in some cases is accelerating. In these adverse circumstances, India’s urban areas must become the focus for new policy initiatives emphasizing population control, rural development, and urban growth containment (Nath 2007).

According to the Report of the Technical Group on Estimation of Housing Shortage, constituted in the context of preparing the 11th Five-Year Plan document, housing shortage as of 2007 is estimated to be around 24.71 million and housing shortage during the plan period (2007–2012), including the backlog, was estimated as 26.53 million, of which 21.78 million are related to the economically weaker

Table 5.3 Slum population in selective municipal corporations of Million Plus, 2001

Million+ municipal corporation	Total population	Total slum population	Slum population (%)
Greater Mumbai	11,978,450	6,475,440	54.1
Delhi	9,879,172	1,851,231	18.7
Kolkata	4,572,876	1,485,309	32.5
Chennai	4,343,645	819,873	18.9
Surat	2,433,835	508,485	20.9
Pune	2,538,473	492,179	19.4
Nagpur	2,052,066	737,219	35.9
Ludhiana	1,398,467	314,904	22.5
Meerut	1,068,772	471,581	44.1
Faridabad	1,055,938	490,981	46.5

Source: Census of India, 2001

sections (EWS) and 2.89 million to the low-income group (LIG). In addition, there are substandard housing units that need improvements, both structural and sanitary. Most of the housing shortage is for EWS and LIG sections, which does not seem to becoming translated into economic demand because of lower affordability by the poor. A sizable number of this requirement leads to squatters and slums. Mumbai, which is known as the commercial capital of India, is basically a *slumpolis* as 54 % of the population resides in substandard housing units. In the case of Kolkata, this proportion is around one third. In the satellite metropolis, Faridabad, around 47 % of the population is concentrated in slums (Table 5.3).

In 2001, 33.4 % of urban households lived in one-room accommodations. It is extremely hard for the lower middle income group to afford to own a home or flat. Rental units are also in severely short supply. The poor section of the society mostly lives in slums and some are homeless, sleeping on the pavement. It is a gigantic challenge for the nation to provide adequate housing (Das 2007). In spite of ever-increasing investments in housing programs, the problem remains stupendous. It is a paradox that the number of homeless, squatters, and slum dwellers in the Indian cities is increasing in proportion to public housing programs.

Starting with the Slum Area Improvement and Clearance Act of 1956, the objective of the public agencies had been to make the city slum free and provide housing to the slum dwellers. In general, a three-pronged strategy had been adopted for improvement of shelter for those residing in the slums or *Jhuggi-Jhopri* (JJ) clusters: (i) relocation/resettlement, (ii) on-site upgradation, and (iii) environmental improvement in JJ clusters/slum areas. The greatest advantage of the relocation strategy is that it usually comes with housing security, through land use rights, and outright ownership of some kind of long-term land lease. However, these relocation sites are often far away from existing communities, job opportunities, support structures, and schools. Community members who want to keep their old jobs or attend the same schools must bear the burden of additional traveling time and expense and must adapt themselves to a new environment. In cases of relocation, communities

face the cost of reconstructing their houses at the new site and in some cases the additional burden of land purchase payments. But tenure security tends to be a big incentive to invest in housing and environmental development at the new site. To further improve the efficiency of relocation measures, proximity to workplace, low-cost transport, and control of land mafia are required. In reconstruction strategy, existing slum communities are totally rebuilt on the same land, or on land that is nearby, within the same general area, either under long term lease or outright purchase. The security of land tenure at the new site provides the community with a strong incentive to invest in their housing, through rebuilding or new construction. Although the reconstruction option involves making considerable physical changes within the community and requires some adaptations to a new environment, the strategy allows people to continue living in the same area and to remain close to their places of work, and this is a crucial compensation for the expense and difficulty that reconstruction involves. Slum upgrading is a way of improving the physical environment and basic services in existing communities, while preserving their location, character, and social structures.

Shelter for the slum and hutment dwellers is a continuous and a participatory process. It needs the support of the government agencies in terms of land, services, tenure, finance, public transport. etc., whereby they can organize their own structures and shelter. It is also necessary to adopt transparency and a noninterventionist approach in dealing with the squatters. The planning and housing should focus upon the deprived 'other half.' The provision of a component of shelter for EWS/LIG should be compulsory for all government/private/cooperative housing in a citywide strategy. The private sector should participate in this social responsibility. Mixed-use zoning should replace single-use zoning. Mandatory provision for informal sector/street vendors should be an integral part of planned development.

The housing strategy should incorporate the development of new housing areas, upgradation, re-densification and redevelopment of existing housing areas, including unauthorized colonies, villages, and the inner city. The future requirement of shelter provision will be dominated by small dwelling units. In view of the limited availability of land and increased requirement of housing, plotted residential development should be discouraged. There is a need to reexamine the myth of low-rise housing for the poor and to encourage multi-storied housing options, as is being done in Mumbai, Pune, and other cities.

It is necessary to adopt a multi-prolonged strategy for provision of housing and for delivery of serviced land by involving the private sector to a significant extent, as well as public agencies and cooperative societies, etc. The overall responsibility for provision of land and facilitation of adequate housing to meet the projected demand lies with the government, which should devise ways of collaboration with the private agencies. Planning norms, land use zoning, density, floor area ratio (FAR), and building controls are to be reviewed so that new areas can be opened up for low-income housing as well as the redevelopment of existing areas can be triggered. It is essential to optimize utilization of land with a view to increase net residential density. A fixed density could lead to underutilization of FAR or imposition of artificial limits to optimal use of land, which is a scarce commodity.

Table 5.4 Water crisis in major metropolitan centers

Metropolis	Demand (million liters per day)	Supply (million liters per day)	Gap (million liters per day)
Mumbai	3,400	2,900	500
Delhi	830	520	310
Chennai	971	675	296
Bengaluru	840	705	135

While developing the city-level shelter, land, and infrastructure plans, there is a need to relate those with the urban poor and to redirect the resources for the economic emancipation and self-reliance of the poor. These concerns must involve transformation and innovation in the relationship among people, governments, financing institutions, etc. The success of this collective enterprise depends upon the involvement of people at the grassroots level for which civic engagement, sustainability, and equity are the guiding principles. The empirical evidence suggests that provision of housing to the urban poor really helps them to climb up the poverty line and accelerate up the social and economic ladder.

The population growth in urban areas increases the density of population in relation to the available facilities. The uncontrolled growth makes it impossible for the cities to expand and update urban amenities. Most of them are unable to provide water, sewerage, and drainage to a large portion of the urban population. It is clear that urban areas have more people than they can support given the present urban infrastructure. The imbalance between power demand and supply has increased. In 1951, the population of Delhi was 1.4 million, and in 2006 it became 12.79 million. The peak power demand in 1951 was 27 MW; it is now 4,100 MW. The city's five power plants generate only one fourth of its power needs. There is a shortage of 900–1,000 MW, which is reflected in 3- to 12-h power cuts. For the worsening urban crisis, there is an urgent need to focus upon the improvement in energy services. There is urgent need to develop decentralized renewable energy resources, such as solar and wind energy. Similarly, the water crisis is present in all the metropolitan centers and over time its intensity and magnitude have increased (Table 5.4). According to the 54th round of NSS (National Sample Survey), 70 % of urban households were reported being served by tap water, 21 % by tube well or hand pump, 41 % had sole access to their principal source of drinking water, and 59 % were sharing a public source.

In Indian cities water is emerging as the most critical sustainability constraint. A range of technical and institutional options ranging from centralized surface storage to decentralized rainwater harvesting and recycling, together with design and water management options, is to be explored. The following steps should be taken to ensure water security. (i) Metering of water supplies should be made mandatory in a gradual manner so as to conserve precious water and to generate revenue. (ii) Leakage and unaccounted-for water (UFW) is another constraint in cities and towns, up to 50 % in some cases. Such losses should be minimized through intensive

leak detection and rectification programs. Severe penalties should be levied on those found responsible for leakage and wastage of water. (iii) To reduce wastage of water, adopt low-volume flushing cisterns. (iv) Rooftop rainwater-harvesting systems in both public and private buildings including industrial and commercial establishments should be made mandatory so as to conserve water. ULBs should make it a point not to approve building plans without such systems. (v) Water quality surveillance and monitoring to ensure prevention and control water-borne diseases are required.

The 54th round of NSS reported 26 % of households having no latrines, 35 % using septic tanks, and 22 % using a sewerage system. Around 43 % of households in urban areas either had no latrines or no connection to a septic tank or sewerage system. According to the Central Pollution Control Board, the wastewater generated in 385 class I cities is about 15,800 MLD, whereas treatment facilities exist for barely 3,750 MLD.

About 71 % of urban households reported removal of household waste by household members themselves, 14 % by local authorities, and 12 % by private agreement among residents. The solid waste generated by the million-plus cities ranges from 1,200 metric tons per day in cities such as Ahmedabad and Pune to a maximum of 5,000–5,500 metric tons per day in cities such as Delhi and Mumbai. Of the total waste generated in the million-plus cities, barely 30 % is treated before disposal. The disposal efficiency ranges between 22 % and 66 %, with Kochi the best and Nagpur the worst, and 40 % of the municipal waste is not picked up at all (*The Hindustan Times*, 19 March 2010). It has been estimated that ULBs spend about Rs. 500 to Rs. 1,500 per tons on solid waste collection (60–70 %), transportation (20–30 %), and treatment and disposal (<5 %), which shows that hardly any attention is given to scientific and safe disposal of waste. Landfill sites have not yet been identified by many municipalities, and in several municipalities the landfill sites have been exhausted and the respective local bodies do not have resources to acquire new land. Because of the lack of disposal sites, even collection efficiency is decreasing. Increase in quantity of municipal solid waste generation with increase in the urban population is quite obvious. Efforts toward waste recycle, reuse, and resource recovery for reduction in waste and adoption of more advanced technology measures for effective and economical dispersal of municipal solid waste is the need of the hour.

Some urban households do not have access to latrines and defecate in the open. About 5.48 million (8.13 %) urban households use community latrines and 13.4 million households (19.49 %) use shared latrines; 12.47 million (18.5 %) households do not have access to a drainage network; about 26.83 million (39.8 %) households are connected to open drains. The status in respect of the urban poor is even worse. The percentage of notified and nonnotified slums without latrines is 17 % and 51 %, respectively. In respect of septic latrines, the availability is 66 % and 35 %. In respect to underground sewerage, the availability is 30 % and 15 %, respectively. More than 37 % of the total human excreta generated in urban India is unsafely disposed, imposing significant public health and environmental costs to urban areas. Impacts of poor sanitation are especially significant for the urban poor (22 % of the total urban population), women, children, and the elderly. The loss from

diseases caused by poor sanitation for children under 14 years alone in urban areas amounts to Rs. 5 billion at 2001 prices. Inadequate discharge of untreated domestic/municipal wastewater has resulted in contamination of 75 % of all surface water across India (Ministry of Urban Development 2007).

Because of the lack of efficient, comfortable, and reliable public transportation coupled with buoyant economic growth, most of the cities in the country are already witnessing a rapid growth of personal vehicles. This trend coupled with the declining share of public transport has led to severe problems of congestion and its consequent costs in the form of travel delays, loss of productivity, air quality deterioration, noise pollution, and increasing road fatalities. It is not only posing a serious threat to sustainability of urban areas but also impacting India's energy security with increasing demands. The road transport is breaking down, with poorly maintained roads, traffic jams, long delays at intersections, and frequent accidents. Traffic congestion is a serious problem that is choking many cities to a standstill in terms of the movement of people and goods within the metropolis. Today India's largest cities are among the world's worst hit by traffic problems (Gupta 2006). The greater size necessitates traveling by two-wheelers, three-wheelers, and cars, and the shortage of mass modes of transport (buses and trains) results in their explosion. Horizontal expansion of the metropolitan centers necessitates traveling by private vehicles and vertical expansion increases the density and parking problems. Delhi now has about as many cars as it had people in 1981. From 2001 to 2008 alone, the increase was around 2 million vehicles.

For urban areas to be able to support the required level of economic activity, they must provide for the easy and sustainable flow of goods and people. Unfortunately, however, such flow of goods and people has been facing several problems. Billions of man-hours are lost with people "stuck in traffic." The population of India's six major metropolises increased about 1.9 fold during 1981–2001, and the number of motor vehicles increased by more than 7.75 fold during the same period. The cost of travel, especially for the poor, has increased considerably, largely because the use of cheaper non-motorized modes such as cycling and walking has become extremely risky as these modes have to share the same right-of-way with motorized modes. Further, with population growth, cities have tended to sprawl, and increased travel distances have made non-motorized modes impossible to use. In turn, this has made access to livelihoods, particularly for the poor, far more difficult. Travel in the city has become more risky with accident rates having gone up from 106,000 in 1981 to more than 390,000 in 2001. The number of persons killed in road accidents has also increased, from 28,400 to more than 80,000 during the same period. This risk again has tended to impact the poor more severely as many of those killed or injured tend to be cyclists, pedestrians, or pavement dwellers. Increased use of personal vehicles also has led to increased air pollution. Unless these problems are remedied, poor mobility can become a major dampener to economic growth and cause the quality of life to deteriorate.

'Urban fatigue' from urban frictions is common. Urban fatigue sets in on journey to and from work and after work, and a person is left with no energy to do any constructive or recreational work at the end of the day. Everywhere you go, there is congestion, competition for space, and physical bodily friction while walking,

riding a bus or train, shopping, or going to cinemas, etc. The parking problem is emerging as a first-rank problem of the majority of metropolitan centers. Traditional solutions to cope with the demand of increasing traffic have resulted in widening of roads to the maximum, thus eating away the area meant for pedestrians and cyclists. The building of new roads and widening of existing roads are, however, reaching the stage of saturation. It is becoming well nigh impossible to obtain land and remove encroachments for widening of the road network. Solutions such as an underground metro network that are often projected as the panacea for traffic and environmental problems are often long range and too expensive. Surface railways for intracity transport could be less costly and of shorter range. By and large, in the past few years, the investments made to improve transport are in the form of (i) construction of overpasses and (ii) widening of roads. These policy measures have not produced the desired results. The plan needs to take into account integration of land use and the transportation system and environmental sustainability.

The basic purpose of transportation should be efficiency, equity, ecological awareness, and land economy. The following areas need priority attention for sustainable transport. (i) Integration of buses and tram routes with MRTS, metro rail, circular rail corridor, and waterways. (ii) It is globally accepted that mixed land use (MLU) helps in revitalizing community life and attracts pedestrians back on the street. The mixed land use also provides a more diverse and sizeable population and wider commercial base to support public transit. (iii) It has also been established that higher density does not create congestion and is environmentally sustainable. Public transportation is to be linked with mixed land use and high-density lifestyle. (iv) Transportation policy should be linked with telecommunications, E-mail, video-conferencing, and mobile phones, etc., as alternatives to physical movement. (v) It is necessary to encourage pedestrian and cycle movement; for example, in China, the Netherlands, and Sweden it has a very significant role. The main problem arises from the low priority in planning and mixing of bicycle traffic with fast vehicular modes; 30 % of fatal accidents involve cyclists. These routes should be adequate, direct, shortest, safe, and attractive. The cycle rickshaw, a popular mode of passenger transportation in Indian cities, should be redesigned for efficiency, safety, and speed. (vi) It is well known that two thirds of the suspended particulate matter (SPM) is contributed by vehicular traffic. Pollution continues to impair human health; therefore, it is necessary to develop alternative fuels, which include electricity/battery, compressed natural gas (CNG), and solar energy. (vii) Parking is one of the critical problems faced by the city, which is becoming serious because of distortions in land use, unauthorized encroachments, and longer trip lengths accompanied by higher private vehicle ownership because of poor public transport and the easy financing of private vehicles. (viii) It must however, be recognized that the high costs, low profits, and long gestation periods of urban transportation projects do not always make them financially viable. To attract the private sector to participate in mass transportation projects, the government will have to participate in the equity of such projects and provide certain benefits and concessions.

An efficient transportation system is the lifeline of cities. Immediate proactive measures are needed to deal with the emerging situation. The only emerging solution

Table 5.5 Incidence and rate of Indian Penal Code (IPC) crimes in metropolitan centers

Year	Incidence	Rate (crimes/100,000)
2003	291,246	270.0
2004	309,929	287.3
2005	314,708	291.7
2006	326,363	302.5
2007	336,889	312.3
2008	347,153	321.8
2009	343,749	318.6

Source: National Crime Record Bureau Report (2009)

is to invest sincerely in public transport, pedestrianization, and non-motorized vehicles now or pay very heavily later. The National Urban Transport Policy (2006) recommends short-term and long-term planning for transportation of all cities, technology upgradation, private sector partnership, energy efficiency, regulating the car industry, and dovetailing the intercity movement system with intracity transport. The policy focuses on the need to ‘move people, not vehicles.’ It seeks to do this by encouraging improvements in public transport and facilities for the use of non-motorized modes. It suggests greater involvement of the private sector and innovative financing mechanisms to enhance efficiency and reduce the impact on the public budget. It seeks to encourage cleaner technologies and create better awareness among the people so that there is support for the initiatives that need to be undertaken and also for some of the compromises that people may need to make. It emphasizes the need to build capacity to undertake good urban transportation planning, both at the institutional and individual levels. The emphasis has to be on public-private partnership.

Urban India, especially metropolitan centers, has seen a tremendous increase in crime and of incidents of communal violence. The increase in crime is attributed largely to two factors: losing social control in the context of overall changing composition of the city’s population and the widening gap between the rich and the poor. Both these factors are closely interrelated, and it is often not really possible to separate greater anonymity in social life or greed as the root causes (Dutt and Venugopal 1983). Inequalities, unemployment, and underemployment are creating insecurities. The incidence and rate of IPC (Indian Penal Code) crimes is increasing every year (Table 5.5). In this way, the symbols of civilized society have emerged as crime centers.

One of the most deleterious effects of overcrowding of cities is the reduced sense of social responsibility among the people. Competition for space and services has bred an everyman-for-himself attitude. People resist queuing for services, disregard rules and regulations, spoil public and private property, and show an utter disregard for the rights and feelings of fellow citizens. These attitudes mean urbanization is going on without urbanism.

Municipal by-laws need to be suitably amended with necessary penal clauses and enforced effectively to stop open defecation and the indiscriminate throwing of garbage/litter in public places, which is the main source of contamination of water bodies and spread of diseases. Adequate sanitation facilities need to be provided to the areas prone to open defecation. It is necessary that the problems of water supply and sanitation (including sewerage, low-cost sanitation, wastewater treatment, and solid waste management) are addressed simultaneously to improve overall environment.

The other major symptom of deterioration of the urban environment is rapid increase in the levels of water and air pollution. The increase is caused by a complex of reasons, of which the most important are related to the failure of the municipal bodies or other concerned authorities to (i) expand systems of disposal of solid and liquid waste, and put in place adequate systems of sewage treatment; (ii) enforce pollution control regulations to reduce or eliminate discharges of polluting affluent into the rivers and other water bodies by industrial units and power stations, and of particulate matter in the atmosphere; and (iii) take measures, such as requiring proper maintenance of motor vehicles to reduce pollution from their exhausts. The rapid increase in the number of motor vehicles is a particular cause of increasing air pollution over or near the large cities. The two- or three-wheeler vehicles, powered by two-stroke engines, are the principal source of noise pollution in the cities.

5.4 Sustainable Measures

Despite the Report of National Commission on Urbanization (1988) and the two successive National Housing Policies within a span of a decade, the country is yet to evolve a National Urban Policy. The Seventh Plan stated that apart from the fact that many of the municipal bodies are moribund or have been superseded, they are being administered badly, have undeveloped and/or eroded tax systems, and suffer from lack of capital funds for development. The services they provide have deteriorated over the years and there seems no sign of reversal (Planning Commission). Most of the municipal bodies in the country do not have the required professional competence to handle future challenges. The processes and technologies are very old and outdated. Despite the ongoing invasion of IT-enabled services in the country, many urban bodies are still in the process of planning to take e-governance initiatives. Accounting systems of most of the urban local bodies (ULBs) are primitive in nature. Delivery systems of water supply, urban transport systems, garbage collection and disposal, as well as other urban services, are inefficient and are not financially self-sustaining.

The urban governance in the country, today, has been characterized by fragmentation of responsibility, incomplete devolution of functions to the elected bodies, lack of adequate financial resources, unwillingness to progress toward municipal autonomy, adherence to outdated methods in property taxation, and hesitation in the matter of levy of user charges, property tax recovery, and levy or withdrawal of

octroi. Experience shows that functional autonomy can become a reality only when financial strength supports it. Therefore, states need to play a catalytic role; in particular, the governmental agencies and developmental authorities need to adopt a supportive role toward the elected bodies rather than take over functions that statutorily belong to urban local bodies (ULBs).

In recognition of the critical importance of rapid urban development, a new project aimed at encouraging reforms, and fast-track planned development of a few identified cities, the Government of India launched an ambitious program called Jawaharlal Nehru National Urban Renewable Mission (JNNURM) in December 2005. The program is not only concerned to provide central assistance for urban renewal and strengthening of urban infrastructure, but the strength of this Mission lies in the fact that this is directly linked with certain urban reforms at the ULB level as well as the State government level. The concerned ULBs are supposed to prepare a City Development Plan (CDP) after due consultation with various stakeholders. Under the CDP, various projects are to be listed in order of priority, along with the investment plan. After the CDP is prepared and accepted by the Government of India, the State government is then required to enter into a Memorandum of Agreement (MoA) with the Union government, on the timeframe of implementation of the required reforms during the Mission period, that is, up to the year 2013. The majority of the ULBs in the country are faced with financial crunch and badly need to reform themselves and their procedures. JNNURM would adequately meet both these requirements of the ULBs. There may, however, be some ULBs that fail to fulfill their reform commitments and deadlines as per the MoA.

The major problems in urban planning are (i) unwillingness by the administration to include citizens in the decision-making process; (ii) the problems of burgeoning slums, increasing crime, overburdened infrastructure, and lack of adequate public transport are increasing along with the growth in urban population; (iii) public space is inadequate, weakly linked, and difficult to access; (iv) the Town and Country Planning Department has done a weak and arbitrary job of land use mapping and zoning laws, and our administration has done a poorer job of enforcing these laws; and (v) citizens lack respect for public space. A myopic view focused on their private properties is widespread.

Sanitation has been accorded low priority, and there is poor awareness about its inherent linkages with public health. Despite the appropriate legal framework, progress toward the elimination of manual scavenging has shown limited success. Little or no attention has been paid toward the occupational hazard faced by sanitation workers. There are considerable gaps and overlaps in institutional roles and responsibilities at the national, state, and city levels, Sanitation investments are currently planned in a piecemeal manner and do not take into account the full cycle of safe confinement, treatment, and safe disposal, Technologies have been focused on limited options that have not been cost-effective, and sustainability of investments has been in question. Urban poor communities as well as other residents of informal settlements have been constrained by lack of tenure, space, or economic constraints in obtaining affordable access to safe sanitation. In this context, the issues of whether services to the poor should be individualized and whether community

services should be provided in nonnotified slums should be addressed. However, provision of individual toilets should be prioritized. In relationship to “Pay and Use” toilets, the issue of subsidies inadvertently reaching the non-poor should be addressed by identifying different categories of urban poor. Sanitation has been provided by public agencies in a supply-driven manner, with little regard for demands and preferences of households as customers of sanitation services (Ministry of Urban Development 2007).

An important element in the maintenance of a healthy and self-renewing mature city is the quality of community that is bounded by geography. Urban residents need to look beyond their personal properties and start investing in their neighborhoods. Zoning violations or encroachment on public pavement or even the street outside their front door is common. Retail store owners commonly take over public pavement space uncaring of the resultant pedestrian inconvenience and traffic chaos. Parks are taken over for religious activities. Stormwater drains are covered over and built upon. Unless local residents show some ownership, such examples will deteriorate quality of life. Most citizens have themselves not respected building regulations. Multiple administrative bodies with overlapping jurisdictional authority make the matters further complex. Reliable data are lacking; no comprehension and cohesive surveys are conducted. Public policies are made in an empirical vacuum. Policies and monitoring mechanisms are lacking.

It is high time that the city planners and managers should gear up to meet the challenges of urban planning, especially in the era of globalization wherein market forces will be, by and large, shaping the future of the cities. In view of the changing scenario and to make urban planning and development process sustainable, it would be appropriate to interlink the planning framework comprising national-level spatial strategies, regional-level strategy plans, the metropolitan region spatial plan, and city and ward level land use and development plans. Further, the process of a developmental plan should be facilitated by developing urban and regional information systems and providing access to remotely sensed data, aerial photographs and satellite imageries, and the Geographical Information System (GIS). The advent of digital technology with the availability of various modes of fast communication such as internet, intranet, cellular phones, and menu-based software has revolutionized the concept of governance. In a broader sense, e-governance represents the strategic and systematic use of modern information and communication technology by the government to improve the efficiency, transparency, and accountability in its functioning and interface with the citizens.

Planning and management of urban centers needs quicker reaction to the ground truth. The traditional information backup has a wide gap between paper and ground. GIS is a vehicle through which planners can be backed with geographic and attribute data for analysis and the decision-making process with fast update and analysis, especially in the field of property tax, fire, health, and other emergency services. The benefits of modern technology are that it makes infrastructure available in open domain, provides easy access to municipal services, hassle-free payment of taxes and user charges, quick redressal of grievances, development of regulatory mechanisms in the provision of services, access to information for investment decision and

project development, and improved information for urban sector research and policymaking and improved efficiency.

For urban areas to be able to support the required level of economic activity, they must provide for the easy and sustainable flow of goods and people, an achievement sought by (i) incorporating urban transportation as an important parameter at the urban planning stage rather than being a consequential requirement; (ii) encouraging integrated land use and transport planning in all cities so that travel distances are minimized and access to livelihoods, education, and other social needs, especially for the marginal segments of the urban population, is improved; (iii) improving access of business to markets and the various factors of production; (iv) bringing about a more equitable allocation of road space with people, rather than vehicles, as its main focus; (v) encourage greater use of public transport and non-motorized modes by offering central financial assistance for this purpose; (vi) enabling the establishment of quality-focused multi-modal public transport systems that are well integrated, providing seamless travel across modes; (vii) establishing effective regulatory and enforcement mechanisms that allow a level playing field for all operators of transport services and enhanced safety for the transport system users; (viii) establishing institutional mechanisms for enhanced coordination in the planning and management of transport systems; (ix) introducing Intelligent Transport Systems for traffic management; (x) addressing concerns of road safety and trauma response, (xi) reducing pollution levels through changes in traveling practices, better enforcement, stricter norms, technological improvements, etc.; (xii) building capacity (institutional and manpower) to plan for sustainable urban transport and establishing knowledge management system that would service the needs of all urban transport professionals, such as planners, researchers, teachers, and students; (xiii) promoting the use of cleaner technologies; (xiv) raising finances, through innovative mechanisms that tap land as a resource, for investments in urban transport infrastructure; (xv) associating the private sector in activities where their strengths can be beneficially tapped; and (xvi) taking up pilot projects that demonstrate the potential of possible best practices in sustainable urban transport (Ministry of Urban Development 2006c).

5.5 Conclusion

India is urbanizing. This transition, which will see India's urban population reach a figure close to 600 million by 2031, is not simply a shift of demographics. It places cities and towns at the center of India's development trajectory. In the coming decades, the urban sector will have a critical role in the structural transformation of the Indian economy and in sustaining the high rates of economic growth. Ensuring high-quality public services for all in the cities and towns of India is an end in itself, but it will also facilitate the full realization of India's economic potential. India's economic growth momentum cannot be sustained if urbanization is not actively facilitated. Nor can poverty be addressed if the needs of the urban poor are isolated

from the broader challenges of managing urbanization. Cities will have to become the engines of national development. India cannot afford to get its urban strategy wrong. The challenge of managing urbanization will have to be addressed through a combination of increased investment, strengthening the framework for governance and financing, and a comprehensive capacity building program at all levels of government.

According to the High Powered Expert Committee Report on Indian Urban Infrastructure and Services (2011) the key elements of a comprehensive framework of urban policy and planning are (i) increasing investment in urban infrastructure from 0.7 % of GDP in 2011–2012 to 1.1 % by 2031–2032 (ii) increasing spending on maintaining assets, both old and new; (iii) engaging in renewal and redevelopment of urban areas, including slums; (iv) improving regional and metropolitan planning with integration of land use and transportation; (v) ensuring access to services for all including the poor to meet the recommended norms; (vi) reforming systems of service delivery; (vii) improving governance of cities and towns by a unified command under a mayor; (viii) strengthening and securing the financial base of ULBs; (ix) State governments providing an enabling environment for ULBs to discharge their enhanced responsibilities; and (x) the government of India should launch a New Improved JNNURM (NIJNNURM) with focus on capacity building.

India's future is urban. It is in developing sustainable cities. Urbanization is both driven by and supports economic growth. Given this, the challenge for India is to avoid unplanned and haphazard urbanization and ensure orderly and citizen-friendly urban growth. The three pillars of sustainable urbanization are (i) improving enabling environments, the framework of institutions, policies, incentive structures, and reporting requirements for urban governance; (ii) ensuring that decentralization and devolution are made to work; and (iii) continuing programs of technical assistance and training for improving urban governance and management.

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Chapter 6

'Glocalizing' Urban Sustainability: The Case of Nairobi, Kenya

Christopher D. Cusack and Kathryn J. Bills

Abstract The city of Nairobi, Kenya, has today reached a critical juncture in its history. Despite sitting atop the Kenyan urban hierarchy as a primate city, Nairobi is far smaller than other notable cities of the developing world. Thus, although issues of housing and infrastructure provision, economic opportunity, and environmental health are paramount in all cities, Nairobi is afforded a profound opportunity to implement a sensible approach to sustainable urban planning. For Nairobi to be successful, however, a new approach to the city's typically heavy-handed top-down modus operandi is needed. Increased government transparency and accountability are required, as is the fostering of a network of political, business, and community leaders who work together to plan for the city's future. Efforts at empowering the underprivileged and improving economic opportunity offer viable means for accomplishment in Nairobi. These efforts include combining community knowledge with advanced technology through public participation geographic information systems (PPGIS), as well as uniting business, political, community, and religious leaders through a regime theory of urban growth. This study therefore assesses the problems and prospects facing the city of Nairobi. Positing the need for a model of sustainable urban planning that incorporates technology transfer, public participation, and regime collaboration, the study advocates for strategic planning initiatives that can positively affect the future of Nairobi.

Keywords Nairobi • Participatory GIS • Urban sustainability

6.1 Introduction

The city of Nairobi, Kenya, has today reached a critical juncture in its history. Although by no means a *global* city, Nairobi may plausibly be considered as having a seat on the global stage because of the large number of international organizations seated there (Girard 2003). However, it has not as yet reached the dimensions

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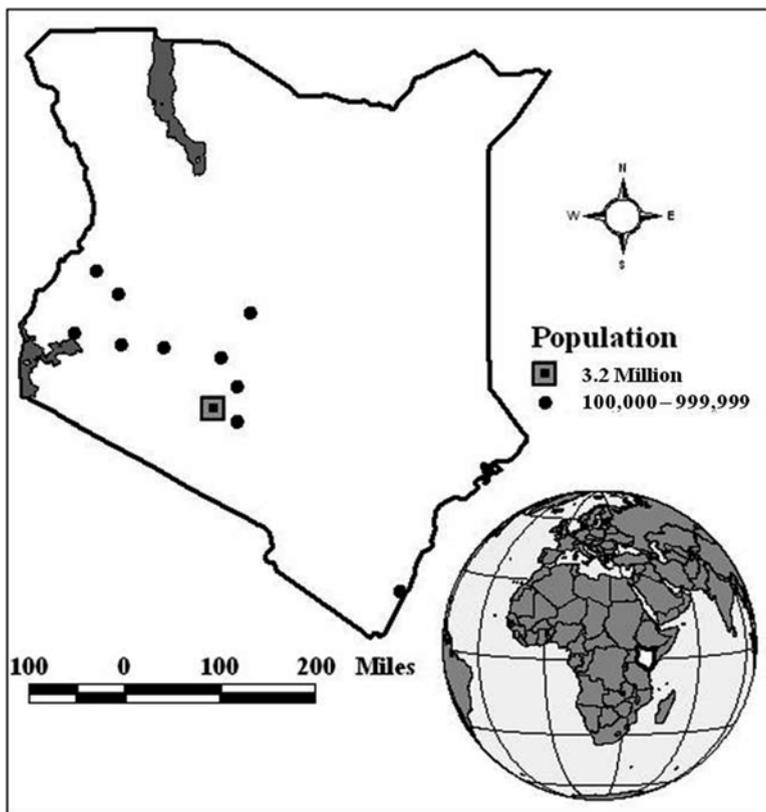


Fig. 6.1 Relative location of Nairobi and Kenya

of a *mega-city*. The distinction is crucial, as global cities are acknowledged as command nodes of a global urban system whereas mega-cities are discussed in terms of crisis and oft defined as “big but not powerful” (Robinson 2002, p. 540). Global cities are typically associated with First World stature and are exemplified by cities such as New York City, London, and Tokyo (Sassen 1991). Yet, Nairobi cannot simply be dismissed from the global stage as it receives recognition from its stature as a political capital, serving as host to one of only ten regional offices worldwide of the United Nations Human Settlements Program, its multinational corporations and international organizations, and the Jomo Kenyatta airport, which serves as the hub for much of the East African tourist industry.

At the same time, Nairobi is not faced with as crushing a set of burdens as the mega-cities of the world. With an estimated population of approximately 3.2 million people, Nairobi sits atop the Kenyan urban hierarchy as a primate city (Fig. 6.1). However, despite its relative size within Kenya, the city of Nairobi is far smaller than other notable cities of the developing world. By point of reference, the population of Lagos is more than threefold that of Nairobi: Delhi is more than four

times as large, Mumbai is more than five times as large, and Mexico City more than sixfold. Thus, although issues of housing and infrastructure provision, economic opportunity, and environmental health are paramount in all cities, Nairobi's distinction as a global city but not a mega-city offers a profound opportunity to implement a sensible approach to strategic urban planning. Indeed, decisions made today regarding planning and development will largely determine the city's future viability.

For Nairobi to be successful, a new approach to the city's typically heavy-handed top-down *modus operandi* is needed. Increased government transparency and accountability are required, as is the fostering of a network of political, business, and community leaders who work together to plan for the city's future. This need is only one of many inherent difficulties inherent of the city of Nairobi and is essentially tied to the problems of divided loyalties facing the nation as a whole. Nairobi, born of imperial expansion, is regarded as lacking any indigenous rationale and contains very few traits of indigenous Kenyan life. An enduring quandary for Nairobi, therefore, is that the city is viewed as an "alien introduction" (Mehretu and Mutambirwa 2003, p. 311). Consequently, the first loyalties among the residents of Nairobi are not to the city, but rather to their ancestral land and home people (Gugler 1996; UNHSP 2003). Efforts to appropriately plan the future of the city, however, must not be dissuaded by the issue of ethnic diversity, which too readily provides an explanation for inertia throughout Africa (Azam et al. 2002).

Rather, Nairobi must take advantage of the opportunity to design a better future around sustainable growth. However, successfully managing its growth, providing for its people, and increasing economic opportunity requires a change in the current politico-planning paradigm in Nairobi. By looking abroad and finding evidence of relative success in other cities around the globe, the politicians and planners in Nairobi may well ascertain the applicability of a new methodological approach to development. Specifically, efforts at empowering the underprivileged and improving economic opportunity offer viable means for similar accomplishment in Nairobi. These efforts include combining community knowledge with advanced technology through public participation geographic information systems (PPGIS), as well as uniting business, political, community, and religious leaders through a regime theory of urban growth. Although care must be taken to modify outside techniques to match the local context of Nairobi, the potential for the successful transference of these planning approaches is quite tangible.

6.2 The Growth of Nairobi: Causes and Consequences

During the past several decades, the growth of both the population and the land area of Nairobi has been exceptional. The built-up area of the city experienced a fourfold increase from its size of 15 km² in 1976 to 62 km² by the year 2000. In the same way, the current population of Nairobi represents a more than fivefold increase over the city's 1969 population. The causes of Nairobi's rapid population growth are twofold. Natural increase accounts for an estimated 52 % of the growth and

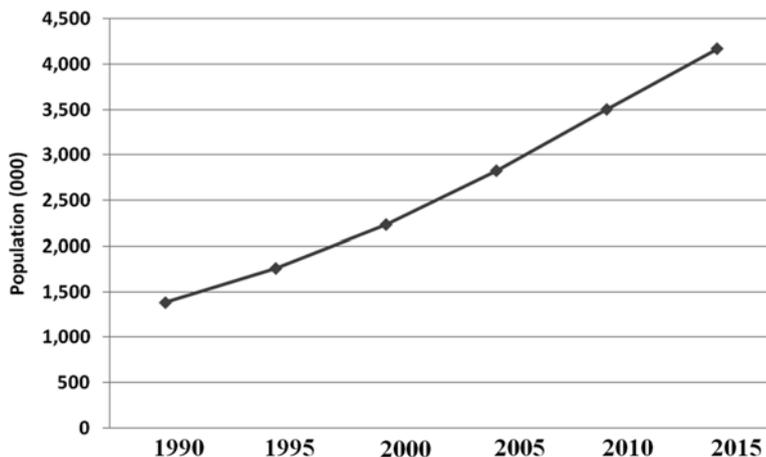


Fig. 6.2 Population of Nairobi: estimates and projections

in-migration comprises the remaining 48 % of the city's population increase (Mundia and Aniya 2005). With an annual growth rate of 4.9 % between 1995 and 2000, representing a doubling time of just over 14 years, the population growth of Nairobi shows no signs of abating (Fig. 6.2). This growth has proved unsustainable for the city and has resulted in deplorable living conditions for a majority of the city's residents, as concomitant with overall population growth has been the escalation of informal settlement villages or *bidonvilles*. These "villages" now number at least 134 and house slightly less than 2 million individuals, an estimated 60 % of the total Nairobi population (UNHSP 2003, p. 219).

Although the sheer number and size of these slums has been exacerbated by rapid population growth, they are by no means a new phenomenon in the city. Segregated living quarters can be traced to the very inception of Nairobi itself. Established as the capital of the East Africa Protectorate, Nairobi was originally sited as a railway headquarters in 1899. By the early twentieth century racial segregation in the urban layout was formally sanctioned by government plans. Separate residential zones for Europeans, Asians, and African laborers were adopted, and relationships between the groups were notably antagonistic (Stren and White 1989; Nangulu-Ayuku 2000).

Thus the stage was set for present-day living arrangements, as upscale European homes are located in the residential areas of Upper Nairobi and the "Hill" district, whereas Asians are predominant in Parklands and Eastleigh. The majority of Africans live in Eastlands, which borders the poorer Asian neighborhood of Eastleigh (Mehretu and Mutambirwa 2003). A thin wall is frequently the sole partition between these very different worlds. The European elite is taking to a 'gated community' style of living, not unlike residential life in the United States (Auclair 2005). Replete with residential and retail opportunities amidst a socially

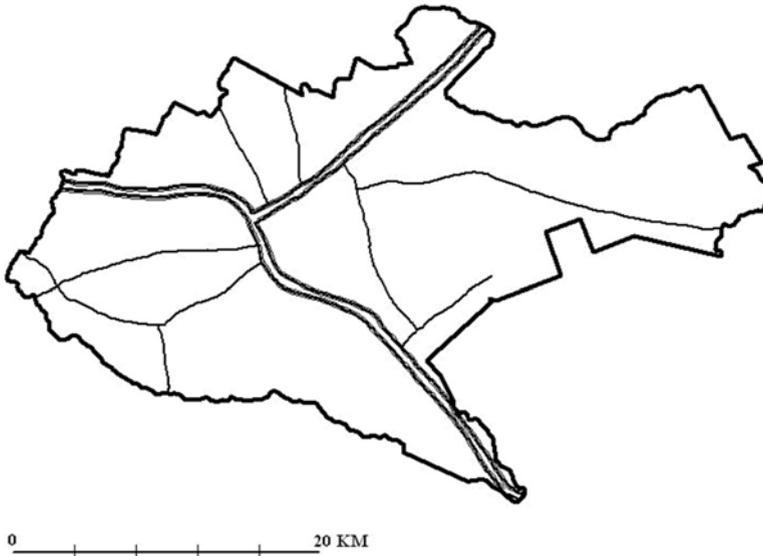


Fig. 6.3 Street network of Nairobi

constructed 'safe' space, life inside the walls contrasts jarringly with that on the outside. With population densities ranging from several hundred per square kilometer (km^2) in high-income locations to tens of thousands per square kilometer in the slums, living conditions could not be more disparate. And yet the slums continue to proliferate, encroaching on other land uses and sprawling out along the major thoroughfares. A series of radial roads, which link the city to other parts of the country, converge in the center of Nairobi (Fig. 6.3). Discontinuous settlements have taken root along these roads, leading to urban sprawl and a star-shaped pattern of linear growth (Mundia and Aniya 2005).

With virtually no coordinated planning efforts, unchecked growth exacerbating an already untenable situation has long been the norm in Nairobi. The growth continues as a result of natural increase and unabated migration from rural Kenya. People are drawn to the city because of the anticipation of opportunities to forge a better life, or to at least gain an otherwise nonexistent economic toehold. On their arrival to the city, however, migrants find an absence of formal support, and must in turn carve out a niche in the informal economy to survive. The rise of the informal sector is readily apparent, as unregulated small-scale businesses now employ an estimated 500,000 people, or as many as two thirds of all employees in Nairobi (Bigsten et al. 2004; Mundia and Aniya 2005). This informal economic activity, vital to the survival of the majority of Nairobi residents, is also indicative of the government's lack of ability to plan for and absorb a large and growing population in need.

The dualism between the formal and informal sector represents a larger dichotomy between the ‘haves’ and ‘have nots,’ readily typified by the dire living conditions of the *bidonvilles*. Indeed, aside from the urban elite, most find that anticipated promises are unattainable, and that housing quality and standards of living are often worse than in rural villages. Failure to adequately accommodate a growing population, and the inability to integrate workers into the formal economy, inhibit economic growth and sustainable urban development in Nairobi.

6.3 Slum Settlements of Nairobi

In Nairobi, slum settlements originated during the pre-Independence period when urban layout revolved around distinct enclaves of Africans, Asians, and Europeans. At this time slums developed in response to the unbalanced allocation of resources in regard to the housing and infrastructural needs of these three separate sections. Rural-to-urban migration followed, with 85 % of Kenya’s population growth between 1989 and 1999 being absorbed directly in the slums of Nairobi and Mombasa (Davis 2006, p. 18). The lack of policy during this post-Independence period provided opportunity for slums to overtake much of Nairobi. Consequently, of the 3.5 million populating Nairobi, approximately 2.1 million people live in slum settlements (United Nations 2003, p. 219).

The *bidonvilles* of Nairobi encompass only 5 % of Nairobi’s land area while housing 60 % of the inhabitants (Amuyunzu-Nyamongo and Ezeh 2005, p. 92). Furthermore, this difficulty has led to crisis and general unavailability of resources crucial to life. Life in the *bidonvilles* is dreadful. As noted by Girard (2003, p. 22), “Here the dignity of the human person is totally neglected. Kibera, Kasarani, Degoretti, Mathare and Korogocho are but a few of these informal settlements marked by extremely high density (about 42,000 inhabitants per sq km) with small housing units of one or two rooms lacking any infrastructure and sanitation.” More than 11 % of children in the slums of Nairobi die before reaching the age of 5; in non-slum areas, childhood mortality is less than 1 % (Auclair 2005).

The absence of resources necessary for basic human life for those residing in the slums of Nairobi make everyday life a struggle for survival. With medical care, public sanitation, and water nearly nonexistent, what seems commonplace to most citizens of the Western world is precious to slum dwellers. With densely populated slums, resources are rarely allocated evenly, and as home to low-income urbanites, many residents cannot afford the overpriced resources on which they rely. Of the various resources that are largely unavailable to Nairobi’s slum dwellers, perhaps the most critical is water. Only 24 % of households in Nairobi’s slum settlements have access to tap water, either public or piped into the residence, compared to 92 % of Nairobi as a whole (Amuyunzu-Nyamongo and Ezeh 2005, p. 92).

Similarly, lack of sanitation within the slums of Nairobi has led to a medical crisis. The city of Nairobi produces 1,000 tons of solid waste each day, but collection services are virtually nonexistent, especially in slum settlements (Amuyunzu-Nyamongo and Taffa 2004, p. 3). Residents have attempted to help mitigate absent sanitation

practices on an individual basis. Slum residents have begun employing “flying toilets” in which they put their waste in a plastic bag and throw it onto the nearest roof or walkway. This practice, only a very quick way to be rid of waste, permeates the already limited piped water supply in Nairobi’s slums. In the poorer sections of Nairobi, piped water is no longer potable as the result of fecal contamination (Davis 2006). In recent years, the inadequacy of water allocation among residents and limited sanitation regulations has allowed the spread of disease and early mortality among Nairobi’s slum residents. Life-threatening diseases caused by contaminated water, including cholera and hepatitis, have become more widespread throughout Nairobi (Unger and Riley 2007). As a result, the infant mortality rate in Nairobi’s slums (151 per 1,000) is two to three times higher than in Nairobi as a whole (Davis 2006, p. 146).

Well aligned with the history of Nairobi’s racially segregated slums, ethnic divisions within slum settlements have transcended time. Discrimination is common along ethnic lines with most individuals residing in subcommunities of their own ethnic background. Racially motivated violence has been experienced throughout Nairobi’s slums, although crimes of all types are prevalent throughout Nairobi. In a UN-Habitat study conducted in 2001, it was found that 40 % of Nairobi’s residents had been victims of robberies or thefts and that 18 % had been physically assaulted (Werlin 2006, p. 43). A later study revealed that one quarter of all survey takers had reported that vehicles in which they had been traveling in had been held up at least once in the previous year (Werlin 2006, p. 44). An overhaul of Kenya’s policies and urban planning techniques is therefore necessary to improve not only the lives of slum dwellers and the bleak conditions in slums, but the sustainability of the city in its entirety.

6.4 Urban Planning in Nairobi

Despite its role as the economic engine of Kenya, Nairobi’s generally poor infrastructure, poor governance, and a lack of human capital has hampered the economic productivity of the city (Bigsten et al. 2004). Nor has Nairobi been helped by a legacy of incoherent and uncoordinated city planning. Indeed, “in the face of the failure to establish coherent and effective Nairobi-wide urban policies, the outlook for the situation in slums appears to be rather bleak” (UNHSP 2003, p. 220). The effects on the resultant form and functionality of Nairobi therefore necessitate an overview of the history of urban planning in the city.

The precursor to official urban planning in Nairobi took the form of the Simpson Health Report. Prepared by Professor J.W. Simpson in 1914, the report purportedly stood as an analysis of health and sanitation problems in the city. A pro-government document that effectively reinforced British control of the city, the report advocated a solution based on residential and commercial segregation (Nangulu-Ayuku 2000). The legacy of the report continues in the segregation of Nairobi to this day. Urban planning in Nairobi next took form through production of the 1948 ‘Master Plan of a Colonial Capital’. Commissioned by the British government, the report revealed a

supposition that spatial planning could mold the city dweller in Nairobi into little more than a 'tinged copy' of an urban Englishman (Slaughter 2004, p. 39). Thus the initial efforts at the planning of Nairobi were essentially racially based and aimed at securing, or at least mimicking, the British way of life.

Even after Independence in 1963, little changed with regard to the development of an effective planning framework for Nairobi. By the early 1970s, city planners were voicing concern that their coordinated planning remained nonexistent, and that the only plans drawn up were associated with sectoral pressures (Stren and White 1989). In 1973, the Nairobi Urban Study Group (NUSG) was formed and given charge to develop a Metropolitan Growth Strategy. One of the main proposals, to decentralize industry, has yet to be implemented. An additional recommendation, to establish an official planning department, remained unfulfilled until 1981 (Stren and White 1989). A 1978 revision to the Nairobi master plan echoed the original NUSG proposal of decentralizing industry. The revision formulated plans to guide future growth to the periphery of previously built-up areas while increasing densities at the city center. Present-day conditions indicate, however, that land use and urban growth have not adhered to these plans (Mundia and Aniya 2005).

Thus, throughout Nairobi's existence, a clear planning policy has largely been absent. Efforts that have been made have been on a fairly ad hoc basis and have resulted in duplication of effort and an inefficient and inequitable delivery of services. Given the complexities of present-day Nairobi, coordination of service provision efforts and an effective planning approach are essential (Werna 2000). Yet, for a variety of reasons, including a lack of available resources, effective planning remains elusive. A fundamental limitation has been a virtual absence of the power to implement, without which the planning process remains mired in futility. Frequently, the principal culprit in the prevention of planning application is patronage politics. The government in Kenya has demonstrated a top-down approach and is largely opaque in its operations. This 'Fordist' approach to government is representative of the workings of the Nairobi city government. As control is centralized and verticalized, both domestic and donor-funded projects are negatively affected and the planning process is subverted by political interests (Werna 2000; Hanmer et al. 2003).

As planning in the public arena has largely been ineffectual, efforts at addressing the environmental and socioeconomic consequences of a rapidly growing population in a poorly planned urban milieu have been initiated by faith-based and other nongovernmental organizations (NGOs). In Nairobi, examples of such workings are frequently found in the *bidonvilles* of Mathare, Kibera, and others. In Mathare, for example, a joint venture between the Catholic Church of Nairobi and the German government has provided thousands with improved housing, as well as health and educational facilities. Furthermore, an economic component was incorporated through the construction of more than 100 stalls for small-scale business ventures. These stalls are designed to provide an opportunity of lasting income generation (Girard 2003, p. 22). Such cooperative activities are important for a variety of reasons. Most obvious is their function in improving living conditions and providing

economic opportunity that the government is unable or unwilling to provide. More subtle, but perhaps of equal or greater consequence, is their role in generating synergy and building institutional capacity (Girard 2003).

In essence, the efforts of the nonprofit associations are frequently designed to help the inhabitants of the *bidonvilles* help themselves and each other. This cooperative capacity is critical for the populations of the slums, which tend to be in constant movement, "in constant search of ever-shifting opportunities" (Watson 2005, p. 289). Such frequency of population change makes the development of cooperative enterprise less likely and represents a challenge for efforts at generating lasting improvement. Therefore, it is by positioning populations in a way that they may become more self-reliant and synergistic that the workings of the NGOs have an opportunity to have a truly ongoing effect. In addition to the role of NGOs in the city, Nairobi has benefited through its involvement in composing a Poverty Reduction Strategy Paper (PRSP) for the International Monetary Fund. Prepared by governments in low-income countries, the PRSP is a participatory process that links the domestic populace with outside partners to develop a strategy for poverty reduction. Its objective is to provide the means by which the United Nations' Millennium Development Goals (MDGs) can be met (IMF 2005).

Despite receiving only limited commitment from the government, Kenya's participation in the PRSP has further linked NGOs to efforts at poverty reduction. Such support has heightened the sense of purpose and self-determination amongst the communities in need and has contributed to important attitude shifts toward the potential for personal improvement. The consultative process of the PRSP process also proved valuable through its role in generating an enormous amount of previously nonexistent community-level data. Proper utilization of such data could potentially alter priorities and planning efforts throughout the country (Hanmer et al. 2003). Community-level data provide, for the first time, the opportunity for accurate understanding of the spatial extent of particular conditions and establish a framework for proper urban planning. The need for more of this type of data has been widely acknowledged. The combination of a lack of data and a lack of planning enforcement has curtailed planning efforts and heightened the array of problems facing Nairobi.

Planning in Nairobi is also limited by maps drawn at different scales or as unscaled sketches, as well as ineffective land use regulations (Mundia and Aniya 2005, p. 2832). As a result, the city is faced with a myriad of dilemmas in need of remedial land use planning. Thus, the need for accurate and up-to-date data is self-evidently acute in Nairobi. The lack of detailed (or even more general) data in terms of population, housing, employment, and environmental variables reveals yet another potential role for nongovernmental organizations. However, NGOs are themselves no panacea for the urban woes that face cities of the developing world. Similar to their intended beneficiaries, many NGOs face daunting limitations in resource availability. Furthermore, NGOs are potentially beholden to their own benefactors and, similar to many government structures, may operate with only limited transparency (Roy 2005). In Nairobi, a number of initiatives have been undertaken with NGO assistance and have achieved positive outcomes, such as an

increased housing stock and improved economic opportunities. However, these efforts have also resulted in a number of unintended negative consequences, including the proliferation of new slums and heightened social exclusion, among others (UNHSP 2003, p. 220).

For all the good that they do, it must still be acknowledged that NGOs simply cannot do it all. Without proper coordination, the approach to service distribution and home improvement will remain substantively more ad hoc than holistic. Support for, and involvement by, the government of Nairobi is critical to the pluralistic provision of services in the city. Similarly, comprehensive planning and decisive action in terms of development issues is also required. Planning efforts in Nairobi, and elsewhere throughout Africa south of the Sahara, must move beyond land use control and address sustained development or be destined for marginalization (Watson 2005). Consequently, the need for strategies of effective planning and governance has reached critical proportions.

6.5 The Suitability of an Alternative Planning Approach in Nairobi

That past planning efforts in Nairobi have been ineffective has been well documented, and any present-day analysis of the city's slums and lack of basic amenities will similarly reveal the need for a reconstitution of the planning process. Without an effective and assertive planning approach, the city is likely to continue down a path of unsustainable urbanization. Indeed, without a dramatic shift in policy and investment, the city of Nairobi, as well as other rapidly growing cities in the region, could well be destined for 'mega-village' status as opposed to reaching the stature of sustainable urban centers (Auclair 2005, p. 28). Continued unplanned and unchecked growth will prove untenable, and the timing is still right for intervention. Nairobi stands as a global city while remaining free of the mega-city appellation. It is in this time of need, and with a legacy of ineffectual planning and governance, that the city of Nairobi may find success in looking afresh at its planning efforts.

The lack of a universal planning paradigm and a history of misguided efforts at Western planning implementation in non-Western settings have called into question the potential for cross-national transference of planning techniques. Such reservations are based on past presumptions that, in particular, British or American planning practices could be applied to cities of the developing world. Perhaps not surprisingly then, conditions in many receiving cities may have actually worsened as they were held to specific and, in their new context, senseless standards set forth by the Western models. As one ready example, recent evictions in Nairobi slums, initiated by violations of municipal by-laws, are called into question as the by-laws do not account for present socioeconomic conditions and themselves are "relics of the colonial era and set to Western expectations" (Otiso 2002, p. 260). Although concern over the dominance of the Western planning paradigm and its unmodified

application in non-Western settings is both valid and appropriate, it has perhaps caused the pendulum to swing too far in the opposite direction.

Indeed, support for virtually any planning transference between cities in disparate settings is now largely eschewed. This reaction, although understandable, is itself a potential inhibitor to the successful planning of cities of the developing world. What is needed is an effort at finding common ground where Western strategies and technologies are assimilated into, rather than forced on, the local urban environment. By taking into account the context and setting of each urban area and acknowledging that every city is its own dynamic entity, Western planning approaches may well provide some avenues toward urban sustainability. While acknowledging differences between cities, it is also proper to recognize areas of similitude and thereby underscore the prospects of successfully applying Western planning in non-Western locales. At first glance, cities in Britain or the United States may not appear to have any commonalities with their counterparts in the developing world. However, a more nuanced review between these sets of cities does indeed reveal both past and present similarities.

Presently, slum settlements, typified by the *bidonvilles* of Nairobi, seem to pose an insurmountable challenge to cities of the developing world. Yet not long ago, such settlements were also characteristic of cities in the West. The works of Charles Dickens, who himself knew indescribable poverty, has memorialized the horrors of urban living at the time. A lack of sanitation and an abundance of disease and crime were the norm, as existence in the past slums of Europe parallels life in the *bidonvilles* today (Auclair 2005, p. 26). Additionally, although the dissimilarity in indices of urbanization would seem to particularly extend to rates of population increase, a comparison of recent growth in cities of the developed and developing world reveals the opposite. Indeed, although much has been made of the rapidity with which cities of the developing world have grown, their growth rates are by no means unprecedented. In fact, cities in the United States were among the fastest growing in the world during the twentieth century. A comparison of Nairobi with the cities of Miami and Phoenix reveals that both the latter experienced faster rates of growth than Nairobi throughout the twentieth century (Hardoy et al. 2001, p. 34).

That Nairobi's rapid increase in population is by no means atypical perhaps provides reassurance that though the city is currently experiencing substantial growing pains, there is potential for slower and more sustained growth in the future. Thus, the attempts to apply Western models of urban form to Nairobi to assuage growth, which would on the surface seem nonsensical, instead exhibit some viable applicability. Furthermore, although the classic models as espoused by Burgess (concentric zone), Hoyt (sector), and Harris and Ullman (multiple nuclei) are unable to fully explicate the form and functioning of Nairobi, neither can they be completely discounted. With an archetypal star-shaped pattern of urban growth extending away from the central business district along major transport routes, the city of Nairobi demonstrates facets of both the sector model as well as the concentric zone model and in this way mirrors cities of the West (Mundia and Aniya 2005). Thus Nairobi, as it currently stands, is emblematic of the potential for the conveyance of cross-national

and cross-cultural urban planning and is only one of perhaps many cities of the developing world that could potentially benefit from Western technology and expertise.

6.6 ‘Glocalizing’ Planning Efforts: Combining the Global with the Local in Nairobi

As noted by Costa et al. (1998, p. 9), “urbanization has indeed been a mixed blessing for large parts of the world.” This sentiment holds equally true for globalization. Although the continent of Africa has largely been bypassed by fiscal flows associated with the global economy, it is by increasing their presence on the global stage that African cities may reach a level of prosperity. Indeed, evidence suggests that despite the relative paucity of global interaction on the African continent, those countries that have promoted inward-looking policies have inhibited economic growth whereas developing countries that have facilitated trade opportunities have experienced higher growth rates. Such evidence inevitably leads to a positive correlation between the relative openness of African economies and their economic growth (Azam et al. 2002). Furthermore, although much of the globalization debate centers on its potential to amplify inequalities within and between societies, there are indications, when considering the determinants of income distribution, that “international openness of the economy” is found not to have an effect (Odedokun and Round 2004, p. 321).

Openness alone, however, is insufficient as an economic catalyst. Governance, characterized by transparency in the political and planning processes, is equally needed. In Kenya, and particularly in Nairobi, poor governance has led to issues of credibility and has hampered potential investment and subsequent growth (Bigsten et al. 2004). Playing political games with the urban planning process has also disaffected the Nairobi populace. Thus, although economic globalization serves as the dominant influence shaping urban development, a critical difference between cities of the more developed and less developed worlds is “the lack of sufficient political will, decisive planning and reforms in a context of persisting poor governance hampered by conflicts” (Auclair 2005, p. 26). Consequently, calls for improved governance, strengthened democracy, and greater transparency and accountability as part of a growth strategy are becoming increasingly vociferous (Stren 2001; Azam et al. 2002).

The role of the state cannot be discounted when formalizing a model of urban and national growth and development. It is also only through the formal sector that global connections can be achieved and necessary services, such as infrastructure and education, can be provided. Political transparency will afford increased imports and exports, as well as provide accountability when handling tax revenues (Bigsten et al. 2004). If used properly, tax dollars can service the greater good and thereby encourage economic investment. This, in turn, may be used to amplify service

provision in a constant cycle of positive development and is critical to successful development in Nairobi. As noted by Otiso (2002, p. 264), "since urban areas are the engines of economic growth, failure to provide them with basic services makes them unproductive and a drain on, rather than a stimulus to the national economy." A strong state and formal political sector may be essential for a city to contend on a global stage, but this does not translate into a mandate for heavy-handed, top-down planning.

A culture of mutual trust and acceptance wherein all segments of an urban society (public, private, community) work together for a common cause is fundamental for a city's success. This approach is associated with the regime theory of urban growth, which assumes that the involvement of all segments of society is necessary for a locale to succeed globally (Stoker 1995). Regime theory acknowledges that in addition to politics and business, a city's power hinges on the bonds created between its citizens, locally based organizations, and the community. A variety of case studies, primarily focusing on cities in the United States (where the theory was first postulated) or the United Kingdom, have publicized the indispensable influence of these formal and informal regime partnerships (see Stone 1989; Vogel 1990; DiGaetano and Klemanski 1993). Construction and maintenance of a regime network is thus understood as proffering the optimal opportunity for successful ventures and the ability to provide a means to a desired end that otherwise may remain unattainable.

By involving community groups, the regime theory of urban development also complements such bottom-up planning approaches as advocacy planning. Formulated in response to the problems caused by large-scale housing projects and other top-down redevelopment efforts so pervasive in the United States during the 1950s and 1960s, advocacy planning is a participatory planning process in which the affected citizens are directly involved in the future of their communities (Carley and Smith 2001). The conception of a true urban regime and the effectuation of advocacy planning, or some variation thereof, in the city of Nairobi is both prudent and indispensable. With its rapid growth and level of primacy, Nairobi has known only a top-down approach to urban planning. However, planning from beneath is both important and appropriate, and Western models that focus planning efforts at the local level would be well applied (Obudho 1994, p. 211).

Involving all citizens of Nairobi, including those of the *bidonvilles*, and linking knowledge to action in effectual planning is paramount to the city's success. Yet before any planning efforts can be put into practice, there must first be a knowledge base upon which to act. In Nairobi, a comprehensive knowledge base does not yet exist and stands as the preliminary step toward competent city planning. Following in the steps of the PRSP and building on the array of community information generated by the process could feasibly help to attain such vital data. There is no easy way to gather information: it must come from conducting fieldwork and will require a sustained commitment from the urban regime. However, this information-gathering process will itself necessarily involve the people of Nairobi and thereby help to actualize the planning process. Then, taking another page from modern planning in the United States, the data accrued can be used with geographic information systems (GIS) technology.

The potential for GIS to be the 'great equalizer' while helping to minimize the digital divide is significant. Geographic information systems require personnel proficient in the software and hardware, but also contribute to far greater understanding of the issues at hand with their mapping and analytical capabilities. Once again mirroring planning activity in the United States, GIS technology can be used to benefit, as well as benefit from, public participation. Such public participatory GIS (PPGIS) efforts are increasing throughout the US and Western Europe to empower marginalized groups and affect sustainable development. Although PPGIS efforts are most closely associated with the more developed world, they have also been successfully introduced in Ghana, Senegal, China, and Nepal (Brunn and Ghose 2003). PPGIS is regarded as having the ability to draw attention to community problems and thereby elevating concerns from the local to the national stage. The end result could be a synthesis of community needs that engender the requisite political pressure to change society (Kyem 2004, p. 52). Without question, PPGIS also affords the city of Nairobi opportunity for data generation from which sound planning strategies may be derived and real change may be initiated.

Understandably, the prescription of utilizing GIS to affect social change and advance sustainable planning principles is far easier than its actual application. GIS is itself a source of concern in terms of its potential for serving as yet another distinction between the haves and have nots. Such concern, however, gave way to rising criticisms throughout the 1990s and essentially initiated the PPGIS movement aimed at democratizing the use of GIS technology. Thus, uniting citizen participation with geographic information systems represents a true synergy between local knowledge and modern technology. With consideration for the local context, PPGIS has the ability to empower participants and produce positive change (Elwood and Ghose 2001; Hoyt et al. 2005). In the United States, PPGIS is perhaps most closely associated with efforts at urban revitalization and community-oriented planning in neighborhoods that frequently are marginalized by the political and planning processes. PPGIS activity in these communities involves residents, including youths and the elderly, in data collection and map creation and thereby creates a vested interest in both the process and product (Warren 2004).

By utilizing geographic information systems in a similar participatory fashion, an active urban regime of Nairobi will be following the practices of advocacy planning and PPGIS in the United States. However, although the actors and actions may appear similar, they will be able to tailor their approaches to suit the context within which they are operating, thus affording Nairobi the necessary tools and techniques to successfully employ a bottom-up approach to urban planning that truly meets the needs of the people. Consequently, the residents of the *bidomvilles* and elsewhere in Nairobi would be directly involved and would both give to and gain from the PPGIS process. This approach is also an important step toward proving the city a viable site for international business activity. Global companies, which deem stability an important measure in site location, will note the collaborative information-gathering process as an encouraging sign of constancy. Opening economies and reducing barriers to global activity is noted as holding promise for the future growth in Africa (Azam et al. 2002).

Urban planning in the United States therefore offers several tools and techniques that may be well applied in the city of Nairobi, including an ethos of advocacy planning, as well as the development of a resolute urban regime and the use of geographic information systems in a participatory fashion. These are potential purveyors of appropriate planning in Nairobi. Significantly, no calls are made for the transference of any overarching planning measure from the United States or Western Europe to Nairobi. Thus, such seminal actions as the establishment of a greenbelt, new town development, or laying out growth according to the principles of new urbanism, are explicitly not prescribed. Such drastic and most likely misapplied efforts would do little to meet the needs of Nairobi. Prescribing a specific feature of Western planning for use in Nairobi is not an appropriate response. Prescribing tried and true planning efforts that maintain flexibility for adaptation in a non-Western setting is a far more realistic and operative response.

6.7 Conclusions

Today Nairobi is at a critical juncture in its history. The primate city is experiencing substantial population growth and associated development pressures. Much of the city is marked by inadequate housing and infrastructure and by a dearth of occupational opportunities in the formal sector. Environmental concerns also abound as exceedingly high population densities in the *bidonvilles* result in unsanitary living conditions. Yet Nairobi is only a fraction of the size of many other cities of the developing world and far from mega-city status. It has global name recognition and may even plausibly be recognized as a global city. Despite daunting challenges, the city of Nairobi still has the opportunity to affect meaningful and lasting change. Accepting this challenge is the first step. The next step is to establish firm and lasting linkages between politicians, business leaders, and community advocates. The third is to exert proactive planning efforts aimed at uplifting all citizens of Nairobi. Finally, the involvement of modern tools and technology, such as geographic information systems, will go a long way to competitively position Nairobi in the twenty-first century.

The acceptance of generic approaches to development issues in seemingly inimitable cities has been escalating in tandem with the ever-increasing homogenization of the world's cities. What then is necessary is an approach that appreciates both the similarities and disparities of each of the world's cities. Stren (2001) posits that although models of strategic planning are being developed in the North and applied in the South, the conditions and complexities facing these efforts mandate that the relative availability of resources be taken into account. In an increasingly interconnected world, taking advantage of congruencies among cities while understanding and appreciating their individualism proffers perhaps the optimal opportunity for successful urban planning. To foster global investment, Nairobi must demonstrate a sustainable urban environment, which again requires regime cooperation and a feeling of vested interest amongst the populace.

Political leaders can continue to pursue policies of self-enrichment, businesses can continue seeking profit maximization, and life in the *bidonvilles* will continue to deteriorate. Conversely, the paradigm can shift in Nairobi and people can work together for the greater good with recognition that a rising tide does indeed lift all boats. Without question, the politicians and planners in Nairobi can learn from their counterparts in the West. That the developed world has something to offer to the developing world in terms of planning technology and technique is being increasingly recognized. Specific planning approaches, with modification, can truly provide opportunity for more equitable growth. Those who despair would do well to heed the words of Dutt and Pomeroy who acknowledge similar distresses in the cities of South Asia but also ably denote that these cities, similar to Nairobi, are “beacons of hope” and “powerful engines of social and economic change” (2003, p. 332). The city of Nairobi faces difficult challenges, but without question they are challenges that with proper collaboration and planning can be successfully resolved.

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Part III
Quantitative Analysis

Chapter 7

Socioeconomic Correlates of Asian Urbanization

Ashok K. Dutt, Frank J. Costa, and Christian Tettey

Abstract In contrast to other parts of the world, Asian urbanization is unprecedented. Asian cities are growing rapidly despite threats of climate change on urban sustainability and the inequitable distribution of health threats. The prosperity of a nation is intimately linked with the prosperity of its cities. In this chapter, urbanization is correlated with development and expenditure on development with the intent to examine the circular relationship between urbanization and development. Data variables were obtained from World Bank and published sources within the United Nations. Using three different statistical techniques, this chapter concludes that urbanization is linked with underdevelopment of rural areas, which causes unprecedented migration from rural to urban areas.

Keywords Asian urbanization • Factor analysis • Urbanization and development

Urbanization levels in Asia are low, except for Japan and the Tiger economies of South Korea, Taiwan, Hong Kong, and Singapore. Sub-Saharan Africa has lower levels than Asia. Developed countries and most of the former Soviet Union are highly urbanized, more than 65 %. Latin America lies in an intermediate position with about 50 % urbanization level. Asia is marked, however, by the great size of the population aggregates. In 1950, there were some 226 million urban dwellers in the region; by 1990, just under 1,000 million; and projected for 2025, some 2,700 million, or an increase of 12 fold in 75 years. Indeed, the 1950 urban population of Asia was barely 8 % of what it is projected to be in 2025. Quantity must indeed be the transformation of quality with figures such as these: a radical change in entire ways of life and of civilizations (Harris 1999, p. 9).

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Globalization has affected Asian cities in both the manufacturing and service sectors. The Chinese premier during his visit to India in 2005 made a profound statement: “China is the factory of the world, while India is its office.” Big cities are expanding physically and their population is increasing rapidly. In the 1980s Jakarta increased at an annual rate of 3.1 % and Bangkok Metropolitan Area extended to 100 km from the urban core. More than half the world’s cities of 1 million or less are in Asia. The smaller cities of Asia are also experiencing the ripple effects of development.

Smaller centers have experienced extraordinary growth under the impact of industrialization. Tiruppur in Tamil Nadu in India is a well-known example. The sheer speed of change frequency means we are always out of date. On the periphery of Dhaka a world-class garment export industry has been built since 1980, now employing some 700,000 workers, the majority of them women. Or take Bangalore, successively a leading center of electronic hardware and now of software. Such high-speed change transforms the patterns of land use in the city: the decline of the Mumbai financial sector has had effects of the opposite kind, producing a building boom and some of the highest urban land prices in the world in the southern tip of the city and the relocation of back-office functions to a new business area in the north of the city (Harris 1999, 11).

A significant impact of the West on Asian cities is aptly reflected in building tall skyscrapers. The first skyscrapers of the world were built in U.S. cities in the second half of the nineteenth century based on two new technologies: (1) the use of electrically operated elevators, and (2) the introduction of a steel frame for the tall buildings.

Each mega-city in Asia is also looking to the West because each is adding skyscrapers in the central areas, until it seems they are competing with each other to grow taller. Mumbai’s Nariman Point, built on a large area reclaimed from the sea, has developed since the early 1970s into an office, hotel, and residential skyscraper complex, causing a shift in the Central Business District (CBD) focus from its earlier location near the Victoria Terminus (now Chatrapati Shivaji) railway terminus. The Nariman Point skyline looks like a mini-Manhattan. The relatively low-rise CBD of Kuala Lumpur is in the process of getting a magnificent facelift as the 100-acre race course, located near the CBD, has been converted into a commercial building complex called Petronas Towers, “resembling a pair of cornucops topped with minarets” (The Economist 1993). The complex completed in 1996 was the tallest building in the world. Thus, Asia’s pre-1996 tallest building, the 1,250-foot high Central Plaza built in 1993 in Hong Kong, was relegated to a second position on the continent (Dutt and Noble 1996, p. 1). Currently, Taipei has the honor of having the world’s tallest building.

The Asian urbanization levels are comparable in many ways to urbanization in the U.S. and Western Europe in the nineteenth century. Nonetheless, Asia has been urbanizing in its own unique way during the past 100 years. The unprecedented increase of births over deaths characterizes contemporary Asia’s rapid increase of population in general. Urban population in Asia is also increasing in absolute numbers. Death rates declined sharply because of better medical and health facilities whereas birth rates remained at high levels in the 1950s and 1960s. However, birth rates declined in the 1980s and 1990s. In other words, Asian cities are experiencing

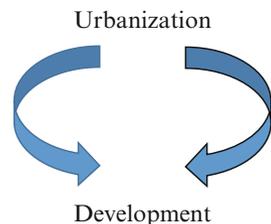
the highest rates of natural increase of population, particularly in urban areas, a condition not true even of Western Europe during the nineteenth century.

Some economic and demographic variables correlate with urbanization negatively, others positively. Urbanization growth is positively related to per capita growth in gross national product (GNP) and to export value, whereas the fertility rate has a negative relationship. Such features are reflected best during the 22-year period (1969–1991) in Japan, Indonesia, China, and India, although in Saudi Arabia the fertility decline is not so noticeable because of its unique and rapid petroleum-based development and adherence to the Islamic practices of discouraging family planning (Dutt and Noble 1996, 12).

Global warming is projected to cause climate change all over the world. In Asia, one major consequence will be a large-scale melting of the snow cover that lies on the high Himalayas and Tibetan Plateau up to 2035 to 2050. This snowmelt will engorge the rivers that originate from this snow cover, causing floods in the river basins of Huanghei (Yellow River), Yangtze, Red River, Mekong, Salween, Irrawaddy, Brahmaputra, Yaluzangbu, Ganges, Indus, and others. The United Nations has also estimated that there will be raised sea levels and fewer (or increased) rainy days in many parts of the world. Both trends will affect urban center development in general. Here is an example in India. It may be understood that high water levels created by a rising sea level would remain permanently, whereas flooding in the rivers caused by snow melting is not a permanent feature but rather would disappear in a few months.

Major Indian cities that will experience fewer rainy days include Mumbai, Hyderabad, Bangalore, Nagpur, Ahmadabad, and Amritshar. These cities, with the exception of Mumbai, already experience a scarce water supply and will be further challenged. Moreover, global warming will also cause the sea level to rise, causing coastal inundation problems for several cities such as Mumbai, Chennai, and Kolkata (Calcutta) in India. Each city should plan to increase their sea defense embankments. It is unfortunate that no steps have yet been taken to resolve these problems. Figure 7.1 also indicates that the cities in the eastern part of India such as Kanpur, Varanasi, Patna, Kolkata, and Guwahati will experience more rainy days. To prevent overflows, they will have to raise the Ganges and Brahmaputra River embankments. India, as most other Asian countries, has not started to plan the infrastructure investment to counter the effects of climate change. Among the developed countries, the Netherlands has taken a lead in meeting the climate change challenges

Fig. 7.1 Circular relationship between urbanization and development



(Human Development Report 2006, p. 167). This country had been fighting against increased sea-level subsidence and pumping water from areas below sea level. It has simply combined its existing efforts with climate change challenges.

A study published in 2008 examined urbanization levels and socioeconomic correlates in Muslim countries. The present study examines all Asian countries. The 2008 study (Dutt et al. 2008, pp. 87–106), which applied three quantitative techniques using the same dataset for the Muslim countries of Asia, uncovered some common characteristics. Urbanization correlates of low-income countries such as Afghanistan, Bangladesh, Pakistan, Tajikistan, and Uzbekistan are associated with low health expenditure, lower life expectancy, and higher infant mortality. The opposite is true for high-income countries such as Saudi Arabia, Kuwait, and United Arab Emirates.

Three statistical techniques are used here, not only to complement each other, but because each serves a specific purpose in explaining the urbanization correlates of the Muslim countries of Asia. The narrowest explanation is provided by stepwise regression model 2, in which two variables, access to improved sanitation facilities and GDP per capita, best explain the urbanization association. Factor analysis associates urbanization with four positive variables: healthcare, life expectancy, GDP per capita, and GDP per capita purchasing power parity (PPP), and two negative variables: crude death rate and infant mortality rate. Thus, factor analysis brings in a larger number of variables that are negatively and positively associated with urbanization. The Pearson correlation, on the other hand, has seven variables that cause urbanization and eight variables that are consequences of urbanization. Thus, the Pearson correlation covers a much wider number of variables that are correlates of urbanization.

7.1 Circular Relationship: Urbanization and Development

Urbanization is correlated with development and expenditure on development. By development, we mean economic, social, cultural, and service development because growth of anyone of these four components is related to urbanization. Thus, there is a direct relationship between urbanization and development. This relationship is circular in nature, meaning that development induces urbanization whereas urbanization also enhances development.

To assess quantitatively the relationship between urbanization and development, the possible development variables for countries in Asia have been identified. These data variables were obtained from World Bank and United Nations published sources. Some data such as average annual population growth rate are temporal, but the rest of the data are recent, either 2002 or 2003. The development variables represent demographic, economic, health, service facilities, urban, and employment.

7.2 Urbanization Correlated with Development Variables Using Pearson's Correlation

Three urbanization-related variables are identified as (1) percentage of urban population compared to total population in 2003, (2) percentage of average annual urban population growth between 1990 and 2003, and (3) percentage of population living in urban agglomerations of more than 1,000,000 compared to total population in 2003.

Although these three variables are interrelated, a pair of two variables is highly correlated: the percentage of urban population and the percentage of total population in urban agglomerations of 1,000,000 and more. Taking these three urban variables together, we do find that only four pairs of variables are closely related to more than one urban variable. Crude death rate is negatively correlated with percentage of urban population. Crude birth rate again is positively correlated with average annual urban population growth. Per capita health expenditure is highly correlated with percentage urban population. Physicians per 1,000 population is negatively correlated with urban population annual growth, which is true for hospital beds as well; fertility rate is high where urban population growth rate is high. Higher percentage of urban population correlates positively with greater access to improved sources of water. This same positive relationship holds for higher access to improved sanitation facilities. However, improved sanitation facility is higher in countries with larger population in 1,000,000+ cities. Life expectancy and infant mortality rate have different kinds of correlation: countries that have a greater percentage of urban population have higher life expectancy but a lower infant mortality rate. GDP per capita and GDP per capita at purchasing power parity (PPP) (2003) are both highly positively correlated with countries with higher population in million-plus cities and with higher percentage of urban population. The three employment variables (agriculture, industry, and service) show a very distinctive relationship with urbanization. Percentage of urban population is negatively correlated with employment in agriculture but has a high positive correlation with employment in service. Again, employment in service is highly correlated with population living in urban agglomerations of more than a million.

In summation, urbanization variables are related to variables in economic, demographic, infrastructure, and service variables. A significant outcome of this analysis is that urbanization is positively correlated with GDP but is not related to high employment in the industrial sector. Higher service employment and lower agricultural employment are the typical characteristics of urbanization in Asia.

Based on the Pearson's correlation, scatter diagrams were drawn for pairs of variables. Four such diagrams are shown here with percent urban to total population running against four other variables. The first scatter diagram (Fig. 7.2) shows the relationship with percentage of employment in services.

Except for Armenia, all countries fall within the 95th percentile range, and a group of eight countries, namely, Hong Kong, Singapore, Jordan, UAE, Republic of

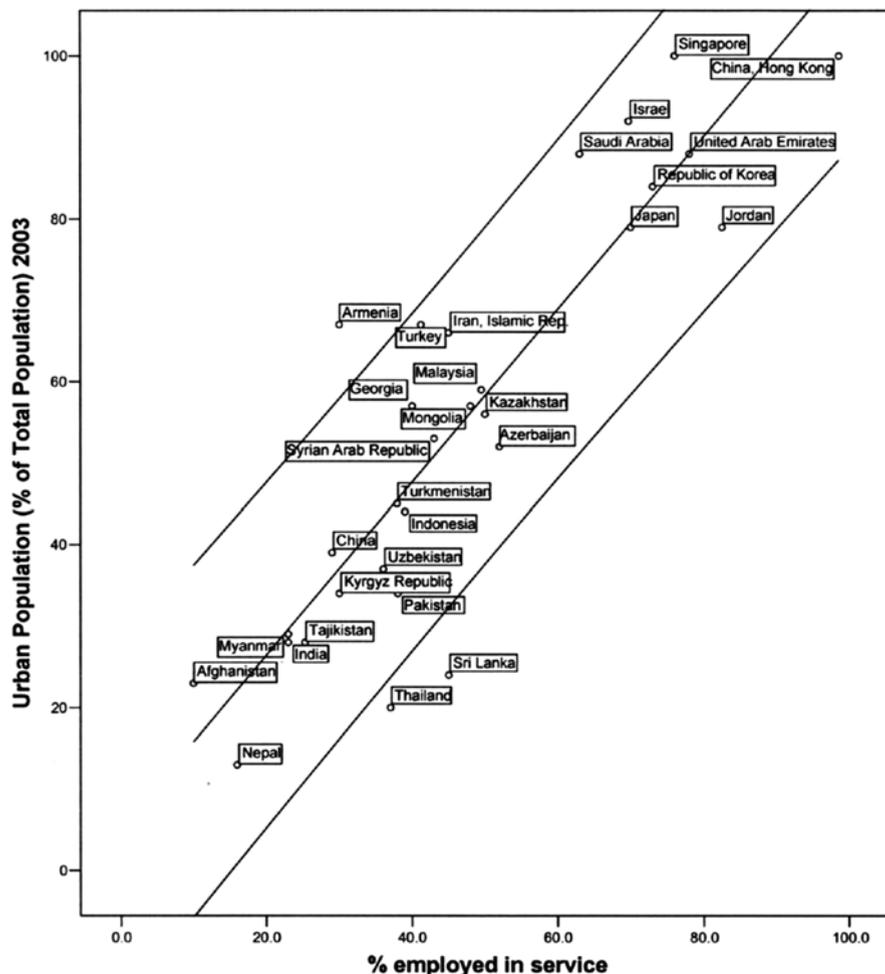


Fig. 7.2 Scatter diagram showing urban population percentage and employment in services

Korea, Israel, Saudi Arabia, and Japan, form a cluster of high employment in service and urban population percentage. In contrast, Afghanistan, Nepal, and Thailand fall in the lowest tier of both employment in service and percent urban.

The second scatter diagram (Fig. 7.3) relates urban population to life expectancy. As expected, Japan, Hong Kong, Israel, Singapore, and Kuwait are in the highest tier of urban population percentage and life expectancy at birth. On the other hand, Cambodia, Laos, Nepal, and Myanmar are in the lowest tier with low urban population percentage and life expectancy. Three countries—Vietnam, Thailand, and Sri Lanka—have a low percentage of urban population but relatively high life expectancy: these countries have a relatively good healthcare network in the rural areas.

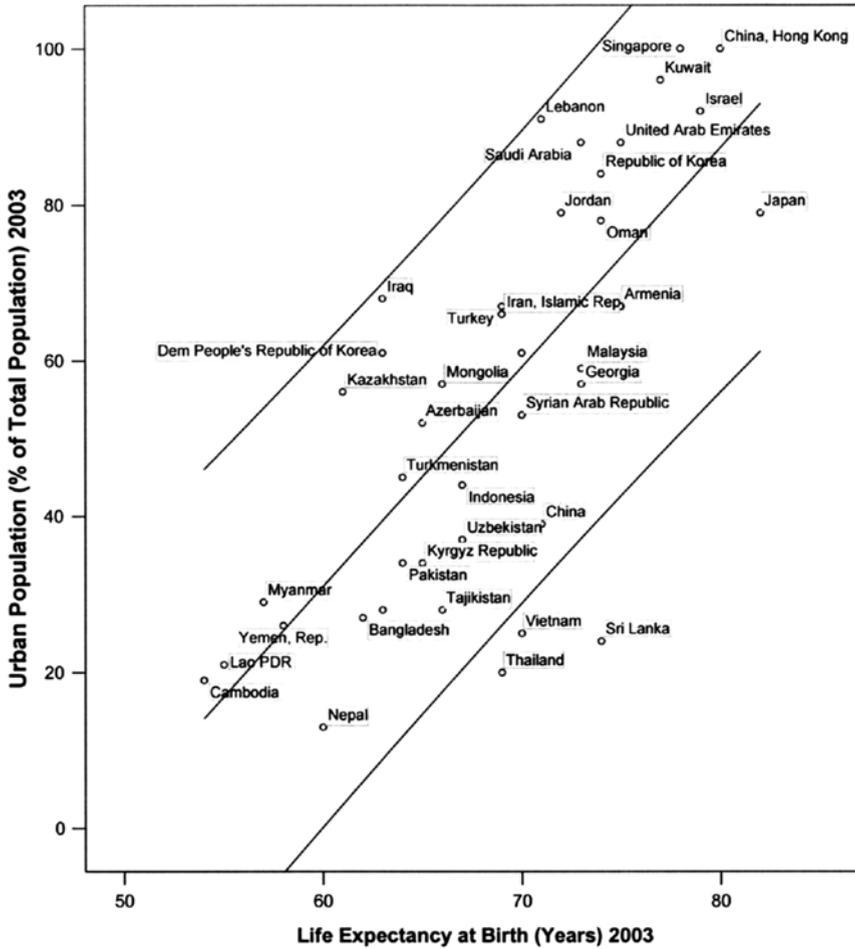


Fig. 7.3 Scatter diagram showing urban population percentage and life expectancy at birth

Figure 7.4 relates urban population with physicians per 1000 persons. From the scatter diagram, Israel and Lebanon stand out as having the highest number of physicians per 1000 in combination with highest urban population percentage, whereas a group of ten developing countries (Nepal, Cambodia, Thailand, Laos, Afghanistan, Vietnam, Sri Lanka, Bangladesh, India, and Myanmar) are endowed with the combination of low number of physicians and urban population percentage.

The fourth diagram relates urban population to GDP (gross domestic product) per capita at PPP. The GDP per capita in combination with urban population percentage shows a high-level clustering of seven countries: Hong Kong, Singapore, Kuwait, Israel, Saudi Arabia, Republic of Korea, and Japan. Ten countries fall in the lowest GDP per capita and urban population percentage, with Nepal trailing at the bottom (Fig. 7.5).

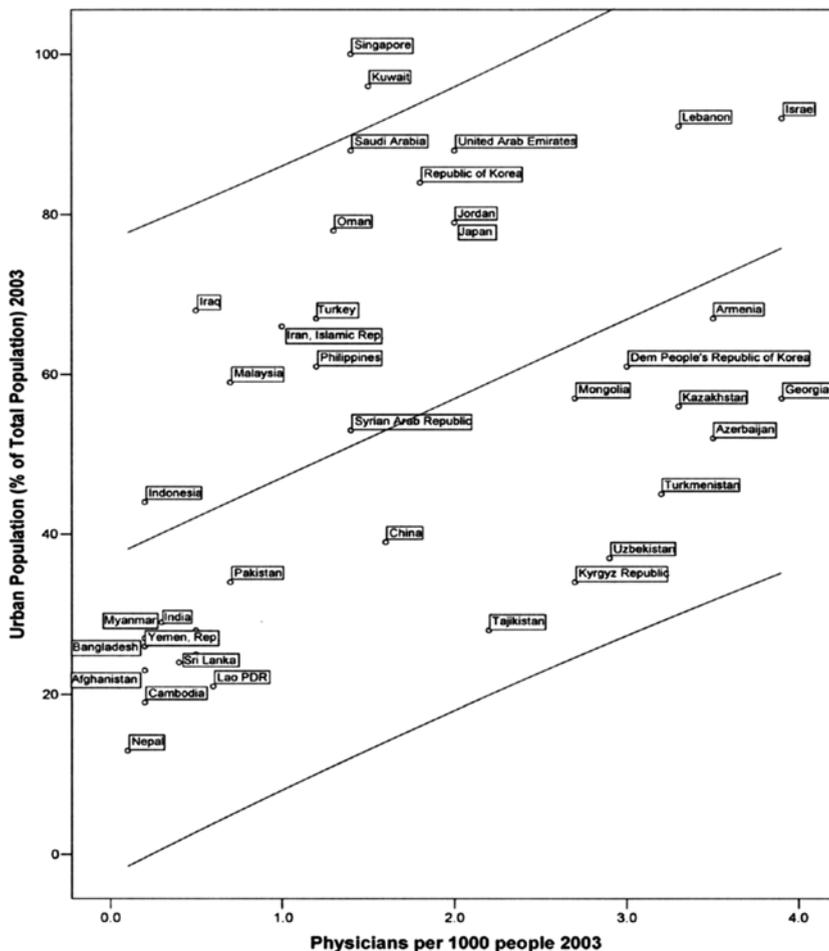


Fig. 7.4 Scatter diagram showing urban population percentage and physicians per 1000 people

7.3 Results of Stepwise Regression Analysis

Based on Pearson’s correlation results, we sought to determine the possible problems of co-linearity in the regression analysis, based on correlations coefficients of 0.9 or more. Some variables were found to have high correlations and therefore were eliminated from the data set for analysis, in an effort to minimize the possibility of co-linearity among the variables. These variables include age compositions (0–14, 15–64, and 65 years and more), dependency ratio, and crude death rate. The SPSS program was used to run stepwise regression, with percentage of urban population as the dependent variable. Stepwise regression is a way of computing multiple regressions in stages such that the independent variables that are best

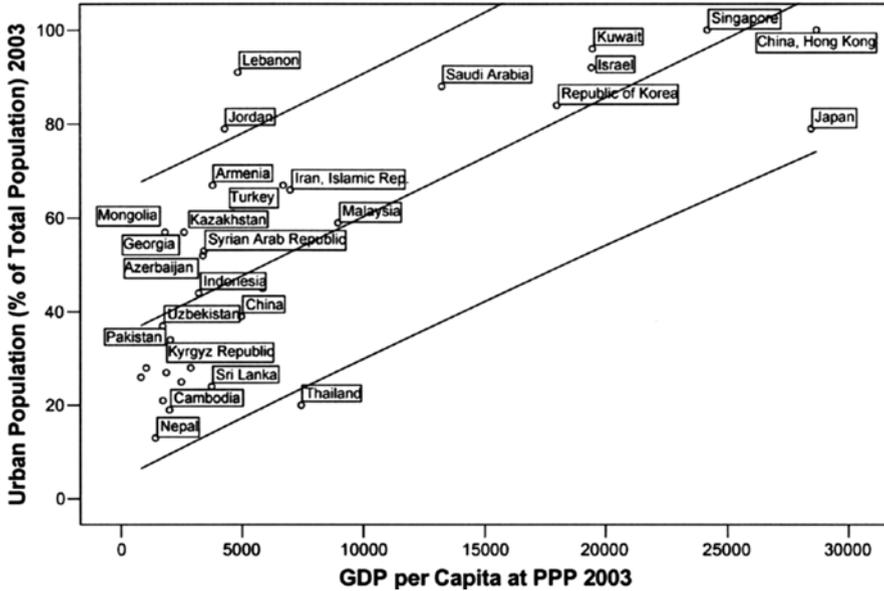


Fig. 7.5 Scatter diagram showing urban population percentage and gross national product (GDP) per capita at purchasing power parity (PPP). (From PPP 2003)

correlated with the dependent variable are included in the equation in stages. The program does so by controlling for previously entered independent variables until no additional independent variable can be added (Kahane 2001).

Using the stepwise regression, the variables included in the explanation of urbanization are life expectancy at birth, percent of the employed population in service, physicians per 1,000 persons, and GDP per capita at PPP. These variables explain 73 % of the variance in urbanization (Table 7.1). As can be seen from the coefficient table (Table 7.2), a combination of demographic, health service, and economic variables are associated in predicting urbanization. The explanation therefore is as follows: increased urbanization brings about higher economic levels, with a greater number of healthcare facilities, resulting in higher life expectancy at birth. Also, a greater number of people are employed in the service sector. Urbanization and economic prosperity (depicted by GDP per capita at PPP, 2003) and growth of service sector have a triangular interdependent relationship whereas higher life expectancy and greater proportion of hospital beds are direct results of economic prosperity.

7.4 Factor Analysis

The factor analysis technique was used to group the variables that are associated with three urbanization variables: (1) percentage of urban population to total population, (2) urban population annual growth rate, and (3) percentage of the total

Table 7.1 List of variables used in quantitative analysis

Average annual population growth rate (%), 1990–2003
Average annual population growth rate (%), 2003–2015
Age composition (%), 0–14 years
Age composition (%), 15–64 years
Age composition (%), 64 years and over
Dependency ratio (dependents as proportion of working age population), young
Dependency ratio (dependents as proportion of working age population), old
Crude death rate (/1,000 people), 2003
Crude birth rate (/1,000 people), 2003
Population density (people/km ²), 2003
Health expenditure per capita (\$), 2002
Physicians per 1,000 people, 2003
Hospital beds per 1,000 people 1995–2005
Total fertility rate (births per woman), 2003
Access to improved source of water (% of population), 2002
Access to improved sanitation facilities (% of population), 2002
Life expectancy at birth (years), 2003
Infant mortality rate (per 1,000 live births), 2003
Gini index, 2003
GDP (\$ billion), 2003
GDP per capita, 2003
GDP at PPP (\$ billion), 2003
GDP per capita at PPP, 2003
GDP growth rate (%), 2003
GDP per capita growth rate (%), 2003
Urban population (% of total population), 2003
Urban population average annual % growth, 1990–2003
Population in urban agglomerations of more than 1 million (% of total population), 2003
% Employed in agriculture
% Employed in industry
% Employed in service

Source: World Bank (2005); United Nations (2004)

Table 7.2 Coefficient table of regression analysis

	<i>B</i>	Standardized coefficients beta	<i>t</i>	Significance	Collinearity statistics	
					Tolerance	VIF
(Constant)	-56.0453		-2.1240	0.0390		
Life expectancy at birth (years), 2003	1.1170	0.2899	2.6340	0.0115	0.4763	2.0995
% Employed in service	0.3427	0.2734	2.8645	0.0063	0.6334	1.5786
Physicians per 1,000 people, 2003	5.9570	0.2728	3.3708	0.0015	0.8812	1.1348
GDP per capita at PPP, 2003	0.0011	0.3167	2.771	0.0080	0.4421	2.2620

VIF Variance Inflation Factor

population in urban agglomeration (1,000,000+). The literature on factor analysis is plentiful (Gorsuch 1983; Kim and Mueller 1978a, b; Lawley and Maxwell 1971).

Varimax rotation with Kaiser normalization was used (Table 7.4). Four factor solutions explained 87.19 % of the variance cumulatively (Table 7.3); only factors 1 and 2 contained urbanization variables (Table 7.4). Factor 1 explained 24.12 % of variance and factor 2 explained 28.33 % of variance.

Factor 1 contains two urban variables: percentage urban population and population in urban agglomeration of more than 1 million. These variables are associated with higher employment in the service sector and fewer people employed in agriculture. In addition, there is a positive association of two economic variables, GDP per capita at PPP and GDP per capita in this factor. Two healthcare variables are also associated with this factor, indicating that higher urbanization means better hospital facilities and increased expenditure on health; this, in turn, means that economic prosperity can cause higher urban growth. Four demographic variables are associated in this factor as well: mortality rate, crude birth rate, life expectancy, and population density. Higher urban growth entails lowering of mortality and crude birth rates on the one hand and increases in life expectancy and population density on the other.

Factor 2 contains the growth rate of urban population variable, which is inversely correlated with GDP growth rate as well as GDP per capita growth rate. As the urban population grows, either by migration or by natural growth, economic growth fails to keep pace with the rate of urban population growth. In the same factor, crude birth rate is positively correlated with urbanization, indicating high natural growth leading to higher dependency ratio and greater ratio of people in the age group of 0–14 years. Urban population growth correlates well with annual population growth in the period from 1990 to 2003 and will continue to be highly correlated in the future period from 2003 to 2015.

The advantage of the application of factor analysis is that 14 variables were grouped in factor 1 and 11 variables with 1 urbanization variable in factor 2. Factor analysis provides us with the opportunity to explain the results based on grouped variables.

7.5 Conclusions

To solve urbanization problems in Asia, attention must be paid to the socioeconomic development trends in the region as these tend to explain the rate of urbanization. Because urbanization is believed to result from migration from rural areas to urban areas, the best possible means of intervention to arrest urban explosion is to develop policies that would address socioeconomic development in the rural areas. Encouragement of village-based industries is one way to resolve this problem. By this effort, rural dwellers could be content with life in the rural areas and cease migrating to the urban areas in search of nonexistent jobs, where they ultimately escalate urban problems.

Table 7.3 Total variance explained in factor analysis

Component	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	13.059	38.408	38.408	13.059	38.408	38.408	11.601	34.120	34.120
2	8.913	26.216	64.624	8.913	26.216	64.624	9.632	28.330	62.451
3	5.088	14.966	79.590	5.088	14.966	79.590	5.197	15.286	77.736
4	2.585	7.602	87.192	2.585	7.602	87.192	3.215	9.455	87.192
5	1.575	4.632	91.823						
6	1.497	4.403	96.226						
7	0.866	2.546	98.772						
8	0.311	0.915	99.687						
9	0.107	0.313	100.000						

Table 7.4 Rotated component matrix

	Component			
	1	2	3	4
Age composition (%), 64 years and older	0.806	-0.573	0.026	-0.114
Dependency ratio (dependents as proportion of working age population), old	0.976	-0.175	0.009	-0.026
Population density (persons/km ²), 2003	0.864	-0.273	0.204	0.14
Health expenditure per capita (\$), 2002	0.984	-0.136	-0.002	0.016
Hospital beds per 1,000 people, 1995–2005	0.793	-0.305	-0.059	-0.484
Access to improved source of water (% of population), 2002	0.624	0.063	-0.559	0.303
Life expectancy at birth (years), 2003	0.774	-0.109	0.036	0.397
Infant mortality rate (per 1,000 live births), 2003	-0.61	-0.008	-0.063	-0.74
Gini index, 2003	-0.599	-0.048	0.295	0.629
GDP (\$ billion), 2003	0.927	-0.193	0.309	0.04
GDP per capita, 2003	0.978	-0.164	-0.007	0.019
GDP per capita at PPP, 2003	0.942	-0.212	0	0.13
Urban population (% of total population), 2003	0.545	0.229	-0.355	-0.038
Population in urban agglomerations of more than 1 million (% of total population), 2003	0.707	-0.189	-0.217	0.207
% Employed in agriculture	-0.689	-0.413	0.284	0.129
% Employed in service	0.591	0.576	-0.283	-0.151
Average annual population growth rate (%), 1990–2003	-0.041	0.964	0.049	0.185
Average annual population growth rate (%), 2003–2015	-0.333	0.924	-0.075	0.135
Age composition (%) 0–14 years	-0.5	0.838	-0.142	-0.091
Age composition (%), 15–64 years	-0.056	-0.889	0.24	0.316
Dependency ratio (dependents as proportion of working age population), young	-0.41	0.823	-0.256	-0.243
Crude death rate (/1,000 people), 2003	0.021	-0.846	0.167	-0.179
Crude birth rate (/1,000 people), 2003	-0.309	0.932	-0.081	0.05
Total fertility rate (births per woman), 2003	-0.212	0.955	-0.033	-0.009
GDP growth rate (%), 2003	-0.549	-0.664	0.049	-0.184
GDP per capita growth rate (%), 2003	-0.445	-0.773	0.047	-0.202
Urban population average annual % growth, 1990–2003	-0.063	0.782	0.398	0.445
% Employed in industry	0.209	-0.42	0.011	0.06
Surface area (000 km ²), 2003	-0.155	-0.106	0.928	0.05
Access to improved sanitation facilities (% of population), 2002	0.449	0.007	-0.628	0.566
GDP at PPP (\$ billion), 2003	0.393	-0.153	0.891	0.143
Physicians per 1,000 people, 2003	-0.058	-0.214	-0.191	-0.859

Extraction method: principal component analysis

Rotation method: Varimax with Kaiser normalization

Most countries of Asia are progressing along the staged processes of development in the traditional sense. Agricultural economies are becoming impacted by modernization, resulting in more manufacturing orientation, and eventually higher service sector development. Japan and Singapore are the primary examples of this kind of development. China is an exception as it still has a higher percentage of people in manufacturing compared to services.

Application of the three different statistical techniques revealed the nature and characteristics of various urban variables with various socioeconomic and health-related variables. The Pearson correlation and the scatter diagrams reveal that higher economic development causes greater urbanization, along with the higher population growth rate, declining fertility and infant mortality rates, better access to improved sources of water and improved sanitation, higher life expectancy, higher growth of population in the 0–14 years age group, and greater health expenditure per capita. Similarly, the stepwise regression strengthens the idea that urbanization is interchangeably related to economic prosperity and service sector development. Factor analysis emphasizes that per capita income and improvement in services are also heavily related to urbanization. Thus, the three techniques explain and strengthen the results derived from each as well as revealing certain relationships not explained by other techniques.

A market or modified market path had been the most successful economic growth for Asia. The condition is clearly illustrated by Singapore, Hong Kong, Israel, and South Korea, where the higher urbanization rate correlates with high GDP per capita. Even the communist countries such as China and Vietnam are looking more into market economies and the private sector to cope with rising development. The most recent Chinese (11th) Five Year Plan emphasizes private investment. Already, in 2006, 50 % of China's economy is private while India has encouraged private enterprise since the early 1990s.

The two economic powerhouses of Asia are China and India. Each is in the throes of rapid urbanization, which should continue for several decades, although each still has a majority of their population in rural settings. By 2050, China will have the highest total GDP, followed by the U.S. and India.

Oil-based economies of West Asia present a unique set of characteristics: they are experiencing (a) massive infusion of economic resources, (b) rapid urbanization, and (c) economies changing from underdeveloped to developed without going through the phase of industrialization. As West Asian countries are primarily Islamic, they have a taboo on family planning, exceptions being Bangladesh and Indonesia, where family planning is extensively used.

Hence, a fertility rate decline is not rapid in other Muslim countries of Asia. The slow growth of stagnant economies continues to follow dogmatic socialist paths, which in turn have affected their patterns of urbanization. Myanmar and North Korea are examples of this pattern wherein both GDP per capita and the percentage of people living in urban areas are low. In these economic settings, a limited urban development prospect discourages rural to urban migration, whereas strong centralized control inhibits population movement to urban areas.

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Chapter 8

Assessing the Impacts of the Global Financial Crisis on Major and Minor Cities in South and Southeast Asia: A Hyperlink Analysis

Stanley Brunn, Lomme Devriendt, Andrew Boulton, Ben Derudder, and Frank Witlox

Abstract We used the number of volume of hyperlinks, that is, electronic data from Google, for 19 large cities in South and Southeast Asia to demonstrate their national (in the case of India), regional, and extraregional linkages. The results can be used to illustrate the degree of intraregional and interregional flows of information about the global financial crisis between major and minor cities within South and Southeast Asia and other major global economic powers. Singapore, without doubt, is the major city in these regions. Kuala Lumpur, Bangalore, Bangkok, Delhi, and Mumbai are in a second category; Lahore, Karachi, Kolkata, and Dhaka are in yet another category. Indian cities exhibit strong national linkages. The accompanying tables, maps, and graphs illustrate the vast contrasts between cities in these two regions.

Keywords Global financial crisis • Hyperlink analysis • Regional linkages

8.1 Introduction: Daunting Challenges

The visual and print media, government analysts, and financial institutions have reminded us frequently in the past 2 years that the current financial slowdown or crisis has far-reaching effects on the lives of individuals and businesses and

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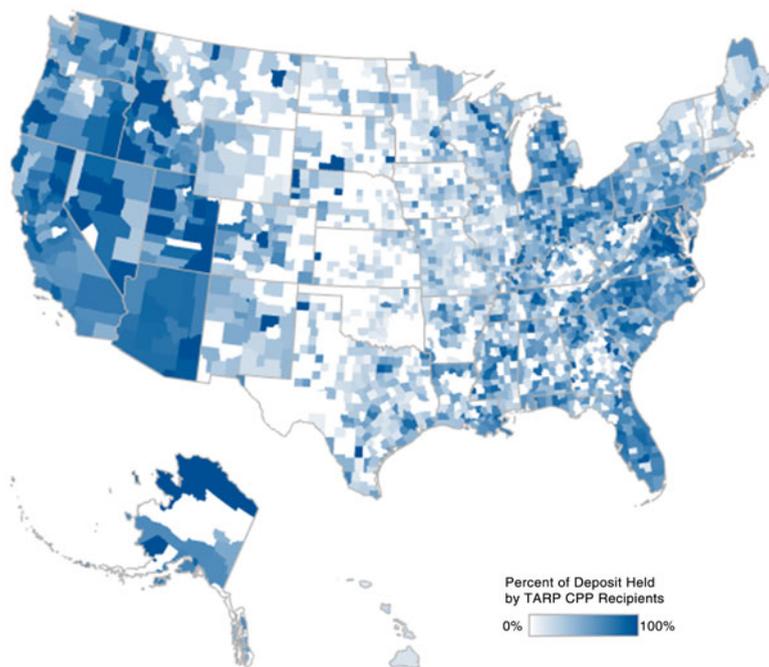


Fig. 8.1 Percent of deposit held by TARP CCP recipients (From subsidyscope.com)

organizations in urban and rural areas. They have also reported, with human interest stories, about high unemployment, homeless populations, and closed factories, in the world's largest cities as well as in small towns and rural areas (Fig. 8.1). Few countries and regions on the planet have escaped the financial crises that appear frequently in national and international newspaper and television reporting. Aside from the reporting by journalists and governments, scholars in the various social and policy sciences are beginning to examine the multiple causes of the crisis and the associated impacts on governments, financial institutions, businesses, and individuals (Derudder et al. 2009; Lee et al. 2009). Studying these impacts at national, regional, and international scales would seem to be required, even though timely, quality, and accurate data for local or global investigations are often not available for in-depth analyses. This dilemma surfaces when scholars realize that there are no comparable international databases available at national or subnational levels tracking the flow of money and credit around the world, and also there are no comparable databases measuring the impacts of economic slowdowns or downturns. The result is that scholars seeking to understand the scale and impacts of the current global financial crisis must consider surrogate databases. Unemployment levels, business closures, suspended and abandoned construction projects (ghost developments and subdivisions), factory layoffs, and reduced spending on human goods and services are data that one might consider, but often these data are not available for

comparable local and regional analyses or are not reported at regular intervals (monthly or quarterly) to make meaningful timeline projections.

For the past year we have been trying to tackle the challenges facing social and policy scientists who seek to provide some understanding of the global dimensions of the current financial crisis or economic slowdown or recession (Devriendt et al. 2009, 2011; Brunn et al. 2010; Boulton et al. 2011). Although we are aware that there are a number of criteria one might use to measure the global and regional impacts of the financial crisis, one database that would be especially useful would be the global transfer of monies or credit from one city to another city. Such an intricate and international linkage analysis would be desirable, but, unfortunately, such data are not available on global, regional, and national scales. A second possibility would be to collect and analyze data on downturns in productivity (manufacturing, construction, and service economies) or reductions in labor force (unemployment figures in various sectors). A third desirable source would be the number of workers who have applied for unemployment benefits or those individuals or firms that have applied for bankruptcy or foreclosed on agreements. These data, however, as those just mentioned, are difficult to obtain, in large part because they are not available or because there are no centralized national or regional governmental organizations and offices that collect them. Even if such data were available on any of these financial transactions, economic sectors, or employment categories, there would likely not be comparable data that would permit meaningful and significant analyses.

In absence of any readily available international database on the global financial crises, we make use in this chapter of an alternative database that we think provides a useful perspective on the current conditions, that is, the *global* and *real-time* intercity links represented by the World Wide Web. A core characteristic of the current Information Age is the unprecedented volume of and access to information, with the Web being the most prominent and obvious example. These literally hundreds of billions of digital information “pages” represent a huge and thus far underutilized source of data on the characteristics of and relationships between places (Devriendt et al. 2009). The chapter is organized as follows. The first part is based on our previous work wherein we briefly introduce the arguments for using the World Wide Web as an alternative source of real-time urban rankings on the current financial crisis at global and regional scales. In the second part, we present an in-depth empirical analysis focused on the South and Southeast Asia region to better understand the impact of the *global* financial crisis at the *regional* scale. Third, we provide an overview and discussion of the results, and conclude by suggesting some avenues for further research.

8.2 Use of a Hyperlink Web Database in Global Urban Studies

With the increasing importance of the Web for an ever-broader spectrum of human activities, we can expect that the structure of and information in this space will reflect more and more the existing (“offline”) relationships between people, cities,

institutions, and so forth (Hillis 1998; Barnett et al. 2001; Barnett and Park 2005; Zook and Graham 2007; Park and Thelwall 2008). Furthermore, what is desirable and urgently required in urban studies, particularly in times of global crises, are up-to-date and real-time measures of information *about* cities and informational flows *between* cities (Castells 1996, 2001; Crutcher and Zook 2009). The key point here is that currently *we have* access to unprecedented volumes of relevant information: the WWW being the most prominent and obvious example, which, with the rise of new ICTs (information and communication technologies), is a vast and valuable information source for monitoring changes in urban relationships as well as for a quantitative estimate of business salience (Brunn and Dodge 2001; Zook 2005, 2008; Devriendt 2010).

The potential for using Web information in looking at global and regional flows between places has been explored previously (Kellerman 2002; Dodge and Zook 2009). For instance, Heimeriks and Van den Besselaar (2006) draw on hyperlinks between research websites to study the international connections of scientific research. They analyze hyperlink networks on the scientific web to study the development of research fields, and the relationship between research organizations and the relevant institutions in their environments. We used the Google search engine—Google fast became and stands as the de facto standard search engine (Marketshare. hitslink.com 2009; GlobalStats 2009)—to develop a global hyperlink database for urban network analyses.

At the most basic level, entering the name of a city in the Google search engine provides the number of indexed web pages related to that city. The volumes of information links on the World Wide Web are a useful barometer for comparative urban linkages because they represent electronic pieces of information that are most useful in examining knowledge economies in a global perspective. In short, a hyperlink analysis has two advantages over other databases that might be used to consider global financial flows: first, they provide timely information *about* cities and regions and, second, they can be used to measure and map the relationships *between* and among cities and between and among regions.

To obtain data on the economic situation for each city, we entered not only the name of the city, as researchers have done in previous Web-based analyses (Brunn 2003; Devriendt et al. 2008), but combined with some key phrases (here, “economic slowdown” and “global financial crisis”). These key phrases are essential in producing economics-related search results but are also helpful in limiting the “unwanted”/irrelevant search results of intercity relationships. This result is what we previously called the “Paris Hilton” effect: searching for the word “Paris,” without any additional keywords, returns (many) Paris Hilton-, rather than Paris, France-, related results.¹ Searching, for example, for the number of (Google) Web pages that jointly mention “London” and “economic slowdown” resulted in 364,000 entries about this word combination. We developed in this way an *international* database wherein we

¹Other potential “problems” with the present hyperlink analysis such as word order, temporality, and language are largely discussed by Devriendt et al. (2009).

ranked 100 major cities globally through this quantitative hyperlink analysis (this list is based on the top 100 cities in population as provided by Demographia 2009).

We began our inquiry not knowing what we would uncover or discover about the geographies of information related to the current financial situation. What we learned from these qualitative and quantitative analyses (see also Devriendt et al. 2009, 2011; Boulton et al. 2011) are several significant findings: (1) the extent of the current financial crisis is indeed global and international, in that it impacts major cities in all major world regions; (2) global interdependency is well illustrated in the volume and flow data that emerge; (3) the financial picture is much more complex than one might imagine, in that the financial crisis is not limited to only the largest financial markets (New York, London, and Tokyo), but also large regional centers in South America, South Asia, Southeast Asia, and elsewhere; and (4) the linkages of the 100 largest cities with all others is not what one might predict or suspect, in that those linkages reveal a much more complex set of urban and financial networks than might be predicted. It is in this fourth observation that we began to observe that the largest cities in North Africa and Southwest Asia are not all linked to Europe and North America or that those in Latin America are mostly linked to large US and Canadian cities. Our graphical and cartographical analyses depict this complex network of global, regional, and subregional financial networks.

8.3 Empirical Regional Analyses of the Financial Crises

A useful, productive, and logical next step in any examination (descriptive or quantitative or cartographic) analysis of the urban financial linkages by geographers, economists and other to date is to extend hyperlink analyses of the financial crisis to consider the situation of developing world regions. One would expect that the impacts would be different in North American and European cities than those in Latin America, Sub-Saharan Africa, or South Asia. This empirical analysis is an attempt to fill this gap in our knowledge base. We focus on the networks and impacts of the financial crisis on major cities, capital cities, and major regional centers in South and Southeast Asia. Because we are interested in the South(east) Asian region, we examined web data for all the 19 cities in South and Southeast Asia from the Demographia list: the selected cities are Jakarta (ranked 2nd), Manila (5th), Mumbai (9th), Delhi (11th), Kolkata (15th), Karachi (24th), Bangkok (28th), Chennai (38th), Lahore (39th), Ho Chi Minh City (40th), Dhaka (41st), Hyderabad (43rd), Bangalore (44th), Kuala Lumpur (50th), Ahmadabad (56th), Singapore (63rd), Yangon (69th), Pune (71st), and Bandung (94th).²

Using the same search requests (cities and phrases, as already mentioned), we further calculated (a) the number of linkages each city in our database had to all

² Although other South and Southeast Asian cities such as Kathmandu, Thimpu, Vientienne, Phnom Penh, and Bandar Seri Bagawan are worthy to examine, we based our selection of cities on the top 100 Demographia list (in terms of population). In further research, we will enlarge this list.

other world cities in the top 100 in the world (that is, the number of web pages jointly referencing pairs of cities); (b) the number of linkages each had to all the other cities in South and Southeast Asia; and (c) the volume of linkages to cities in their respective regions compared to those outside the region. Because the number of hyperlinks for the “economic slowdown” and “global financial crisis”—our two financial crisis search terms—were similar for most cities (Pearson’s r is 0.96 for the top 100 cities), we divided the total number by 2 to obtain a Global Financial Score (GFS). The GFS measure is used in the following analyses. We also considered it important to examine the GFS per capita, so we calculated the GFS per capita (per 100,000 inhabitants). These Google searches were conducted on 23 February 2010. Among the major questions we seek to answer are the following:

1. Which cities have the most and fewest total references to the current financial crisis?
2. How do the leading cities in these regions compare to other major world population centers?
3. Are there one or two or three cities in South and Southeast Asia that dominate? If so, what is the degree of their domination?
4. Is there any clear hierarchy of connected cities in these regions, that is, those that are strongly connected and those with only few linkages?
5. Do capital cities emerge as major centers of regional and global connection or are some capitals more connected than others?
6. Which cities are most connected to all others and are there any differences between most linked cities in South and Southeast Asia?
7. Are there cities that are more regionally oriented (that is, South Asian cities to other South Asian cities) and others that are more extraregional or international in orientation?

Answers to these questions will help us place the global and regional financial crises of South and Southeast Asian cities in a better perspective. Without such analyses we will not be sure of the scale and dimensions of financial problems in these regions nor of their regional and international linkages.

8.4 South and Southeast Asian Cities in Global Perspective

In terms of the GFS (Global Financial Score) for the 19 cities, there were major differences (Table 8.1, Fig. 8.2). Singapore’s hyperlink total was 287,000, which was more than twice the totals for the second (Delhi, 124,000), third (Mumbai, 115,000), and fourth (Kuala Lumpur, 100,000). Farther down the list from these three were Bangkok, Manila, Bangalore, and Jakarta. And much farther down the list, with few references to the categories of economic slowdown and global financial crises, were Karachi, Ho Chi Minh City, Lahore, Yangon, and Bandung. A ranking of the GFS per capita entries was somewhat similar to the total GFS with Singapore, Kuala Lumpur, Bangalore, and Bangkok having the highest figures and Karachi, Kolkata, Lahore,

Table 8.1 GFS (per capita) for 19 largest South and Southeast Asian cities

City	Country	Region	GFS	GFS per capita (per 100,000 inhabitants)
Singapore	Singapore	Southeast Asia	287,000	7,175
Kuala Lumpur	Malaysia	Southeast Asia	100,200	1,965
Bangalore	India	South Asia	61,200	1,073
Bangkok	Thailand	Southeast Asia	84,600	1,058
Delhi	India	South Asia	124,000	813
Pune	India	South Asia	29,400	783
Hyderabad	India	South Asia	42,600	744
Chennai	India	South Asia	46,900	730
Mumbai	India	South Asia	115,500	679
Manila	Philippines	Southeast Asia	81,750	427
Ahmadabad	India	South Asia	15,600	345
Jakarta	Indonesia	Southeast Asia	59,850	291
Dhaka	Bangladesh	South Asia	15,315	255
Ho Chi Minh City	Viet Nam	Southeast Asia	14,750	236
Yangon	Myanmar	Southeast Asia	8,895	228
Karachi	Pakistan	South Asia	18,750	216
Kolkata	India	South Asia	26,900	204
Lahore	Pakistan	South Asia	11,595	184
Bandung	Indonesia	Southeast Asia	3,775	126

GFS stands for Global Financial Score

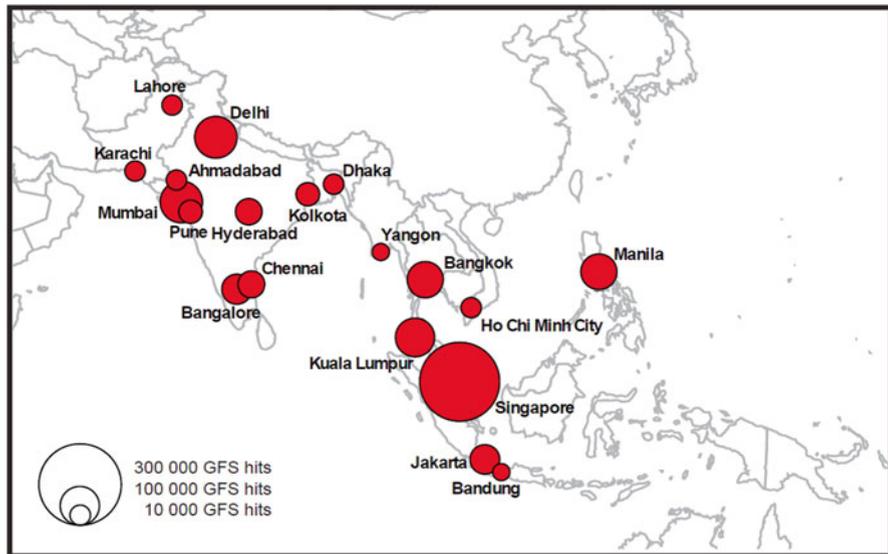


Fig. 8.2 Global Financial Score (GFS) for 19 largest South and Southeast Asian cities

Table 8.2 Global GFS relationships

City	Country	Region	Global GFS relationship
Singapore	Singapore	Southeast Asia	3,856,104
Jakarta	Indonesia	Southeast Asia	2,713,236
Bangkok	Thailand	Southeast Asia	2,119,465
Manila	Philippines	Southeast Asia	1,911,618
Bangalore	India	South Asia	1,717,622
Chennai	India	South Asia	1,481,876
Hyderabad	India	South Asia	1,386,191
Delhi	India	South Asia	1,195,462
Mumbai	India	South Asia	1,107,050
Kuala Lumpur	Malaysia	Southeast Asia	632,939
Ho Chi Minh City	Viet Nam	Southeast Asia	589,097
Yangon	Myanmar	Southeast Asia	573,584
Karachi	Pakistan	South Asia	549,470
Dhaka	Bangladesh	South Asia	433,076
Pune	India	South Asia	351,874
Lahore	Pakistan	South Asia	337,257
Bandung	Indonesia	Southeast Asia	237,821
Ahmadabad	India	South Asia	207,649
Kolkata	India	South Asia	189,051

and Bandung the lowest. What becomes apparent in even a cursory examination of Table 8.1 is that there are cities in both South and Southeast Asian regions that are clearly at the top or bottom of this ranking. It is also worth noting at this juncture that there is no straightforward relationship between the amount of information on the web about a given city (such as its GFS) and Internet access in that city. The hyperlinked data that we are using represents the information available about the global financial crisis in each city and not necessarily the amount of information on the web produced or consumed within each city. This subtle, but important, point is worth keeping in mind in our following discussions of city hyperlinks.

Another perspective on the international linkages is obtained by looking at the number of linkages (hyperlinks) between each of the 19 cities and all others within the top 100 major world cities. That is, how many web pages reference the South or Southeast Asian city under consideration jointly with another major city and the global financial crisis? A high number would indicate a degree of similarity or connection between the economic situations of two cities, whereas a low number might indicate there are fewer such connections. We can treat the ensuing number as describing a global GFS relationship (see Table 8.2). In terms of this measure, again Singapore emerged as the clear leader with 3.8 million total hyperlinks referencing it jointly with major world cities and nearly 50 % more than Jakarta, the second leading city with 2.7 million hyperlinks. Bangkok and Manila had more than 1.9 million each, and Bangalore, Chennai, Hyderabad, Delhi, and Mumbai had more than 1 million each. At the other end of the continuum are some surprises: Lahore

Table 8.3 Number of hyperlinks in own regions in comparison to global (regional+global) number of hyperlinks

City	Country	Region	RH	GH	RH/GH (%)
Kolkata	India	South Asia	134,480	323,531	42
Ahmadabad	India	South Asia	94,484	302,133	31
Pune	India	South Asia	148,684	500,558	30
Kuala Lumpur	Malaysia	Southeast Asia	188,508	821,446	23
Mumbai	India	South Asia	320,714	1,427,763	22
Delhi	India	South Asia	282,596	1,478,058	19
Lahore	Pakistan	South Asia	66,582	403,839	16
Dhaka	Bangladesh	South Asia	82,130	515,206	16
Hyderabad	India	South Asia	242,227	1,628,417	15
Chennai	India	South Asia	246,362	1,728,238	14
Karachi	Pakistan	South Asia	87,872	637,341	14
Bangalore	India	South Asia	252,359	1,969,981	13
Singapore	Singapore	Southeast Asia	491,210	4,347,314	11
Yangon	Myanmar	Southeast Asia	68,729	642,313	11
Bangkok	Thailand	Southeast Asia	250,623	2,370,087	11
Manila	Philippines	Southeast Asia	206,517	2,118,135	10
Jakarta	Indonesia	Southeast Asia	251,858	2,965,094	8
Ho Chi Minh City	Viet Nam	Southeast Asia	40,820	629,917	6
Bandung	Indonesia	Southeast Asia	14,257	252,078	6

(16th) and Kolkata (19th). Southeast Asian cities were more connected to the world's largest cities than those in South Asia. Three of the four South Asian cities with the fewest hyperlinks were in India. The Indian cities with the most connections were Bangalore, an "Indian Silicon Valley" city, followed by Chennai, Hyderabad, and Delhi, the Indian capital. Kolkata, as just noted, was in last place among Indian cities in connections to other world cities; it had fewer than half of Dhaka's total.

8.5 Regional and Extraregional Linkages

A different perspective on regional and global linkages is obtained by comparing the Global Hyperlink (GH) value with Regional Hyperlink (RH) value (Table 8.3). GH is defined as the number of relational hyperlinks to all (global and South and Southeast Asian cities), where RH is the number of hyperlinks between a city and others in its own region. The ratio RH/GH is a comparison of a city's regional total to its global number. A high value would indicate strong regional connections, and a low percentage a city with relatively few regional ties (hyperlinks).

The cities with the highest GH, not surprisingly from what we have already discussed, are Singapore (4.3 million), Jakarta (2.9 million), Bangkok (2.4 million),

and Manila (2.1 million). The lowest GH cities are Lahore (403,000), Kolkata (323,000), Ahmadabad (302,000), and Bandung (252,000). A ranking of the cities with the highest RH would be similar for both the top and bottom cities.

The calculated ratios illustrate striking differences among the 19 cities in these ten countries. First, Indian cities are those with the highest RH/GH ratios: Kolkata (42 %), Ahmadabad (30 %), and Pune (31 %). These percentages indicate the strong regional connection of Indian cities; Bangalore's RH/GH was 13 %, which indicated a lower regional connection and more international linkages. Second, the cities with the lowest RH/GH ratio (and thus the most international ties as a proportion of total hyperlinks) were Jakarta (8 %), Ho Chi Minh City (6 %), and Bandung (6 %). Third, Southeast Asian cities tended to be more "international" than those in South Asia. Fourth, Indian cities were less international than those in Southeast Asia, and fifth, most capital cities in Southeast Asia had RH/GH ratios in the 6–11 % range (Bangkok, Manila, Singapore, and Yangon).

8.6 Global Linkages for Selected Cities

Five cities illustrate the volume and extent of the GFS linkages. These data derive from the data collected on the number of linkages of each of the 19 cities to the world's other 100 largest cities. In this analysis it should not be surprising that many of the largest population cities in the world are identified and ranked as those they are most connected; they also are the most connected cities when we control for population or use hyperlinks per capita. For this part of the analysis we selected only five cities (Singapore, Jakarta, Bangkok, Manila, and Bangalore). These five are among the major cities connected to other world cities, and the five are also important economic centers in South and Southeast Asia (see Table 8.4).

The city most linked to these five cities is Hong Kong, with nearly 562,000 hyperlinks. This financial and economic center in East Asia, not surprisingly, has major financial linkages for investments and loans, throughout Southeast Asia especially. Hong Kong was the world city with the most links to Singapore; it was Jakarta's second, Bangkok's third, Manila's fourth, and Bangalore's fifth most-linked city of all 100 cities. London was the world city with the second most connections to these five cities (552,000). For Jakarta and Bangkok it was their second leading city; for Bangalore and Singapore, it was the third. This European financial capital retains strong linkages to major banks and investment houses in South and Southeast Asia. The third leading city with the most connections to these five cities was New York (551,000); it was the leading city with connections to Bangkok and the second most connected city with Singapore and Manila.

Following Hong Kong, London, and Paris was New York, which ranked in the top five in connections with all five cities. Next were Beijing and Shanghai, with Beijing having more connections to these five cities than with Shanghai. Tokyo's linkages were seventh with Singapore, Jakarta, and Manila, ninth with Bangkok, and twelfth with Bangalore. The only other cities in the top 100 in population that

Table 8.4 'Global' GFS relationships of Singapore, Jakarta, Bangkok, Manila, and Bangalore

Singapore	Jakarta		Bangkok		Manila		Bangalore	
Hong Kong	269,000	Hong Kong	117,000	New York	Kinshasa	79,800	Paris	76,800
New York	232,000	London	113,550	London	New York	68,350	Shanghai	72,390
London	231,000	New York	110,500	Hong Kong	Sydney	65,200	London	69,400
Beijing	145,400	Kinshasa	106,720	Beijing	London	60,150	New York	59,800
Paris	138,900	Sydney	87,650	Paris	Hong Kong	56,650	Beijing	46,550
Shanghai	126,200	Beijing	85,450	Berlin	Beijing	52,150	Hong Kong	46,000
Tokyo	124,600	Tokyo	84,200	Tokyo	Berlin	50,950	Chicago	43,070
Chicago	107,800	Paris	78,350	Shanghai	Paris	491,100	Boston	40,520
Sydney	100,800	Shanghai	73,600	Chicago	Tokyo	47,200	Guangzhou	39,700
Boston	87,800	Montreal	69,155	Sydney	Shanghai	44,200	San Francisco	38,710
Los Angeles	86,000	Chicago	61,700	Seoul	Seoul	43,450	Los Angeles	38,700
Washington, DC	80,600	Moscow	58,350	Boston	Moscow	40,150	Tokyo	38,520
San Francisco	80,500	San Francisco	56,700	Moscow	Chicago	40,050	Berlin	37,830
Berlin	74,800	Berlin	55,850	Los Angeles	San Francisco	39,150	Atlanta	36,460
Moscow	74,600	Sepoul	55,250	San Francisco	Los Angeles	38,900	Toronto	36,060
Toronto	70,900	Los Angeles	54,950	Kinshasa	Boston	37,650	Sydney	35,980
Seoul	70,200	Boston	53,200	Toronto	Toronto	37,295	Detroit	35,360
Houston	62,800	Toronto	461,140	Atlanta	Houston	36,905	Philadelphia	35,170
Atlanta	61,200	Mexico City	45,180	Houston	Hanoi	36,600	Moscow	35,075
Philadelphia	60,700	Houston	44,770	Cairo	Taipei	35,200	Houston	34,990

were ranked in the top 20 for all five cities were Sydney, Chicago, Berlin, Boston, Los Angeles, San Francisco, Moscow, Toronto, and Houston; each of these, except for Sydney and Chicago, had a total number of hyperlinks fewer than half those for Hong Kong, London, Paris, and New York.

There were some cities that had strong linkages with other individual cities for which the possible reasons were difficult to discern. Examples of these linkages include Houston as Singapore's 18th most linked city, Mexico City as Jakarta's 16th, Kinshasa as Bangkok's 16th, Hanoi as Manila's 19th, Milan as Jakarta's 16th, and Kinshasa as Bangkok's 15th. Kinshasa was 1st for Manila, Hanoi was 19th for Manila, and Guangzhou was 9th for Bangalore.

Of these five South and Southeast Asian cities, the most linkages with other large cities are with those in North America especially; East Asian cities were second in terms of links, and European cities were a distant third.

8.7 Regional Linkages for Selected Cities

We explored the linkages that another five cities have with the other cities in South and Southeast Asia considered in this study. These cities were Singapore, Mumbai, Delhi, Bangalore, and Chennai (see Table 8.5). We have already noted the strong regional networks of Indian cities, and we wanted to observe the extent of their financial ties to other cities in both South Asian and Southeast Asian regions. Of these five Indian cities, the city that had the most linkages with the other 18 cities was Mumbai; it had nearly 321,000 hyperlinks or 20 % of the total for all cities' linkages. Next were Delhi with 8.8 % (282,000 hyperlinks) or 18 %, followed by Bangalore (252,000) (8.5 %). Manila, Kuala Lumpur, and Bangkok had between 8 % and 10 %; all others were less than 4 % each. The South and Southeast Asian cities with the fewest hyperlinks related to global financial crises were Lahore and Ho Chi Minh City with less than 2 %; Bandung, the city with fewest linkages, had only 5,700 or 0.3 % of the regional total.

The city pair with the most hyperlinks (nearly 108,000) is Singapore and Kuala Lumpur; second is Singapore and Manila (nearly 76,000); and next are Delhi and Mumbai with 66,000 hyperlinks. These cities are the most linked in the region in regard to issues about the global financial crisis. Many of the capital cities in South and Southeast Asia have fewer than 10,000 hyperlinks to one or more of the five cities. Some cities have fewer than 5,000 links to one or more of the cities; examples of these include Dhaka and Ho Chi Minh City. Bandung has the fewest linkages of any city in this study, fewer than 1,000 with Mumbai and Bangalore.

We illustrate the extent and geographic networking of these 5 cities through a series of "clockograms" (Fig. 8.3a–e for the 5 cities), which can be read by comparing the names of the leading cities and the ranking of the 18 cities in the volume of linkages. For example, Singapore's clockogram clearly shows the dominance of nearby Kuala Lumpur, followed by Bangkok, Delhi, Mumbai, Manila, and Jakarta as cities with which it has the most links in regard to the global financial crisis. Few

Table 8.5 Regional GFS relationships of Singapore, Mumbai, Delhi, Bangalore and Chennai

Singapore	Mumbai		Delhi		Bangalore		Chennai		
Kuala Lumpur	100,700	Delhi	66,200	Singapore	49,650	Delhi	45,400	Bangalore	46,800
Manila	76,150	Singapore	45,200	Bangkok	27,000	Singapore	31,550	Mumbai	35,000
Delhi	49,600	Chennai	34,950	Jakarta	24,900	Hyderabad	29,350	Bangkok	25,215
Mumbai	45,100	Bangkok	23,000	Mumbai	22,850	Bangkok	19,015	Singapore	23,520
Bangkok	45,000	Jakarta	21,300	Pune	22,600	Pune	18,850	Jakarta	18,255
Jakarta	35,300	Kolkata	20,450	Manila	21,250	Jakarta	16,700	Ahmadabad	17,150
Bangalore	31,500	Manila	18,650	Kolkata	21,000	Chennai	16,050	Kolkata	15,400
Chennai	23,445	Pune	14,800	Bangalore	14,850	Kolkata	15,200	Manila	13,830
Hyderabad	22,600	Bangalore	14,500	Ahmadabad	13,150	Manila	14,765	Pune	13,600
Pune	11,925	Ahmadabad	12,900	Chennai	12,500	Mumbai	14,150	Delhi	12,450
Kolkata	8,410	Hyderabad	9,315	Hyderabad	9,700	Ahmadabad	11,075	Hyderabad	8,375
Ho Chi Minh City	8,010	Karachi	8,845	Kuala Lumpur	9,250	Kuala Lumpur	5,020	Kuala Lumpur	4,255
Karachi	7,160	Kuala Lumpur	8,725	Karachi	7,990	Karachi	3,535	Karachi	3,355
Dhaka	7,150	Lahore	6,540	Dhaka	7,835	Yangon	3,145	Dhaka	2,775
Yangon	6,915	Dhaka	6,450	Yangon	7,365	Lahore	3,135	Yangon	2,485
Ahmadabad	5,410	Yangon	5,530	Lahore	5,845	Dhaka	2,955	Lahore	2,220
Lahore	4,870	Ho Chi Minh City	2,800	Ho Chi Minh City	3,790	Ho Chi Minh City	1,850	Ho Chi Minh City	1,073
Bandung	2,010	Bandung	559	Bandung	1,071	Bandung	614	Bandung	604

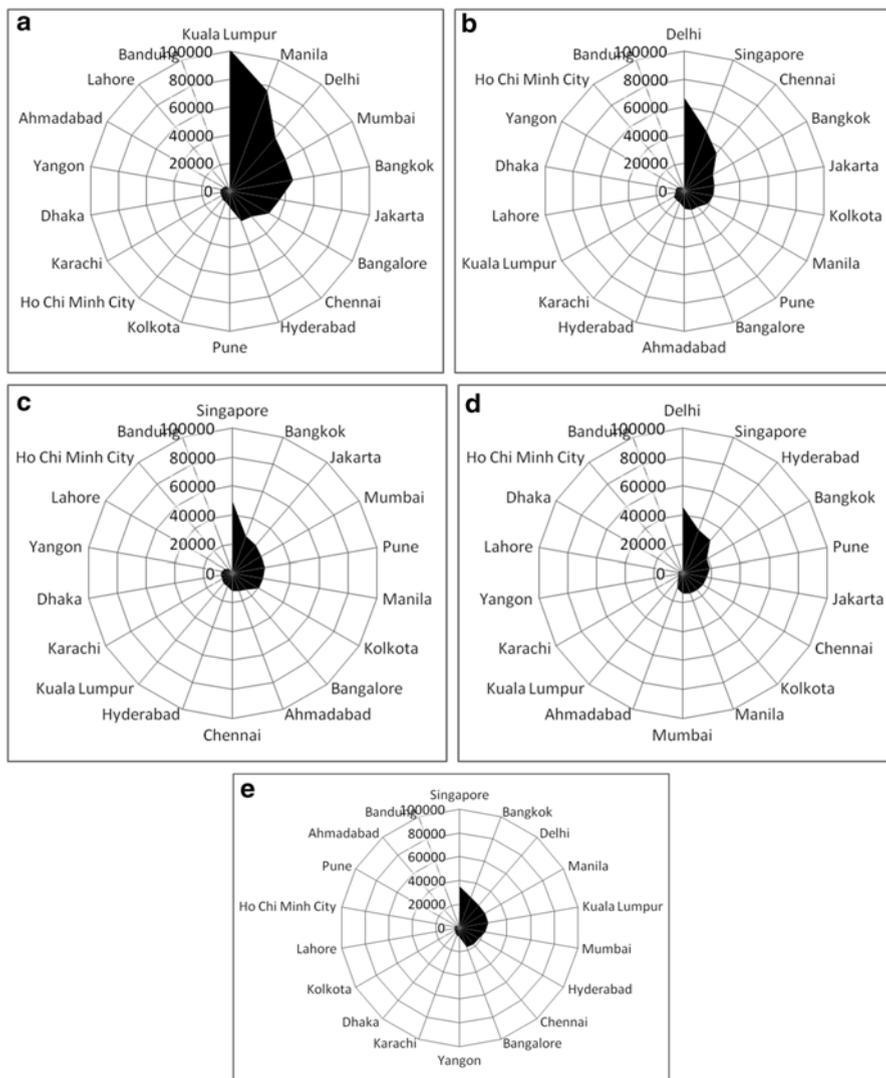


Fig. 8.3 (a–e) Regional clockogram of Singapore, Mumbai, Delhi, Bangalore, and Chennai

are the links with Ho Chi Minh City, Dhaka, Lahore, Yangon, and Bandung. The Singapore clockogram contrasts somewhat with Mumbai’s, which has links mainly with other Indian cities. Mumbai is most connected with Chennai, followed by Delhi, Singapore, Hyderabad, and Pune. The cities least connected to Mumbai are the same as for Singapore. Delhi’s pattern is somewhat similar to Mumbai in that it is most connected to other Indian cities; Singapore ranks as the secondmost net-

worked city. The final 2 cities we consider here are Bangalore and Chennai; their totals are far less than those of Mumbai or Delhi, but their linkages with other Indian cities are similar. In all 5 cities, there are few connections with cities in Pakistan and the capitals of Vietnam, Myanmar, and Bangladesh.

8.8 Discussion

Mapping and analyzing the role of South and Southeast Asia cities in the current global economy reveals how complex the linkages are between large financial centers, regional economic and financial centers, capital cities, and other large population centers. The complexity defies easy attempts to try and understand the global and regional variations that exist. Here, we identify ten major observations are noted from the foregoing descriptions of the city and regional data. We discuss first the global and international dimensions, proceed then to regional, and then to the results for large cities in individual countries.

First, and this observation should come as no surprise, the largest cities are not those with the most hyperlinks. Although 3 South Asian cities (Mumbai, Delhi, and Kolkata) and two in Southeast Asia (Jakarta and Manila) are included in the 15 largest world cities, they have much lower rankings in the number of hyperlinks (for the top 25, see Table 8.6). Kolkata, Jakarta, and Manila are not among the top 25 major world cities in GFS hyperlinks; however, Kuala Lumpur, Hanoi, and Bangkok are. What these results illustrate is the disparity between population size and K economy data about cities. That the cities with the most hyperlinks are in North America and Europe comes as no surprise, as these are among the cities with the largest, longest, and strongest K economies.

Second, there are also significant differences between the ranking of the largest cities on total hyperlinks, total population, and GFS scores. The highest GFS rankings are for Singapore, Delhi, Mumbai, and Kuala Lumpur, followed by Bangkok, Manila, Bangalore, Chennai, Pune, and Hyderabad. Another group of cities with very low scores includes Lahore, Yangon, Bandung, Kolkata, Karachi, and Dhaka. Third, based on these results, we observe that most cities in South and Southeast Asia are not among the cities or regions that are strongly connected to the 100 largest cities when considering the current economic slowdown: the most connected are the largest cities in the richest countries and most urbanized countries. The low rankings for South and Southeast Asian cities reflects their semi-peripheral, peripheral, or deeply peripheral (for some) positions within the global economy. This point was illustrated in our GAWC report (Devriendt et al. 2009).

Fourth, when we considered the international linkages of five major cities in South and Southeast Asia (Singapore, Jakarta, Bangkok, Mumbai, Bangalore), we discovered they are most linked with the world's major financial markets and cities. Hong Kong and London were those with the strongest connections, followed closely by Paris, New York, Beijing, Shanghai, and Tokyo. The next group of cities with the

Table 8.6 GFS of top 25 major cities

Rank	City	Country	Region	GFS
1	New York	United States	North America	563,500
2	London	United Kingdom	Europe	480,500
3	Singapore	Singapore	Southeast Asia	287,000
4	Hong Kong	China	East Asia	246,500
5	Beijing	China	East Asia	223,500
6	Washington, DC	United States	North America	207,500
7	Paris	France	Europe	200,500
8	Sydney	Australia	Australia	188,550
9	Chicago	United States	North America	181,000
10	Shanghai	China	East Asia	150,000
11	Boston	United States	North America	139,500
12	Tokyo	Japan	East Asia	138,500
13	Los Angeles	United States	North America	136,000
14	Delhi	India	South Asia	124,000
15	Mumbai	India	South Asia	115,500
16	San Francisco	United States	North America	112,000
17	Toronto	Canada	North America	109,900
18	Melbourne	Australia	Australia	109,700
19	Berlin	Germany	Europe	102,300
20	Moscow	Russia	Russia	101,600
21	Kuala Lumpur	Malaysia	Southeast Asia	100,200
22	Hanoi	Viet Nam	Southeast Asia	95,000
23	Atlanta	United States	North America	91,100
24	Bangkok	Thailand	Southeast Asia	84,600
25	Houston	United States	North America	82,950

most connections to these five were Sydney, Chicago, Los Angeles, Seoul, Boston, Moscow, Berlin, and San Francisco. North American and East Asian cities were clearly the leaders compared to major financial centers in Europe.

Fifth, although most of South and Southeast Asian cities can be considered to occupy a semi-peripheral or peripheral status, one city emerges as the most connected to the largest global centers: that is Singapore. As we have observed, in several measures considering the Global Financial Score and GFS Per Capita, this Southeast Asian city dominates all others, including those with much larger populations in India, Philippines, Pakistan, and Indonesia. It also has the most linkages with all other cities in South and Southeast Asia, far surpassing Jakarta, Bangkok, Manila, Delhi, and Mumbai. It truly is *the* key economic lynchpin in urban South and Southeast Asia. The relationship between GFS and GFS per capita is $r=0.76$ for the top 100 cities and $r=0.90$ for South and Southeast Asian cities.

Sixth, regionality in urban economic networking is particularly evident among cities in India. Five of the six cities with the highest regional hyperlink/global hyperlink (RH/GH) ratios were in India (a high ranking illustrates more regional

connections than global connections). Regardless of population size or number of hyperlinks related to the economic slowdown, Kolkata, Ahmadabad, Pune, Mumbai, and Delhi had more linkages with each other than with Singapore, Bangkok, Manila, Karachi, and Jakarta.

Seventh, the strong Indian regionality was further apparent in an examination of the linkages of selected Indian cities with cities in nearby Pakistan and Bangladesh. In the case of Mumbai: Karachi ranked 12th in linkages with this large city on the Arabian Sea; Lahore was ranked 14th and Dhaka 15th. Mumbai had more linkages with Singapore, Manila, Bangkok, and Jakarta than with the aforementioned cities in Pakistan and Bangladesh. The low rankings observed for Mumbai also were identical for Delhi, Bangalore, and Chennai. These three cities also had more linkages with Singapore, Bangkok, Manila, and Bangkok than with Karachi, Lahore, or Dhaka.

Eighth, there are several patterns evident in the linkages of other Southeast Asian capitals (Table 8.7). Kuala Lumpur, not surprisingly, is most strongly linked to Singapore and Bangkok. Jakarta is most strongly linked with Bangkok, Singapore, Delhi, Manila, and other Indian cities; it has few links with other capital cities in Southeast Asia. Both Yangon and Ho Chi Minh City, two important capitals in the region, have many more linkages with the large cities in the region, especially Singapore, Bangkok, Delhi, Manila, and Mumbai, than with other capitals nearby. Kolkata, Lahore, and Dhaka are among the capital least connected to other capitals in South and Southeast Asia.

Ninth, the linkages of most cities in South and Southeast Asia are with one or two dominant cities, either, as we have seen, within the same country, as in the case of Indian cities, or with nearby large cities in one of the two regions. The “clockograms” we constructed illustrated this point well. Rather than these linkages being somewhat equally distributed among several key cities, one or two cities dominate, usually the largest populated cities in South and Southeast Asia and largest capital cities. The cities with small populations and even small regional capitals are much less connected.

Tenth, and finally, our regional analyses strongly illustrate not only those cities that are most connected, but also a number that are not connected to regional and global centers in terms of information about the current economic crises. This peripherality concept is evident in some of the large-population cities in India, such as Pune, Ahmadabad, and even Kolkata, as well as the capital cities of Dhaka, Yangon, and Ho Chi Minh City. The Southeast Asian cities are clearly in the shadows of Singapore, but also of Bangkok and Manila.

8.9 Conclusions

This chapter represents a first attempt to examine the international dimensions of the current economic crises in two developing world regions, viz., South and Southeast Asia. We sought to measure those dimensions by looking at an electronic

Table 8.7 Number of hyperlinks for Manila, Jakarta, Bangkok, Kuala Lumpur, Yangon, Ho Chi Minh City: capital cities to others in the region

Jakarta	Bangkok	Manila	Kuala Lumpur	Yangon	Ho Chi Minh City
Singapore	35,300	Singapore	31,300	Singapore	7,860
Bangkok	27,600	Bangkok	26,100	Bangkok	7,340
Delhi	24,900	Jakarta	24,500	Bangkok	7,240
Manila	24,500	Delhi	20,850	Singapore	6,795
Kuala Lumpur	24,235	Mumbai	18,350	Manila	6,715
Mumbai	21,600	Bangalore	14,395	Mumbai	5,540
Hyderabad	18,385	Chennai	19,070	Karachi	4,200
Chennai	18,250	Hyderabad	18,080	Dhaka	4,045
Bangalore	17,565	Chennai	13,790	Bangalore	3,150
Yangon	7,865	Dhaka	7,860	Chennai	2,490
Karachi	6,665	Kuala Lumpur	7,795	Yangon	3,280
		Yangon	6,715	Ho Chi Minh City	
Dhaka	5,325	Karachi	5,190	Karachi	2,370
				Ho Chi Minh City	
Kolkata	4,405	Kolkata	3,650	Hyderabad	2,310
		Ho Chi Minh City		Dhaka	
Lahore	4,330	Kolkata	3,390	Kolkata	1,860
		Ho Chi Minh City			
Ho Chi Minh City	3,900	Lahore	3,060	Lahore	1,860
				Hyderabad	
Pune	3,880	Pune	2,575	Pune	1,800
Ahmadabad	1,665	Ahmadabad	1,720	Ahmadabad	391
Bandung	1,488	Bandung	1,253	Bandung	383
				Bandung	
				Hyderabad	
				Pune	
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database about the current economic conditions in large cities. We utilized the Google search engine to identify the volume and geography of hyperlinks related to the global financial crises and global economic slowdown for 19 major cities in South and Southeast Asia. We compared these volumes with the population sizes of these cities and also the linkages each of these cities had with all others in these regions and with the largest world cities. These data provided us an opportunity to measure, map, and analyze the results for individual cities as well as cities in India specifically, and for major cities in South and Southeast Asia.

The major finding of this descriptive, analytical, and cartographic effort is that the linkages of cities in these two developing world regions are much more difficult to understand than might be initially expected. Whereas one might expect that these 19 are all linked to the same global financial centers, viz., New York, London, and Tokyo, the results showed the linkages patterns were much more complex. Furthermore, there were sharp differences among cities in these regions, with some having strong national linkages, as in the case of Indian cities, and others more extraregional, as in the case of many capital cities in Southeast Asia. The dominant city in this region in regard to linkages or information networks about the global financial crisis was not Mumbai, nor was it Delhi; rather, it was Singapore. This Southeast Asian city emerged as not only the most-linked city for most cities in Southeast Asia, but also one of the leading cities in linkages for Indian cities. And this city's major international connections were with Hong Kong, New York, London, Beijing, Paris, Shanghai, and Tokyo, not with Mumbai, Jakarta, Manila, or Bangkok. Kuala Lumpur is, however, strongly linked to Singapore. The Singapore picture illustrates well the intricate and often unpredictable nature of trying to make facile generalizations about the current economic crises.

This study has clearly identified a number of additional possible studies that merit investigation by economic geographers and others interested in considering regional dimensions of the current financial crises. We mention only three that we consider especially meaningful. The first is to examine the extent of the economic problems in selected key cities based on web content: these may be unemployment, bank failures, foreclosures, stimulus packages, and disinvestment. A similar content analysis of web pages was conducted by Williams and Brunn (2004) and also Devriendt et al. in their *Globalization and World Cities (GaWC)* report (Devriendt et al. 2009). Second, it would be worth examining in greater detail the linkages of the global financial centers with the largest cities in this region. Specifically, we consider the role of Hong Kong, Beijing, and Shanghai along with Tokyo, as these are cities with already strong investment histories, especially in Southeast Asia. Third, the peripherality concept begs for more attention, as these are not only cities (many with large populations) in these regions, but many of these are also capital cities. The peripherality is already apparent in Fig. 8.4 showing the GFS scores per capita. In addition to Yangon and Ho Chi Minh City, Colombo, Vientienne, Phnom Penh, Bandar Seri Begawan, Kathmandu, and Thimpu need to be considered along with the second, third, and fourth largest cities in Indonesia, Philippines, Thailand, and Malaysia. These cities, as have the mega-cities, in both South and Southeast Asia, have been negatively affected by the global and regional financial crises.

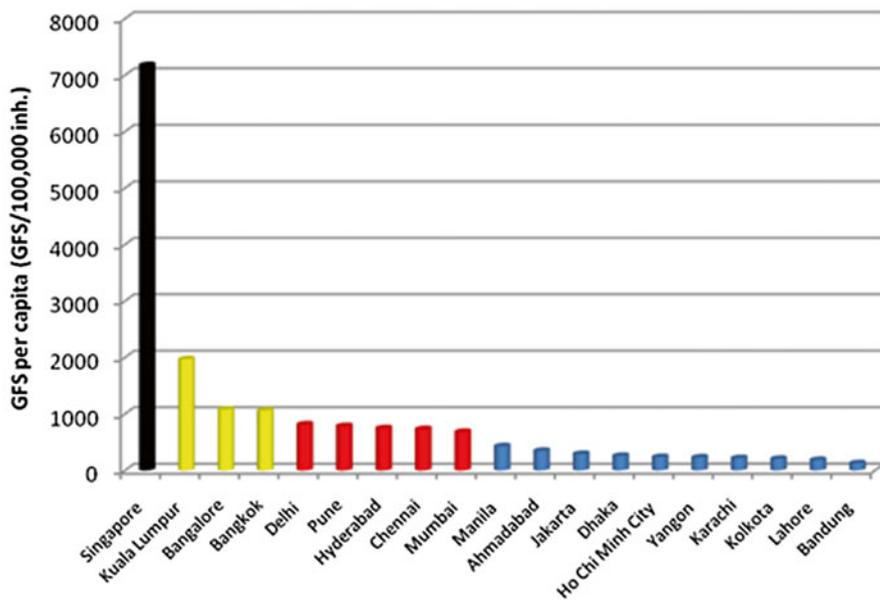


Fig. 8.4 GFS per capita for the 19 South and Southeast Asian cities

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Chapter 9

Asian Indian Settlement Patterns in Select American Gateways

Milton E. Harvey, Kevin A. Butler, Norah F. Henry, and John W. Frazier

Abstract Asian Indian immigration to the United States (U.S.) has had a distinguished history in the twentieth century, with the 1965 Hart-Celler Immigration and Nationality Act dividing this history into two distinct phases. Although the pre-1965 phase was characterized by exclusion, post-1965 was about progressive inclusion of the immigrants. With the economic restructuring causing a shift from manufacturing to services and quaternary sector in the U.S. during the later 1980s and early 1990s, Asian immigration was now characterized by high human capital. The authors establish that Asian immigration continues to increase in spite of recent setbacks caused by recession in the economy and some evidence of reverse migration. Drawing upon case studies from the metroplexes of Dallas–Ft. Worth, Metropolitan Phoenix, and Austin, Texas, the authors conclude that Asian Indian immigration represents a significant and continuing current wave of immigration to the United States.

Keywords Asian Indian • Gateway • Heterolocalism • Immigration • Metroplexes

Asian Indian immigration to the United States (U.S.) can be divided into two distinct phases: pre- and post-1965. The milestone separating these phases was the U.S. landmark 1965 Hart-Celler Immigration and Nationality Act. This bill eliminated the restrictive national origins quota system in place since the 1920s and replaced it with a system favoring family reunification and employment preferences.

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9.1 The Pre-1965 Era

Starting with small groups of Sikhs from Punjab, Asian Indians came as merchants and traders, while others worked in lumber mills in Oregon, Washington, and California and still others in the construction of railways such as the Northern Pacific (Hess 1998). Besides the physical exertion of these jobs, these early immigrants faced social and political threats. The Asiatic Exclusion League was formed in the early 1900s by labor unions and white European immigrants to restrict both the flow of immigrants from Asia and the rights of those immigrants already in the U.S. Asian Indians were denied U.S. citizenship during this era because they did not meet the “white person” clause of the 1790 Naturalization Act. Anti-Asian sentiment culminated in the 1917 Immigration Act, which essentially created an “Asiatic Barred Zone” restricting immigration from most of Asia. These political and social pressures resulted in very little Asian Indian immigration during this period. In fact, in 1940, the last year that data are available for Asian Indians before the passage of the Hart-Celler Act, there were a mere estimated 3607 Asian Indians in the entire United States (Integrated Public Use Microdata Series 2010).

9.2 The Post-1965 Era

With the passage of the Hart-Celler law came an immigration policy that abolished the 1920s quota system, increased attention on the Eastern Hemisphere, and favored specific needed labor skills and family reunification (Lai and Arguelles 2003). As a result, Asian Indians began entering the U.S. in large numbers. The 1990 Immigration and Naturalization Act (INA) created the H1-B visa, which provided even greater access for Indians, and others with skills.

By 1980, the U.S. Bureau of the Census added new Asian nationality classes that included “Asian Indians,” defined as “Bengalese, Bharat, Dravidian, East Indian, or Eronese” (Xenos et al. 1989, p. 5). This wave of immigrants was characterized by very high human capital. Highly educated and trained in high-demand fields such as medicine and engineering, these immigrants supplied the growing demand created by the United States transformation to an information-based economy. By 2000, this group’s U.S. population reached 1.8 million, doubling their 1990 population. The Asian Indian population has continued to increase during the first decade of the twenty-first century, reaching an estimated population of 2.5 million that is second only to the Chinese-American total of 2.9 million (U.S. Census, American Community Survey 2009). According to the United States Census, more than 50 % of foreign-born Asian Indians entered the U.S. between 1990 and 2000; about 18 % entered before 1980. India surpassed the Philippines as the second leading Asian country of birth of legal immigrants behind People’s Republic of China by 2008.

Given the rapid growth of Asian Indians in the U.S., this population deserves increased attention by scholars. The aim of this chapter is threefold: (1) describe the spatial and temporal distribution of Asian Indians in the United States, then develop

and test a regression model to explain the distribution; (2) use the concept of gateways to examine the settlement patterns of Asian Indians from the perspectives of three models of immigrant sociospatial behavior: spatial assimilation, pluralism, and heterolocalism; and (3) present case studies of socioeconomic and cultural patterns of Asian Indians in three gateway cities.

9.3 Asian Indians: Patterns and Explanations

9.3.1 Distribution of Asian Indians

The Asian Indian population in the United States indeed continues to grow. The information used herein is extracted from the Integrated Public Use Microdata Series (IPUMS) (Ruggles et al. 2010). In contrast to traditional census data that are aggregated and delivered as tabulations linked to large geographic areas, public use microdata are disaggregated (individual) responses to a census or survey that are collected for geographically contiguous areal units with a minimum population of 100,000 persons. The total number of Asian Indians between 1980 and 2008 reported in the upper half of Table 9.1 increased continuously but at varying rates: 97.51 % (1980–1990), 110.57 % (1990–2000), and 44.33 % (2001–2008). For the years when data were available annually, the largest increase, of 14.27 %, occurred in 2001.

Table 9.1 Total and projected number of Asian Indians in the United States (U.S.) (1980–2007)

Period	Year	Number	Change	% Change	Basis
1	1980	395,620	–		Count
2	1990	781,376	385,756	97.51	Count
3	2000	1,645,329	863,953	110.57	Count
4	2001	1,880,081	234,752	14.27	Count
5	2002	2,036,253	156,172	8.31	Count
6	2003	2,169,983	133,730	6.57	Count
7	2004	2,260,419	90,436	4.17	Count
8	2005	2,310,858	50,439	2.23	Count
9	2006	2,449,006	138,148	5.98	Count
10	2007	2,588,818	139,812	5.71	Count
11	2008	2,713,688	124,870	4.82	Projected
				44.33 (2001–2008)	
12	2009	2,798,195	84,507	3.11	Projected
13	2010	2,875,934	77,739	2.78	Projected
14	2011	2,947,909	71,975	2.50	Projected
15	2012	3,014,917	67,008	2.27	Projected
16	2013	3,077,598	62,681	2.08	Projected
17	2014	3,136,477	58,879	1.91	Projected
18	2015	3,191,991	55,514	1.77	Projected

Source: Count from IPUMS. Projections by logarithmic smoothing

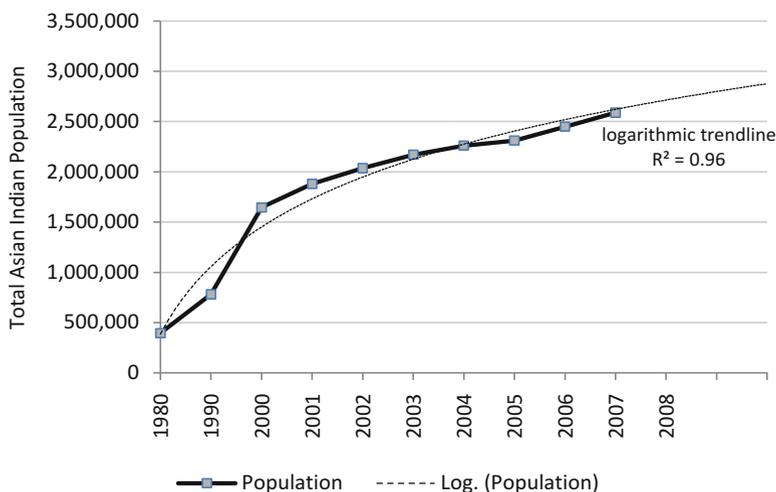


Fig. 9.1 Asian Indian population trend (Source: IPUMS Sample of U.S. Census 1980–2000, American Community Survey 2001–2008)

A logarithmic trend line was fitted to the data at the upper part of Table 9.1 (1980–2007). This transformation fits the data very well (Fig. 9.1), with an explained variance of more than 96 %. Based on this result, we projected the Asian population in the United States through 2015 when the population of Asian Indians is expected to exceed 3 million.

In Fig. 9.2 we have mapped the state-level distribution of Asian Indians in the 48 contiguous United States for 2000, 2004, and 2008. The pattern in 2000 is dominated by coastal concentrations: the east coast in the megalopolis (Boston to Baltimore), the south (Texas, Florida, and Georgia), and the west (California). In the interior, the concentration is around the Great Lakes, with Illinois the focus. This pattern persisted with some spatial expansion into contiguous states. By 2008, the western concentration of Asian Indians included California, Washington, and Arizona. In the east and southeast, Florida and the states of the megalopolis fuse with the Carolinas, attracting large numbers of Asian Indians. Initially, the Asian Indian distribution was largely coastal with some concentration around the Great Lakes; later, it reached the American heartland and gradually intensified.

9.3.2 Growth of Asian Indian Population at State Level

Table 9.2 is a summary in the percent growth rate of Asian Indians between 2001 and 2008 in each of the 50 states plus the District of Columbia by size of the Asian Indian population. By 2001, Asian Indians are resident in all the 50 states and the District of Columbia. The row totals show that, in 2001, 28 states had fewer than

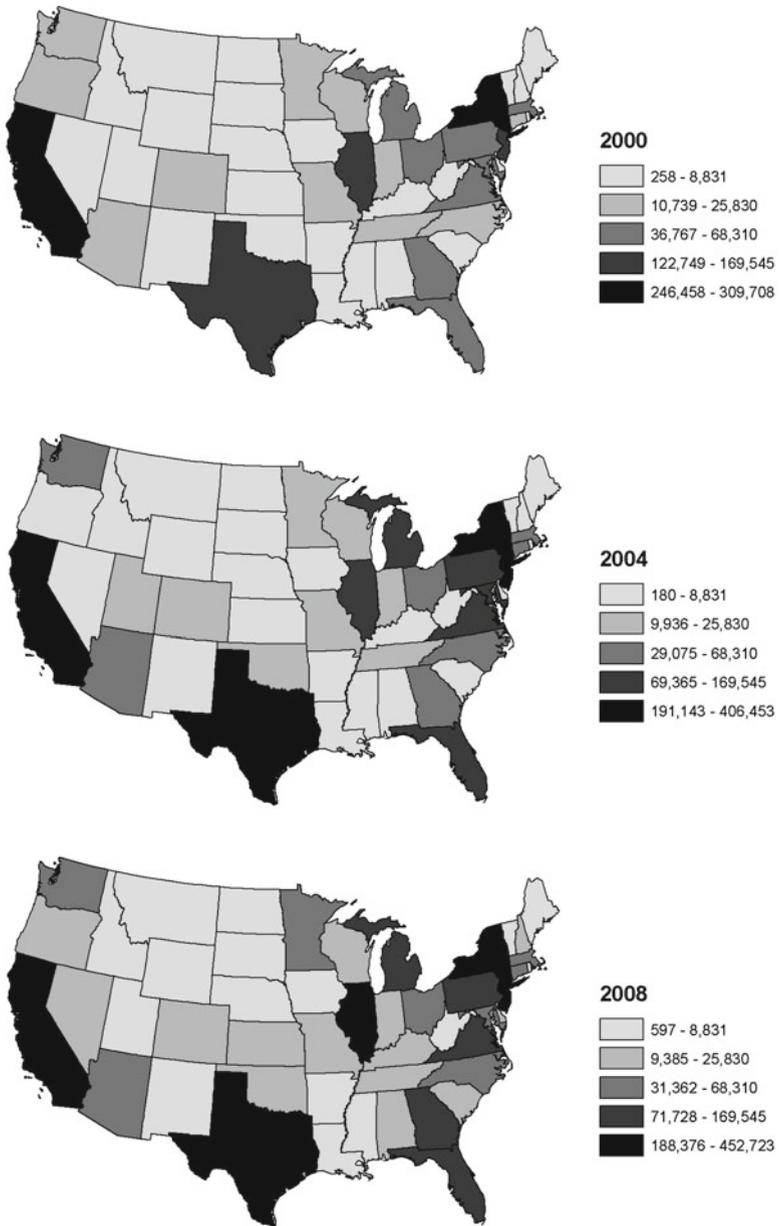


Fig. 9.2 Asian Indian population 2000–2008 (Data source: IPUMS American Community Survey sample 2001–2008)

Table 9.2 Asian Indians: size and growth rate typology by states

Average population	Growth rate: 2001–2008			
	Decline	0–49.9 %	50–99 %	>100 % growth
Largest (452,723)		California		
Large (239,728)	New York	Illinois		
		New Jersey		
		Texas		
Small (74,000)	Wisconsin	Maryland	Florida	Arizona
		Virginia	Georgia	
		Michigan	North Carolina	
		Oklahoma	Ohio	
		Connecticut	Massachusetts	
		Tennessee	Washington	
			Pennsylvania	
			Colorado	
			Minnesota	
			Missouri	
Smallest (>10,000)	Alaska	District of Columbia	Vermont	Indiana
	North Dakota	New Mexico	Hawaii	Kansas
	West Virginia	Nebraska	Iowa	Wyoming
	Maine	Delaware	Kentucky	Montana
	South Dakota	Utah	Oregon	New Hampshire
	Louisiana		South Carolina	Arkansas
	Rhode Island			Mississippi
	Alabama			Nevada
Idaho				

Source: Weighted samples from American Community Surveys of 2001 through 2008

10,000 Asian Indians. Examination of the columns, however, shows that in half the states the growth in the Asian Indian population by 2008 was at least 50 % and more than doubled in 9 of those states.

Taking the rows and columns together, we make the following observations.

First, the number of Asian Indians declined in 11 states (see column labeled ‘Decline’ in Table 9.2), including New York, but increased by as much as 49.9 % in 15 other States. This group includes some of the largest populated states (California, Illinois, New Jersey, and Texas). Four states with an average of fewer than 10,000 Asian Indians are also in this moderate growth category. Second, the fastest growth (more than 100 %) states have a relatively small average Asian Indian population, about 73,000. Except for New Hampshire, the rest are non-coastal. Third, in the 7 states (Florida, Georgia, North Carolina, Ohio, Massachusetts, Washington, and Pennsylvania), where the average Asian Indian population was 74,000 in 2001, that number increased by at least 50 % by 2008. Fourth, certain metropolitan regions that serve as gateways for all U.S. immigrants (Singer et al. 2008a) were also entry points for the majority of U.S. Asian Indians in 2000.

Based on total population size and population growth rates of Asian Indians, we identify four categories of states.

Large and Increasing Asian Indian Population This category consists of states with very large populations: California, Illinois, New Jersey, Texas. Although the increases between 2001 and 2008 are less than 50 %, the absolute numbers are impressive: 81,011, 52,766, 73,568, and 63,899, respectively.

Small and Declining Asian Indian Population The ten states in this category (see bottom two rows in column labeled ‘Decline’ in Table 9.2) include remote and cold Alaska, mountainous West Virginia, the Atlantic coastal states of Maine and Rhode Island, and two southern states (Alabama, Louisiana); others are the interior states of Wisconsin, Idaho, and the Dakotas.

Small But Increasing Asian Indian Population This group consists of three types of growth trajectories of Asian Indians. In type A, the growth rate between 2001 and 2008 was less than 50 %. This category, which includes Maryland, Virginia, and Connecticut, is characterized by growth rates between 50 % and 99 %. Type B states include heavily populated states such as Florida, Georgia, Massachusetts, Pennsylvania, North Carolina, five Midwestern states, and Arizona. Type C states experienced mercurial increases of more than 100 % in that 8-year period.

Very Small and Increasing Asian Indian Population With fewer than 10,000 Asian Indians in 2001, that number increased at varying rates: less than 50 % and between 50 % and 100 %. The states with less than 50 % increase in Asian Indians are District of Columbia, New Mexico, Nebraska, Delaware, and Utah; the increases in raw numbers were 14,264, 707, 2,378, and 1,936, respectively. Six states (Vermont, Hawaii, Iowa, Kentucky, Oregon, South Carolina) with very small Asian Indian populations in 2001 experienced increases between 50 and 99.9 %.

9.4 Explanation of the Distribution Pattern

In the last section we described the existing patterns and trends of Asian Indian population in the U.S. Here we consider the following question: “Why did these patterns and trends occur?” One approach to answering this question is to examine the distribution of Asian Indians at the state level and identify explanatory variables. Voluntary migrations are influenced by the economic, cultural, and political attractiveness of the destination location. We explain place attractiveness for Asian Indians by focusing on the following pull factors: economic opportunities and cultural diversity. Economic opportunity, which is captured by measuring employment in two sectors of the economy (finance and insurance and professional, scientific, and technical services), is particularly important to Asian Indians. Employment data for each state were extracted from the U.S. Census County Business Patterns dataset (<http://www.census.gov/econ/cbp/intro.htm>). The U.S. Census defines the finance

Table 9.3 Asian Indians at time t as a function of the state's employment in finance and PST at time $t-1$

Dependent variable					
Number of Asian Indians	Independent variables	Regression coefficient	Beta weight	t value	Adjusted R^2
2001	Intercept	-19189.823		3.58	0.856*
	# Employees in finance (1999)	0.213	0.383	2.24	
	# PST employees (1999)	0.247	0.556	3.25	
2003	Intercept	-17,690.025		3.11	0.865*
	# Employees in finance (2001)	0.210	0.363	2.50	
	# Employees in PST (2001)	0.246	0.585	4.04	
2003	Intercept	-19,027.514		3.53	0.892*
	# Employees in finance (2003)	0.165	0.277	2.01	
	# Employees in PST (2003)	0.301	0.681	4.94	

*Significant at $\alpha=0.001$; *PST* professional, scientific, and technical services

and insurance sector as firms that are “primarily engaged in financial transactions (transactions involving the creation, liquidation, or change in ownership of financial assets) and/or in facilitating financial transactions.” Examples of professional, scientific, and technical services (PST) include “legal advice and representation, accounting, bookkeeping, and payroll services, architectural, engineering, and specialized design services and computer and consulting services.”

To explore the influence of employment on the number of Asian Americans in a state, we regress the Asian Indian population at time t for a state on total number of employees in each of the two sectors for that state at time $t-1$. For example, to explain total Asian Indian population for 2001, employment data from 1999 were used. Table 9.3 summarizes the results of the regression analysis for 3 years of Asian Indian population data.

Employment opportunities in the financial and PST sectors explain a large portion of the variability in Asian Indian population from state to state (note high R^2 values in Table 9.3). The standardized beta coefficients indicate that, as opportunities in finance and insurance and PST services increase, the Asian Indian population increases. Interestingly, the explanatory power of PST increases with time. In 2002 it was more than two times as important as financial and insurance in explaining the concentration of Asian Indians in a state.

Taken together, the patterns in Fig. 9.2 and Table 9.2 demonstrate the coastal pattern of initial migration and recent shifts to selected interior states. A clear picture of the distribution of Asian Indians is evident at the county level in Fig. 9.3. This

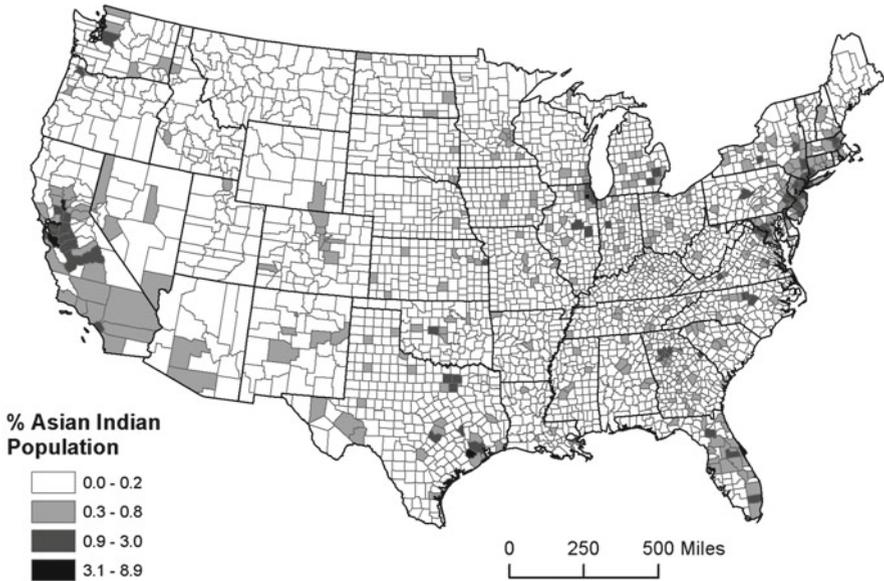


Fig. 9.3 Asian Indian population by county (Source: US Census Bureau, Census 2000, SF1)

map clearly demonstrates the attractiveness of places such as New York and Los Angeles. Singer defined some of these places as gateways. In 2002 the top states of residence of legal permanent resident population were California, New York, Texas, Florida, New Jersey, Illinois, Massachusetts, Virginia, Washington, and Pennsylvania (Rytina 2004). “Based on trends in the size and growth of the immigrant population over the course of the twentieth century,” Singer (2008, p. 9) developed a typology of spatially contiguous ‘qualified’ metropolitan areas consisting of former gateways, post-WWII gateways, pre-emerging gateways, emerging gateways, and reemerging gateways. Former gateways, such as Cleveland, attracted large numbers of foreign-born population in the early 1900s but no longer serve as important destination points. Post-WWII gateways have only attracted significant numbers of immigrants in the past 50 years (e.g., Miami). Pre-emerging gateways such as Seattle are areas that have relatively low numbers of foreign-born population but have experienced significant growth in this population in the 1990s. Emerging gateways such as Dallas–Ft. Worth experienced large increases in their foreign-born populations in both the 1980s and 1990s. Re-emerging gateways served as receiving areas for foreign-born population in the early twentieth century, and then their attractiveness waned, but it is now returning (e.g., Philadelphia). Recent literature on American gateways has tended to focus on emerging gateways because of their uniqueness, which includes newer geographic settlement structures that reflect the socioeconomic status (SES) of post-1965 immigrants from Asia and Latin America (Singer et al. 2008a, b).

9.5 Singer's Taxonomy of Gateways and Asian Indians

Similar to other recent immigrant groups, Asian Indians have been drawn to particular gateway entry points. As we observed earlier, Asian Indians are a bi-coastal population, with California having the highest number, followed by New York and New Jersey (Frazier 2003). Despite their coastal concentrations, well-established and emerging gateway cities occur in other regions such as in the Midwestern gateway states of Illinois, Michigan, Indiana, and Ohio. In these cases, although total populations are small, Asian Indians constitute a larger than expected proportion of the total Asian population. In four of these states, they account for more than 25 % of all Asians, whereas in highly ethnically diverse states such as California, this Asian Indian proportion is less than 10 %; in Florida and Georgia; that share is less than 25 % (Frazier 2003).

The gateway perspective is useful for identifying states that are serving as receiving areas for Asian Indians. We reproduce, as closely as possible, Singer's typology for Asian Indians only, which is summarized in Table 9.4. Here are some observations using her definitions as context.

1. *Emerging gateways* have experienced very high growth in the immigrant populations "during the past twenty-five years alone." In the six MSAs, the Asian Indian population has continued to grow. Except for Washington, DC/Virginia/Maryland (DC/VA/MD), the Asian Indian population increased by more than 1,000 %, with the fastest increase in Las Vegas and Orlando. Four of the gateways, that is, Atlanta, GA, Dallas–Fort Worth, Phoenix, and Washington, DC/VA/MD, are among Singer's twenty-first century gateways.
2. *Re-emerging gateways*, Singer noted, "began the twentieth century with a strong attraction for immigrants, waned as destinations during the middle of the century, but are now reemerging as immigrant gateways." (2008, p. 9). For Asian Indians, the highest population growth among these gateways was between 1980 and 1990. Even in San Jose, CA, where the population of Asian Indians increased by more than 2,000 %, the large increases between 1980–1990 and 1990–2000 were considerably less after 2000. Of these gateways, Minneapolis–St. Paul, Portland–Vancouver, and Sacramento, CA, are also among Singer's twenty-first century re-emerging gateways.
3. *Former gateways* previously attracted large numbers of immigrants in the early 1990s, "but no longer." In large former gateways (e.g., Detroit), the Asian Indian population continued to increase between 1980 and 2008; from 10,420 to 56,968 for Detroit. Overall growth between 1980 and 2008 is on average about 500 % for re-emerging gateways.
4. *Continuous gateways* according to Singer "are long established destinations for immigrants and continue to receive large numbers of the foreign-born." For Asian Indians the four continuous gateways include Chicago–Gary–Lake, IL, and New York–Northeastern NJ, that had a large Asian Indian population in 1980 (35,420 and 57,660, respectively) and in absolute terms, have continued to attract large numbers of Asian Indians. By 2008 these numbers rose to 167,118

Table 9.4 Asian Indian population by gateway type, 1980–2008

Gateway type	Asian Indian population				Percent change in Asian Indian population			
	1980 ^a	1990 ^b	2000 ^c	2008 ^d	1980–1990	1990–2000	2000–2008	1980–2008
<i>Emerging</i>								
Atlanta, GA	2,640	9,022	36,402	63,186	241.7	303.5	73.6	2,293.4
Dallas–Fort Worth, TX	5,360	13,347	40,600	69,235	149.0	204.2	70.5	1,191.7
Las Vegas, NV	200	1,204	2,879	6,517	502.0	139.1	126.4	3,158.5
Orlando, FL	880	4,860	11,632	25,019	452.3	139.3	115.1	2,743.1
Phoenix, AZ	1,260	4,250	11,513	25,747	237.3	170.9	123.6	1,943.4
Washington, DC/Virginia/Maryland (DC/VA/MD)	16,340	35,120	72,116	110,664	114.9	105.3	53.5	577.3
<i>Re-emerging</i>								
Denver–Boulder–Longmont, CO	2,200	2,235	7,788	10,931	1.6	248.5	40.4	396.9
Minneapolis–St. Paul, MN	3,240	5,659	13,561	26,497	74.7	139.6	95.4	717.8
Portland–Vancouver, OR	900	2,742	9,887	12,174	204.7	260.6	23.1	1,252.7
Sacramento, CA	2,260	6,011	14,354	29,754	166.0	138.8	107.3	1,216.5
San Jose, CA	4,640	18,477	65,876	98,703	298.2	256.5	49.8	2,027.2
Seattle–Everett, WA	2,440	5,370	16,574	37,248	120.1	208.6	124.7	1,426.6
Tampa–St. Petersburg–Clearwater, FL	1,620	3,215	12,531	20,445	98.5	289.8	63.2	1,162.0
<i>Pre-emerging</i>								
Austin, TX	660	3,311	10,324	18,589	401.7	211.8	80.1	2,716.5
Charlotte–Gastonia–Rock Hill, SC	1,540	2,763	5,317	13,461	79.4	92.4	153.2	774.1
Greensboro–Winston Salem–High Point, NC	800	1,176	2,722	4,030	47.0	131.5	48.1	403.8
Raleigh–Durham, NC ¹	560	3,132	12,401	22,021	459.3	295.9	77.6	3832.3
Salt Lake City–Ogden, UT	900	792	3,048	4,971	–12.0	284.8	63.1	452.3
<i>Former²</i>								
Baltimore, MD	4,080	7,603	16,264	24,182	86.3	113.9	48.7	492.7
Cleveland, OH	3,920	5,223	9,997	13,713	33.2	91.4	37.2	249.8
Detroit, MI	10,420	14,993	38,051	56,968	43.9	153.8	49.7	446.7

(continued)

Table 9.4 (continued)

Gateway type	Asian Indian population				Percent change in Asian Indian population			
	1980 ^a	1990 ^b	2000 ^c	2008 ^d	1980–1990	1990–2000	2000–2008	1980–2008
Milwaukee, WI	1,140	2,710	4,712	9,593	137.7	73.9	103.6	741.5
Philadelphia, PA/NJ	11,020	20,278	44,946	68,559	84.0	121.6	52.5	522.1
Pittsburgh–Beaver Valley, PA	3,180	4,358	9,735	13,077	37.0	123.4	34.3	311.2
St. Louis, MO-IL	2,980	2,799	8,758	14,047	–6.1	212.9	60.4	371.4
<i>Continuous</i>								
Boston, MA	5,000	11,697	30,096	45,799	133.9	157.3	52.2	816.0
Chicago–Gary–Lake IL	35,420	50,616	113,106	167,118	42.9	123.5	47.8	371.8
New York–northeastern NJ	57,660	98,193	204,663	250,385	70.3	108.4	22.3	334.2
San Francisco–Oakland–Vallejo, CA	14,220	7,540	18,572	19,818	–47.0	146.3	6.7	39.4
<i>Post-WWII</i>								
Houston–Brazoria, TX	12,080	23,593	51,125	71,118	95.3	116.7	39.1	488.7
Los Angeles–Long Beach, CA	17,720	43,348	63,109	74,598	144.6	45.6	18.2	321.0
Miami–Hialeah, FL	3,480	5,299	8,787	10,885	52.3	65.8	23.9	212.8
Riverside–San Bernardino, CA	1,800	8,233	14,215	21,487	357.4	72.7	51.2	1,093.7
San Diego, CA	2,520	4,599	10,926	20,556	82.5	137.6	88.1	715.7

Source: ^aIPUMS 1980 5 % sample, ^bIPUMS 1990 5 % sample, ^cIPUMS 2000 5 % sample, ^dIPUMS version of American Community Survey, 2006–2008 sample

Notes: ¹The Raleigh and Durham, NC area was separate areas in Singer's analysis; ²Buffalo–Niagara Falls, NY was included in Singer's analysis but was omitted here because of data availability

and 250,385, respectively. These two are truly continuous gateways. In contrast, in Boston, MA, and San Francisco–Oakland–Vallejo, CA, the Asian Indian population was small in 1980 and has remained relatively low; these populations are growing at a decreasing rate. Of these four, only San Francisco–Oakland–Vallejo, CA is one of Singer's twenty-first century gateways.

5. *Post-World War II gateways* began attracting large numbers of immigrants within the past 15 years. The four cities grew most in the past 8 years, as is particularly true of Riverside–San Bernardino, CA. The continuous and the post-World War II gateways constitute what Singer called *established immigrant gateways*.

6. Singer defines *pre-emerging gateways* as “places ... where immigrant populations have grown very rapidly starting in the 1990s and are likely to continue to grow as immigrant destinations” (p. 10). Austin, TX, and Raleigh–Durham, NC, epitomize these pre-emerging gateways: between 1980 and 2008, the population of Asian Indians increased by more than 2,500 %. All the five gateways in this group are twenty-first century gateways.

9.5.1 *The Synthesis*

In Fig. 9.4, we have plotted the total Asian Indian population for each of the six gateway types from 1980 to 2008, and in Fig. 9.5 we graph the percentage of Asian Indians in metropolitan areas for the same period and gateway types. From these graphs we make the following observations.

1. The largest concentration of Asian Indians is in continuous gateways (Boston, MA, Chicago-Gary-Lake IL, New York-northeastern NJ, and San Francisco-Oakland-Vallejo, CA).
2. The post-WII and re-emerging gateways form the second cluster of metropolitan areas where the number of Asian Indians is high and growing.
3. Asian Indians are most concentrated in continuous gateways, whereas foreign-born immigrant groups as a whole (Singer 2008, p. 13) are concentrated in post-WWII gateways.

Katz and Lang (2003, pp. 181–210) define hyper-growth metropolitan areas as places with a population growth of more than 300 % in Latino population between 1980 and 2000. We apply their definition to metropolitan concentrations of Asian Indians between 1980 and 2008. However, because of our longer time period, we calculate the percent of hyper-growth metropolitan concentrations of Asian Indians at 300 %, 400 %, and 500 % (Table 9.5). Many of the metropolitan areas where Asian Indians live are of the hyper-growth type. Approximately 91 % of Asian Indian gateways grew at 300 %; about 74 % grew at 400 %, but only about 59 % grew at a 500 % level.

Our analysis shows the concentration of Asian Indians in super-growth metropolitan centers and their associated MSAs. The picture we have presented here is the result of numerous waves of inter-gateway migrations, immigration, and in situ births and deaths. Because we cannot peel off these layers of immigration and natural increases by Asian Indians at the gateway level, we can describe some aspects of their recent inter-gateway migration (Fig. 9.6). This map shows flows between some of the gateways as origins and destinations of Asian Indians:

- California: major migration to Illinois and Washington and major migration from New York and the Carolinian research triangle.
- New York: major flows to California, New Jersey, and Florida but a weak counterflow from California.
- Pennsylvania: major migration to Georgia; major migration from New Jersey.

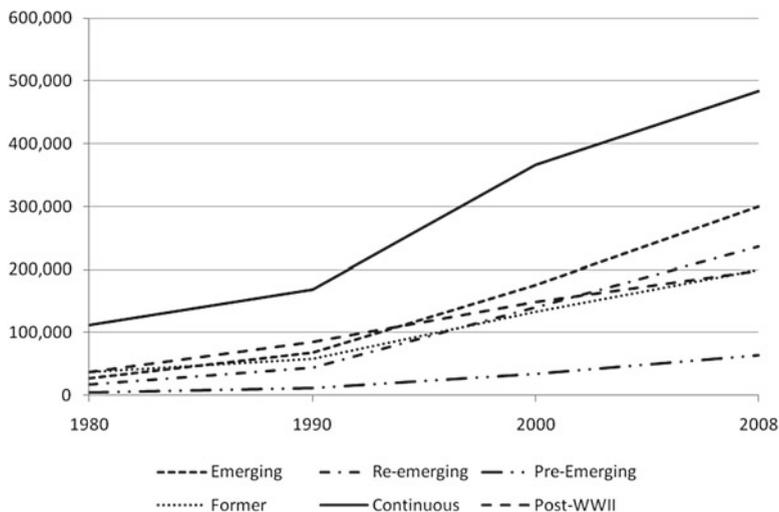


Fig. 9.4 Total Asian Indian in metropolitan areas, by gateway type, 1980–2008 (After Singer 2008)

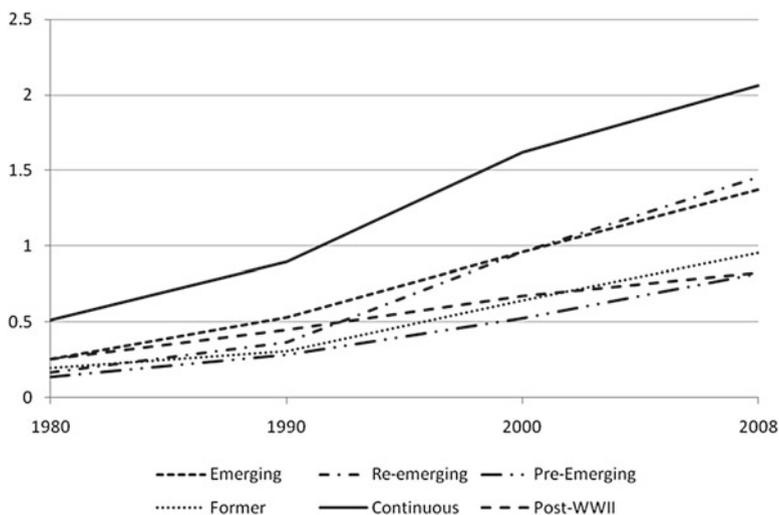


Fig. 9.5 Percent Asian Indian in metropolitan areas, by gateway type, 1980–2008 (After Singer 2008)

Although exploration of Asian Indian settlement patterns and interstate migration at the state scale are illustrative of broad patterns, migrant destination choice is more often motivated by cultural and economic opportunities, which are more appropriately explored at the metropolitan scale. Indeed, Fig. 9.3 shows, at the county level, that Asian Indians prefer specific areas within a state as destination choices. This begs the

Table 9.5 Number of super-growth metropolitan areas (metros)for Asian Indians

Gateway type	Number of metros	300 %	400 %	500 %
Emerging	6	6	6	6
Re-emerging	7	7	6	6
Pre-emerging	5	5	5	3
Former	7	6	4	2
Continuous	4	3	1	1
Post-WWII	5	4	3	2
Percent of super-growth metropolitan centers	34	91.18	73.53	58.82

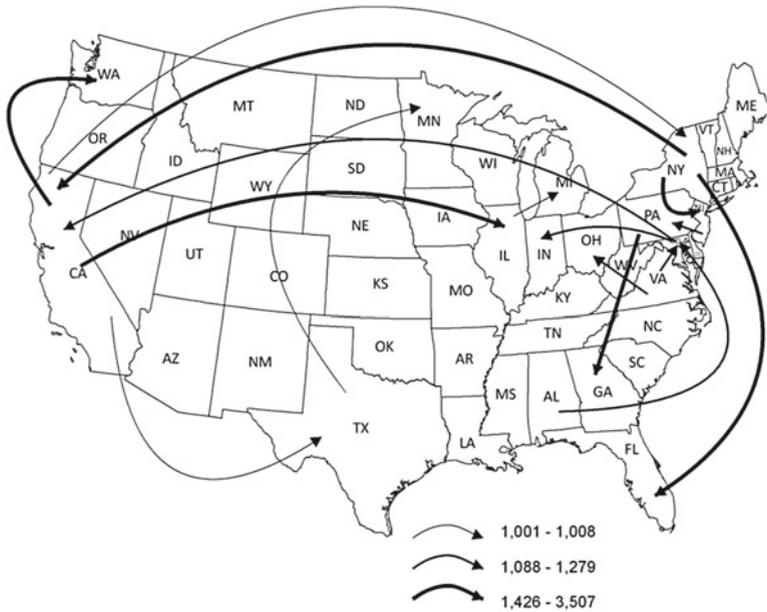


Fig. 9.6 Number of Asian Indians migrating from state to state. (Only flows > 1,000 are depicted) (Source: IPUMS American Community Survey samples, 2007 and 2008)

question, “What are the preferred destination choices of Asian Indians at the metropolitan scale and how do these choices differ across gateway types?”

9.6 Distribution of Asian Indians in Selected MSAs

We address the question by selecting from each of the six gateway categories (Table 9.4), the metropolitan area (and its associated MSA) with the largest population of Asian Indians, an indication that these MSAs are preferred destination choices for Asian Indians and, therefore, serve as appropriate locations to glean spatial settlement patterns:

Washington, D.C. MSA (Emerging Gateway)
 San Jose, CA (Re-emerging Gateway)
 Raleigh, NC (Pre-emerging Gateway)
 Philadelphia, PA. MSA (Former and now a Re-Emerging Gateway)
 New York City Region (Continuous Gateway)
 Los Angeles, CA MSA (Post-WWII Gateway)

9.6.1 *Prevailing Models of Ethnic Concentration and Dispersal*

Historically, ethnic migration in the United States was by the niche dispersal process, the niche being the metropolis. When “significant numbers of immigrants from a given origin enter a large city in a nation like the US, they will initially occupy less desirable tracts near its center. As they acquire higher educational and economic status and some degree of cultural assimilation, they or their descendents will shift upward and outward through social and physical space into the more attractive zones of the metropolis, eventually being absorbed into the dominant community” (Zelinsky and Lee 1998, p. 282).

In a detailed study of the immigrant settlement patterns in Washington, D.C., Price, Cheung, Friedman, and Singer (2005) provided specific examples of why spatial assimilation theory may not be applicable to Asian Indians: language and socioeconomic status. In contrast to most immigrant groups, Asian Indians have near fluency in spoken and written English as a vestige of British colonial rule. Also, Asian Indians enter the United States with high levels of educational attainment. Examining data from the 2000 Census for the three largest immigrant groups in the United States (Table 9.6), it is clear that Asian Indians have sufficient economic resources, educational attainment, and language skills to make other destination choices than the less desirable inner-city neighborhoods. Consequently, the straight-line assimilation theory may not be operating under such circumstances.

An emerging view of settlement, heterolocalism, provides a promising alternate theory: the “possibility that an ethnic community can exist without any significant clustering, i.e., when the members of a particular group are scattered throughout a city, metropolitan area, or some larger spatial domain” (Zelinsky and Lee, p. 285).

Table 9.6 Socioeconomic characteristics of major immigrant groups in the U.S. in 2000

Group	Median HH income in	% Master’s, Ph.D., or professional degree		% Foreign born who speak English well
		Men	Women	
Asian Indian	\$70,708	40.90	26.7	69.8
Chinese	\$60,058	26.25	17.5	34.6
Mexican	\$33,516	2.40	2.4	23.4

Heterolocal populations are dispersed but maintain ethnic identity through various interactions and places such as temples. Because our data are at the county level for each of the six gateways listed here, we cannot evaluate directly the veracity of these two theories. Indirectly, however, we can observe their effects, FQ, by dividing the proportion of Asian Indians in the i^{th} county by the proportion in the central city or central metropolitan area (the focal county). We have called this the FQ index. If FQ is greater than 1, then that county is more attractive to Asian Indians than the focal county. The larger the value of FQ, the more the possibility of a widely distributed population associated with heterolocalism. The results for the six counties are discussed next.

9.6.2 *Washington, D.C. MSA (Emerging Gateway)*

The results are summarized in Table 9.7. Except for Anne Arundel County, MD, the other counties have FQ indices greater than 1. The counties with the highest potential for heterolocalism are Loudoun, VA, Howard, MD, Montgomery, MD, and Fairfax, VA (Fig. 9.7). The recent detailed study by Price et al. (2005, p. 73) of the Washington MSA at the zip code level identified some of these same counties for Asian Indians: “In recent years, many highly skilled Indian professionals with advanced degrees were drawn to metropolitan Washington’s high-tech complexes, which are primarily located in Montgomery and Fairfax counties.” (See their Fig. 4 on page 75.) By 2008, Loudoun, VA, and Howard, MD, have become preferred counties for Asian Indians. Coincidentally, Loudoun, Fairfax in Virginia, and Howard and Montgomery counties in Maryland rank among the top ten counties with the highest median household income in the United States.

9.6.3 *San Jose, CA MSA (Re-emerging Gateway)*

This area is the 31st largest metropolitan area in the country. In northern California, San Jose, the county seat of Santa Clara County, is the largest city in terms of population, land area, and industrial development, and it is the center of Silicon Valley, one of the major high technology centers of the country. In 2000, it had the third largest concentration of Asians in the country. In Table 9.8, for the City of San Jose, the number of Asian Indians was below the reporting threshold of 20,000. At the county level, the number was just over 66,000 in Santa Clara. In the MSA, estimates of 2008 indicate that from 2000 to 2008 the Asian Indian population increased by 49 %, and their impact on the sociocultural landscape of the MSA was captured in 2001 by Bettina Boxall, staff writer for the *Los Angeles Times* (July 6, 2001):

“The Hindu temple here was one of the largest in California when it opened in a converted electronics warehouse in 1994—big enough, its founders thought, to last a good two decades.”

Table 9.7 Asian Indian population and ratios for selected areas in the Washington, D.C. MSA (Emerging gateway)

Area	1990 population ^a		2000 population ^b		2008 estimated population ^c			FQ ^d
	Total	Asian Indian	Total	Asian Indian	Total	Asian Indian	Proportion	
Anne Arundel County, MD	427,239	757	489,656	1,753	510,778	3,313	0.0065	0.84
Baltimore County, MD	692,134	3,296	754,292	6,346	785,549	7,616	0.0097	1.26
Howard County, MD	187,328	1,929	247,842	4,768	272,412	8,529	0.0313	4.07
Montgomery County, MD	757,027	13,339	873,341	23,626	942,747	29,510	0.0313	4.07
Prince George's County, MD	729,268	6,168	801,515	7,692	825,924	8,235	0.0100	1.29
Arlington County, VA	170,936	1,555	189,453	3,334	204,889	3,783	0.0185	2.40
Fairfax County, VA	818,584	9,942	969,749	25,700	1,005,980	34,556	0.0344	4.46
Loudoun County, VA	86,129	394	169,599	2,327	277,433	13,740	0.0495	6.43
Prince William County, VA	215,686	796	280,813	1,886	358,719	6,507	0.0181	2.36
Washington, D.C.	609,866	1,820	571,753	2,418	588,373	4,559	0.0077	1.00
Total	4,694,197	39,996	5,348,013	79,850	5,772,804	120,348	0.0208	

Data Sources: ^aIPUMS 1990 5 % sample, ^bIPUMS 2000 5 % sample, ^cIPUMS version of American Community Survey, 2006–2008 sample, ^dFQ is the proportion of Asian Indians in the county divided by the proportion of Asian Indians in the focal area (highlighted in bold)

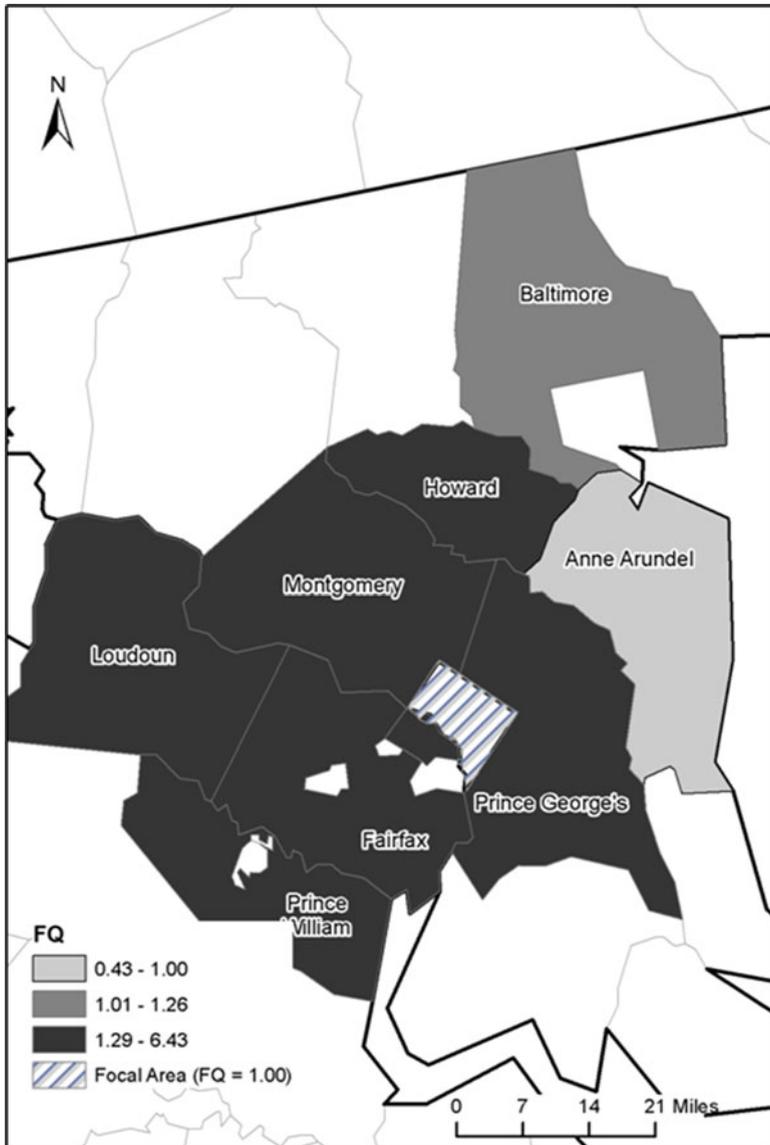


Fig. 9.7 Asian Indian settlement patterns in the Washington, D.C. area (emerging gateway)

They were wrong. Temple membership has grown from 380 families to 4,800 as the Silicon Valley’s Asian Indian population has surged in the last decade, part of an international high-tech migration that has both repeated and rewritten the standard California tale of demographic change.

Signs of Indian presence abound. Whether it is manifested in bustling temples or weekend cricket matches in the parks, Indian life has taken root in this land of software geeks and outlandishly priced tract houses. There is even a term for Indians who live and work in the Silicon Valley—“Silicon *desi*.”

Table 9.8 Asian Indian population and ratios for San Jose, CA (Re-emerging Gateway)

Area	1990 population		2000 population		2008 estimated population			FQ ^a
	Total	Asian Indian	Total	Asian Indian	Total	Asian Indian	Proportion	
Santa Clara County, CA	–	–	1,682,585	66,741	1,734,756	99,133	0.0571	1.47
Santa Clara County (excluding San Jose)	–	–	–	–	829,576	63,928	0.0771	1.98
City of San Jose, CA	–	–	–	–	905,180	35,205	0.0389	1.00
Total			1,682,585	66,741	1,734,756	99,133	0.0571	

^aFQ is the proportion of Asian Indians in the county divided by the proportion of Asian Indians in the focal area (highlighted in bold). See Table 9.1 for data sources. – indicates no data available

This growth was mainly in communities outside San Jose where the FQ value of 1.98 may reflect heterolocalism.

9.6.4 Raleigh, NC (Pre-emerging Gateway)

The trend in the growth of the Asian Indian population in Raleigh, NC, is similar to that in San Jose. In 1990, the total number was just over 2000 for Wake County including Raleigh (Table 9.9). But by 2000, because of the influx of immigrants, the Asian Indian population had tripled. Smith and Furuseth (2008, p. 282) noted that: “Many of the new immigrants were from Asia ... Between 2000 and 2005 alone ... a growth rate of nearly 28 %. Asian Indians and Chinese experienced the highest growth, 76.9 % and 41.1 %, respectively.” Within this period twice as many Asian Indians resided in Wake County as in the city of Raleigh. The FQ index for the rest of the county is almost twice that of the city, which may reflect the fact that many Asian Indians did not first settle in Raleigh then relocate to communities outside the city; rather, they settled directly in communities outside Raleigh. This is heterolocalism.

9.6.5 Philadelphia, PA MSA (Former Gateway and Re-emerging Gateway)

Before the 1970s, Philadelphia’s immigrant population was mostly European, but by 2006, “only 23 % were from Europe, while 39 % had their roots in Asia.” (Singer et al. 2008a, b, p. 6). In 1990, about 28 % of Asian Indians in the nine-county

Table 9.9 Asian Indian population and ratios for Raleigh, NC (Pre-emerging Gateway)

Area	1990 population		2000 population		2008 estimated population			FQ ^a
	Total	Asian Indian	Total	Asian Indian	Total	Asian Indian	Proportion	
Wake County, NC	423,380	2,034	627,846	7,231	829,218	15,110	0.0182	1.58
Wake County (excluding Raleigh)			354,721	4,708	500,552	11,322	0.0226	1.97
City of Raleigh			273,125	2,523	328,666	3,788	0.0115	1.00
Total	423,380	2,034	627,846	7,231	829,218	15,110		

^aFQ is the proportion of Asian Indians in the county divided by the proportion of Asian Indians in the focal area (highlighted in bold). See Table 9.1 for data sources

Philadelphia MSA resided in Philadelphia County. This percentage has changed little: about 25 % in 2000 and estimated at 22 % in 2008.

Most of the growth is in counties in the Delaware Valley (Philadelphia and contiguous counties) (Table 9.10). In June 2010, *The Historical Society of Pennsylvania* in “Indians and other South Asians in Philadelphia: An Overview” writes that “Indian American engineers and programmers are prominent in the computer industry, and also continue to maintain a strong presence in the nursing, medical, and academic professions. Today, the spirit and business acumen of Indian American entrepreneurship is evident in the Delaware Valley in retail trade, real estate, the ethnic food industry, travel agent services, motel businesses, and management and consulting firms.”

Excluding the counties of Camden, NJ, and perhaps Delaware County, PA, all the counties in the Delaware Valley have at most 50 % more concentration of Asian Indians than Philadelphia County. These fairly consistent FQ values may reflect the convergence of two processes: initial cultural assimilation and later heterolocalism (Fig. 9.8). Zelinsky and Lee (p. 285) observed thus: “As is the case with the other models, heterolocalism can be observed in both metropolitan and non-metropolitan settings.” Outside this valley, Atlantic County, NJ, is another growth center for Asian Indians where the concentration of Asian Indians is almost twice that in Philadelphia County (Fig. 9.8).

9.6.6 New York City Region (Continuous Gateway)

The five boroughs of New York and Los Angeles, CA MSA account for more than 30 % of all Asian Indians in the United States. As New York City’s percentage declined from a share of 17.6 % in 1980 to 13.7 % in 2008, the share of Los Angeles increased in the same period from 15.7 to 18.3 % (Table 9.11).

Table 9.10 Asian Indian population and ratios for selected areas in the Philadelphia, PA, MSA (Former gateway)

Area	1990 population			2000 population			2008 estimated population			FQ ^a
	Total	Asian Indian	Total	Asian Indian	Total	Asian Indian	Total	Asian Indian	Proportion	
New Castle County, DE	441,946	1,898	500,265	4,542	526,414	8,219	0.0156	1.35		
Atlantic County, NJ	224,327	753	252,552	3,371	269,993	5,529	0.0205	1.77		
(D) Burlington County, NJ	395,066	1,814	423,394	3,773	446,262	7,149	0.0160	1.38		
(D) Camden County, NJ	502,824	2,621	508,932	4,473	516,994	5,423	0.0105	0.90		
(D) Bucks County, PA	541,174	2,748	597,635	5,916	620,057	8,651	0.0140	1.20		
(D) Chester County, PA	376,396	1,080	433,501	2,849	485,083	6,565	0.0135	1.17		
(D) Delaware County, PA	547,651	2,196	550,864	4,856	553,234	6,385	0.0115	0.99		
(D) Montgomery County, PA	678,111	3,336	750,097	8,056	775,304	12,429	0.0160	1.38		
(D) + Philadelphia County, PA	1,585,577	6,293	1,517,550	12,819	1,448,911	16,876	0.0116	1.00		
Total	5,293,072	22,739	5,534,790	50,655	5,642,252	77,226	0.0137			

^aFQ is the proportion of Asian Indians in the county divided by the proportion of Asian Indians in the focal area (highlighted in bold). See Table 9.1 for data sources. + The City of Philadelphia and Philadelphia County are contiguous. (D) = Delaware Valley

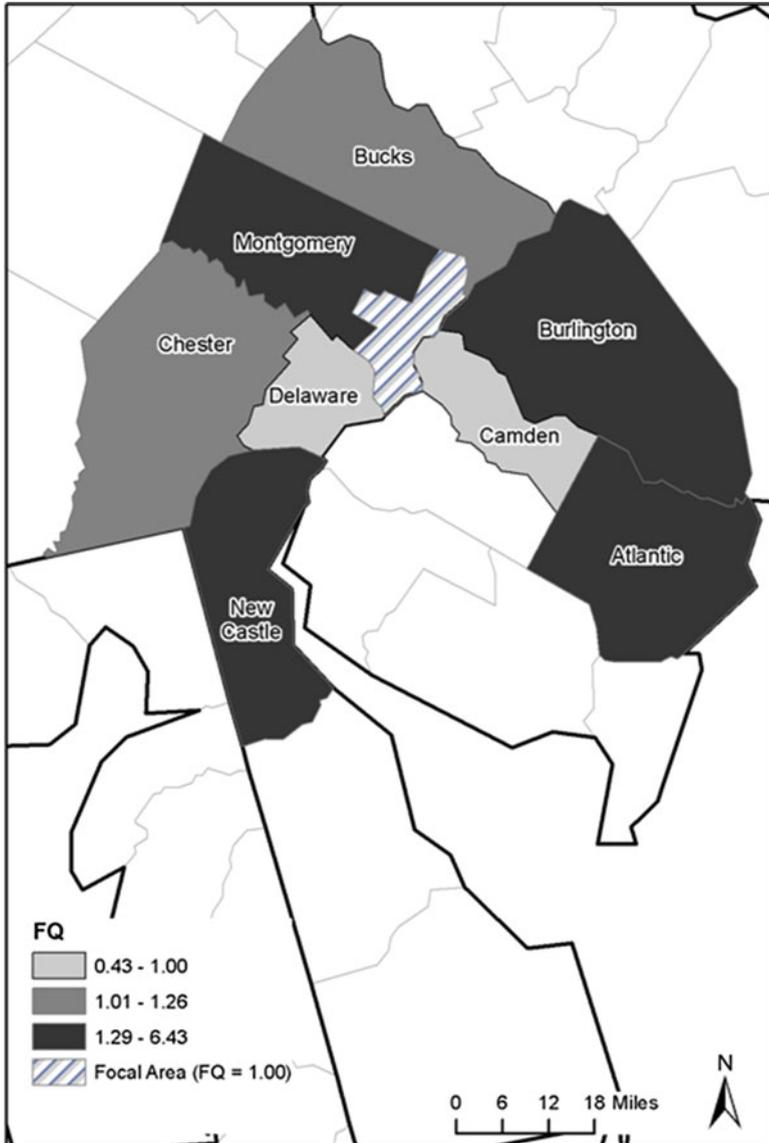


Fig. 9.8 Asian Indian settlement patterns in the Philadelphia, PA area (former gateway)

Within New York City, data at the tract level show that of the 170,899 Asian Indians in New York City in 2000, the majority resided in Queens and Staten Island (New York City Department of City Planning 2010). Outside New York City, the FQ indices for the other counties in the region indicate that, relative to New York City, Middlesex County, NJ, and Somerset County, NJ, have high concentrations of Asian

Table 9.11 Asian Indian population and ratios for selected areas in the New York city region (Continuous gateway)

Area	1990 population		2000 population		2008 estimated population		2008 proportions	
	Total	Asian Indian	Total	Asian Indian	Total	Asian Indian	Proportion	FQ ^a
Bergen County, NJ	825,380	9,780	884,118	17,862	891,246	24,022	0.0270	1.00
Essex County, NJ	778,206	5,845	793,633	9,006	772,663	11,974	0.0155	0.58
Hudson County, NJ	553,099	11,552	608,975	20,486	594,334	27,227	0.0458	1.70
Mercer County, NJ	325,824	3,247	350,761	6,909	363,968	12,717	0.0349	1.30
Middlesex County, NJ	671,780	19,110	750,162	54,880	783,646	86,572	0.1105	4.11
Monmouth County, NJ	553,124	3,774	615,301	7,312	641,673	8,669	0.0135	0.50
Morris County, NJ	421,353	5,341	470,212	10,966	486,459	17,687	0.0364	1.35
Somerset County, NJ	240,279	3,400	297,490	10,067	321,589	18,924	0.0588	2.19
Nassau County, NY	1,287,348	11,875	1,334,544	23,793	1,352,817	37,779	0.0279	1.04
Rockland County, NY	265,475	3,420	286,753	5,778	297,159	6,230	0.0210	0.78
Suffolk County, NY	1,321,864	5,648	1,419,369	10,540	1,510,716	17,283	0.0114	0.43
Westchester County, NY	874,866	8,058	923,459	14,107	950,237	19,873	0.0209	0.78
+ Five Boroughs of NYC	7,280,106	88,001	8,004,759	183,930	8,308,350	223,714	0.0269	1.00
Total	15,398,704	179,051	16,739,536	375,636	17,274,857	512,671	0.0297	

^aFQ is the proportion of Asian Indians in the county divided by the proportion of Asian Indians in the focal area (highlighted in bold). See Table 9.4 for data sources. + Composed of the following counties: Bronx, King, New York, Queens, and Richmond

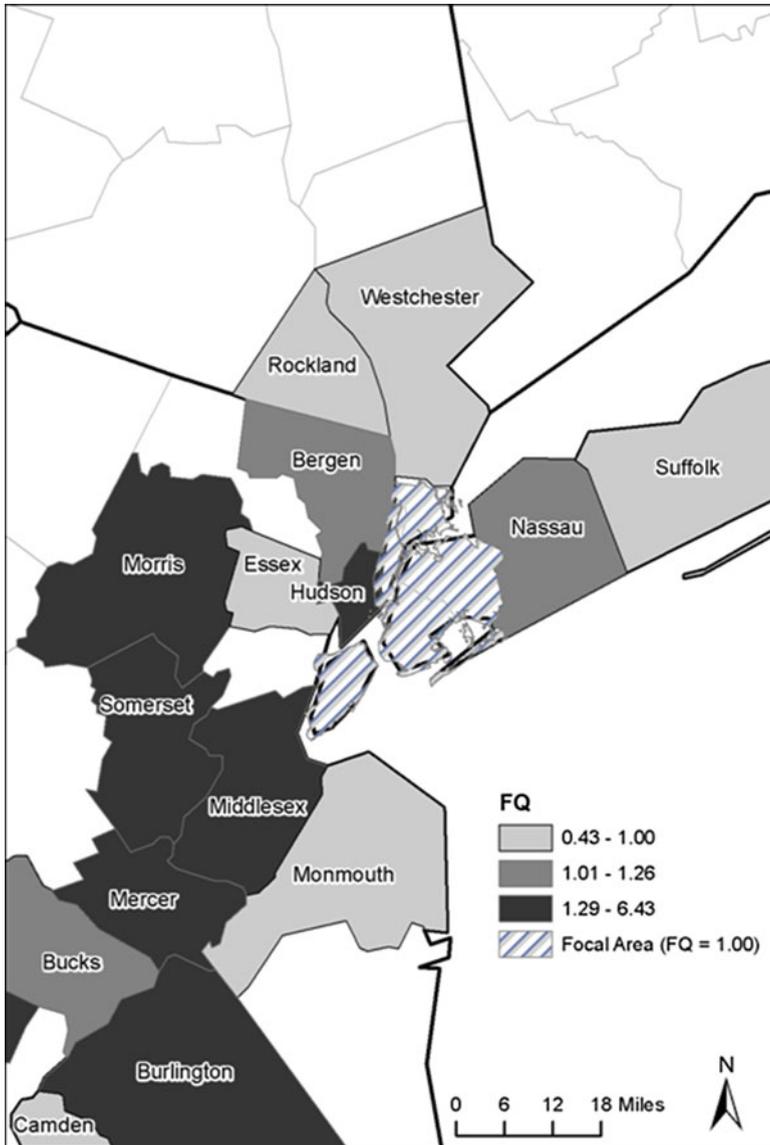


Fig. 9.9 Asian Indian settlement patterns in the New York City area (continuous gateway)

Indians. As shown in Fig. 9.9, besides these two counties, there is a western belt from Burlington in the south to Morris in the north. In Middlesex County, 7.3 % of the population is Asian Indian, the fourth largest after White Non-Hispanics (61.9 %), Hispanics (13.6 %), and Blacks (9.1 %). New Jersey Department of Labor (2001) wrote: “The number of Asian Indians more than doubled in nine New Jersey counties. Middlesex County had the largest gain of Asian Indians (+35,770),

followed by Hudson County (+8,934) and Bergen County (+8,082). Together with Morris and Somerset Counties, these five counties accounted for more than two-thirds (67.5 %) of the state's total Asian Indian population as of April 1, 2000."

9.7 Los Angeles, CA MSA (Post-WWII Gateway)

The greater Los Angeles area with an estimated 2008 population of 17.7 million is the second largest metropolitan area in the U.S., second only to the New York City region. Greater Los Angeles has the third largest Asian Indian population of all the gateways with more than 140,000 Asian Indians residing in the five-county region. However, it experienced only a modest (in comparison to other gateways) growth in Asian Indians population of 321 % from 1980 to 2008. In 1990, about 24 % of Asian Indians in the five-county metropolitan area resided in the City of Los Angeles. This proportion has declined slightly, to an estimated 21 % in 2008 (Table 9.12).

Settlement patterns within the Los Angeles region can be viewed from the perspective of this region's unique urban morphology. In part because of its substantial growth after WWII, Los Angeles does not resemble the single focal city surrounded by concentric rings or wedge-shaped sectors of growth. Instead, it has inspired a new polycentric perspective of urban morphology. Dear (2002, pp. 24–25) conceptualizes this perspective thus:

Urbanization is occurring on a quasi-random field of opportunities in which each space is (in principle) equally available through its connection with the information superhighway. Capital touches down as if by chance on a parcel of land, ignoring the opportunities on intervening lots, thus sparking the development process. The relationship between development of one parcel and non-development of another is a disjointed, seemingly unrelated affair. While not truly a random process, it is evident that the traditional, center-driven agglomeration economies that have guided urban development in the past no longer generally apply.

The polycentric structure of Los Angeles, we argue, reduces the attractiveness of the City of Los Angeles as a potential settlement location. Indeed, Fig. 9.10 shows, with the exception of Orange County, a somewhat homogeneous distribution of Asian Indians. The Los Angeles polycentric form and its large population have also resulted in some of the worst traffic congestion in the country. Residential choice in L.A. is often dictated by the location of employment, given that commuting even moderate distances is not feasible. The polycentric model implies dispersed employment opportunities that will logically result in a dispersed population.

Even though the Asian Indian population is rather dispersed in this region, there is a vibrant four-block concentration of Asian Indian-owned businesses in the City of Artesia in southeast Los Angeles County. This area is unofficially known as "Little India." Attempts for an official designation and recognition with a freeway sign were unsuccessful because of objections from other ethnic groups in the area (Watanabe 2005). This incident hints at a history of ethnic and racial tensions in the

Table 9.12 Asian Indian population and ratios for selected areas in the Los Angeles, CA MSA (Post-WWII gateway)

	1990 population		2000 population		2008 estimated population		2008 proportions	
	Total	Asian Indian	Total	Asian Indian	Total	Asian Indian	Proportion Asian Indians	FQ ^a
Los Angeles County, CA	8,863,164	43,829	9,519,338	60,268	9,832,137	72,191	0.0073	0.93
Los Angeles County (excluding City of L.A.)	5,394,618	27,493	5,823,894	34,748	6,081,808	42,402	0.0070	0.88
Orange County, CA	2,410,556	15,212	2,846,289	27,197	2,985,995	41,007	0.0137	1.74
Riverside County, CA	1,170,413	3,121	1,545,387	5,526	2,055,232	10,158	0.0049	0.63
San Bernardino County, CA	1,418,380	4,370	1,709,434	7,368	1,999,753	11,709	0.0059	0.74
Ventura County, CA	669,016	2,355	753,197	4,123	793,814	6,330	0.0080	1.00
City of Los Angeles, CA	3,468,546	16,336	3,695,444	25,520	3,750,329	29,789	0.0079	1.00
Total	14,531,529	68,887	16,373,645	104,482	17,666,931	141,395	0.0080	

^aFQ is the proportion of Asian Indians in the county divided by the proportion of Asian Indians in the focal area (highlighted in bold). See Table 9.1 for data sources

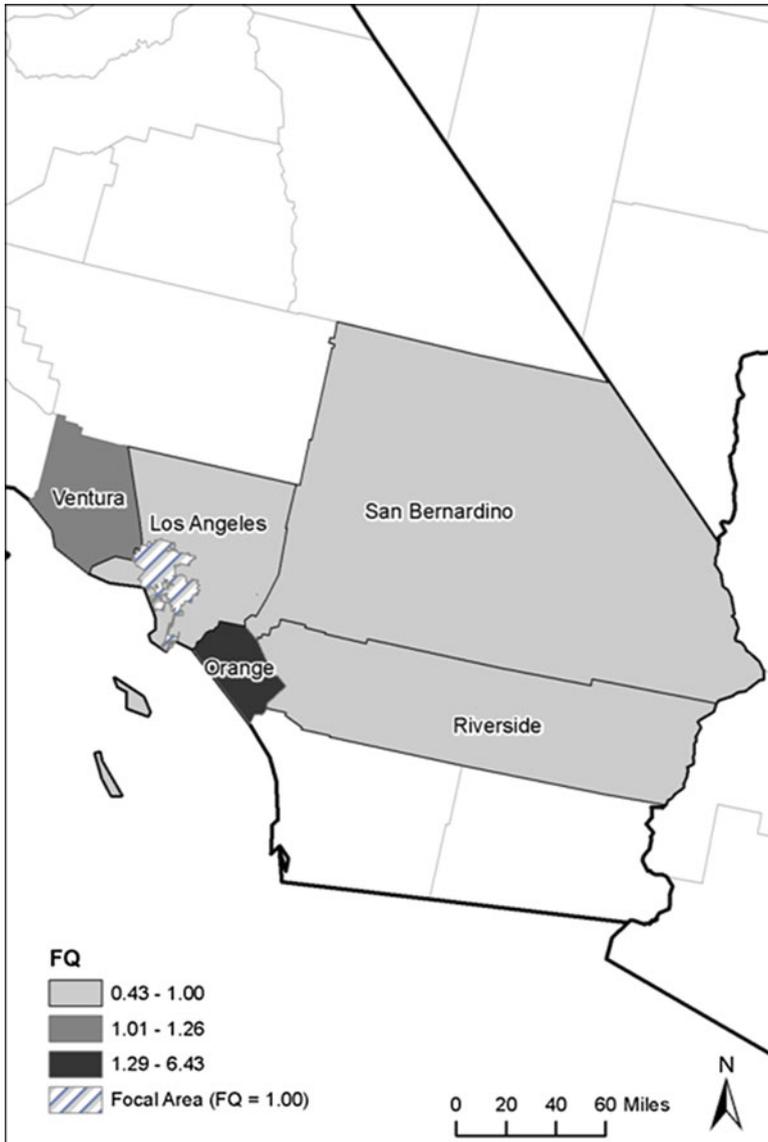


Fig. 9.10 Asian Indian settlement patterns in the Los Angeles, CA area. (post-WWII gateway)

city. These tensions erupted in civil unrest in 1965 (Watts riots) and as recent as 1992 (Rodney King incident). The perception of ethnic and racial tensions perhaps encourages new immigrants to avoid the central city of Los Angeles. Regardless of the cause, whether urban form, traffic congestion, or perceived racial tension, Los Angeles demonstrates heterolocalism.

9.8 Case Studies

In the last two sections we discussed the concentration of Asian Indians at the state level and within Singer's six-typology of gateway cities. Except for Philadelphia MSA, a former gateway, the others reflect the influence of noncentral city employment and sociocultural alternatives to the central city in residential choice. The gateways discussed here are all metroplexes where the "suburbs [changed] from an amorphous, bedroom community status to an organized economy clustered around recognizable employment centers drawing on a fairly close commuting shed" (Andrew Hamer, quoted by Hardwick (2008, p. 31)). The case studies are the metroplexes of Dallas–Ft. Worth, Metropolitan Phoenix, and Austin, Texas.

9.8.1 *The Dallas–Ft. Worth "Metroplex"*

As noted earlier, the Dallas–Ft. Worth region, the "Metroplex" (DFW Metroplex), an emerging gateway, experienced rapid increases in both its native-born and immigrant populations in recent decades. By 2008, the metroplex had at least 1 million foreign-born residents (Singer 2008). Not surprisingly, the spatial structure of the metroplex has undergone dramatic change in its racial/ethnic composition during the same period. Immigration, in-migration, out-migration, and "white flight" processes created a multiethnic regional system led by newcomers responding to employment growth opportunities and new housing. These processes included dramatic increases in the Hispanic population, and to a lesser but important degree, those of the Asian and African diasporas (Brettell 2008). Two striking features of this new metroplex are its increasing number of foreign-born and an evolving spatial structure. As in the case of other emerging gateway metros, an evolving spatial structure includes immigrant settlements in the old urban core and the inner and outer ring suburbs (Singer 2008), resulting from class-based housing costs and varied employment opportunities.

Brettell's study of the Dallas–Ft. Worth metroplex examined five different foreign-born groups, including Asian Indians (Brettell 2008). She illustrated that this population has multiple settlement patterns and varied life experiences. Asian Indians are concentrated in some areas, such as Irving, "along Highway 114, where many of the high-tech companies have built offices... (and) dense rental and condominium housing has been built to accommodate the rapid demographic and economic growth" (Brettell 2008, pp. 60–61). Indians also are clustered in western Plano with other Asians, which together constitute about 31 % of that suburb's population (Brettell 2008).

Many Asians also exhibit a heterolocal structure, a widely dispersed pattern, but ethnically connected through various functions and places (Zelinsky and Lee 1998) (Fig. 9.11). In this case, Asian Indians are highly dispersed in a crescent that crosses the northern suburbs of Dallas County and spills into Tarrant, Denton, and Collin



Fig. 9.11 Major Asian Indian grocer in the Dallas area (Photograph courtesy of Yudhveer Kandukuri, University of Akron)

Counties as well. This settlement structure is explained by relatively high incomes, the desire to live near their high-tech employers, and the attraction of very good suburban schools (Brettell 2008). Referring to this spatial structure as heterolocal, Brettel explains:

... (They) are largely settled in the suburbs in a semicircle north of Dallas, from Highway 114, north of Irving in the west, through Carrollton and Lewisville in the northwest, to Plano in the north, and to Richardson and Garland in the east...the major grocery store for this community, Taj Mahal Imports,... is located in a strip shopping mall that has become a gathering point for a highly residentially dispersed population (Brettell 2008, p. 64).

Thus, this is one example of Asian Indian settlement in the outer suburbs where higher socioeconomic status (SES) is required and where place-making and group interactions maintain ethnic identity and support the heterolocalism of this group (also see Brettell 2008).

A “secondary” Asian Indian settlement in the metroplex appears in Mesquite, an inner-ring suburb. The Indian source region (Kerala) characteristics, SES, and their skin color explain this locational choice of Asian Indians. The early immigrants from Kerala, Christian women, characterized by their dark skin color, were recruited as nurses and earned relatively modest incomes. Accordingly, they sought affordable housing near hospitals and experienced restricted housing choices consequent to skin color (Brettell 2008). Thus, the residential choices of these Kerala migrants influenced the early and continuing settlement patterns in Mesquite.

This case study explains what appears to be complex Asian Indian settlement structure in an emerging gateway region. However, time of immigration, SES, and group characteristics clarify that Asian Indian settlements reflect both the relatively

high SES and employment status of recent immigrants (two thirds of Indian males are professionals), and the historical constraints faced by and characteristics of earlier immigrants.

9.8.2 *Metropolitan Phoenix*

The Phoenix metropolitan area, another emerging gateway, experienced rapid changes in ethnic composition, growth of foreign-born populations, and changing metropolitan spatial structure similar to the Dallas–Fort Worth region. In contrast to the Dallas–Fort Worth metroplex, however, the Phoenix region is a two-county (Maricopa and Pinal) metropolitan area and, therefore, is more compact.

The transformation of the Phoenix area has been led primarily by the rapid influx of the Hispanic population. However, the Asian Indian population is also growing rapidly here. As in the DFW metroplex, the 1965 Immigration and naturalization Act (INA) and the high-technology boom that followed, particularly in the 1990s, created a demand for skilled labor, and were the impetus for growth of both native-born and foreign-born populations, including Asian Indians. The highly developed areas of this two-county region include Phoenix and approximately a dozen surrounding important suburban communities: Peoria, Glendale, and Goodyear, west of Phoenix; Scottsdale, Fountain Hills, and Paradise Valley, east of the city; and Tempe, Mesa, Chandler, and Gilbert to the southwest.

The Asian and Asian Indian populations in this metropolitan area are much smaller than those of Dallas–Fort Worth. However, the Phoenix groups have been growing steadily and rapidly (Oberle and Li 2008). Here, both the Asian and Asian Indian populations are larger in the suburbs than in the city of Phoenix. Oberle and Li (2008) make the point that northern Phoenix is more suburban than urban in nature, which further strengthens the suburban-type settlements of most Asians in the Phoenix region. They point out that early arriving Asian physicians settled in northern Phoenix in the 1970s.

In the Phoenix suburbs, as in Dallas–Fort Worth, Asians tend to reside near their places of employment and in a heterolocal fashion. Asians and Asian Indians, whether in Gilbert, Chandler, or other Phoenix suburbs, not only reside near industrial employers, but also are widely dispersed and are linked by ethnic businesses (Fig. 9.12). An example of these patterns is also provided by high-tech industries and residence in the East Valley suburbs. The importance of occupation and SES also is clear for the Asian Indian population, which has “The highest percentages working in professional, science, and technology services, management, and professional and related occupations” (Oberle and Li 2008, p. 95). Also, Asian businesses have grown in number in recent decades and are located in both the central city and suburbs. Along with Chinese entrepreneurs, Asian Indians lead in Asian business ownership, including an increasing number with non-family, paid employees, and enjoy higher sales than all other Asia-owned businesses (Oberle and Li 2008).



Fig. 9.12 Asian Indian businesses in the Greater Phoenix Arizona area (Photographer: Ramakrishna Billakanti, University of Akron)

It is clear from this case study of Asians and Asian Indians that metropolitan-level spatial structures are changing in emerging gateway metropolitan regions. The creation of heterolocal settlements in suburbia are occurring in various directions, spurred by the suburbanization of high-tech industries, the relatively high SES and employment status of recent immigrants, and their preferences for suburban living, while maintaining ethnicity. Skop reports in detail how Indian ethnic diversity, the spatial structure of the metropolitan area, and other factors explain Indian heterolocalism in Phoenix (Skop 2012).

9.8.3 *Austin, Texas: A Pre-emerging Gateway*

Our final case study focuses on the Austin, Texas, metropolitan region, which has been termed a pre-emerging gateway. This classification implies a more recently growing foreign-born population, since the 1990s, and the likelihood of the location remaining an immigrant destination in the twenty-first century. Austin has been characterized in positive ways, including as a unique and tolerant place, an “identity” that is a welcoming, intellectual place (Skop and Buentello 2008). However, this metropolitan area also has been characterized as “a city divided” by institutional policies that have deliberately segregated the city on the basis of race and class (Skop 2009). These two images provide different windows for observing a metropolitan location that has grown very rapidly in response to a booming high-tech and educationally based economy, concomitant in-migration from other U.S. regions, and immigration.

These two images of Austin appear to apply differently for the recently expanding Latino and Asian ethnic groups. Although Hispanics (largely of Mexican ancestry) appear as the less socioeconomically successful and more isolated, Asians, because of their high educational attainment, appear to be more integrated into the high-tech economy and the professional class. They are more residentially dispersed than the

African American and Hispanic populations. As a result, these ethnic groups have a “bifurcation of experience on the basis of national origins and education” (Singer 2008, p. 20). Because this chapter focuses on Asian Indians, our discussion does not examine the specific issues that confront Blacks and Hispanics.

Given that Austin is a pre-emerging gateway, it is not surprising that nearly two thirds of its Chinese and Asian Indians entered the country after 1990. According to Skop and Buentello (2008, p. 261), Asian Indian men have been recruited for professional employment, especially in the high-tech sector. Their skills match the demand of Austin’s “creative economy”; 83 % have college degrees, and 92 % either “speak English only” or “speak English well.” Thus, the majority of Asian Indians work in professional positions and enjoy high incomes, which exceeded the median incomes of white, non-Hispanics in 2000. Asian Indians in the Austin area also achieve relatively high home ownership rates, despite their recent entry into the U.S. Clearly, Asian Indian immigrants in Austin, as a group, experience the “American Dream.”

A review of foreign-born settlements in Austin must be contextualized within the city’s unusually large size, relative to other communities, such as Atlanta.

The city of Austin covers more than 230 square miles, extending largely north and south along the I-35 corridor... the result of massive annexation, especially in the mid-1990s ... As a result, much of the land within Travis County now falls under the jurisdiction of the city (Skop and Buentello 2008, p. 267).

Not surprisingly, the majority of the native-born and foreign-born reside within the central county (Travis) of the metro region, most of which is Austin. As a result, one cannot apply the spatial framework of inner city, inner suburbs, and outer suburbs. Despite this, some foreign-born settlement structures are apparent. For example, the existence of a Hispanic enclave on the east side of downtown Austin was noted by Skop and Buentello (2008), as was the suburban-like pattern of most Asians. These authors noted the heterolocal patterns present:

...some recent immigrants, especially those from India and China, have the financial resources to afford the neighborhoods that offer the best and newest housing, the highest-performing schools, and superior living conditions and amenities (p. 271).

They also noted the multiethnic character of Austin’s suburbs and the influx of immigrants. Immigrant place-making in the suburbs strongly suggests heterolocalism.

Immigrants have begun to claim space in suburban Austin, establishing religious institutions, retail outlets, and other services. Strip malls of immigrant-owned stores and restaurants have developed along main thoroughfares, and more are being built every year. Latino, Vietnamese, Chinese, and Indian bakeries, grocery stores, travel agencies...have emerged. Indeed, they have become the most visible symbols of the increasing numbers and economic clout of recent immigrants in Austin (p. 272).

These three case studies involving Asian Indian experiences and settlement patterns in different types of emerging/gateway metropolitan areas clearly indicate the complexity of this recent immigrant group as they contribute to the transformation of local landscapes and their communities. Comparatively high SES has led to their

suburban locations and to heterolocal patterns in all three cases, which occurred largely without first localizing in inner-city neighborhoods. This difference may in part reflect the very nature of emerging gateways that experienced rapid growth in their local high-tech economies and substantial increases in both their native-born and foreign-born populations which generated rapid suburbanization.

9.9 Discussion

Besides the Hart-Celler Act of 1965, other developments in the 1960s, such as the 1964 Civil Rights Act, the 1968 Fair Housing Act, and the 1974 Equal Credit Opportunity Act, as well as the 1990 INA created an ideal environment for immigrants, such as Asian Indians, with human capital or who build up capital in the United States, to freely choose jobs and residence. Concurrently, the American city was changing as a consequence of the automobile, the expanding and improved new roads and highway systems that have resulted in suburban expansion to such an extent, that Hardwick (2008, p. 31) rightly observed, “the outer city is no longer ‘sub’ to the ‘urb’ in any traditional sense of the word . . . many American suburbs are replete with a wide range of employment opportunities; shopping districts, education, health care, and law enforcement systems; and a local sense of place that distinguishes them from other parts of the larger metropolitan area and makes them self-sufficient economically, culturally, and politically.” The residential location choices of Asian Indians that we have discussed in this chapter operate within this environment.

Asian Indians are a growing segment of both the Asian and total foreign-born populations. The large continuous gateways of Boston, Chicago, New York, and San Francisco still attract large numbers of immigrants. There is little to suggest that this pattern will change. However, settlement patterns *within* these gateway regions do appear to be different for Asian Indians when compared with some other immigrant groups. As we demonstrated at the MSA level and with three specific case studies, there is evidence that Asian Indians are bypassing the traditional pattern of initially settling in central city neighborhoods. Their preferred destination choice is suburbia, one component of heterolocalism. They are able to make this choice because of their fluency in English and high socioeconomic status.

Although the perspective of heterolocalism is useful in examining the *locational* choices of immigrant groups, a more holistic framework, both spatially and conceptually, is necessary to explore the economic, social, and cultural interrelationships between Asian Indians and the broader society. Are Asian Indians forming “ethno-suburbs” or enclaves in the suburbs? Are Asian Indians undergoing a process of assimilation or is cultural pluralism emerging? These important questions may be answered by additional exploration of the individual gateway regions at a more granular spatial scale.

Despite the realizations that the severe recession of the post-2006 period slowed immigration to the U.S. and that some Asian Indians are returning to India in a “reverse migration” for a variety of reasons (Chacko 2007), evidence substantiates

the continued increase of the Asian Indian population in the U.S. In fact, the Indian reverse migration of IT professionals, for example, is admittedly small (Chacko 2007), especially given their large numbers in the U.S. Moreover, the Asian Indian population in the U.S. continued to increase during the recent recession. Estimates from the ACS, 2005–2009, included an estimated total of 2,502,563 Asian Indians in the country. The margin of error potentially reduces that number by only 17,738, and reflects an increase of more than 800,000 from their Census 2000 total. Thus, this population continues to increase unabated, and remains an important influence in many communities.

9.10 Conclusions

In sum, Asian Indians represent a significant and continuing current wave of immigration to the United States. Growing population pressure in India, growing demand for additional professional medical personnel generated by the aging baby-boom generation, increasing importance of the information economy in the U.S., and a continued decline in the science, technology, and mathematics abilities of native-born students will fuel an ongoing demand for Asian Indian immigration.

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Part IV
Economic Impact

Chapter 10

Cluster-Based Economic Development: Four Cases for Context in Developing Regions

Neil Reid and Jay D. Gatrell

Abstract Economic development—as a process, practice, and profession—has historically been informed by the experiences of developed nations. To that end, the growth and expansion of the so-called cluster approach developed by Porter (1990) has been heavily dependent upon the experiences of North America and Europe. Yet, research demonstrates that the dynamics of economic development, associated manufacturing, and urbanization in developing nations is distinct (Thakur 1974, 1979). Insofar as the approach has been widely embraced in a variety of peripheral and developing contexts to enhance the overall competitiveness of nations or specific industries, this chapter examines the trajectories of four transitioning clusters in India, Nigeria, and Brazil. This chapter defines cluster-based economic development, provides select examples of active projects in developing nations, and discusses the unique challenges facing the implementation of cluster initiatives in non-Western contexts.

Keywords Cluster-based economic development • Developing regions

There is considerable debate surrounding the various notions of whether the world is flat (Friedman 2005), spiky (Florida 2005), or continues to suffer the historical legacies of core–periphery relationships (Patel and Pavitt 1991; Gatrell 1999). Nevertheless, economic development as a practice, profession, and process operates on the fundamental assumption that the overall competitiveness of place-based industries can be enhanced through sustained and focused action. Indeed, a great deal of literature has been dedicated to the notion that places, regions, and nations can improve observed material conditions and the overall competitiveness of a single industry (or region) through a focused emphasis on so-called strategic “clusters” and the existing (or creation of new) relationships within and between the firms, organizations, and agencies that comprise these economic clusters (Porter 1990;

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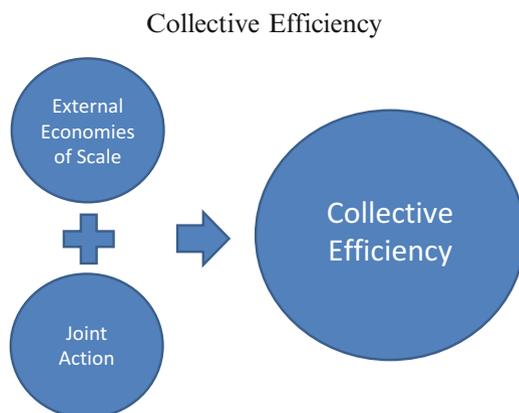
Leydesdorff and Etzkowitz 1996). Yet, the experiences of developing nations suggest the scale, scope, and mechanics of economic development in developing regions is distinct from the North American and European experiences (Thakur 1974, 1979; Dutt et al 1994). In this chapter, we provide an overview of the cluster approach, highlight four real-world clusters (two in India, one in Nigeria, one in Brazil), and discuss the sociospatial implications of cluster development in peripheral regions.

10.1 What Is Cluster-Based Economic Development?

Cluster-based economic development (CBED) is premised on the idea that the economic competitiveness of an industry, and by extension the geographic region in which the industry is located, can be significantly enhanced when the individual businesses that comprise that industry work collaboratively to solve problems and address challenges which individual businesses are incapable of solving or addressing by themselves Diez (2001). Individual businesses are incapable of solving particular types of problems or addressing particular types of challenges because of lack of critical resources (time, money, expertise). However, as noted by Porter (1998, p. 88), the mere co-location of companies, suppliers, and institutions creates the potential, for economic value; it does not necessarily ensure its realization. Economic value occurs through what Schmitz and Nadvi (1999) refer to as *collective efficiency*. Collective efficiency is the competitive advantage that can be attained from the combined benefits of external economies of scale and joint action (Fig. 10.1). External economies of scale are *passive* in that they are a natural outcome of geographic concentration of businesses. Joint action, in contrast, requires conscious and deliberate collaboration.

One of the biggest challenges to collaboration is a low stock of social capital among potential collaborators (Hospers and Beugelsdijk 2002). Cohen and Prusak

Fig. 10.1 The relationship between external economies of scale, joint action, and collective efficiency



(2001, p. 4) define social capital as “the stock of active connections among people: the trust, mutual understanding, and shared values and behaviors that bind the members of human networks and communities and make cooperative action possible”. Enhancing the stock of social capital within an industry and between industry and non-industry stakeholders is critical to the long-term sustainability of any industrial cluster.

The propensity for collaboration is enhanced when an industry is faced with an exogenous threat that calls into question its economic viability. Exogenous threats to industries can be numerous and wide ranging. For example, they may result from reduced levels of protection from imported products (Meyer-Stamer 1998; Knorrnga 1999; Tewari 1999), reduced access to overseas markets as a result of protectionist measures imposed by foreign governments (Svendson and Svendson 2000), intensified overseas competition (Schmitz 1995, 1999; Reid and Carroll 2006), and the imposition of higher standards in product quality (Nadvi 1999) and environmental standards (Kennedy 1999).

There are literally hundreds of cluster initiatives around the world (Solvell et al. 2003), with everything from Formula One racing cars to thoroughbred horses being produced by firms that are part of an industrial cluster (Henry and Pinch 2001; Akoorie 2000). The advantages of being part of an industrial cluster are numerous. The benefits include the potential to engage in the sharing of resources (e.g., equipment), development and nurturing of a common brand identity based on place or on product, economies of scale through pooled purchasing of inputs, and leveraging local institutions (such as trade schools, universities, or industry organizations) to deepen the spatial division of labor (Solvell 2008; Reid and Smith 2010). Collectively, the advantages of agglomeration when marshaled within a collaborative network and shared identity promotes joint action and transforms the potential of co-location into the competitive benefits of an economic cluster.

Beyond definitional issues, however, the cluster concept is necessarily derived from the hyper-competitive realities of globalization. In this sense, the spatial dynamics of clusters force economic development professionals and governments to face the paradox of the local–global dialectic. That is to say, clusters compete in a hyper-mobile marketplace fueled by borderless flows of global capital and do so by embedding and differentiating industries and firms in place. As the case studies demonstrate here, how local industrial clusters respond to the paradox varies, as do the outcomes. Moreover, the competitiveness of industries in the peripheral regions of the developing world must respond not only to local dynamics but to global imperatives beyond their control.

10.2 Cluster Case Studies

In this section we highlight four clusters: the woolen knitwear cluster in Ludhiana, India; a tannery cluster in the Palar Valley, India; Brazil’s Sinos Valley footwear cluster; and Ilorin, Nigeria’s weaving cluster. These clusters have been selected

insofar as they are associated with more traditional industries and production systems. As a result of shifting geopolitics and the expansion of global capitalist structures, all these clusters have also faced different exogenous threats. Additionally, these clusters, in contrast to the high-tech clusters of the developing world popularized by the media, serve as examples of how local agglomerations face and respond to shifting markets of the new global economy. In the case of Ludhiana's woolen knitwear and Ilorin's weaving cluster, major threats appeared as a result of economic liberalization policies adopted by the governments of India and Nigeria, respectively. Tougher environmental regulations imposed by the Indian government threatened the existence of the Palar Valley's tannery cluster, and more stringent demands imposed by international markets became a major challenge facing the shoe producers of the Silos Valley. Each cluster responded differently to these exogenous threats with varying levels of success. Each subsection here outlines the specific nature of the threat facing each cluster and the nature of the response by cluster members.

10.2.1 Cluster 1: Woolen Knitwear (Ludhiana, India)

The woolen knitwear industry in the Indian district of Ludhiana provides an example of a cluster whose resilience and successful response to liberalization owes little to joint action. Home to more than 80 % of India's woolen knitwear firms and accounting for more than 90 % of India's output of woolen and acrylic knitwear, the region faced a twofold threat in the early 1990s (U.S. International Trade Commission 2002). These threats emerged from the almost simultaneous collapse of Ludhiana's primary export market, the former Soviet Union, and the opening up of the Indian economy to imports in 1991. Not only did the cluster survive these threats, it emerged from them stronger than ever (Tewari 1999; Ganguly-Scrase 2008).

The growth and success of Ludhiana's woolen knitwear cluster during the second half of the twentieth century had been aided by tariff protection provided by the Indian government, which allowed the industry to develop a strong presence in the domestic market. With additional government support, the industry also developed export markets in the Middle East, Eastern Europe, and the Soviet Union. The Soviet market became particularly important to Ludhiana as a result of a government-to-government agreement that saw 17 Ludhiana-based export houses being given exclusive rights as the only Indian exporters of woolen knitwear products to the Soviet Union. As a result of this preferential trade agreement, the Soviet market accounted for about half the Ludhiana's output of woolen knitwear products by the late 1980s (Tewari 1999). The collapse of the Soviet Union in 1991 therefore had potentially devastating consequences for the export segment of Ludhiana's woolen knitwear industry. The Soviet problem was exacerbated by the decision of the Indian government, in the same year, to reduce tariffs on woolen knitwear imports into India as part of its economic liberalization plan (McCartney 2009). Thus, within the span of a few months Ludhiana's woolen knitwear producers witnessed their main export market disappear and experienced intensified competition in domestic markets.

The response of the cluster to these disruptions was dramatic, with the result that within a year output increased and exports grew at unprecedented levels (Tewari 1999). A number of key factors explain the cluster's successful response to these potentially devastating threats. First, there was the contrasting nature of the pre-1991 domestic and export markets. Exports to the Soviet market were dominated by lower-quality products, but the domestic Indian market was focused on providing higher-quality products. Despite the decline of the less sophisticated Soviet markets, the local industry was able to leverage their expertise in the higher-quality and more competitive domestic marketplace as part of a new more global export strategy. These new markets were primarily in the more demanding high-end markets of Europe and North America. The high-end domestic market had, therefore, proved to be a valuable "learning ground" for many of Ludhiana's producers (Tewari 1999). Access to the Western European markets was also greatly facilitated by the fact that a number of medium-sized enterprises had been exporting to that market during the 1970s and 1980s. Those who successfully responded to the crisis had also previously invested not only in new technology but in upgrading the skill and knowledge base of their workers as well. They were, therefore, well positioned to take advantage of new opportunities in more sophisticated markets.

As already noted, the successful response of the Ludhiana's cluster to changing market conditions owed little to the region's woolen knitwear producers engaging in joint action. Rather, firms appear to have been able to effectively align their domestic and export markets individually. In fact Tewari (1999) observed that "interfirm cooperation ... has not been Ludhiana's knitwear cluster's strong suit." There do appear to be strong external economies of scale in play, however, with the existence of a specialized labor pool, equipment suppliers, and technical support services (Tewari 1999; Kharbanda 2001; Gulrajani 2006). Intense inter-firm competition among the 5,000-plus firms that comprised the cluster fostered innovation in both processes and products. This culture of innovation, combined with the experience of successfully competing in diverse markets, meant that Ludhiana's woolen knitwear producers were well positioned to respond to the crisis of the early 1990s (Humphrey 2004).

10.2.2 Cluster 2: Tanneries (Palar Valley, India)

In contrast to Ludhiana's woolen knitwear producers, the tannery industry in India's Palar Valley provides an excellent example of effective joint action. In this case the exogenous threat came from a 1995 decision by India's Supreme Court to close hundreds of tanneries in the state of Tamil Nadu, where the Palar Valley is located. The Supreme Court's ruling was a response to the failure of the industry to treat effluents that were produced by the tanneries. As a result, approximately one third of the more than 200 tanneries in the Palar Valley were forced to close. Tamil Nadu produces approximately 40 % of India's leather exports (IRMB International).

Faced with this crisis, many tanneries in the Palar Valley came together to build and operate a number of common effluent treatment plants. Constructing common effluent treatment plants was not the only option available to tanneries. Individual tanneries could have built their own treatment plants. Indeed, some did. However, risk and cost-sharing and the opportunity to circumvent legislation prohibiting future capacity expansion were key drivers behind the decision of individual producers to build and operate joint plants (Kennedy 1999).

Operating joint effluent treatment plants was not without its challenges. Individual tanneries were now forced to work together for the common good. Joint treatment plants were managed and operated as a limited company in which individual tanners were shareholders. A managing director and a management board were elected by and from the shareholders. Management and operation of a successful joint effluent treatment plant requires cooperation among individual tanners. It also, however, provided other opportunities for mutually beneficial collaboration. For example, tanners have entered into innovative bilateral agreements whereby they traded effluent quotas with each other (Kennedy 1999). By commodifying the effluents, the cluster improved the overall competitiveness of the industry through the deployment of neoliberal market forces that inevitably drove process and product improvements. Neoliberal market forces refer to a broader collection of economic and policy reforms that developed throughout the 1980s and into the 1990s. Neoliberalism emphasizes the importance of open markets, political freedom, and associated narratives commonly attributed to globalization in the post-Cold War era.

Not all joint effluent treatment initiatives were successful. There were some failures. A major contributor to failed joint initiatives was a lack of entrepreneurialism, which can be traced back to the early 1970s when the Indian government decided to upgrade the industry by promoting the export of finished leather and leather products at the expense of raw and semi-finished hides and skins. To respond effectively the industry had to upgrade its knowledge base, invest in new machinery, access new markets, and, perhaps most significantly, engage in new subcontracting relationships with each other. The tanneries that most effectively responded to this first crisis did so, to some extent, by investing in what Kennedy (1999) refers to as “cooperative capital:” this meant that they were well positioned to effectively collaborate when faced with the effluent crisis. They had, in other words, accumulated a significant stock of social capital. Those who had not made such investments during the early 1970s struggled to cooperate with each other when it came to building and managing joint effluent treatment plants.

10.2.3 Cluster 3: Leather Footwear (Sino Valley, Brazil)

By 1990, Brazil had established itself as the world’s third largest exporter of leather shoes; the number one and number two positions were held by Italy and South Korea, respectively. The center of Brazil’s leather shoe industry is the Sinos Valley, located in the southern part of the country. The cluster is composed of not only the

manufacturers of leather footwear but also other members of the supply chain such as tanneries, industrial machinery manufacturers, second-hand machinery dealers, freelance designers, financial consultants, technical training centers, industrial associations, and export and forwarding agents. Through the mid-1990s, the Sinos Valley exported on average more than 125 million pairs annually (Schmitz 1998). In total, more than 3,000 firms were considered part of the Sinos Valley leather shoe cluster. The cluster has a long history. By the late 1960s it already included more than 400 firms (Schmitz 1999). Initially these firms focused on the domestic market (Schmitz 1995). A policy of import substitution protected the domestic market for these domestic producers. In the early 1970s export opportunities began to manifest themselves when U.S. importers started to seek out a cheaper source of shoes. U.S. importers were impressed with the size and capabilities of the Sinos Valley producers, with the result that they offered some of them export contracts. In the early 1980s, shoes produced in China threatened Brazilian hegemony of the U.S. shoe market. Sinos Valley producers reacted to the Chinese threat by producing higher-quality shoes for the U.S. market. At the same time, U.S. retailers discovered just-in-time inventory control and began demanding that Sinos Valley shoe producers deliver their product in smaller batches and meet tighter delivery schedules.

As more challenging demands were placed on Sinos Valley shoe producers, the level of inter-firm cooperation increased. As more stringent demands were placed on producers, the issue of trust has surfaced as critical. Firms that coped best with the tighter delivery schedules were those that had invested heavily in developing mutually beneficial inter-firm relationships. During the 1960s and 1970s joint action was most visibly manifest in shoe producers collectively lobbying for the establishment of a variety of different technical schools, technology centers, and trade fairs (Schmitz 1995). More and more collaborative manufacturing started to take place with producers sharing information and becoming knowledgeable of each other's manufacturing processes.

The earliest example of joint action occurred in the 1960s and 1970s with the establishment of an organization to organize and host biannual shoe fairs and technical schools specializing in various aspects of the industry (e.g., tanning). These institutions were established as the result of collective campaigning and lobbying by local producers. The trade fair organization (FENAC) along with private sector export agents played a critical role in connecting Sinos Valley shoe producers with international markets.

10.2.4 Cluster 4: Textile Weaving (Ilorin, Nigeria)

In contrast to the previous three examples, the weaving industry of Ilorin, Nigeria, failed to successfully adapt to the challenges of liberalization. The city of Ilorin, located in southwestern Nigeria, is the capital of Kwara State and has a population of approximately 850,000. The city's weaving cluster pre-dates colonialism by more than 100 years. Historically, the industry was run by master weavers. Master

weavers not only have sufficient training in the art of weaving but, more importantly, have access to sufficient capital to purchase yarn.

Over the years, the Ilorin weaving cluster has been extremely innovative in terms of both products and processes. Product innovation focused on design, with more complex patterns replacing traditional stripe and check patterns. These design innovations helped Ilorin weavers maintain a strong market presence. The quality of the cloth produced by Ilorin weavers was such that it was favored in the production of clothing for important celebratory occasions such as weddings. Additionally, high-quality cloth and innovative designs helped Ilorin weavers develop extensive export markets in both Europe and North America. To help meet the growing demand for their products, Ilorin weavers collaborated and subcontracted with each other when necessary (Meagher 2005).

During the mid-1990s, however, market conditions for Ilorin weavers changed dramatically as Nigeria eliminated bans on the import of textiles. Concomitantly, Nigeria was experiencing a severe economic crisis that was characterized by hyperinflation, significant currency devaluation, and rampant unemployment. This confluence of events resulted in a fast and dramatic decline in demand for Ilorin cloth. The domestic market, for example, shifted toward purchasing imported damask and lace from Asia and Europe. As a result, demand for Ilorin cloth was soon at a tenth of where it stood in the late 1980s. The response of the cluster to the crisis was both chaotic and inadequate, with the result that by the end of the 1990s nearly 80 % (more than 8,000) of the weavers had gone out of business.

The economic crisis resulted in a decline in quality standards in the cluster driven by a number of interrelated factors. First, reduced demand saw master weavers offload apprentices and give them the status of master weavers prematurely (traditionally, it took about 15 years for an apprentice to achieve the status of master weaver). As these new master weavers only had a few years of training, they did not have the skills necessary to produce a superior product. At the same time the shrinking market saw weavers engage in cutthroat competition and also cut corners in an effort to gain market share.

As we have demonstrated in the example of Ludhiana's woolen knitwear industry, it is possible for a cluster to rise to the occasion and address the challenges of economic liberalization, often emerging stronger in the process. So why did the Ilorin weaving cluster fail where others succeeded? According to Meagher (2005), a key factor was that government institutions did not provide support for the failing cluster. The 1990s saw significant decentralization of power in Nigeria, one result being that many local governments received nearly 90 % of their funding from the national government. Thus, local government was not dependent on strong local industry to fund their activities and therefore had little incentive to support local businesses. Furthermore, the local government used their newfound power to harass local weavers (many of whom had previously existed in the shadows of informality) into complying with local tax and other regulatory codes.

10.3 Common Themes

Having detailed the challenges and responses of four clusters, it would seem both appropriate and useful to identify some common themes that might enhance our understanding of the ability of different clusters to respond to crises.

First, the role of government can be important, as clearly demonstrated in the woolen knitwear and weaving clusters of Ludhiana and Ilorin where the decisions by the Indian and Nigerian governments to open up their economies to foreign competition significantly impacted the trajectory of the two clusters, respectively. As these two case studies highlighted, the success of these two clusters in responding to the challenges posed by liberalization differed dramatically. Although Ludhiana's woolen knitwear industry was able to adjust and emerge stronger from the experience, liberalization signaled a death knell for large segments of Ilorin's weaving cluster. The fate of Ilorin's weaving cluster was also negatively impacted by an unsupportive local government that did little to help local weavers address the challenges of the crisis and, indeed, was responsible for the creation of a business environment that was unfriendly to small businesses. The decision as to when a national government decides to liberalize its economy can also be important. In the case of India, liberalization did not occur until after Ludhiana's woolen knitwear industry had developed (under tariff protection) a strong presence in the domestic market. Similar protection from imports also helped the leather shoe cluster in Brazil's Sinos Valley develop a strong and vibrant industry. The Indian government had also assisted the industry in developing and nurturing important export markets in both the Soviet Union and the Middle East. It was also the Indian government that created the crisis for the Palar Valley's tannery cluster when the Indian Supreme Court ruling resulted in the closure of hundreds of high-polluting tanneries. On the other hand, the Indian government had aided the Palar Valley's tannery industry during the 1970s when it had helped to promote the export of higher value-added finished leather products at the expense of lower value-added semi-finished hides and skins.

Second, positive behaviors and decisions made in previous decades were beneficial in helping with current crises. For example, woolen knitwear producers in Ludhiana who had, in previous years, invested in new technology and upgrading their skill base were more successful in accessing new market opportunities than those who had not made such investments. Similarly, the tanneries in the Palar Valley that were most successful in responding to the effluent crisis were those that had previously invested in both their human and capital assets and had engaged in developing and cultivating new subcontracting relationships. Sinos Valley shoe producers that were best able to respond to new demands placed upon them by international markets were those that had previously invested in developing trusting relationships with other producers in the region. On the other hand, the example of the Ilorin weavers demonstrated that there are situations where previous wise business decisions (e.g., investing in new design innovations) was insufficient to overcome the challenges of a crisis and that there can in fact be a "reversal of trends towards technical innovation and quality improvements" (Meagher 2005, p. 21).

Third, training and access to information are critical in the success of an economic cluster. Although cluster theory in high-tech regions focuses almost exclusively on universities and other formal institutions or programs dedicated to workforce development (Calzonetti 2006), clusters in developing regions may be more closely aligned to more traditional or informal training structures. Indeed, the practices, opportunities, and information networks surrounding an industry in the “developed” regions likely differ from those in more peripheral contexts. For example, the case of Nigerian master weavers and the untethering of apprentices that accompanies liberalization and increased competition proved problematic. Although the historical model of the master–apprentice is seldom considered an essential institutional arrangement, the reality is that outside the “Western” world the uncoupling of the previous “training regime” produced unforeseen consequences. Although without doubt the apprentices became entrepreneurs, they entered the market with limited training and less complete knowledge, which resulted in limited success. Analogously, the Brazil case demonstrates how trade organizations were critical in efforts on the part of shoe producers to reach global markets. In addition to providing key contacts, trade organizations play a major role in expanding the reference of local cluster and introduce new knowledge and practices into local systems. Consequently, the notion of education and workforce development in peripheral regions should be broadened (or more appropriately contextualized in such a fashion as) to include organizations and institutions beyond the cluster mainstream.

10.4 Closing Thoughts...

Globalization, the spatial dynamics of neoliberalism, and the end of the Cold War have collectively “empowered” peripheral regions to compete globally along multiple axes (i.e., innovation, quality, enhanced niche markets) and not just a single criterion such as labor cost. According to the dominant narratives surrounding globalization, the expansion of global markets and opening of new markets have enabled (or potentially enabled) peripheral producers and associated clusters to maximize the global flow of capital vis-à-vis opportunities for niche marketing, heightened the competition between local and global producers, and deepened the spatial division of labor. It is within the context of neoliberalism and globalization that Porter’s (1990) *Competitive Advantage of Nations* and the resulting cluster “frenzy” emerged in the 1990s. Given the new conditions of globalization, local spaces and regions were poised to develop, deepen, and enhance existing local industries and associated social infrastructures vis-à-vis “cluster development.” As these examples demonstrate, the specific response to these new conditions varied, as did the outcomes. More importantly, the context—both historical and spatial context—of the examples varied significantly.

Ironically, local economic clusters are derived from the inherently aspatial assumptions of neoliberalism (i.e., open markets, private property, standardized

practices—think quantitative geography’s homogeneous plain) (Scholte 2005). Consequently, the equalizing tendencies of neoliberalism frustrate the prospects of peripheral clusters. That is to say, the conditions of neoliberalism and the competitiveness of nations, regions, or places are inherently uneven across space and over time. As the examples illustrate, the role of government, the timing of economic liberalization, the competitive implications of enhanced regulation, and the importance of promoting the uninhibited marketizing of the economic landscape simultaneously at the domestic and global scales limit the capacity for economic clusters to develop and thrive in the “periphery.” That is to say, the practices deployed at domestic and global scales are necessarily distinct, as the case of Ludhiana demonstrates. Further, as Hart (2001, 2002) notes, the narratives surrounding development and neoliberalism privilege the “developed” world and create new place-specific challenges for emerging peripheral regions. Hence, the historical context of economic liberalization, enhanced environmental regulation, and a range of other sociocultural factors influence the scale, scope, and success of local economic clusters. In this sense, the cluster concept—although useful for explaining how local specialized economies have responded at the macro scale—cannot neatly be assigned to the sample case studies or more local scales per se.

In the end, history, culture, and geopolitics must be used to contextualize the classic cluster approach. In this sense, clusters in peripheral regions (and the broader sociopolitical narrative of globalization) do not and cannot conform to the simplified geometries associated with super-territoriality and global capital (Hart 2001, 2002; Sidaway 2007). Indeed, the responses and outcomes of each case varied. Although globalization has attempted to erase the simplified spatial construct of the core and periphery, the inherent spatial contradiction of capital (homogeneity and differentiation) continues to be reproduced, albeit at more local scales, using the new language of competitiveness. Nevertheless, economic clusters continue to provide policymakers with a readymade response to the conditions of globalization. As a result, the cluster approach has been widely adopted by governments and other agents around the world to improve the competitiveness of economies at multiple scales. Moreover, the popularity and adoption of the approach will continue to expand.

As this chapter implies, the promises of the development narrative (property, prosperity, etc.) have changed very little since the days of Walt Rostow, even if the policy mechanisms and language have changed. No doubt economic clusters in developing regions can be successful, and associated “modern” benefits of urban manufacturing derived (Thakur 1974, 1979), but the evidence suggests this process has been and will continue to be uneven (Dutt et al. 1986). As the four case studies demonstrate, firms, governments, and entire industries have a collective role in promoting the competitiveness of regional economies. Similarly, local context coupled with exogenous threats shape and reshape the economic landscape.

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Chapter 11

Impact of Economic Development on Regional Structure of Urban Systems in India

Bhawan S. Dahiya

Abstract India is a large country with a very long history of urbanization. The urban systems in India have developed in response to its political economy. Most studies do not consider change at the macro level. The present work studies the growth and evolution of Indian urban systems with an emphasis to include all urban places with more than 20,000 population at national and macroregional levels for a 100-year period and to relate the urban size change with economic development in each macro region. As such this study has the following three objectives: first, it examines the characteristics of urbanization trends as a background to the development of urban systems; second, it measures the rank–size and primacy distribution at national and macroregional levels for a 100-year period, that is, 1901–2001; and third, it evaluates the evolving urban system with economic development. This research has several interesting implications for theory. The present research has contributed to our understanding of the changing structure and behavior of the national and macroregional urban systems in India, through successive time periods during the past century.

Keywords Economic development • Primate city • Urban agglomerations • Urban system • Urbanization • Zipf’s rank–size

11.1 Nature of the Problem

The Indian urban system is complex and diverse. It covers a diversified culture and economy, which is reflected in the system itself and particularly in the distribution of its urban places by size. The urban system has developed in response to its political economy. However, a regularity in the distribution of urban places over space as well as in the size and number of urban places can be discernible, and they are indicative of an integrated urban system. However, none of the studies in India except those of Thakur (1980) covers changes at the macro level in the spatial distribution of towns in urban systems for about a 100-year period. Conversely, studies

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by Raza and Habeeb (1976), Habeeb (1981), and Alam (1980) consider longitudinal analysis of urban systems of about a 100-year period. They have analyzed the evolution of the urban system and found distortions in the urban system as a result of the policy adopted during colonial rule to concentrate investments and high-order administrative and political functions in a few large urban centers. Alam (1980) states a condition of hypertrophy, and Raza and Habeeb (1976) contend that this prevents the formation of regional urban systems. Das and Dutt (1993) and Dutt et al. (1994) also cover longitudinal analysis of urban systems of about a 100-year period focusing on rank–size distribution and primate city characteristics in India. Their analysis focuses on historical change in city-size distribution in India at both national and regional levels since 1911, selecting urban areas of only class I cities. India's national urban system has been found to be gradually moving toward Zipf's rank–size distribution, and primate cities have persisted in three macro regions in India. However, if the urban settlement system is disaggregated and examined at the macro level, three distinct rank–size distributions can be identified: (1) primate city distribution, (2) log-normal city-size distribution, and (3) decentralized or polynucleated distribution (Alam 1980). Thus, the belief that urban places are related to each other in some orderly fashion of formation with a system is the basis for the postulation of rank–size rule. This is an investigative hypothesis, a theoretical model or a norm to express a relationship after observed empirical regularity in city size: it provides a discernible pattern in the size distribution of urban places of a region and, hence, it is used as a standard for measuring and explaining the structure and evolution of an urban system. Rank–size distribution is indicative of political unity, economic development, and an integrated urban system, but primate city-size distribution is indicative of political unity, underdevelopment, and imbalance in the distribution of urban places. Thus, a longitudinal study of the growth and evolution of urban systems is imperative, and such studies may lead to better understanding of the structure and behavior of urban systems and ultimately to the formulation of a much-needed dynamic urban place theory.

The present work studies the growth and evolution of Indian urban systems with an emphasis to include all urban places above 20,000 in population at national and macroregional levels for a 100-year period and then to relate the urban size change with economic development in each macro region.

11.2 Objectives of Study

Very few studies of national city size as well as regional-level distribution over a long period of time have included the application of rigorous statistical techniques. Therefore, the objectives of this study are, first, to attempt to examine the characteristics of urbanization trends as a background to the development of urban systems; second, to measure the rank–size and primacy distribution at national and macroregional levels for a 100-year period, that is, 1901–2001; and, last, to relate the evolving urban system with economic development.

11.3 Study Area

India is a large country with a very long history of urbanization. The vast landscape of urban settlements in India provides a laboratory for the study of the complex structure of urban systems. In terms of absolute number of urban settlements and size of urban population, India is possibly the largest urbanized nation in the world today. India's urban population in 2001 was about 285.4 million, and India's recognized urban settlements, numbering 5,161 in 2001, are at various stages of technological and cultural modernization with a remarkable unevenness of development among different regions. The present urban hierarchy, both administrative and economic, and interdependence among cities and towns that have led to the formation of the present Indian urban system is rooted in the British colonial era. The urban system has been found to be highly distorted, dominated by large metropolitan centers such as Mumbai in the west, Kolkata in the east, Delhi in the north, and Chennai in the south. For historical reasons, an urban system has evolved around these four distinct metropolises. The southern region depicts a higher urbanization level with Chennai as the major city, followed by Bangalore, Vishakhapatnam, Coimbatore, Mysore, etc. The western region also has a high level of urbanization, with Mumbai as the major city, followed by Hyderabad, Ahmedabad, Nagpur, and Pune. The eastern region, with Kolkata as its primate city, is quite marked. Kolkata's history of urbanization dates back to the beginning of colonial power when it was selected as the capital for administrative, military, and commercial activities. These activities have proved the initial impetus for its growth, making it the most industrialized metropolis of the country. Delhi has been the dominant city in the northern region since 1951, followed by Kanpur, Jaipur, Lucknow, Ludhiana, Agra, Meerut, Faridabad, Allahabad, and Amritsar. Thus, it is quite evident that the study area includes four macroregional urban systems under which the Indian economic and urban space is structured and has developed over the years. These systems are in the process of becoming integrated and interlinked. The limits of the spatial extent of the four macro regions have not been static over the years because during the past century Delhi's growth has been remarkable, followed by that of Mumbai, Kolkata, and Chennai.

11.4 Review of Literature

Two theories are significant in understanding urban systems: hierarchical and non-hierarchical. The central place theory envisages a hierarchical structure of settlements in a meso-region; this is essentially a normative deduction theory and introduces the idea of a discrete hierarchy of settlements; on the other hand, the primate city and rank-size rule are nonhierarchical theories, both of which are rooted in the empirical inductive approach. The rank-size rule covers the entire settlement system, whereas the primate city concept focuses only on the leading

city. The rank–size rule is essentially an economic rather than a sociological theory of settlement structure (Ramachandran 1989, 203).

Credit goes to Zipf (1949) for laying out a strong theoretical logic to the rank–size rule. His rank–size rule emphasizes the regularity in city-size distribution, whereas the primate city concept emphasizes the abnormally large size of the premier city in different regions or nations of the world. In any region or country there are always a few large settlements (cities) and a large number of smaller settlements (towns). In other words, the number of settlements in any region is inversely proportional to the size of the settlements. Zipf explicated the concept within a broad context of a general theory of human behavior and attributed the rank–size regularity to the balancing forces of unification and diversification. The forces of unification result in the emergence of a few large settlements, while the forces of diversification produce a large number of settlements, which are small in size. When plotted from largest to the smallest, the second-ranked city is half the size of the first, the third ranked city is one third the size of the first, the n th ranked one is $1/n$ th of the size of the first, and so on, depicting a harmonic progression of cities within the urban hierarchy.

Beckman (1958) pointed out that by the addition of a random element, the discrete steps of the hierarchy could be blurred with a continuous size distribution. Berry (1961) recognized three kinds of city-size distribution: lognormal, primate, and intermediate type. The log-normal distribution appears as a straight line on a logarithmic normal probability graph. A marked gap between the leading city and smaller cities suggests primate type and the intermediate a traditional one. Berry suggests a possible trend of movement of city-size distribution from primate to log normal over time. However, Curry (1964) is the first to attempt a comprehensive formulation of the organizational features of urban systems in terms of cybernetics. Both Berry and Curry argue that rank–size distribution is the result of an entropy maximizing process. Nevertheless, Berry is not always clear and consistent in this respect; he fails to make use of this concept. Curry, on the other hand, is unable to define explicitly how order comes with existence in urban systems (Curry 1964, p. 145). Simon (1955) suggests that log-normal distributions are produced as limiting cases by the stochastic growth process based on the notion of a general systems theory. According to Simon, the rank–size distribution is simply an average condition of a steady state of the system, that is, a condition of entropy. Taking the theoretical log normality postulated by Zipf, an attempt has been made in this research to measure the entropy of the city-size distribution pattern of India at both national and macroregional levels.

Stewart (1958) opined that rank–size rule, although in many cases a reasonable approximation to the actual distribution of towns by size, has no logical basis. It breaks down in many areas at both extremes. The rule is a better description of reality for large heterogeneous areas than for small homogeneous areas.

In the Indian context, there are a few studies that invite attention. Reddy (1969) found feeble urban rank–size regularity in the Krishna and Godavari deltas. In other words, log normality is not in evidence in any outstanding degree. Even in India, it is not present except for the cities of population more than 1 lakh (0.1 million). It

has been asserted by Ahmad (1965) that rank–size relationship holds well in the case of 1-lakh cities in India for 1951 and 1961. Thus, the most important implication of the absence of rank–size relationships at the national level is that we do not have an integrated system of settlements at the national level (Ramachandran 1989, p. 202). In a large and diverse country such as India, this is to be expected. However, the absence of rank–size relationships at the national level is supported by the fact that the urban settlements in many states conform to the rank–size rule and that primacy exists in at least 13 of the 25 states (Ramachandran 1989). Dayal and Thakur (1982) found that in spite of the physical and economic differences in the Bihar plain and Chhotanagpur Plateau, the system characteristics displayed by these two regional urban systems were broadly similar during 1872–1971. The study of rank–size relationship has indicated a trend toward regularity and orderliness in both systems dominated by Patna in the Bihar plain and Jamshedpur-Ranchi in the Chhotanagpur Plateau. The position of primacy has not changed in the Bihar plain, although the position of the largest city in the Chhotanagpur has changed through the years.

Das and Dutt (1993), in their studies on rank–size distribution and primate city characteristics in India, highlighted that India's national urban system is gradually evolving toward Zipf's rank–size distribution. However, primate cities have persisted in three of the four macro regions in India. In other words, over the years, the force of unification is becoming stronger relative to the force of diversification. Rank–size distribution represents the condition of maximum entropy or randomness, but it has not been proven. The analysis is also made for only class I cities for the period 1911–1990. The population of cities for 1990 were estimated by the Town and Country Planning Organization. Because India is a very large country and has a quasi-federal political structure, which means that much political and economic power lies with the states, it is not expected that primate cities will develop at the national and macroregional levels. Therefore, it is pertinent to ask the question as to what happens to the regional-level primacy as well as rank–size over the years. In other words, four points emerge: (1) national and regional level analysis, (2) inclusion of all urban settlements, (3) entropy analysis of evolving urban system, and (4) explication of politicoeconomic forces affecting the evolving urban system.

11.5 Data Source

The main purpose of the present study has been to delimit a macroregional system boundary, to analyze the change in rank–size and primacy at national and regional levels, and to relate the change with economic development at the macroregional level. To accomplish this task, data have been collected mainly from Census of India publications. The urban size distribution has been studied for the following time periods: 1901, 1911, 1921, 1931, 1941, 1951, 1961, 1971, 1981, 1991, and 2001. Urban areas having populations of at least 20,000 have been taken into account,

which has precluded the collection of field data. The early-published census records have been the primary source of data for the number of urban places for each specific point in time. The census records provide population data of all urban places on a consistent basis at intervals of 10 years. However, there is confusion and ambiguity regarding the definition of urban places. The definition of town has varied since 1872; however, since 1901 the definition has been satisfactory. A standard and rigorous definition of town was ultimately laid down in the census of 1951, and the 1961 and 1971 censuses have adopted urban agglomeration and standard urban area. In this study, each urban agglomeration has been considered as a separate urban place, as has been published by the Census of India (Series I, Part II-A-ii: A Series, Table A-4, 'Towns and Urban Agglomerations').

Data on economic development in the form of Index of Levels of Economic Development—1980 and 1993, and Index of Levels of Development of Infrastructure—2000 have been collected from the 'Profiles of Districts,' 1980, 1983, and 2000, published by Center for Monitoring Indian Economy (CMIE), Mumbai.

11.6 Methods

The following procedures have been used to analyze data and present them statistically and cartographically:

1. In determining the boundary of Mumbai, Kolkata, Delhi, and Chennai urban systems for 1901, 1911, 1921, 1931, 1941, 1951, 1961, 1971, 1981, 1991, and 2001, a gravity potential model has been applied.
2. The primacy index has been calculated as the ratio between the populations of the premier city and that of the second-ranking city. However, the primacy index of the settlement system has been ascertained by dividing the actual population of the first-ranking city by its expected population (P_1), which has been derived considering the total urban population and the number of urban centers, following the formula suggested by Browning and Gibbs (1961, pp. 441–442) as follows:

$$P_1 = \frac{\sum P}{\sum 1/R}$$

where $\sum P$ is the sum of the population of urban centers and $\sum 1/R$ is the sum of the reciprocal of the ranks.

3. Urban places at the national and macroregional level have been arranged according to population size from the largest to the smallest and ranked as 1, 2, 3, ..., n . The logarithmic progression of city-size distribution has been plotted on a graph as log-rank on the x -axis and log-population on the y -axis. The same has been compared with respective regression line and its expected rank–size regularity for the given total urban population and number of urban centers in the system.

The expected population of each urban place has been calculated by dividing the expected population of the premier city (P_1) by its respective rank.

An overall index of deviation between the actual and the expected size has been determined and expressed as a percentage to the total urban population of the region. The amount of population that has to be reshuffled for rank–size regularity has been derived by the following formula (Browning and Gibbs 1961, pp. 441–442):

$$\frac{\sum d / 2}{\sum P_e} \times 100$$

where d is the difference between the actual and expected population and P_e is the expected population. The results obtained by the foregoing calculations have been further tested by Spearman rank correlation coefficient (ρ), which measures the correlation between the ranks of the actual population and the ranks of the deviations of the actual population from the expected population and gives further statistical support to the conclusions. It is a measure of the correlation, which requires that both variables be measured at least on the ordinal scale so that objects or individuals can be ranked in two ordered series (Thakur 1976, pp. 18–28). The ρ value has been calculated by the following formula (Smith 1975, p. 247):

$$\text{Rho or } r_s = 1 - \frac{6Sd^2}{n(n^2 - 1)}$$

where Sd^2 = sum of the squared difference of rank for all the individuals, n = total number of individuals, and r_s = correlation coefficient.

4. Taking the theoretical log-normality postulated by Zipf as given, the entropy of the city-size distribution pattern has been calculated. The entropy measure indicates the degree of deviation of the existing pattern from log normal. The procedure of calculations is as follows (Shannon 1948):

- (i) Let n be the number of urban centers of the existing system. Each urban center i consists of a fraction of the total urban population of the system, which is denoted as y_i ($y_i > 0$ and $i = 1, 2, \dots, n$). It is obvious that

$$\sum_{i=1}^n Y_i = 1 \tag{11.1}$$

- (ii) As the distribution of the city size is an outcome of a simple probabilistic process, entropy, H_R , of the system can be calculated such that

$$H_R = -\sum_{i=1}^n y_i \log_2 y_i \tag{11.2}$$

where y_i is the probability of a given number of people occurring in an urban center i ($i=1, 2, \dots, n$), expressed as a fraction of the total urban population. H_R is simply the entropy of the urban population shares of the system. When the shares of all the urban centers within the system are equal, i.e., when $y_i=1/n$, ($i=1, 2, \dots, n$), a complete homogeneity is reached and $H_R=H_{max}=\log_n n$.

When all the y_i are zero, except one, which is unity, a minimum entropy occurs, $H_R=H_{min}=0$, as there is only one urban center within the system. These are the two extreme theoretical states of the equilibrium of the city-size distribution system.

- (iii) According to the theoretical rank–size rule, the urban population shares are in the form of a sequence of ratios, such as

$$P_R : P_R / 2 : P_R / 3 : \dots : P_R / n$$

where P_R is the population of the largest urban center and n is the number of the total urban centers. The entropy of this theoretical system, H_L , has also been calculated by means of Eq. 11.2 provided, for comparison purpose, the total number of urban centers and the total urban population are correspondent to the existing pattern and the shares within the theoretical system follow the foregoing sequence of ratios. In this theoretical system, the probability density function of each size class of urban centers is the same, and it represents an average state of equilibrium, i.e. state of log normality. Obviously $H_{min} < H_L < H_{max}$ and $H_L/H_{max} = \text{Cos } 45^\circ = 0.7071$.

- (iv) A ratio of the entropy measures of the existing pattern to the theoretical log-normal pattern has been calculated such that

$$R_R = H_R / H_L$$

when the two measures are alike, $R_R=1$, the existing system is of a lognormal distribution. If $R_R < 1$, the greater is the tendency toward primate distribution. On the other hand, if $R_R > 1$, the greater is the tendency toward a distribution in which the medium-size urban centers dominate.

- (v) To compare the R_R ratios over time, the trend of movement of the city-size distribution pattern of the systems has been traced.
5. The decadal and the interregional differences in the levels of economic development have been analyzed through cartographic techniques, frequency distribution of districts according to the levels of economic development, coefficient of variation, and chi-square value at 1 % significance level.
 6. The impact of economic development on regional structure of urban settlement systems has been highlighted with the help of comparison among the parameters of primacy, rank-size distribution on the one hand and the coefficient of variation and average levels of economic development at national and macroregional levels on the other.

11.7 Findings

The major findings of the study can be summarized under the following headings.

11.7.1 Trends and Patterns of Urbanization in the Twentieth Century

The past century, particularly the post-Independence period, registered a tremendous growth of urbanization in terms of percentage of urban population to the total population, density of urban population per square kilometers, and number of towns as well as size of towns. However, the urban systems of the four macro regions have revealed significantly different trends and patterns in this regard. It has been observed that through the successive time periods the Delhi region has expanded toward Kolkata as well as Mumbai, and Mumbai is encroaching the Kolkata and Chennai regions, whereas Kolkata has annexed a small part of northeastern Andhra Pradesh, which was earlier in the Chennai region (Fig. 11.1).

The density of urban population per square kilometer has increased from 5.4 in 1901 to 93.4 in 2001 (excluding Jammu & Kashmir and Assam). Among the four macro regions, the Chennai region maintained the highest density of urban population throughout the past century, while the Kolkata region remained at the bottom line. From 1901 to 1951 and again in 2001, the Delhi region moved above the national average, whereas the Mumbai region has registered higher than national average since 1961. At the end of the past century, that is, in 2001, the Mumbai region has exceeded the Delhi region by a slender margin (Table 11.1).

When compared on the basis of density of towns and urban agglomerations per 1,000 km², it is found that India has reached the benchmark of at least one (1.2) per 1,000 km² in 1991 as against only 0.24 in 1901. In 2001, all the four regions attained this benchmark. In 1901, Delhi had the highest density of towns (0.46) followed by Chennai (0.24), Mumbai (0.21), and Kolkata (0.14). In 1961, Chennai surpassed Delhi and in 2001 Chennai recorded 2.5 towns per 1,000 km², followed by Delhi (1.6), Kolkata (1.11), and Mumbai (1.07). Consequently, the average area of dominance per town has decreased. It is found that in 2001 the average area of dominance in India, Chennai, Delhi, Kolkata, and Mumbai was 15.04, 11.32, 14.14, 16.93, and 17.24, respectively; the corresponding figures in 1901 were 36.53, 36.36, 26.30, 47.13, and 38.46 (Table 11.2).

Thus, it can be concluded that all the macro regions have grown in terms of both number and size of towns. Chennai has grown relatively more in terms of number of towns whereas Mumbai has grown more in terms of size of towns, particularly large cities. This statement is further corroborated by the figures of average size of towns. In 1901, the average size of towns and agglomerations were 31,831, 31,793, 19,992, 15,997, and 22,843 in the regions of Chennai, Kolkata, Mumbai, Delhi and India, respectively; by 2001, the corresponding figures have increased to 58,492, 60,088, 89,571, 59,392, and 66,394.

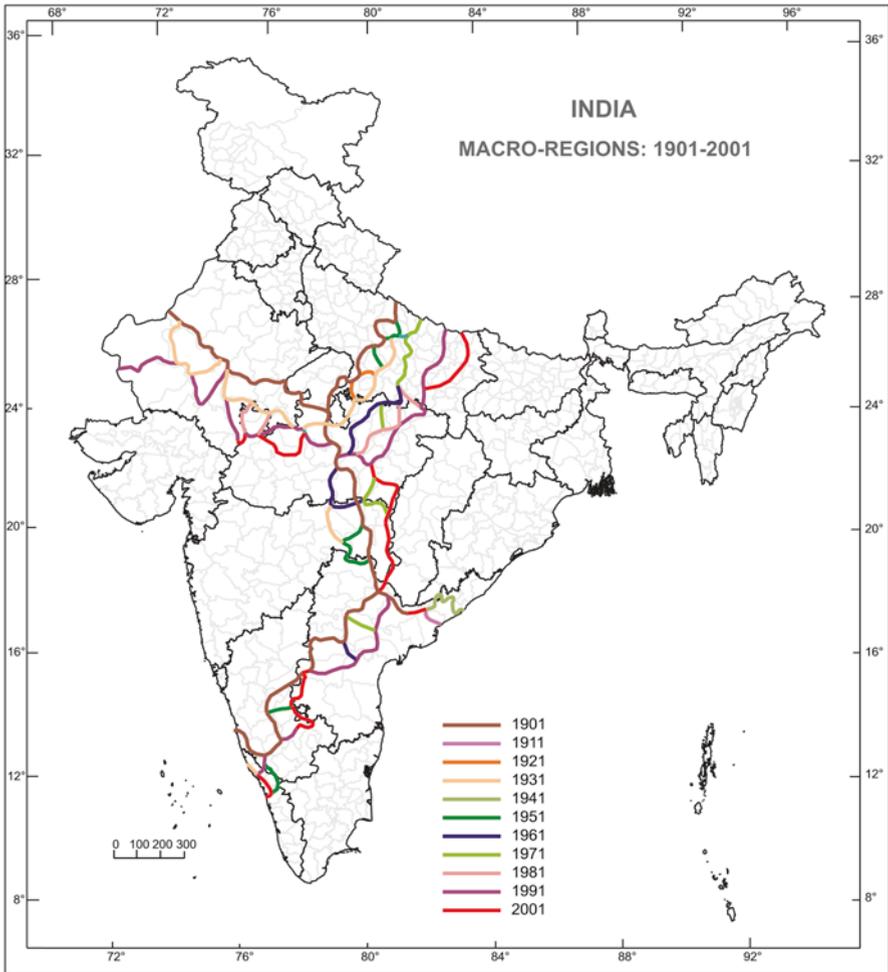


Fig. 11.1 India: macro regions 1901–2001

Table 11.1 Changes in areas of macro-urban systems: 1901, 1951, and 2001

Region	Area (in '000' km ²)			Changes in area (in '000' km ²)		
	1901	1951	2001	1901–1951	1951–2001	1901–2001
Mumbai	967	935	918	–32	–17	–49
Kolkata	1,105	1,042	931	–63	–111	–174
Delhi	766	896	1,071	+130	+175	+305
Chennai	457	422	375	–35	–47	–82

Source: Computed by the author

Table 11.2 Density of urban population, density of towns/1,000 km², average area of dominance, and average size of towns (1901, 2001)

Region	Year	Density of urban population/km ²	Density of towns/1,000 km ²	Average area of dominance (in '00' km ²)	Average size (population) of towns
Mumbai	1901	4.3	0.21	46.5	19,992
	2001	95.9	1.07	9.3	89,571
Kolkata	1901	4.6	0.14	69.8	31,793
	2001	66.7	1.11	9.0	60,088
Delhi	1901	7.4	0.46	21.7	15,997
	2001	94.5	1.59	6.3	59,392
Chennai	1901	7.7	0.24	41.6	31,831
	2001	145.3	2.48	4.0	58,492
India	1901	5.4	0.24	41.9	22,843
	2001	93.4	1.41	7.1	66,394

Source: Computed by the author

11.7.2 Structure of National Urban System of India

An attempt has been made to analyze the temporal changes in the structure of the urban settlement system of India from 1901 to 2001 on the basis of empirical constructs of Jefferson's 'primate city urban system' and Zipf's 'rank-size urban system' (Figs. 11.2, 11.3).

It has been found, on the basis of the most dominant city, that the past century has been shared by two premier cities. During the first half (1901–1951) of the century, Kolkata U.A. enjoyed the premier position, while in the second half Mumbai U.A. occupied this position. The national primacy index has fluctuated during successive time periods. A higher index of primacy of 1.80, 2.07, and 1.24 has been recorded in 1901, 1941, and 2001, respectively, whereas the intervening periods have a low primacy index with a minimum of 1.02 in 1981. Thus, during the last century, no single city can be designated as the primate city of the national urban system of India. The absence of a primate city may be explained by the large size of the country, its colonial heritage, and weaknesses in the forces of nationalism in the country. Several cities have functioned as the nerve centers of national administration, economic, and cultural activities at different time periods. Hence, the Indian urban system, at least during the past century, has experienced the dominance of some large cities, particularly Mumbai, Kolkata, Delhi, and Chennai.

A cursory view of the rank-size distribution of urban settlements on log-log graphs for successive time series reveals that the lower part of the distribution more closely fits a straight line than does the upper part, which represents the largest cities, most of which were to be bigger in size to fall in the truncated log-normal line. Further, the increasing length and upward shifts of the exponential line during successive periods explain that over the years our national urban system has grown in terms of number as well as the size of towns. Second, it is found that the regression

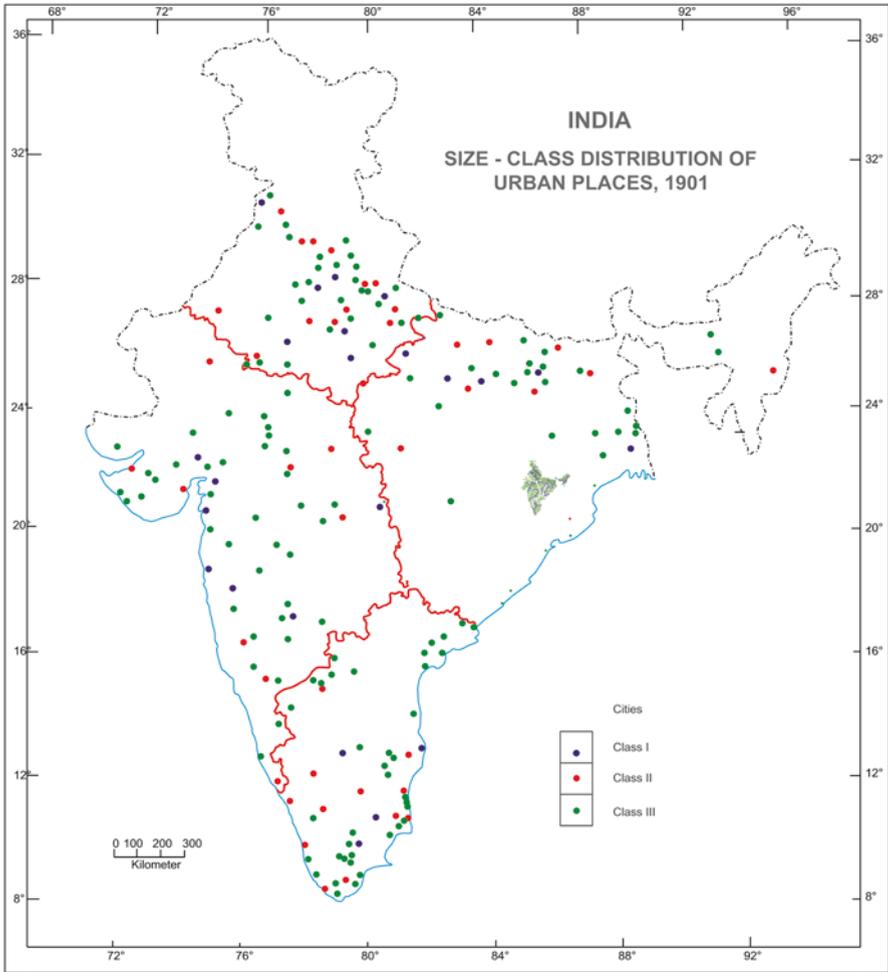


Fig. 11.2 India: size-class distribution of urban places, 1901

of size on rank is highly reliable as in all time periods the theoretical relationship between the rank and the population, as hypothesized by Zipf, explains more than 99 % of the variance. Third, the coefficient of regression of size on rank has been less than unity but it has increased from 0.7585 in 1901 to 0.9568 in 2001, which suggests that throughout the past century the forces of diversification have been dominant over the forces of unification in determining the size and number of cities in the national urban system, but their dominance has continuously decreased. As the regression coefficient in perfect condition of the ‘rank–size rule’ is 1.00, hence the coefficient (0.9568) shows that both forces are in a state of close balance and the national urban system of India has attained a near-perfect regularity of the rank–size

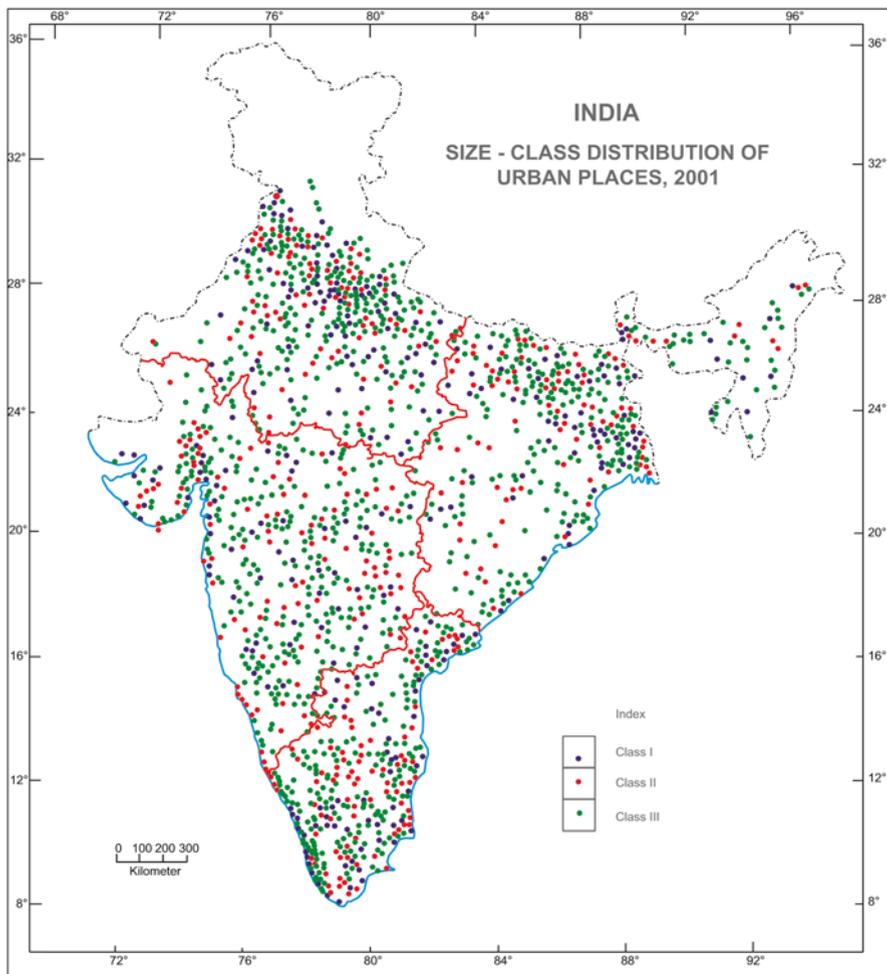


Fig. 11.3 India: size-class distribution of urban places, 2001

rule. In other words, the increasing slope of the best-fit lines toward unity through successive time periods indicates that the average rate of change in the population of settlements in accordance with their ranks has increased to attain regularity of rank–size rule and ultimately, in 2001, it has almost accorded with the rule. This trend has been confirmed by the decreasing percentage of population to be reshuffled for rank–size regularity (Fig. 11.4, Table 11.3).

Fourth, the value of the Spearman rank correlation coefficient (ρ : the correlation coefficient between ranks of actual and ranks of deviation of actual from the expected population) has increased to such an extent (0.990 in 2001) that at the end of the century there has been a near-perfect correlation between ranks and the

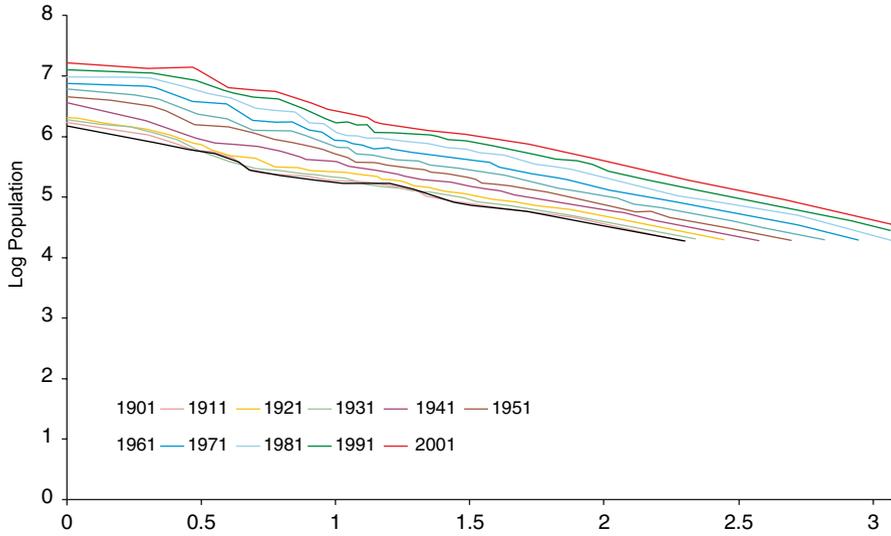


Fig. 11.4 India: rank-size distribution 1901–2001

Table 11.3 Factors of rank-size distribution of urban system in India (1901–2001)

Census year	Regression coefficient of size on rank	Population to be reshuffled (in %)	Rho (correlation coefficient between ranks of actual and ranks of deviation of actual from expected population)	Entropy changes $H_R/H_L (R_i)$
1901	$-0.7585 \log r$	16.34	0.519	1.2294
1911	$-0.7695 \log r$	13.54	0.327	1.1017
1921	$-0.7728 \log r$	13.91	0.439	1.1022
1931	$-0.7861 \log r$	15.16	0.664	1.1168
1941	$-0.8267 \log r$	12.21	0.815	1.0936
1951	$-0.8537 \log r$	9.87	0.735	1.0800
1961	$-0.8619 \log r$	10.40	0.903	1.0831
1971	$-0.8817 \log r$	10.50	0.929	1.0827
1981	$-0.9123 \log r$	10.50	0.977	1.0848
1991	$-0.9301 \log r$	10.47	0.992	1.0859
2001	$-0.9568 \log r$	10.46	0.993	1.0804

Source: Computed by the author

amount of deviation from perfect rank-size regularity. Further investigations revealed that most of the top-ranking cities had divergence below the expected line whereas most of the remaining large cities had divergence above the expected line. Thus, a large number of settlements, mostly lower-ranking ones, have almost reached their expected size for rank-size regularity. Last, the entropy changes in rank-size distribution also give statistical support that the Indian urban system is growing as well as moving toward rank-size regularity.

11.7.3 Regional Structure of Urban Systems

Throughout the century, Kolkata, Mumbai, Delhi, and Chennai have been the largest cities in their respective regions. Among the four macro regions, Kolkata has maintained its highest degree of regional primacy with its climax at 12.63 in 1951, which was 5.89 in 1901 and 7.74 in 2001. When primacy is defined with index as more than three, then Chennai has never been a primate city, except in 1911, when its second-ranking city (Hyderabad) was annexed in the Mumbai gravity region. Mumbai has experienced oscillations in its regional primacy index. In 1901, 1921, and 1961–1981, Mumbai's regional primacy index has more than three. On the other hand, Delhi's primacy has increased successively and reached from 1.14 in 1901 to 4.75 in 2001.

Regional rank–size distribution revealed that the urban systems of Mumbai, Delhi, and Chennai have moved toward rank–size regularity through successive time periods; Kolkata, which was close to rank–size regularity in 1901, depicts a 'U-shaped' trend with highest departure in 1951. Thus, by 2001, all regional urban systems have come closer to regularity. In this regard, Mumbai is a classic example with coefficient of regression of size on rank as 0.997, followed by Delhi (0.974), Chennai (0.954), and Kolkata (0.952).

Thus, considering primacy and rank–size distributions, it has been found that at the end of the century, the Chennai region has shifted to 'binary pattern' with Bangalore as its second-ranking city is in close competition in hierarchy distribution. On the other hand, Kolkata maintained a 'primate pattern' with climax in 1951. Delhi has moved toward 'primate pattern' but is still lagging behind Kolkata in primacy and leading in rank–size regularity. Mumbai has come closest to the 'theoretical rank–size pattern' (Tables 11.4, 11.5, 11.6).

Table 11.4 Coefficient of regression of size on rank: 1901–2001

Year	Mumbai	Kolkata	Delhi	Chennai
1901	0.7616	0.9517	0.7240	0.7875
1911	0.8648	0.9491	0.7123	0.7249
1921	0.8488	0.9479	0.7428	0.7409
1931	0.8587	0.8997	0.7967	0.7658
1941	0.9026	0.8861	0.8626	0.7994
1951	0.9311	0.8632	0.9061	0.8333
1961	0.9263	0.8648	0.8994	0.8673
1971	0.9326	0.8747	0.9193	0.8844
1981	0.9569	0.9094	0.9336	0.9196
1991	0.9677	0.9048	0.9607	0.9456
2001	0.9966	0.9521	0.9738	0.9526

Source: Calculated by the author

Table 11.5 Spearman rank correlation coefficient between ranks of actual population and ranks of deviations of actual population from the expected population: 1901–2001

Year	Mumbai	Kolkata	Delhi	Chennai	India
1901	0.0146	0.8152	0.6273	0.6845	0.519
1911	0.4063	0.9403	0.6442	0.6268	0.327
1921	0.3827	0.9659	0.7783	0.4722	0.439
1931	0.2404	0.7968	0.7765	0.5080	0.664
1941	0.4696	0.9841	0.7342	0.6786	0.815
1951	0.4383	0.9650	0.4936	0.4505	0.735
1961	0.3677	0.5413	0.2790	0.3777	0.903
1971	0.5167	0.2228	0.4464	0.4069	0.929
1981	0.6038	0.7326	0.5984	0.5711	0.977
1991	0.9362	0.7060	0.8062	0.7083	0.992
1991	0.95432	0.97861	1.03137	1.02809	1.0859

Source: Calculated by the author

Table 11.6 Entropy changes in regional city-size distribution (H_R/H_L)

Year	Mumbai	Kolkata	Delhi	Chennai	India
1901	1.04036	0.91604	1.14431	1.05197	1.2294
1911	0.97668	0.87689	1.14537	1.08370	1.1017
1921	0.98606	0.85928	1.13803	1.08900	1.1022
1931	1.00553	0.87574	1.12540	1.09571	1.1168
1941	0.99502	0.82637	1.09985	1.09779	1.0936
1951	0.96307	0.82441	1.06548	1.07184	1.0800
1961	0.96620	0.88309	1.04766	1.05996	1.0831
1971	0.95762	0.91858	1.03442	1.04739	1.0827
1981	0.95795	0.93653	1.03677	1.03990	1.0848
1991	0.95432	0.97861	1.03137	1.02809	1.0859
2001	0.94559	0.98620	1.02137	1.01887	1.0804

Source: Computed by the author

11.7.4 Levels of Economic Development

India has registered an average annual growth rate of 5.80 % in gross domestic product (GDP) at factor cost from 1980 to 2000. The per capita income has increased from Rs. 5,352 in 1980 to Rs. 10,561 in 2000, that is, it doubled within this period. In other words, India has made a significant growth in the fields of agriculture, mining, manufacturing, and service sectors during these two decades, which has led to tremendous economic development in the country. Simultaneously, substantial decrease in the coefficient of variation in economic development revealed that India has decreased regional imbalances in economic development during the last two decades of the century.

Each macro region has made substantial economic development, and the distribution of districts according to the level of economic development in each region has become more and more normal from the positively skewed one. However, inter-regional differences in the distribution of districts according to their level of economic development are still significant, even at the 99 % confidence level, as the calculated value of 'chi-square' in each year was much greater than the tabulated value. However, the calculated value of chi squared has decreased over the years. Thus, the interregional differences have decreased substantially but are still significant at the 0.01 % significance level. During this period, Chennai remained the most developed region, whereas Kolkata retained its lowest position. In 1980, Mumbai had the second position but in 1993 Delhi pushed it to the third position.

The regional coefficient of variation (a better device for comparison between different sets of data) in economic development revealed some interesting facts. (1) The variability in the distribution of economic development has decreased tremendously in each region as well as at national level. (2) In 1980, the variability in economic development was maximum in the Kolkata region followed by Delhi, Mumbai, and Chennai. In 1993, it was highest in Mumbai followed by Kolkata, Delhi, and Chennai. In 2000, the variability in infrastructural development was maximum in Delhi region, followed by Chennai, Mumbai, and Kolkata in that order. (3) The variability in the distribution of economic development in India has decreased by more than 50 % within these two decades. The most drastic decrease was registered in Kolkata region followed by Mumbai, Delhi, and Chennai.

11.7.5 Impact of Economic Development on Regional Structure of Urban Systems

It has been found that the level of economic development and its coefficient of variation have a close bearing on the pattern of rank-size distribution of settlements in a country or region. A close scrutiny of association between these two sets of data revealed the following. First, decreasing coefficient of variation within economic development over the years leads the city-size distribution toward rank-size regularity; this explains the movement of India and its each regional urban system toward rank-size regularity during the last 20 years of the century. Second, in a fairly well developed region, economic progress with decreasing coefficient of variation to a moderate level, rank-size distribution tends to attain a binary pattern, as in the region of Chennai. Third, substantial increase but still at a low level of economic development with significant decrease to a low level in variation shifts the primate-city pattern toward rank-size regularity, but primacy still is found to be high, as in the case of the Kolkata region. Fourth, a moderate level of eco-development accompanied by a sharp decrease in variation moves the city-size distribution toward a theoretical rank-size regularity, as in the Mumbai region. Fifth, and last, fair growth in economic development with decreasing variation but still at a moderately high level shifts the urban system toward rank-size regularity as well as increases the primacy of the premier city, as can be seen in the region of Delhi (Tables 11.7, 11.8, 11.9).

Table 11.7 Primacy index, level of economic development, and intraregional variation in economic development

Region	Primacy index			Level of economic development			Variation in economic development		
	1981	1991	2001	1981	1991	2001	1981	1991	2001
Mumbai	3.61	2.90	2.96	119.5	98.3	94.8	87.4	77.2	23.78
Kolkata	10.01	10.02	7.74	75.8	60.2	90.7	147.1	72.0	19.1
Delhi	3.50	4.15	4.75	102.9	100.2	115.4	119.8	71.8	61.5
Chennai	1.47	1.31	1.13	126.6	116.9	132.2	66.9	51.5	42.7
India	1.02	1.14	1.24	100.0	100.0	100.0	114.6	94.6	51.1

Source: Computed by the author

Table 11.8 Coefficient of regression of size on rank and variation in economic development

Region	Coefficient of regression of size on rank			Level of economic development			Variation in economic development		
	1981	1991	2001	1981	1991	2001	1981	1991	2001
Mumbai	0.957	0.968	0.997	119.5	98.3	94.8	87.4	77.2	23.7
Kolkata	0.909	0.905	0.952	75.8	60.2	90.7	147.1	72.0	19.1
Delhi	0.934	0.961	0.974	102.9	100.2	115.4	119.8	71.8	61.5
Chennai	0.920	0.946	0.953	126.6	116.9	132.2	66.9	51.5	42.7
India	0.912	0.930	0.957	100.0	100.0	100.0	114.6	94.6	51.1

Source: Computed by the author

Table 11.9 Entropy of city-size distribution and intraregional variation in economic development

Region	Entropy ratios			Level of economic development			Variation in economic development		
	1981	1991	2001	1981	1991	2001	1981	1991	2001
Mumbai	0.958	0.954	0.946	119.5	98.3	94.8	87.4	77.2	23.7
Kolkata	0.936	0.979	0.986	75.8	60.3	90.8	147.1	72.0	19.1
Delhi	1.037	1.031	1.021	102.9	100.2	115.4	119.8	71.8	61.5
Chennai	1.040	1.028	1.019	126.6	116.9	132.2	66.9	51.5	42.7
India	1.085	1.085	1.080	100.0	100.0	100.0	114.6	94.6	51.1

Source: Computed by the author

11.8 Conclusions

The present research has contributed to our understanding of the changing structure and behavior of the national and macroregional urban systems in India through successive time periods during the past century. It was observed that the forces of diversification dominated the forces of unification at the aggregate national level as well as macroregional levels, but their dominance has decreased over the time periods, particularly during the post-Independence period. The national and all four macroregional urban systems were found shifting toward regularity in their rank–size

distribution. By 2001, these forces were almost accorded a balance, and rank–size distributions in all the respective urban systems were observed very close to Zipf’s curve, particularly in the Mumbai macro-urban system, followed by the macroregional urban systems of Delhi, Chennai, and Kolkata. Second, India has never had a primate city at national level, at least during the past century, nor is expected to do so in the near future, mainly because of its large area, which needs at least one premier city in each macro region to serve the population properly. Hence, it was found that all the four macro regions have at least one premier city. Kolkata has been a classical example of regional primacy, although decreasing since Independence. Delhi’s regional primacy has increased throughout the century. The Mumbai region has had oscillations in its primacy index, and since 1981 it is third in terms of regional primacy, whereas Chennai cannot be designated as a primate city, at least since Independence, as its index of primacy is less than two, because of the rapid growth of the second-ranking city, Bengaluru. Thus, the Chennai region has moved toward bimodal city-size distribution, whereas in the macro regions of Kolkata, Delhi, and Mumbai, primacy exists at the top, and the other urban places in these systems have come closer to rank–size regularity. Third, it was observed that level of urbanization is directly related to the level of economic development, but it is the variation in economic development that affects city-size distribution. Generally, high variation gives rise to primacy and low variation gives rise to rank–size regularity. In short, all hypotheses under this research have been proved.

This research has several interesting implications for theory. First, the evidence from India, particularly, from different macroregional systems, is consistent with theory that the level of primacy in an urban system first rises and later, when regional imbalance decreases at a higher level of economic development, falls, and the city-size distribution shifts toward rank–size regularity. Second, at a middle stage, there can be primacy at the top rank, although with trial fits into Zipf’s curve, that is, rank–size regularity.

11.8.1 Future Research

Future research needs to be carried on in the following direction. Attention should be paid to the study of dynamics of growth in a macroregional urban systems, especially the eastern region, dominated by Kolkata in a system framework. The region should be delimited on the basis of flows to quantitatively determine the system boundary of Kolkata and its subsystems, such as Patna, Ranchi, Bhubaneswar, Guwahati, and Siliguri, that is, how the subsystems nest within a larger macro-system of Kolkata in a core–periphery interacting space economy. Research is needed to focus on the changing system boundary of Kolkata covering both colonial and postcolonial settlement. The sphere of influence of Kolkata is shrinking, which needs to be proved and confirmed, as well as how Kolkata has served the needs of society in the surrounding region over the years.

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Chapter 12

India's Cities Rising: The Challenges in Higher Education

Meera Chatterjee and Allen G. Noble

Abstract In recent decades, urban population growth, combined with the impact of globalization, has influenced higher education in India. In this chapter the authors examine the growth of higher education since Independence; in particular, evaluating the changing role of government, the changing dynamics of access to education leading to the development, and the demand for higher education in more recent times. The authors argue that under the impact of globalization not only has the structure of higher education changed but with the introduction of distance and online education, and information and communication technology (ICT) as well as cross-border higher education, the dynamics of higher education has also changed. The resultant impact is growth of privatization in higher education, with the use of ICT, which has added an extra dimension to the delivery and reception of education in India. All this not only has consequences for the contextualization of higher education in twenty-first century India but it also calls for reconsideration of existing policy geography.

Keywords e-Learning • Government • Higher education

12.1 Background

As India's urban population exploded in the closing decades of the twentieth century, educational levels rose steadily; centers of higher learning, concentrated in the urban nodes of the country, also rose to address the challenges of a complex modern society on the brink of world recognition and leadership.

India is often viewed as an engine of global growth because youth and children constitute a significant percentage of its 1.237 billion population. It is a promising and

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enormous market for all kinds of secondary and tertiary activities, and higher education is no exception. Education has been a poignant issue in a developing and overpopulated country such as India since Independence. Perceived to augment human qualities and character, it is the solitary method of inducing economic changes in life. Such a critical and significant positioning of education in the Indian societal structure makes it susceptible to the latest challenges posed by expeditious globalization of the country. The super-fast rate of transformation of the overall economic structure of the country has resulted in a direct impact on education, which already has experienced remarkable changes since Independence. However, presently education is going through a new set of challenges as a response to increased globalization.

Despite the incredible growth of the economy, illiteracy, as well as attaching tremendous importance to education, paradoxically is one of the foremost problems facing the country. It has mainly plagued the lowermost-income group. However, India should most fairly be viewed against the situation of other South Asian countries (Table 12.1).

The overall rate of literacy is low in South Asia with the exception of Sri Lanka and Maldives. The caveat to keep in mind, as with all figures of developing countries, is that the numbers are only roughly comparable from country to country. Nevertheless, India has to concentrate on increasing literacy rates to match its position in globalization. Policies relating to higher education in India are the responsibility of the central government, which provides funding to the University Grants Commission (UGC) and establishes central universities in the country. On the recommendation of UGC, the Central Government also declares Education Institutions as 'Deemed to be University.' Deemed University is a status of autonomy granted to high-performing institutions in India.

State Governments are in charge of establishing State Universities and Colleges and provide grants for their development and maintenance. Legislative power has been given to the Central Government for determination and setting standards in institutions of higher education or research. The amount of public expenditure incurred by the nation is an indicator of the importance attached to education. Table 12.2 shows the expenditure on education as a percentage of gross domestic product (GDP). In contrast to the sudden growth of all aspects of the economy, education in general, and higher education specifically, maintains a low profile in public expenditure.

Its share of gross national product (GNP) was nearly 1 percent during the 1970s, just 0.35 percent in the mid-1990s, before increasing modestly to 0.6 by the end of the decade. After

Table 12.1 Literacy rate

Country	Male literacy (%)	Country	Female literacy (%)
Maldives	96.2	Maldives	96.4
Myanmar	93.9	Sri Lanka	89.1
Sri Lanka	92.3	Myanmar	86.4
India	74.4	India	47.8
Pakistan	63	Pakistan	36
Nepal	62.7	Nepal	34.9
Bhutan	60	Bhutan	34
Bangladesh	53	Bangladesh	31.8

Source: World Development Indicators (2008)

Table 12.2 Public expenditure on education

Year	Expenditure on education as % of GDP	Expenditure on higher education as % of GDP
2001–2002	3.80	0.69
2002–2003	3.77	0.70
2003–2004	3.49	0.62
2004–2005	3.68	0.66

Source: Ministry of Statistics and Program Implementation (MOSPI) (2008)

the formulation of the New Policy of Education (NPE) in 1986, the central government gradually increased its contribution to the funding of elementary education, and this trend continued in the 1990s. As a result, in total expenditure on education, the share of higher education spending declined from 12.2 percent during 1982–1992 to 11.4 percent for the states, and more dramatically, from 36.2 to 23.3 percent for the center. Notwithstanding the high growth rate after economic liberalization, the real rate of growth of public expenditure on higher education declined from about 5.5 percent during 1982–92 to 5.3 percent 1993–2004, largely because of deceleration in spending by the states. The average real expenditure on higher education per enrolled student declined at 2.4 percent annually during this period - from Rupees 8,322 in the period 1981–82 to 1991–92, to Rupees 6,790 in the period 1992–93 to 2003–04 (Kapur and Mehta 2007).

Therefore, instead of allocating additional funds as an expression of promising growth of the economy, the proportional expenditure (Table 12.2) incurred by government has decreased in reality.

12.1.1 Growth of Higher Education Since Independence

Before Independence, admittance to higher education was mostly restricted to an exclusive group whose members were approved by the British government and the elite class of the Indian society. As a result, education was not accessible to a majority of the population. The number of educational institutes and their infrastructure was inadequate to accommodate a greater number of scholars. Consequently, the total number of students was only a few thousands enrolled in approximately 500 colleges and 20 universities. As India approached independence, the imperative need for developing and diffusing higher education was clearly felt, not only by the population but by the education administrators as well.

Since Independence, the increase of higher educational institutions, as well as student enrollment, has been astonishing. According to the 2006–2007 Annual Report of the Ministry of Human Resources and Development (MHRD), there has been an 18-fold increase in the number of universities, a 35-fold increase in the number of colleges, and a 10-fold increase in enrollment. Presently, India supports the world's second-largest system of higher education (Chitnis 2002). The total number of students enrolled in higher education (11.2 million in 2006–2007) exceeds the total population of many small countries. This spurt of student growth has been matched with the increase in the higher education institutes such as

Table 12.3 Expansion of higher educational institutes

Years	Colleges for general education	Colleges for professional education ^a	Universities ^c
1950–1951	370	208	27
1960–1961	967	852	45
1970–1971	2,285	992	82
1980–1981	3,421	3,542 ^b	110
1990–1991	4,862	886	184
2000–2001	7,929	2,223	254
2001–2002	8,737	2,409	272
2002–2003	9,166	2,610	304
2003–2004	9,427	2,751	304
2004–2005	10,377	3,201	343
2005–2006	11,698	5,248	350

^aEngineering, technical, medical, and education

^bIncludes institutions for postmatriculation courses

^cDeemed universities and institutes of national importance

universities, colleges, and technical and medical schools (Table 12.3). This stunning escalation of education can be attributed to dynamic factors working collectively. The government had a strong role to play in developing the present networking of the education system by making it accessible and responding to the socioeconomic demand of the situation.

12.1.2 *The Role of Government*

India, by default, inherited the colonial British education system. Subsequent to its freedom from colonial rule in 1947, the constitution of independent India promised education to everyone up to the age of 14. In conjunction with the constitution, education was prioritized by government in all 5-year plans, making it an integral part of socioeconomic development across the country. Additionally, the government also worked toward expanding opportunities for higher education. Consequently, the school and higher education system is persistently being enlarged and diversified. The system of perpetual “reservation” of admittance for certain classes of applicants made by the government facilitated the spread of education across the entire societal structure.

Owing to the apathetic approach of the British government, most of the Indian universities during British rule did not support a curriculum with technical depth. The post-Independence era focused on overall planned economic development, with special emphasis on heavy industries. As a response to the demands of the time, the universities developed exhaustive and comprehensive technical education programs. Furthermore, distinctive national institutes have been established to offer schooling in law, management, medicine, and engineering, with outstanding research centers. The focus was not only to expand the educational network but also to maintain the

quality and standard of education. The University Grants Commission (UGC) has been set up to scrutinize the level of education imparted by colleges and universities. The UGC was officially established in November 1956 as a statutory body of the Government of India through an Act of Parliament for the coordination, determination, and maintenance of standards of university education in India. To ensure effective coverage by region throughout the country, the UGC decentralized its operations by setting up six regional centers. As a result of such efforts, India presently is acknowledged widely for its great consortium of scientific and technical education.

12.1.3 Access to Education

All through colonial rule, most of the colleges and universities had a strong gender bias. The continuing policy of the government of India was to make education accessible to all, irrespective of social and economic status. The doors to all types of higher education were opened to women. As a result of these policies, a tremendous increase occurred in the number of students enrolled with colleges and universities (Table 12.4). This accessibility to education has been termed the “democratization” of higher education.

The massive expansion of higher education has contributed to the phenomenon of what can be called democratization of higher education. Presently a large number of students from lower socio-economic strata constitute a sizeable proportion in the total enrolments in higher education. One-third to 40% of the enrolments in higher education belongs to lower socio-economic strata, compared to the extremely elitist system inherited from the colonial rulers. Women students form currently about 40 per cent of the total enrolments (Tilak 2005).

Democratization of education has opened the gates to the masses. The demand for higher education led to increased demand for teachers. Accordingly, there has been a remarkable increase in number of teachers hired (Table 12.4).

12.1.4 Development and the Demand for Higher Education

Education plays a vital role in the development of any country. It is an investment to build a strong base for economic growth, and India is no exception to this. To meet the demands of development, post-Independence India has made heavy investment in higher education. All the 5-year and annual plans have attached heavy importance

Table 12.4 Growth in higher education (in millions)

Categories	1950–1951	1990–1991	2003–2004	2006–2007
Students	0.1	4.9	9.5	11.2
Teachers	0.015	0.27	0.45	0.49

Source: University Grants Commission (UGC) (2003a, b)

to the education system, leading to an educational explosion. The first Prime Minister of independent India focused mainly on making the country an industrial nation. This vision created a demand for home-based technical knowledge and manpower, leading to expansion of the education system. However, during the first Five Year plan, higher education was not attended upon as a prioritized sector. But, in the second five-year plan the allocation of funding was doubled, from 9 to 18 % (Fig. 12.1). The eighth and ninth plans again witnessed steep cuts of funds in higher education as a result of economic reform policies in the 1990s. The overall development of the

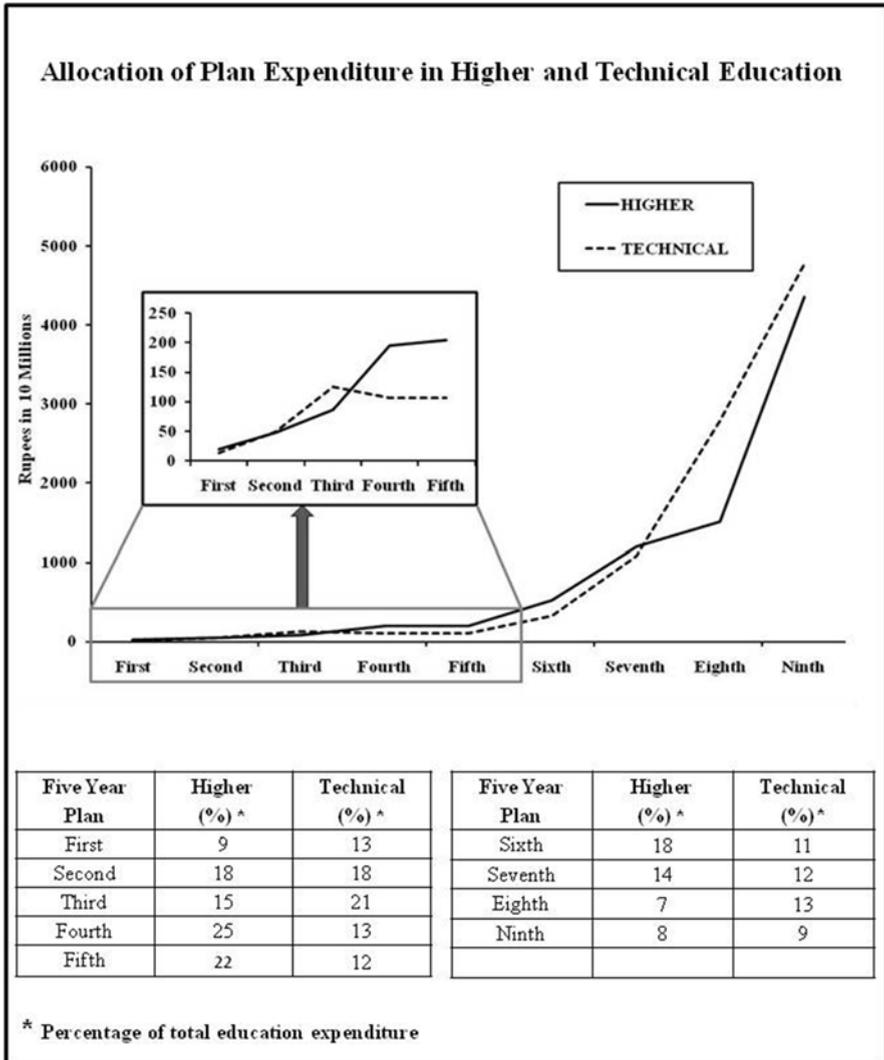


Fig. 12.1 Plan Expenditure in Higher and Technical Education

country demanded an educated and highly qualified population; education, in turn, churned out further development.

Therefore, education and development are complementary to each other. The new socioeconomic system evolved after colonial rule required human power with diverse skills. Consequently, the government could not help but develop an educational structure perpendicularly. As an outcome of globalization, India is reaping the fruits of recent industrial relocation. It has witnessed a big boom in the business process organization (BPO) and knowledge process organization (KPO) sector. To facilitate and sustain this trend, it is imperative that the country continues to produce highly accomplished human power at an accelerated pace.

12.2 Changing Structure of Higher Education

Higher education in India is imparted by public and private colleges or universities. Recent expansion of higher education in India is mostly maneuvered by the private sector, a relatively new trend in the Indian scenario. The expansion of public universities has been sluggish and skewed at the regional level. The shift of paradigm is now being slowly accepted in the Indian market as a response to meet the growing demand of vocational and technical education. Figures 12.2 and 12.3 show the distribution of private medical and engineering colleges in the states of India. The country has been experiencing continuous increase in the number of such private colleges to meet the rising demand. Figure 12.4 shows the percent distribution of private medical and engineering colleges to the government. Overall the increase in

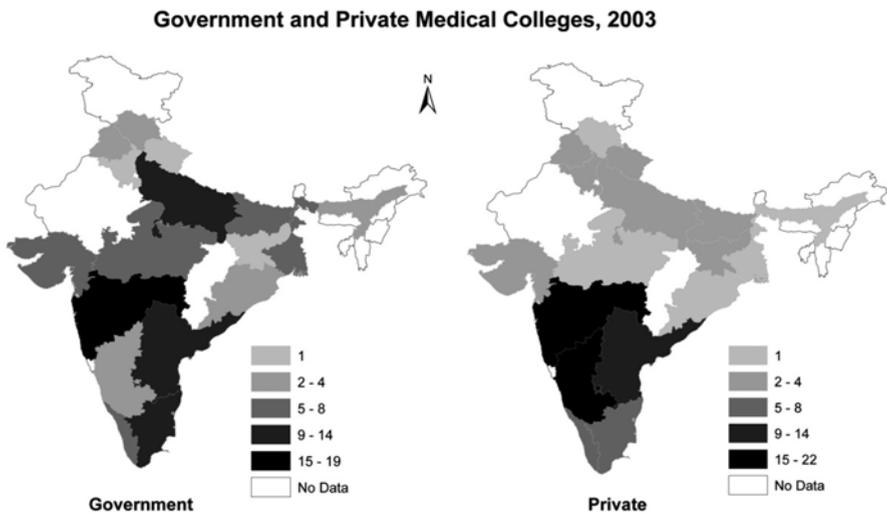


Fig. 12.2 Distribution of Government and Private Medical Colleges

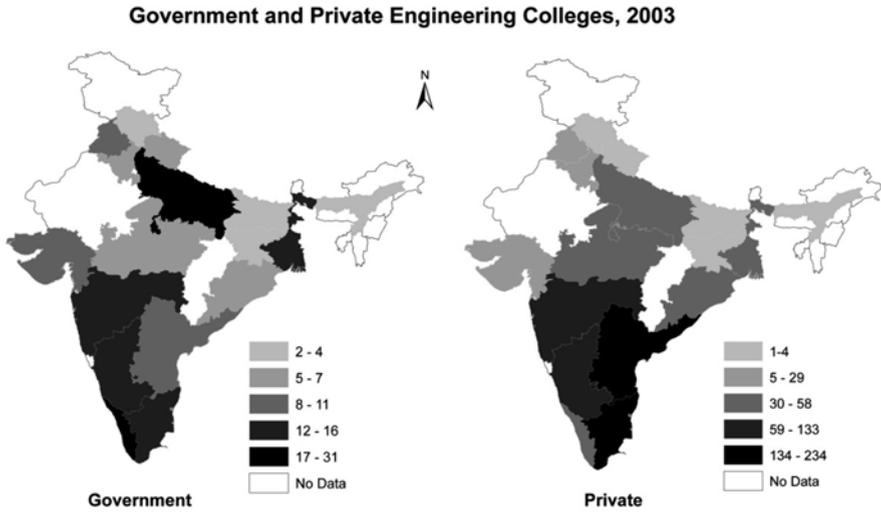


Fig. 12.3 Distribution of Government and Private Engineering Colleges

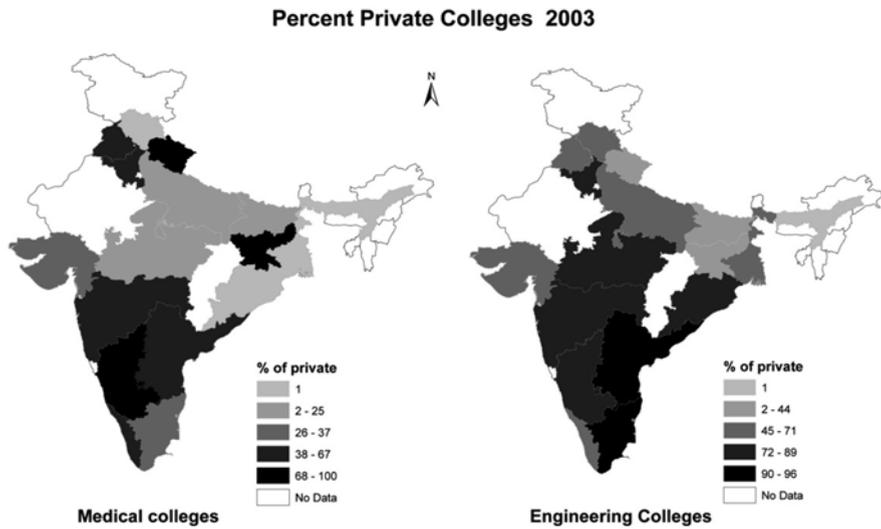


Fig. 12.4 Private Colleges - 2003

number of engineering colleges is more than the medical schools. More than 80 % of the engineering colleges are private in states such as Chhattisgarh, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Andhra Pradesh, and Tamil Nadu as opposed to only three states (Jharkhand, Karnataka, and Uttaranchal) with more

than 80 % medical colleges. Private colleges/universities are often costlier than their public counterparts. However, the increasing purchasing power of the middle class and availability of student loans have brought these expensive schools within the means of a larger segment of the population. Such changes are being fueled by the constant demand of the educated population to support a higher degree of development. Privatization of higher education has appeared in at least three ways in India: (1) commercial private higher education institutes, (2) self-financing courses within government institutions, and (3) converting government-aided private institutions into private self-financing institutions.

Commercial private higher education in India is a direct response to the market demands of global forces and tied to the industries. The institutions not only impart education but also groom their students and place them in well-paid jobs.

These schools are diligently focused and minutely design their specific courses and training. These private institutions are owned by the commercial business group(s) and the corporate sector.

In recent years, large corporate sector has evinced keen interest in higher education. Big business house of Ambanis set up Dhirubhai Ambani Institute of Information Technology at Gandhi Nagar. Mukesh Ambani Group is setting up a reliance School of Life Sciences. Steel magnate Mittal set up a technical university at Jaipur. Most ambitious of them is Anil Agarwal of Vedanta Group setting up a mega university – the Vedanta University in Orissa. Mahindra and Mahindra, an automobile major is setting up five engineering colleges in collaboration with premier foreign institutions at Chandigarh, Goa, and Pune (and other two locations to be identified). (Agarwal 2007)

There are many self-financing engineering colleges and management institutions affiliated to the traditional universities. Their curriculum and courses are designed to meet the national or state standard. However, there are some that are not affiliated to any of the traditional universities; these normally cater to the demands of the national and international corporate sector. The programs of these institutions are designed to meet the demands of the market. Consequently, any change in the program can be easily implemented by them. These schools follow a capitalistic approach in which the system is student oriented and the faculty lacks the power and autonomy they customarily enjoy at government schools. Similar to universities in the United States (USA), these institutions rely heavily on part-time faculty, introducing a relatively new culture in India. The tuition fee in these private universities is quite high as they depend mostly upon student payments. The survival of these institutions is driven by the willingness and ability of the students to pay tuition. As a part of education reform, the Government of India strongly believes in the reallocation of resources from higher to primary and secondary levels of education. This shift means promoting privatization of higher education by converting government-aided private institutions into private self-financing institutions. The sudden change in the scenario of higher education can be attributed to a number of factors. (1) The demand for higher education has risen drastically in recent years because of globalization and the fact that the traditional colleges/universities are neither able nor geared to respond to the demand. (2) Internationalization of higher education has led to competition from many foreign universities and institutions.

(3) A new trend of effortlessly accepting privatization of higher education by larger numbers of students, particularly by those of the middle class, is seen. (4) Nevertheless, India's rapidly growing youth population is also putting pressure on the traditional system. (5) The shift of government's focus to elementary and secondary education led to declines in public funding; (6) immediate demands of the market can easily be met by the private colleges and universities by creating custom-made programs; and (7) one of the attractions of the private institution is guaranteed job placement.

12.3 Distance Learning System and Online Education

Modern communication technology is being harnessed effectively to provide higher education. Information, communication, and technology have brought revolution in having education delivered remotely. India has developed an "open university system" to promote distance learning. Indira Gandhi National Open University (IGNOU) was the pioneer and was founded to provide higher education to less fortunate people. A portion of the enrollment for IGNOU comes from rural areas of India. However, the distance learning method is also gaining popularity among urban areas. At present there are seven open universities in India offering more than 500 courses. IGNOU has about 1.5 million students enrolled.

Open universities can be highly cost effective as the cost of teaching is less than in the traditional way of imparting education. These institutions maintain a close relationship with industry and keep track of industrial demand to adjust their courses. Modern telecommunication techniques have expanded the horizon of higher education through the distance learning method as never before. Costs to the students are 66 % less, and they are also saved the difficulty and the time in traveling to traditional schools.

The Indian education system has not been able to use the Internet to impart education to a great degree although it is being used for administrative purposes. As a precondition to introduction and expansion of online education, the entire country needs to be connected with high-speed Internet. Some reputed national institutes such as the Indian Institute of Technology (IIT), IGNOU, and the Indian Institute of Management (IIM) are providing some career courses through online education.

Sixteen of the world's better ranking universities have got together and set up a \$ 50 million joint venture called Universitas 21 Global, an online MBA business school. These universities include McGill, British Columbia, Virginia, Edinburgh, Sweden and Melbourne of Australia. This \$ 50 million project has been established in collaboration with a private company called Thomson Learning, an educational and training service division of the Thomson Corporation. Universitas 21 Global aims to tap markets of potential students from UAE, Singapore, Malaysia, India, Korea and China. It has already enrolled 1000 professionals from 45 countries for its graduate programme. It has also offered an M.Sc. in Tourism and Travel Management recently. The online degree of Universitas 21 has been well received in the world market and the degree certificate awarded by it bears the crest of all the 16 top ranked participating universities (Kaul 2006)

India being a populous country and with the availability of technology, it certainly has high potential of diversifying to an online education system.

12.4 Cross-Border Higher Education

India had been experiencing cross-border higher education (CBHE) in a different form for a long time. Indian students have been crossing borders to acquire higher education from foreign universities. However, lately education is crossing borders from both sides in various forms, considering that the accelerated demand for higher education in India cannot be fully met by traditional institutes. However, these institutions are trying to handle the paramount pressure exerted by the rising demand of an ever-growing population. Consequently, a new wave of CBHE is a spontaneous response to meet such demands of higher education. The internationalization and globalization of higher education has essentially created the path for the convergence of CBHE, CBHE being a process in which all educational ingredients cross national jurisdictional borders, whether students, teachers, courses, or curriculum. It is a diffusion of people, programs, and institutions. The medium of education varies from online (e-learning) to face to face (contact classes).

By CBHE, we usually imply students following a course or program of study that has been produced, and maintained, in a country different from one's country of residence. The estimates are that by 2020 there will be 165 billion people seeking higher education, including 7.2 billion international students. About 60 % of demand is likely to come from India and China, the two most populous states, emerging economies and world power in making. (Gupta 2007)

CBHE can be provided by public/private and not-for profit/for profit providers. Although small in scale, it has a greater impact than for-profit higher education. So far, India has been sending a large number of students abroad for higher education and professional training as a part of CBHE. However, lately India has opened itself as an eligible and promising market for higher educational institutions (HEI) from abroad. In addition, it has the advantage of having the English language integrated into the education system, which further helps to attract HEIs. The programs attracting attention in the Indian market are management studies, engineering, medicine, and fashion technology. The USA and UK are very active in utilizing the vast and open Indian market for HEIs (Fig. 12.5).

Joint degrees and collaborative programs are becoming more popular. Manipal Academy has collaboration with Malaysian Medical College at Maleka, BITS Pilani has launched a business school in Dubai and Wharton has a management programme in Hyderabad, IIT with French collaboration in Singapore. (Gupta 2007)

Although the CBHE is slowly making a place in the educational structure of India, there has been an inherent resistance in India to making education a commodity. Imparting education is treated as a noble job. In the later part of this chapter a narrative is cited wherein this view is echoed by an academician. CBHE is expensive

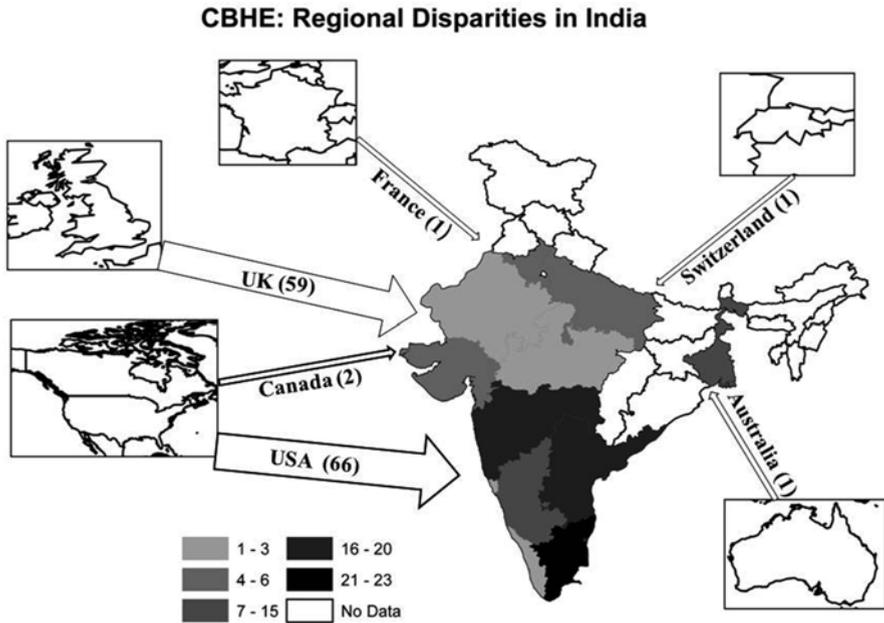


Fig. 12.5 Regional disparities in Cross Border Higher Education

and not effortlessly reachable by the majority of the population. Rather, CBHE is thought to be widening the already existing gap between the people. In addition, India has limitations in terms of educational infrastructure.

12.5 Response of the Educated Community

Information and communication technology (ICT) is bringing huge alterations in the education system of India. The major concerns are CBHE, internationalization of education, and online education or e-learning. It has created a wave of assorted reactions among the educated group of India. As with any other change in a system, some people are skeptical about the adaptability and acceptability of the changes, although some consider it as a positive response to the inherent demands of globalization.

From an academic viewpoint, both the dimensions of internationalization in higher education afford the country's higher education institutions intellectual enrichment, and gives a stimulus to academic program and research. From the cultural point of view, it facilitates better understanding of other cultures. Possible ties between the political and economic elite of the host and sending countries gained through internationalization activities in higher education can enhance mutual understanding and social cohesion in increasingly multicultural societies. (Stella 2005)

According to an academician in Delhi University, one of the central universities in India, both online and the present wave of CBHE have limited scope in India. To her,

the new wave of on line or e-education has partial acceptance in India because of the involvement of the technology. The access to the technology is limited to certain percentage of people in the cities. This is opposed to the policy of making higher education accessible to a large group. Additionally it poses a threat to face to face or contact classes which at any cost should not be replaced by technology. Education imparted in person gives the satisfaction of reaching students instantly which is impossible to get otherwise as it becomes a mechanical delivery of lectures. Furthermore, there is a huge percentage of teachers in India who did not grow up with the computers. It will be difficult to use their expertise in teaching on-line classes. However, it has an advantage in terms of reaching people beyond the radius of a good university or an educational institute provided the tool for accessing the class is available. The Institute of Lifelong Learning in Delhi University has been working to promote the concept of continuous learning through distance education. It can certainly bloom as informal sector of education.

The international educational institutions moving into India as a part of CBHE is completely beyond the reach of common people. It is totally confined to the elite class of Indian population. Unless it is a reputed school, like Wharton school of management, etc., quality of education is a big issue to deal with as quality control is very difficult and impractical. This is no way restricting any brain drain from India to other countries. Though these institutions are using local resources but a major chunk of money is flowing out too. Nevertheless, students are getting exposure as well education from international institutes without additional expenditure associated with living in a different country.

12.6 Conclusion

The Indian higher education system has been going through a colossal change. The changes can be observed in different aspects of education. Privatization, use of ICT, mode of delivery, and CBHE have produced a dynamic environment in the higher education system. However, the alterations and modifications are not always aptly designed. Consequently, higher education in India requires suitable planning to handle unsystematic growth in conjunction with quality control.

Higher education institutions have grown dramatically during the past 10 years. This growth can primarily be attributed to the private sector. Lately, business houses in India are perceiving education as a commodity. The transformation of the thought process of the Indian population also facilitated the contemporary pattern of higher education. The major concern of such concentrated and expeditious growth is unchecked quality. There are many private colleges mushrooming all over the country without proper quality control. If the quality goes unchecked, the base of the education system will become eroded in the long run. In contrast, the good private institutions are providing the support required by the system. The higher education sector has also been witnessing a tremendous increase in the number of seekers. Private schools are also helping in meeting the unprecedented demands of higher education.

Use of ICT has added an extra dimension to the delivery and reception of the education in India. College and universities are gradually creeping toward infusing modern technology into the higher education system. The present trend is to move toward technology-based education. The usage of information available on the Internet is slowly becoming integrated in higher education. ITC is helping not only the students but also the educators. The delivery of education is also going through a revolution in India. Online education and CBHE is a new wave in the Indian education system. Although there are many criticisms and challenges pertaining to the changing system of higher education, it is imperative to bring the higher education system to the same level as in developed countries. The institutions such as IIT, IIM, Manipal, Amity, and Symbiosis are the pacesetters, and now other institutions are also trying to follow the trend. India has made a gigantic leap toward improving its higher education system. There is, however, still a long way to go.

Without doubt, the future holds a range of challenges at all levels of the educational system, which will have to be solved in large part in India's cities. Even primary and other lower-ranking components of the system will require the attention of urban governments as the growth of demand from burgeoning numbers of children will need to be met. Higher education will require an even greater expenditure of effort. Instruction at all educational levels will become more complex, and training longer and more sophisticated. The eventual return or payback to cities will be in the form of enlarged employment in industries, expanded management centers, and more highly skilled workers, and this will in turn result in calls for higher living standards and more and better urban facilities. Across the entire country, this demand will steadily expand the economic support and opportunities required in the city.

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Chapter 13

Hazard Risks and Social Vulnerability in Urban India

Monalisa Chatterjee

Abstract In 2001, approximately 28 % of India’s population was living in urban areas, and this figure is expected to increase to 41 % by the year 2030. The ongoing migration of people from rural to urban areas has produced excessive pressure on the cities to accommodate incoming migrants with basic living standards and a safe environment. The necessities of continuing economic growth and consequent increase in population have altered the local environment and expanded the physical boundaries of urban areas to hazardous areas that are at higher risks from environmental hazards and losses. These risks are even more pronounced under the impetus of the changes in the climate. Although economic development and spatial growth of urban areas have changed the local environment and made these places more susceptible to collapse under uncertain environment conditions, trends in growing risks observed in Indian cities show that the problem is equally aggravated by the increase in social vulnerability among the marginal population in urban areas. This chapter proposes a framework to understand the “socioenvironmental” aspect of risks that exist in urban India and their effect on the production and distribution of risks for the marginal population in these cities.

Keywords Indian cities • Informal sector • Natural hazards • Risk • Slums • Vulnerability

13.1 Introduction

The year 2010 is estimated to mark the transition of a majority (50.6 %¹) of the world’s population from rural to urban. Most of these transitions are occurring in the less-developed countries of Asia and Africa, where the percentage of urban population has risen from approximately 29 to 47% since the 1980s. The most

¹UNPD (2007). World Population Prospects: The 2006 Revision and World Urbanization Prospects: The 2007.

Revision. Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat.

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alarming implications of this process include the irrevocable alteration of local and regional environments, increase in unsustainable exploitation of natural resources, and widening social equity gaps in third-world cities. The challenge for cities in developing countries such as India, therefore, is to find development strategies that are environmentally sustainable as well as urban lifestyles that are balanced and equitable. One of the main steps toward addressing this challenge is to understand the influence of socioeconomic and environment processes and the adopted policy approach on environmental risks in cities, especially their impact on the conditions of low-income marginal populations. In view of this concern, the chapter presents two points of analysis that are crucial in understanding the emerging risks in the cities of India. First, we examine the increasing trends of natural hazards events and their impacts on Indian cities; and second, we explore the concept of social vulnerability, where it argues that pressures of rapid globalization, increasing environmental risk, and the institutional approach to these pressures together continue to produce aggravated conditions for historically marginalized and vulnerable urban populations.

13.2 Urbanization in India

Trends in urbanization in India show an unprecedented growth of population in mega-cities and class I² cities since the 1940s. Although the actual percent of urban population in India is still less than one third of the total population in comparison to other developing countries in Africa such as Botswana (61 %), the volume of growing urban population in India (approximately 360 million) is much larger (the urban population in Botswana is only about 2 million). Often these cities are located in or are expanding into environmentally unsafe places. Therefore, concentrations of large volumes of population, infrastructure, investment, and economic growth in such places have made cities in India especially vulnerable to losses from increasing risks of environmental hazards. Furthermore, the urban population has reduced ability to survive the consequences of hazards because migration from rural areas uproot and isolate these households from their traditional networks of support and livelihood, planting them in unknown unsafe environmental conditions that make them vulnerable to any kind of extreme hazard events.

13.3 Trends of Increasing Hazards in Urban Areas³

Data for natural hazard events that have exclusively occurred in cities in the 48 years between 1960 and 2008 show that the number of such events has increased from 2 per decade to 11 between 2000 and 2008 (Fig. 13.1). Data for distribution of the

²Population more than 100,000 people.

³The study uses data from the International Disaster Database of Center for Research on the Epidemiology of Disasters (CRED) to analyze frequency and impact of natural hazards

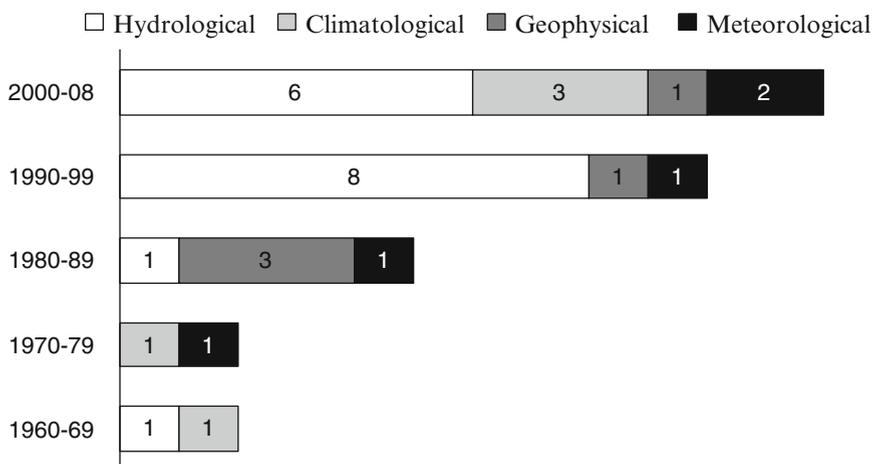


Fig. 13.1 Types and frequency of natural hazards in urban areas

different types of disasters show that in the past two decades hydrological events such as regular floods and flash floods are the most common natural hazards in Indian cities (Fig. 13.1).

The increasing trend in hazard events in urban areas is further confirmed by the trends for increasing casualties and losses. Although available data do not include indirect or comprehensive information on direct losses, they show that deaths from natural hazards in urban areas have increased from only 5 deaths in the decade 1960–1969 to approximately 20,000 deaths in 2000–2008. Trends in hazards (Table 13.1) show that climatological events in the past (i.e., 1960–1979) had a larger impact on urban populations. But in recent years, climatological events such as heat waves and high temperatures have produced a higher number of casualties despite affecting a smaller section of the population.

In the 1980s, the trend changed again, and meteorological events such as tropical and local storms followed by hydrological events such as floods affected the largest number of people in urban areas. The maximum number of deaths from natural hazards in the 1980s was, however, reported as resulting from hydrological events. The frequency of hydrological events in urban areas continued to rise in the 1990s, and floods affected the largest number of people and caused the maximum number of deaths in cities in the 1990s as well. However, in the 2000s geophysical events proved to be most devastating, killing more than 20,000 persons and affecting more than 6 million people. This sudden increase in the impact of geophysical events was mainly caused by the Gujarat earthquake in 2001 that severely affected the cities of Bhuj and Ahmedabad located close to the epicenter (Sanderson and Sharma 2008).

and technological accidents that have occurred in cities of India. This analysis, however, does not include large-scale regional events that have also affected cities and towns in the area but concentrates on events that have specifically affected urban areas.

Table 13.1 Trends in urban hazards

Type of hazards	1960–1969		1970–1979		1980–1989		1990–1990		2000–2008	
	Deaths	Affected population								
Hydrological	0	0	0	0	95	25,000	487	1,302,625	466	3,329,110
Climatological	5	326,000	172	700	0	0	0	0	299	0
Geophysical	0	0	0	0	19	78	43	156,500	20,005	6,321,812
Meteorological	0	0	0	0	13	3,300,000	250	0	0	0
Total	5	326,000	172	700	127	3,325,078	780	1,459,125	20,770	9,650,922

Although hydrological events were not the most devastating, these events also affected as many as 3 million people living in urban areas in these 9 years (2000–2008). Moreover, the increasing trend of impact is evident in the extent of economic losses experienced in urban areas. However, the lack of systematically collected loss data in urban areas means that an assessment of the extent of economic losses in cities is only possible with specific case studies.

13.4 Hazard Losses in Cities

Because cities are the centers of concentrated resources, infrastructure, and assets, extreme events result in large-scale economic losses that are often not insured adequately. For example, the Mumbai flood event in 2005 caused extensive damage to Mumbai and surrounding areas. In addition to the reported 700 deaths, 244,110 houses were destroyed or partially damaged, 97 school buildings collapsed, 5,667 electricity transformers were damaged, and vehicular losses of the national highways and transportation systems (52 broken local trains, 41,000 taxicabs, 900 buses, 10,000 trucks) were experienced because of the floods. Trade and commerce suffered losses of 50 billion U.S. dollars (5,000 crores) (Government of India 2005). Floods also caused extensive damage to the livestock and dairy industries; 15,321 cattle deaths were reported within the city limits (Duryog Nivaran Secretariat 2008). Beyond the immediate losses, there were epidemic outbreaks, and continuing rains turned recovery into a haphazard process (Kshirsagar et al. 2006). Diseases reported within 2 weeks of the deluge included gastroenteritis, hepatitis, enteric fever, typhoid, malaria, dengue, leptospirosis, and other types of infections and fevers (Government of India 2005). One hospital treated the following cases: 15,536 with diarrhea, 37,696 with fever, 9,731 with skin infection, 40,368 acute respiratory infection, and 36,540 other cases including broken bones and referrals (L.T.M Medical College 2005).

In addition to the direct impacts, hazard events in cities have cascading effects at different scales and sectors. For example, in Mumbai impacts were felt at the regional and global levels (Duryog Nivaran Secretariat 2008). The transportation system was one of the worst hit sectors. Mumbai's nodality, size, and layout cause its people to be extensively dependent on mass transportation, especially for travel to work. Because the flood inundated and damaged local trains, tracks, buses, and roads, transportation within the city was entirely disrupted. Similarly, several national highways that connected Mumbai with its hinterland were cut off. Operations at the national and international airports of Mumbai ceased because of flooded runways. This hiatus, in turn, disrupted worldwide passenger and freight movements. Furthermore, global financial transactions were interrupted because the National and Bombay stock exchanges were closed for 2 days. Another global impact was the extensive insurance losses claimed by industries and storehouses in Mumbai. For the first time in Mumbai, these losses reached US\$10 billion (1,000 crore) (Krishnan 2005). A long-term indirect impact was a reduction of real estate

market transactions, especially in the worst affected areas of central and northeastern Mumbai (Times News Network 2005). Finally, the flood affected the informal businesses and livelihoods of the low-income population. Although these impacts are of great importance, lack of methodical data hampers assessment of their extent and severity. Nevertheless, individual reports and papers exploring the severity of such events in urban areas note the excessive impact suffered by the low-income population living and working in informal sectors (Concerned Citizen's Commission 2005). Slum dwellers in Indian cities are identified as the most severely affected section of the urban population because of their inherent social, economic, political, and ecological vulnerabilities.

Data on environment hazards in urban areas show a rising trend in hazard frequency. Specific accounts of these events illustrate that such events have severe impacts on urban populations and in particular on the low-income marginal population. However, review of current research on this topic indicates that studies exploring the connection between complex urban development processes in third-world cities, consequent marginalization, and growing hazard risks are not found in the literature.

13.5 Gaps in Research

Research on human adjustment to urban natural hazards in developing countries appears in the academic literature, but only as a minor theme. Such studies are outnumbered by studies of haphazard urban development (Hardoy et al. 2001) and lack of basic facilities (McGranahan et al. 2001), as well as spatial segregation and the growth of marginalized populations that are exposed to degraded environmental conditions (Marcuse and Kempen 2000). But when natural hazards are addressed, the focus is on disaster impacts, relief, and immediate coping strategies (Aragon-Durand 2007; Few 2003; Whitehead 2007). Hazard mitigation receives less attention compared to estimating risks (Wang et al. 2008), integrated risk management (Amendola et al. 2008; Wenzel et al. 2007), and technological solutions in support of preparedness and emergency response measures. Even though a few papers focus on the design of strategies that would assist in the development of environmental change mitigation and adaptation practices, efficient systems of resource use (Muller 2007), just and adaptive institutions (Manuta and Lebel 2005), and options of risk redistribution (IPCC 2007b; Mills 2005; Yucemen 2005), understanding the institutional context within which marginal population vulnerabilities exists are seldom addressed in the immediate response or risk management studies. Moreover, there is a striking lack of data on the hazard response decisions of individuals, families, and other local groups. Even though it is known that when loss redistribution, loss sharing, and loss shifting measures are embedded in long-term adjustment mechanisms they can play a significant role in sustaining low-income populations during and after times of crisis, apart from anecdotal evidence (Basu 1997; Baydas and Zakaria 1995; Goetz and Gupta 1996; Sumarto et al. 2003; Zeller and Sharma 2000), little has been published about the salience, structure, function, and varieties of these strategies as they are actually practiced.

Although its importance is much remarked on by commentators, the role of natural hazard management in sustainable development is also an understudied topic in the academic literature. Hazard management is now recognized as an important component of sustainable development, but means of integration and balancing between safety and sustainability have not yet been elaborated. Concerns about increasing environmental risk have been linked to the issue of unsustainable urban development wherein third-world cities have been identified as critical places for aggravated risks (Bigio 2003). Moreover, cities are also considered to be the '*key focal points for the linkages between mitigation and adaptation*'⁴ (IPCC 2007a) and hence are arenas of potentially sustainable hazard management. Although urban planners and hazard mitigation managers are looking to acquire strategies that simultaneously address sustainable development and hazard risk reduction issues (Fernandez et al. 2006; Haque and Etkin 2007); the urban hazard mitigation policies have typically prioritized plans for reducing deaths, losses of buildings, infrastructure, industries, and other income-generating facilities and seldom explored the connection of losses to the underlying conditions of vulnerability in society. Attempts at integration are often limited to concerns about administrative coordination and the enhancement of organizational linkages among academic, developmental, municipal, and infrastructural interest groups.

One other clear disconnect in literature exists between the formal policies and informal sections of the urban population, and it is particularly restrictive for hazard mitigation in cities of developing countries such as India. The informal sectors comprise marginalized populations living in hazardous areas who suffer from multiple stresses because of the lack of political, economic, environmental, and legal identities and rights to the resources of the city. In the literature are found few initiatives that analyze underlying conditions to identify ways of reducing the vulnerability of low-income marginalized populations such as slum dwellers in urban areas (Jones 2004; Pelling 2003; Uitto 1998; Waley 2005; Wisner 1997; Zoleta-Nantes 2002). However, such attempts are missing from the literature focusing on Indian cities. This gap is noted even more with the looming threat of climate change and its implications for densely populated coastal cities in India (Revi 2008; Sharma and Tomar 2010). Under such conditions, a conceptual framework to understand the relationship/separation existing between informal and formal urban sections and a long-term policy approach that further aggravates the division is essential. Even when hazard scholars emphasize that empowerment and integration of marginalized sections of urban society into formal hazard mitigation systems is necessary for management plans to be effective, genuine efforts to identify the processes that produce marginalization or close loopholes which exert extreme pressures on the fragile conditions of marginal populations and articulate grassroots hazard reduction schemes that also support integration with sustainable urban development are rare (Wisner et al. 2004). Instead, slum dwellers continue to be excluded from any long-term plans of risk reduction because of the negative and conflict-ridden opinions associated with informal settlements and the restrictive approaches adopted to manage these settlements in Indian cities.

⁴Page 359: IPCC (2007b, p. 976).

13.6 Slum Settlements in India

Even in academic literature opinion on slums vary; where some scholars view informal settlements as places of abject poverty, disempowerment, and hopelessness (Davis 2006; Neekhra 2008; Pryer 2003), others consider them shadow places (Pelling et al. 2008) and incubators of new social experiments and cultural models (Cejas and De Mexico 2006; Dawson 2004), places that can be transformed by a combination of their own and others' efforts (UN-Habitat 2003). In India, slum development schemes have been attempted several times in past decades. In addition to issues such as the magnitude of rural urban migration and inadequate resources, slums have continued to grow because of lack of cooperation between different public and private agencies, manipulation of policies to benefit parties other than slum dwellers, the inability of slum residents to participate in developing and implementing schemes of slum improvement, and because planning for slum development in India has privileged 'neeti' (institutional justice) over 'nyaya' (realized justice) (Sen 2009). In India, the treatment of slums has always resulted in division, inequality, and injustice. Before independence, injustices in planning approaches by British focused on demolition of informal settlements instead of investing in the improvement of conditions for low-income populations. This approach was passed on to the Nehruvian conception of a post-colonial state that emphasized a technocratic vision (Gandy 2008). Hence, engineers and planners continued to treat slum settlements as 'undesirable' in cities instead of integrating these communities with mainstream population.

In addition to the critical treatment, slum development strategies have experienced legal and institutional barriers. In India, three kinds of policy interventions have been tried: low-cost housing, basic services, and subsidized credit (Neekhra 2008). These approaches have ebbed and flowed in popularity since 1947. Recent trends in planning for the urban poor show a steady increase in funds to support the welfare of the urban poor and a tendency to grant land tenure to slum dwellers (Burra 2005). However, the main difficulty lies in negotiating with large government agencies such as airports, port trusts, and defense authorities, which are the main landowners in urban areas of India.⁵ This creates a paradox: '*...politically, it is not possible to demolish the homes of thousands of slum dwellers, who live on government land, but the central (and other) government departments that own the land refuse to allow the inhabitants to receive tenure and basic services*',⁶ which would legitimize slum dwellers in those spaces permanently.

The division of public responsibilities among different echelons of government also complicates the matter. Because housing and urban development sectors fall under the jurisdiction of state governments, policies made at the national level may

⁵Slum land ownership in Mumbai shows 48 % of slums being located on private land and the rest (52 %) on government land (state, 21 %; municipal, 18 %; state/central, 7 %; railways/airport authority, 6 %). Urban Age 2007. Urban India: Understanding the Maximum City. In *Urban India*, 47. Mumbai Urban Age.

⁶Page 69: Burra (2005, pp. 67–90).

not be implemented by the state. Furthermore, the state government may design policies that are separate from and sometimes contradictory to those propounded at the national level. Consequently, a discrepancy has evolved because available funding from the central government for certain types of schemes is not used by the state government agencies in improving conditions of the urban poor. Moreover, policies designed by the central government do not apply to settlements located on land owned by other government agencies and vice versa. Similarly, most of these policies apply only to legal or notified slums while excluding the illegal settlements from any benefits of slum improvement. Management of these schemes by the contesting agencies, all of which have different philosophies, approaches, areas of jurisdiction, and political affinities, has also added to the complications. Many schemes have failed to deliver for reasons of inadequate institutional ability to integrate all stakeholders in the execution of the program without long delays and obstructions (Burra 2005; Das 2003; Neekhra 2008; Risbud 2003).

Legal and institutional limitations, discriminatory attitudes, socioeconomic stresses, and ecological constraints have all added to the pressures experienced by the slum population and contribute to the production of their risk from natural hazard events, their vulnerability to losses, and their inability to recover from disasters. Hence, it is important to integrate these constraints in the framework to understand the context within which hazard risks are experienced by the low-income population in Indian cities.

13.7 Socioenvironmental Vulnerability Framework for the Marginal Urban Population

One of the main challenges in developing a balanced hazard management system for low-income populations in cities in India is learning to negotiate the already existing imbalances, loopholes, and gaps that afflict marginal slum communities in the rapidly altering societies. Conceptual understanding of these places is limited by the complexity of overlapping societal processes that converge on them. In particular, hazard managers are poorly informed about the types of spillover pressures on slum communities that flow from the institutional approaches adopted to address other socioeconomic and environmental problems at different scales. For example, separate sets of societal and environmental problems bear down on these neighborhoods from above, each accompanied by particular policy responses that often are shaped by different sets of responsibilities and capabilities at different scales, from the global through the local. In addition, within slum households there is a complex interplay of forces that affects the distribution and use of available resources to cope with these problems. Figure 13.2 is an effort to clarify the many different forces at work.

This framework highlights differences in the very nature of problems identified and addressed within the socioeconomic and environmental policy frameworks.

developing economic and social institutions to facilitate these adjustments (IPCC 2007b). The approach to resolve ecological issues at the metropolitan level in Mumbai also focuses on procuring advanced technology to reduce fuel use, restoration of local streams, and designation of open spaces.

The types of problems observed within both these frames have apparent similarities and some differences. The evident buzzwords in policy, such as inadequate resource base, advancement of technology to support larger population groups, etc., are common within both frames of analysis. The scarcity reduction-oriented approach that emphasizes improvement in technology and economic growth percolates down to other levels of governing, and development of institutions is another type of similarity evident in both frames. As shown in the framework, similar sets of socioeconomic and environmental problems and goals move on to the national and metropolitan levels. However, interpretations of these problems and policy approaches at each level are often altered under the influence of experiences from the past, or the ideologies and priorities of leaders and decision makers, etc. For example, at the national scale in India, problems are identified and the approaches to eradicate these issues are made in the context of the nation's focus on economic growth, reliance on scientific and technological methods, and the remnants of a colonial past that primarily emphasizes political domination. Therefore, this passage of ideas and priorities from global to national and national to metropolitan (via state level) allows for transitions to occur in its interpretation and eventual implementation at a local scale.

In the context of cities in India, urban hazard mitigation policy focuses on mitigating the 'disaster,' the disruption of social order, instead of the 'hazard,' which entails alleviating underlying factors in society that produce risk of and vulnerability from extreme natural events (Kapur 2005). Decisions to prioritize certain approaches at every level establish the division between who gains or suffers from these strategies. Cumulative pressures of exclusion from adopted policies at different policy scales aggravate risks and vulnerability for urban slum dwellers. In addition to the impact of these foregoing pressures, the slum communities are also subject to the physical risks of flooding. The societal adjustments that they deploy to offset flood impacts are influenced by sociopolitical entitlements, cultural ideologies, and agency and individual household characteristics, which are also highly constrained for these communities by the exclusionary policies at different scales. In the context of hazard mitigation under such structures, informal communities cannot rely on positive aid from formal or governmental institutions because of this underlying exclusion and instead depend on limited, unsustainable sources of informal and limited support, which further aggravates their vulnerable condition.

13.8 Conclusion

The frequency of natural hazards affecting Indian cities and the direct and indirect losses experienced from these events show an upward trend in India. Although cities in general are growing increasingly vulnerable to losses, the main and most severe

impacts of hazards in Indian cities falls on the low-income marginal population who are located in hazard-prone areas and are structurally most vulnerable to losses and incapable of quick recovery. Although research has explored specific and general issues addressing hazard mitigation and urban development in third-world countries, little focus has been placed on specific factors influencing the ability of the marginal population to reduce their vulnerability to losses. Moreover, concerns about integration and coordination have not been applied to the formal–informal divisions in society. Hence, a more comprehensive framework is required to investigate the type of constraints experienced by slum populations arising from both socioeconomic and environmental pressures experienced and the policy approach adopted at different scales. The chapter argues that for marginalized slum population in Indian cities, their risky locations and vulnerable conditions are the product of large-scale and long-term exclusionary strategies that have not focused on reducing the division between societies but rather have added to the additional pressures of environment risk and vulnerability in these communities. These underlying inequalities are exaggerated in the case of extreme events, and hence specific attention is required to identify underlying root causes and simultaneously develop strategies, institutional capacity, and participatory approaches to reduce social vulnerability and risk from hazards in Indian cities.

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Part V
Infrastructure Development

Chapter 14

High Technology and Sociospatial Change in Bengaluru: A Mixed-Method Approach

Rajrani Kalra

Abstract High technology is defined as a collection of activities such as information technology (IT), hardware, software and services, business process outsourcing, computer chips, telecommunications, data processing, and electronics industries. Large cities in India have experienced a process of urban growth based on the exploitation of agglomeration economies. This research explicates the social-spatial theme in a broader sense and identifies the resultant impact of high technology upon the changing geographic landscape of Bengaluru. To elucidate this theme, the following two questions are addressed in this chapter: (1) Have high-technology firms created social-spatial transformation within the various wards of Bengaluru? (2) What are the nature and characteristics of transformations with respect to income disparities, lifestyle-related attributes, gender, and family relationship of the various segments of population in the wards of Bengaluru? Quantitative and geographic information systems (GIS) are utilized for analyzing secondary data along with primary data collected through a structured questionnaire. This research concludes that the location of high-tech firms has increased the gap and has transformed the high-technology wards relative to non-high-technology wards socially, economically, and culturally. The high-technology firms do not locate in proximity to educational institutions within wards but rather co-locate where wards are characterized by high literacy, illiteracy, slum population, high-rise luxury apartments, shopping malls, poverty, and homelessness. Women's employment in the high-technology sector has enhanced gender equality, and the traditional role of women in the family has been challenged. An example of a high-technology ward is Koramangala with the best residential locality, excellent educational institutions, and a cluster of slums.

Keywords High technology • Bengaluru

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14.1 Introduction

High technology can be defined as a set of industries consisting of a complex set of processes involving digital processing, automation, storage, and communication of information of all kinds. Appold's (2005) analysis of research laboratories in the U.S. showed that these firms were located in local agglomerations in a regionally dispersed pattern driven by mimetic behavior of firms. Further, high technology can be viewed as technological change administered by the construction of knowledge and its application and diffusion in the economy for regional economic development (Malecki 1983, 1997). This chapter defines high technology as a collection of such activities as information technology (IT), hardware, software and services, business process outsourcing, computer chips, telecommunications, data processing, and electronics industries (Kalra 2011).

A recent analysis of the information and communication technology (ICT) sector in India posits that competitive factors such as 'skilled workers,' 'adequate telecommunication networks,' and an 'improved policy and regulatory environment' have fostered the rapid growth of both domestic and foreign firms in the globally competitive ICT sector (OECD 2010) in major metropolitan areas. Singh (2004) reckons IT as an elite sector that has fueled Indian economic growth. He raised a pertinent question: Has this sector impacted the teeming millions of poor in India, resulting in increased inequality? However, this chapter focuses on social spatial change and inequality at the local level in Bengaluru.

Large cities in India such as Bengaluru, Delhi, Mumbai, and Chennai have experienced a process of urban growth based on the exploitation of agglomeration economies. Economic activities have a tendency to concentrate in central areas or the downtown and disperse toward outer areas or suburbs. This dispersion in land use takes place via three stages: concentration of economic activities in central areas and outskirts, followed by population shifts toward inner and outer suburbs, and then location of manufacturing, retail, and back office functions in the outer areas (Gaschet 2002).

This process produces both prosperity and disparity within urban areas because increased investment from a high-growth area is expected to be located in the same region, and this can be sustained only by larger urban areas showing greater technical progress (Malecki and Varaiya 1987). Hence, urban concentration leads to a continued migration of capital, finance, and skilled and unskilled labor from surrounding areas to concentrate in the urban areas. Such a process produces intraurban disparities and transformations among the fast-growing areas and the lagging areas within cities. The fast-growing areas tend to attract more investments in social infrastructure, utilities, shopping malls, housing, roads, and schools whereas the slow-growing areas experience congestion, dilapidated infrastructure, and poor maintenance of public utilities.

Bengaluru has been transformed from a pensioners' paradise to the high-technology city of the country, and presently, almost every week five or six IT companies are starting up in the city. The growth of IT firms has been shaping and

transforming the demographic profile of the city. Its growth has attracted migrants to the city, and consequently its population has grown. The city was always considered to be a cosmopolitan city, but since 1991, it has become the software hub of creative and talented people. The phenomenal increase in IT firms has exacerbated the intraurban changes within the 100 wards of Bengaluru. These changes range in terms of urban facilities such as educational centers, shopping malls, residential, road construction, transport infrastructure, electricity, and drainage systems. Further, these modifications have been facilitated by the institutional components of the planning process where the urban development authorities, construction companies, and national real estate developers have paved the paths almost like an invisible hand in the marketplace. The high-technology corridors display the juxtaposition of parks, road, high-speed telecommunication lines, educational institutions, and residential complexes. Further, the environment of the high-technology corridor depicts a striking discontinuity in relationship to the socioeconomic landscape it replaces (Walcott and Heitzman 2006).

Kalra (2006, 2011) made an exploratory analysis of the impact of high-technology clusters upon the local social structure at the intraurban scale (ward level). She examined the theme whether high technology is an urban infrastructure-led development in Bengaluru. She observed that contrary to popular belief high technology has not necessarily followed the location of infrastructure amenities (Kalra 2011). Chacko (2007) conducted a survey of 15 returning migrants living in Bengaluru and Hyderabad during 2005–2006. Returning immigrants who were part of the ‘knowledge diaspora’ in the U.S. brought skills, networks, and capital that helped thrust the Indian IT industry to the forefront. Everyone interviewed took great pride in their businesses and were happy to discuss the details of their profession. A life-cycle cluster approach has been utilized to analyze the Indian IT hub in Bengaluru. In the initial stage of development, local ties and network played an important role, but this soon was substituted by a diaspora network in the rejuvenation of the IT sector in Bengaluru (Sonderegger and Taube 2010).

Grondeau (2007) demonstrated that information and communication technology (ICT) development in Bengaluru is a strategic issue that has created a divide among the population engaged in the IT sector and the population working in non-IT sectors. In a social context, Patel (2010) studied the impact upon women employees as a result of their employment in transnational call centers in India. Her analysis uncovers the anxiety Indian society has toward women who work at night, earn an excellent remuneration, and are exposed to Western culture. She further opines that call center employment is both enabling and constraining for the women who participate in it.

The current research further clarifies this social-spatial theme in a broader sense and identifies the resultant impacts of high technology upon the changing geographic landscape within the 100 wards of the city of Bengaluru. To elucidate this theme, the following two specific questions are addressed in this chapter. (1) Have high-technology firms created social-spatial transformation within the various wards of Bengaluru? (2) What are the nature and characteristics of transformations

with respect to income disparities, lifestyle-related attributes, and gender and family relationships of the various segments of population in the wards of Bengaluru?

The research design for this study consists of a mixed-method approach, that is, utilizing quantitative and qualitative approaches with secondary and primary data. This approach has facilitated comprehending and investigating the intraurban socio-economic changes in Bengaluru. This chapter is organized as follows. The second and third sections discuss the study area and review the literature; the fourth section explains the research methodology; the fifth section presents a discussion on high technology and sociocultural transformation; the penultimate section discusses high technology and the sociospatial landscapes in Bengaluru, and the final section presents the conclusion.

14.2 Study Area

The city of Bengaluru was chosen for an in-depth study on the impact of high technology on sociocultural transformation because it contains one of the largest numbers of IT firms in India. Bengaluru, the capital of Karnataka State in South India with a population of more than 7 million, is the fifth largest city in India after Delhi, Mumbai, Kolkata, and Chennai. Located in the Mysore plateau in the interior of the Deccan plateau, it is almost equidistant from both western and eastern coasts. Its accessibility is high although the city is located on undulating terrain, and it is well connected by railway lines, five national highways, and by high-quality road infrastructure and a number of regular flights to major cities in the region. The average elevation of the city is approximately 1,000 m above sea level (a.s.l.), which produced a mild, equable, and salubrious climate throughout the year. Equally good are the situational characteristics of the city, which is rich in natural resources, especially agriculture, forests, horticulture, and minerals. Much of the history and growth of Bengaluru relate to its site and situation characteristics and, more recently, as a transportation center in South India by extending paved roads outward in all directions to become highly accessible. Thus, the locational, site, situational, and transportation advantages have made the city a vibrant commercial and industrial center. Bengaluru is located over ridges delineating four watersheds: the Hebbal, Koramangla, Challaghatta, and Vrishabhavathi watersheds (Sudhira et al. 2007, p. 382). Such microenvironmental conditions have been favorable for the location of high-technology firms. Consequently, the city acquired the name of ‘Garden City,’ and the ‘Pensioners Paradise,’ because of the presence of dozens of lakes, colorful gardens, and amazing greenery.

The city was established in the middle of the sixteenth century through the formation of the fort and settlement market (Pete) (Srinivas 2004). The cityscape is polynucleated, consisting of the city proper (Pete) on the western side, the Cantonment on the eastern side, and the information technology corridor/parks on the southeastern side (Kalra 2011). The land use and socioeconomic characteristics are spatially organized around three nuclei, reflecting the changing character from

west to southeast. Thus, in many ways, Bengaluru continues as a divided city between its western and eastern parts, which are characterized by distinct linguistic, political, and economic cultures (Nair 2005, p. 26). Educational institutions of repute such as the Indian Institute of Science established in 1911, the Indian Space Research Organization founded by Central Government investments in research and technology establishments in 1972, the Indian Institute of Management, and universities and engineering colleges have branded Bengaluru a 'Science City.' The industrial landscape of Bengaluru has been diverse, ranging from textiles, heavy machinery, electric devices, and aeronautics to information technology, and the efforts made by Sir M. Visveswaraya (1860–1962, as Chief Engineer) for shaping the industrial growth for five decades are well known. The major cause for the emergence of Bengaluru as a center of manufacturing after Independence was to locate strategically susceptible industries such as defense and electronics and public institutions away from coastal lands (Chittaranjan 2005; Collato 2010; Dittrich 2007; Nair 2005). Thus, with the emergence of Bengaluru in the 1950s and 1960s as an important center in India, some of the country's biggest public sector industries were established, such as Bharat Heavy Electricals Limited (1954), Indian Telephone Industries (1948), Hindustan Machine Tools (1955), Bharat Earth Movers Limited, Hindustan Aeronautics Limited, and National Aerospace Laboratories. They have been the engine of Bengaluru's fast economic growth. However, its transformation from 'Garden City' to the 'Silicon City' has been a steep curve of change in the past two decades (Aranya 2007) because of the concentration of firms specializing in research and development, electronics, and software production (Sudhira et al. 2007).

The third developmental focus of the city is in the southeastern part, including Koramangla (close to the old airport), Whitefield, and Electronics City, popularly known as the Information Technology Park/Corridor, which is the magnet of software and computer industries attracting multinational corporations (MNCs) from all over the world (Schenk 2001; Rosenberg 2002). With currently around 1,500 software companies employing more than 100,000 professionals, Bengaluru is the undisputed information and communication technology (ICT) capital and a pioneering hub of India (van Dijk 2008, p. 246). Apart from ICT majors such as Infosys, WIPRO, Tata Consultancy Services, and Microland, the world's leading ICT companies such as GE, Texas Instruments, CISCO, Digital, IBM, HP, COMPAQ, Motorola, Lucent Technologies, Microsoft, Sun Microsystems, Oracle, Novell, and several others have made Bengaluru their domicile (van Dijk 2008, p. 246). The city gained international reputation during the 1990s on two major accounts: first, emergence as a mega-city, and second, as 'India's Silicon Valley' (similar to Silicon Valley in the United States) (Heitzman 2010, p. 3). As noted by Madon (1997), the city has become the most sought after high-technology center in India with an important role in international information technology, contributing about 40 % of India's production in high-technology sectors. This is the city with the largest share of exports in India's economy. By comparison, the three foci differ in their spatial growth, functional structure, demographic and social characteristics, quality of life, and transportation facilities. Parallel to this is the trend that the high-tech firms are

unevenly distributed in the city, which has created a west–east divide. According to Dittrich (2005), Bengaluru is a divided city under the impact of globalization. This divide is clearly reflected in the sociocultural characteristics of the city.

14.3 Review of Background Research

Earlier studies examined ecological and geographic aspects of the city and have documented spatial growth and change. One study focusing on ecological zones of the city showed relationships between space and functions (Gist 1957). Another study focused on zones and their uses in the city, including housing, demography, and industry (Venkatarayappa 1957). Contributions by geographers are highly varied. First, the study analyzes and describes the evolution of a townscape, relating site and situation, water supply, and drainage conditions with morphology and land use (Singh 1964). Mahadev (1978) investigated two aspects of internal structural dynamics of the city: (1) impact of land use change on the economic base of the city, and (2) impact of geographic, economic, social, and historic factors bringing change in the spatial growth and internal dynamics of activities of the city. Similarly, Gowda (1978) analyzed development of industry, population, and recent economic growth on the shaping of Bengaluru. Second, it illustrates the human aspect of urban landscape (Prakasha Rao and Tewari 1979). Based on a sample survey, they collected a wealth of primary data, and factor analysis was implemented to quantitatively measure the spatial variations in the socioeconomic characteristics of the city, taking class, ethnicity, caste, family size, and economic status into account. Third, this is followed by an analysis of the presence and absence of high-tech firms in the creation of socioeconomic inequalities in Bengaluru (Kalra 2011). The Moran's *I* statistics results indicated that the high-tech firms are clustered in the southeast, and local indicators of spatial association (LISA) indicates that they are clustered in the southeast and northeast and are completely devoid in the south, northwest, and also in the core of the city, revealing spatial heterogeneity. Given the historical perspective, Nair (2005) has exemplified Bengaluru as 'the promise of the metropolis,' and presents a social history of Bengaluru's twentieth century, traces the city's sudden rise to metropolitan status, and the consequent spacing of urban areas. Drawing upon a variety of methods and materials, she provides an important insight on Bengaluru's recent growth.

A few studies have appeared concerning Bengaluru as a high-tech center and its various ramifications within the past decade. Most address the topic from a globalization perspective. Studies of globalization (especially related to information technology) in Bengaluru are many, and provide distinct and insightful analyses of the unequal distribution of income (Dittrich 2005, 2007). Heitzman (2004) analyzed the nature of growth that Bengaluru experienced with the emergence of the information society and examined the city as a network with emphasis on the creation of information technology and the challenges it is facing. The book has attempted to describe the processes that led to this model city and the dynamics that underlay

Bengaluru at the end of the millennium. Bengaluru is currently experiencing a radical change and faces challenges in the delivery of basic infrastructure and services. The city needs to systematically address the challenges related to social and economic infrastructure, governance, and development (Sudhira et al. 2007). Narayana (2011) argues that in terms of globalization of trade and capital, Bengaluru showed a higher degree of globalization than Karnataka State and all India. The city's globalization is driven by historical growth and the cluster of electrical and electronics industries, the availability of highly skilled, communicative, and low-cost technical manpower, enormous growth of external demand, generous public policy incentives and concessions, and by its competitive advantages in both the business environment and the investment climate. This description indicates their contributions to the agglomeration of ICT production and services. A more striking phenomenon, however, is the emergence of the well-paid workforce of high technology as a new category of entrepreneurs from the middle class. This transformation is creating a gap among the workforce employed in high-tech and non-high-tech firms (Upadhaya 2003).

14.4 Research Methodology

To accomplish the objectives, this study analyzes the intracity sociocultural transformation in Bengaluru using recent data from a variety of government, semi-government, private agencies, and interviews. In Indian intracity analysis, a useful and convenient administrative unit is the ward, the smallest basic territorial unit for information about social, cultural, economic, demographic, and infrastructural variables in urban analysis. The years 1991–2001 encompass a period of rapid morphological change in Bengaluru, which would become evident in the 2011 census data. In this study, the spatial unit is 100 wards as defined by the City Planning Department (Fig. 14.1), which allowed for the identification of spatial variations in the sociocultural attributes of the city. The study period selected for analysis is 2002–2005. In this field of research, longitudinal data are either inadequate or are not available because of lack of enumeration and lack of data collection at this geographic scale for previous years (Kalra 2011).

The secondary data were collected from various governmental organizations, such as Bangalore Development Authority (BDA); Bengaluru Mahanagar Palika (Bangalore City Corporation); Department of Information Technology, Biotechnology, Science and Technology; Software Technology Parks of India (Bengaluru); National Association of Software and Service Companies (Delhi); Bangalore Transportation Authority (Bengaluru); Agenda Task Force of Bengaluru; and Census of India. Several variables were extracted from these sources, such as number of information technology firms, call centers, software and hardware firms, business process outsourcing, number of educational institutions and research and development centers, number of civic amenities, workers, slums, and the literate and illiterate population.

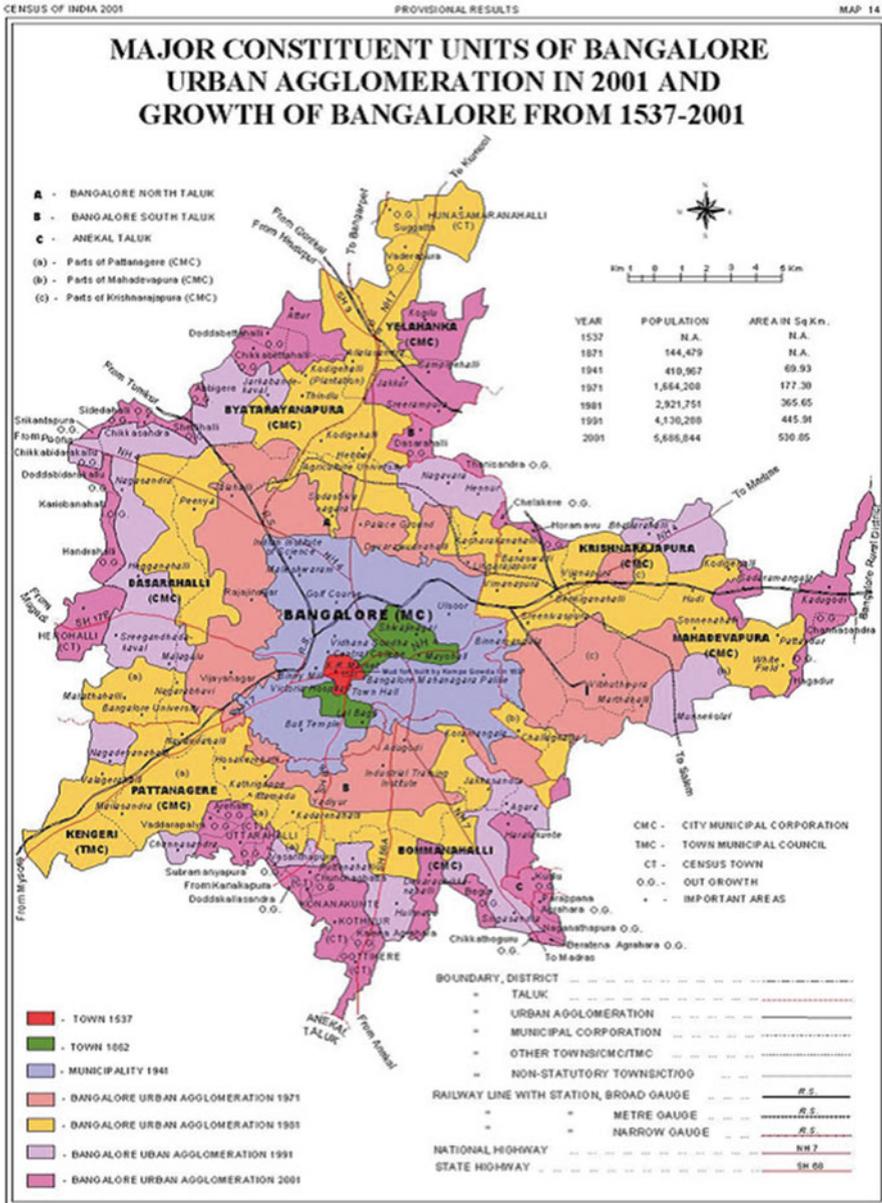


Fig. 14.1 Study area: Bangalore MC (100 wards) (From Census of India 2001)

There are many social and cultural changes taking place in the city for which there are no data, so data were collected through interviews to give more insights to the analysis. The primary data were collected by utilizing a structured questionnaire and interviewing officials in various governmental organizations, educational institutes, and software firms during 2005–2006. The survey combined both open-ended and categorical questions. A structured interview was conducted with 50 respondents representing all income groups (high, medium, and low) ranging from academicians, software professionals, real estate agents, businessmen and businesswomen, college graduates, and retired people. Respondents from both high-technology and non-high technology wards were interviewed.

Taped interviews with key informants began in 2005, and written questionnaires were filled to supplement the recorded interviews. Apart from the interviews, visits to all the new urban infrastructures, such as the electronics city, technological parks, research and development institutes, newly built malls, and other urban facilities has given stimulus to conducting the research. Casual observations and field notes while visiting the firms and talking to the people has facilitated the researcher's concentration on substantive issues taking place in the city.

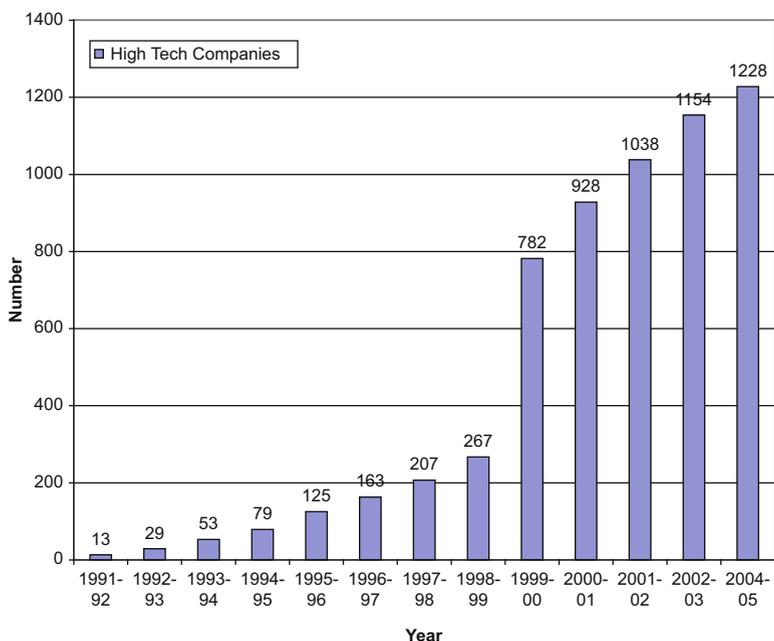


Fig. 14.2 High-tech companies in Bengaluru: 1991–2005 (From [Department of IT and Biotechnology, Bangalore](#), [BangaloreIT.com](#))

Computation of data and its analysis have been run using two different softwares: ArcGIS 9.3.1 and GeoDa. The method used to examine the importance of high tech on sociocultural transformation belongs to the family of exploratory spatial analysis at the ward level. The area investigated covers the wards in the city of Bengaluru. There are two separate analyses. The purpose of the first analysis is to measure the spatial distribution of high-technology firms for which choropleth maps based on wards using ArcGIS 9.3.1 were prepared. The mean center and standard deviation ellipses (SDE), under centographic methods of descriptive statistics, were calculated. The mean center is the average location of a set of points that reveals the center of gravity of the spatial distribution of high-tech wards (Taylor 1977; Wong and Lee 2003; Burt et al. 2009): it is calculated when the x and y coordinate systems of the high-tech firms are defined and derived. On the other hand, the standard deviational ellipse is the logical extension of the standard distance circle, which captures the spatial spread and directional bias of a set of point locations (Wong and Lee 2003, p. 203). In the second analysis, spatial autocorrelation has been employed for detecting patterns of distribution at global and local scales by taking into account both the location of units and their attributes (Wong and Lee 2003). If spatial autocorrelation is positive, it reveals the firms with similar characteristics tend to be located near each other, and if it is negative, it suggests that the firms in that location tend to have disparate characteristics or they are dispersed (Wong and Lee 2003). This concept is related to Tobler's First Law of Geography: everything is related to everything else but near things are more related than distant things (Tobler 1970).

Moran's I , a global measure of spatial autocorrelation, determines the degree of spatial dependence, or, the degree to which high-tech firms cluster together by ward. As Moran's I approaches 1, the degree of spatial autocorrelation increases, whereas a Moran's I of 0 indicates a random pattern. It is a first step in locating localized clusters of the high-technology firms. But, because the degree of spatial autocorrelation varies by location, to further measure the spatial heterogeneity of spatial autocorrelation, the spatial autocorrelation at the local scale is measured by the local indicator of spatial association (LISA). The LISA indicates local instability, the level of spatial autocorrelation at the local scale, and the local deviations from global patterns (Anselin 1995).

14.5 High Technology and Sociocultural Transformations of High-Tech Firms and Population

Subsequent to the increase in the number of multinational corporations (MNCs), the city of Bengaluru has grown spatially along with the population increase from 1,89,485 in 1911 to 95,88,910 during 2011 (Census of Karnataka; <http://censuskarnataka.gov.in>). There has been a phenomenal increase in population, especially since 1951. In 1941, the cantonment area was added to Bengaluru City Corporation. Since India's Independence in 1947, major large-scale public sector

undertakings were set up in Bengaluru such as Hindustan Aeronautics Limited (HAL). This advent not only increased the prospects of economic development but also impacted population growth. During 1941–1951, the government established high-technology industries related to aircraft, telephones, machines, and electronics. Later in 1970, high-technology industries and institutes of higher learning, such as the Indian Institute of Science, helped Bengaluru become the science capital of the country, followed by the IT firms that made Bengaluru the high-technology city. This stage further attracted skilled migration from all over the country, not only because of IT companies but also the educational and employment opportunities.

Since the start of economic liberalization in 1991 and the concomitant exponential increase in location of MNCs and business process outsourcing, the population of Bangalore Municipal Corporation (BMC) increased at a very rapid rate (70 %) during 1991–2001 (Fig. 14.1). The population of BMC, which encapsulates 100 wards, contains 75 % of the total population of Bengaluru Urban agglomeration and is very unevenly distributed (Census of India 2001). The growth of population in Bengaluru can be explained by three main reasons: (1) natural increase, (2) jurisdictional change, and (3) national and international migration. Changes in the administrative boundary of the municipal corporation resulted from the Bengaluru urban agglomeration expansion, and this also impacted population increase.

With the growth of Bengaluru as a high-technology city, there has been an influx of migration from within and outside the city. Figure 14.3 shows the spatial association (LISA) of population and high-technology firms. Among all the wards, Madivala and JPNagar have strong positive spatial correlation among the high-technology firms and population distribution. This method has a constraint, however, as one would have different clusters of wards using different spatial weight matrices. The calculation of spatial weight matrices is a tool to measure quantitatively the distribution characteristics of a variable in a GIS environment. One can observe low clusters of high-technology firms and population as this is the old part of Bengaluru, that is, the palace area on the western outskirts is less developed as compared to the eastern part developed by the British as the cantonment. It also reveals an uneven pattern as 72 wards are devoid of high-technology firms. Therefore, the population concentration and high-technology firms are clustered together, as the high-technology firms are located especially in the upper-class residential localities where there are well-developed infrastructural facilities.

14.5.1 High Technology and Educational Status

It has been stated that educational institutes are one of the major site choices for location of high-technology firms in Bengaluru. Accordingly, it is argued that high-technology firms are located only in those wards that have educational and technical institutes and, consequently, the level of literacy will be high in those wards. It is to be seen whether this argument really holds true in the case of Bengaluru and, if so, if this is exacerbating the already prevailing disparities in Bengaluru. This city has

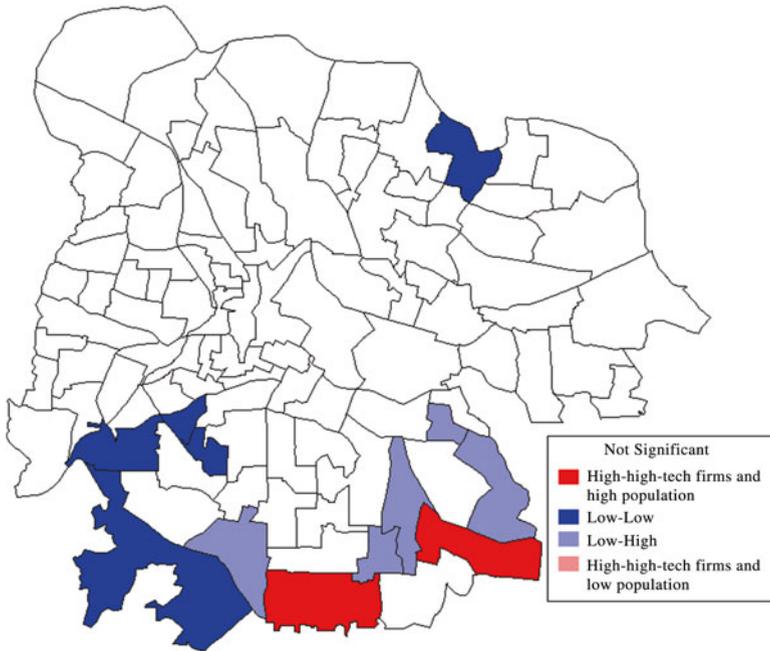


Fig. 14.3 Spatial clusters of high-tech firms and population (From Department of IT, Bangalore and Census of India 2001)

one of India's most prestigious and largest numbers of science and technical colleges. The Indian states of Karnataka and Andhra Pradesh were the first to invest in private engineering colleges sanctioned by the Government of India (Saxenian 2006). Second, there are inter-state disparities in terms of educational institution location. An important characteristic of such a location is that there are 400 engineering colleges in the southern states of which 77 (almost 20 %) engineering colleges are located in Bengaluru. These colleges graduate 29,000 students annually (Saxenian 2006). Bengaluru has a diverse ethnic constitution because it is home to all of India's prestigious educational and technical institutes. This notable feature draws myriad of students from out of state, and brings potential information technology entrepreneurs or the new *Argonauts* from all over the country to locate in Bengaluru (Saxenian 2006). Seen in this way, the locational freedom is related to human capital in the urban and regional economy where it is skilled labor that shapes the landscape (Malecki 2006). Currently, Bengaluru is considered to be one of the hotspots of the IT sector, and credit goes to the high-quality and uniform educational standards prevalent in the city (Desai 2006; Saxenian 2006).

The high-technology firms are under competitive pressure to deliver products and services, and they are attracted to regions with amenities and natural endowments.

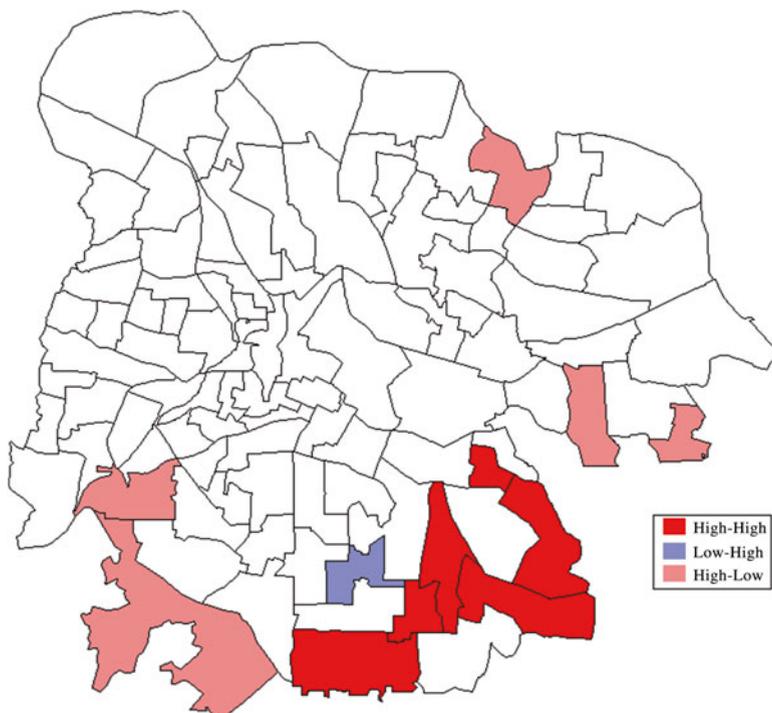


Fig. 14.4 Spatial clusters of high-tech firms and literate population (From Department of IT, Bangalore and Census of India 2001)

These endowments are not just limited to the physical environment but also include diverse opportunities for consumption and interaction (Malecki 2006). This is true, especially, in the case of Koramangala, Jayanagar, JP Nagar, Airport, and the IT corridor because the IT firms are attracted to these wards that are already high in literacy rate and have excellent infrastructural facilities required for setting up an IT firm. The Moran's I analysis result in a clustered pattern of high-technology firms and the percent literate population in Bengaluru. However, the LISA results reveal the clusters of high-technology firms and literacy rates are positively spatially correlated in the IT corridor and the neighboring wards. Surprisingly, high illiteracy and high-technology firms are also co-located, especially in the south and southeast localities of Bengaluru City (Fig. 14.5). This finding implies that illiterate populations are also present where the high-technology firms are located, so high-tech firms do not locate entirely in those wards that have high literacy levels, but are influenced by the prevailing amenities of the wards such as availability of cheap domestic and household workers.

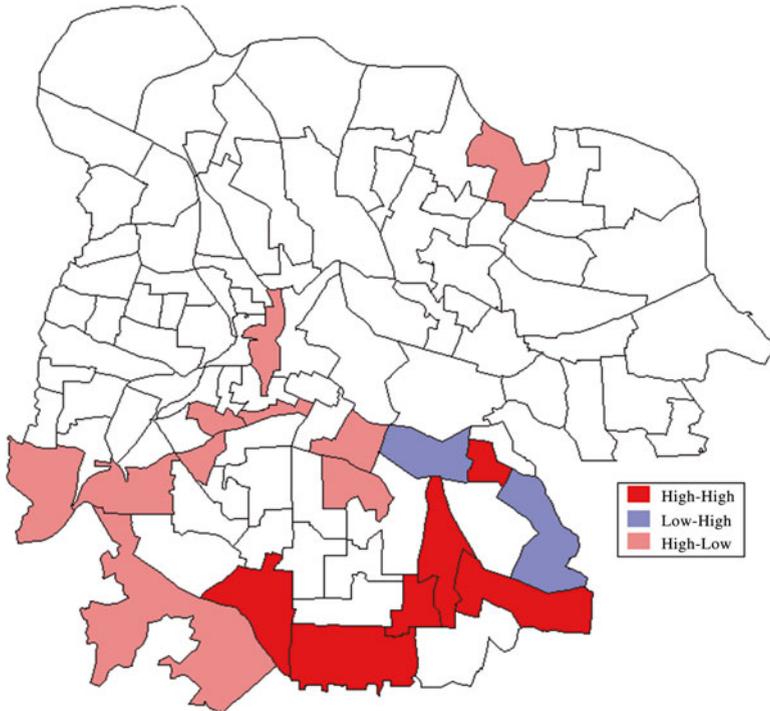


Fig. 14.5 High-tech firms and illiteracy (From Department of IT, Bangalore and Census of India 2001)

14.5.2 *High-Tech Firms and Slums*

The city of Bengaluru is prosperous and is marred by poverty amidst prosperity (Madon 1997). The growth of the city happened primarily because of its technological achievements, which has not benefited the poor population either directly or indirectly. The slum population in 1991 was 0.52 %, which increased to 0.79 % in the year 2001, but it is relatively less compared to other metropolises such as Delhi, Mumbai, Kolkata, and Chennai. According to various nongovernmental organizations, the recent internationalization of industrial activities had a negative impact on the poor as less money was spent on improving public services for their benefit (Madon 1997). A large segment of the urban poor population is engaged in informal sector activities. This class of marginal workers has not benefited from the increasing presence of high-technology activity. Instead, this has led to social polarization among different economic classes in the city. Interesting results have been derived from the spatial autocorrelation analysis of literate and illiterate population variables. The analysis reveals that the high technology-related population is concentrated in

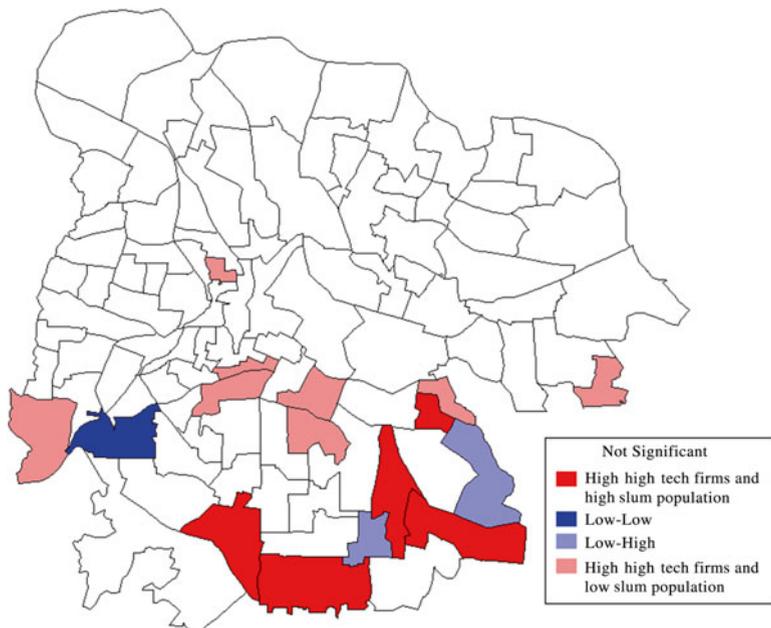


Fig. 14.6 LISA (local indicators of spatial association) results of high-tech firms and slum population (From Department of IT, Bangalore and Census of India 2001)

those wards that have a highly literate as well as an illiterate population. Therefore, it cannot be confirmed that the high-technology firms are associated only with high literacy, but its presence is quite significant as the spatial clusters reveal in Fig. 14.5.

In contrast, there are large number of slums with an illiterate population where high-technology firms are located (Fig. 14.6). The main reason is that the high-technology firms are not only clustered but several of them are located on the outskirts of the city (municipal corporation limit) and this was also the historic place where the British had settled. There are clusters of slums near the high-income localities as the wealthy people employ the poor as household workers and the low-income population desire accessibility to work. The slum dwellers find it easier to locate very close to the high-income localities, unless the municipal corporation clears their slum concentration. Another factor is that there is a housing shortage in the city of Bengaluru, and the poor, especially the unskilled labor class, cannot afford expensive houses and thus reside in poor dwellings. Thus, one can find pavement dwellers and people begging in this high-technology city, which is an appalling sight. This characteristic is typical of Indian cities as slums are an important constituent of any South Asian city as compared to Western cities. As in a typical bazaar-based city of South Asia, there is a concentration of slums and squatters on the outskirts of the city (Dutt 2001; Dutt and Pomeroy 2003).

The bazaar city model seems to be applicable to Bengaluru as slums are concentrated in Koramangala (a high-tech ward). The western part of the city is less developed relative to the eastern part of the city. Interestingly, the ownership of land in the slums of Bengaluru is around 16 % in the study area (Bangalore City Corporation). Approximately 37 % belongs to private owners and 16 % to the Bengaluru Development Authority. An analysis of the location of slums exemplifies that they are generally located in proximity to the residential and commercial areas and that 14 of 159 slums were located near the industrial areas (Bangalore Development Authority 2012).

In any Indian city, the inner core develops because of the concentration of trade and commerce. The wealthy live in juxtaposition with the poor in the IT corridor of Bengaluru. Thus, in the IT corridors are found the clustering of high-technology firms, with both illiterate and literate populations and the location of slums all set against each other in one ward of the city. Slums are generally considered to be an urban blight in a beautiful city, one that requires much aesthetic improvement. The Koramangala ward, with the largest number of high-technology firms, has also the largest numbers of squatters and slums. But, the slums that are located in the IT corridor are also a great source of employment, and the employers are in dire need of various unskilled and less skilled services such as domestic work, cleaning help, shopping assistance, and porters. Thus, the presence of high-technology firms, slums, educational institutes, and literate and illiterate populations together provide a strong argument that high technology is not the only leading factor in creating intraurban disparities. The main factors are historicity, availability of infrastructural facilities, transportation services, residential and commercial land values, the planning framework of the city, and the availability of newly developed infrastructures.

Many commercial and infrastructural facilities were already located in those wards (the IT corridor), and high-technology entrepreneurs have taken the benefit of this agglomeration. Even the concentration of Scheduled castes and Scheduled tribes are spatially associated with the high-technology firms (Fig. 14.7). Thus, there is also spatial clustering in the location of slums and illiterate population groups.

It is clear that the new high-technology firms are growing in number, especially in those areas that are adjacent to already existing high-technology wards (the IT corridor). This trend has created transformation within the wards from the spillover effect. The high-technology firms now spread outward toward the city limit because of the rise in real estate prices, lack of sufficient office space, cheap rent, less congestion, and IT park concentration.

14.6 High Technology and the Sociocultural Landscape

The cities are sprawling metropolises, and these locations are the locus of contradictions wherein not all benefit from the new economy (Castell 2001). The new economy emphasizes two elements of technological change: the new network

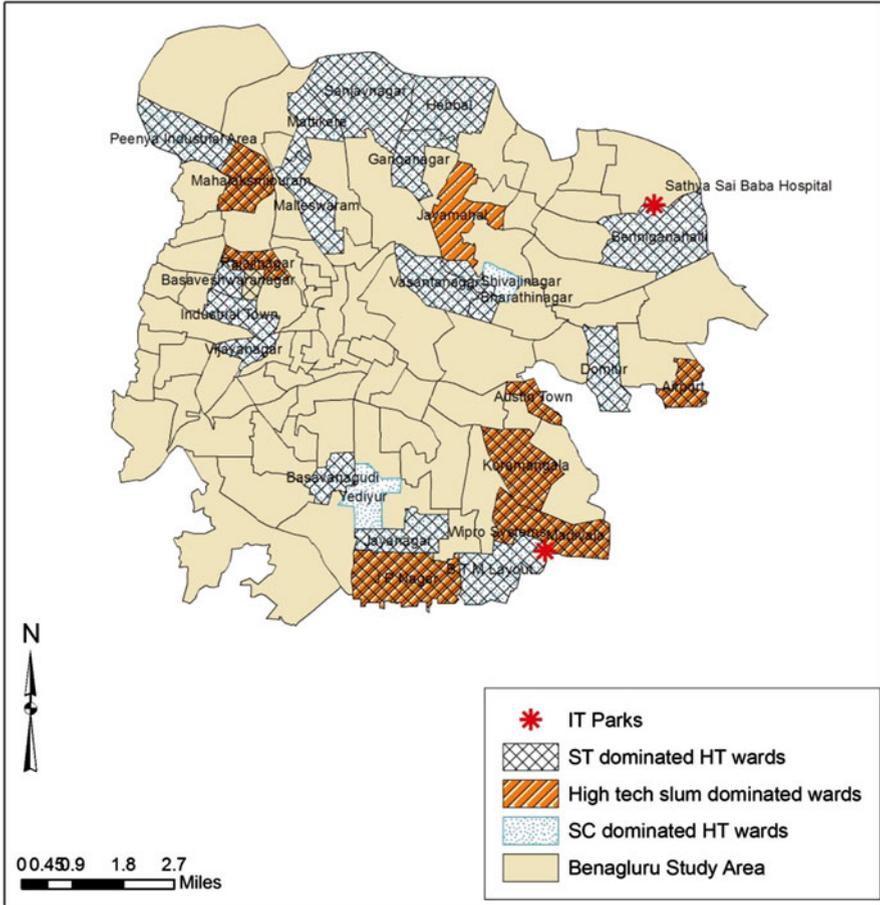


Fig. 14.7 Socioeconomic landscape of Bengaluru (From Department of IT, Bangalore and Census of India 2001. *SC* Scheduled Castes, *ST* Scheduled Tribes, *HT* high-tech)

phenomenon and the knowledge-based economy. Malecki (2006) suggests that technology has facilitated many of the economic activities that have enabled relationships between people, firms, and organizations. Such networks have dispersed across different locations over large distances. There are various ways in which technology has transformed our daily lives. First, it has made the local economic activities more interdependent with distant places. Local economic activities, business process outsourcing (BPO), and call centers in Bengaluru are connecting people from across the world. Second, the new economy has made people, firms, and organizations accessible, thus overcoming the distance barrier (Couclelis 2000). The increasing export of software is an indicator of the competitiveness of Bengaluru’s scientific expertise, strength, and capability in the arena of knowledge

economy. Hence, high technology has not only increased the size of the local economy, the gross domestic product (GDP) of the state, and exports and volume of economic activities, but is also transforming the city spatially, socially, and culturally. These new activities transform the urban landscapes of the city, as are discussed in the subsequent sections.

14.6.1 A Tolerant Bengaluru?

Bengaluru has transformed from one of the best residential cities to the high-technology city and is denoted as the pride of India. It has an excellent number of talented IT professionals and a more stable and liberal sociocultural environment (Dittrich 2007). Ashok, an IBM IT engineer, viewed the importance of computer education and noted: “Definitely, in a place like Bengaluru, a person not knowing about computers is almost treated like an illiterate.” He further argued that “computers are the future and everyone needs to know at least the basics about computers. It has become an essential part of life, i.e., food, clothing, shelter, air, water and computers.” This view was of a young Indian Institute of Science graduate who was working in an MNC. This concept leads us to think how computer knowledge has become a basic need of everyday sustenance.

Historically speaking, Bengaluru has always welcomed people of different cultures and had a tolerant and accommodative cultural heritage. It is an excellent example of the amalgamation of the Aryan culture of the North and the Dravidian culture of the South. It is considered to be a great city for writers and painters, and a hub of art, culture, theatre, and drama. Some of the renowned names in arts are from Bengaluru, such as Ram Gopal, Shanta Rao, and several others (Phalaksha 2003). The principle of secularism, broad-mindedness, and Catholicism are present today and was also followed by the ancestors in Karnataka (Phalaksha 2003). There are endless examples of tolerance and coexistence of various religions and languages, which were never a hurdle in the daily lives of the people.

Karnataka is also considered to be a linguistically and religiously diverse state (Kalra 2012). Almost 46 % of the respondents spoke more than four of the following eight spoken languages: English, Hindi, Kannada, Telugu, Tamil, Malayalam, Nepali, and Oriya. The majority of the sample populations interviewed was Dravidian, that is, all were from the southern region. Almost 36 % spoke more than three languages and at least 18 % of the respondents spoke more than two languages. The most dominant combination was two or more among the following four languages: English, Kannada, Hindi, and Telugu.

Ashok, an IBM (MNC) employee, viewed that he is not associated with any one religion and considered himself as a “universal person” and said he “believed and respected all religions.” Thus, several of the other interviewees believed in multiple religions rather than any particular one, revealing the idea that the citizens are tilted towards a more diverse and a tolerant Bengaluru as compared to other cities of the nation. This is a city of traffic congestion and collapsing infrastructure; nonetheless,

people adjust, and they wait for 5–10 min on the red light and feel comfortable waiting before crossing the road. It was quite surprising to find nobody lost their patience in public. Jagadeesh (1998) in his memoirs on Bengaluru observes that the “people of Bengaluru are mild, balanced and affectionate as before.” A few interviewees expressed some concerns. Some of them stated that the real culture of Bangalore is dying as most of the people are coming from out of state and were influencing their food and language.

14.6.2 Work Culture

The MNCs have brought a change in the work culture and especially in the domestic IT companies, which has made them very competitive. Many of the interviewees were of the view that the MNC location in Bengaluru has been an important phenomenon because it has brought a change in work culture with time-bound work completion targets, enhanced competition, and a focus on higher productivity. More recreational activities are provided, which eases the stress level, and makes the job enjoyable, which is a positive change in the work atmosphere, and new standards are being implemented in a majority of the IT firms. But Rajesh, a software employee from IBM who migrated from Chennai, commented that the “MNCs terribly exploits their workforce and sometimes it is stifling to work in such an atmosphere. Also, working in an MNC does add to the social status and boosts the confidence of a person and the scope to find employment abroad increases.” Thus, many youths such as Rajesh thought that there is a social status associated with an MNC as compared to any domestic company, unless it is of a similar status, such as Infosys, WIPRO, and Tata Consultancy Services. Therefore, the MNCs are able to acquire skilled and cheap labor easily. Rajesh also viewed that his matrimonial prospects and those of many of his peers and friends have improved significantly, as he hopes to get a spouse of his liking because he works in a MNC.

14.6.3 Visible Income Disparities and Wage Inflation

Upadhaya (2003) states that the well-remunerated and cosmopolitan workforce of high technology is creating a new category of entrepreneurs emerging from the middle class. The growth in number of the rich and wealthy from the working middle-class population has created a widening gap between the workforce employed in high-technology and non-high-technology firms. Thus, high technology has brought Bengaluru into the limelight globally and produced large income disparities across the classes and uneven spatial development across wards. There exists severe inequality between different socioeconomic status groups, extreme poverty, and critical problems of civic deficiency within Bengaluru.

The altering image of Bengaluru has also influenced the wage structure and has created uncontrolled wage inflation, as MNCs provided relatively higher salaries to

its employees, and they tripled the salary in 3–4 years, more quickly than the State Government employees. This is a strong motivation for highly skilled graduates to seek recruitment in leading MNCs, and this sometimes leads to social tension among the State Government and the MNC employees (Madon 1997) because a junior software developer earns around Rupees (Rs.) 10,000 per month, whereas the senior manager earns Rs. 500,000.

Further, a semi-skilled employee earns only Rs. 4,000 a month, and a female domestic maid earns only Rs. 300–1,000 (1 dollar was equal to 45 Rupees in 2007). The attraction of opportunities in an MNC, its brand name, the experience of working with state-of-the-art technology, excellent work environment, and a chance to migrate to the West for lucrative employment are some of the pull factors providing incentives for young professionals to work with international corporations. Hence, the Indian firms have to use low-skilled manpower and the government firms become just a stepping stone for the new professionals to become employed in an MNC (Patibandla and Petersen 2002). This trend has led to a division of view within the State Government in Karnataka, which is committed to support the MNCs. Deepak, a young employee of the Bruhat Bengaluru Mahanagar Palike, stated that the modification that MNCs have brought in Bengaluru is that: “It has changed a lot in the lifestyle of young people. We can see a lot of women working in the night shifts and this was not possible earlier.” People prefer MNCs as they pay higher salaries and benefits relative to local domestic firms. Ashok, an IBM employee, stated how MNCs have changed Bengaluru, and he said “Oh yes! MNCs have created a lot of job opportunities and made Bengaluru a global brand.” He also emphasized that “MNCs have changed the ways Indians look at the job opportunities and the MNCs have created their own hierarchy in the Indian society.” These observations imply that the MNCs have also brought with them a work culture that is positively impacting the city, its workers, and the people in general. One could feel upon becoming a part of the workforce in any MNC or domestic IT company that it now offers a truly competitive international work culture.

The increase in wage differences between MNCs and Indian firms has also led to inequality among different socioeconomic groups within the city and the state of Karnataka (Madon 1997). The different wards of Bengaluru reveal this disparity. For example, consider the case of Koramangala and compare it to any other ward in western Bengaluru (Figs. 14.8 and 14.9). These two situations are strikingly different as one looks like a city and the other seems a small village or a town. They differ in the location of social and economic facilities such as commercial, retail, and educational institutions.

14.6.4 Diverse Gourmet/City of Bars

Bengaluru is also considered to have the largest number of restaurants (Jagadeesh 1998). The city has been inundated with diverse food chains and international cuisines in the Forum Mall in Koramangala, Garuda Mall, or Bangalore Central near

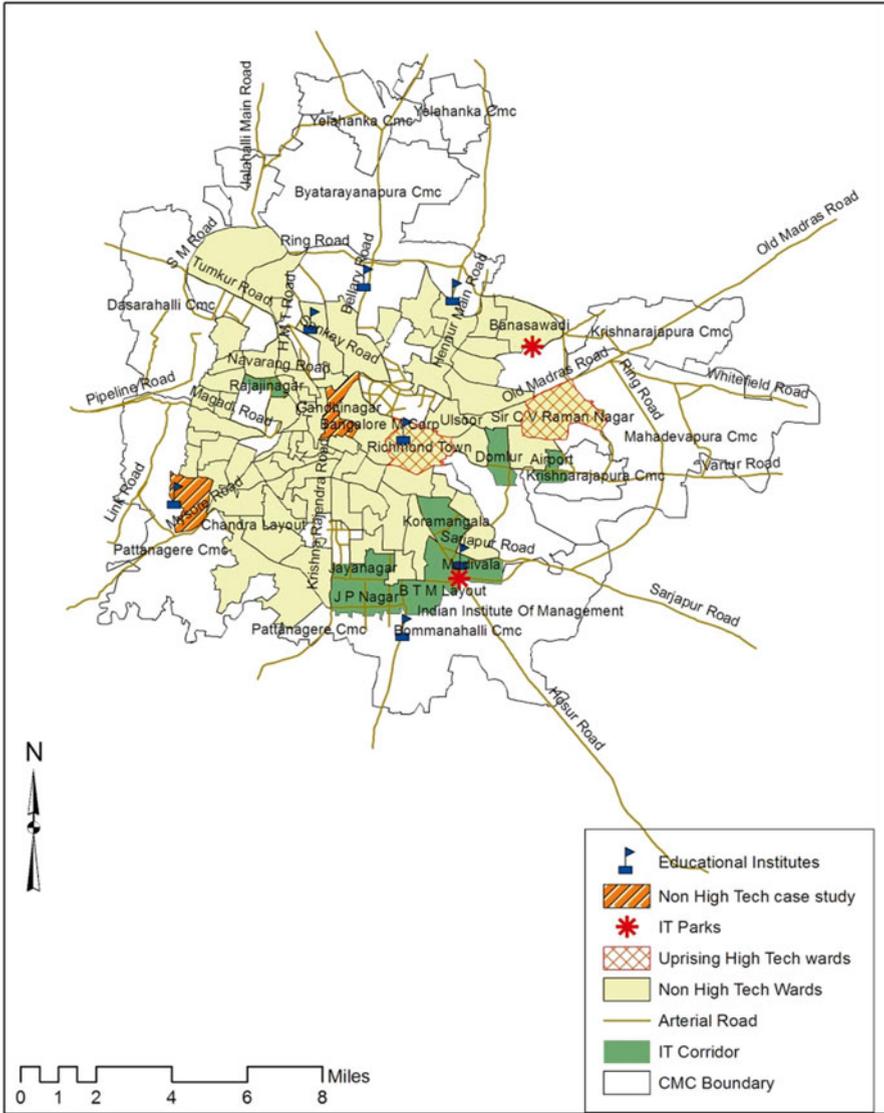


Fig. 14.8 High-tech and the non-high-tech landscape of Bengaluru (uprising high-tech wards are the wards that have recently added high-tech firms (From Richmond Town and Sir C.V. Raman Nagar))

MG Road, where the food courts and the eateries are always crowded. Connoisseur cooking and eating are increasing in Bengaluru, with various cuisines of not only North and South India but also Mexican, Chinese, Italian, and international delicacies (Srinivas 1999).



Fig. 14.9 IT strip in Koramangala (Photograph by the author)

Bengaluru is transforming very rapidly with the presence of global chains, such as Coca-Cola, Kentucky Fried Chicken (KFC), Sony, and Ford companies. There is a great diversity of eating places from big, small, and medium hotels to self-service, footpath, house, and mobile hotels. There are old ethnic restaurants such as MTR (opened in 1905 as Brahmin Coffee Club), which has now become internationally popular. Other food chains such as VV Bakery, Udupis, and Kamats have spread with a chain of hotels all over Bengaluru serving Indian and Chinese cuisines (Jagadeesh 1998). These restaurants and food courts serve delicious food that suits families with different price range affordability. The non-air-conditioned rooms provide cheap and delicious food but the air-conditioned rooms provide a cool, quiet, spacious environment with considerable ambience.

Pizza Hut is an additional exciting example of cultural globalization that is dominant in all the major cities of India. It is a household name apart from Dominos. There are 26 Pizza Huts in Bengaluru (<http://www.pizzahut.co.in>). They are always crowded with people of different age cohorts and nationalities that were not to be seen 10 years ago. The new food joints with variety and quality are increasing every day as there are clients who are ready to pay more and try new culinary adventures. Additionally, Bengaluru is often called the pub capital of India, as it has almost 3,000 bars, pubs, and wine shops and more than 62 dance bars, and a new one opens every month. There are more than 25 dance bars in the central business district (Richmond area). With the increasing high-technology firms, these bars are

mushrooming even in middle-income residential areas such as Indiranagar, Jayanagar, and Malleshwaram, which is a cause of concern for families that hold traditional values (Deccan Herald 2005).

14.6.5 Recreational Activity

The mode of recreation has been transformed in both the high-technology and non-high-technology wards. There were interesting responses that varied among the 50 respondents concerning the choice of visiting temples, bars, parks, or family shopping, and visiting movie theaters. Almost 22 % of the respondents preferred to visit family, friends, and visit parks, whereas 16 % liked to go to temples and do shopping. About 26 % were inclined to visit theaters and watch movies, which are quite affordable and a very popular recreational activity of an average Bangalorean, and 20 % liked to visit bars and pubs, which have become more common since the growth of high-technology firms.

A visit to any other ward apart from Koramangala or Jayanagar, and Rajajinagar (although a high-technology ward) and Nagarbhavi (a non-high-technology ward), would reveal the presence of a completely different culture in those areas (Fig. 14.8). One of the interviewees from Infosys was comfortable regarding the dress code and expressed that “we are not wearing Western dress to promote it, but it just makes us look more professional” as we are supposed to wear business dress 4 days a week. The most surprising issue here is the question: Is the Indian attire no more professional? There is another view from the students of Bangalore University and Institute for Social and Economic Change at Nagarabhavi, and that is they rarely visit the shopping malls such as Forum and MG Road. These areas appear as if they are not part of Bengaluru. Thus, the change in urban infrastructures and establishments are visible as one drives from the airport toward the western part of the city and even to an information technology ward such as Rajajinagar.

There are diverse views from people of different walks of life, as one of the officials from Bangalore Mahangar Palika and now Bruhat Bangalore Mahanagar Palike (BBMP) stated that there needs to be a “dress code,” especially in places of employment to maintain decorum. But Health Commissioner of BBMP, Dr V.P. Ikkeri, who then just returned from the U.S. after an official sojourn, expressed that he was quite happy with the growth in Bengaluru and believed that one needed to adapt with time.

14.6.6 Rising Number of Automobiles

There has also been an increase in the number of automobiles since 1980, which has impacted city structure, its growth, and commuting patterns. Especially, the growth of the IT industry has also produced an increase in the commuting pattern and,

hence, urban sprawl. The two- and three-wheeled motor vehicles have become quite affordable and are now within the budget of middle-class and upper middle class families. Cars have also become quite popular and affordable, and now the middle and upper middle class generally own more than one car in each family. Around 26 % of the respondents use a car to commute to their offices and workplace; 40 % use other modes such as motorcycles and chartered buses (buses started by the company for their employees) and taxis, whereas 20 % live close to their work and walk, and 14 % use public transport. Traffic has increased considerably in Bengaluru, especially after the mushrooming of high-technology firms, and more people prefer an alternate mode of transportation rather than use their own personal vehicle, which causes a great deal of congestion and many delays on very busy roads.

The statistics reveal that the number of motor vehicles (cars, two-wheelers, taxicabs, and others) has increased from 1.68 lakhs in 1980 to almost 31.29 lakhs in 2008, resulting in traffic congestion (1 lakh is equal to 100,000). The State Government is putting all its efforts into curbing congestion by constructing flyovers, on- and off-ramps that have made road travel safe and convenient. This alteration implies that strict measures need to be taken to curb the increasing traffic to manage urban Bengaluru and keep the infrastructure in a healthy condition.

14.6.7 Gender and Family

Not surprisingly, with globalization and the predominance of MNCs in Bengaluru, it is not only the economy that has benefited but the workforce which has felt the impact in terms of cultural change, such as culinary choices, dress style, music, nightlife, enhanced individuality, and privacy within households. The mental image of a youth is also changing tremendously. The sudden rise of young and wealthy computer engineers as a result of IT industry is leading them to the adoption of Western culture; fewer familial obligations are making them materialistic and inspiring them to be consumerists and individualistic in their outlook. There is now evidence to suggest that high-technology firms are also impacting the family system. The joint family is splitting to become nuclear, and this is tremendously transforming and is endangering the traditional values and ethics of the society. However, the comments of some of the interviewees are quite stark. One software worker, Rajesh, who hails from Tamil Nadu and Ashok, a Kannadiga from Bengaluru, were tied to their family values and traditions. They mentioned that it would be very rare if they married a non-Tamilian or non-Kannadiga, respectively.

The shift in the role of gender toward services has been the major change in the labor markets. Female participation in the labor market has increased. More women are working as software developers and earning equal pay or even more than their male counterparts. Professor Vinod Vyasulu, now a consulting economist, makes a case that the diffusion of IT has inspired men to participate in daily household

chores. They now help the women in the household tasks and, thus, the traditional roles have been challenged. Earlier, it was a big taboo in both rural and urban areas; now a positive change has taken place. The role of women is becoming strong as they are now becoming high-technology workers. Unmarried young women working in Infosys and Wipro, who migrated from Delhi, commented that the working culture is very good and there is a serious professional atmosphere at the workplace. This is a positive change in the working environment, especially for women, as it is informal as well as professional and the security level is high. Women are also in top positions in the high-technology firms. Hema Ravichandar, a senior Vice-President and a group head of HRD (Human Resource Development) of Infosys, illustrates her experience reaching the top. She says, "Being a woman is a tough job, and being a professional women is tougher in trying to break the glass ceiling on your way up the ladder of your chosen career, as it can prove to be the trial of a lifetime." She also makes the case that although information technology does offer a better platform for women to grow, it still offers its own set of challenges for women with ambitions. Many of the women surveyed stated that they have never experienced any kind of harassment at the workplace; but Neela Bhattacharjee, Senior Vice-President of Global Business Development says, "the issue of harassment of women is the result of social conditioning." Some say that they have experienced a very subtle exclusion from their male colleagues. But Meena Ganesh, CEO of TESCO, believed the choice is up to the women as to how they handle the situation (Data Quest 2004). Many professional women claimed that they cannot reach the higher echelons of their career goals as well as have a successful married life with children without the support of their families. There is always a trade-off between career achievements and the amount of time women professionals can devote to their families. A negotiated balance can only maximize the returns in both goal areas.

Another interesting social change is the increase of high-technology couples. In a country where arranged marriage is popular and dominant, high technology has brought a social transformation in the marriage market. As the number of high-technology professionals increase, they are no longer dependent on horoscopes, but now the criterion is salary matching, or it can be called a match of equals. In India more than 20 % of IT professionals are married to other IT workers; however, it may or may not be in the same organization. But they are benefiting from each other in improving and complimenting their careers. One of the high-technology couples, Nivruti Rai of Intel, states, "I could do well in the company; I had an extra advantage of discussing solutions to my work-related problems at home and applying them at office" (Venkatesh and Shariff 2006). It is basically leading to advancement, and Kyndon Saldahana, of Kanbay, argues that IT is changing the spouses and making them more supportive of their wives who are climbing the ladder of success faster than they are. Tech couples are very satisfied and are finding safe haven not only in each other's aptitudes but also in diverse career choices, job opportunities, and developing a network of contacts (Venkatesh and Shariff 2006).

14.6.8 Rise of Tech Culture

High technology has created a ripple effect and attracted a skilled labor force from all parts of the country, but it also creates low-skill jobs. As one of the interviewees argued, the youngsters who can speak very good English are given training in the technical skills and are being employed in many call centers and business process outsourcings. A further change that is quite visible is that high-technology companies are taking full care of their employees. They are providing them cultural and entertainment facilities as well. For example, Infosys, an IT firm, has all the amenities (swimming pools, gyms, and aerobics machines), and now the dance culture is becoming quite common with the increasing software firms. The Bangaloreans are discovering a taste for tango, salsa, and ballets. Many Western dance training schools have been located in the city, especially in the central business district and Koramangala. There are weekend classes to suit everyone's needs. It is not just the software firms that are the sole reasons for the dance culture. However, they have provided enough disposable income to the youngsters who are working in the high-technology industry. Many of them are migrants, single, and are in the age cohort of 22–35. As a result, partying in bars and pubs and shopping in malls has become quite synonymous with the tech culture. The outcome of these changes is that a tech culture is booming.

A further change noticed is the diffusion of beauty unisex salons, which were not common until 2000. But now, men and women visit the same salon. It is no longer a taboo for men to go to beauty salons, especially in this high-technology city. In Koramangala's Forum Shopping Mall, many men visit expensive salons for facial services, which are a striking change. The basic argument is that high technology alone cannot be blamed for it. This change has become quite visible with the rise in income, leading to self-growth, self-entertainment, and pampering of oneself, which is noticeably visible. The amenities and facilities are rising, especially in the high-technology wards and the wards that neighbor them, and others are trying to match with this trend. Even the billboards have become bold and glaring, which was not to be found earlier. This trend is not specific to Bengaluru but is observed in all the major metropolises of the country.

14.7 Conclusion

High technology is defined as a collection of activities such as information technology (IT), hardware, software and services, business process outsourcing, computer chips, telecommunications, data processing, and electronics industries. This research assumes that high technology reconstructs urban and economic development at the macrolevel but creates urban disparities at the microlevel. This study has explored and analyzed the role of high-tech firms in the creation of socioeconomic inequalities in Bengaluru. A comprehensive analysis of the secondary data based on

rigorous quantitative and map pattern analyses along with content analysis of interviews reveals six findings. First, there has been a boom of high-technology companies in the city at private, public, and MNC levels since 1991, with the liberalization and information technology policy in Karnataka, which was the first of its kind in India. Importantly, it is not just because of high-technology firms that Bengaluru is called the Silicon Valley: it is a combination of historic, social, economic, geographic, and educational factors that have created the platform for the multinational corporations and the high-tech firms. Second, the Moran's *I* results indicate that the high-technology firms show a clustered pattern of location in the Bengaluru Metropolitan Corporation. The LISA results show that high-technology firms are clustered in the southeast and northeast and are completely absent in the south, northwest, and also in the core of the city, revealing spatial heterogeneity. Third, the analysis has shown how, contrary to popular belief, high-technology firms do not just agglomerate or cluster only where there are educational institutions within the ward. The high-rise luxurious apartments, the shopping malls, and poverty and homelessness are found in one place. Koramangla is an example, having the best residential locality with the highest number of high-technology firms, excellent educational institutes, and clusters of slums. Fourth, the rise of middle-class millionaires has created a widening disparity within the social groups by their demand for Western-style malls, shopping outlets, luxurious houses, entertainment facilities, and tastes, preferences, and consumption patterns. Fifth, high technology has brought gender equality; the traditional roles of women have been challenged, and more women have entered late-night shifts in BPOs. There has also been a rise of tech-couples, and marriage no longer requires class, caste, and horoscope matching. Sixth, high technology has transformed the society, enriched diversity, and has impacted the cultural landscape of the city. It has impacted especially the high-technology zone and the CBD, but the Pete area and the non-high-technology wards are completely bypassed with respect to cultural and urban landscape transformation. The Pete, important foci of the city, is still traditional and untouched by the high-tech influence. Thus, high technology has brought a new direction and thinking renaissance in the society. It has made the old generation rethink its values and accept the new reality. The findings reflect that high tech has brought some socio-spatial changes that are really dynamic in nature. Thus, this research contributes to the understanding of the impact of high technology in creating intraurban transformations and visible changes in the urban landscape. The study contributes both conceptually and empirically to the body of our scientific knowledge by documenting intracity social change that is taking place at the ward level. Although there can be many causes of social transformation, high technology has been an instrumental force in shaping the social fabric of the city. The study identifies three foci of the city: one is the Pete area or the traditional core, the second is the CBD or the cantonment area, that is, the colonial core, and the third is the emerging high-technology zone (IT corridor and IT parks). It is anticipated that a new spatial organization of land use will emerge in this high-technology zone consisting of recreational sites, shopping malls, tech culture, state-of-art architecture, quality buildings, and luxurious residential theme-based apartments by world-class builders. Finally, the study

also contributes toward the theory formulation based on the high-tech model. The existing model of India's city structure based on the concept of the Bazaar and the colonial-based model is contested and perhaps can become an exemplar for other similar cities to emulate.

Further research needs to be pursued to investigate the intertwining relationship among high technology and urban development in various metro cities of India. The Indian metropolises such as Delhi National Capital Region, Mumbai, Kolkata, Chennai, Chandigarh, Hyderabad, Ahmedabad, and Pune are presently undergoing massive change with the growth of high-technology firms juxtaposing in the periphery of the city, suggesting a pattern of concentrated decentralization in growth. Such studies may identify the emergence of a form of the production of new urban spaces resulting from globalization and giving birth to new foci apart from those traditional and colonial. The collective wisdom of all these studies may contribute to an urban model building or a theory formulation of a high-technology-based model of an Indian city.

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Chapter 15

Delhi Metro Rail Travel Behavior Analysis: Impact of Individual and Trip Characteristics

Aditi Ranjan, Pankaj Lal, and Andres Susaeta

Abstract Mass rapid transit systems (MRTS) in cities can potentially reduce congestion, decrease energy consumption, improve air quality, and contribute toward job creation and development. Rail transit, even though with lower flexibility and higher capital and operating costs than bus transit, has gathered support from the public and policymakers for its high capacity, environmental benefit, comfort, and security. However, for an improved understanding of rail riders, it is necessary to explore individual, household, and trip characteristics that affect the travel behavior to rail stations. This study analyzes the effects of rider characteristics on the mode choice using a multinomial logit model. The study found that certain factors that attributed to the increased share of walking to reach stations relative to other transit modes were commuters who belonged to low-income households and who were traveling to school, or college, whose total trip distance was not too large, and those who had Master's degree or higher level qualification. Females are more likely to use an auto- or cycle-rickshaw to reach the metro station. Students are more likely to be dropped off. Bus availability showed that riders who have a direct bus connection were more likely to use the bus. Private vehicle ownership and availability was strongly associated with increased probability of using non-walk modes when connecting to metro rail. The study results provide important information for the use of geographers, urban planners, and transportation policymakers that can be used to facilitate rider-oriented transport development.

Keywords Delhi • Mass rapid transit systems • Mode choice • Public transit

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15.1 Introduction

The initiation of large urban infrastructure projects in cities worldwide has led to a massive shift in town development, vehicle congestion, environmental amelioration, and changes in commuter behavior. One of the salient physical infrastructure projects worldwide is creation of public transport systems in cities. Historically, bus transit has been touted as the most popular public transit system in the world; however, light rail transit has gained momentum in recent years because of such factors as high capacity, reliability, comfort, and positive image (Kim et al. 2007, p. 512). Public transport systems such as bus and rail transit face severe problems in most of the developing world, although the situation differs across countries and cities (Vasconcellos 2001, pp. 1–323). The situation in Indian cities such as Delhi is no different.

Increased vehicle density on roads has led to slowing down of buses and increases in operating costs, in turn dissuading the public for using bus-based public transit (Halcrow Group et al. 2008, p. 22). This problem is further accentuated by the demand supply incongruity existing in urban India. The travel demand overwhelmingly exceeds the limited supply of transport infrastructure and services in India. The excess demand particularly impacts public transport systems, resulting in most bus and train services being overcrowded, undependable, slow, inconvenient, uncoordinated, and dangerous (Pucher et al. 2004, pp. 95–102).

The rapid growth of Indian cities has dramatically increased demand for land and travel in urban areas, thus putting enormous pressure on transport and other kinds of public infrastructure. The sheer increase in the urban population is sufficient to generate serious transport problems. During 1991–2001, Delhi faced an annual growth rate of 3.85 %, resulting in an estimated population of nearly 14 million in Delhi (Government of India [GOI] 2008, pp. 18–19). The growth rate of the city was more than double the rate observed at the all-India level of 2.13 % (GOI 2008, p. 19). The city is the sixth most populated urban agglomeration in the world, and by 2025 the population of Delhi is expected to reach 22.5 million (United Nations World Population Database 2007). The density of population (defined as number of people per square kilometer) in Delhi is the highest among all states and unions in India, estimated as 9,340 persons/km² compared to 324 persons/km² for the nation (GOI 2008, pp. 21–22).

The burgeoning urban population coupled with the increased number of vehicles on the city roads have led to increasingly congested roadways, signified by the fact that the urban population increased by 60 % during 1990–2004 but the number of registered motor vehicles increased by as much as 130 % during the same time (Fig. 15.1).

As of 2008, there were 5.23 million vehicles within the municipal limits of Delhi, translating to 317 vehicles per 1,000 people (GOI 139). Most of the increase in vehicles is occurring from the purchase of approximately 500 new individual vehicles per day (Rail India Technical and Economic Services [RITES] 2005, p. 1.2). Delhi had more private motor vehicles than Mumbai, Kolkata, and Chennai combined (Delhi Metro Railway Corporation [DMRC] 2010). The road network has failed to keep pace with vehicle increase. The road network in the city has increased

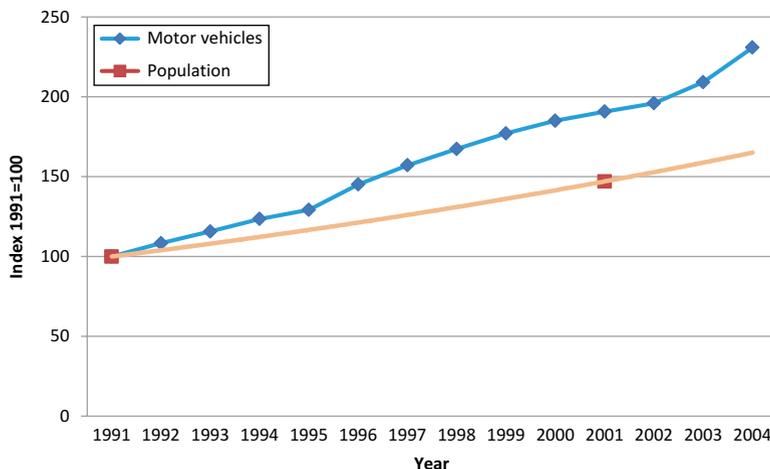


Fig. 15.1 Motorization and urbanization trends of Delhi [Based on population data from Government of India (2008) and motor vehicle data from Government of India (2004)]

3.7-fold from 8,380 km in 1971–1972 to 30,923 km in 2006–2007, compared to a 24-fold increase in the number of vehicles, which has increased from 0.21 to 5.23 million (GOI 2008, p. 141). Roads occupy nearly 21 % of the total city area; however the large number of motor vehicles causes extreme congestion on the roads, resulting in ever-slowing speed, fuel wastage, environmental pollution, and road accidents (Advani and Tiwari 2005, p. 1). In spite of the construction of several new flyovers and roads in the past few years, the roads continue to face congestion at peak hours. In 2001, the road length per vehicle in Delhi was 8.5 m, which decreased to 5.9 m per vehicle in 2007 (GOI 2008). Driving space has constantly been decreasing, adding to the problems of congestion and slow traffic movement (Fig. 15.2).

When compared with the desirable level of modal split for mass transport options (Padam and Singh 2001, p. 16) it was found that the share of mass transport in the city is well below the desired range. The share of mass transit in Delhi has hovered around 60 % for the past two decades rather than catering to 70–85 % of total trips. The RITES report points out that existing bus service has achieved the highest productivity among city bus endeavors in the country and carries more than 5 million trips a day. However, it has not been able to meet the expectations of Delhi commuters (RITES 2005, p. 2.1). They attribute this to ever-increasing average trip length (14 km) with corresponding increase in journey time of 55–60 min. The bus services also tend to become overcrowded with significant increases in waiting period at bus stops. This problem has resulted in growing use of personal vehicles, leading to increased road congestion, delays, fuel wastage, and environmental pollution.

Along with this, the forces of decentralization have led to a relative decline in Delhi's Central Business District (CBD), which has resulted in the diminished importance of inner cities such as the 'Walled City of Delhi' or 'Rajiv Chowk' (earlier known as Connaught Place). The decreasing importance of the CBD in Delhi can be partly attributed to government policies geared toward decongesting crowded city



Fig. 15.2 Congestion on Delhi roads (From author data)

centers. Land use regulations strictly limit the ratio of floor area to land area in the city center, thus restricting the vertical limit of buildings and the density of development in the center (Pucher et al. 2007, p. 383; Bertraud 2002, p. 1). As Indian cities such as Delhi grew over time, the government policies virtually forced new development to the suburban fringe. This move was further fueled by the fact that regional governments and local administrations in suburban jurisdictions had less stringent land use regulations than the cities, and they even advertise their more permissive policies to lure economic development away from the CBD (Bertraud 2002, pp. 1–3). The city thus evolved in a dispersed, polynucleated manner, complete with a variety of business and residential districts. The new satellite towns on the outskirts of Delhi (Noida, Faridabad, Ghaziabad, and Gurgaon) have emerged as new growth centers. Manufacturers and industries also followed the new population clusters toward the satellite towns (Siemiatycki 2006, p. 280). The high ownership of motor vehicles and official plans encouraging multimodal business activity in a city such as Delhi have resulted in city forms that encourage “sprawl” in the form of relatively dense cities within cities. This polynucleated growth also pointed toward the need of efficient public transit systems that could connect satellite towns to different areas of the city. Despite burgeoning investments in road infrastructure and plans for land use and transport development, Delhi faced an unprecedented public transit crisis as personal vehicles (two-wheelers and cars) and different forms of public transport struggled to meet the mobility demands of city residents. This crisis was further accentuated by the fact that road traffic suffered from a high degree of road accidents and fatalities. Another factor that supplemented the argument for a safer public transit system such as the Delhi Metro Rail System was the high number of road accidents. The average number of persons killed per day, 5, and those injured, 13, was five times the average observed in the United Kingdom (Siemiatycki 2006, p. 280).

The future transit demand was also expected to aggravate the public transit crisis. In an assessment conducted by RITES, future transport usage and scenario was forecast up to 2021 without metro rail transit (RITES 2005, pp. 2.1–2.3). They estimated that Delhi population in 2021 will need about 28.70 million total vehicular daily trips, of which 24.72 million trips will be intracity and the balance, 4.08 million, inter cities.

The rapid urbanization coupled with increasing pressure on bus-based public transit systems led to movements toward developing rail-based public transit systems in metropolitan cities such as Kolkata, Mumbai, or Delhi. Cities such as Kolkata and Mumbai already had rail-based public transit systems to accommodate a large number of travel trips. The Government of Delhi website outlines a number of benefits of adopting a metro rail system in cities such as Delhi: time savings for commuters; reliable and safe journeys; reduction in atmospheric pollution; reduction in accidents; lower fuel consumption; reduced vehicle operating costs; and increase in the average speed of road vehicles (Delhi Metro Rail Corporation 2010).

To meet the increasing transportation demand in Delhi, the Union Government of India along with the State Government of Delhi started the construction of an ambitious mass rapid transit system, known as Delhi Metro, in 1998. The Delhi metro network comprises a rail network of underground, elevated, and surface corridors that started its commercial operation on December 24, 2002.

The whole project, estimated to cost INR 150 billion at the 1996 price level, was expected to handle 12.6 million commuter trips. The metropolitan rail system by June 2010 Delhi Metro network had put into operation more than 125 km of rail lines with 107 metro stations. The metro rail network has reached the satellite towns of Gurgaon in the state of Haryana and NOIDA in Uttar Pradesh (Fig. 15.3). The work on the second phase of the Delhi metro, so as to reach its plan of covering 198.5 km, is currently underway.

There are concerns raised about metro rail projects as well. For example, Siemiatycki (2006, pp. 277–278) suggests that transportation infrastructure mega projects are becoming more prevalent, even as evidence suggests that such projects often experience significant cost overruns while failing to fully deliver on their projected benefits. In Delhi, the development of a metro has been accompanied by land appropriations, slum clearances, and a broad range of political and economic opportunity that can potentially widen the rift between the wealthy and the poor (Siemiatycki 2006, pp. 277–282). Tiwari (2003, pp. 446–449) finds that Delhi's transportation policy has only addressed air pollution and congestion of motorized traffic and is therefore inherently biased against the city's most vulnerable groups, such as pedestrians and cyclists, who face the highest and further increasing risks of fatal road accidents. Researchers such as Siemiatycki (2006, pp. 286–288) suggest that successful realization of a modern metro rail for Delhi has been accompanied with physical destruction and social disorientation, a phenomenon that has been seen in other cities that have developed metro railway systems, including Kolkata and New York. Another criticism of the metro network is low ridership, which has been criticized by Comptroller and Auditor General GOI audit reports among others. According to a Wall Street Journal Report (Wall Street Journal, July 19, 2009), the ridership status for first phase of metro (65.45 km of rail lines) was just 21 % of

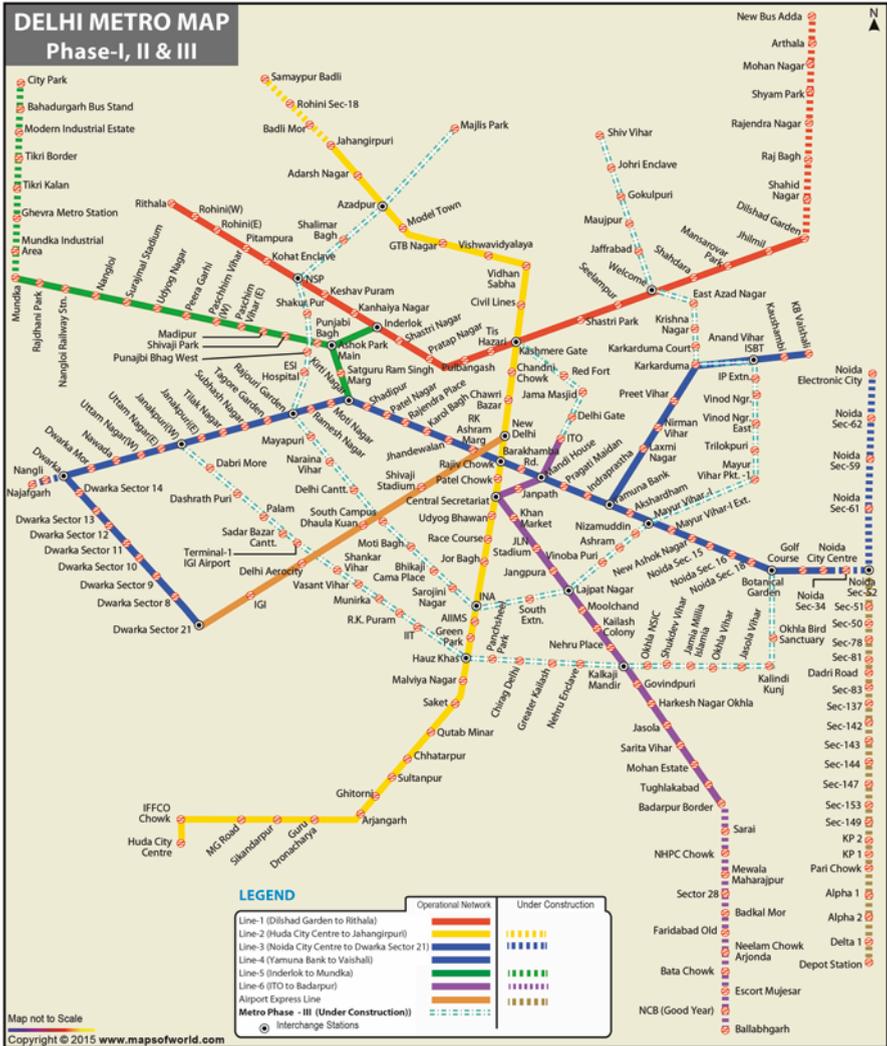


Fig. 15.3 Delhi Metro route map (From www.mapsofworld.com)

the original 1995 projections and 29 % of the 2003 revised projection. The lower transit ridership problem is faced by many rail transits worldwide (Kim et al. 2007, p. 512). Cervero et al. (2004, pp. 445–469) in a national survey, “Transit oriented development (TOD) projects in United States (US),” found that increasing transit ridership is the principal aim of TOD whereas community economic development has remained a secondary priority.

Some, such as Dunphy (1996, pp. 37–41), suggest that transit agencies in the U.S. have been suffering from lower number of urban residents for whom TOD was planned whereas the primary growth market for transit are the riders who are travel-

ing to suburban destinations. However, the Delhi Metro network, which serves suburbs and city centers alike, is way off its ridership projections, fueling the need for taking a closer look at individual ridership behavior. Several studies have been conducted to assess personal and household characteristics associated with mode choice of rider trips (Train 1978, pp. 167–178; Train and McFadden 1978, pp. 349–353; Schwanen and Mokhtarian 2005, pp. 83–99; Kim and Ulfarsson 2004, pp. 117–126). Studies have also explored relationships between transit accessibility and household automobile ownership (Schimek 1996, pp. 120–125) generally find that association to be statistically significant. With quite high levels of vehicle ownership and road congestion in Delhi, automobile ownership might not be the sole factor affecting individual choices for using metro rail.

Studies have also explored rider mode choice and the built environment or land use relationships (Rodriguez and Joo 2004, pp. 151–173). Loutzenheiser (1997, pp. 40–49) researched rider mode choice between home and stations of the Bay Area Rapid Transit (BART) system in California. The impact of household, land use, personal, and environmental characteristics of the stations were explored using three binary logit models (walk vs. non-walk, walk vs. transit, and walk vs. automobile). Cervero (2001, pp. 1–23) explored the influence of land use patterns and the built environment on pedestrian access to BART stations. The study emphasized that rail transit planners and managers should focus on all transit riders; including those who walk, use other transit, and use personal automobiles to reach the metro stations.

For an improved understanding of metro rail riders, it is necessary to assess personal, household, and trip factors associated with travel behavior to metro stations. Existing studies have largely considered the mode whereby riders walk to transit rail stations (Kim et al. 2007, pp. 513–514). The “walking distance” to LRT stations has also been assessed by many researchers. For example, O’Sullivan and Morrall (1996, pp. 22–26) reported that the average walking distance of LRT stations in the U.S. was 649 m for suburbs and 326 m for CBD areas. They suggest that LRT rider walking distance is important to promote high-density mixed-use development and a quality pedestrian environment to boost ridership. Based on a comfortable walking distance of 500 m to reach metro stations, Advani and Tiwari (2005) suggest that 31 % of Delhi will have the highest accessibility when 198.5 km of metro rail becomes operational.

Cervero (2001, pp. 1–23) explored the transit access mode and distances in the BART system and found that the home-end access distance for commuting trips varied according to transit mode used to reach the station. The distance for walking was 1 km or less; bus transit, 1–1.6 km; and park-and-ride, beyond 1.6 km. Kim et al. (2007, p. 514) argues that access to metro rail stations need to be factored in while researching increased ridership and transportation needs in suburban areas. They also pointed that existing studies tend to assess only primary modes used for each trip, and it is difficult to examine the travel behavior of transit riders from existing studies, in particular for riders who often use other modes to reach transit stations.

This chapter intends to assess the effects of personal and household characteristics, the built environment, on the mode choice used for reaching metro stations using a multinomial logit (MNL) model. The model is considered more statistically efficient than analyzing pairwise mode choices between homes and transit stations

(Kim et al. 2007, p. 513). Although the development of metro rail in Delhi has gathered attention as a means to provide transportation, there have been hardly any studies exploring the travel behavior of rail transit riders. The study makes an important addition to the growing body of literature on ridership behavior in TOD and expands the frontiers of transportation geography by applying principles and tools of limited dependent variable analysis to a polynucleated city rail transport system in a megacity such as Delhi.

The rider behavior insights might be applicable in Indian cities with a similar milieu (such as Hyderabad, Bangalore, and Ludhiana) that have undertaken assessments to consider similar public transit systems. It is anticipated that this activity will add insight and facilitate implementation of existing or future metro rail systems. The study results are expected to provide important inputs to geographers, urban planners, and transportation policymakers to facilitate improvements geared toward rider-oriented TOD.

15.2 Data and Methods

A survey was designed and administered to metro rail commuters from December 15, 2009 to April 15, 2010 through a process of personal one-to-one interviews. To refine the survey questionnaire, a pilot one-to-one interview was conducted in three study stations, namely, Rajiv Chowk, Shahdara, and Dwarka Mor. Feedback on the survey was also solicited through administering the survey online to 15 metro travelers. The survey questionnaire, thus refined, was administered to a total of 340 riders who were randomly selected coming out of a metro station covering three major lines: blue, yellow, and red (Fig. 15.3). The survey was administered to riders across eight metro stations: Rajiv Chowk, Kashmere Gate, Patel Chowk, Patel Nagar, Dwarka Mor, Pitam Pura, Mayur Vihar Extension, and Shahdara (Fig. 15.4). Incomplete responses were discarded during compilation, resulting in 255 complete responses for analysis.

The survey encompassed questions regarding the metro trip, alternate mode of commute for the trip, general commute behavior of respondents, and demographic information of the respondents. The multiple-choice survey questions were explained to respondents and an example was also provided to facilitate better comprehension. Respondents were then asked to provide their views about their trip and sociodemographic attributes and to outline their stated preferences.

As the survey was administered randomly on all three metro lines active during the time period, sociodemographic composition of commuters might be used to gain insights about general travel preferences of Delhi residents who use metro rail. Analysis of urban travel behavior is typically undertaken using data for a single day for each individual or household in the sample, although it is generally accepted that individual or household travel behavior varies on a day-to-day basis.

Because this was a snapshot survey, conducted at a particular point in time, inferences regarding changes in travel behavior might not be possible. Because the option of responding to the survey outside the metro station was completely voluntary,

Fig. 15.4 Researcher collecting information from metro employee (From author)



there might be some nonrespondent bias, that is, people who responded to surveys might have answered questions differently than those who do not. Furthermore, these surveys were not triangulated through another survey or complementary information, thus the responses provided by the commuters might have some respondent bias. However, it is quite difficult to account for these biases and therefore these have been ignored, and the responses have been taken on face value. The random survey encompassed different strata of commuters and can be used to gain insights regarding their travel preferences and behaviors. These surveys were conducted on working days (Monday to Friday), excluding gazetted holidays, so as to reduce the holiday traveling spurt. Table 15.1 shows the characteristics of the analyzed data.

There are five mode choices in the study: (1) drive and park, (2) pick-up/drop-off, (3) bus, (4) walk, and (5) cycle- and auto-rickshaw. Delhi residents commuting by public transport such as metro rail usually differ in the initial part of their trip between home and the railway station. Therefore, results measuring the degree by which accessibility to the public transport networks influences metro mode choice in an urban area can provide useful insights. Taking a bus to reach a metro station was the most convenient option for the commuters, with 25.88 % respondents indicating that they reached the metro by taking a bus. Cycle- and auto-rickshaw were also commonly used to reach the metro and was used by 20.31 % of respondents. The next preferred option was walking to the metro station: 19.61 % of commuters. The drop-off option, where the metro commuter used somebody else's vehicle to reach the station, was indicated by 18.23 % of respondents. Use of a self-driven

Table 15.1 Summary statistics of the commuter survey

Variable	Options	No. of observations	Percent of total
Mode to transit station	Walk	50	19.61
	Own car	40	15.69
	Drop-off	47	18.23
	Bus	66	25.88
	Cycle-/auto-rickshaw	52	20.39
Age	<15	10	3.92
	15–30	69	27.06
	30–60	122	47.84
	>60	54	21.18
Gender	Female	101	39.61
	Male	154	60.31
Household income	<30,000 Rs	64	25.10
	30,000–50,000 Rs	100	35.69
	>50,000 Rs	91	39.22
Family size	<4	41	16.08
	4–6	90	35.29
	>6	124	48.63
Trip frequency	>Once a day	158	61.96
	Once a day	50	19.61
	<Once a day	47	18.23
Trip time	Odd time (before 8 am and after 8 pm)	23	9.02
	Normal time (10 am–5 pm)	104	40.78
	Peak time (8–10 am and 5–8 pm)	128	50.20
Station distance by mode (km) and standard deviation (parentheses)		1.794 (1.981)	
Trip length	<10 km	72	28.24
	10–20 km	92	36.08
	20–30 km	54	21.18
	>30 km	37	14.51
Trip purpose	Work	100	39.22
	Home	48	18.82
	Leisure	34	13.33
	Education	73	28.63
Vehicle ownership	Yes	178	69.80
	No	77	30.20
Bus link availability	Yes	201	78.82
	No	54	21.18
Education	Less than college	49	19.22
	College	103	40.39
	Master's or above	103	40.39
Occupation	Private job	109	42.75
	Government employee	55	21.57
	Student	65	25.49
	Not employed	26	10.20

vehicle to reach the metro station was indicated by 15.69 % of commuters. Thus, 46.3 % of respondents used a paid transit mode (bus, auto-rickshaw, or cycle-rickshaw), whereas 34.1 % used their own or another's vehicle option to reach the metro. These mode choice decisions made by metro riders have been analyzed through a theoretical model as outlined next.

15.3 Theoretical Model

The theoretical framework used in this study to analyze data is the 'random utility model' developed by McFadden (1974, pp. 105–142). Models have been developed under the premise that discrete choice models can be used for understanding metro rider behavior and relationships, which can be used for ex ante prediction and forecasting. We applied the MNL model to analyze the transit mode choice to reach metro stations. Hensher et al. (2005, pp. 308–371) argue for maximizing the observed component of utility, and suggest using the MNL model and capturing "rich" data rather than going for less restrictive models such as nested logic. Furthermore, MNL has been in common use as a mode choice model for the past three decades (Train 1978, pp. 167–174; Kim et al. 2007, pp. 511–522). Under this framework, the indirect utility of an individual rider results from the sum of a deterministic part and a stochastic element.

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad (15.1)$$

Formally, where U_{ij} is the utility for each respondent i to opt for j travel mode alternatives, V_{ij} is the deterministic part of the utility, and ε_{ij} reflects the uncertainty (white noise) or unobservable influences on riders' choice. The riders have the option to choose the transit mode j , which reflects an improved state over alternative k ("other than j transit mode alternatives") if the utility associated to the alternative j exceeds the utility of the alternative k . As a random component is involved, only probabilistic statements about either option can be made. Thus the probability of individual i to choose alternative j over k can be formally expressed as follows:

$$P_{ij} = P(V_{ij} + \varepsilon_{ij}) > P(V_{jk} + \varepsilon_{ik}), j \neq k \quad (15.2)$$

The deterministic utility V_{ij} consists of β_j ; the estimable transit mode-specific coefficients and X_{ij} are characteristics of the transit modes and riders. The error terms ε_{ij} are independently and identically (IIA) distributed type 1 extreme value distribution (the Gumbel distribution). The riders are assumed to behave rationally, and so that each rider selects the transit mode to reach the station that provides the highest utility; this leads to the MNL model for the probability of a rider selecting mode j from J available mode choices.

$$P_{ij} = e^{\beta_j X_{ij}} / \sum_{j=1}^J \beta_j X_{ij} \quad (15.3)$$

To estimate the mode-specific coefficients, the model needs to be in terms of one transit mode as MNL is sensitive only to differences in utility. One transit mode utility must therefore be arbitrarily fixed.

$$\ln \frac{P_{ij|j-1}}{P_{ij}} = \beta_j X_i \quad (15.4)$$

Without loss of generality, the walk mode is selected as the base case is most conveniently set to zero. The coefficients of the model can therefore be interpreted through their impact on the log-odds ratio of each alternative to the base case, walk.

Among random utility models, MNLs assume that the decision maker has a perfect discrimination capability and alternative modes are independent of each other. This “(IIA)” property of MNL states that ratio of choice probabilities of any pairs of alternatives is independent in the presence (absence) of any other alternative in the choice set. This property limits use of MNL in the presence of correlated alternatives. The MNL models are therefore valid when the outcome categories are plausibly distinct (McFadden 1974, pp. 105–142). We followed Hausman and McFadden (1984, pp. 1219–1240) and conducted a Hausman-type test to determine the IIA for our transit mode choice set. The Hausman test for the MNL model in this study indicated that there exists no statistical evidence to reject the IIA assumption at the 95 % level of significance.

15.4 Results and Discussions

The coefficients of this MNL model are estimated using the method of maximum likelihood using STATA 11.0. The STATA output also provides standard errors of the estimates and their significance at $p=0.01$, $p=0.05$, and $p=0.001$ levels. To focus on the most statistically significant factors, the coefficients that are not significantly different from zero at the 90 % level of significance (p value >0.1) are not represented in Table 15.2, which outlines the MNL results. The estimation result for the MNL model shows an acceptable goodness-of-fit in terms of likelihood improvement from the model. This is the likelihood ratio chi-square test, that in the four equations comparing transit mode (own car, drop-off, bus, and auto/cycle-rickshaw) with the walk mode, at least one of the predictor regression coefficient is not equal to zero. The probability of the chi-square statistic rejects the null hypothesis that all the regression coefficients of equations are simultaneously equal to zero. The standard interpretation of the MNL is that for a unit change in the predictor variable, the MNL odd of outcome of the transit modes relative to the referent group (walk) is expected to change by its respective parameter estimate, given the variables in the model are held constant.

The variation in individual daily travel behavior may result from variation in needs and desires, which the individual attempts to satisfy and be affected by the travel resources and time constraints that limit the individual’s freedom to vary

Table 15.2 Multinomial logit analysis of mode choice to metro rail transit stations

Variable	Own car	Drop off	Bus	Cycle/auto rickshaw
Constant	-4.199 (3.35)	-2.478 (3.58)	-0.418 (3.54)	-8.102* (3.77)
Vehicle ownership	-2.230* (0.88)			
Income	<30,000 Rs >50,000 Rs			-2.330* (1.00)
Education	Less than college Master's and above			
Station distance	2.270* (0.89)	2.000* (0.84)	1.749* (0.82)	2.159* (0.84)
Bus link availability	2.113*** (0.48)	2.260*** (0.48)	2.451*** (0.48)	2.215*** (0.48)
Vehicle available for trip		1.782* (0.75)	1.492* (0.69)	1.655* (0.73)
Age (years)	<15 30-60 >60			-1.742* (0.86)
Occupation	Student Government employee Not employed	6.066** (2.23) 6.738*** (1.72)	3.583* (1.62)	7.465*** (2.25) 6.748*** (1.73)
Gender	Female	6.228*** (1.71)		6.738*** (1.72)
Trip length	<10 km 10-20 km 20-30 km			4.382* (2.19) 1.219* (0.58)
Trip purpose	Education			
Pseudo R ²	0.292			
Likelihood ratio	237.356			
Log-likelihood with constant	-406.927			
Log-likelihood with convergence	-288.199			
Number of observation	255			

Note: Reference mode is walk to metro station. Significance level: *<0.10, **<0.05, ***<0.01. Only statistically significant variable coefficients are represented in this table. Figures in parentheses represent standard errors. In case of dummy variables, the base case has not been represented in the table. The variable (e.g., for Not employed) is listed even if it is not significant for any transit modes to elucidate that the 'private employee' is the base variable

behavior from day to day. Analyses of urban travel behavior focus on trying to explain variations in the travel behavior of different individuals in terms of the characteristics of those individuals and their environment. We refer this component of variability in travel behavior as interpersonal variability. With this in mind, the background information of respondents regarding gender, age, household income, educational background, occupation, and family size plus trip-related variables are discussed next. Only the coefficient for predictor variables that has been found to be statistically different from zero is discussed. The interaction variables to assess relationship between variables such as gender and vehicle ownership were insignificant and so were dropped from the model.

Women tend to have different levels of personal variability in their daily travel behavior as compared to men. It can be argued that women may follow traditional gender-based lines and might make fewer trips for work, education, or leisure. Females are more likely to prefer auto- or cycle-rickshaw to reach metro stations rather than walking, which might be for reasons of safety or convenience. For other transit modes, the likely odd preference was insignificant.

Respondents were categorized in four age classes: less than 15 years, between 15 and 30 years, between 30 and 60 years, and older than 60 years. This class division was based on the premise that younger commuters (<15 years) have different travel priorities as they are generally school going. Similarly, youths (15–30 years) might have different preferences than the typical working-age population (30–60 years). Travel preferences of senior citizens were captured through the last age class (>60 years). As compared to youths, younger commuters are more likely to be dropped off by parents or relatives to reach metro stations and are also more likely to take an auto- or cycle-rickshaw than walk to stations. The working-age populations are expected to take a bus, or auto- or cycle-rickshaw, or be dropped off at metro stations rather than walk, which might be attributed to the fact that this age group might be commuting to and from work and are interested in reaching stations quickly to avoid spending more time by walking. For the older populations, MNL odd preferences were found to be insignificant, suggesting that no clear preference for transit modes exist for older people.

Sociological research studies show that persons in higher social classes are more active and diverse in their participation in social and community organizations and leisure activities than those in lower classes (Reissman 1954, pp. 76–78). Educational background is an important determinant of social class combined with occupational and income status. To disaggregate travel behavior based on educational background, information regarding education status was collected from respondents. Three education classes, namely, high school or less (12 or fewer years of education), college education (less than master's degree), and university education (master's degree and above). The study points out that people who have a master's degree and above are less likely to walk to stations and will opt for other transit modes. They tend to be time-sensitive riders attempting to minimize their trip time by lowering the time taken to reach stations. The coefficients for the other education classes were not found to be significant.

Household income tends to influence a person's travel behavior. Those individuals having considerable travel and related resources are more able to vary their day-to-

day travel and related behavior than those individuals having limited travel and related resources. Money is a resource that enables people to participate in out-of-home activities, particularly leisure-related activities. Furthermore, income is an indicator of social status, and people of high social status are more likely than those of lower social status to participate in both social and leisure activities. These considerations result in a difference in people's daily travel and related behavior based on household income. To capture this information, the monthly income of the respondents' household was collated. The monthly income categories for household income composed of three hypothetical classes, namely, less than 30,000 rupees (low income), between 30,000 and 50,000 rupees (mid income), and more than 50,000 rupees (high income), were assessed. This income categorization has been created by researchers to gain an heuristic intuition about the travel choices and behavior of respondents. The low-income class are less likely to opt for own car, drop-off, or auto-rickshaw rather than walk or take a bus to metro stations: this is expected as lower-income households are less likely to own a car or to afford the use of an auto- or cycle-rickshaw, not surprising as many studies have found that higher-income individuals use the bus less than those with middle and lower incomes (Kim et al. 2007, p. 518).

Size of the family tends to impacts travel choice behavior of people. A larger-size family might have less freedom to vary their travel behavior from day to day in comparison with lower member households as they might be subject to more household-related constraints. One can expect that the presence of a large number of family members in the household will increase the likelihood of members undertaking tasks to satisfy the other members' needs. Further, one can expect that socialized gender-linked roles may cause the presence of children in the household to have more impact on the travel and related behavior of other family members. To disaggregate a commuter's travel preferences based on their family size, information regarding respondents' family size was captured. Three categories of family size were created: fewer than four members (small family), between four and six members (mid-size family), and more than six members (large family). The respondents' family size information is in agreement with Economic Survey of Delhi (2008) information, which estimated average family size in Delhi to be 5.1 members. The family size-related coefficients were found to be not significant for any of the mode choices used to reach metro stations.

People's occupations might impact travel behavior. One can expect occupational status to have considerable impact on interpersonal variability because occupation substantially limits an individual's ability to vary behavior. Employed persons or students might have substantially higher levels of trip needs as compared to those unemployed because work or study performed by individuals requires them to be in specific places at particular times. Therefore, it can be inferred that those individuals more subject to such roles have lower levels of variability in their daily travel and related behavior and might prefer metro to another travel mode. To capture this information, occupations of the respondents were classified into four categories: government employee, private job, student, and no gainful employment. This latter group included the unemployed and homemakers. The results show that students have increasing shares of pick-up/drop-off compared to the other modes, which

might be attributed to the fact that students might not need a motor vehicle during the day and other family members can use the vehicle. Students are also more likely to use auto- or cycle-rickshaws to reach metro stations than to walk, as compared to those engaged in private jobs. Surprisingly, the results showed that government employees are more likely to use rickshaws than are private sector employees. However, the MNL odds for opting for auto- or cycle-rickshaw by government employees is lower than the students while holding all other variables in the model constant.

Individuals having a motor vehicle available have more ability to vary their travel patterns from day to day. Use of a motor vehicle for a trip avoids travel mode switching and is convenient in terms of point-to-point travel. Having a private automobile available is associated with a reduction in the shares of all modes compared to walking. Those riders who own motor vehicles tend to use their vehicle rather than walk and are also less likely to hire auto- or cycle-rickshaws, which can be attributed to such reasons as timeliness, cost, comfort, cleanliness, and convenience.

Availability of public transit options other than metro might also impact travel mode choice. As buses are the primary means of mass transit other than metro, the availability of bus links for the commuter is worth exploring. A person has to change a bus to reach his destination area if the trip is not covered by any direct route. In that case, the waiting time at the transfer bus stop and the distance and convenience from the bus stop where one has alighted to the bus stop from which one can get the next connecting bus is important. This factor therefore measures both bus link availability and convenience, as riders do not have to transfer between buses to connect to the light rail system. Thus, instead of just comparing available travel options by total time, fare, and distance, one should consider the influence of an available metro link for the total trip comparison. It was found that bus availability increases the likelihood of commuter using a bus rather than walking to the station.

The results show that distance to the metro station is significant: this is self-explanatory, as the longer the distance to the metro station, the lower the likelihood of a commuter walking to the station. The coefficient of this variable was significant for all the transit modes depicting a person's comparatively strong preference for opting for non-walk modes. The total trip distance may be identified as a determinant of mode choice among metro rail commuters. The effect of this variable can be used to measure the expected impact of continuing suburbanization at increasing distances on the split of transport demand between the different transport modes available to Delhi residents. The typical trip length information was solicited from metro consumers. It can be inferred that metro rail is predominantly used for covering distances between 10 and 20 km. The commuters who cover a longer trip distance (>30 km) are more likely to walk to stations to take a bus or be dropped off. Those who cover longer distances might include travelers who need to switch from one line to other, which has its own inconvenience, and taking a faster mode to reach stations might not be preferable for them.

The frequency of a person using any particular travel mode can be used to gain insights regarding the travel behavior and the impact a new travel mode has on travel choices. Information regarding frequency of metro travel was gathered from

the respondents in terms of more than once a day, once a day, and less than once a day. The dominant commuter group in metro was those who traveled more than once a day (62 %), followed by those who use metro rail once a day (19.6 %). These groups might depict regular office goers or students and constitute work- or education-related trips. Commuters who travel infrequently, such as those who do not travel at least once a week, constitute just 18.4 % of the total respondents, signifying that people who tend to commute by metro are repeat travelers and favor metro over other travel options on a consistent basis. The coefficient of frequency of trip in the model results was not statistically significant, indicating that the commuter's choice regarding transit mode used to reach a metro station is not affected by frequency of metro ridership.

An understanding of the variability in a person's travel behavior is important to the functioning of transportation services as such variability affects daily peaking characteristics. Bonsall et al. (1984, pp. 386–391) observed hourly, daily, and monthly variations in traffic flows and pointed out that, in particular, the variation in daily peak profiles is not well understood. They discussed the importance of understanding time variability in traveler behavior in the assessment of traffic mode choices and how respondent trip time affects their responses. The trend and preferences of an early-morning or late-night commuter might be different from day trips where a commuter might be making trips for work or education. Similarly, the peak traffic trend, assumed to be between 8 a.m. and 10 a.m. in the morning and 5 p.m. to 8 p.m. in the evening more often than not will be different than the non-peak-hour commute. In the survey, most of the metro trips were made during the morning and evening peak hour traffic combined (50.1 %), with 24.7 % between 8 a.m. and 10 am and 25.7 % between 5 p.m. to 8 p.m., respectively. A large part of the trips (40.7 %) were made during normal hours and only 9 % were made in early mornings (before 8 a.m.) and in late evenings (after 8 p.m.), respectively. However, in our study no significant mode choice preference was observed for different trip time, possibly because even during peak hours the metro commute is preferred rather than alternate travel modes such as bus or private vehicle for reasons of road congestion, which more often than not results in longer travel time and less convenience and comfort.

A considerable effort has been devoted to characterizing the functional dimensions of household travel. Such segmentation of travel activity has been found to be related to travel purposes. For example (Gordon and Richardson (1997, pp. 95–106), examination of United States Nationwide Personal Transportation Survey (NTPS) data for 1983 showed that non-work travel accounted for just over half of all person-trips in the a.m. peak and two thirds during the p.m. peak. The purpose of the trip was captured by collecting data in terms of work, leisure, home, or education. The results also show an interesting fact: people who are traveling to their home, for leisure, or for attending school or college do not have significantly different choices of selecting any transit mode to reach a metro station compared to those who are traveling to reach their place of work.

The average transit distance to reach metro stations among riders who used a bus or a personal automobile in this study were 2.23 km for bus riders and 1.83 km for

car owners who prefer to drive and park at metro stations. The average distances for commuters who are dropped off are 1.83 km, and 1.79 km for the those taking an auto- or cycle-rickshaw. The average walking distance was 1.17 km for those who walk, signifying that people are willing to suffer inconvenience in terms of more time for a metro ride, possibly because respondents have a strong preference for metro compared to other public or private transit modes. This finding is important when implementing multimodal development around metro stations by providing improved estimates of the number of potential riders who require parking or bus services. Improved pedestrian development plans could also be suggested around the stations. The result shows that vehicle ownership results in people using them to reach metro stations. Also, our result signifies that more metro riders are attracted by provision of improved parking lots and bus services to reach metro stations.

15.5 Conclusions and the Way Ahead

With urban traffic congestion becoming an acute concern, transportation researchers have begun to pay closer attention to commuters' trips, households, and individual behavior, especially those trips made on weekdays. This study was a commuter mode choice study conducted to assess rail transit behavioral of metro rail transit riders. The results indicate that females tend to prefer auto- or cycle-rickshaw rather than walking to the metro station. The younger commuters are more likely to be dropped or to take the rickshaw. The working-age populations are less likely to walk and rather opt for other transit modes. A higher level of education among respondents lowers their likelihood of walking to stations. Income level impacts a commuter's transit choice of reaching metro station, as low-income household members are more likely to walk or take a bus than use their own vehicle or hire a rickshaw. Students are more likely to be dropped off compared to the other occupational classes. The family size-related coefficients were found to be not significant for any of the mode choices used to reach metro stations.

No significant mode choice preference was observed for different trip times, frequency of making a metro trip, or the purpose for which the trip is made. The commuters traversing a greater trip distance are more likely to walk to stations than take a bus or be dropped off. However, as expected, as the distance to reach a metro station increases, the lesser is the likelihood of a commuter walking to a station. This variable was significant for all the transit modes, denoting a comparatively strong preference for opting for non-walk modes when distance to a station increases. The results thus showed heterogeneous preferences for the individual, household, and trip characteristics.

We assumed that the transit modes and the socioeconomic variables of this discrete choice model were exogenous. It might be argued that the selection of mode choice is correlated with the error term (endogenously determined) for a ridership survey conducted at a different snapshot in time. If endogeneity arises for this particular case, the estimated coefficient of transit modes will be biased upward/downward depending on the direction of the correlation with the error terms.

Potential solutions to correct for endogeneity are the use of instrumental variables or determining the endogenous variable by equilibrium model (Besanko et al. 1998, pp. 1533–1547). Correction for endogeneity bias was beyond the purview of this paper.

Understanding present and future individual preferences for metro rail is an important policy tool. Although the findings suggested that an individual's transit mode choices are determined by their individual traits and trip characteristics, periodic revisions of these studies are certainly important to formulate policies based on changing rider perceptions and preferences. Further different approaches might be used to gain insights regarding rider welfare measures and TOD to be adjusted for different policy contexts. For instance, the use of meta-analysis is particularly interesting to validate and explore the systematic and identifiable variation of rider preferences to determine the appropriateness for metro facility improvement or expansion. Another situation considered for this study was that we assumed that people were homogeneous within each day. However, a person's choices might be influenced by different geographic locations within a city and the preferences of other people. Thus, a more specific level of aggregation or an incorporation of spatial variation could be a plausible extension of this study.

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Chapter 16

Mobility, Marginality, and the Cycle-Rickshaw in Indian Cities

Gopa Samanta

Abstract As a slow-moving vehicle, the rickshaw has never been popular in the cities of the West, dominated by speed and motorized transport. However, the rickshaw was initiated as a means of intraurban transport in the cities of developing countries by the Western rulers during the colonial period. In the cities of Asia, the rickshaw has always been a popular means of mobility for shorter distances. The smaller the size of the city, the higher is the need of the rickshaw, because most city streets in Asia cannot accommodate motorized public transport. The importance of the rickshaw in Indian cities is significant not only because of its role in carbon-free transport but also for its role in generating livelihoods for a large number of urban poor. It is a significant sector of the informal labor market, accommodating the urban poor as well as fresh migrants from the rural catchment areas of the city. However, at present, in most of the cities of India the rickshaw is being discouraged by city governments as a nonviable mode of transport. This chapter explores the diverse mobility issues and marginality around the rickshaw and rickshaw pullers in Indian cities. The paper is developed from a broad base study on rickshaws in the cities of West Bengal province in India.

Keywords Informal transport • Marginality • Mobility • Rickshaw • Small cities

16.1 Introduction

The role of the rickshaw, in spite of its significant contribution to urban mobility, has never been acknowledged by Indian policymakers. A number of mobility issues are involved in studying the rickshaw in a developing country context: intra-urban mobility, mobility of rural poor to cities, and mobility in the informal sector. The majority of research on the rickshaw has considered each of those issues separately, and therefore the rickshaw remained highly under-researched in mobility studies.

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In the transport policy of India, it is seen as a symbol of backwardness and as the main cause of traffic congestion on the city roads. The increasing number of rickshaw is being acknowledged by the transport planning commission, and an important concern of the policymakers of each and every city regarding the rickshaw is either to ban or to control their numbers. Although many efforts have been expended by policymakers to control its entry, rickshaw pulling is one of the fast-growing informal labor markets accommodating the mobility of the urban poor as well as that of new migrants coming from relatively backward rural areas around the cities. The sheer size of the rickshaw sector, in the economy of the city, is much greater than often estimated: it includes, for every male employed, at least three dependents, owners, repairers, tea-stall operators, and shopkeepers (Lahiri-Dutt and Williams 2010). Estimating their number is even more difficult than estimating the numbers of rickshaws or their contribution to the Indian economy.

The rickshaw is widely used in Asian countries in varying styles and is called by various names, such as *trishaw*, *pedicab*, *cyclo*, and *becak*. It has also been referred to as the ‘developing world’s taxicab’ (Kishwar 2009). The design of a rickshaw may vary from country to country, but the technology—constructed from the old-fashioned bicycle—remains the same. In contrast to bicycle technology, which has developed dramatically with ultralight-weight materials, cycle-rickshaws have not changed much (Rajvanshi 2002) as cycle-rickshaws were welded and bolted to a heavy steel and wood chassis seat (http://www.the-south-asian.com/June2002/cycle_Rickshaw). The Japanese claim they invented the *jin riki sha*, or ‘man-powered car,’ back in 1867, when a trio in Tokyo drew inspiration from the horse and carriage. Others credit the concept to Jonathon Goble, a Baptist minister who was an American missionary in Yokohama. He is said to have devised the rickshaw when the health of his sick wife deteriorated and she was unable to walk. Modest as the rickshaw may be, it was an improvement over sedan chairs, and within a decade, Japan had nearly 200,000 on its streets, and it spread throughout Asia. It is believed that Chinese merchants introduced the vehicle to Calcutta in 1900 to carry their goods. Forty-nine years later, China banned the conveyance after the Communist takeover. The rickshaw or its variants are still a common mode of urban transport in different countries of Asia such as Thailand and Vietnam (Samanta and Lahiri-Dutt 2004).

This human-powered vehicle is dominantly found in the cities of Bengal in comparison to other states in India. It may be rooted in the transport culture of Bengal, which started with the palanquin (the culture of *Bangali Babu*, meaning Bengali gentleman) in nineteenth-century colonial Bengal and was replaced by the rickshaw in the twentieth century. Although the palanquin was used by the rich people of Bengal, the rickshaw is a mode of transport catering to the needs of all classes in a city. Kolkata (the capital city of Bengal) got its rickshaw in the early twentieth century, and it came to the other cities of Bengal as a means of transport around the 1950s. This useful mode of transport, although a colonial import, has flourished faster to serve the narrow and winding roads of the cities of Bengal. The increasing number of rickshaw is, however, not always related to the increasing

demand for transport in the cities. It is rather related to the increasing entry of poor in the urban labor market, especially from rural areas, to whom rickshaw pulling is the easiest option for livelihood in the cities. Rural unemployment and joblessness are, therefore, one of the reasons for the flourishing of the rickshaw in the cities of India.

The present chapter focuses on a number of research question regarding the rickshaw and its role in the urban mobility pattern in the cities of India. The basic objectives of the paper are to understand the historical development of the rickshaw as a mode of urban transport in cities; to identify the status of rickshaw pulling as a flourishing informal urban economy; to analyze the policies of city governments on the role of the rickshaw in urban mobility; to understand people's perceptions of the viability of the rickshaw as a significant mode of urban transport; and last to explore the livelihood crisis of rickshaw pullers. An in-depth empirical research was carried out in a few small and medium sized cities of West Bengal to better understand different issues related to the rickshaw and rickshaw pullers in urban mobility. This empirical study, based on both quantitative and qualitative methods, however, is not intended to generalize the rickshaw population in Indian Cities. The quantitative method of a structured questionnaire is followed to generate a database on the livelihood issues of the rickshaw pullers. The structured questionnaire survey covers a sample of 200 rickshaw pullers in five cities covered for this research. Focused group discussions were conducted and informal interviews were used as qualitative research methods to understand the policies of the city government and the perceptions of citizens about rickshaws. The field research covers interviewing a different sections of people in the cities, starting from rickshaw pullers, rickshaw contractors, and rickshaw union leaders to common citizens (both users and non-users of the rickshaw) and policymakers at the city level.

16.2 The Rickshaw in Indian Cities

The rickshaw has always been an effective and popular mode of urban mobility in the cities of India since it was introduced in Kolkata in 1900. Later on, it was introduced in other parts of India and in almost all cities including Delhi (in the 1940s). The rickshaw in Indian cities can be considered as a colonial form of mobility imported by the Chinese immigrants. Although in Kolkata there are both hand-pulled rickshaws and cycle-rickshaws for carrying passengers, in all other cities of India it is only the cycle-rickshaw that operates as an effective vehicle for Intra-city movement. This popularity of the rickshaw in Indian cities has both historical and economic reasons. Besides the increasing demand for a vehicle for effective intra-urban mobility, the rickshaw has flourished in Indian cities for the migration of the rural poor without much education or capital into the cities in search of jobs for whom rickshaw pulling is the best option available. Although there are ongoing debates on the poverty estimates and on measuring indicators for estimating the levels of poverty, according to the Urban Poverty Report 2009, the average level of

present urban poverty in India is 25.7 % (Rustagi et al. 2009), and the majority are fresh rural-to-urban migrants (Singh 2009). These people, mostly coming from the agricultural sector, are being engaged in the casual and self-employed informal work available in the cities (Jeemol 2009), among which rickshaw pulling is significant because of its ease of entry (Kishwar 2009) without any capital investment.

Rickshaw pulling as an occupation gained popularity in Indian towns and cities after World War II (Kumar 1989). The National Transport Policy Commission of India in 1980 recognized rickshaw pulling as a fast-growing occupation in Indian cities to meet the growing demands for transport and estimated the increase in the numbers of rickshaws from 1.3 million in 1979 to 2.3 million in 2000 (Nayak 1989). According to another estimate (Rajvanshi 2000), close to 2 million cycle rickshaws ply the Indian roads carrying at least 6–8 billion passengers every year. Although the rickshaw is a powerful symbol and reminder of a feudal past (Sen 1996), this non-motorized vehicle is preferred by the citizens to get the vehicles at their doorsteps. However, in the globalizing cities of India, the Government spends for motorized vehicles by constructing flyovers (overpasses) and widening of roads and does not make any space for non-motorized vehicles, including the rickshaw, on city roads. Kishwar (2009) argues that the Government should give priority to the rickshaw, not only for its eco-friendly nature but also because it occupies less road space in comparison to a car and has greater flexibility of movement in congested areas. Therefore, in the history and geography of urban nobility, the rickshaw has its own merits of being an effective practice. In the urban mobility context, the rickshaw has historical roots as well as contemporary demands. The history of the rickshaw is a history of colonial mobility in India, and the contemporary demand of the rickshaw is subaltern in nature as it is the demand of women, elderly, and poor rickshaw pullers, all representing marginal communities in cities (Samanta and Roy 2013).

16.3 ‘Modernity’ in Urban Mobility and the Rickshaw

The rickshaw has been outlawed in many countries of the world on grounds of being exploitative and inhuman to the poor. In Pakistan, both the hand-pulled and cycle-rickshaws have been banned since the late 1950s or early 1960s and have been replaced by auto-rickshaws, which are now quite popular there. In China, the rickshaws were drastically cut off from the city roads after the foundation of the People’s Republic of China in 1949. Although the rickshaw gained popularity in Hong Kong after World War II, new rickshaw license has not been issued since 1975. In some cities of Asia, a few rickshaws have been retained as heritage vehicles, mainly for tourists. However, in many Asian cities, the cycle-rickshaw is very much present in the city as a form of urban means of mobility; their contribution to total urban mobility is sometimes very high, as in Dhaka in Bangladesh and many other cities of Indonesia, Malaysia, and India. Although the rickshaw always remains invisible to the city planners in the cities of India (GOI 2006) and Bangladesh, it is

still a prime mode of urban transport. The Dhaka Urban Transport Project (DUTP), in a study conducted in 1998, estimated that the number of pedestrian passengers is quite high (nearly 60 % of total passengers) and that the numbers of passengers dependent on the rickshaw and motorized vehicles are 19.2 % and 6.8 %, respectively (Shams et al. 2005). According to them, at present there are about 80,000 licensed rickshaws plying in Dhaka City on an unofficial basis; these estimates may go up to 500,000. This situation is also a result of the increased rural-to-urban mobility of the poor people who join this occupation. According to Begum and Sen, about 83 % of the rickshaw pullers select this occupation because of the “ease of entry,” especially for those people who are illiterate, poor, and not trained in any other profession (Begum and Sen 2004).

Asian cities are currently passing through a phase of globalized modernization, in which the motorized forms of mobility are prioritized and non-motorized forms are deprioritized in the name of ‘speed’ and ‘modernity.’ Indian cities are also no exception to this trend. In this era of globalization, they are all competing to receive accolades that will classify them as a ‘global city’ and an ‘engine of growth.’ If we look at the National Urban Transport Policy of the Government of India, we can easily trace this trend in the name of the ‘greater common good.’ The policy says that with increasing urban sprawl and rising income levels, non-motorized transport has lost its earlier importance. Statistics show that the share of bicycle trips of the total trips in Delhi has declined from 17 % in 1981 to 7 % in 1994. Longer trips have made cycling more difficult. Further, non-motorized modes are also exposed to greater risk of accidents as they share a common right-of-way with motorized vehicles (GOI 2006). The persons killed in road accidents are mostly poor, more especially cyclists, pedestrians, or pavement dwellers. The pro-motorized policy also argues for the need to increase the average speed of traffic to reduce emissions resulting from suboptimal speeds. Although it recommends specific paths for non-motorized vehicles, this recommendation is limited to only certain parts of the city and is designed to fill the gaps to connect places to the motorized public transport system. Non-motorized transport does not pollute the city air and therefore is also encouraged on the ground of its environment-friendly nature. The policy never takes into consideration the right of non-motorized transport on the city roads, which makes these forms of mobility ‘subversive.’ The actors of non-motorized transport are never asked to give their views in the policy design or implementation activities, and therefore, their voices remained ‘subaltern’ (socially and politically outside the hegemonic power structure).

The National Urban Transport policy says that the Central Government would give priority to the construction of cycle tracks and pedestrian paths in all cities to enhance safety and to encourage the use of non-motorized modes under the Jawaharlal Nehru National Urban Renewal Mission, JNNURM (a massive city-modernization scheme launched by the Ministry of Urban Development, Government of India, in 2005 to improve the quality of life and infrastructure in the cities). However, in reality, the major investment in the JNNURM was allocated for construction of flyovers to ease the mobility of private transport, especially cars. Although in a few cities provision has been made for non-motorized transport, the

experience has generally been that many such cycle tracks and pedestrian paths do not get used as initially envisaged, because these facilities are designed badly and without fully recognizing the limitations and problems faced by cyclists or pedestrians. In the name of an appropriate mix of various modes of transport, these roads were actually made exclusively for motorized transit. Pedestrian safety is also adversely affected by the lack of safe crossing facilities at busy intersections even in high-traffic corridors. The cost of travel, especially for the poor, has therefore, increased considerably, largely because of the decline of the use of cheaper non-motorized modes such as cycling and walking. Further, with population growth, cities have tended to sprawl, and increased travel distances have made non-motorized modes impossible to use. This configuration of events has made access to livelihoods, particularly for the poor, far more difficult (GOI 2006).

16.4 Rickshaw Pulling and Mobility into Bazaar Economy

Rickshaw pulling is an important informal activity in the cities of India. The substantial literature on the urban informal economy of developing countries (Sood 2012; Jeemol 2009; Mukhopadhyay 1998; Aziz 1984; Papola 1981; Joshi and Joshi 1976) is predominantly orientated toward the idea that rural–urban dichotomy in the developing world leads to rural–urban migration, which consequently inflates the urban informal sector. Rickshaw pullers in cities are dominantly illiterate migrants from rural areas lacking year-round jobs, who move into the city’s inflating bazaar economy and often end doing rickshaw pulling as they do not have many other options available in the cities. Moreover, the cities are increasing in size at a faster rate, without the advantage of public transport, thus increasing the scope for the rickshaw to meet the demand for mobility in those newly developed areas.

The International Labour Office (ILO), in its report on Kenya, distinguished the informal sector from the formal one by defining the former as to be characterized by ease of entry, reliance on indigenous resources, family ownership, labor intensiveness, and adapted technology, skills acquired outside the formal school system and unregulated market (ILO 1972). Apparently this has come to be the most widely accepted definition, although Mazumdar (1975) added the lack of unionization as another significant feature. Rickshaw pullers in Indian cities bear all the characteristics of an informal sector following ILO guidelines. However, Mazumdar’s additional characteristic of the informal sector, that is, lack of unionization, does not apply to the rickshaw pullers. They are highly unionized in most of the urban centers in west Bengal, and the political parties are keen to bring the rickshaw pullers under their union as they provide a good pool of voters. Therefore, around rickshaw pulling, there are high levels of political mobility, which make this sector of economy fluid, between formal and informal. Our empirical research in Burdwan observed that the rickshaw unions were so strong in this city that the city government could not introduce the auto-rickshaw in the 1990s because of their opposition. This

observation indicates that in spite of being a marginal community in the cities, the rickshaw pullers can have a big role in political movement to control policy decisions.

The rickshaw pullers are the *squatter citizens* ubiquitous in cities and towns of the developing world, and their rag-tag machines have long caught the imagination of Western travelers and tourists. Initially, these workers were seen as unproductive (Mazumdar 1975; Fields 1975; Lal 1973; Todaro 1969). Seminal authors such as Geertz (in his 1963 study) who used the word ‘*bazaar*’ economy made the point is that the bazaar economy is not conducive to economic development. In sharp contrast to this view, however, recent empirical literature has increasingly seen the informal workers as dynamic and efficient, responding successfully to changing demand in the economy and contributing significantly to income and output (Bhattacharya 1996; Sethuraman 1976). Agreement on the fact that the growing proportion of economic activity in developing countries is actually informal in nature has placed informal workers such as the rickshaw pullers at the center of economic development debate. Informal activities such as rickshaw pulling provide at least some economic opportunities for the rural migrants and urban poor, often providing services and commercial activities at a low level of economic utility. Instead of informal sector, Sen (1996, p. 2978) preferred the term ‘the unintended city’ to define rickshaws and rickshaw pullers in the city. According to her, this is a city/society that has grown within and beside the intended city and society, and the existence of this city is neither planned nor intended, either by ruling sections and their planners or, in any collective or deliberate sense, by its own members.

Many of the migrant men employed as rickshaw pullers in the cities often leave their families behind in the villages, and they may not return to their villages for months at a time. In an empirical study on the rickshaw pullers of Allahabad City Misra (1983) identified four types of migration on the basis of duration of migration and frequency of rural–urban contact established by rickshaw pullers: circulatory, semi-circulatory, seasonal, and permanent. The rickshaw pullers live in slums in different locations of the urban centers nearer to which they operate their rickshaw-pulling activity. The contribution they make as a collective body of labor to the Indian economy is massive, although there is no record whatsoever of this value. Rickshaws are also one of the largest sources of employment in Indian urban centers, employing millions of people.

16.5 The Rickshaw Pullers

The rickshaw pullers are the poorest of the poor even among the various urban informal workers in Asian cities (Ravi 2006; Banerjee and Kumar 2011; Samanta 2012; Rahman and Assadekjaman 2013). They originally come from backward rural areas, and rickshaw pulling appears to be a relatively easy livelihood option on their arrival to the city (Begum and Sen 2004). They put in hard physical labor and have most uncertain and insecure jobs, often verging on illegal operations. There is

a high degree of mobility around rickshaw ownership. Very few rickshaw pullers own their vehicle, and most of them ply hired rickshaws. It may seem, superficially, that there is an element of self-employment in their work, but any systematic study would show that they are merely sellers of labor power with no control over the means of work they do (Kumar 1989). Empirical study in different cities shows that only about 27 % have their own vehicles. Most of these ownerships are again illegal, that is, rickshaws without registration. The remaining 73 % are usually owned by a few contractors who rent those out to pullers on a daily basis. The proportion of ownership of rickshaw has remained unchanged since 2001 (Samanta and Lahiri-dutt 2004), primarily because of a complete neglect of the rickshaw pullers' economic well-being by the local and state administrations. The shortage of registered rickshaws leads to high competition in obtaining a rickshaw, even on hire. Harassment by the police is a major feature of the criminalization of poor rickshaw pullers; pounding of illegal rickshaws and fines for noncompliance to various rules are common features. However, none of these various rules is followed strictly; the police at times take up special drives to seize the rickshaws without a registration plate. The municipal authority then takes a payment to release the seized rickshaws.

The average age of rickshaw pullers is between 20 and 40 years. This young age group is the most common in this profession, constituting about 68 % of the total sample. The rickshaw pullers in this age group are mostly fresh migrants as there is a greater tendency among young people to migrate to the cities in search of jobs. Rickshaw pulling requires physical strength and endurance therefore, the number of rickshaw pullers decrease in older age groups. Both the morbidity and mortality rates are very high in this profession, and many die before old age. The existing rickshaws are so poorly designed that running them takes a heavy toll on the health of rickshaw pullers (Rajvanshi 2002). Cycling on an empty stomach and at poor levels of nutrition affects their health badly. Because of this physically demanding job (Shams et al. 2005) and the exhaustive physical labor throughout the day, the pullers start suffering from an age above 40 to 45 years (Rahman and Assadekjaman 2013). They often suffer from extreme physical weakness. The common diseases from which the rickshaw pullers suffer are aches and pains, tuberculosis, asthma, cardiac problems, and peptic ulcer. To obtain energy for their hard physical labor and to overcome the consequent fatigue, many of them (85 % of the survey respondents) smoke *beedies* (country cigarettes without a filter), chew tobacco, and drink alcohol (38 % drink country liquor every day and another 42 % drink twice or thrice a week). They sometimes smoke 20–25 *beedies* (one single pack) per day to maintain economic mobility, which affects their lungs and chest, thus shortening their life span.

Average family size is not very high among the rickshaw pullers. In most cases (61 % of the respondents), the number of children is one to two per person. The rickshaw pullers are much aware of the financial burden of having many children, which has helped to reduce the number of children per family. The permanent residents and the second-generation migrants (whose father has migrated to the city) usually maintain their families in the town and the first-generation migrants

tend to keep their families in their village home. The level of literacy among the rickshaw pullers is relatively low. More than half, that is, 53 %, of them are illiterate. Of the remaining 47 % who are literate, 35 % and 12 % have primary and above primary education, respectively. However, almost all the rickshaw pullers send their children to school. They want to continue their children's education as long as they can in spite of their low level of income, as they do not want their children to continue in this laborious and unhealthy profession.

The income of any informal sector is difficult to measure with precision because of the irregular nature of the informal sector itself (Bhattacharya 1998). The income of rickshaw pullers varies widely depending on the duration of work and on the seasons of the year. About 86 % of the rickshaw pullers are engaged in this occupation throughout the year, whereas 14 % do this job seasonally. These 14 % are seasonal migrants in the city, leaving their family in the village to come to earn some money during the lean season in agricultural laboring. Moreover, people usually hire more rickshaws in summer and rainy seasons than in the winter. Considering all these factors, this survey has been done very carefully to calculate the actual average income of the rickshaw pullers. The average daily income varies between Rs. 100 and Rs. 250 (84 % of respondents). The average income of rickshaw pullers decreases with their age. Although this income is meager compared to the present prices of essential commodities in India, the rickshaw pullers prefer rickshaw plying as it is a year-round job having a more or less steady income.

Among the rickshaw pullers, almost 45 % are the single earning member in the family, having several dependents. In the remaining 55 % of households, there is a second (38 % of respondents) or a third earning member in the family. The practice of savings is almost nil among the rickshaw pullers. They earn just about enough to barely subsist. About 25 % of them have some kind of a savings account, either in banks or in post offices. However, having savings in fixed deposit schemes is rare among them with only one or two exceptions. They cannot arrange food even for 1 or 2 days if they do not go to work due to illness or any other reasons such as *bandh* (strike). Therefore, neither their small income nor their informal jobs provide economic security.

The nature of housing is an important economic indicator, rickshaw pullers being 'illegal citizens' who often live in substandard housing (Hardoy and Satterthwaite 1989). About 73 % of the rickshaw pullers live in their own houses whereas 27 % of them could not buy a house in the city and live in a rented house. Most of these are located in the low-cost slum areas of the town and the quality of housing is poor. Although the family and the number of children have come down to a smaller size at present, the poverty situation is still significantly dire among them. They often cannot buy shoes, a hat, a raincoat, the things that are very necessary to ply a rickshaw in the city. They often fall sick in summer from plying a rickshaw in the hot sun and in the rainy season from getting wet in heavy showers that sometimes continue for the whole day. Although they can manage to buy a small piece of polythene sheet to protect their passengers from rain, they cannot buy a raincoat to protect themselves.

16.6 Rickshaws and the City Governments

Policymaking related to urban transport in India has focused predominantly on road infrastructure development and transport system management to accommodate and improve traffic characteristics of motor vehicles with a particular focus on congestion (Badami 2009, p. 43). Rickshaw pulling and rickshaw pullers are a sector that has somehow been entirely left out of the Indian government's planning agenda in urban transport, except to move them out of metropolitan cities (Sood 2012). The rickshaw has always been seen by the urban local government in India as a 'problem' on city roads. In the government policies, the 'rickshaw question' has been addressed in many ways: by banning them from the main roads, by trying to make separate lanes for them on the major arterial roads, and by trying to regulate the number of illegal rickshaws, whether by periodic inspection of licenses or by not issuing them at all (Lahiri-Dutt and Williams 2010). To my question to the policy-makers in different cities of Bengal, "Why is the rickshaw not encouraged in cities as an effective mode of transport?" the answers are varied, which helps us to understand how the role of the rickshaw is perceived by the policymakers. Some mentioned that rickshaw is a costly mode of transport and citizens do not want rickshaws at all. Some opined that a rickshaw is a very slow mode of transport and is the main reason for the traffic congestion and consequent traffic jams often occurring on city roads. Some others mentioned that the rickshaw is a symbol of backwardness and affects badly the image of a city. These attitudes about the rickshaw strengthen our argument that the role of the rickshaw in urban mobility is grossly underestimated by policymakers at national and state as well as at local levels.

Among the three arguments against rickshaws as an effective mode of urban transport made by the city governments, the first one is relatively grounded, whereas the second and the third arguments are proved to be invalid by empirical research findings in different cities of India (Sen 1996; Mitra 2003; Kishwar 2009). The National Transport Planning Centre identified the cycle-rickshaw as a cheaper mode of transport and as the vehicle of the less affluent groups in underdeveloped cities (Kumar 1989), catering to the needs of the poor and the middle class in the city. On the basis of field research it has been observed that nowadays the rickshaw is neither a cheaper mode of transport nor does it serve the lower middle and poor classes. Therefore, poor people cannot afford to hire a rickshaw; rather, it is the middle and upper class who use a rickshaw for relatively shorter distances. Even the car-owning class in the cities uses a rickshaw for moving to certain places in the city where there is no parking space for a car. The posh residential areas in India such as Salt Lake City in Kolkata still depend on rickshaws to reach the main road to take a motorized transport vehicle (taxi, bus, or auto-rickshaw) as these cannot be available at their doorsteps.

Another argument made by the city governments against rickshaws is about congesting city roads and the creation of traffic jams. But the question is: Do only rickshaws cause congestion? Cars usually occupy more space on city roads, but they

are never discouraged either by the transport departments or by the respective city governments. A car takes at least eight times the road space as compared to a rickshaw, not only because it is bigger in size but also because road safety demands at least 10 to 15 ft of space between one motorized vehicle and another (Kishwar 2009). There is no comparable limit imposed on the number of cars or other motorized vehicles in the cities. Between 1995 and 2004 there has been an increase in the number of cars from 633,802 to 1,314,672 in a single city of Delhi against an increase of registered cycle-rickshaws from 46,231 to 49,838 (Cox 2010). According to a recent estimate (Indiatogether 2010), 2,00,000 motorized vehicles are being added per year to Delhi without any attempt at control. The responsibility for road congestion is often placed on rickshaws only as they can easily be removed by the city government on the ground of illegality. The rickshaw is also considered by the city government as a slow mode of transport. However, it has been observed that on narrow congested city roads speed does not vary much between rickshaws and motorized vehicles.

The rickshaw pullers have, in recent years, given rise to a very important public debate implicitly involving the lives, livelihoods, and futures of a huge population, which is among the poorest and most exploited sections in the metro cities. Such debates are more frequently observed in cities of Kolkata (state capital of West Bengal) and Delhi (the national capital). The debate on rickshaws is so popular in Indian cities that it sometimes enters into the agendas of the election manifesto of political parties. In the mid-1990s, the state government of West Bengal took rigorous initiative to ban both hand-pulled and cycle-rickshaws from the city of Kolkata. In case of Kolkata City (Sen 1996), the rickshaw pullers were viewed as 'dispensable' by traffic planners and politicians in their efforts toward city modernization. In Delhi, Government law permits only those rickshaw pullers who own their rickshaw. The seizing of rickshaws is very common in many cities of India, but the occasions vary from rickshaws without lights and non-registered rickshaws to rickshaws entering into the no-rickshaw zone. The bribe taken from rickshaw pullers on grounds of not seizing a rickshaw sometimes reaches a very high amount. According to a survey done by MANUSHI (a Delhi-based NGO), Delhi government employees take nearly Rs. 100 million per month by way of bribes from the rickshaw pullers and rickshaw owners in Delhi (Indiatogether 2010).

16.7 Users' Response on Rickshaws

In an opinion survey done in Burdwan City by a local newspaper (SAMBAD in Bengali) in 2009, on choosing a rickshaw or auto-rickshaw as the more effective mode of urban transport, it was observed that 90 % of the citizens of Burdwan town were in favor of the auto-rickshaw. A similar study (Shams et al. 2005), done in Dhaka City, also observed that the majority of the commuters do not want the rickshaw for mobility in the city; the citizens preferred the auto-rickshaw because of its cheaper cost and faster speed. The question of pollution

produced by the auto-rickshaw was not addressed in the opinion survey. Our field survey indicates that the non-polluting nature of rickshaw in urban mobility is prioritized neither by the policymakers nor by the citizens. Citizens not using rickshaw feel that is not required in cities. A small section argues that allowing rickshaw pulling to continue in the city is an issue of violating human rights.

In the field survey on the need of the rickshaw on city roads, it was found that the responses are highly gendered. To understand the pattern of response and its gendered aspect, we have to understand first the pattern of use of the rickshaw. If we ask who uses rickshaw in the city, then they are mostly elderly men and women of all age groups who do not own personal motorized vehicles or are unable to ride bicycle. In Indian cities, the social status of the upper and middle class still does not permit women to ride a bicycle. The mobility of women is still restricted in public spaces, especially in small and medium cities, where societies are dominantly controlled by the feudal rural families coming into the cities from their surrounding agriculturally rich hinterland who are more bounded by the social norms for women. Here, women have to bear the responsibility of protecting family honor and therefore they cannot operate any vehicle such as a bicycle. This gendered nature of mobility is therefore a cultural issue associated with the concept of modernity that controls women's dress, nature of mobility, and use of vehicles (Huq-Hussain and Habiba 2013). In contrast, the use of rickshaws is low among the men as they always use their own vehicle, either a bicycle or motor cycle. In our question to the men on the need of rickshaws in urban mobility, their immediate responses were 'The rickshaw is the source of all traffic problems on city roads; therefore, the city government should immediately ban rickshaws in most parts of the central areas of the city. Rickshaws can ply the outer fringe areas of the city, where vehicles are few.'

The necessity of the rickshaw in cities is highly prioritized by women commuters as their mobility is enhanced by the rickshaw. The rickshaw is a significant mode of transport for their daily needs of mobility such as going to the railway station or to the bus stand, for getting to their workplace outside and within cities, going to drop off and pick up their children from their schools, going to the market, etc. Most women who we interviewed stated that getting a rickshaw is always a big relief for their outside mobility in cities. The rickshaw, therefore, has a big role in the social mobility of women in small and medium cities, which is usually dependent in nature. The policymakers in cities, who are mostly men, either do not understand that or do not want to take care of the need for the rickshaw in cities for the effective mobility of women.

16.8 Rickshaws in Small and Medium Cities

In contrast to large metropolitan cities, the small and medium cities of India lack a developed public transport system, and therefore the people living in those cities depend on their own vehicle or the rickshaw for mobility in the cities. The need for rickshaws is increasing at a faster rate as most of the cities are not served by the

town bus because of the narrow width of their roads. To meet that rising demand, many new unregistered rickshaws took to the roads of the city as the cost of making a rickshaw is only Rs. 6000–7000 (US\$135–155). This increase in unregistered rickshaws provided livelihoods to a large number of poor people either from the city or from the surrounding countryside. Also, a huge number of rickshaws are plying the city roads that are registered with the *gram panchayats*¹ located in the surrounding rural areas of the city. Therefore, at present there are three types of rickshaws on the city roads: rickshaws registered with the municipal authority, rickshaws registered with rural *gram panchayats*, and unregistered rickshaws, blurring the distinction of legal and illegal. All are contributing significantly to the urban mobility of the city. The approximate ratio of registered to unregistered rickshaws in cities varies between 1:3 and 1.5. This ratio for unregistered rickshaws increases further in the peripheral areas of the cities as in these areas rickshaws are not controlled by the police. Such coexistence of registered and unregistered rickshaws, legal and illegal, is typical of the informal urban economy of developing countries. There is no record of the exact number of rickshaw pullers in the cities and it is also difficult to estimate. The inherent problem with the policy of the local governments has made rickshaw pulling an illegal informal activity in the city. The numbers of rickshaw pullers have significantly increased with the increasing number of rickshaw pullers commuting from the surrounding rural areas. At present, 18 % of the rickshaw pullers are commuters from a number of rural places within a range of 40 km from the cities. This increase in commuter rickshaw pullers is a recent phenomenon, as in our earlier study (Samanta and Lahiri-dutt 2004) we found hardly any commuter rickshaw pullers (6 of 400). Also, there are large numbers of pullers who work seasonally in this job and ply rickshaws only during the lean season of agricultural labor.

From the field survey, it was found that most of the rickshaw pullers are plying rickshaws that they do not own. They hire rickshaws from the rickshaw contractors on a daily basis, which indicates the gap between policy and practice and the negligence of the city government in governing rickshaws. In a parallel search for the rickshaw driver-owner, it was found that the majority of them have sold their rickshaw in financial emergencies and these were bought by rickshaw contractors for their business of renting out rickshaws. At present one rickshaw registration plate can be sold at Rs. 60,000 to Rs. 70,000 because of the very limited supply as against a huge demand for registered rickshaws in the city. There exists an organized union for both rickshaw owners and rickshaw pullers in the cities. Although these unions are formed to protect the rights of their members, they have so far shown little interest in obtaining any major economic or social benefits (such as health and accident insurance, pension schemes, etc.), for the rickshaw pullers. The unions are only interested in increasing their membership and are quite strict about getting their regular subscriptions. However, they completely neglect the issues such as legalization and seizing of rickshaw or raising fares, and thus the membership in unions has dropped over time.

¹ The lowest tier of local self-government in India. *Panchayats* have been given significant administrative and decision-making powers in recent decades in West Bengal following the 73rd constitutional amendment of the Indian constitution.

16.9 Rural–Urban Mobility and the Rickshaw

Rickshaw pulling is a significant choice for fresh migrants from poorer rural areas. Inadequate income and poverty in the villages are the main causes of rural–urban mobility, supporting the ‘push’ hypothesis of migration (Bhattacharya 1998). The main advantage that a rickshaw puller has over an agricultural laborer is not so much a higher income but rather the regularity of income flow, which is missing for rural laborers working in an environment marked with high seasonality (Begum and Sen 2004, p. 23). Thus, poor people migrate to the cities to pull rickshaws to have a steady income even if it is very meager. Analysis of empirical data on source regions of rickshaw pullers shows that they have mostly migrated from rural areas located either near the city or in the distant areas of other districts as well as of other states. All these areas from which people have moved to rickshaw pulling are characterized by a highly seasonal agricultural economy and lack of other employment opportunities. Therefore, this rural–urban mobility of rickshaw pullers is controlled more by economic factors in which money plays the role of a vehicle riding upon which people move from their rural home to cities in search of livelihood options.

The hypothesis (ILO 1972; Todaro 1969; Mazumdar 1975) that the informal sector is the domain of migrants to the urban center is roughly true for rickshaw pullers of the cities of Bengal. About 65 % of the rickshaw pullers in the city are migrants and have originated from rural areas of a wider circle. Of this 65 %, the percentages of intra-district, inter-district, and inter-state migration are 35 %, 23 %, and 7 %, respectively. In the inter-district migration, the chief contributors are Murshidabad, Birbhum, and Bankura Districts, having less developed economies in comparison to agriculture, and the industrially rich Burdwan District (GOWB 2001). Bihar and Jharkhand, economically backward states of India, show the highest contribution to inter-state migration. The motive of migration is predominantly economic. People have been compelled to leave their village homes because of the lack of jobs and have migrated to the town to be absorbed in the urban informal sector.

16.10 Conclusions

In Indian cities, there is an increasing trend of a mechanized form of mobility that prioritizes use of cars and motorcycles and pushes aside a whole range of mobility such as walking, bicycles, and rickshaws. This trend is in the line of the model of development set by the international agencies and adapted by the central as well as the city-level governments. The rickshaw is entirely left out of the government’s decision making because of an ideology of development that equates modernization with mechanization and transformation with the replacement of things new. The rapid growth of motorized vehicle ownership and activity in India is causing a serious setback in the overall mobility pattern of cities in the form of traffic congestion, besides creating a wide range of serious health, environmental, socioeconomic, and

resource use impacts (Badami 2009, p. 43). At the beginning of the twenty-first century, there were close to 18 million petrol-powered two-wheelers and about 1.5 million petrol- and diesel-powered three-wheelers in India (Rajvanshi 2002), which have increased since then at the rate of about 15 % per annum.

Rickshaws are inevitably seen as slow, old-fashioned, primitive, and unproductive, the remnants of a period that India is in a hurry to leave behind, rather than as a rural-based asset in need of improvement (Gallagher 1992). The rickshaw pullers are unwanted by most citizens who do not use a rickshaw. To the government they are part of ‘the unintended city’ (Sen 1996), although they are a reality in nearly all towns and cities of the developing world, from the largest metropolis to the smallest town, and bring forward the contradictions of modern development in these countries. In spite of discouragements, the number of rickshaws has increased considerably in almost all cities in India during the past two decades.

Rickshaw and rickshaw pullers provide an interesting case in mobility studies as there are a number of mobility issues around rickshaws. Besides spatial mobility, a range of economic, social, political, and gender dimensions are present that are still under-researched in mobility studies. The present research focuses on how these different dimensions of mobility are interlinked. The spatial mobility of rickshaw pullers from rural to urban settings cannot be understood without considering the associated economic mobility. Similarly, the economic mobility of rickshaw pullers and of rickshaw owners is tightly linked with political mobility through unionized and collective action. The social mobility of women again can only be understood through the spatial mobility assisted by the rickshaw. Thus, the rickshaw demands its own ‘right to the city’ as a distinctive form of mobility that keeps the cities of India and its citizens mobile in a number of ways.

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Part VI
Housing

Chapter 17

Majority's Perception of Minority Groups on Housing Values: A Study Within the San Juan MSA, Puerto Rico

José R. Díaz-Garayúa

Abstract The importance of neighborhood characteristics in housing markets is indisputable because housing is fixed in geographic space. This research uses a survey to explore neighborhood residents' perceptions about minority groups and housing values in specific areas within the San Juan MSA, Puerto Rico. The study uncovers the ethnic variables that influence housing values. The results showed a tendency of perception based on spatial context and distance. In addition, this study helps to understand race, ethnicity, and place in the context of the island of Puerto Rico.

Keywords Ethnicity • Housing values • Puerto Rico • Segregation

Housing is one of the most conspicuous elements in the human landscape. Adequate housing units provide security and the space of common ground to initiate social relationships. However, different dynamics exist at the neighborhood level, and with these dynamics exist the possibility of inclusion of minority groups. Many scholars have conducted research on housing. This study examines the majority's perception about the effect of minority groups on neighborhood characteristics and housing values in four urban neighborhoods within the San Juan Metropolitan Statistical Area (MSA) of Puerto Rico.

17.1 Homeownership and Ethnic Groups

It is important to place the study of housing in a broader context to understand the impact of housing on society. Housing is, without doubt, complex. Its complexity lies in the socioeconomic, political, cultural, and other processes associated with life events that might affect not just one but many families. Thus, housing might

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positively or negatively affect individuals and society. It is known that housing has a domino effect on the types of opportunities that might be available for the community, such as healthcare, educational institutions, availability of jobs, and recreational sites (Santiago 1992). Very often ethnic groups have observed limitations in their possibilities of acquiring proper housing. Historically, skin color, ethnicity, and nationality have been used to limit, if not segregate, these groups. Problems of segregation occur in many societies. Segregation might be the result of legal constructs, as happened in South Africa where the government, through apartheid, encouraged segregation. The United States government encouraged and supported segregation through zoning and unofficial practices, such as “redlining” (Kaplan et al. 2004; Reibel 2000; Massey and Denton 1993; Abrams 1955). The most visible effect of these practices is reflected on the landscape. In other words, the most visible outcome of segregation is its spatial dimension.

Segregation might affect livelihood opportunities for many families because housing is one of the primary means of wealth accumulation. Massey and Denton point out “one primary means by which individuals improve their life chances is moving to neighborhoods with higher values” (Massey and Denton 1993, p. 38). Very often housing represents the most important contribution to the share of minorities’ wealth, which is roughly 60 % for both Blacks and Hispanics (McCarthy et al. 2001). Consequently, housing value change affects, either positively or negatively, a household’s wealth. Crump (2004) argues that segregated residential structures in the United States are indicators of discrimination and reduce the opportunities of minority groups. Thus, not every person has equal opportunities to become a homeowner. There are numerous examples pointing out disparities among racial or ethnic groups (Galster 1991; Gyourko et al. 1999; Choudhury 2001; Denton 1967; Gotham 2002; Crump 2004). Also, there are numerous studies on residential segregation focusing on housing values (Emerson et al. 2001; Kiel and Zabel 1996; Oliver and Shapiro 1995; Page 1995; Long and Caudill 1993; Blau and Graham 1990; Follain and Malpezzi 1981; Farley 1977; Daniels 1975; King and Mieszkowski 1973). Many of the studies suggest differences in housing values across racial and ethnic categories in the United States.

In addition, Yinger (1998) maintains that ethnic discriminations are still being experienced in the housing market by ethnic minorities. Yinger (1998) reported that real estate agents show fewer housing units to African-Americans and Hispanics than Anglo-Americans. Page (1995) supports this argument. She demonstrates that real estate agents show 10–20 % fewer housing units to their African-American and Hispanic clients in proportion to Anglo-Americans. Consequently, the ability of minorities to improve their lives through investing in real estate is limited. Blau and Graham (1990) argue that “racial differences in inheritance and other intergenerational transfers most likely play an important role in well-being” (p. 338). Throughout time, these constraints have a deep impact on the well-being of minority groups.

Acquisition of a home has historically been a problem for minority groups in many parts of the world. In the United States, the Association of Real Estate Boards used economic, social, political, and legal power to segregate (Denton 1967; Gotham 2002). Segregation and discrimination negatively impact the homeownership opportunities of minority groups. The homeownership options for minority groups

were reduced to marginal areas (Crump 2004). Thus, it is probable that when we negatively affect the opportunities of minority groups we are negatively affecting the opportunities of the whole society. More findings on housing problems are presented by Rossi and Weber (1996). They indicate that Blacks and Hispanics are less likely to be owners on any socioeconomic level. In addition, immigrants and minorities occupied worse-quality housing units in comparison to Whites and those native born (Schill et al. 1998). Many methods of exclusion have emerged. Harassment, as well as economic, political, and social isolation, is used to discourage the inclusion of minorities in society and thereby force them to live in substandard conditions. Foreigners experience these types of abuses in many countries around the world, including the free and democratically developed societies.

Thus, the majority's attitude toward minorities can perpetuate a process of segregation that disadvantages them, possibly leading to a negative social impact not only for the minority groups but also for society. Therefore, an examination of the spatial patterns of minority group residences may help to identify problems in which housing values could be affected by the perceptions of residents in spatial proximity to a minority neighborhood. In this way, relative location and neighbors' perceptions can influence housing values (Can 1998). Massey and Denton (1993) point out the existence of Anglo-American apprehensions about racial mixing in relation to weak property values and security. In fact, Massey and Denton (1993) present a survey of attitudes (Farley 1977) in which the majority of White respondents indicated their willingness to live in practically all-White neighborhoods. Precisely, the purpose of this work is to explore the majority's perception about minority groups on neighborhood effects, including housing values, in four urban neighborhoods within the San Juan (Puerto Rico) Metropolitan Statistical Area. This work offers further insight to the study of Díaz-Garayúa (2009) on neighborhood characteristics and housing values. Díaz-Garayúa (2009) examined the influence of multiple characteristics, including nationality, on housing values using nonspatial and spatial regression methods.

17.2 Ethnic Background

In Puerto Rico's recent history, Cubans and Dominicans have been the two main groups migrating to the island. They are the most noticeable minority groups of foreign origin in Puerto Rico since the 1900s. These groups arrived at the island in different migratory waves. In 2000, there were 19,973 residents of Cuban origin in Puerto Rico (U.S. Census 2000). Residents of Dominican origin in Puerto Rico numbered 56,146 (U.S. Census 2000). However, their number could be higher because the inability of the census to collect data from populations with irregular migratory status.

Dominican mass migration to Puerto Rico can be divided into three stages. The first stage occurred soon after the assassination of the Dominican President Rafael Trujillo (Martínez-San Miguel 2003). Moreover, after the U.S. intervention in 1965, there was an increase in the numbers of Dominicans migrating to Puerto Rico (Duany 2005). The second migration occurred in the 1970s and 1980s

when more educated people and skilled workers reached the island in search of economic opportunities. The last migration stage, in the mid-1990s, consisted of a significant number of working-class Dominicans (many of them arriving to Puerto Rico illegally) leaving their country after the economic crisis.

Puerto Ricans generally associates Dominicans with illegal migration. Therefore, the Dominicans have become scapegoats for many urban ills. The two most common examples include Puerto Ricans complaining that Dominican cheap labor displaces Puerto Ricans from their jobs, and the media associating Dominicans with illegal migration, prostitution, drugs, and other criminal activity (Duany 1990). Therefore, Dominicans have been marginally integrated into the Puerto Rican economy and society. However, Dominicans are not represented at the political level (Duany 2005). Nevertheless, the Dominican community has been active at the social level. “Immigrants from Cotuí, Jarabacoa, La Romana, La Vega, and Puerto Plata [areas in the Dominican Republic] have formed their own groups in Puerto Rico” (Duany 2005, p. 256).

The migratory waves of Cubans to Puerto Rico began soon after the victory of the socialist revolution whereupon there was a significant migration of Cubans to Puerto Rico (Martínez-San Miguel 2003). This migration was initiated after 1959 (Cobas and Duany 1997). Similarly, Dominican migratory waves to Puerto Rico occurred. Martínez-San Miguel (2003) points at three major migratory waves: (1) from 1959 to 1973, which might be divided into the golden exile (1959–1969) and the freedom flights (1965–1973); (2) from 1973 to 1980; and (3) from 1980 to 1995.

The socioeconomic bifurcation between Cubans and Dominicans, as well as the recognition that the Cuban population in Puerto Rico is smaller than the Dominican population, is significant for an understanding of the dynamics between immigrant groups and Puerto Ricans. Cubans in Puerto Rico enjoy more social mobility than any other minority group for different reasons. (1) In comparison to Dominicans, they are a small group, which results in less friction. (2) Cubans enjoy a different migration status in comparison to Dominicans. Cubans are almost automatically eligible for U.S. citizenship because they come from a socialist country (see Cuban Adjustment Act). (3) In general, the first Cubans who arrived in Puerto Rico, mainly businessmen and entrepreneurs, enjoyed a higher socioeconomic status (Martínez-San Miguel 2003). Also, the Cuban community, mainly in Florida, received a substantial percentage of small business loans from the U.S. government (Grosfoguel 2003). In addition, the Cuban migration decreased in the 1970s in contrast to the Dominican migration, which increased in the 1980s. Another factor contributing to the social mobility of Cubans is the perception that Cubans are whiter than Dominicans. This perception revives the ideas of racial intolerance and xenophobia.

17.3 Methods

A geographically systematic sampling approach was used to gather information on three of the four neighborhoods selected. McGrew and Monroe (2000) defined a systematic sampling method as the use of a “regular sampling interval (k) between

individuals selected for inclusion in the sample” (p. 90). This method was used for all neighborhoods but one, which was subjected to simple random sampling.

One neighborhood was subjected to the simple random sampling method because the peculiar characteristics of the area made it impossible to maintain a systematic method. This neighborhood has a high level of renter occupancy because of its proximity to the University of Puerto Rico where the majority of the renters are college students. Because the surveys were conducted on Saturdays, many of the residents of this neighborhood were unavailable, forcing the use of a simple random sample method for this area. The sample size was limited by economic resources and time. For this reason the confidence level of the sample size was down to 90 % while the confidence interval was at 10 %. The confidence level “refers to the probability that the interval surrounding a sample mean encompasses the true population mean” (McGrew and Monroe 2000, p. 101). The confidence interval is a range in which the true value is likely to exist or “an interval, or bound, [that] represents the level of precision associated with the population estimate” (McGrew and Monroe 2000, p. 98). In other words, there might be a fluctuation of 10 %, plus or minus, in the survey answers. Despite these issues, the survey remains the best method to address a series of specific questions for this research.

The survey question addresses various topics. For instance, one part of the survey addresses the resident's perception in evaluating the effect of housing value within the other community's context. Basically, this part of the survey compares the participants' neighborhood to others. A different section in the survey attends to the participants' perception about the status of their neighborhood characteristics as well as in four other neighborhoods. In this way, each resident is assessing their perception about their neighborhoods in contrast to others. Following this section, another section of the survey examines the participants' perceptions in assessing the impact of neighborhood characteristics on housing value. The final section of the survey examines participants' attitudes and perceptions about the relationship between minority groups and housing values. The last section creates the foundation to suggest a tendency related to the association of minority groups to housing value. Generally, the survey identifies a trend for one specific minority group. Following this question the participants had the opportunity to explain their answers.

17.4 Study Area

The study area is located within the San Juan MSA, Puerto Rico. The neighborhoods are located within the San Juan MSA in the following *municipios* (administrative areas roughly equivalent to U.S. counties): Bayamón, San Juan, and Carolina (Fig. 17.1).

Various neighborhoods were surveyed and some of them were consolidated because of their characteristics (Fig. 17.2). These sites share some similarities but also some differences. The neighborhood of Santa Rita, located in the Río Piedras district (*municipio* of San Juan), has several peculiarities. First, the main campus of the University of Puerto Rico is located nearby and a large number of the residents

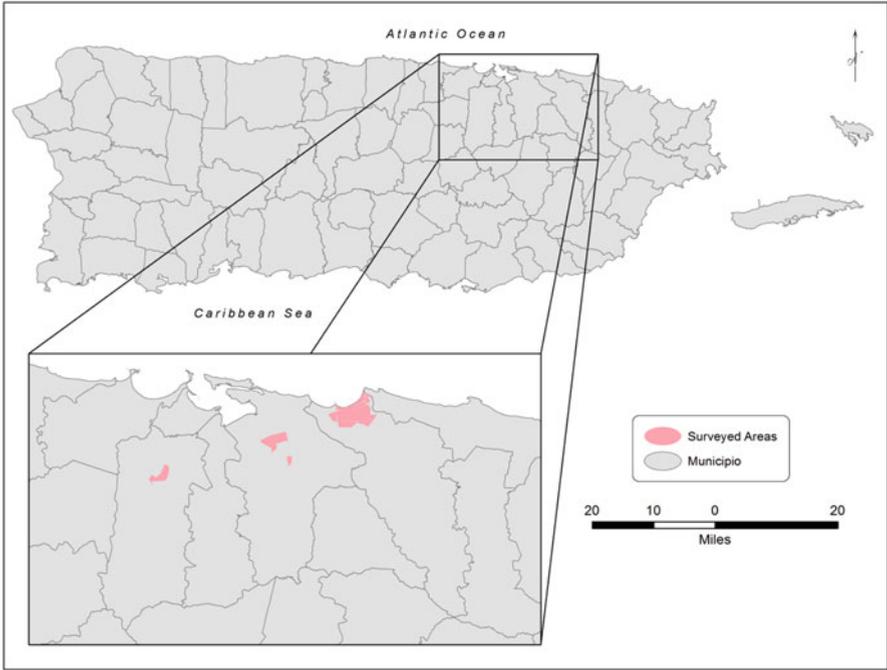


Fig. 17.1 Surveyed areas

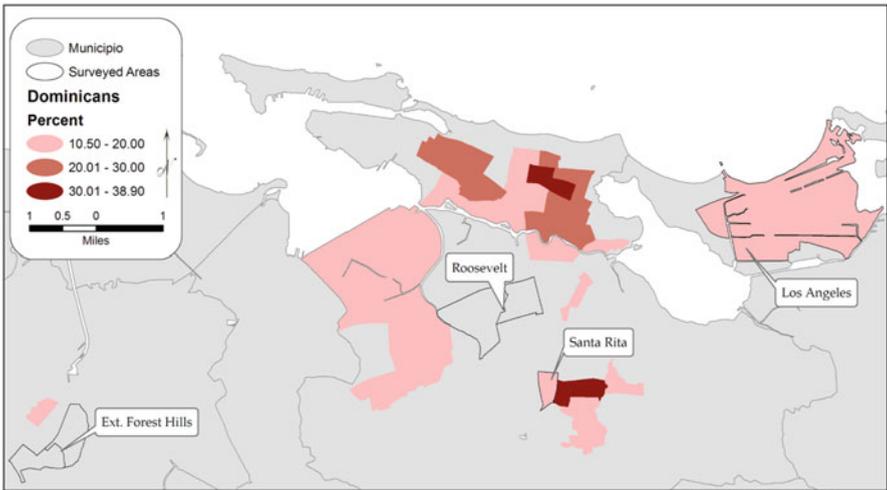


Fig. 17.2 Surveyed areas and Dominican population

in this neighborhood are university students. Also, more than 10 % of the residents in Santa Rita are Dominicans. Actually, the area of Río Piedras hosts an increasing number of this ethnic group. The selection of respondents in this neighborhood was slightly different from the other neighborhoods given the previously mentioned particularities and the difficulties of surveying multifamily housing dwellings. Another neighborhood surveyed was Los Angeles, in the *municipio* of Carolina, which also has a Dominican population greater than 10 %. However, this neighborhood was adjacent to the island's large international airport and the Dominican residents here were relatively disconnected from the Dominican community of San Juan. The third site surveyed was a group of three neighborhoods (Roosevelt, Hyuke, and El Vedado), hereafter referred to as Roosevelt, which were spread across two census tracts. This area was relatively distant from the Dominican communities of Santurce (in the *municipio* of San Juan) and Río Piedras (also in the *municipio* of San Juan). The Dominican population in this site was about 3 % of the total population. The final site included in the field survey was the site composed of Extensión Forest Hills and Flamboyán Gardens, in the *municipio* of Bayamón. These neighborhoods were distant from any neighborhood in which the Dominican population was greater than 10 % and even more separated from the Dominican community of Santurce (San Juan).

17.5 Results and Analysis

The survey allowed a close examination of the neighborhood's social interaction. The survey was four pages in length and was administered in total to 260 participants across four different areas. The survey captured socioeconomic data as well as attitudes and perceptions of the participants regarding the impact of neighborhood characteristics on housing value. Scholars tend to refer to neighborhood characteristics as an important socioeconomic factor impacting the housing market. Therefore, the residents' perceptions and attitudes were examined toward neighborhood characteristics in relationship to housing values.

17.6 Perception as Potential Elements Impacting Housing Values

The first question of the survey asked participants to estimate their property value if their housing unit were hypothetically located in another neighborhood. The question was, if your housing unit were located in (Old San Juan, Loíza, Torrimar, and Villa Palmera), how do you think it would change your housing value? The purpose of this question was to provide context of the respondents' neighborhoods. The survey presented four neighborhoods. Each of these neighborhoods has its own characteristics. Old San Juan is the historic district located in the capital city.

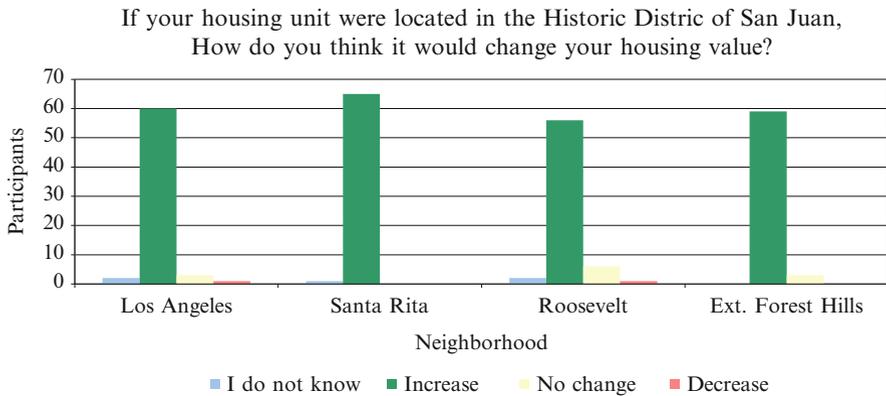


Fig. 17.3 Responses after assessing the question related to the Historic District of San Juan

In general, Old San Juan can be identified as an upscale neighborhood with a large population of young professionals. This area is also a popular tourist attraction, and tourism-related businesses are common here. The town of Loíza is generally known for its high percentage of Afro-Puerto Rican population. According to the 2000 U.S. Census, 59.72 % of Loíza's population had incomes below the poverty level. Torrimar is located in Guaynabo city. In contrast to Loíza, Guaynabo is recognized as a wealthy city. Indeed, among all *municipios*, Guaynabo has the lowest percent of people under the poverty line. Torrimar is an upscale neighborhood with housing values easily reaching half a million dollars or more. The last neighborhood is Villa Palmera, San Juan. Villa Palmera is an old neighborhood, poor, and contains a high percentage of Dominican population. In general, respondents perceived that if their housing unit were located in the historic neighborhood of Old San Juan it would increase in value (Fig. 17.3).

In a similar way, respondents perceived that if their housing unit were located in Torrimar, Guaynabo City, it would increase in value (Fig. 17.4). These neighborhoods were identified as upscale areas and therefore positively impacting the housing value.

The responses for both Old San Juan and Torrimar are substantially different for the other two neighborhoods: Loíza and Villa Plamera. These two neighborhoods share similar characteristics such as low income levels and high percentage of minority population. Loíza has a high percentage of Afro-Puerto Ricans. In fact, the percentage of Afro-Puerto Ricans in Loíza is higher than the percentage of White population. Villa Palmera has a high percentage of Dominican population. Figures 17.5 and 17.6 present the results.

There is a clear pattern in the responses in which participants perceived that locating their housing units in Old San Juan and Torrimar would increase their property values. The most notable characteristic of both Old San Juan and Torrimar is that they are upscale neighborhoods. In addition, Old San Juan is a Historic District. According to Noonan (2007, p. 27) "historic and landmark designation can affect

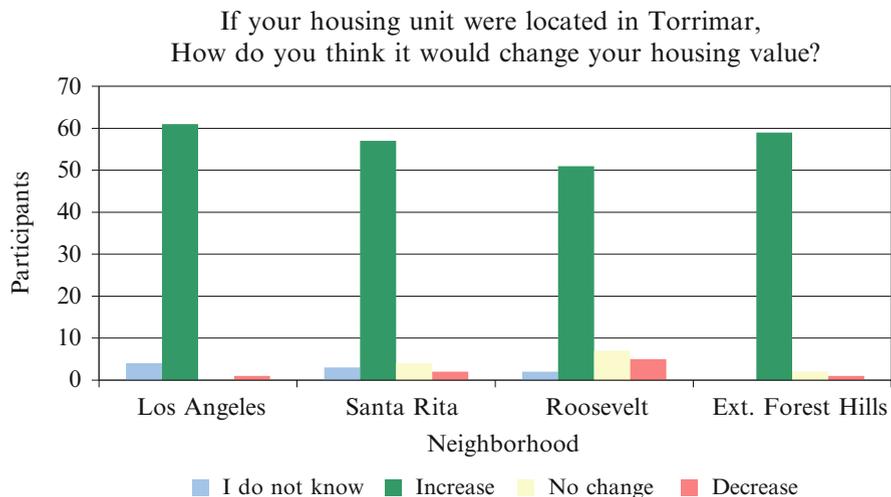


Fig. 17.4 Responses after assessing the question related to Torrimar

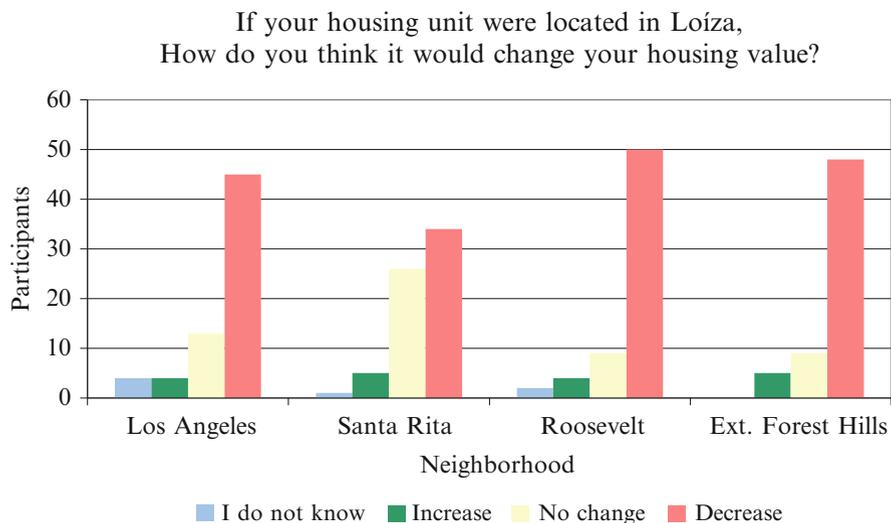


Fig. 17.5 Responses after assessing the question related to Loíza

prices of both the designated property and neighboring properties.” Other studies support Noonan’s argument of historic designation and property values (Coulson and Lahr 2005; Coulson and Leichenko 2004). In contrast, the participants perceived that locating in Loíza or Villa Palmera would decrease their property values.

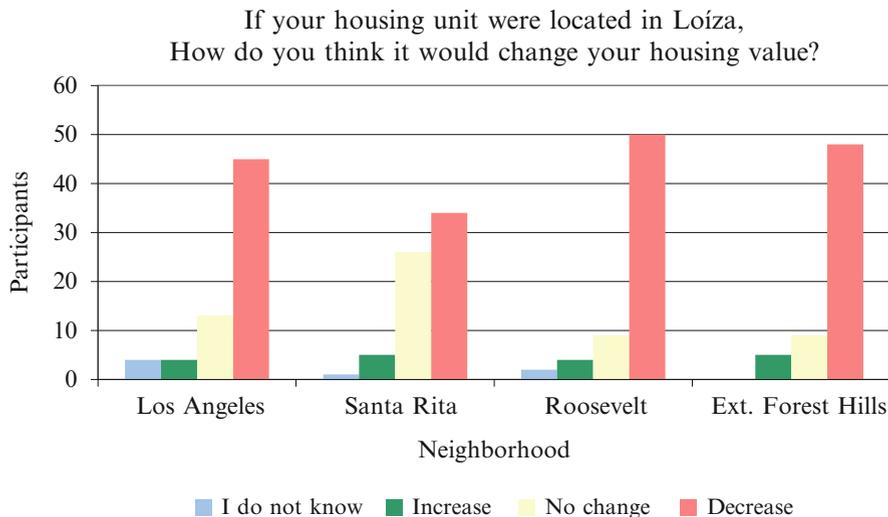


Fig. 17.6 Responses after assessing the question related to Villa Palmeras

The most prominent characteristic of these neighborhoods is that they have a high percentage of minority population: a high percentage of Black population in Loíza and a high percentage of Dominican population in Villa Palmera. There are many studies that point out this phenomenon, especially for Blacks (Myers 2004; Reibel 2000; Kiel and Zabel 1996). For instance, Myers (2004, p. 299) suggests “house values fall as the percent of Blacks in a neighborhood rises, indicating that high concentrations of Blacks may be perceived as a neighborhood disamenity by some consumers.” Other studies include minority groups such as Hispanics (MacPherson and Sirmans 2001; Page 1995). Therefore, a high percentage of Blacks in Loíza as well as a high percentage of Dominicans in Villa Palmera may be seen as disamenity for the respondents in the survey. The question that we must add would be why the respondents perceived a minority population as disamenity?

17.7 Perception of Ethnic Characteristics and Housing Values

The last question in the survey addressed the variable of ethnic composition (and race) relative to housing values. The respondents were asked about the effects of Whites, Blacks, Cubans, and Dominicans on housing values. The question was “if (Whites, Cubans, Afro-Puerto Ricans, Dominicans) doubled in your neighborhood, how do you think it would change your housing value?” The results are shown in Figs. 17.7, 17.8, 17.9, and 17.10.

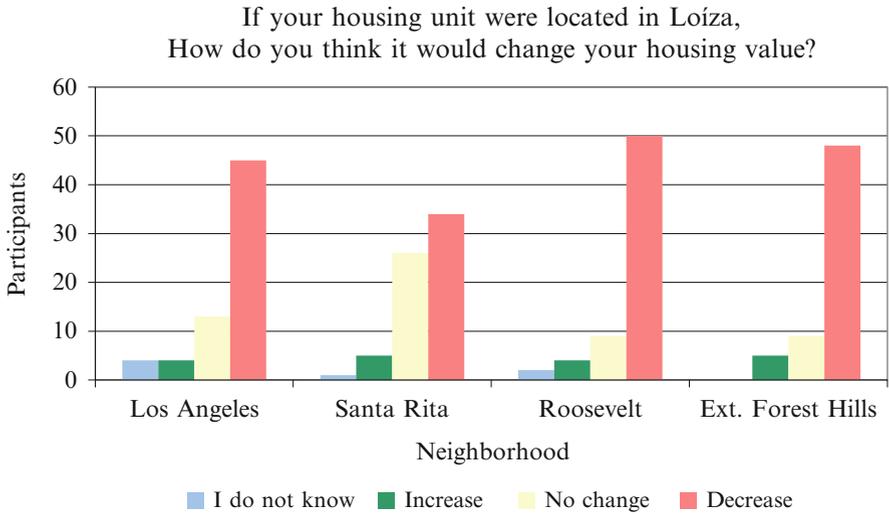


Fig. 17.7 Responses after assessing the question related to Whites

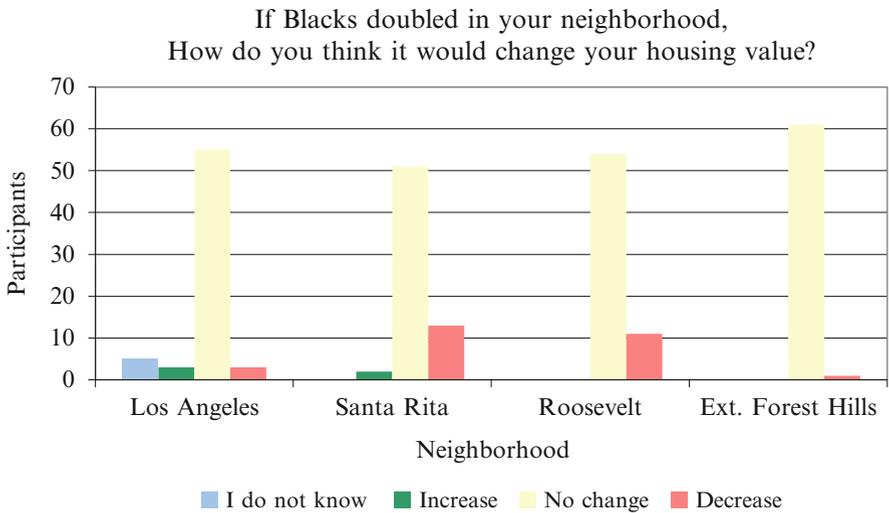


Fig. 17.8 Responses after assessing the question related to Blacks

When the respondents were asked about their perception of housing values if White residents doubled in their neighborhoods, the most common answer was “no change.” Figure 17.7 shows that 83.6 % of the participants in the Los Angeles neighborhood and 86.4 % of the participants in the Santa Rita neighborhood

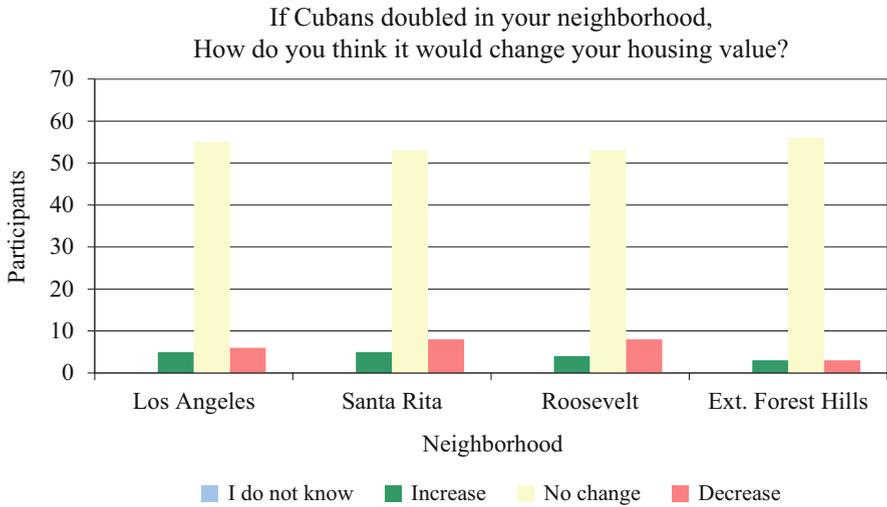


Fig. 17.9 Responses after assessing the question related to Cubans

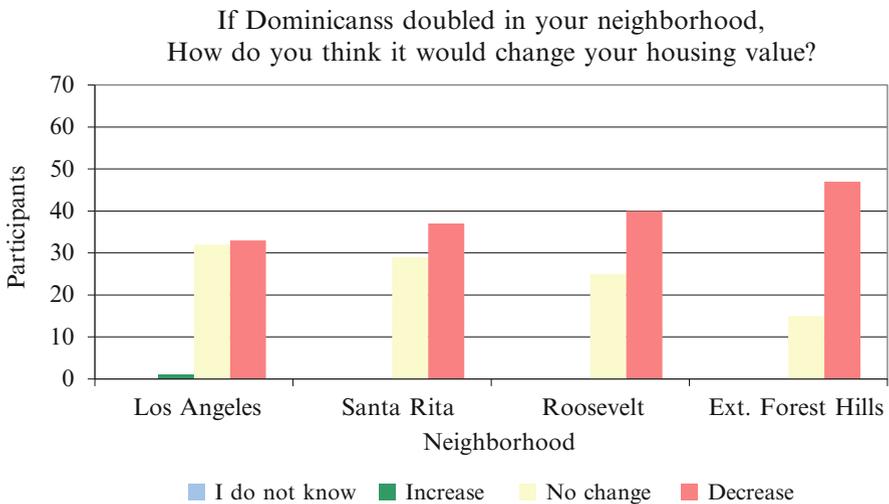


Fig. 17.10 Neighborhood responses

responded “no change.” Similarly, 88.1 % of the participants in Roosevelt and 97 % of the participants in Ext. Forest Hills envisioned no change if Whites double in their neighborhoods.

Similar responses were provided when the same question was addressed regarding the doubling of Black population. The majority of the participants in each

community perceived “no change” if Blacks doubled in their neighborhoods (Fig. 17.8). In the Los Angeles neighborhood more than four fifths (83.6 %) of the participants answered “no change.” In Santa Rita little more than three quarters envisioned “no change” in the housing values if Blacks doubled in their neighborhood, similar to the participants in Roosevelt who perceived “no change.” Finally, the majority of the participants (98.5 %) in Ext. Forest Hills perceived “no change” if Blacks doubled in their neighborhoods. For the majority of the participants in all neighborhoods, the most common answer was “no change” in housing values if Blacks doubled in their neighborhoods. Similar to the answers for Whites, the majority of the responses indicated “no change” although a few respondents answered a decrease. Although Blacks might be placed at the bottom of the racial hierarchy, the majority of the respondents indicated “no change.” This trend might be perceived as an expression of nationality in which Puerto Rican becomes the most important description, and secondary to it is skin color, although this answer might contrast to that given and reported in Fig. 17.5 in which the participants perceived that their housing values might decrease if it is located at the town of Loíza, where the majority of the population is Black. This response might suggest that other variables, such as income, might influence housing values.

Nationality might be another variable to take into consideration. The participants were also asked “If Cubans doubled in your neighborhood, how might that change housing value?” (Fig. 17.9). The most common answer was “no change” in Los Angeles, Santa Rita, Roosevelt, and Ext. Forest Hills, with 82.1 %, 80.3 %, 82.1 %, and 90.0 %, respectively. The majority of the responses were “no change.” It must be pointed out that Cubans in Puerto Rico (a non-incorporated territory of the U.S.A.) are seen as U.S. citizens and not as illegal immigrants. However, neither their minority status nor their condition as being immigrants has placed them in a vulnerable position. In any case, it is likely that Cubans are being perceived as Whites, and many of them enjoy a high socioeconomic status, which might help to explain the pattern of the responses.

The last question about national/ethnic origin vis-à-vis housing value addressed the Dominican population (Fig. 17.10): if Dominicans doubled in your neighborhood, do you think it would change your housing value? Here, the responses followed a strong pattern in all the four surveyed areas. The majority of the participants across all surveyed neighborhoods perceived a decrease in property value if Dominicans doubled in their neighborhood. However, in Los Angeles neighborhood the answers were polarized between 50.7 % of the participants who envisioned that housing values would “decrease” whereas 47.8 % perceived “no change.” The Los Angeles neighborhood has a Dominican population of more than 10 %. In Santa Rita, an area with a high population of college students and Dominican population, the respondents also tended to answer “decrease” (56.1 %), although 43.9 % expected “no change.” In the neighborhood of Roosevelt, 59.7 % of the participants perceived that housing values might “decrease” if the Dominican population doubled while 40.3 % perceived “no change.” In Ext. Forest Hills neighborhood almost three quarters (74.2 %) of the participants perceived Dominicans would have an adverse effect on housing values and could trigger a “decrease,”

whereas just a little more than a quarter (25.8 %) of the participants perceived “no change” in their housing value. The neighborhoods of Roosevelt and Ext. Forest Hills have a Dominican population of about 3 %.

The responses for Dominicans greatly contrast with the responses for Whites, Blacks, and Cubans. Why did the majority of the participants respond “decrease”? First, Dominicans, in Puerto Rico, are considered to be Black. Second, they are a vulnerable population because of their migratory status. In addition, they tend to occupy the jobs that nobody else wants. These reasons might be tied to the respondents’ explanations for their answers, such as “many Dominicans living in the same housing unit.” It is a possibility that various Dominicans will live together in a single-family housing unit to lower costs and be able to send remittances back to the Dominican Republic to help their families.

17.8 Analysis and Interpretation of the Survey

The purpose of the survey was to make an assessment of the majority’s perception about minority groups versus housing values. The survey used neighborhood characteristic variables, made use of various well-known neighborhoods as reference areas, and collected participants’ perceptions for analysis. This section presents the most relevant questions included in the survey.

The survey reveals interesting findings and a spatial context regarding the perceptions of impacts of minorities on housing values. For instance, the first question exposes a clear dichotomy between neighborhoods and establishes a hierarchy of neighborhoods that might positively or negatively influence housing values. In fact, these neighborhoods (Old San Juan and Torrimar in contrast to Loíza and Villa Palmeras) hold divergent peculiarities. The neighborhoods of Old San Juan and Torrimar showed a high incidence of positive relationship in housing value. On the one hand, Old San Juan and Torrimar are upscale neighborhoods. In addition, Old San Juan is a historic district. In both the Old San Juan and Torrimar neighborhoods the percentage of Blacks or Dominicans is almost zero. On the other hand, the neighborhoods of Loíza and Villa Palmera have a greater percentage of minority residents. Loíza’s Black population is over 50 % while Villa Palmera has the most noticeable concentration of Dominicans in Puerto Rico. In addition, both Loíza and Villa Palmera are low-income areas. The first question’s responses were as expected. The dichotomy between affluent and poor, and between the majority and minority groups neighborhoods, showed up immediately. Moreover, in the subsequent questions there was a continuous dichotomy referring to the neighborhood characteristics of the more affluent (Old San Juan and Torrimar) and the less affluent (Loíza and Villa Palmera) neighborhoods.

The most interesting results are illustrated in the responses from the last question on the survey. The last question asked the participants to evaluate the effects on housing values if an ethnic group (Cuban, Dominican, Afro-Puerto Rican, or Black, and White) doubled in their neighborhood. Among all the groups, Dominicans were

the only ethnic group with a conspicuous negative response. In short, the responses of the last survey question seems to be the most revealing, suggesting a relationship of distance and perception of decreasing property values if the Dominican population doubles. For instance, the neighborhoods of Los Angeles and Santa Rita share one commonality: large percentages of Dominican population. In Los Angeles the Dominican population is 11.52 % whereas in Santa Rita it makes up 13.44 %.

However, there are two differences between the Los Angeles and Santa Rita neighborhoods: (1) Santa Rita is surrounded by other neighborhoods with the same or higher Dominican population percentage, while the Los Angeles neighborhood is not close to neighborhoods in which Dominican levels are high; and (2) many residents in Santa Rita return on the weekends to their parents' houses. In other words, they are not permanent residents and their perceptions regarding the Dominican population might also be shaped by their parents' neighborhood context.

The two census tracts that contain the Roosevelt community have a Dominican population of 2.69 and 2.55 %. However, Roosevelt is surrounded by various neighborhoods that reach from 10 to 20 % of Dominican population. The same is the case for Ext. Forest Hills in which the Dominican population reaches 1.99 % in one of the census tracts and 4.99 % in the other. There is an area nearby Ext. Forest Hills that residents identify as a Dominican neighborhood. However, according to the 2000 Census, the Dominican population reaches 13.65 % in that neighborhood.

Duany (1990) perceived "areas with 11–20 % of foreign population as a medium concentration and an area of more than 20 % of foreign population as high concentration" (p. 22). However, participants of Ext. Forest Hills neighborhoods perceived these areas of 11–20 % as exclusively Dominican neighborhoods. The perception of various participants about the number of Dominicans in the Los Angeles neighborhood is that there are "various Dominicans but this is not a Dominican neighborhood," which suggests that a contrast exists between Los Angeles, which holds a medium concentration of the Dominican population (11–20 %), and Ext. Forest Hills, that holds less than a 5 % Dominican population per census tract. These perceptions are noticed in the responses across the neighborhoods, especially Ext. Forest Hills and Los Angeles. Therefore, the results suggest an association of distance from Dominican neighborhoods and the participants' perceptions about the relationship between Dominicans and housing values.

Today, there are more areas in which the Dominican population is more conspicuous. Dominican migration has continued to other neighborhoods in Puerto Rico. Nevertheless, professional appraisals of housing values cannot include these social variables in their estimates because they would be penalized as unethical practices. Still, perceptual problems exist. Duany argued that "the continuous migration of Dominicans to Puerto Rico has resulted in a particular perception which associates the immigrants with crime, a decrease in salaries, and abuse of public services" (Duany 1990, p. 19). Yet, this study suggests that participants' perception of Dominicans and lower housing values differs according to the distance of the participants from Dominican-prevalent communities. In other words, the greater the distance the stronger the tendency to perceive that Dominicans are linked to lower housing values. In fact, scholars have pointed out that this phenomenon

of perception and distance explain that location is an important factor that affects awareness (Golledge and Stimson 1997).

The survey gave respondents an opportunity to answer the open-ended question, "Why do you think this phenomenon (of minority groups affecting the housing value) occurs?" Interestingly, many of the respondents tended to disassociate themselves from the question and "spoke" for the community (and not speaking from a personal perspective). Therefore, it is important to consider the way in which people answered the question. It was common for many people answering the survey to respond to it in this way: "Well, I do not think that Dominicans diminish the housing value but other people think so because of discrimination."

There were 228 participants who perceived that Dominicans diminish housing values, of which 28.9 % of them also believe that is because of "cultural differences." The second most common answer (14.9 %) of the participants' perception was attributed to "discrimination." A more curious answer was given by 12.3 % of the participants who perceived that the Dominican population, if doubled, could diminish housing values. They explained that this phenomenon occurs *but the impact depends* on the "level of education." However, this is interesting because some participants provided this explanation after they answered that the Dominican population, if doubled, would diminish housing values. For example, there were other participants who answered no change and later explained that it depended on the level of education or on the person. Another common explanation, offered by 11.8 % of the participants, was "noise." They perceived that the Dominican population, if doubled, could diminish housing values because they (Dominicans) are "noisy people." These were the four most common answers that cover those given by the 228 participants who perceived that Dominican could diminish housing values.

There were almost 30 different responses regarding Dominicans as diminishing housing values, such as because they rent the property instead of owning, they are illegal, they do not follow laws, there are too many Dominicans living in a single housing unit, cultural differences, and too many cars on the street. However, some of these answers seem unlikely in some of the surveyed neighborhoods. A participant in the neighborhood of Ext. Forest Hills responded "Dominicans always have their cars in the street and they are loud." Still, the fieldwork combined with personal in-depth knowledge of the area did not reveal Dominicans in that section of the street. In fact, the many cars in the street were from the interviewee with three family members and four cars. Another answer used was that Dominicans are drug dealers: this was the reasoning of one participant in the Los Angeles neighborhood who possesses a Master's degree in theology, a Bachelor's degree in education, and is retired. In the same neighborhood of Los Angeles, a Dominican respondent answered that if Dominicans double the housing values decrease because Puerto Ricans discriminate against Dominicans. This person, who is married to a Puerto Rican, compared the discrimination against Dominicans living in Puerto Rico with that of Haitians living in the Dominican Republic.

Various participants in the Roosevelt neighborhood gave totally different responses regarding decreasing housing values. An occasional answer was addressed against the commercial establishments. One participant explained that commerce brings more crime, noise, and traffic to the residential area. Other participants in the neighborhood agree with this reasoning. Roosevelt is a neighborhood that is dissected by various major avenues, also surrounded by main avenues, and close to the central business district of Hato Rey. Among all the answers there were various concerns with space, such as Dominicans leave their cars in the street, there are many Dominicans living in a single housing unit, and there are many Dominicans in a small space (neighborhood).

An elderly participant in the neighborhood of Santa Rita gave the last of these answers. The old lady, in her eighties, has been living in the area since her marriage in her twenties and has witnessed the neighborhood's transformations. The small space makes reference to the increase of population density of Santa Rita but also makes reference to the island of Puerto Rico hosting Dominicans.

The survey shows the importance of the neighborhood context and the relationships of different variables that might impact median housing values across the study area. The survey reveals the qualitative aspects of the reasons for each neighborhood's participants' perceptions of minority groups, among other neighborhood characteristics, vis-à-vis housing values. The survey resulted in a reliable instrument to provide understanding patterns in responses that reinforce the concept of spatiality and exceptionality across space. The survey showed that a constant response emerged in which the participants perceive negatively the presence of Dominicans for housing values. However, this is not the same for Blacks. Furthermore, as mentioned earlier, Puerto Ricans tend to identify themselves as Puerto Ricans to distinguish themselves from other nationalities. Yet, Puerto Ricans are conscious of the racial dynamics in Puerto Rico.

17.9 Conclusion

The study uncovers the ethnic variables that might influence housing values. This research suggests the contention that attitudes and perceptions seem to play a role in shaping housing values in Puerto Rico. The results showed a tendency of perception based on spatial context and distance. In other words, an increase in distance from the Dominican community is linked to increases in the participants' negative responses. The survey was able to capture the participant's reasons given for their responses. The results suggest a relationship between distance and perceptions. In addition, this study helps to understand race, ethnicity, and place in the context of the island of Puerto Rico.

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Chapter 18

Impact of the Growth of Farmhouses on Adjoining Local Settlements in National Capital Territory of Delhi

Satya Prakash Kaushik

Abstract This study is an attempt to analyze the impact of the growth of farmhouses in the outskirts of Delhi, which have brought many changes in the surrounding area occupied by the village society. The study is based on a field survey conducted in 2007. The study reveals widespread sale of agricultural land to outsiders for the development of farmhouses. A large number of farmers lost their traditional occupation and have been ruined because money received from the sale of land has been wasted in unproductive activities. Consequently, these settlements have experienced social and economic transformation along with loss of cultural identity and change in the socioeconomics of their demography.

Keywords Farmhouses • NCT of New Delhi

Introduction of new elements in an area is expected to bring some changes in the socioeconomic and spatial organization of the communities in that area. It can affect its social structure, social values, occupational structure, sectoral changes in economy, and changes in production system and production efficiency. It may have effects on spatial organization of the local communities in the sense that any spatial change in the production bases often brings locational changes in other spheres of life. An expanding city such as Delhi introduces many such symptoms in the adjoining rural belt and modifies its socioeconomic and spatial organization. A farmhouse is one such innovation introduced in the rural belt of Delhi in the past few decades. As farmhouses require large parcels of land, they now occupy a large share of the land traditionally used by local people for agricultural purposes. The sale of land by the local people to the farmhouse owners has brought changes in their land values, agricultural pattern, occupational structure, and the environment. The owners of the farmhouses are of different socioeconomic background, and their social values and lifestyles are quite different from those of local communities. At least two contrasting communities with different social and economic backgrounds have therefore

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produced a different socioeconomic and cultural landscape. The growth of farmhouses has perhaps produced many positive and negative changes in the rural belt of Delhi.

18.1 Methodology

This study is based on a field survey conducted in 2007. The study is organized into three broad sections. Section I includes socioeconomic characteristics of the local communities. Section II consists of the transactions of agriculture land by the local communities. Section III incorporates the possible impacts of the sale of agricultural land and the development of farmhouses on such land by people from outside. The third section further consists of three subsections, including questions related to the impacts on the local communities on their economic activities, social norms, and infrastructure facilities. The changes in social parameters and infrastructure activities are largely based on qualitative information generated through focused group discussion (FGD) and analyzed with the help of descriptive techniques.

18.2 Database

Observing the wide distribution of farmhouses in various parts of rural Delhi, it was not possible to carry out a field survey of all the farmhouses. Moreover, time and money constraints do not allow for a universal survey. Therefore, only about 171 samples have been drawn for the purpose of the present study, equivalent to 5 % of the approximately 3,400 farmhouses [as mentioned in Municipal Corporation of Delhi (MCD) records up to 2005] in representative samples have been drawn from each village in proportion to the number of farmhouses developed in each village. Within a particular village, a sample is drawn randomly. This information is also supplemented with some personal interviews and focused group discussions (FGD) of the local communities. The local communities include the people living in the surrounding villages of the clusters of farmhouses.

18.3 Conceptualization of the Impact of Farmhouses on the Local Communities and Discussion

Development of farmhouses in the peri-urban space of Delhi is examined herein to understand the process and the outcomes related to socioeconomic and ecological settings and structures. Impacts of the development of farmhouses on local communities can be broadly grouped into two components (Fig. 18.1).

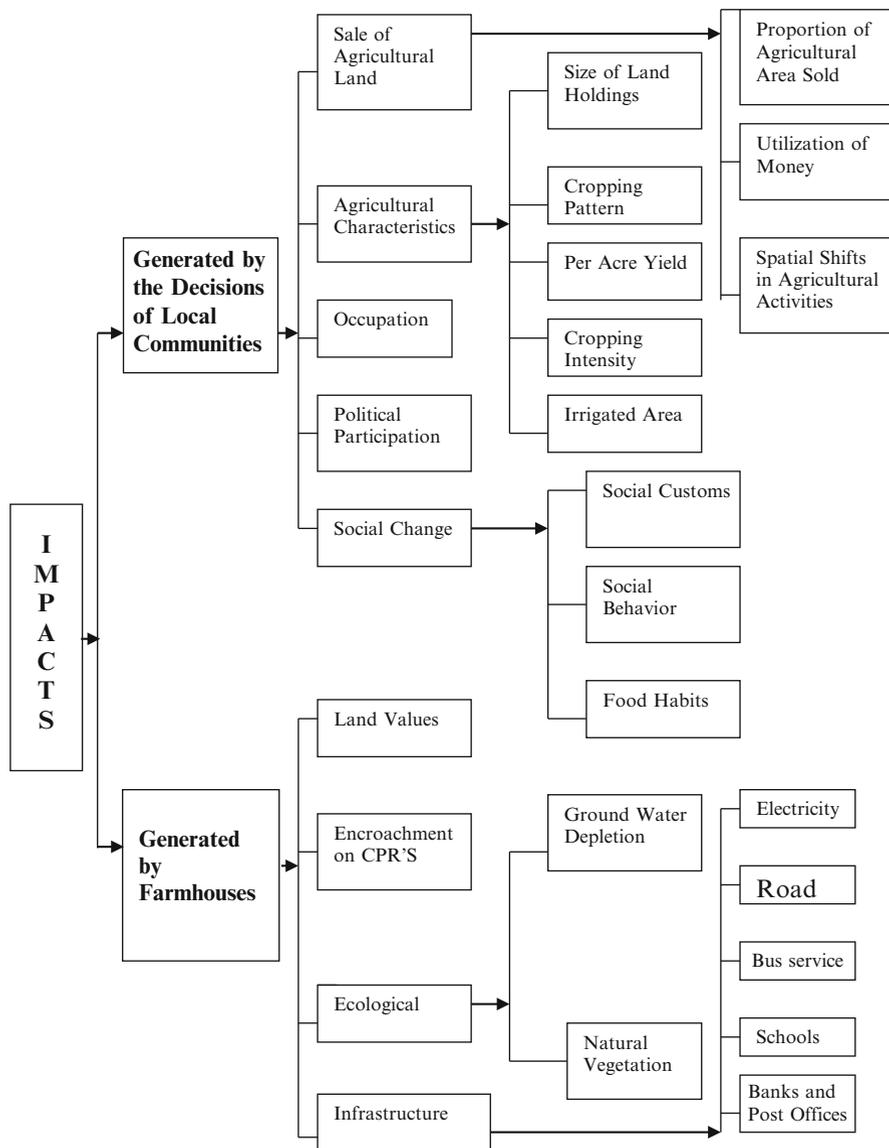


Fig. 18.1 Conceptualization of the impact of farmhouses on local communities

Large numbers of agricultural fields were sold by the local communities for the development of farmhouses, which has brought many changes. Many of these families have repurchased agriculture land in neighboring districts of Haryana, thereby creating a spatial shift in agriculture activities. The size of landholdings has declined substantially. Agriculture characteristics such as cropping pattern, cropping

intensity, per acre yield, and irrigated area have been modified. There is significant occupational shift to such nonagricultural activities as transportation and small-scale businesses. Many of the former landholders failed in new ventures and thus became unemployed. Some people were attracted toward local politics. The aforementioned developments have also affected their social setup. Their lifestyle has been affected by both sale of land and proximity to the farmhouses. They consume more alcohol now, and in the absence of cultivation their food habits have changed because now they have to purchase most of these items from the market.

The development of farmhouses is instrumental in raising the land values of these areas, which has greatly benefited both the local communities and the owners of the farmhouses. The presence of the farmhouses has positively affected development of infrastructures such as roads and sewerage, but all these benefits have come with a cost. There are a number of cases of land encroachment of Common Property Resources (CPRs). The local people expressed their resentment. Farmhouse owners have created ecological disasters by excess withdrawal of groundwater for the maintenance of their greenery. This study includes only the impacts generated by the decisions of local communities.

18.4 Changes Resulting from the Decisions of the Local Communities

Local communities have sold their agricultural land to the people from outside their villages for the development of farmhouses. The sale of land by these people has affected their occupational structure, social values, consumption patterns, political participation, and agricultural characteristics such as the size of landholdings and cropping pattern. The owners repurchased some agriculture land in adjoining districts of Haryana, which has brought a spatial shift in agricultural activities.

18.5 Sale of Agriculture Land

The growth of farmhouses in the adjoining rural belt of urban Delhi is a symptom of neo-urbanism. Thousands of acres of agricultural land, as stated earlier, are now under the farmhouses, which are owned by the elites of urban Delhi. The sale of land by the local communities to the people from outside their villages has brought profound changes in factors such as the size of their landholdings, a spatial shift in agricultural activities, and change in occupations. Large tracts of agricultural land have been sold for the development of farmhouses in the study area for reasons as discussed in Chap. 5 (Kaushik 2004). About 13 % (12.74 %) of the geographic area and 15 % (18.79 %) of the agricultural land of the sample villages has been sold to

Table 18.1 Delhi: percent of area sold to total landholdings by the sample households

Village/region	Total area (acres)	Area sold (acres)	Percent (%) of area sold to total area
Holambi Kalan	129.5	49	37.84
Holambi Khurd	18	7	38.89
Bhaktawarpur	97.7	48.5	49.64
Northwest	245.2	104.5	42.61
Chawla	45	12	26.67
Bijwasan	95	20	21.05
Pindwala Kalan	71.5	14	19.58
Southwest	211.5	46	21.75
Chattarpur	100.7	48.5	48.16
Gadaipur	140.5	72	51.25
Mandi	38.5	25.5	66.23
South	279.7	146	52.19
Total	736.4	221.5	50.51

Source: Kaushik (2004)

Table 18.2 Delhi: temporal pattern of the sale of land by the sample households

Region/year	Percent of land sold		
	1975–1985	1985–1995	1995–2007
Northwest	6.10	5.6	88.26
Southwest	30.43	17.39	52.17
South	18.44	79.36	2.19
Total	15.18	35.42	49.26

Source: Kaushik (2004)

the owners of farmhouses. In the Southern region as much as 26.40 % of the geographic area and 43.72 % of the agricultural land is under farmhouses. Overall, sample households have sold half of their agricultural land. The maximum proportion of land has been sold in the Southern region (52.19 %), followed by the Northwestern (42.61 %) and the Southwestern region (21.75 %) (Table 18.1).

The Southern region has experienced these incidences more because of the early start of the growth process of farmhouses and its strategic location south of Mehrauli. Among the total sample households, two thirds have sold their entire landholdings. These households sold their agricultural land when the process of farmhouse growth started in the early 1960s. At that time, the price of agricultural land was very low because cultivation was not very remunerative. Moreover, whatever money these people received from the sale of their agricultural land was wasted in unproductive activities. In the Southern Region, sample households had sold more than 90 % of their land before 1996 (Table 18.2). They had sold their land hoping that new occupations would improve their economic condition, but because these poor people were unskilled and inexperienced in nonagricultural pursuits, they forfeited most of this money in new ventures. Now these people have neither land for cultivation nor

money to invest in nonagricultural pursuits and have just ruined their lives. They repent their past mistakes and are leading a miserable life. The people of the Southern region, which includes the villages of Mehrauli block located between *Andheria* crossing and *Bhatti* mines, are the worst affected. About 80 % of the sample households in these villages have already sold all their agricultural land. According to the respondents, only about 20 % of these people have effectively reinvested the money. The rest of the people, some 80 %, have just wasted it in drinking alcohol, or they have failed in new ventures that they started after the sale of their land.

In the Northwestern and the Southwestern regions, where the growth process of the farmhouses started a little later, incidences of sale of agricultural land are fewer. The people of these areas became aware about the bad experiences of their counterparts in the Southern Region. Therefore, instead of disposing of their entire land in one stroke, they withheld a part of their agricultural land. Moreover, they used their money more wisely by investing it in buying agricultural land in the adjoining areas of the Gurgaon, Faridabad, Sonapat, Rohtak, and Rewari Districts of Haryana. Some of their family members supervised the new agricultural activities and the rest remained in their parent villages in Delhi. In this manner, they were able to enhance their living standard and simultaneously remained in touch with their traditional occupations.

18.6 Utilization of Money Received from the Sale of Land by Local Communities

The local people have made use of money received from the sale of land in many ways. The main investment is for land, new occupations, and building houses. The money wasted on alcohol and such other activities seem to be highly underreported.

During this survey, the author got the general impression in almost all the villages that many of the families have been ruined because of alcohol and recreational habits. They wasted most of the money received from the sale of their land. Moreover, the majority of those who invested in new nonagricultural occupations failed in their new business, largely because of their chronic habit of alcoholism. The amount spent on various accounts (Table 18.3) is illustrative of the phenomenon. A fairly large amount was spent on purchase of land (87.10 %). Investment in house renovation and new occupations comprises 3.5–6 % of the total amount of money. In the Northwestern and the Southwestern regions, investment in land is greater whereas wastage in alcohol drinking is the most important head of expenditure in the Southern region. About one fifth of the amount received by the households of the Southern region has been wasted in alcohol drinking and recreational activities (Table 18.3).

Table 18.3 Utilization of money from sale of land

Village/Region	Amount used for different purposes (in percent, %)				
	Land	House building	Marriage	Occupation	Other
Holambi Kalan	95.43	1.54	3.01	0.00	0.00
Holambi Khurd	56.00	44.00	0.00	0.00	0.00
Bhaktawarpur	7.26	29.15	5.29	15.89	42.39
Northwest	83.43	5.56	3.29	2.10	5.61
Chawla	80.35	7.22	3.67	3.50	5.25
Bijwasan	92.92	1.27	0.95	1.59	3.24
Pindwala Kalan	72.22	9.26	18.51	0.00	0.00
Southwest	89.35	2.87	1.72	2.09	3.77
Chattarpur	65.73	6.57	5.75	1.64	20.30
Gadaipur	84.11	4.67	11.21	0.00	0.00
Mandi	66.50	1.66	4.15	8.31	19.36
South	67.59	4.18	5.47	4.55	18.22
Grand total	87.10	3.57	2.26	2.21	4.85

Source: Kaushik (2004)

18.7 Spatial Shift in Agricultural Activities

Local communities have invested a substantial part of money that they received from the sale of agricultural land in their parent village in repurchase of agricultural land elsewhere. The repurchase of land has taken place mostly in specific belts. Most of the land outside Delhi has been purchased in adjoining districts of Haryana such as Faridabad, Gurgaon, Rohtak, Sonapat, and Panipat. Apart from this, some land has been purchased within Delhi, either in the same village or in other nearby villages where the land prices were relatively low. Surprisingly, the households who have sold their land at their parent village have purchased more land elsewhere, mainly because of the comparatively low prices of land in Haryana. Moreover, these people were traditionally working in agriculture for generations and hence it was a wise step to invest in land rather than any other activities about which they have no knowledge. Therefore, the chances of success were greater by remaining in the same profession. These people have introduced a new concept of farming ('suitcase' farming, which is an old and established practice in the U.S.) in the adjoining districts of Haryana. The households that have purchased land in these parts of Haryana stay at their parent village in Delhi, and some or all the adult members of the family move to their agricultural fields in Haryana at the time of agricultural operations such as sowing and harvesting of crops. In most cases hired workers from Haryana, Uttar Pradesh (UP), or Bihar carry out the farm operations. Generally, workers from Bihar and UP are preferred and they stay permanently on the farms. They are preferred over local laborers because migrant laborers are willing to work

at low wages for long hours. Ironically, they discriminate with the local workers for the reasons the farmhouse owners showed to them in their parent village. The owners of the land or their family members, mainly adults, regularly visit their farm for supervision. The majority of respondents stated that they are earning more from agriculture in Haryana than they had in Delhi before the sale of land at their parent village as a result of fertile soils and better input facilities such as canal irrigation.

18.8 Location of Repurchased Agricultural Land

Local people have purchased land near to their village. The households that belonged to the Southern region preferred to buy land in the Faridabad-Balabgarh-Palwal belt and those from the Southwestern region preferred the Gurgaon-Rewari and Rohtak-Bahadurgarh belt. The main reasons assigned by the local people for this site-specific purchase of land are first, distance from the parent village, and second, cultural similarity and knowledge of the area. For example, people from the Southern region mostly belong to the *Gujjar* community. This community is also widely distributed in the Faridabad-Balabgarh-Palwal belt.

Hence, for reasons of cultural similarities and the social relationships of some families with the people of this area, it becomes easier to purchase land. They also feel secure to make large investments. Similarly, the people of the Southwestern region preferred the Gurgaon-Rewari belt and the Rohtak-Bahadurgarh belt. Culturally, the people of this region are more akin to the people living in adjoining parts of Haryana in the districts of Gurgaon, Rewari, and Rohtak. The people from the Northwestern region have preferred Sonipat and Panipat Districts to purchase land because culturally they are nearer to them and have family ties with the people of this belt. Moreover, it is comparatively nearer to their parent village, which helps in the effective supervision of agricultural activities. It is observed that 38.95 % of the households have purchased land elsewhere from the money received from the sale of land at their parent village (Kaushik 2004). The maximum purchase of land has been made in the Faridabad-Balabgarh-Palwal belt (40.54 %), followed by the Gurgaon-Rewari belt (21.62 %), within Delhi (19 %), the Sonipat-Panipat belt (11 %), and the Rohtak-Balabgarh region (8.11 %). In the Northwestern region all the households that have invested in land have preferred the Sonipat-Panipat belt. In the Southwestern region the majority of the households have preferred the Gurgaon-Rewari belt (47 %), within Delhi (33.33 %), and the Rohtak-Bahadurgarh belt (17.65 %). All these areas are near to the Southwestern region. In the Southern region 87.50 % of the households have preferred the Faridabad-Balabgarh belt, which is the nearest site and culturally close to these people. The rest of the 12.50 % have preferred to buy land within Delhi (Fig. 18.2).

Respondents have stated that those households who have reinvested money in the purchase of agricultural land are now relatively well off, mainly because these

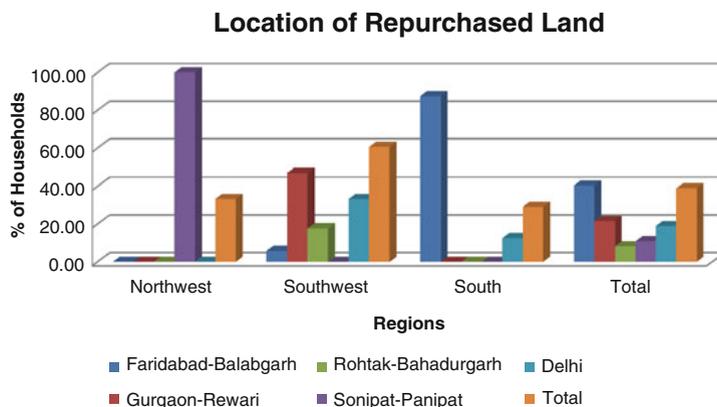


Fig. 18.2 Location of repurchased land

people were well acquainted with their traditional occupations. The timely reinvestment of the money that they received from the sale of their agricultural land saved them the ignominy of gloom and poverty. The agricultural land purchased by these people in adjoining areas of Haryana has benefited them in many ways. First, they were able to purchase more land than they had sold at their parent village because of price differentials. The agricultural land is very cheap in Haryana in comparison to rural Delhi.

Second, the productivity of the land is relatively higher because of fertile soil and the availability of infrastructure facilities such as irrigation. Moreover, they now have money for mechanization of agriculture, which helps in increasing the output. Third, they now have a perennial source of income. Fourth, these people were able to utilize their traditional skills and save themselves from the trauma of unemployment as happened with their co-villagers.

18.9 Repurchase of Land from Sold Land

The people who invested in nonagricultural pursuits are now a dejected lot. Most people have failed in business and wasted their entire sale money. The irony of the situation is that only about 40 % of the sample households have reinvested in purchase of agriculture land. Collectively, these households have purchased about 50 % more agricultural land than they had sold in their parent village (Fig. 18.3). However, if we include all the sample households (including those who have sold their agricultural land in Delhi but have not invested any amount in repurchase of agricultural land elsewhere), only 54.67 % of agricultural land has been repurchased elsewhere compared to the total amount of land they sold in their parent village. People of the Northwestern region are wiser, investing in agriculture land in that two thirds of the amount of land sold has been repurchased elsewhere.

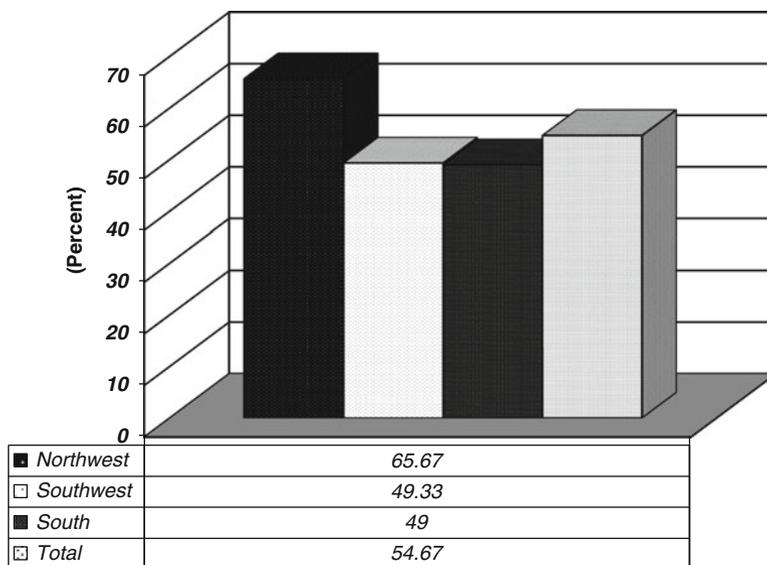


Fig. 18.3 Repurchased land With Respect To (WRT) land sold

18.10 Changes in Size of Landholdings, Agricultural Inputs, and Cropping Pattern

In the absence of canal irrigation, the high cost of tube-well boring, general poverty, the adverse physical environment, and negligence on the part of the government, agriculture remained backward in the National Capital Territory (NCT) of Delhi. Until a few decades earlier there were only a small number of tube wells for irrigation purposes, and these were not sufficient to irrigate even a single crop annually. The respondents said that in the 1970s there were only one or two government-owned tube wells in the whole of rural South Delhi. In the absence of canal water, agriculture was primarily rainfed, and as a consequence agriculture production as well as per acre yield was very low. Moreover, only those crops that need less water and can withstand long dry spells were in cultivation, such as *Jowar*, *Bajra*, and *Gram*. Areas under wheat, rice, or mustard were restricted to the Southwestern and the Northwestern regions where irrigation facilities through tube wells were better than in the Southern region. In fact, poor irrigation facilities and backward agriculture were the prime factors that forced the rural people to sell their agricultural land. Ironically, in the same areas, after the development of the farmhouses thousands of tube wells have appeared. To meet the farmhouse water requirements, tube wells have been set up in almost all the farmhouses. In fact, many of these households have installed more than one tube well. Such was not possible earlier when the local people were the owners of this land, however, because they were suffering from the vicious cycle of poverty–poor agricultural infrastructure–low returns from the agriculture.

18.11 Size of Landholdings

Size of landholdings is an important parameter in studying the agricultural characteristics of a given area. Cropping pattern, level of mechanization, and productivity are defined to some extent by the size of the landholding (Singh 1984). The average size of landholdings has declined from more than 15 acres to 5.2 acres during 1981 to 1996 (Kaushik 2004). About 30 % of the households in the villages affected by farmhouse construction had large landholdings of more than 10 acres each before the start of the farmhouses.

Now, this proportion has declined to 22 % (Fig. 18.4). The proportion of large landholdings has declined because a part of the total landholdings has been sold to the people from outside their villages, mainly for development of the farmhouses. The rest of the land is used for cultivation or in some cases it remains idle throughout the year for speculation in land prices. Thus, these pieces of land, which remain idle, may be sold in the near future, which consequently will further reduce the size of landholdings. The proportion of medium-sized landholdings has also declined substantially. In contrast, the proportion of small-sized landholdings has increased, largely because of the sale of a part of the total landholdings in the past. Landholdings are large in the areas least affected by the farmhouse process such as the Northwestern region, where about 50 % of the households still have more than 10 acres of land each. The proportion of small-sized landholdings (<5 acres) is least in this region. The proportion of large landholdings is also high in the Southwestern region: about one third of the households have more than 10 acres of land. In the Southern region, however, the proportion of small landholdings is greater because most of the agricultural land has already been sold (Table 18.4).

There is a significant decline in landholding size between 1980 and 2007, from 5.39 to 2.52 acres. The greatest fall is noticed in the Southern region where presently the average size of a holding is only 0.62 acre. The Northwestern region has

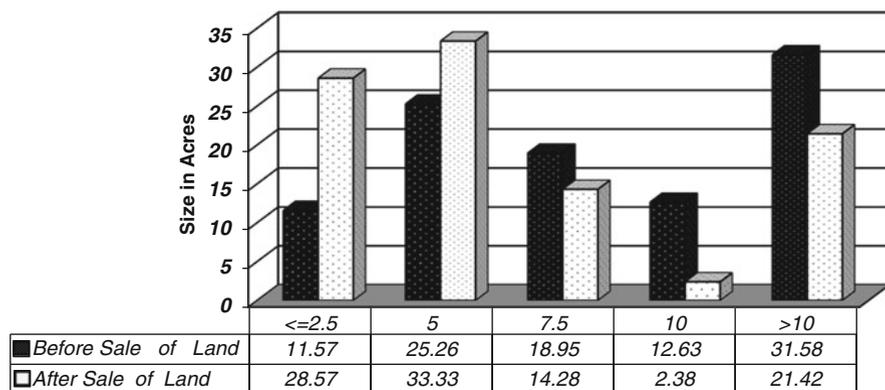


Fig. 18.4 Size of landholdings

Table 18.4 Average size of landholdings (acres)

Region	1981	2007
Northwest	5.42	2.35
Southwest	5.95	4.81
South	5.39	.62
Total	5.39	2.52

Source: Kaushik (2004)

also experienced significant decline as compared to the Southwestern region. Although the sale of land is more frequent in this region, particularly in the *Bijwasan* Village, some samples from this region are taken from *Pindwala Khurd* where farmers still hold their land so that the size of the holdings has not declined much.

18.12 Changes in Cropping Pattern

The sale of land has induced significant changes in cropping pattern in the study area. Earlier, because of low rainfall and the absence of irrigation, cropping pattern was skewed in favor of coarse grain crops such as millet and barley. The sale of agricultural land made it possible to install tube wells, which assured a regular water supply for irrigation and consequently brought changes in the cropping pattern. Now, the area under coarse grains is increasingly replaced by wheat, vegetables, paddy, and mustard, which require relatively more water. The largest area is under wheat in all the regions. Wheat was the dominant crop in all the regions in both periods. Presently, about 40 % of the area is under this crop. *Jowar*, *gram*, *bajara*, *paddy*, vegetables, fodder, and edible oil crops were the other important crops. By region, wheat, paddy, and vegetables are dominant crops in the Northwest region; wheat, *paddy*, *jowar*, *bajra*, and vegetables in the Southwestern region, and wheat, *paddy*, vegetables, and *jowar* in the Southern region are important crops (Fig. 18.5).

There was considerable shift in the cropping pattern during the study period. These shifts can be summed up as (1) wheat and *jowar* are the principal crops in both reference periods, (2) area under *gram* and millet declined significantly in all the regions, (3) overall area under wheat, paddy, mustard, pulses, *jowar*, and vegetables increased marginally, (4) area under wheat, fodder, and vegetables increased significantly, (5) wheat, mustard, and vegetables experienced significant increase in the Southern region, (6) vegetables and edible oil crops registered significant change in the Southwestern region, largely because of a decline in *jowar* and *bajra*, and (7) vegetables, *jowar*, and paddy gained in the Northwestern region.

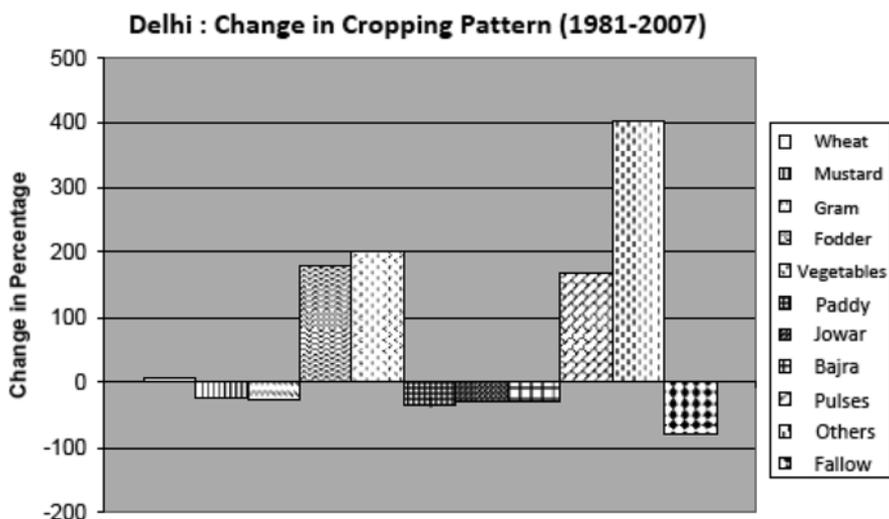


Fig. 18.5 Delhi: change in cropping pattern (1981–2007)

18.13 Changes in Yield

Per acre yield is affected by a number of factors including both physical and institutional. The physical factors adversely affecting the per acre yield include rocky soils, undulating terrain, and the presence of salts in parts of the study area. The prominent institutional factors include use of high-yielding varieties, irrigation, mechanization of agriculture, and fertilizers. In the early 1970s, output was very low because of unscientific agriculture. The majority of farmers were using traditional seeds, locally called *desi* varieties, the output of which was very low. However, these varieties were more suitable, considering the rain-fed system of agriculture. The farmers were poor and uneducated. Thus, they were not in a position to buy improved varieties of seeds, costly fertilizers, and tube well irrigation. Later on, sale of a part of their agricultural land provided them money to install tube wells and use other modern inputs. Apart from government efforts, the aforesaid developments, as stated by the respondents, were responsible for the increase in per acre yield of different crops.

There is only marginal increase in the per acre yield of different crops. The highest increase (43.56 %) in per acre yield has been recorded in wheat, from 11.11 quintals in 1980–1981 to 15.95 in 1995–1996 and further to 21 quintals in 2007. Considering the time period of 15 years, however, this increase is also not significant. In all other crops the increase in yield is even less significant. In such crops such as *Jowar*, *bajra*, *gram*, *pulse*, or *paddy*, increase in yield is very low (Table 18.5). Except *gram*, the per acre yield of all the crops is least in the Southern region,

Table 18.5 Changes in yield (in Quintal/Acre)

	Northwest region		Southwest region		Southern region	
	1981	2007	1981	2007	1981	2007
Kharrif:						
Jowar	5.21	10.63	4.67	10.21	5.97	10.24
Bajra	5.79	12.06	6.13	11.77	5.33	12.01
Maze	6.35	12.64	5.48	12.49	5.36	12.90
Paddy	5.66	14.05	4.87	13.57	5.44	13.75
Fodder	5.74	9.66	5.31	9.85	5.30	9.84
Rabi:						
Wheat	5.44	21.89	5.24	21.75	5.37	21.56
Gram	5.84	11.86	5.33	12.00	5.51	11.86
Mustard	6.03	9.21	5.25	9.23	5.63	9.79
Zaid:						
Vegetable	5.34	9.86	6.24	11.82	5.29	11.34

Source: Kaushik (2004)

mainly because of poor irrigation and adverse physical conditions. However, in comparison to the average yield of different crops in Delhi (including non-sample households), the per acre yield of the sample households is higher among all the crops, which reflects the impact of the sale of land by the sample households on their agricultural characteristics. This impact is largely that the sampled households now have money to install tube wells and to purchase agricultural implements, which positively affected the productivity of the land.

18.14 Changes in Cropping Intensity

Cropping intensity is defined as the number of crops grown over a piece of agriculture land in a calendar year. Cropping intensity to a large extent depends upon the availability of water for irrigation, soil quality, and agriculture inputs. Canal irrigation is almost nonexistent in Delhi. The only source of irrigation is a tube well. However, even now because of the rocky terrain and low water table in the Southern region, there are few tube wells other than those in the farmhouses. The cost of boring and purchase of machinery is very high, which an average farmer cannot afford; because of these high costs of tube wells and the absence of canal water, cropping intensity is not very high, especially in the Southern region. Rocky soils and undulating terrain made it more difficult to cultivate fields and to provide irrigation. The dissected land of the Aravalis covers parts of the study area. In other regions also, cropping intensity is not very high. Many pockets in the Northwestern and the Southwestern regions are covered with brackish soils. The local farmers shared that

problem is aggravated by the increase in tube-well irrigation. Large numbers of agriculture fields in Nazafgarh and Kanjhawala blocks can be seen with a sheet of chlorides and nitrates. Nevertheless, availability of tube-well irrigation has increased cropping intensity. In 1980–1981, cropping intensity was only 121, which increased to 149 in 1995–1996 and 181 in 2007. It is lowest in the Southern region in all the periods: 1980–1981 (81.56), 1995–1996 (109.27), and 2007 (181). In the Northwestern and the Southwestern regions, it was 190 and 189, respectively.

18.15 Irrigated Area

The number of constraints such as low rainfall and the virtual nonexistence of artificial means of irrigation cause the irrigated area to be very low in Delhi. Until the late 1980s, irrigation was largely dependent on the Persian wheel-driven wells (*Rahats*): there were a couple of these wells in each village. *Rahats* were installed on these wells. These *Rahats* were not sufficient for irrigation of even one crop annually. Thus, irrigated area was very low. After the sale of a part of their agriculture land, local people were able to install tube wells, which increased the area under irrigation. The irrigated area increased from 77.40 % in 1980–1981 to 92.59 % in 1995–1996, and almost at the same level in 2007 (Table 18.6). The percent of irrigated area was lowest in the Southern region in 1980–1981 (67 %), 1995–1996 (74.55 %), and 2007 (89.72 %) because of the rocky soils and undulating terrain. The corresponding figures for the Southwestern region are 77.40 % and 92.59 %, respectively. In the Northwestern region also, trends were similar to the Southwestern.

Table 18.6 Percent of irrigation by tube wells

	Northwest region	Southwest region	Southern region
Khariff:			
Jowar	80.89	79.91	86.94
Bajra	86.78	88.47	86.1
Maze	85.45	86.06	83.17
Paddy	85.68	87.49	86.69
Fodder	82.78	83.35	82.67
Rabi:			
Wheat	91.70	92.68	92.76
Gram	88.05	85.82	86.47
Mustard	84.92	84.59	86.66
Zaid:			
Vegetables	92.54	93.42	89.72

Source: Kaushik (2004)

18.16 Changes in Occupational Structure

There is a significant change in the occupational structure in the study area. For the purpose of the study, only adult members in the working-age group of 15–60 years are considered. In rural areas, the traditional occupation is agriculture, but dependency on agriculture has declined significantly in the rural belt of the inner fringe. Before the development of farmhouses the majority of people (74.20 %) were engaged in agriculture. In many of such villages, agricultural land is increasingly occupied by nonagricultural activities or it is under farmhouses. The local people are denied work on such farmhouses.

After the sale of land, the proportion of workers in the agriculture sector declined significantly. Many of these people started nonagricultural occupations. The maximum shifts in occupations are observed from agriculture to business activities. The people did not possess any technical skill or expertise to handle work such as jobs in transport and government service or even the entrepreneurship skills for small business. The respondents informed us that many of the families lost their money in new occupations. Presently, among the sample households only 40 % of the working population is engaged in agriculture and allied activities, followed by small enterprises and other such business (25 %), transport (14 %), police and defense (5 %), and other (18 %) (Table 18.7).

The proportion of people engaged in agriculture activities is higher in the Northwestern region than the other regions such as the Southwestern and the Southern, mainly because in the Northwestern region the growth of farmhouses is restricted to a few villages only and most of the land is still with the local people (Table 18.8).

Table 18.7 Changes in occupational structure

Occupational structure	1980–1981	1995–1996	Percent change
Agriculture and allied	74.20	39.47	–46.80
Transport	10.57	13.16	24.50
Police and defense	3.84	4.82	25.52
Business	3.64	24.56	574.72
Others	7.75	17.98	132.00

Source: Satyaprakash (2004)

Table 18.8 People's perceptions about economic change

Condition	Employment opportunities	Animal husbandry	Fodder supply	Migrant labor
Increased marginally	4.06	0.00	0.00	20.32
Increased significantly	30.89	7.31	4.87	23.577
Declined marginally	20.32	14.63	16.26	7.3
Declined significantly	37.39	69.91	74.79	42.27
No change	7.317	8.130	4.06	6.50

Source: Kaushik (2004)

There is great remorse in the mind of common men against the sale of land that happened in the past. They feel that it has reduced the job opportunities in the area. Sale of land has also negatively affected the animal husbandry that is largely linked with agriculture. In the absence of agriculture, the land fodder supply has declined substantially, and this has had a negative impact on animal husbandry.

18.17 Social Change

The local people (rural communities) were traditionally dependent on agriculture. But in the past few decades, they have sold a part of their land to people from outside their villages for the establishment of farmhouses. These sales brought many changes in their traditional occupations and economic setup, as already described. Such changes in economy and occupations resulting from landed money have further produced effects in the wider social sphere of life of the village communities (Fig. 18.6).

Money received from the sold land has triggered a dowry race among the local communities. The traditional joint family system has disintegrated, and a large number of people became addicted to alcohol. The presence of a large amount of migrant labor has transformed them into a multi-cultured society. The aforementioned

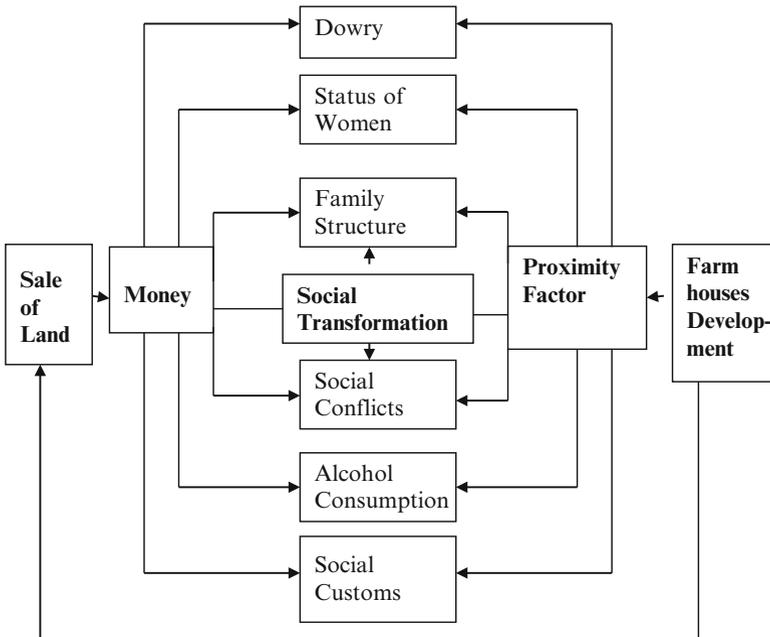


Fig. 18.6 Conceptual framework of social change caused by the presence of farmhouses

changes have created social unrest among the local communities. The positive side of these developments is reflected in the increase in the status of females. They are more educated now, and girls are not considered a burden on the family. Change is observed in their lifestyle, which is reflected in food, clothing, and social behavior. These observed changes, of course, are not purely an outcome of the farmhouse impacts. Several influences from the city and institutions are also present. Although the study does not have a controlled population to measure such impacts statistically or analyze influences in an integrated manner, it is certain that land sold for farmhouses has provided extra money, which has triggered many social taboos, cultural practices, and different investment patterns. Altogether, the region surrounding the farmhouses has been transformed. The following findings henceforth are a result of combined effects and not solely from farmhouses.

18.18 Changes in Social Environment

Social customs evolved over a long period of time. Many factors shaped the social transformation experienced by the surrounding communities. Proximity to farmhouses is only one of those. Nevertheless, the overwhelming majority (86.18 %) of the sample households feel that proximity to the farmhouses has significantly degraded social customs, citing the example of the dowry system in marriages. Respondents reported that money received from the sale of land has introduced a sort of competition among the rural people for large investments in marriages. There is breakdown of the traditional hierarchy. Most of the people feel that there is decline in the respect given to elderly people. Earlier, the whole family was dependent on agriculture and most of the members were dependent on the head of the family for all money matters. But after the sale of land and the breakdown of traditional occupations such as agriculture, people are economically free to make their decisions independently.

18.19 Social Conflicts

There is significant increase in the population of the sample villages. Farmhouses have created a demand for various kinds of workers. Large numbers of workers are employed at the farmhouses. They are mostly male migrant workers of specific age group from the adjoining states. Many of these workers are settled in nearby villages. This has not only increased the population of these villages but also modified their demographic and socioeconomic characteristics. The presence of a large number of migrant workers (about 12,000 persons), many of which are without their families, has created many social problems. Incidences of burglary, eye teasing, rape, eloping, and inter-caste marriages have increased.

18.20 Family Structure

Traditionally, the rural communities have a joint family system. Earlier, agricultural activities demanded labor, which was provided by the entire family. After the sale of agricultural land for the development of farmhouses, there was no functional value of joint families. The sale of agricultural land has introduced occupational changes among the rural people. Their proportion has increased in nonagricultural activities. Consequently, this has affected the family structure. The sale of land has created a rift in many families and has been instrumental in breakdown of the joint family system. Second, the sale of land and declining interest in agriculture have considerably reduced dependency on each other. The situation arises from the sale of the land, which also brought changes in social attitude and social values favorable to the nuclear family system.

In the study area, more than half (55 %) of the families were nuclear and the rest of the 47 % were joint families. The significance of the family structure is that the joint family system is more common in the Southwestern region than the Southern region. This may be because of comparatively high incidences of the sale of land in the Southern region (Fig. 18.7).



Fig. 18.7 Children coming from a girls' school, Chhattarpur Village

18.21 Education and Status of Females

A large majority of the people (more than 70 %) feel that there is a positive change in the attitude toward females. They are more independent now and are free to be involved in education and learning skills, which was not a practice previously. Earlier, female members of the family were not allowed to acquire education or to do jobs outside their village. They were supposed to be engaged only in the traditional jobs of housekeeping and child rearing. But now, after coming in contact with people from outside and the impact of urbanization and media, their thinking has changed. Now people feel that there is not so much discrimination in the freedom of either sex. The status of women has positively changed, and girl children are no longer considered a burden on the family.

18.22 Consumption of Alcohol

The most adverse impact of the sale of land and the growth of farmhouses in the neighborhoods of the rural communities come in the form of increasing alcoholism among the rural people. They try to imitate the lifestyle of the farmhouse people. More than 60 % of the people feel that incidence of alcohol abuse has increased substantially in both young and elder members of the rural society (Table 18.9). Although alcohol consumption is not a new thing to the people of this area, earlier it was restricted to a small minority of the rural society. Alcohol was not acceptable in the society. With the sale of land, landowners received large amounts of money. The majority of them were illiterate and did not have any other skills to utilize the money by investing it in productive activities. A large portion of such money was wasted in unproductive and undesirable activities such as consumption of alcohol. Many families have been completely ruined and are now on the road. The family bonds are breaking, and social conflicts are on the rise. Alcoholism is gradually becoming acceptable in society. Even schoolgoing children are becoming addicted to alcohol.

18.23 Political Participation

Among the families who have sold their agricultural land, attraction toward political activities has increased recently. One third of the people say that their participation in such activities has increased: first, because of the large sums of money received from the sale of land; second, now they have more time to spare for such activities as they are free from agricultural activities; third, there are no requirements of technical skill; and fourth, the incremental return of the investment in politics is much higher in the form of unaccounted money and power. The local people believe that

Table 18.9 Change in social environment (% of respondents)

Condition	Social customs	Social environment	Superstition	Consumption of alcohol	Respect for elders	Independence to M/F	Political participation	Food habits	Education
Improved marginally	0	0	0.00	8.13	0.81	4.06	4.06	6.00	34.95
Improved significantly	1.63	2.44	0.81	18.69	14.63	34.14	32.52	9.76	43.09
Degraded marginally	7.32	11.38	13.82	21.13	23.57	18.69	14.63	17.89	9.76
Degraded significantly	86.18	78.05	74.79	47.96	53.65	17.88	44.71	60.16	6.5
No Change	4.88	8.13	10.56	25.20	7.31	25.20	4.06	8.94	5.69

Source: Kaushik (2004)

their political awareness has benefited the village community in many ways. First, they influence the government and have been successful in enhancing the minimum rate at which agriculture land can be acquired by the government. Second, many infrastructure works have resulted from their active involvement, such as metalled roads, sewerage, and new buildings for the schools.

18.24 Access to Household Amenities

The sale of land by local people for the establishment of farmhouses in NCT of Delhi introduced urban symptoms into the rural society in two ways. Primarily, it brought much money to many rural families, and second, it brought in an entirely different urban culture at the same time. The sale of land has brought changes in their patterns of consumption. The present study is an attempt to analyze this change in access to household goods. There has been appreciable increase in the access to many household goods by the local people after the sale of their land (Fig. 18.8). The Government of Delhi had made provision for safe drinking water and electricity to almost all the population well before the sale of land for the establishment of farmhouses started. In the consumption of non-basic goods such as access to television, telephones, refrigerators, cars or scooters, however, major change has occurred. The people living in the Southwestern and the Northwestern regions are better placed insofar as access to non-basic goods is concerned. In these regions, 25–50 % of households had access to such goods even before the sale of land, barring cars and telephones. On the other hand, only 5–10 % of the households had access to such facilities in the Southern region. The main reason for this variation is that most of the rural households were dependent on agriculture. Because of better soils,

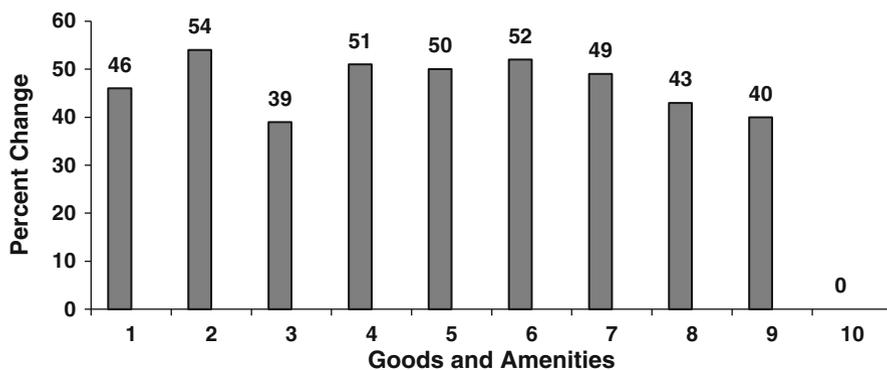


Fig. 18.8 Changes in access to goods and amenities: 1 kitchen gas stove, 2 scooter, 3 car, 4 refrigerator, 5 desert cooler, 6 TV, 7 radio, 8 telephone, 9 tap water, 10 electricity supply)

returns from agriculture were greater in the Northwestern region and Southwestern Delhi than the Southern region.

Significant increase in access to household goods after the sale of land is seen in all the regions, but the increase is greater in the Southwestern region followed by the Northwestern and South regions. More than 90 % of the sample households have access to such goods in the Southwestern region, except cars and telephones. More than two thirds of the households have access to car and telephone in this region. There were few variations in the availability of such facilities between the Northwestern and the Southwestern regions before the sale of land, but now 20–30 % of more households have access to such facilities in the Southwestern than the Northwestern region. These variations are more focused in the Southern region where only about two thirds of the households have access to such amenities other than cars and telephones. One third of the households have access to cars and telephones. The comparative figure is 20–30 % higher in the Southwestern and the Northwestern regions.

The reasons for these variations are, first, although the process of the sale of land for the establishment of farmhouses was started earlier in the Southern region, the people sold their land at a time when land values were not as high, so they received a relatively smaller amount of money from the sale of their land in comparison to the people of other regions who sold their land at a much higher rate at a later stage. Second, the people who were traditionally agriculturists could not properly manage the money they received from of the sale of their land. Most of the money was wasted in nonproductive activities. However, the people of other regions were aware of this bitter experience of the *Gujjar* belt and may have acted more wisely by investing money in productive activities such as buying agriculture land in other areas.

18.25 Conclusion

The growth of farmhouse culture in the NCT of Delhi has brought profound changes in the socioeconomic and spatial organization of the local communities living in the vicinity of the farmhouse clusters. Now the two communities of entirely different social and economic backgrounds are living side by side. The rural people are largely dependent on agriculture, but the characteristics of agriculture changed after the sale of land for the development of farmhouses. The size of landholdings has declined considerably. Area under irrigation has been increased by increase in the number of tube wells. Consequently, the intensity of cropping as well as per acre yield has gained marginal increases. A shift in the area under different crops is observed. The cultivated areas under wheat, mustard, *jowar*, and vegetables have increased while that of gram and *bajra* declined. After the sale of their land, however, their dependency on agriculture has reduced considerably. Many people have purchased agriculture land in adjoining parts of Haryana. Most of the agriculture operations are done by migrant labor. The owner supervises this work from his

parent village. Thus, a kind of suitcase farming is introduced in the area. There is a significant shift to nonagricultural occupations. Some people have invested in businesses such as transport and shops. A part of the money received from the sale of land is used for the gentrification of their house, improvement of household amenities, and purchase of consumer goods.

This change in rural economy affects the social organization of the local people. It brings positive as well as negative changes. Social changes, of course, are not entirely caused by the presence of farmhouses, which rather has contributed indirectly and also been caused by other concomitants. There is a positive change in the level of literacy, the lifestyles of the people, and access to consumer items such as television and telephones, and improvements in the physical infrastructure such as roads, electricity, and tap water. The behavior of the people becomes more rational, and women are now becoming more independent and educated.

However, the growth of the farmhouse culture also brings many negative changes. Many of the families were ruined after the sale of their agricultural land because they had no other skills to start new occupations from this money and in many cases it was wasted in nonproductive activities such as drinking alcohol. Many of the families became jobless. Those people who had invested this money more wisely, as for purchase of agriculture land elsewhere, are now in a better position economically. However, this group constitutes only a thin minority of the households who have sold their land at their parent village and subsequently repurchased agriculture land in adjoining areas of Haryana. Most of these people purchased land in those parts of Haryana that are nearest to their parent village and are more akin to them culturally.

Local people see deterioration in social values and respect for elders in the family. There is also increasing incidence of the nuclear family at the cost of the traditional joint family system. The traditional social values and customs are in a process of change, the assimilation of urban cultural values is on the increase, and the social bonds among rural people are breaking and disintegrating.

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Chapter 19

Spatial Analysis of In-migration and Out-migration in Bolpur Town, West Bengal, India

Braj Raj Kumar Sinha

Abstract Spatial analysis of migration is one of the important aspects of geographic inquiry. It is a study of the arrangement, pattern, position, and size of an object in space and time. Spatial analysis of migration here is meant as the detailed study of in- and out-migration that takes place in the study area from and to different spatial units separated by the defined political or administrative boundary. Spatial units have a close relationship with distance in space and have a crucial role in shaping the pattern and size of migrations. Therefore, this study focuses on the roles of space, demographic elements, and causal powers as fundamental geographic variables in determining the pattern of migration. This study is based on the primary data collected through questionnaire from the respondents in Bolpur Town. The findings of the study show that the number of persons who migrated into or from the town remains greater from within or into the closer spatial units and that the number of persons who migrate generally decreases from or into the farther spatial units, indicating a distance decay effect on migration. Migration is found to vary by age, sex, social group, and causative factors.

Keywords Migration • Bolpur • In-migration • Out-migration

19.1 Introduction

Migration is a multidimensional element of population processes and has great bearing on the population changes of a region. It is also considered as a cultural phenomenon and creates a cultural landscape with the aid, advice, and consent of nature and Earth opportunities. In the words of Zelinsky (1966, pp. 43–44), migration is a cultural phenomenon and a dynamic element, probably more so than fertility and mortality, in population. Migration is a result of the overall design of a society within which economic, social, demographic, and other types of behavior

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are enfolded. According to Trewartha (1969, p. 135), migration is an indicator of the racial, linguistic, and nationalistic mixing of the Earth's population. Shrivastava (1983, p. 157) opined that migration is an instrument of cultural diffusion and social integration. It may create 'communities within the community.' Similarly, migration can also be interpreted as a means of spatial interaction. Ogden (1984) noted that migration is a part of the wider study of population geography and is an important element in understanding the geographic organization of human society.

In the words of Demko et al. (1970, pp. 286–287), migration is the most complex component of population growth. It provides an important network for the diffusion of ideas and information, indicates symptoms of social and economic changes, and can be regarded as a human adjustment to economic, environmental, and social problems. Dudley (1970, p. 300) interpreted migration as an expression of interaction over space, but differs in certain essential characteristics from other channels of interaction, mainly in terms of a commodity that is being transported. Migration is viewed as a form of individual or group adaptation to perceived changes in their environment. Chapman (1979, pp. 140–142) took migration as a good example of relocation diffusion because nobody can be literally in two places at one time. Roseman (1971, pp. 589–598) considered migration to be a spatial and temporal process and noted that migration is an important basis for the identification of relationships between the temporal and spatial dimensions of communities.

Migration of population is a special and an important topic of study in the human branch of geography. It creates a particular niche, especially in the field of population geography. It is a very complicated and problematic global issue and draws the attention of scientists of various specialties. Especially for population geographers, migration is a very interesting topic of research because of its inherently spatial character.

Spatial analysis of human migration is of great concern to geographers as it is considered as a way or an approach to analyzing spatially referenced (spatial unit oriented or spatial unit wise) migration data to generate and obtain new facts and patterns. Spatial analysis explicitly incorporates information about the location, distance, distribution, arrangement, pattern, size, or volume of any geographic phenomenon existing or happening in a defined spatial unit at a particular point of time. In fact, it is the process of determining the spatial distribution of a variable under study and its relationship with the space. Spatial analysis in the geographic discipline is deeply linked with the tools and techniques of cartography because cartographic representation becomes a helpful tool in explaining the spatial pattern of any geographic element. In modern times, computer-based cartography or automation in cartography has become a powerful means for handling bulk geographic data.

Spatial analysis of migration here is meant as the detailed study of in- and out-migration that takes place in the study area from and to different spatial units separated by the defined political or administrative boundary on the map. Spatial units have a close relationship with the distance in space and play a crucial role in shaping the pattern and size of the migrants.

Spatial analysis of in-migration and out-migration provides ideas about changes and impacts at both the origin and destination places of migration and in the context

of health, education, earnings, lifestyle, psychological motives, socioeconomic profile, and demographic and environmental aspects of the migrants. In-migration and out-migration are also important agents in the diffusion of culture and in the changing pattern of opportunities in space. In-migration and out-migration sometimes create favorable conditions and at other times the reverse. Broadly speaking, migration is generally related to ethnic, religious, social, cultural, economic, political, and environmental aspects. Migration is, thus, an important topic of analysis at the spatial level (Sinha 2005, p. 413).

19.2 Study Area

Bolpur (a municipal town of 18 wards) is located in the southernmost part of Birbhum District, West Bengal, in eastern India. It is surrounded by the rural areas of the Bolpur-Sriniketan Community Development (C.D.) Block. Geographically, it is located on the Ajoy–Kopai inter-riverine tract, a segment of the Rarh region in the Lower Ganga Plain. It is about 150 km from Kolkata in the northwest direction. The Bolpur area is one of the economically depressed portions of this region. It is dominated by the agrarian economy and is inhabited by people of different communities and social groups. Bolpur Town is one of the growing towns of Birbhum District in West Bengal and has been given a special place on the map of towns of national importance by the Government of India. The major contributing factor to the growth of Bolpur Town is migration. However, the role of births and deaths is also important. It is very close to Santiniketan, a cultural and educational site in India of international repute. In terms of economic function, Bolpur Town is dominated by commercial and administrative activities.

19.3 Objectives

This study focuses on (1) in- and out-migration by age, sex, and spatial units; (2) in- and out-migration by social group, sex, and spatial units; (3) in- and out-migration by causes and spatial units; and (4) in- and out-migration from rural to urban, from urban to rural, and from urban to urban, respectively.

19.4 Methodology

The methodology consists of a database and a concept base. The database includes the procedures of collection of the primary data and its management and structure to meet the defined objectives. Therefore, this study is exclusively based on the primary data collected through questionnaires in 2004 at household level. To meet the purpose, 15 households were randomly selected from each ward. While

conducting the household survey, houses from different social groups such as General (higher) caste, Other Backward caste, Scheduled caste, Scheduled tribe, and Muslim were chosen to obtain better results. Thus, altogether 270 households were covered in the sample study. The total number of persons from the sampled households was 1236; of them, 168 males and 124 females were reported as in-migrants and 55 males and 87 females were reported as out-migrants within the last 3 years.

The concept base includes the schematic ideas in considering and classifying spatial units. For spatial analysis of in- and out-migration, the places from which the migration starts and the places where it ends can be classified into certain spatial units and on the basis of any kind of boundary such as administrative, natural, or political. Here, for spatial analysis of in- and out-migration, the places from which the migration starts and the places where it ends have been classified on the basis of the administrative boundary of the municipality, community development block (C.D. Block), district, state, and country (location map: Fig. 19.1). The study area (Bolpur Town) is an independent urban spatial unit bounded by its own municipal boundary and surrounded by the areas of different villages of the Bolpur-Sriniketan C.D. Block within which the study area (Bolpur Town) lies. In this town, in-migration takes place from different places of the Bolpur-Sriniketan C.D. Block, different places of the remaining C.D. Blocks of Birbhum District (the district of the study area), places of different districts of West Bengal (W.B.), places of different states of the country, and places outside the country. Similarly, out-migration also takes place from this town to different places of Bolpur-Sriniketan C.D. Block, different places of other C.D. Blocks of Birbhum District, different places of other districts of W. B., and to different places of other states of the country as well as outside the country. Therefore, for convenience and to meet the foregoing objectives, the places of origin (both rural and urban located in the areas of C.D. Blocks, districts, and states) from which migration takes place to Bolpur Town (as the in-migration stream) and the places of destination (both rural and urban, located in the areas of C.D. Blocks, districts, states) where migration takes place from Bolpur Town (as the out-migration stream) are classified as administrative spatial units and known as the C.D. Block within which the study area lies; other C.D. Blocks of the district of the study area; other districts of W.B.; other states of India; and outside India. Such spatial administrative units are applicable for the two-way flow of migration in the town.

Depending on the nature and types of area and settlement, such as rural and urban, spatial units can also be termed as rural spatial units and urban spatial units. These two spatial units vary considerably in terms of both existing and potential resources and opportunities of social, cultural, economic, political, and environmental categories and play a crucial role in encouraging and discouraging the motive and choice of the persons to move from one spatial unit to another. As a result, migration takes place from rural to urban, from rural to rural, from urban to rural, and from urban to urban, and becomes a matter of spatial analysis. Therefore, this study focuses on such types of migration streams.

LOCATION MAP

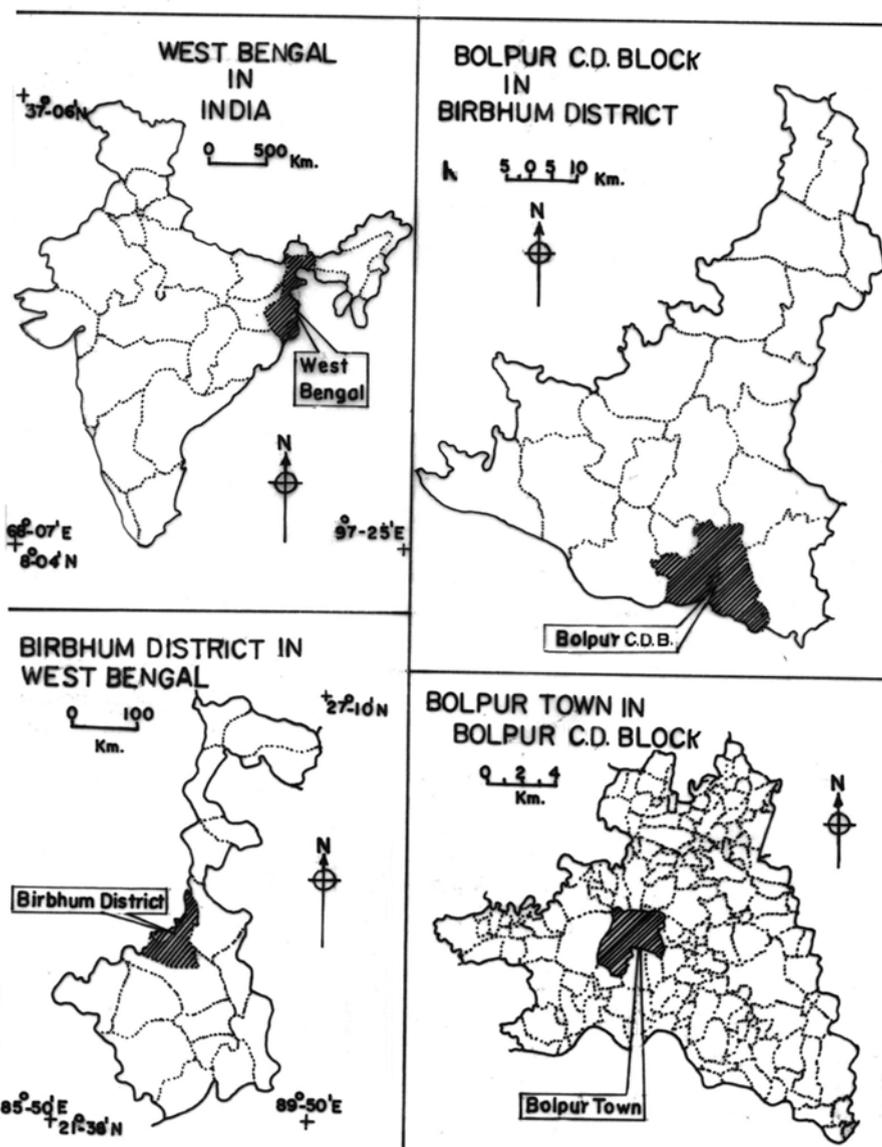


Fig. 19.1 Study area

19.5 Analysis

This section considers the primary data-based pattern of in- and out-migration in Bolpur Town by age, sex, social group, and cause across different spatial units.

19.5.1 Pattern of In- and Out-migration by Age, Sex, and Spatial Units

The volume or size of both in- and out-migration of persons highly depends on their age, sex, and the spatial units. Different spatial units combine different places from which either migration begins (place of origin) or where migration ends (place of destination). Such origin and destination places located in different spatial units denote spatial distances. Such distances between the origin and destination places become a significant factor that influences the volume of migrants. Johnston et al. (1994, pp. 138–139) considered distance as one of the fundamental spatial concepts, and while explaining the distance decay effect noted that the near points remain more related than distant points. His statement is based on the literature of several scholars. Smith (1977, pp. 287–291) explained that the number of people coming to the city drops off with distance in an apparently regular and predictable manner. He emphasized that the interaction between city center and the number of customers traveling various distances appears to decrease with distance, rapidly at first and then less rapidly further away from the point of attraction. Similarly, Newman and Matzke (1984, pp. 171–172) are of the same opinion and stated that the friction of distance reduces the volume of migration between areas; this effect is known as distance decay. Therefore, one can say that the greater is the distance between the origin and destination, the lesser will be the volume or number of the migrants, or vice versa.

The increasing distance from the center of attraction (place of origin) has a slightly different influence on male and female migrants of a certain age group. Normally, the lower and higher age-group persons tend to migrate short distances. Similarly, males migrate relatively longer distances and females migrate a shorter distance. Therefore, depending on the distances, migration may be long distance or short distance as well as sex selective.

19.5.2 In-migration Pattern by Age, Sex, and Spatial Unit

Spatial unit, age, and sex of in-migrants are closely linked because the in-migrants of certain age groups generally depend on the spatial units in which the role of distance remains very significant. When we have a close view of the pattern of different age-group in-migrants across different spatial units, the percentages of both male and female in-migrants coming from within the study area's C.D. Block and from other C.D. Blocks of Birbhum District are quite high (Table 19.1). The percentages

Table 19.1 In-migration to Bolpur Town, West Bengal (W.B.), by age, sex, and spatial units

Spatial units	Age group of in-migrants (years)												Total	
	Below 15		15-34		35-59		60 or above							
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
C.D. Block ^a	19	8	40	24	14	7	6	4	79	43				
	24.05x	18.60	50.63	55.81	17.72	16.28	7.59	9.30	(47.02)+	(34.68)				
Other C.D. Blocks of the District ^b	9	2	47	31	13	18	1	2	70	53				
	12.86	3.77	67.14	58.49	18.57	33.96	1.43	3.77	(41.67)	(42.74)				
Other Districts of W.B.	-	-	2	12	10	7	1	-	13	19				
			15.38	63.16	76.92	36.84	7.69		(7.74)	(15.32)				
Other states of India	-	-	5	9	1	-	-	-	6	9				
			83.33	100.00	16.67				(3.57)	(7.26)				
Outside India	-	-	-	-	-	-	-	-	-	-				
Grand total	28	10	94	76	38	32	8	6	168	124				
	(16.67)	(8.06)	(55.95)	(61.29)	(22.62)	(25.81)	(4.76)	(4.84)	(100.00)	(100.00)				

Source: Field study (2004)

+Bracketed lower figures in the cells are the percentages of grand total in-migrated males or females

xUnbracketed lower decimal figures in the cells are the percentages of total in-migrated males or females of respective spatial unit

^aC.D. Block = C.D. Block within which the study area (Bolpur Town) lies

^bOther C.D. Blocks = Remaining C.D. Blocks of the district of the study area

of in-migrants coming from other districts of W.B. (i.e., from outside Birbhum District) and from outside West Bengal (i.e., from other states of India) are quite low. The main reason behind this is the length of the distance between the origin and destination points. There is no in-migrant from beyond the country. In other words, it can be said that the volume of in-migration generally remains greater from the spatial units at a shorter distance and less from spatial units at a greater distance from Bolpur Town.

Spatial unit variation shows that the percentages of both male and female in-migrants of the age groups 15–34 years and 35–59 years are obviously higher from each spatial unit. However, in terms of number, the preponderance is from within the district. The main reason for such patterns in these two age groups of in-migrants is marriage in the case of females and service/employment opportunities in the case of males. The pattern is similar for persons less than 15 and more than 60 years of age. The picture by age group and sex shows that children less than 15 years of age generally move to Bolpur Town from within and from outside the C.D. Blocks, which migrations cover generally short distances. In-migrants aged 60 years and older move only similar short distances, possibly because older people generally do not tend to come from areas further distant. Of the total in-migrants, the percentage of persons from the age group of 15 to 34 years was highest, which may result from their more active and more mobile nature.

19.5.3 Out-migration Pattern by Age, Sex, and Spatial Unit

Table 19.2 shows that there were only 55 males and 87 females in the category of out-migration. The spatial unit picture shows that the majority of males out-migrate beyond the home district (for employment) of the study area but remain within different districts of West Bengal, whereas the majority of females out-migrate to different C.D. Blocks of the Birbhum district only. Such out-migration of females is normally caused by their marriage. Most middle-class parents prefer places at shorter distances for their daughter's marriage.

Variation by age and sex shows that the majority of both males and females who out-migrated from Bolpur Town were from 15 to 34 years of age, some were from 35 to 59 years of age, and most of them migrated to different districts of West Bengal. Very few persons migrate to other states of India, indicating that both the younger and older age-group persons in the majority migrate within their home state. The largest percentage (80 % for males and 93.10 % for females) of both males and females in the grand total category indicates that the younger age group migrates more than the older age group. There was no out-migration among those less than 15 or more than 60 years of age.

Table 19.2 Out-migration from Bolpur Town, West Bengal, by age, sex, and spatial units

Spatial units	Age group of out-migrants (years)								Total	
	Below 15		15–34		35–59		60 and above			
	M	F	M	F	M	F	M	F	M	F
C.D. Block ^a	–	–	–	23 100.00×	–	–	–	–	–	23 (26.44)+
Other C.D. Blocks of the District ^b	–	–	5 55.56	33 97.06	4 44.44	1 2.94	–	–	9 (16.36)	34 (39.08)
Other Districts of W.B.	–	–	39 95.12	24 88.89	2 4.88	3 11.11	–	–	41 (74.55)	27 (31.03)
Other States of India	–	–	–	1 33.33	5 100.00	2 66.67	–	–	5 (9.09)	3 (3.45)
Outside India	–	–	–	–	–	–	–	–	–	–
Grand total	–	–	44 (80.00)	81 (93.10)	11 (20.00)	6 (6.90)	–	–	55 (100.00)	87 (100.00)

Source: Field study (2004)

+Bracketed lower figures in the cells are the percentages of grand total out-migrated males or females

×Unbracketed lower decimal figures in the cells are the percentages of total out-migrated males or females of respective spatial unit

^aC.D. Block=C.D. Block within which the study area (Bolpur Town) lies

^bOther C.D. Blocks=Remaining C.D. Blocks of the district of the study area

M male, *F* female

19.5.4 Pattern of In- and Out-migration in Bolpur Town by Social Group, Sex, and Spatial Unit

A place of in-migration (e.g., Bolpur Town and other similar places) will have several places of origin located spatially at varied distances in different spatial units. Similarly, a place of out-migration (Bolpur Town and other similar places) will also have several destination places located in different spatial units at varying distances from the study area. Therefore, spatial units provide an idea about distance between origin and destination place. Such distance is found to have influence differently on the persons of different social groups. In other words, spatial units and social group of migrants are to some extent related because the migration of persons of certain social groups depends to some extent on spatial distance.

19.5.5 Pattern of In-migration by Social Group, Sex, and Spatial Unit

Table 19.3 clearly explains the spatial unit and social group pattern of in-migration in Bolpur Town. The detailed picture of in-migration shows that the percentages of persons coming to Bolpur Town from different spatial units were higher from the

Table 19.3 In-migration to Bolpur Town, West Bengal, by social group, sex, and spatial units

Spatial units	Social group of in-migrants														Total	
	Higher caste		OBC		Muslim		SC		ST		M		F			
	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
C.D. Block ^a	20	9	27	13	11	5	21	16	-	-	79	43	(47.02)+	(34.68)		
Other C.D. Blocks of the District ^b	28	29	22	17	6	-	14	6	-	-	70	53	(41.67)	(42.74)		
Other Districts of W.B.	8	11	2	5	-	-	1	2	2	1	13	19	(7.74)	(15.32)		
Other States of India	5	6	1	3	-	-	-	-	-	-	6	9	(3.57)	(7.26)		
Outside India	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Grand total	61	55	52	38	17	5	36	24	2	2	168	124	(100.00)	(100.00)		
	(36.31)	(44.35)	(30.95)	(30.65)	(10.12)	(4.03)	(21.43)	(19.35)	(1.19)	(1.61)	(100.00)	(100.00)				

Source: Field study (2004)

OBC Other backward caste, SC Scheduled caste, ST Scheduled tribe

+Bracketed lower figures in the cells are the percentages of grand total in-migrated males or females

xUnbracketed lower decimal figures in the cells are the percentages of total in-migrated males or females of respective spatial unit

^aC.D. Block = C.D. Block within which the study area (Bolpur Town) lies

^bOther C.D. Blocks = Remaining C.D. Blocks of the district of the study area

Higher caste (H.C.) and Other backward castes (O.B.C.). The dominance of such persons toward the center of attraction (the study area) is shown in the grand total row. In-migration of Scheduled caste (S.C.) is also important. However, in-migration of the Scheduled tribes (S.T.) is less frequent. Such a varying pattern is a reflection of the total socioeconomic background of different social group persons.

The spatial unit picture shows that in-migrants (in terms of both absolute number and percentage) coming to Bolpur Town from within the C.D. Block were generally more from O.B.C., S.C., H.C., and Muslim categories, in that order of dominance. But in-migrants coming from outside the C.D. Block of the study area and from other spatial units of West Bengal and other states of India are in the majority. Higher caste (H.C.) and O.B.C. people generally move for a relatively longer distance, and their mobility in terms of volume remains greater in comparison to that of other social groups. The dominance of O.B.C., S.C., Muslims, and S.T. from within the C.D. Block is observed to follow their lesser education and lower level of human development, whereas the dominance of particularly higher caste in-migrants from different spatial units located away from the center of attraction is the consequence of a better educational and human development background and forward-looking attitude and awareness.

The social group picture in terms of absolute number shows that the majority of in-migrants from each social group remains from within the home C.D. Block and outside the C.D. Block (i.e., from within other C.D. Blocks of the Birbhum District). It indicates that the center of attraction (Bolpur Town) lies in a socioeconomically depressed region and attracts mostly persons from its local areas. In other words, one can say that Bolpur, being a small traditional town surrounded by rural economic functions, has weak centripetal and gravitational force and as a result does not attract many persons from distant places.

19.5.6 Pattern of Out-migration by Social Group, Sex, and Spatial Unit

Table 19.4 exhibits the pattern of out-migration from the study area. It is quite clear that those who out-migrated from Bolpur Town to different places within the C.D. Block were female only and they were from S.C., O.B.C., and H.C. The primary reason is marriage. Those females who have migrated to other C.D. Blocks of the district and to other districts of West Bengal were mainly from the Higher caste (H.C.) and Other backward caste (O.B.C.) categories, the reason being that the families of such social groups prefer, to some extent, distant places in search of better families for their daughter's marriage. Some females migrate for employment opportunities also. In comparison to females, most of the males from these two social groups migrate to some distant places within West Bengal and even to different states of India, generally to find jobs.

Table 19.4 Out-migration from Bolpur Town, West Bengal, by social group, sex, and spatial units

Spatial units	Social group of out-migrants												Total					
	Higher caste			OBC			Muslim			SC			ST		M	F		
	M	F	%	M	F	%	M	F	%	M	F	%	M	F				
C.D. Block ^a	-	7		-	8		-	8		-	8		-	8		-	23	(26.44)+
		30.43x			34.78			34.78			34.78			34.78				
Other C.D. Blocks of the District ^b	4	21		2	11		-	-		3	2		-	2		9	34	(39.08)
	44.44	61.76		22.22	32.35					33.33	5.88			5.88		(16.36)		
Other Districts of W.B.	19	20		14	6		-	-		8	1		-	1		41	27	(31.03)
	46.34	74.07		34.15	22.22					19.51	3.70			3.70		(74.55)		
Other States of India	4	2		-	-		1	-		-	-		-	-		5	3	(3.45)
	80.00	66.67					20.00									(9.09)		
Outside India	-	-		-	-		-	-		-	-		-	-		-	-	-
Grand total	27	50		16	25		1	-		11	11		-	11		55	87	(100.00)
	(49.09)	(57.47)		(29.09)	(28.74)		(1.82)			(20.00)	(12.64)			(1.15)		(100.00)		

Source: Field survey (2004)

+Bracketed lower figures in the cells are the percentages of grand total out-migrated males or females

xUnbracketed lower decimal figures in the cells are the percentages of total out-migrated males or females of respective spatial unit

^aC.D. Block=C.D. Block within which the study area (Bolpur Town) lies

^bOther C.D. Blocks=Remaining C.D. Blocks of the district of the study area

The social group picture in terms of absolute number shows that both O.B.C. and S.C. females compared to total O.B.C. and S.C. females migrate mostly to the boundary of the Birbhum District, the reason being the marriage system, as just stated. Most of the males and some females from the Higher caste, Other backward caste, Scheduled caste, and others migrate to different districts of West Bengal, possibly for employment and marriage. Some Higher caste males and females including others were found migrating to different states of India. Such persons are better educated and might have migrated for government jobs. Out-migrants (particularly males) in terms of absolute number were apparently more oriented toward outside Birbhum District as well as outside West Bengal. The results also indicate that generally H.C., O.B.C., and S.C. out-migrate to preferably more distant areas than the out-migrants of other social groups such as Muslim, S.T., and to some extent S.C. females.

Of the total of out-migrants, females constitute a fairly higher number and percentage, which indicates that in the process of out-migration females outnumber males, and this is natural as most of the females born in their parent's home have to leave, after they are married, to move to the home of other families in different places.

19.5.7 Pattern of In- and Out-migrants in Bolpur Town by Causes and Spatial Units

Movement of people in space and time is generally caused by inequalities in resources and opportunities of livelihood between and within spatial units. Chapman (1979, p. 30) rightly pointed out that migration is obviously related to differences in economic and social conditions and reflects and accentuates potentially divisive inequalities in living standards and job opportunities. Bogue (1969, p. 753) stressed that migration generally takes place when positive (encouraging) pull factors at the place of destination are outnumbered by negative (discouraging) push factors at the place of origin. Some regions or spatial units are socioeconomically, culturally, politically, and environmentally rich and some others are poor. Poorly developed or undeveloped regions are called depressed regions, or less affluent in resources, and the developed regions are more affluent in resources.

It is obvious that migration takes place in response to areal differentiation or regional variation of resource availability in the spatial frame. Some other factors, such as personal choice, aims, or objectives, and some demographic factors, such as age, gender, education, health, employment, and marriage, are also important in the process of migration. Marriage migration generally depends on the social, cultural, and economic security and peace as well as the expectation of a good and happy married life. All kinds of factors can be grouped into push and pull factors.

Push factors motivate persons to migrate from their place of origin and pull factors attract migrants to the place of destination. Spatial units and causes of in- and out-migration at a particular point of time are found to have great bearing on in-migration and out-migration. Therefore, space, time, and causes (factors) become essential aspects of in- and out-migration. Here, in context of the study area (Bolpur Town), marriage, education, service, and other factors were reported at the time of the field survey as the causes of migration, as also shown in the tables. Following are the patterns of in- and out-migration caused by different reasons across different spatial units.

19.5.8 Pattern of In-migration by Causes and Spatial Units

Table 19.5 exhibits the pattern of in-migration caused by such reasons at the place of origin. By spatial unit, the majority of males who in-migrated from within the C.D. Block did so mainly because of education and services, whereas the majority of females in-migrated from within the C.D. Block mainly because of marriage and their higher education; however, services and other reasons were also found responsible.

In-migration of males from outside the C.D. Block (i.e., from within other C.D. Blocks of Birbhum District) to Bolpur Town was mainly caused by services and other reasons, whereas in-migration of females from the same spatial unit resulted from marriage and other reasons.

In-migration of males from outside Birbhum District (i.e., from different districts of W.B.) to Bolpur Town was mainly caused by other services, but in-migration of females from the same spatial unit was caused by marriage, services, and other reasons. Those males and females who in-migrated from outside West Bengal (i.e., from other states of India) to Bolpur Town do so for marriage and other causes.

As a whole, it can be stated that those in-migrated from within the district (i.e. from both within and outside the C.D. Block) to Bolpur Town did so mainly because of marriage, education, and services. Those who in-migrated from beyond the Birbhum District and other states of India did so mainly because of services, marriage, and other causes. The specific pattern shows that marriage is the prime factor in the case of female migration, as two thirds (66.13 %) of females in-migrated because of their marriage. However, some females also in-migrated for education, jobs, and other reasons. The preponderance of females is from within the Birbhum District. The major reasons for male in-migration to the study area were found to be services, education, and other reasons, in order of relative dominance. The preponderance of males who in-migrated to Bolpur Town was from within the Birbhum District.

Table 19.5 In-migration to Bolpur Town, West Bengal, by causes and spatial units

Spatial units	Causes of in-migration												Total	
	Marriage			Education			Service			Other causes			M	F
	M	F		M	F		M	F		M	F			
C.D. Block ^a	1	25	37	11	30	2	11	5	79	43				
	1.27x	58.14	46.84	25.58	37.97	4.65	13.92	11.63	(47.02)+	(34.68)				
Other C.D. Blocks of the District ^b	-	41	10	2	43	2	17	8	70	53				
	-	77.36	14.29	3.77	61.43	3.77	24.29	15.09	(41.67)	(42.74)				
Other Districts of W.B.	-	10	-	-	4	5	9	4	13	19				
	-	52.63	-	-	30.77	26.32	69.23	21.05	(7.74)	(15.32)				
Other States of India	-	6	-	-	-	-	6	3	6	9				
	-	66.67	-	-	-	-	100.00	33.33	(3.57)	(7.26)				
Outside India	-	-	-	-	-	-	-	-	-	-				
Grand total	1	82	47	13	77	9	43	20	168	124				
	(0.60)	(66.13)	(27.98)	(10.48)	(45.83)	(7.26)	(25.60)	(16.13)	(100.00)	(100.00)				

Source: Field survey (2004)

+Bracketed lower figures in the cells are the percentages of grand total in-migrated males or females

xUnbracketed lower decimal figures in the cells are the percentages of total in-migrated males or females of respective spatial unit

^aC.D. Block = C.D. Block within which the study area (Bolpur Town) lies

^bOther C.D. Blocks = Remaining C.D. Blocks of the district of the study area

19.5.9 Pattern of Out-migration by Causes and Spatial Units

From Table 19.6 it was found that the majority of males out-migrated from Bolpur Town to different districts of the state, and the major reasons for their out-migration were better opportunities of employment and education. Marriage has been the prime factor in the case of out-migration of females. Their marriage takes place mostly up to the state level. However, the majority remains within the boundary of the Birbhum District.

As a whole one finds that service/job/employment and the opportunity of better education and work as dominant factors in causing out-migration of the majority of males from Bolpur Town, whereas marriage and job opportunity (services) were found as the most dominant factor in causing out-migration of females. Of the total females as reported in the category of out-migration, 86.21 % were found to have migrated only because of their marriage. Service/jobs also play some role in their out-migration. Service, education, and some other reasons seem to push persons to a relatively farther distance from the study area.

19.5.10 Pattern of Rural-to-Urban, Urban-to-Urban, and Urban-to-Rural Migration in Bolpur Town by Social Group

Migration depends highly on the nature and type of land (area). The nature of the concerned area is generally characterized by its function. On this basis, areas are divided into two categories, rural and urban. Both rural and urban differ in terms of their economic functions. The rural area is exclusively dominated by agricultural activities, whereas social, cultural, and economic opportunities remain less available. Opposite to this, the urban area is dominated by nonagricultural economic functions, and social, cultural, economic, political, and environmental infrastructures or opportunities remain better and more attractive. Inequalities in terms of such opportunities do exist between and within urban centers also. Such rural–urban and urban–urban gaps cause migration from rural to urban, from urban to urban, and from urban to rural. Rural to rural migration is also one of the types of migration, but in the context of the present study rural to rural migration is not applicable. Therefore, the analysis of rural to urban, urban to urban, and urban to rural migration becomes essential.

Table 19.6 Out-migration from Bolpur Town, West Bengal, by causes and spatial units

Spatial units	Causes of out-migration											
	Marriage		Education		Service		Other causes		Total			
	M	F	M	F	M	F	M	F	M	F		
C.D. Block ^a	-	23 100.00x	-	-	-	-	-	-	-	-	23 (26.44)+	
Other C.D. Blocks of the District ^b	-	30 88.24	3 33.33	1 2.94	3 8.82	6 66.67	-	-	9 (16.36)	34 (39.08)		
Other Districts of W.B.	-	21 77.78	12 29.27	1 3.7	5 18.52	26 63.41	3 7.32	-	41 (74.55)	27 (31.03)		
Other States of India	-	1 33.33	-	1 33.33	-	5 100.00	-	1 33.33	5 (9.09)	3 (3.45)		
Outside India	-	-	-	-	-	-	-	-	-	-	-	
Grand total	-	75 (86.21)	15 (27.27)	3 (3.45)	8 (9.20)	37 (67.27)	3 (5.45)	1 (1.15)	55 (100.00)	87 (100.00)		

Source: Field survey (2004)

+Bracketed lower figures in the cells are the percentages of grand total out-migrated males or females

xUnbracketed lower decimal figures in the cells are the percentages of total out migrated males or females of respective spatial unit

^aC.D. Block = C.D. Block within which the study area (Bolpur Town) lies

^bOther C.D. Blocks = Remaining C.D. Blocks of the district of the study area

19.5.11 Pattern of Rural-to-Urban and Urban-to-Urban In-migration

Table 19.7 provides a clear picture about the social group pattern of in-migration from rural areas to the urban area (Bolpur Town) and from other urban areas to Bolpur Town. Of the total male or female in-migrants, 69.64 % of males and 55.65 % of females were from rural areas, and only 30.36 % of males and 44.35 % of females were from different urban areas located in different spatial units. The table shows that there is a preponderance of rural in-migrants to Bolpur Town. However, the preponderance of females in-migrating from rural areas to this town is comparatively less, which indicates that the mobility of males is greater than that of the females. Generally, more males from rural families migrate to urban areas with their wives and children only, and other family members, especially females, remain in their villages because of lesser education, the rural mentality, and a strong rural culture, as well as a greater sense of responsibility (particularly among the persons of the upper age groups) to look after their rural properties. The comparatively higher percentage of rural female in-migrants relative to urban female in-migrants is also because many rural families from the surrounding rural areas of Bolpur Town give the marriage of their daughter to Bolpur Town. Such rural families also send their daughters to Bolpur Town for better educational achievement.

The lower percentage of male in-migrants and relatively higher percentage of female in-migrants from urban centers to Bolpur Town may result from the marriage migration of females from other smaller towns of Birbhum District. In comparison to other smaller towns of Birbhum District, Bolpur town is more attractive in terms of better urban facilities. Many families from other smaller towns of this district have migrated to this town for availing a relatively better standard of education for their children, preferably the female children.

The social group variation shows that the percentage of both male and female rural in-migrants is higher from all social groups, except in the female category of Higher caste, as the percentage of urban female in-migrants is higher than the percentage of rural female in-migrants. This difference possibly occurs because Higher caste people in rural areas still generally do not allow female members from their family to participate in outdoor economic activities because of their traditional attitudes about their social status and prestige. The percentage of Higher caste rural male in-migrants in comparison to that of other social groups is also lower because of their landed property in the villages. Generally, higher-caste people in rural areas still possess more landed property, and they are socioeconomically better. As a result, their mobility remains slightly less. This reason normally does not function so strongly in urban areas from which the female migrates to other areas. In other social groups, however, the situation is different. Both males and females from other social groups generally tend to migrate to urban centers to get any kind of job to augment their earnings to support their other family members, because other social group families are socially and economically poor in comparison to the higher caste.

Table 19.7 Pattern of rural-to-urban and urban-to-urban in-migration by social group and sex to Bolpur Town, West Bengal

Spatial units of in-migration	Social group of in-migrants														Total	
	Higher caste		OBC		Muslim		SC		ST		Total		M	F		
	M	F	M	F	M	F	M	F	M	F	M	F				
Rural areas	39	20	37	26	14	4	25	17	2	2	117	69				
	63.93x	36.36	71.15	68.42	82.35	80.00	69.44	70.83	100.00	100.00	(69.64)+	(55.65)				
Urban areas	22	35	15	12	3	1	11	7	-	-	51	55				
	36.07	63.64	28.85	31.58	17.65	20.00	30.56	29.17			(30.36)	(44.35)				
Grand total	61	55	52	38	17	5	36	24	2	2	168	124				
	(36.31)	(44.35)	(30.95)	(30.65)	(10.12)	(4.03)	(21.43)	(19.35)	(1.61)	(1.19)	(100.00)	(100.00)				

Source: Field survey (2004)

+Bracketed lower figures in the cells are the percentages of grand total in-migrated males or females

xUnbracketed lower decimal figures in the cells are the percentages of total in-migrated males or females of respective social group

The lower percentage of both male and female urban in-migrants (coming from other urban centers) occurs mainly because most of the families that belong to O.B.C., Muslim, S.C., and S.T. are educationally and economically poor in comparison to Higher caste (H.C.) families. Generally, they remain satisfied in their local urban centers even after getting any kind of job. But those from these social groups, having a better education and relatively broader outlook, tend to migrate to other urban centers to get better jobs. Higher caste families in urban areas are socially, culturally, educationally, and economically better in comparison to families of other social groups. They are generally of modern thinking with a broader outlook. Such reasons help encourage Higher caste persons to move from one urban area to another in search of better opportunities. Particularly in the case of both rural and urban female in-migrants, marriage also plays a vital role in their movement from both the rural and urban areas to Bolpur Town.

The percentages of both rural male and female in-migrants from almost all social groups (except H.C. females) in comparison to urban male or female in-migrants to Bolpur Town were noticeably very high. The percentages of total male or female in-migrants in respective social groups from rural areas to Bolpur Town were from S.T., Muslim, O.B.C., S.C., and H.C. in descending order of predominance, with minor exceptions, which generally indicates the comparative mobility of different social group in-migrants from rural areas. Similarly, the percentages of total male or female in-migrants in their respective social category from urban areas to Bolpur Town according to predominance were from H.C., S.C., O.B.C., and Muslims, respectively. Accordingly, this also indicates the mobility of different social group in-migrants (other than a few exceptional cases) from urban areas to the study areas. As a whole, it can be said that the percentages of male and female in-migrants of grand total male and female in-migrants in the respective social group in descending order were from Higher caste to Other backward caste, Scheduled caste, Muslim, and Scheduled tribe.

19.5.12 Pattern of Urban-to-Rural and Urban-to-Urban Out-migration

Table 19.8 clearly shows a social group pattern of out-migration from Bolpur Town to rural and urban areas located in different spatial units. The detailed picture of out-migration patterns shows the percentages of both males and females who out-migrated to rural areas were low in comparison to those males and females who out-migrated to urban areas. Generally, socioeconomically poor persons, especially from S.T., S.C., and O.B.C., move to rural areas in response to the scarcity of job opportunities for such people in Bolpur Town. On the other hand, rural areas provide some agriculture- and non-agriculture-related job opportunities for such less educated and poor urban people.

Table 19.8 Pattern of urban-to rural and urban-to-urban out-migration by social group and sex from Bolpur Town, West Bengal

Spatial Unit of Out-Migration	Social group of out-migrants														Total	
	Higher caste		OBC		Muslim		SC		ST		Total		Total			
	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
Rural areas	1	14	1	8	1	—	5	8	—	—	—	1	8	31		
	3.70x	28.00	6.25	32.00	100.00		45.45	72.73			100.00		(14.55)+	(35.63)		
Urban areas	26	36	15	17	—	—	6	3	—	—	—	—	47	56		
	96.30	72.00	93.75	68.00			54.55	27.27					(85.45)	(64.37)		
Grand total	27	50	16	25	1	—	11	11	—	—	1	1	55	87		
	(49.09)	(57.47)	(29.09)	(28.74)	(1.82)		(20.00)	(12.64)			(1.15)		(100.00)	(100.00)		

Source: Field survey (2004)

+Bracketed lower figures in the cells are the percentages of grand total out-migrated males or females

xUnbracketed lower decimal figures in the cells are the percentages of total out-migrated males or females of respective social group

Social group variation shows that the percentage of both males and females who out-migrated to rural areas were fairly low in each social group except S.C. females. Poor socioeconomic background, particularly of S.T. and S.C., generally push them in greater proportion (in comparison to that of other social group persons) toward rural areas from the study area. Particularly in the case of women, their marriage becomes a major reason of their out-migration to rural areas. Generally the proportion of female out-migration to rural areas is also higher from S.T. and S.C. categories and rather lower from the rest of the social groups. This finding indicates that more women in terms of percentage to total female out-migrants of their respective social group get married to different villages within their home district.

The percentages of both males and females moving to different urban centers from Bolpur Town were higher (in comparison to that of those moving toward rural areas) from the study area. The reasons for such a higher proportion of urban-to-urban migration are service/employment, education, and marriage. Most of the males who out-migrate to other urban areas do so mainly because of the scarcity of better jobs and better standard of education in the study area. Better educated persons have high hopes for better jobs and better urban lifestyles. As a result they migrate to other urban centers to seek and enjoy better amenities and infrastructures. A significant proportion of male out-migration toward different urban centers is also observed because of the lack of better standards of education, particularly in the fields of science, technology, and medical sciences, at Bolpur Town. Consequently, many parents send their children to other urban centers where professional, technical, medical, and other educational opportunities are available.

Social group variation also shows that the total out-migrating males or females in each social group were higher in the case of urban-to-urban migration (i.e., from Bolpur Town to different urban centers), excepting Scheduled caste females. However, the percentages of both Higher caste and Other backward caste males and females were higher compared to that of Scheduled caste, which is a result of the differences in their social, cultural, and economic backgrounds. No urban-to-urban migration was reported in the families of Muslims and Scheduled tribes. The marriage process plays a great role in the case of female out-migration to different urban centers. Most of the parents like to give their daughters in marriage to other urban centers where they can acquire better families for a better life. This observation indicates that the higher proportion of female out-migration to other urban areas is caused by marriage, service/employment, education, and some other reasons.

19.6 Conclusion

Findings of the study show that the number of persons who in-migrated to Bolpur Town remain more from within or from the closer spatial units. Similarly, the number of persons who out-migrated from Bolpur Town remain more to closer spatial units. The number of both in-migrating and out-migrating persons generally decreases with increasing distance from the sending spatial units to the receiving

spatial unit, exemplifying the distance decay effect on migration. Migration is also found to vary by age, sex, social group, and causative factors.

The percentages of both males and females who in-migrated to Bolpur Town were found to be higher from the age groups of 15 to 34 years and of 35 to 59 years. Second, the preponderance of each age group of in-migrating males and females remains high from within the home district of the study area, and the volume of in-migration in terms of number of persons coming from distant spatial units normally decreases.

In out-migration, the majority of both males and females were from the age groups of 15 to 34 years; however, persons aged from 35 to 59 years were also important. Most of the persons from both age groups were reported migrating within their home state (West Bengal). Of the total out-migrants, the number of females, particularly from a younger working-age group, was greater. There was no out-migration from the age groups younger than 15 years and older than 60 years.

The social group picture in terms of both absolute number and percentage revealed that in-migrants from each social group remain dominant from within the home C.D. Block and from within other C.D. Blocks of the Birbhum District. However, Higher caste and Other backward caste people were reported moving to more distant spatial units.

In out-migration also, Higher caste and Other backward caste people were found to be in the majority, and generally they out-migrate to some distant places. In out-migration the preponderance of Higher caste females was found higher in comparison to that of females of other social groups.

Service (job opportunity), education, and some other causes were found as the major reasons in motivating male in-migration, whereas marriage, education, and some other causes were found as the dominant reasons in female in-migration. It was also found that both males and females who in-migrated from within the district to Bolpur Town were in the majority, and the major reasons of their movement were service and other causes (in case of males) and marriage and education (in case of females). Marriage was found as the prime factor in female migration, as about two thirds (66.13 %) of females in-migrated because of their marriage.

In out-migration, service and education were also the dominant causes in motivating males, whereas marriage and job opportunity influence females to migrate from Bolpur Town. Of the total out-migrated females, 86.21 % were found to have migrated from the study area only because of marriage. Service, education, and some other reasons seem to push persons to move relatively greater distances from the study area.

Rural-to-urban and urban-to-urban migration revealed that the percentages of both males and females who in-migrated from rural areas to Bolpur Town belonging to almost all social groups (except Higher caste females) were very high in comparison to those males and females who in-migrated from urban areas. The percentages of total male or female in-migrants in respective social groups from rural areas to Bolpur Town were from S.T., Muslim, O.B.C., S.C., and H.C. in descending order of predominance with minor exceptions. Similarly, the percentages of total male or female in-migrants in the respective social categories from urban areas to Bolpur

Town, according to predominance, were from H.C., S.C., O.B.C., and Muslims, respectively. In fine, it can be said that the percentages of male and female in-migrants of the grand total of male and female in-migrants in their respective social groups in descending order were from Higher caste to Other backward caste, Scheduled caste, Muslim, and Scheduled tribe.

From the pattern of urban-to-rural and urban-to-urban migration it was found that the total out-migrating males or females in each social group was higher in urban-to-urban moves except among Scheduled caste females. However, the percentages of both Higher caste and Other backward caste males and females were exceptionally higher compared to those of Scheduled caste. Only 14.55 % of males and 35.63 % of females of total out-migrating males or females moved from urban to rural areas, and 85.45 % of males and 64.37 % of females moved from urban to urban areas (i.e., from Bolpur Town to other urban centers located in different spatial units). No urban-to-urban migration was reported in the families of Muslims and Scheduled tribes. The marriage process was found to play a significant role in female out-migration to different urban centers. However, other reasons are also responsible for encouraging females to migrate from Bolpur Town.

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Part VII

Planning

Chapter 20

Intracity Use Mobility and City Growth

Direction: Planning for Land Use Balance

Randhir S. Sangwan and Sneh Sangwan

Abstract A city originates as a spatial nucleus that grows over space. The contemporary form or size of an urban center becomes an outcome of the city growth process. This city growth process involves concentration, deconcentration, centralization, decentralization, residential segregation, and spatial invasion and succession. City land use possesses an essential mobility behavior. Its components, however, tend to behave differently to move, showing varying degrees of affiliation and preferences based on individual space occupancy standard and need and efficiency standards for operating. This study explains the importance of intracity use mobility in city growth direction and places emphasis on the planning of various land use components so that balance can be maintained among these components within the city limits.

Keywords Centralization • Concentration • Decentralization • Deconcentration • Intracity use mobility • Residential segregation • Urbanscape

20.1 Introduction

Cities essentially represent a “built environment” through which a precise spectrum of land use components is displayed. Urban land use, however, constitutes a broad camouflage that supports and protects the city’s built environment. The concept of built environment in urban context signifies a precise version of urban land use in the name of city morphology. The city morphology precisely includes the structural and functional elements of those parts of the city that are developed or built. The build of a city encompasses “style, function, and layout.” The elements of

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function and layout lead to the growth process and identification of morphological zonation, which involves spatio-functional aggrandizement of the urbanscape. The spatio-functional spectrum of a city is best translated into a land use mosaic that is basic to the city's built environment.

The city built environment has been found to be a growth process outcome and to be responsive to social, economic, and technological constructs in time perspectives. The social, economic, and technological elements have continued to be ever changing and evolving, as have been the ingredients of the city's built environment. This attribute adds the quality of intracity variations among the city land use components. The intracity component variations are reflected not in form and extent of change only, but also through a dynamic behavior of mobility that generates and maintains the twin processes of outward extension and internal reorganization among the components of urban land use. The process tends to be completed in the form of "accretion" outward and "replacement" within.

The twinned process, conceptualized as furthering the necessary growth process, progresses in response to the mobility trait of city land use components. Representing a built environment, a city must have developed a stability factor in relationship with its three elements of building style, layout (physical design), and function. The stability condition is, however, not rigidly fixed. Of the three elements, function seems to be relatively volatile, whereas the layout or physical plan of the city tends to stabilize. The physical plan responds by expanding to accommodate changing and evolving functions. This tendency introduces traits of mobility among various components of city land use, although not with similar vigor and stride (Sangwan 2000).

City land use possesses an essential mobility behavior. Its components, however, tend to behave differently, showing varying degrees of affiliation and preferences based on individual space occupancy standard and need plus the efficiency standards for operation. Intracity use mobility relates to dynamics of the principles of urban land use location, development, and arrangement in response to the specific preferential attitude of individual use claimants of space occupancy and site requirement standards in a particular context. Intracity use mobility contributes to shape the physical and functional patterns of cities and to the formulation and testing of general principles of urban growth and structure (Mayer and Kohn 1967).

The basic principle behind the mechanism of intracity use mobility and its relevance as a key mechanism to the city growth process and structure may be illustrated as follows (Fig. 20.1).

The present study aims to explain the importance of intracity use mobility in city growth direction, laying emphasis on the planning of various land use components so that balance can be maintained among them within the city limits.

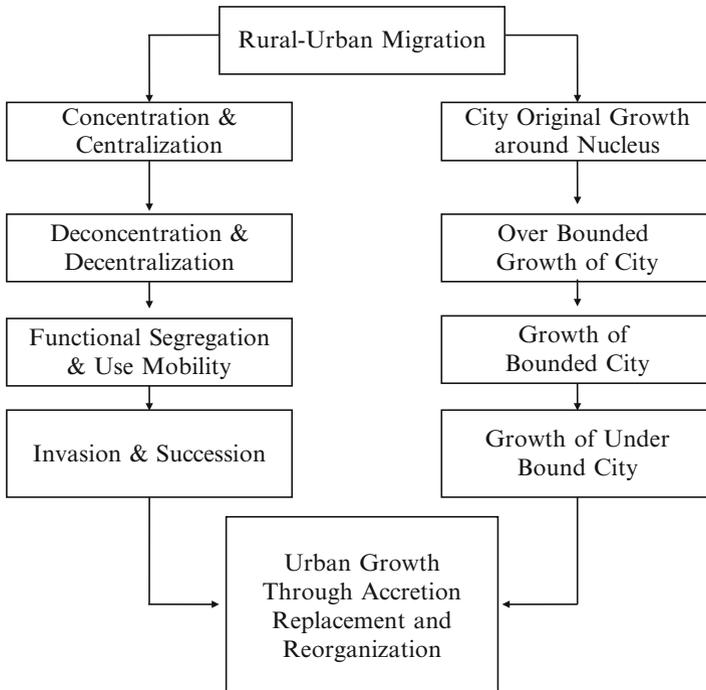


Fig. 20.1 Mechanism of intracity use mobility and its relevance to the city growth process (Sangwan 2000)

20.2 Intracity Use Mobility: An Essential City Growth Process

A city originates as a spatial nucleus. It originates to grow over space. It grows to stay, and it stays to grow. The contemporary form or size of an urban center becomes a city growth process outcome. The city growth process entails the events of concentration, deconcentration, centralization, decentralization, residential segregation, and spatial invasion and succession. A concentration of people begins at some nucleus and intensifies to swell the size of the nucleus, causing centralization through deconcentration around the nucleus. An event of decentralization follows to create separate identities of functional urban mix within the city bounds. Residential segregation becomes more obvious, making residential use category a paramount component of the urban mosaic. Further intensification of the process of concentration and associated decentralization and the trend of residential segregation causes the most effective process of city growth in the form of invasion and succession, which involves extension of city function, residential in particular, along transportation routes at the peripheral contiguous space segments and their accretion within the extended city bounds. The mechanism of a city growth process may be illustrated as shown in Fig. 20.2.

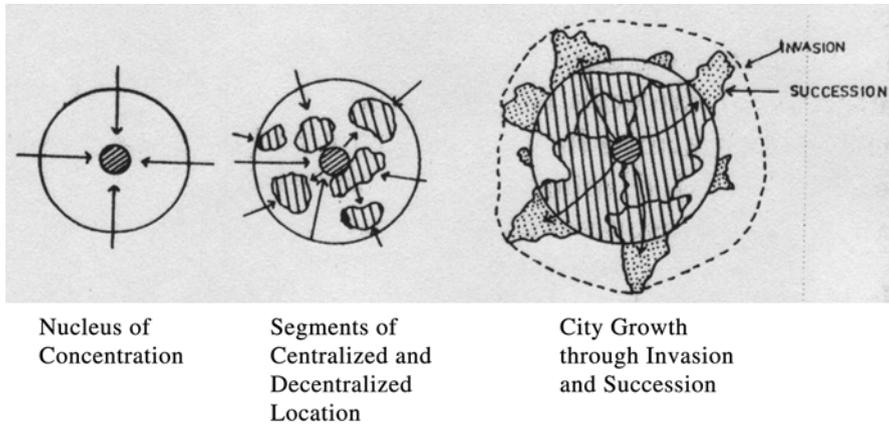


Fig. 20.2 Mechanism of city growth process

The city growth process assumes, therefore, the necessary quality of movement of its component ingredients from their initial space of concentration to a space of centralized nuclei, or further, to decentralized territorial segments, thus increasing the city bounds. The city growth process becomes, in this sense, a function of intracity use mobility. The entire mechanism of the city growth process involves the necessary events of functional replacement and reorganization in the wake of intracity use mobility. Intracity use mobility comes in effect under the “desire to maximize the net externalities of urban life” (Knox 1987). An externality effect is considered to gain significance if the activity of one person, group, or institution impinges on the welfare of others, and is known as *spillover* or *third-party* effects.

Use space locations within the city bounds do not always remain abstract ones. They rather respond to changes in any one of them. Each use component experiences unconformity or incompatible situation of space location in accordance with its preferential choice attitude and intends either to seek some different location or to compel unconformable or incompatible fellow components to move and seek some other locations. This behavior of use components within the city bounds initiates the event of intracity use mobility, and consequent upon this event the processes of decentralization, invasion, succession, and residential segregation tend to regulate and guide the city growth process, bringing changes in the size and form of the city.

The city growth process of Rohtak has responded to the events of intracity use mobility. During the course of its sequential growth, the city of Rohtak has been witnessing the necessary traits of expanding territorial size, form fashioning replacement, and reorganization of functions within its bounds and space segment accretion along its peripheral expanse. All these necessary traits as essential parts of the city growth process have been affected and regulated by the inescapable event of intracity use mobility. The mechanism behind the growth process of the city of Rohtak may be illustrated in a simplified way (Fig. 20.3).

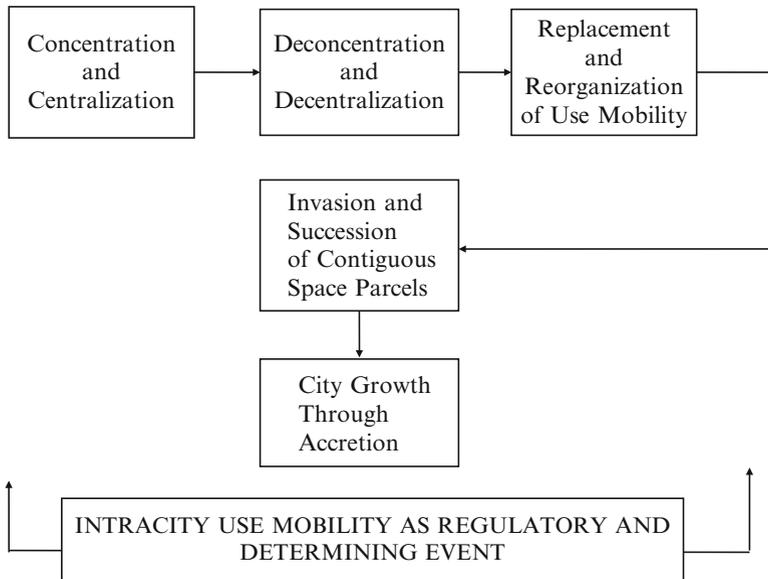


Fig. 20.3 Mechanism of intracity use mobility

The city of Rohtak is expanding mainly toward the east and northeast along National Highway No. 10 as well as major roads leading to other urban centers such as Sonipat, Gohana, and Jhajjar. This expansion is mainly residential development; whereas industrial development is taking place in the west and the south of the walled city. Various business nuclei are also cropping up in different parts of the city because of decentralization: notable among these are Narain Complex, Geeta Complex, D-Park market, and shopping complexes in Haryana Urban Development Authority (HUDA) sectors.

20.3 Intracity Use Mobility: Determinants of City Growth Direction

City growth has not been found to be a homogeneous phenomenon in terms of acquiring any geometric forms. Some classical models have been developed to explain the behavior form of cities, but none has succeeded to explain empirical observations. Cities have accordingly, been modeled to grow in concentric zones, in sectoral extension, or in multiple nuclei locations. Such growth models fail to satisfy the real issue of explaining the size, shape, and growth direction dynamics as involved in the city growth process.

The city growth process has been found to be basically direction oriented. In other words, once a city originates, it tends to grow predominantly in some more

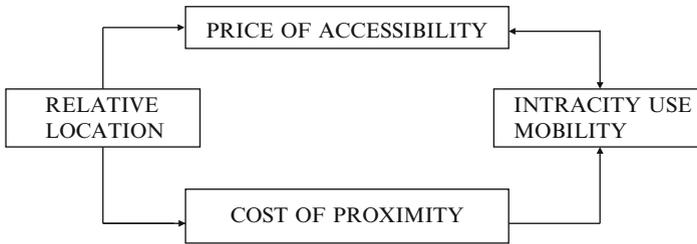


Fig. 20.4 Locational advantage and use mobility

desired directions. Urban land use components seem to develop preferential attitudes toward selection of direction for space locations. Such decisions become the function of the intensity of externality effects, which, in turn, function in sympathy with relative locational advantages (Fig. 20.4).

The city tends to acquire a predominant growth direction also because the ingredients, which determine the extent of relative locational advantages, display in most cases a 'spatially limited field.' Intracity use mobility expresses the directional preferences for use space locations and helps in determining the city growth direction. In other words, urban land use components do not move anywhere in any direction; rather, they regulate their mobility toward preferred direction/directions only. The most apparent exposition of direction preference orientation of city growth has been observed in the development of Dianopolis (a city having one predominant growth direction). The creation of Chandigarh forms an apt example to substantiate this observation. The contemporary growth form of Ludhiana and even of Rohtak City have tended to conform to a growth direction similar to that of Dianopolis. These cities have exhibited an apparent intention to grow in the east–southeast direction predominantly.

City growth with one predominant direction has been favored and facilitated only through the necessary event of intracity use mobility. Different urban land use components by their choice or compulsion have intended to shift their locations in varying degrees as per their requirement of space occupancy standards and preferences in relationship to their previous affiliation and new attractions. Intracity use mobility has, thus, initiated the twin process of replacement and reorganization internally and expansion outwardly in response with 'preferences' for directions of growth. The trend of city growth in terms of preferences for direction in the city of Rohtak has been observed to operate as shown in Fig. 20.5.

From the very beginning, the growth direction of the city of Rohtak has been either east or northeast along the major arteries. As opposed to the direction of residential movement, various other activities are growing in different directions. For example, the *Ganga Mandi*, the oldest grain market of Rohtak, but now converted into a *subzi-mandi*, was established near the walled city. It was shifted toward the south near the railway station in 1910. Consequently, a new grain market was built in 1952 in the vicinity of this old one. Presently, another grain market in the south of the existing grain market has been developed to solve the problem of congestion.

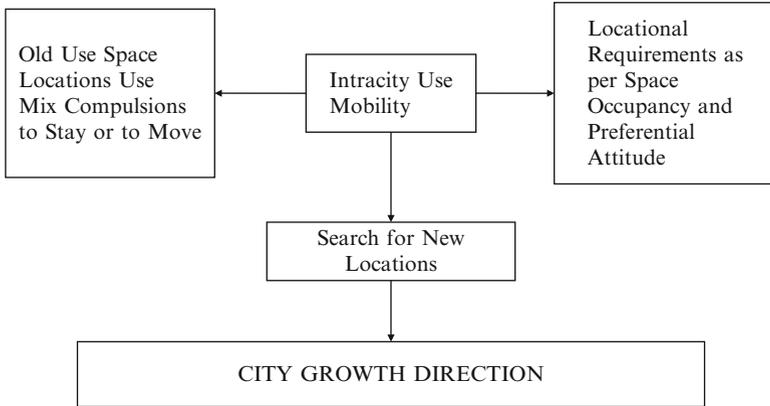


Fig. 20.5 Trends of city growth

20.4 Intracity Use Mobility: The Issue of Use Relocation

It is very simple to comprehend that the event of mobility co-terminates with the necessity of relocation in a spatial context. Accordingly, intracity use mobility necessitates the issue of relocation of different urban land use components in a city context. Use mobility, or the relocation of a particular use component in relationship with other fellow components from one quarter to some other quarter, constitutes a fundamental element of the “urban dynamic at both individual and aggregate levels” (Moore and Clark 1980). The issue of use relocation has asserted a consistent and pervasive behavior determining the processes and directions of urban planning areas. Exercises in use relocation tend to exert a strong influence on the outcomes of plan formulations and implementation in the urban context.

An urban mosaic represents not merely the outcome of space occupancy by different urban land use components in an abstract context. It is, rather, the expression of spatial organization, in terms of shifts and changes of locations, within the city bounds, necessitating exercises in use relocation. The use relocation exercises bear adequate implications of relevance such as the following. (1) The relocation exercises have the merit to ensure conformal and compatible use balance. (2) The use relocation exercise may streamline intracity use mobility behavior. (3) The use relocation exercise may provide a tinge of stability in spatial organization among urban land use components. (4) The use relocation exercise may resolve serious conflicts arising among various space use claimants in the city context. (5) The use relocation exercise may act as a manual of guidelines for preparing and executing city physical plan processes to ensure the sustainability of the city environment. (6) The use relocation exercise may aim at protecting all use components from each other by suitable segregation. (7) The use relocation exercise conceives the principle of assuring the entire city a better place to live and work along with its appearance and livability. (8) A use relocation exercise intends to honor the implications of

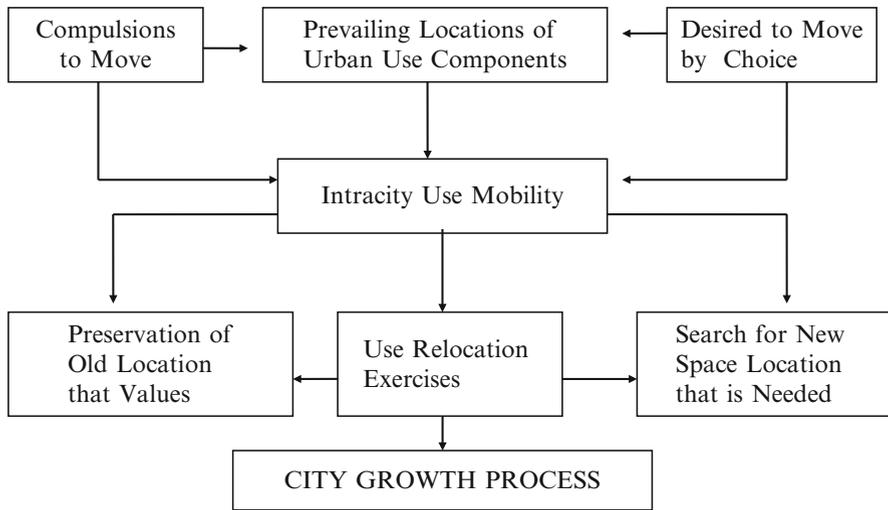


Fig. 20.6 Use relocation exercise in the city growth process

“the intersection of economic, technological, demographic, cultural and political trends for urban change.” (Knox 1987).

How intracity use mobility necessitates the use relocation exercise in the city growth context may be expressed in the form of the following flowchart (Fig. 20.6):

Use relocation exercises in city growth context are constrained by a number of complications at various levels. Use relocation requires transference of space ownership, which generates conflicts of complicated nature. There arises the conflict issue of land values. There arises the conflict issue of negotiation between seller and buyer of land for relocation. There arises the conflict issue of social and political tangles. There arises also the conflict issue of legal occupancy of land intended for use relocation. These conflict issues are aggravated by the extent of competition for some particular segment of urban space among various use claimants and their capacity to bid higher. The use relocation phenomenon has to consider the criterion of choosing the urban space on the basis of superiority of location only. With the expanding periphery of the city, however, urban space that is supposedly inferior by choices is added to the city land stock. In this case, land values rise for the most accessible points or parcels. Different use claimants begin to compete for the acquisition of this accessible and consequently more valuable land. The use relocation, in this situation, follows the tendency of “any utility may compete for any location within a city” and all land goes to the highest bidder (Carter 1981).

Rohtak City has been witnessing the intensity of the city growth process. Intracity use mobility and use relocation have been acting as two major forces to regulate the development of the city.

The city has experienced the relocation process not only in terms of human movement but also in terms of certain activities. For example, the old grain market near the railway station is being shifted to the south of it as a new grain market to

avoid congestion. Similarly, to solve the problem of congestion as well as pollution, the bus stand is being shifted toward the northeastern periphery of the city. There are other activities also that are responsible for the development process in the city through the process of relocation as well as use mobility.

20.5 The Task Ahead: Planning for Land Use Balance

A treatise and comprehension of major issues lead to the understanding of the task ahead. The present treatise and comprehension of the event of intracity use mobility and the issue of use relocation envisage the task as planning for land use balance in the Rohtak City context. The city's physical plan and its social and economic strength are best when replete with its composite urban land use mosaic. Hence, it is believed that planning for land use balance within the city will enhance urban strength and co-terminate with comprehensive city planning. It is thought so because a land use plan represents not just a locational exercise for various ingredients "but rather states principles of desirable spatial relationships" among all the city-forming components (Altshuler 1974).

The task of planning for a city or for land use balance has not been found a simple one because it progresses as a subjective process. A city planning exercise is, however, not new, and some significant modes of planning have been conceptualized to guide the planning processes under temporal and spatial perspectives.

20.5.1 The Planning Process

Berry (1972) has postulated an urban policy model (Fig. 20.7) and suggested a sequence of four modes of planning that are variants of this general model. In essence, one can distinguish between two categories of inputs, external forces and policies and programs, that produce change in the urban system. This change can generate two different types of outputs: undesirable results or desirable results, that is, either problems or the goals or objectives that are being sought. Box 1 represents the existing urban system that has to be acted on to achieve the goals contained in Box 2. In general, urban planning can either be consciously directed toward achieving these long-range goals, or it can simply react to the problems or crises represented by Box 5. Box 3 contains the exogenous forces that influence the urban system, but whose causes lie outside the influence of the urban policymaker. Such forces include the behavior of the birth rate and the gross national product, which often affect the growth of urban areas far more than the policies of individual city planning departments. Finally, Box 4 represents the policies and programs generated by government planning agencies. These programs can be likened to levers that are pulled to cause desired changes in the urban system.

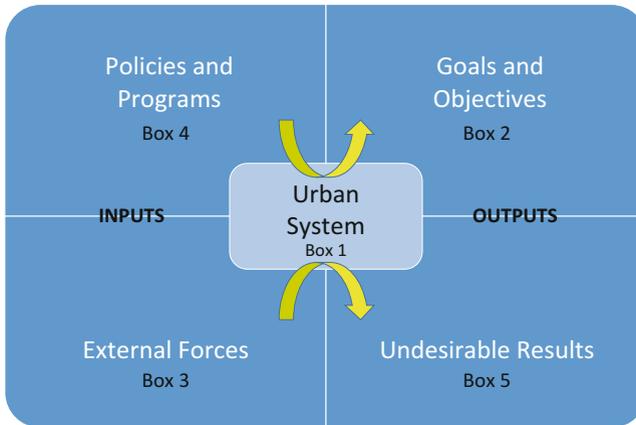


Fig. 20.7 Urban policy model (Berry 1972)

20.5.2 Modes of Planning

Within this general framework, Berry identified four modes or styles of planning: ameliorative problem solving, allocative trend modifying, exploitive opportunity seeking, and normative goal oriented. The simplest and perhaps most common form of planning is the *ameliorative problem-solving* form (Fig. 20.8a), in which nothing is done until the problems reach crisis proportions. This strategy is very present oriented, and little thought is given to long-term goals or objectives. American local authorities are often forced into this essentially reactive mode of planning because of their reliance on elected officials with short terms of office, their restricted budgets, and their limited legal jurisdictions (La Gory and Pipkin 1981).

The *allocative trend-modifying* form of planning (Fig. 20.8b) is more future oriented and uses projections of existing trends to forecast problems that will arise in the future. Based on the prediction of these future problems, available resources are allocated to promote the most desirable outcomes. In this scenario, the regulatory mechanisms are devised to modify and make the best of existing trends. Traffic forecasting demand models provide an excellent example of this strategy of predicting the future and then trying gently to modify it.

The *exploitive opportunity-seeking* planning style (Fig. 20.8c) does not identify future problems but seeks out new growth opportunities. These new growth opportunities are identified by imaginative leaders in both the public and private sectors of the economy. As well as the planners themselves, the individual actors are corporate managers, real estate developers, and industrialists. Although the trend-modifying approach seeks to make the best of existing trends, the opportunity-seeking approach merely aims to maximize profits while it can, with less concern for the future.

Finally, *normative goal-oriented* planning (Fig. 20.8d) is explicitly future oriented, and seeks to identify a desired future state for the urban system. Specific goals are set in accordance with the kind of future that is desired, and plans are

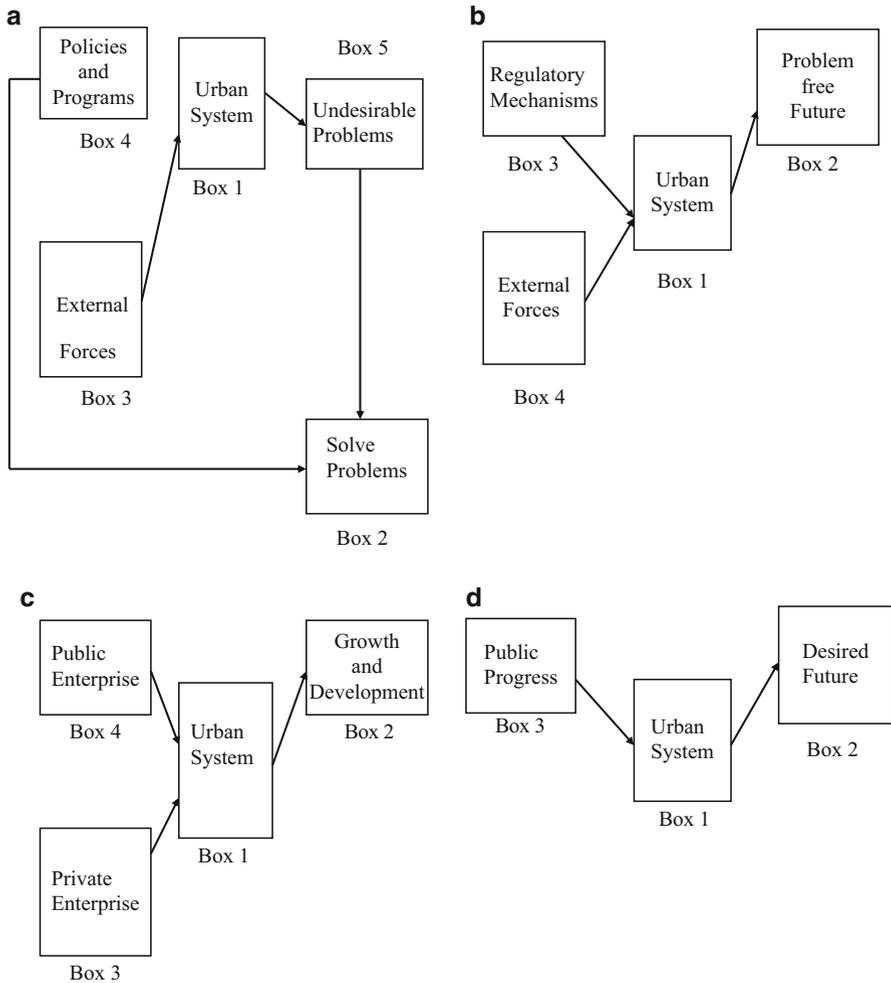
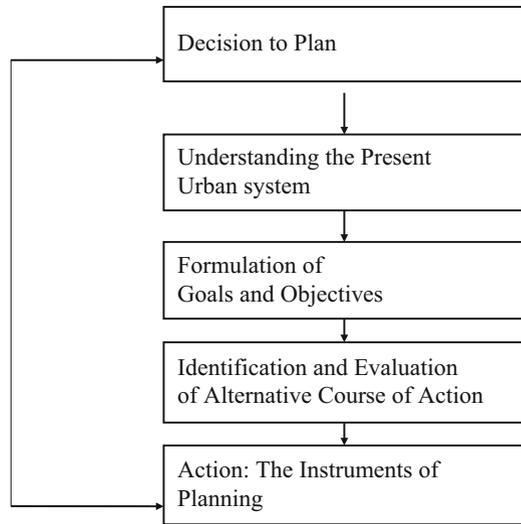


Fig. 20.8 Four urban policymaking styles: ameliorative problem-solving (a); allocative trend-modifying (b); exploitive opportunity-seeking (c); normative goal-oriented (d). (After Berry 1972, fig. 18, pp. 175–176)

implemented to guide the system toward those goals. This approach is more long term in nature, and assumes that consensus can be reached with respect to what an ideal urban system should be.

In reality, of course, planning policy in most countries represents a mixture of these four major types. However, normative goal-oriented planning is really possible only in those countries that have a centralized form of government, with sufficient control over the different sectors of the economy. Thus, this style of planning is characteristic of the Soviet Union and to a lesser extent of democratic countries with strong central governments, such as Sweden and Great Britain. At the other extreme, countries such as the United States and Canada tend to exemplify the ameliorative problem-solving and the allocative trend-modifying forms of planning.

Fig. 20.9 Planning process

20.5.3 *Stages in the Planning Process*

A variety of schematic summaries of the various stages in the planning process have been devised (McLoughlin 1969; Wilson 1974; Batty 1979; Oppenheim 1980).

The one presented here (Fig. 20.9) is a simplified composite of these, and similarly falls within the genre of systems planning. Fundamental to the concept of systems planning is the idea of interaction between two types of systems: the controlling system, represented by the planners themselves, and the urban system, which it seeks to control (Hall 1975). In other words, just as cities and regions can be usefully conceptualized in terms of interacting systems, so can planners themselves, thus creating a planning system (Wilson 1968).

Planning for land use balance happens to be an exercise in creating a city physical plan so as to achieve (1) space for the location of all the major and minor components of urban land use; (2) balanced distribution of various use components in positive relation with the space occupancy standards and preferential location within the existing urban space; (3) conformant and compatible locational relationships among places of living (residential), places of work (commercial, industrial), places of leisure (entertainment), and other use ingredients of cultural, religious, facilities, and utilities significance; and (4) a perspective plan to ensure city growth without generating conflicts in future developmental processes.

Planning for urban land use balance may not be mistaken as a tool to ensure an equal share of urban space to each of the urban land use components and in each of the urban localities. Different urban land use components need different amounts of urban space in accordance with individual space occupancy standards and different urban localities as lie individual locational preferences. Planning for urban land use balance refers to allocation of urban space to an individual use component as per its

space occupancy standards and preferred locality so as to assure functional efficiency in terms of accessibility and proximity among various fellow components without generating conditions of unconformable or incompatible locational existence.

The city of Rohtak has developed an urban mosaic that combines tradition with modernity, an indigenous with anglicized morphological pattern, and a recent legacy of growth. The city has been displaying a strong urge for and varied colors of developmental events to respond to its growth process. It is high time to prepare and regulate the execution of growth processes through a perspective plan formulation.

All planning processes must take into consideration the estimated future population, which become an effective measure to assess the required components to be planned in terms of where and how much of what? The estimated future population of the city of Rohtak is supposed to be approximately 5.00 lakh and 7.00 lakh in coming decades of 2011 and 2025, respectively. Planning standards for the provision of different city ingredients have to be derived accordingly.

Intracity use mobility behavior has shown definite growth directions for the city in physical and land use components in particular. Maps showing the localities of preferences (Table 20.1) or non-preferences (Table 20.2) for mobility help to determine the growth direction of the city.

Table 20.1 Rohtak City: preferred localities

Sector no.	Locality	Ward no.	No. of respondents
1	Sector 14	12	71
2	Sector 1	11	63
3	Sector 2	11	52
4	Sector 3	10	47
5	Sector 4	10	43
6	Model town	12	37
7	D.L.F.	17	32
8	Vikas Nagar	15	31
9	Green Road Enclave	17	27
10	Mansarover Colony	14	24
11	Jagdish Colony	24	22
12	Bank Colony	24	21
13	Durga Colony	16	20
14	Subhash Nagar	14	19
15	Bharat Colony	12	16
16	Adarsh Nagar	13	15
17	Medical Mor	13	14
18	Jhang Colony	14	11
19	Laxmi Nagar	15	9
20	Ram Gopal Colony	10	6
21	Kamal Colony	12	5
22	Dev Colony	12	3
23	Chhotu Ram Nagar	12	2 (total = 590)

Source: Field work

Table 20.2 Rohtak City: nonpreferred localities

Sector no.	Locality	Ward no.	No. of respondents
1	Gandhi Nagar (Camp)	18	39
2	Ashok Nagar	26	32
3	Kachi Garhi	3	31
4	Saini Anand Pura	2	29
5	Ram Lila Ground	3	28
6	Chamman Pura	8	27
7	Guru Nanak Pura	8	26
8	Saini Was	5	26
9	Garhi Mohalla	3	25
10	Krishna Colony	2	25
11	Dairy Mohalla	31	24
12	Chunni Pura	8, 16	23
13	Saini Pura	26	22
14	Kartar Pura	2	21
15	Indira Colony	2	20
16	Para Mohalla	7, 27	19
17	Old Arya Nagar	17	18
18	Prem Nagar	15	17
19	Chand Nagar	15	14
20	Guru Charan Pura	29	12
21	J.P. Colony	1	11
22	Janta Colony	22	11
23	Babra Mohalla	28	10
24	Garhi Mohalla	3	10
25	Kodhi Colony	1	9
26	Sham Colony	1	9
27	Harijan Colony	3	8
28	Quilla Mohalla	26	7
29	Giani Pura	25	6
30	Bhisti Pura	25	6
31	Ravi Das Nagar	25	5
32	Kewal Ganj	29	5
33	Sri Nagar Colony	19	4
34	Chinnot Colony	19	4
35	Daryao Nagar	13	3
36	Silara Mohalla	27	2
37	Dehri Mohalla	27, 28	2 (total = 590)

Source: Field work

The proposed urban land use map of Rohtak City intends to visualize the merit of achieving a balanced land use arrangement and the future direction of city growth Fig. 20.7. Some of the basic features of the proposed development plan of Rohtak City include these: (1) city land is proposed to grow in accordance with the planning through sectoral divisions, and (2) residential sectors have been proposed to be developed primarily in the northern section flanked by the Northern Bye Pass in the north.

Some residential development has been proposed to be developed in the western section and southeast sections also, the former being restricted in the west by the Bye Pass and in the south by the industrial sector of the latter by the southern Bye Pass and the industrial sector in the west. Caution has to be taken to avoid the ill effects of incompatible locations along the industrial sector. Development of built-up areas has been restricted within the confines of the Bye pass Road from three sides and the Jawaharlal Nehru canal in the east. Two major commercial areas have been envisaged to be located in proposed Sector 5 or the mid-southern parcel of the existing boundary of the city. Other uses of relevance have been proposed to assist and serve the major use components as per locational need and standards. The demarcation of a controlled Area Boundary has the utility to regulate the growth process in the right direction and to ensure environmentally sustainable urban development.

The proposed development plan of the city of Rohtak intends to effectuate planning for land use balance, which has given adequate weight to the natural growth direction on the one hand and the prevailing use mix of the city on the other. It considers, in this way, the planning dictum of protecting the old that we value and creating the new which we need. The urban developmental activities that have been planned and proposed to be undertaken are summarized in Table 20.3.

The success of the task or planning does not lie in the plan formulation alone, but more in its efficient execution on the part of planning machineries, local bodies, and the people's participation.

Table 20.3 Rohtak City: proposed land uses

Sector no.	Land use	Area within municipal limit (in hectares)	Area outside municipal limit (in hectares)	Total area (in hectares)
1	Residential	344	1,606	1,950
2	Commercial	152	160	312
3	Industrial	197	613	810
4	Transport and communication	47	382	429
5	Public utilities	48	193	241
6	Public and semipublic uses	132	478	610
7	Open spaces	152	92	244
Total proposed area		1,072	3,544	4,596
Existing area of the town		1,804	–	–
Grand total (existing + proposed)		1,804	4,596	6,400

Source: Town and Country Planning Department, Government of Haryana, 2010

20.6 Urban Land Use Balance: Planning for Governance

It is rightly remarked, “the city is manifesting a complicated thing. In part, the difficulty we experience in dealing with it can be attributed to this inherent complexities. But our problems can also be attributed to our failure to conceptualize the situation correctly. If our concepts are inadequate or inconsistent, we cannot hope to identify problems and formulate appropriate policy solutions” (Harvey 1985). The city is, however, not just a complicated manifestation of settlement. It is also exceedingly dynamic and changes in haste. This trait of an urban center makes the task of planning and implementation of plan proposals inadequate as certain changes in the dynamics of cities have become more apparent in the concurrent late twentieth century. Changes that have tended to revolutionize the entire urban environment in its contemporary camouflage have been multifaceted (Fig. 20.10).

In the wake of necessary changes affecting the urban scenario, cities have begun to experience (1) urban restructuring in the shape of changing the urban form, seeking reinterpretation in terms of complex, polynuclear metropolitan settings; (2) the homogenization of urban space following the process of advances in telecommunications set to remove many of the traditional frictions of space for households as well as for economic activities; (3) manifestation of residential differentiation and segregation in more complex ways and at a finer level of resolution than the sectors, zones, and clusters; and (4) a changing social mosaic effecting central city revitalization in the wake of commercial redevelopment-incumbent upgrading (the improvement of residential neighborhoods by existing residents) and gentrification.

Two major planning issues that have emerged during the 1990s and 2001–2011 and which have exerted a pervasive influence over the success of planning measures have appeared in the form of (1) accessibility ease arising from continued urban decentralization and (2) planning and managing the post-affluent city ingredients.

In a given situation, planning for proper governance of the city forms a significant approach to monitoring the city growth process. It is observed that “one way of understanding the evolution of cities is to think of the urban future as being a

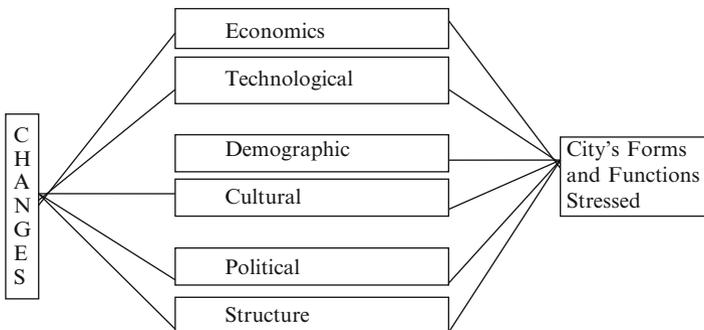


Fig. 20.10 Changes affecting urban scenario

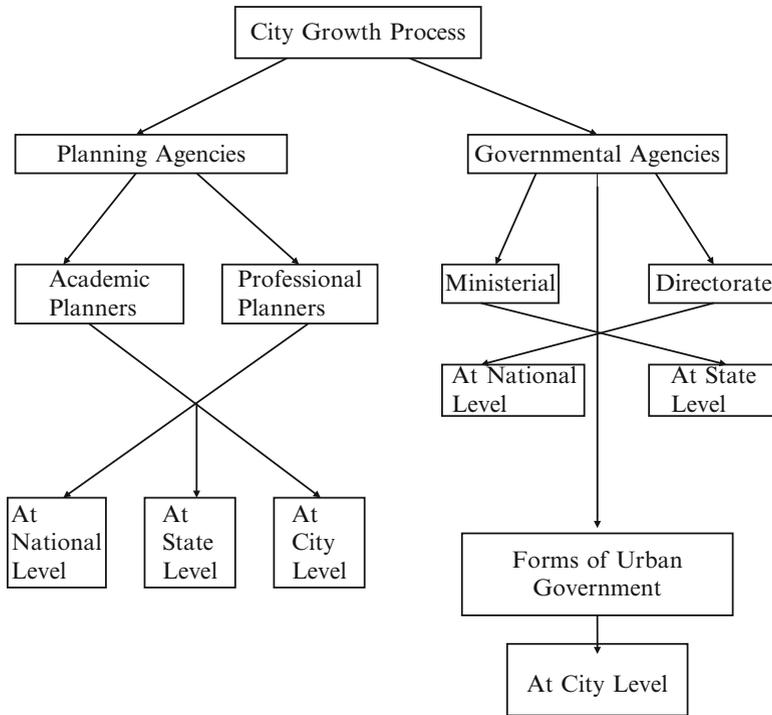


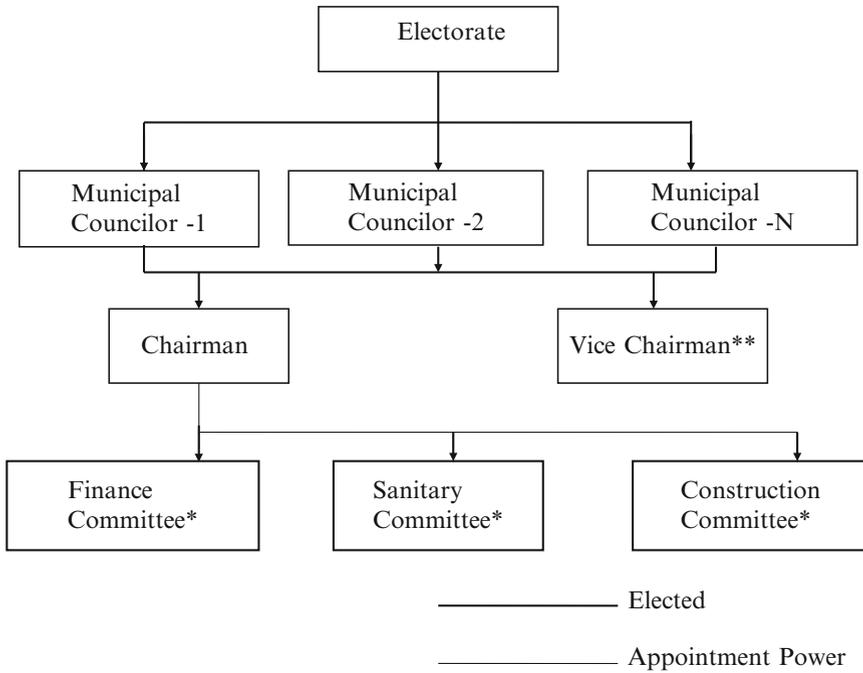
Fig. 20.11 Governance of the planned city growth process

response to the present pattern of socio-economic forces plus the intervention of the state and other factors outside the urban system itself” (Cadwallader 1985). The city growth process should ensure “means for systematically anticipating and achieving adjustment in the physical environment of a city consistent with social and economic trends and sound principles of civic design” (Khan 1990). This goal will require a twofold approach: (1) planning with the help of disciplinary and professional planners who may prepare proposals based on the assessment of existing situations, and (2) monitoring by governmental agencies at the local, regional, and national level, which may guide and regulate the implementation part of the planning processes.

Proper execution and governance of the planned city growth process as in common practice have been found as in Fig. 20.11.

The need for active and sincere involvement of both planning and governmental agencies to monitor the city growth process in Rohtak City has been felt particularly at local and state levels. The city governance of Rohtak is facilitated by its governing agencies and bodies (Fig. 20.12).

These bodies of governance play the roles of monitoring through regulations to effectuate development and control. They possess legal authority to act in the interest of public welfare by advocating and maintaining the urban mosaic of the city so as to ensure qualitative living to city dwellers and efficient functioning of the physical plan of the city simultaneously.



* Each committee consists of four members appointed for one year by rotation
 ** In the Absence of Chairman, Vice Chairman is the Executive Head.

Fig. 20.12 Existing system of city’s governance

Some of the plan execution aspect is related to the city–country interface. In this case, city governing bodies become ineffective to monitor the city growth process to the desired extent. In this situation, the creation of a developmental authority such as the Rohtak Regional Development Authority (RRDA) may be more helpful.

Proper governance of the city growth process alone can form an appreciable city image that is judged by people’s satisfaction and perceptions about city living. It has been implicitly accepted that the city can be treated as a natural object, a phenomenon in space that is perfectly perceived and perfectly comprehended by all those who form part of it or establish a relationship with it (Carter 1981). In this sense, it is also important to note that in the citizen’s view no objective city exists. Most people who live in the city develop most certainly a partial and most probably an ‘idiosyncratic’ view of the urban environment. City planning and governance become a difficult task in this sense, because to govern, planners and agencies must translate subjective mental maps into a spatial framework.

Naturally, therefore, the idea of direct citizen input into urban government, and planning in general, received its greatest stimulus during the early 1960s. In other words, the need of local public involvement has been found imperative in planning and governance of the city growth process. Public participation will ensure transfer-

ence of power from the bureaucracy to the people. However, proper governance to monitor the city growth process can be ensured only through dedicated personnel either in the form of planners, agencies to govern, and those in public participation who promise to use their zeal and expertise with all sincerity and selflessness. It is, after all, a task of amelioration, confidence building, and environmental improvement. Let us hope for a better and sustainable urban environment.

20.7 Conclusion

The city of Rohtak, in the course of its developmental trend and direction, has been experiencing instability of the physical plan in the sense that a new edition of sectoral planning has pervaded the urban developmental courses. Old parts have also tended to respond to new demands by various use components.

Because of increasing population pressure, the municipal limits of the city were extended from time to time, and at present the city constitutes 31 wards having a total area of 28.38 km². Sectoral planning by the Haryana Urban Development Authority (HUDA) is a recent development, resulting into the emergence of new residential localities such as Sector 14 and Sectors 1, -2, -3, and -4 in the eastern and northeastern periphery of the city. For reasons of the availability of all civic amenities in such planned developments, people are greatly attracted, and shift their locations not only from the inner zone but even from the middle zone that comprise the high-density areas.

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Chapter 21

Urban Heritage and Planning in India: A Study of Banaras

Rana P.B. Singh

Abstract Cultural and natural heritages are increasingly threatened by destruction, not only from natural causes but also as the results of anthropogenic interventions. From India, 32 properties are enlisted in the World Heritage list (2015), but the *Ghats* of Varanasi have not yet been proposed for inclusion, mostly because of political complexity and the lack of strong movement from the stakeholders. This chapter attempts to critically examine the rationales for proposing Varanasi as a heritage city in the World Heritage list and the problems faced in this process in the past 12 years. In this context, the status of Varanasi on the scale of the UNESCO World Heritage list, the implications of the past and ongoing Master Plans and City Development Plan, the role of the Indian National Trust for Art and Cultural Heritage (INTACH) (Varanasi), governance strategies, and issues of public awareness are critically examined. It is suggested that under the auspices of City Administration a Heritage & Conservation Cell in the Development Authority and Municipal Corporation should be created, and specific by-laws formulated for the development and preservation of heritagescapes with active participation from stakeholders.

Keywords Heritagescapes • Heritage planning • INTACH • JNNURM • Master Plan • Varanasi

21.1 The Master Plan and Heritage Zones

People say, “By seeing Banaras, one can see as much of life as the whole India can show.” In fact, Banaras is an archetype of all India, but it is full of complexity and contrasts resulting in comprehension too difficult for those who stand outside the Indian tradition. Vārānasi, popularly called Kāshi or Banāras (wrongly spelt as *Benares* in the anglicized way), known as the Cultural Capital, the Heritage city of India, and one of the oldest living cities of the world, records a continuous settlement history since around 1000 BCE (see, Eidt 1977). However, the present city has grown mostly during the early eighteenth century. Varanasi acquired the status of a

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‘million plus city’ (as Urban Agglomeration) in 1991 and recorded a population of 1,435,113 people in 2011 (Singh 2005b). The city’s population consists predominantly of Hindus (63 %), substantial Muslims (32 %), and other religious groups. The main city of Varanasi spreads over an area of 84.55 km². Additionally, everyday about 40,000 commuters visit the city, which influx increases to 60,000 during festive seasons. There are approximately 3,300 Hindu sanctuaries, and 1,388 Muslim shrines and mosques (more than in any city in the world). The existence of 4 universities and 3 Deemed universities, 150 Muslim schools, about 100 Sanskrit *pathashalas* (traditional schools), and 50 Inter and Degree colleges make Banaras a ‘City of Culture and Learning.’ The vividness and multiplicity, and the diversity and unity, are easily envisioned in its practicing religions, performing cultures, functioning society, and regulating economy, altogether making a cultural mosaic or universe of ‘*heritagescapes*’ in which age-old festivities and performances play a major role (Singh 2009c, pp. 17–18).

As the city has grown in area, population, business, and administrative functions, its influence extends beyond the municipal limits. From a city with a single core (CBD, i.e., *Chowk*), it has now acquired the character of an urban agglomeration (UA) spread over an area of 119.52 km². the Varanasi Urban Region is a much larger area over which it has no formal control but to which it sends its products and from which it draws its food and other requirements. What happens in the region has implications for the city and its people and vice versa. With further improvement of the Grand Trunk (GT) Road (National Highway 2) into a superhighway, the future expansion of the city will continue on all sides surrounding the city (Singh 2010).

In 1982, the Varanasi Development Authority (VDA, formed in 1974) made an assessment of the earlier plans of the city. Under the direction of the Town & County Planning Organisation (TCPO), a comprehensive Master Plan of Varanasi 1991–2011 was prepared, during which time the population of Varanasi Agglomeration doubled (Singh 2009c, p. 327). The five-tier areal units are defined on the basis of administration and planning strategy, taking the *Varanasi Development Region* (VDR, as in Master Plan 2011) as the outer limit. From lower to higher hierarchy, they are Varanasi City Municipal Corporation, 84.55 km²; Varanasi Urban Agglomeration, VUA, 119.52 km²; Varanasi Master Plan–Operative Area, 144.94 km²; Varanasi Master Plan–Projected Area, 179.27 km²; and the outermost Varanasi Development Region, VDR, 477.34 km² (Fig. 21.1).

Under the ‘Master Plan 2011,’ the expanded area proposed for Greater Varanasi is 179.27 km²; however, the land use categories planned do not fit the standard norms of ecological balance in the minimum threshold. The most noticeable change during the 1991–2011 Plan is the expansion of the area of the city (+112 %). The major changes since 1991 as introduced after 1988 indicate a catastrophic increase of land under government and semi-government uses (+390.50 %), and public and community facilities (+190.63 %). The increasing population has increased the area under residential use to 253.63 % during 1988 (Singh 2009c, p. 327). This dramatic change spoils the ecological system of land use; the most crucial group is parks and open ground, which have recorded a decrease of more than 60 % in comparison to 1999. Similarly, agricultural land was lost within the Master Plan, at a rate greater

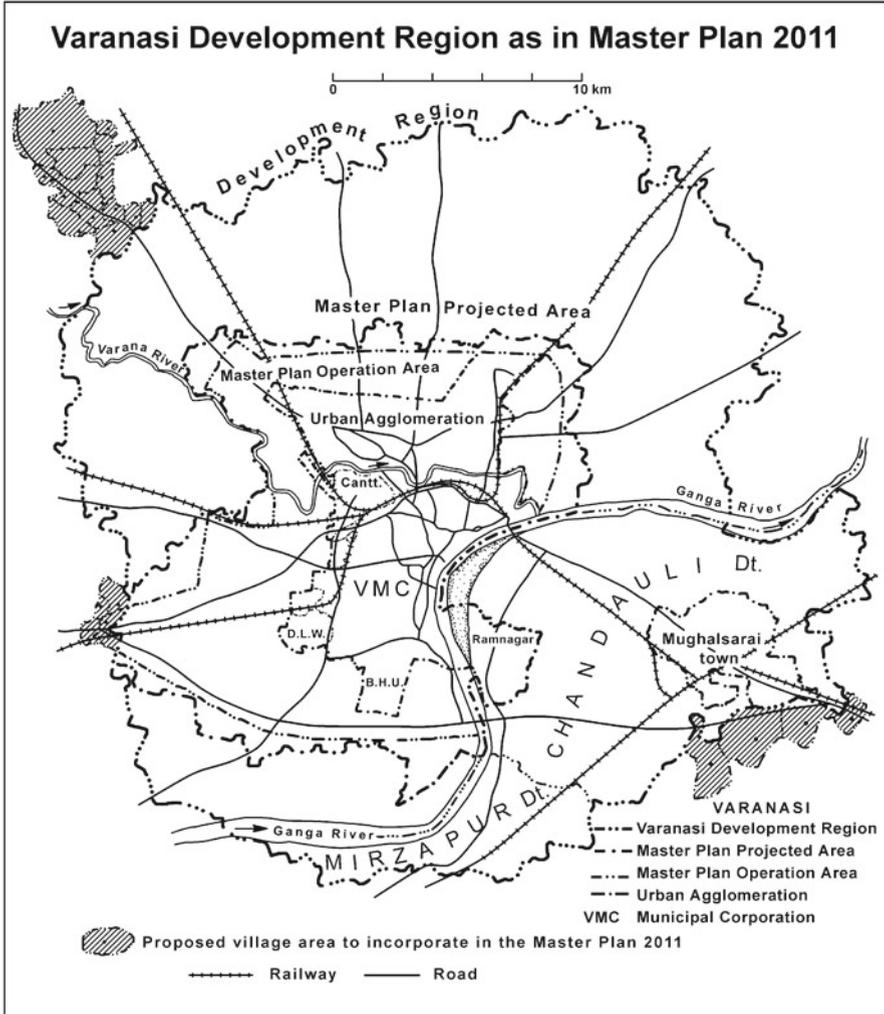


Fig. 21.1 Varanasi development region as in master plan 2011

than 40 %. In addition to the city’s population, every day about 45,000 commuters visit the city. This number increases to 65,000 during festive seasons.

For the first time in the history of Master Plans for Varanasi, some strategies of urban heritage and heritage zoning were proposed in the recent Master Plan (1991–2011) (Singh 2009c, p. 327) to maintain and preserve the ancient glory of Varanasi, and to identify necessary facilities and infrastructure and various heritage complexes (Rana and Singh 2000, pp. 150–154). A little more than 2 % of the total area is proposed under the tourism and heritage zones. More emphasis has been laid on the government and semi-government uses. According to the zoning plan, five heritage zones can be identified in Varanasi (Fig. 21.2).

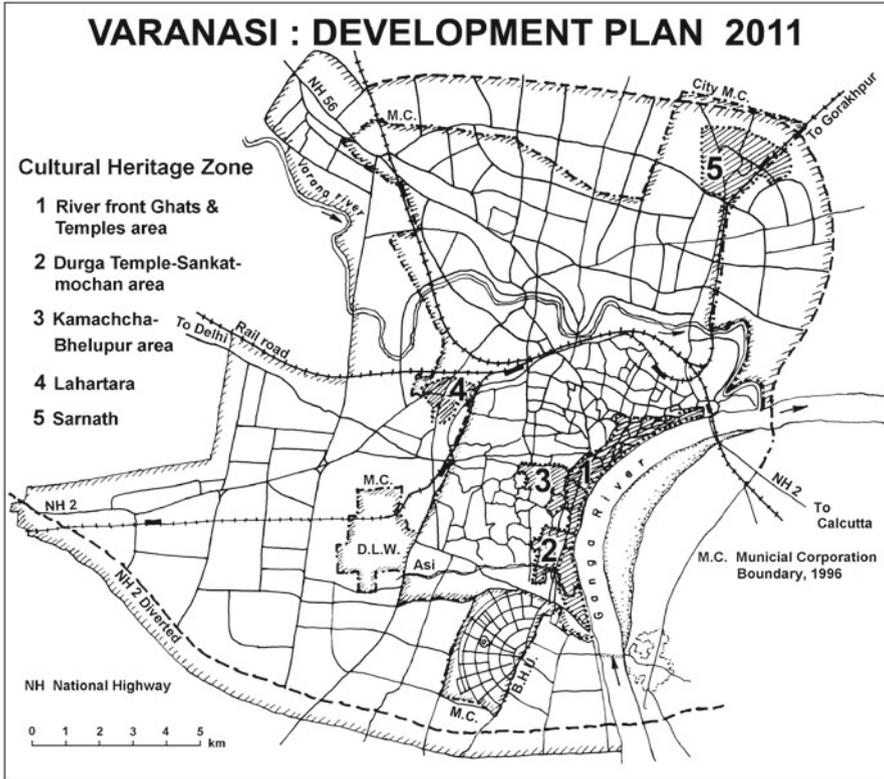


Fig. 21.2 Varanasi development plan 2011

21.1.1 Riverfront Ghats (Stairways to the Riverbank)

The riverfront heritage covers the portion of the city stretching within 200 m from the riverbank. Eighty-four riverfront *ghats* cover a length of 6.8 km along the crescent-shaped bank of the River Ganga, *Ganga-ji* (*Ganges* in anglicized style, devotionally called *Ganga-Ji*), from the confluence of the Asi drain in the south to the confluence of the Varana River in the north (Fig. 21.3). Here, the riverfront is overlooked by lofty palatial buildings built mostly by kings and lords from different parts of India between the eighteenth and twentieth centuries, and the area along the *ghats* is dominated by various shrines and temples. One of the most impressive buildings is the *Darbhangha Palace*, presently called *Brij Rama Palace* (now owned by the Clarks' Hotel Group), which is presently in the process of conversion into a heritage hotel that will consequently result in the loss of heritage and the promotion of environmental pollution. The *ghats* of Varanasi (Fig. 21.4) represent one of the finest ensembles of monumental architecture linked with the everyday activities of the devout people, thus symbolizing the heritage tradition of India.

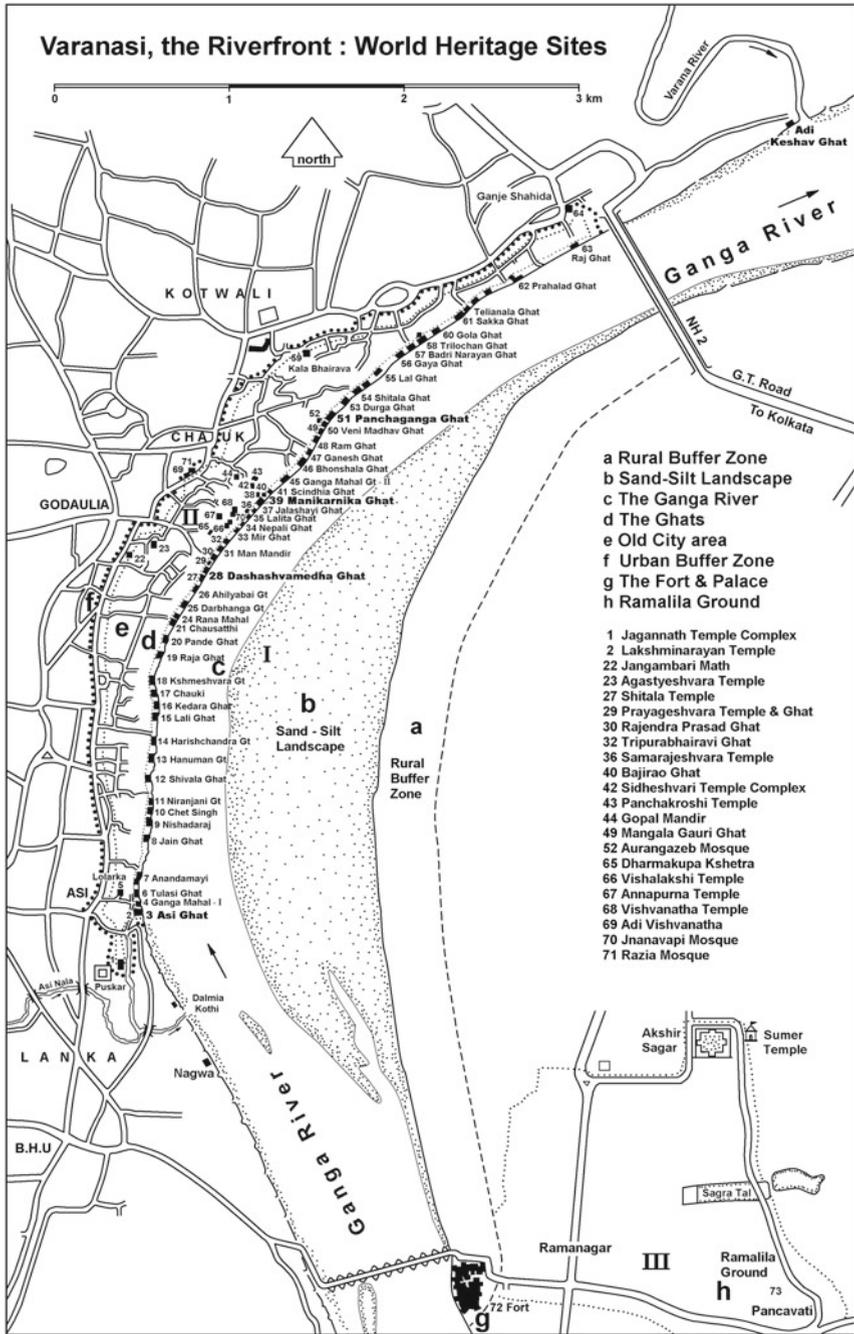


Fig. 21.3 Varanasi, the riverfront: world heritage sites

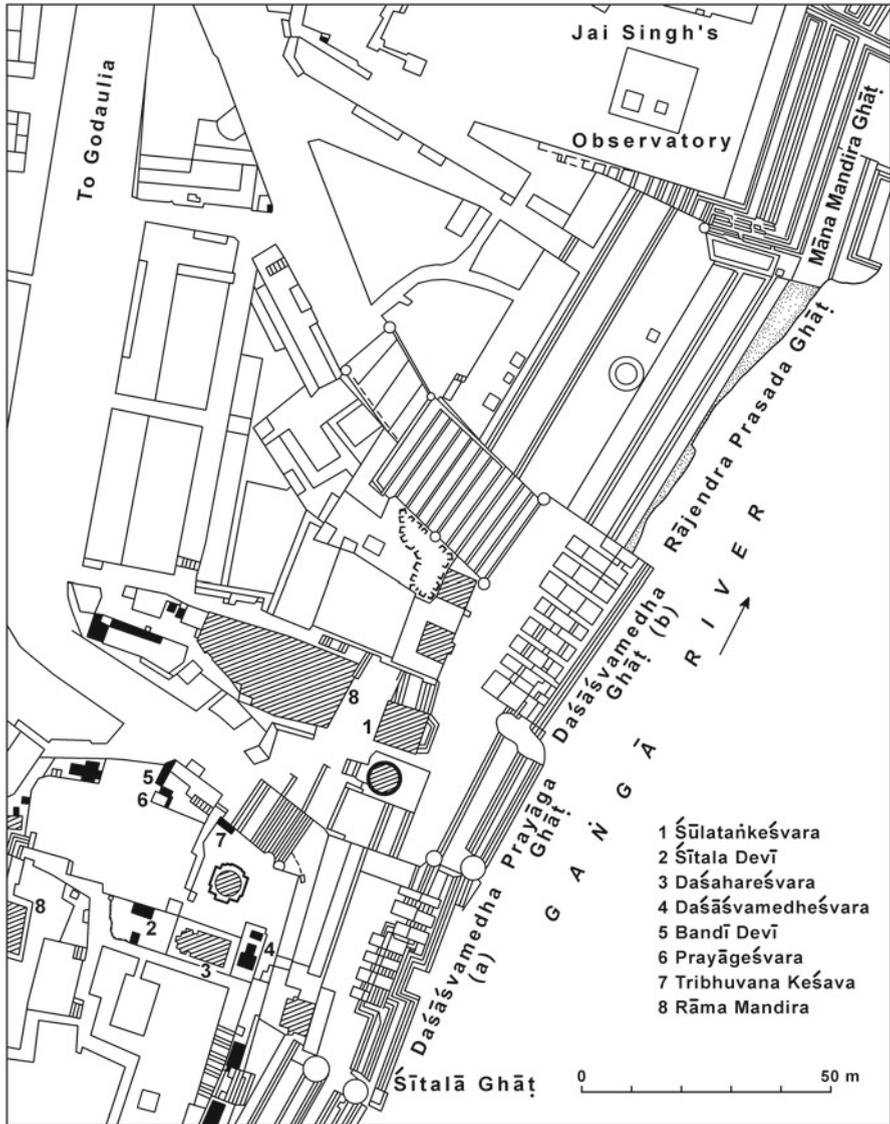


Fig. 21.4 The Ganga Riverfront Ghats from Sitala to Man Mandir, and the main temples

Almost all visitors (tourists and pilgrims) take part in the on-site package scenic tour programs (whether at a luxury or a basic level), of which the Ganga *ghats* are the most popular. The *ghats* are the nexus of the major rituals and festivals (the intangible cultural heritage resources) in the holy city, from where all rituals start by taking a sacred bath and conclude by giving a donation to the riverfront priests, as a thanksgiving.

To absorb population growth in the old city center, new buildings are being constructed either by demolishing old structures or by building over them. Because most of the heritage sites are in these densely inhabited narrow-lane areas, two Uttar Pradesh (UP) State Government orders (no. 320/9-A-32000-127, of 5 February 2000, and 840/9-A-3-2001, of 11 April 2001) state that “in all the towns situated along the Ganga River, no development activities can take place 200 m from the riverbank.” It specifically prohibits new construction on the riverfront *ghats* unless these buildings are temples, *maths*, or *ashrams* (monasteries), and only if these have approved construction plans or are only being renovated. The order goes on to say that all other old buildings that are within 200 m from the *ghats* can only be renovated. Overall, these orders aim to protect the integrity, sacredness, and the ancient glory of cities along the Ganga. The crescent-moon shaped riverbank is a landscape temple in the form of an amphitheatre, where the *ghats* form the platforms, the water the altar, and the sun is God.

21.1.2 Durgakund-Sankatmochan Area

This area contains about 20 temples and shrines and the water pools of Durgakund and Kurukshetra *kundas*, which are two historic sacred tanks dating from the late eighteenth century (Singh 1994). Every Tuesday, and more frequently in the months of *Shravana* (July–August) and *Ashvina* (September–October), especially the nine nights (*Navaratri*) of the light fortnight, worshippers perform rituals in the Durga temple. This temple was built on the orthodox model of Hindu temples, but without an excessive display of minute carvings and sculptures. Toward the east near the Ganga River is the oldest sacred pond in Varanasi, viz. Lolarka Kund, which was referred to in the *Mahabharata* (second century BCE) and which still attracts a large mass of pilgrims, especially on its annual day of celebration falling on the *Bhadrapada* (August–September), 6th day of the light fortnight. In this area also stand the temples of Tulasi Manas Mandir and Sankatmochan Hanuman Mandir.

21.1.3 Kamachcha-Bhelupura Area

This area records some of the old monasteries, ancient shrines, and an ancient heritage site associated with the Jain Tirthankara Parshvanath, together with many monuments and buildings of the British period (eighteenth to nineteenth centuries). The historically notable temples and shrines in this zone are Kamachha Devi, Bhairava, Angareshi Chandi, Vatuka Bhairava, and Vaidyanath Shiva. The Dvarakadhisha (Krishna) temple and sacred pool of Shankhudhara are other heritage sites.

21.1.4 *Kabir Math (Lahartara) Area*

This site was the birthplace of Kabir, a great saint-poet and social reformer of the sixteenth century. There are several monasteries in this area related to the life of Kabir. The Kabir Temple Complex is coming up as a great modern heritage and center of solace and learning; of course, it is turning out to be a 'White Elephant' less associated with local culture. Under the heritage Complex Development Program by the UP Government, a development plan has been prepared and some work is already going on.

21.1.5 *Sarnath*

This archaeological heritage site was famous for its sanctity, beauty, and natural scenery (Fig. 21.5), qualities that attracted the Buddha to give his first sermon here in 528 BCE. Following Muslim invasions and the downfall of the Gahadavalas Kings, the site was left in ruins and only came to light in CE 1793.

The principal site in Sarnath includes a well-preserved commemorative *stupa* (a decorated masonry tumulus), which dominates the site, the foundations of a reliquary *stupa*, the ruins of the temple complex and ancient monasteries, and a myriad of small votive *stupas*. The *stupa* and its surroundings are already proposed in the tentative list of UNESCO World Heritage Sites in 1998. The ongoing development plan is in accord with heritage conservation, environmental sensibility, public involvement, and user feelings, as befitting an important center of heritage tourism. It is sad to record that there is a lack of coordination between Japanese donors and the Indian institutions involved in planning.

21.1.6 *Other Heritagescapes*

There are many other sites, areas, and monuments in Varanasi that urgently require restoration and preservation and inclusion in the sustainable heritage tourism programs: these include the Hindu Observatory at Man Mandir Ghat, the Amethy temple at Manikarnika Ghat, the Sumer Devi temple at Ramanagar and its adjoining tank, and many others. Varanasi is famous for its series and layers of sacred circuits, among which the Panchakroshi is the most popular. This pilgrimage circuit representing the cosmo-spatial *mandalic* territory (*kshetra*) of Kashi is a unique attribute of Varanasi. The total route covers 88.5 km (25 *krosha*, i.e., 5 *krosha* × 5 parts) and is divided into five parts marked by overnight stops. At these five spots there are 44 *dharmashalas* (rest houses) for pilgrims. In every intercalary month, *malamasa* (e.g., the last were from a period of 17 May to 15 June 2007, and 15 April to 14 May 2010, and the forthcoming from 18 August to 16 September 2014; falling every

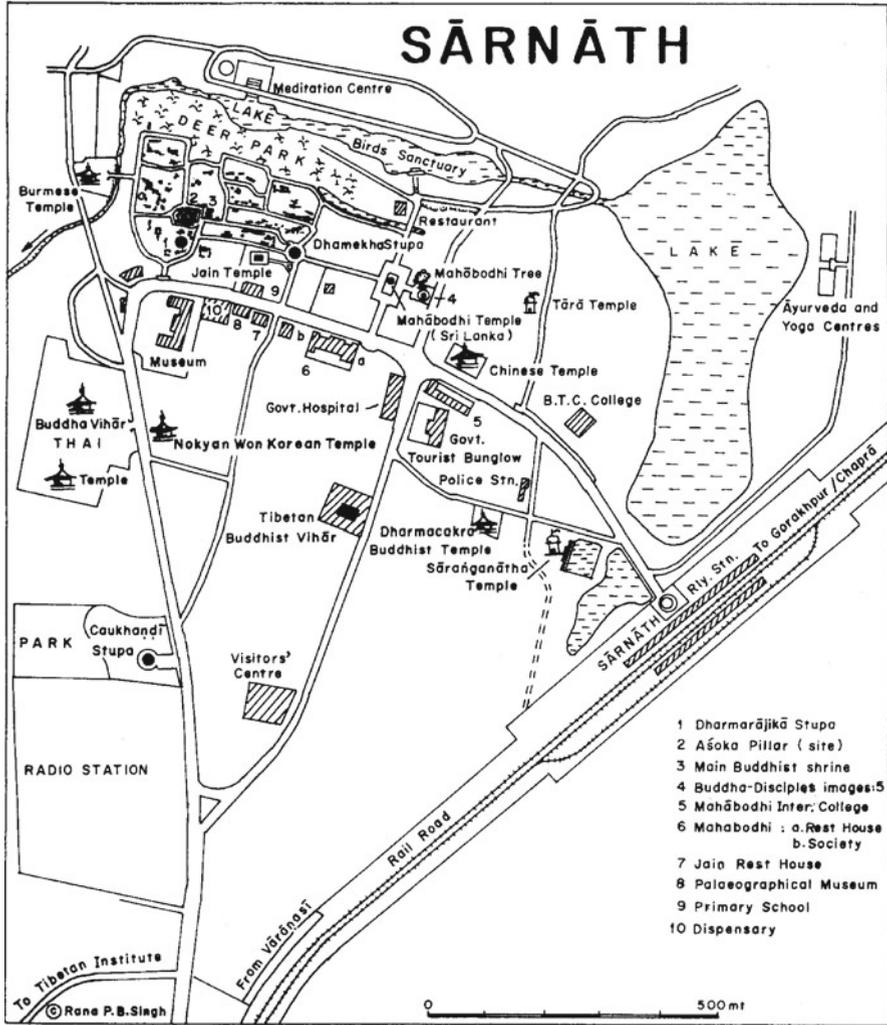


Fig. 21.5 The Buddhist landscape of Sarnath, Varanasi

third year), more than 45,000 devotees perform this pilgrimage (Singh 2002). Under the recently initiated heritage development project, a part of the Master Plan, partial works such as improvement of roads, cleaning of the water pools, and repairing of some of the roads are being completed. On the ground of pilgrimage tourism, this cosmic circuit should be given special emphasis, so also to promote sustainable heritage tourism.

Among the foregoing five sections, the Riverfront City has been in the process of becoming enlisted in the UNESCO Heritage List of ‘mixed cultural landscapes’ since 2001; however, because of the lack of public awareness and active participa-

tion, the complex web of bureaucracy, increasing corruption, and the rise of both individualism and consumerism, there seems to be little hope for the proper implementation of the plans and maintenance of heritage properties in their original forms. Moreover, the nomination process has been marred by conflicts between Hindu and Muslim factions (Singh 2011b, p. 295). Ultimately there is an urgent need to revitalize the city with reestablishing the ecological order by promoting civic sense and active public awakening and participation (Singh 2011c, p. 351). The Ganga River is so polluted now that only the most faithful would venture to take a bath in it. The Ganga River as an environmental milieu is not simply a water stream that flows across the land: this is what the Hindu culture knows to be true, and knows this in a certain way. It is not simply a question of how the river matters to society at present (in a strict sense); it is more important to see the meanings and cultural values that have been sustained for centuries. It is our moral obligation to revere this deeper attitude and maintain it in the context of the present needs, searching for a balanced relationship between man and nature within the microcosm of the Ganga River. This ideal brings together both Hindu culture and the vision of a sustainable society. The Ganga was declared as a 'National River' by the Government of India on 4 November 2008, as the first step for environmental and heritage preservation; however, even after more than 2 years have passed rarely has any recordable transformation been made.

Having a prime objective to help replace the current piecemeal efforts to clean up the Ganga with an integrated approach that sees the river as an ecological entity and to address the problems and strategies for environmental cleanliness, the National Ganga River Basin Authority (NGRBA) was founded on 20 February 2009 and opened by the prime minister of India. Let us hope that the vision and reflections of heritage (tangible and intangible) associated with the Ganga River and continued from the ancient past would also be considered in such programs.

The impact of urban sprawl and neighboring effects is constantly marked by the expansion and growth of two towns across the Ganga River, Ramanagar and Mughalsarai UA, lying only at 5 km and 18 km east of the main city, and recording populations of 48,378 and 154,692, respectively, in 2011 (Singh 2009c, p. 335). During 1991–2001 they recorded a growth of 35 % and 27 %, which reached 19 % and 33 %, respectively, in 2001–2011, mostly the result of varying degrees and complexities of urban sprawl. It is further estimated that both towns will be directly linked as a continuous urban space by 2031. This tendency will further intensify the demographic and economic pressure on the city of Varanasi.

Unfortunately, the *Master Plan 2001–2011* as prepared by the VDA and passed by the UP Legislative Assembly has failed to implement most of the priority projects enlisted. Realizing this, now 'private investors' are encouraged to come forward and take care of the follow-up in processing *Master Plan 2011–2031* under the purview of withdrawal or nonimplementation of the earlier strategies and projects. In the *Master Plan 2001–2011*, a long list of roads was prepared to ensure their widening, but the condition of the roads could not be improved despite the fact the traffic load continued to increase. The VDA also failed in its drive against the high number of illegal constructions, misuse of basements sanctioned with parking

provisions, developers of illegal residential colonies on the outskirts, and illegal destruction and encroachments of heritage properties. Projects such as Kamdhenu Nagar were put on the backburner while the fate of Transport Nagar hung in balance because of delay in completion of the process of land acquisition. A few years back, the VDA had adopted a strict attitude against the lawbreakers and violators of building laws, but its drives could also not continue for long, resulting in falling back into the earlier condition. However, despite its failures in the past, the VDA now appears 'serious' for ensuring a planned development in future as would be proposed in the in-process *Master Plan 2011–2031*.

It seems that some ready-made plans on the line of other similar cities would be superimposed, as in the past, and again rarely is the participation of the people being given its rational place. Will the VDA put these plans into the public domain and call for the opinion of the civil society who are passionate about their heritage and contributing toward its maintenance and preservation? Or will it want the people living in this sacred city to be as disconnected as they are today from their heritage and traditions, which are mostly used as resources for (outsider) tourists? Do we want citizens to continue to be disconnected from the campaign and continue to flush and forget its rich traditions? There is a need to involve the communities and reconnect them to the heritage and traditions in making the in-process *Master Plan 2011–2031* more sustainable and more heritage oriented. Let us not undermine the fact that success of the program to bring the city's culture to better life will rest with the involvement of communities from planning to monitoring (Babu 2009).

21.2 Heritage Development Plan: The Perspectives

In a meeting held at Lucknow (5 September 2008), under the chairmanship of the chief secretary of government of the Uttar Pradesh, the authorities have reconsidered the issue of inscribing heritage zones of Varanasi in the UNESCO World Heritage List (WHL), and nominated INTACH as the advising and coordinating agency. In no way have the earlier three submitted detailed and illustrated reports (2002; Singh 2009b, p. 363) have been taken into consideration. The recommendations include assignment to the VDA for preparing phase-wise action programs and preparation of pilot projects and management plan, and taking support of the state departments of housing, tourism, and culture. The INTACH Varanasi has not been asked for coordination.

With the initiative of the Chief Secretary of the state government of Uttar Pradesh, on 1 January 2009, INTACH, an agency and NGO at New Delhi, has been assigned the job to prepare a Heritage Development Plan (HDP) for Varanasi. The plan to be prepared by this agency would be submitted to UNESCO through the Government of India. This task is in extension and on the line of earlier reports prepared by the Kautilya Society, a local cultural body, on voluntary basis. The first VDA and INTACH New Delhi joint meeting was held on 5 January and it was expected that by June 2009, the first report of the HDP should be submitted and

released for public comments; however, the report is being kept 'secret' by the authorities. Unfortunately, up to March 2011 no final report had been submitted.

On 16 July 2009 and again on 3 August 2009, the INTACH New Delhi made a presentation on its report and submitted the report to the VDA. However, they avoided disseminating the report for the public and giving copies for review to any local expert. Surprisingly, in such a plan, including the Master Plan, public participation and their suggestions are essential before finalization, but in the present case things are kept secret. Based on the presentation and personal experiences during the past three decades, the major highlights and rational critiques of the HDP are presented here.

With a vision of sustainable urban development, promotion of heritage tourism, and the conservation and preservation of heritages (tangible and intangible), the Heritage Development Plan (HDP) was introduced in January 2009 under the auspices of VDA (Varanasi Development Authority) in line with the identification of the five heritage zones in Varanasi, and also consideration of the urban renewal and revitalization program under JNNRUM. The HDP will be applicable for the next two decadal periods that refers to the follow-up revised *Master Plan 2011–2031*. The vision behind this project is to revive, re-create, and make a sustainable effort to preserve the traditional glories and values together with adjusting to modern changes, with an aim that old heritage properties be changed and preserved in a way that they may serve as a productive resource for today. Therefore, the focus is laid upon preserving traditional values and architecture, urban public space where functions may be more efficient and harmonious, and tradition and modernity go hand-in-hand in making landscape and culture more eco-friendly and as well as symbols of human ingenuity. The heritagescapes that are given specific consideration include architecture, natural landscapes, built heritage (structure and function), and pilgrimage routes.

The *first phase* of the HDP consists of four selected areas as a pilot project.

1. ***Dashashvamedha Ghat*** and the nearby area, the predominant area of rituals, pilgrimages, visitation to temples, and visitor attractions. This area is delimited with the pilgrimage routes and individual temples; their number is more than 160, and around 60 % of all religious activities and ancient temples lie in this area. At the other end, this is also one among the three main market areas in the city, dominated by the residential-cum-shop-attached-temple type of built structure. All these are mixed and thus evolved a mosaic of 'sacredscapes.' The basic aim to develop this area is restoration and development together in making the area more livable, where the riverfront natural heritage, built architecture and symbolic values of temples, the grandeur of architecture, the market structure and the variety of shops that support the profane side of human needs, the intangible performances and rituals continued, maintained, and still in operation at least for the past 1,500 years (ancient, medieval, Mughal, colonial, post-colonial, modern periods) in spite of three times of major destruction may all work together.

This area is facing drastic problems related to (1) depletion of the heritage environment; (2) an environment with unhygienic, filthy houses and lanes, and wandering animals (bulls and cows); (3) encroachment of public space, walkways, and open space near houses; (4) vehicular congestion and poor traffic management, a hostile pedestrian environment; (5) lack of tourist facilities, including inadequate places and rooms for stays, such as lodges and guesthouses; (6) inadequate pilgrims' facilities; (7) inadequate festival/event management; (8) dangerously open electric lines and telephone lines; (9) an inferior urban image, lacking signage or indication of lanes and names, with ugly added structures and advertisement posters; (10) improper retail growth, dominated by vendors, side shops, and illegal shops that have encroached on the public spaces; and (11) no proper and viable planning measures together with lack of public awareness and their participation; and also neither existing by-laws, nor people ready to follow up by changing their habits and lifestyle. Very similar conditions could be visualized in different degrees and intensities in other old parts of the city, such as *Chowk*, *Vishvesharganj*, and *Lahurabir*.

The HDP emphasizes the four interconnected attributes for revitalization and heritage planning, such as a pedestrian environment, façade-scape, riverfront ghatscape, and a cultural center and sites of cultural foci. Many theoretically and ideal suggestions are given in these contexts, in addition to promoting pedestrian environment development and site interpretation, and improving accessibility, civic facilities, health, and hygiene.

2. **Chet Singh Palace** along the riverfront is to be projected as a Cultural Centre in the city because of its magnificent buildings, morphological structure, functional space, and built space where public and private gatherings can interact closely.

Chet Singh (1770–1781) built the palatial building of this Ghat in the mid-eighteenth century as a small fortress, which witnessed the fierce battle between the troops of Warren Hastings and Chet Singh in 1781 that resulted to the defeat of Chet Singh. Thus, this fortress went under the control of the British. In the late nineteenth century King Prabhu Narayan Singh again took the possession of this fort. The northern part of it was donated to the Naga group of ascetics who later on built their monasteries and ghats, called Niranjani Ghat and Nirvani Ghat (Singh 2009b, p. 270). This palace was the principal residence of the king in the British Period. This building is composed of (a) a palace with pavilions, built on the terrace overlooking the Ganga; (b) a group of buildings for the women (demolished); (c) a Mughal garden with a *darbar* (assembly hall) and water tower; and (d) a chain of three interconnected temples. The palace has a particularly favored relationship to the Ganga. It opens out onto the ghat that is a continuation of the palace and reached by means of a monumental gateway. The gateway houses a stairway, which gives access to the terrace. There, a central pavilion looks out over the Ganga, on which the Maharaja appeared for public glimpses. The terraced level is defined at two corners by two massive structures topped by octagonal domed pavilions. There are three state temples of Shiva in the compound, built in the eighteenth to nineteenth century. The Kashiraj Trust of the Maharaja owns this palace and area as other

properties of the estate. No specific measures are taken to conserve and preserve the palace and its compound, except that once or twice in a year for some celebrations the palace is allotted and on those very occasions cleaning, whitewashing, and some repairing are done. For lack of proper care and maintenance, the whole environment is in a stage of depletion.

Developing the Chet Singh palace and associated *ghat* as a cultural center will promote activities for enhancing the dissemination and revival of cultural performances (classical music, plays, etc.), examples of heritage preservation and re-use, religious activities for promoting a civic sense, and use of temples for more public visits. The center will be a nodal point for cultural interpretation. Arrangements of signage, illumination, landscaping, suitable lighting, revival and reorientation of the gardens, added extension of built space that would help to maintain the old heritage, and meetings and interaction among tourists and pilgrims that would lead to spiritual awakening and understanding would be some of the measures suggested.

3. **Five halt stations (*vāsa sthāna*)** on the pilgrimage route of Panchakroshi Yatra that delimits the cosmic circuits, that is, Kandwa, Bhimachandi, Rameshvar, Shiopur, and Kapildhara. This route represents the only such unique historical circuit of pilgrimage, covering about 88 km and interconnecting 108 shrines and temples (Singh 2002). All the five stations are attached with a sizeable *kund* and these are now facing critical environmental problems. The emphasis is laid upon the *kunds*, main temple complexes, *dharmashalas* (pilgrims' rest houses), preservation and restoration of historic buildings, pilgrimage paths, and maintenance of green space in view of keeping the serene and sacred scenes of the area alive and more eco-friendly for the mass of pilgrims.
4. **Selected water pools (*kunds*)**, exemplified by Sarang Talab, Pishachmochan, and Pushkar, as representative of three conditions of heritage and cultural context, respectively, face problems of environmental pollution and loss of cultural values, sites in danger that once recorded the history of ancient rituals of ancestor worship and religious cleanliness, and a cultural symbol having association with Brahma (the god of creation) and Krishna (the god of love).

The basic objectives for restoration and development of such water pools include edge formation and improvement, revetment and construction of retaining walls that help with restoration, additional restoration, and upgrading of public and open spaces that would promote social cohesiveness and a more harmonious and hygienic environment. There should be a system of recharging, for maintenance of cleanliness and societal consciousness to have a sense of attachment to place that constantly helps to maintain 'the spirit of place.' By 1932, there were more than 100 water pools; but at present only 20 exist and their condition is unhygienic, environmentally polluted, filled with filth, and commonly used as sewer pits by the neighboring houses.

For the *first phase*, a monetary budget is proposed as worth Indian rupees (Rs.) 2,500 million (US\$ 53 million), which would further subdivided for four subprojects according to the requirements.

The *second phase* of HDP would consist of preparing a detailed inventory and listing of heritage properties; up until August 2009 INTACH has tentatively prepared a list of such 693 properties. Selected properties, such as the Tripoli Entrance gateway at Ramanagar, Balaji Temple (Mangla Gauri Ghat), and Jagannath Temple (Assi), would be taken as pilot objects for making detailed plans for conservation and preservation.

Basic drawback of the HDP. The basic drawback of the recently proposed HDP is lack of public participation, negligence of the historical-cultural processes that made the landscape and lifeways, avoidance of any sort of cooperation from local experts and people, superimposition of so many theoretical and other constructs that are thought as the best measures by them, choosing samples of water pools (*kunds*) without rationality of cultural significance and symbolic values as perceived and practiced by local people since historical past, not considering the proposal on the line of urban planning acts and the earlier planned Master Plan, avoiding making a report and details available to the public for critical observation, completely putting aside the intangible heritage (such as Ramalilas, ancestors' rituals, fairs and festivals, environmental theatres, traditional Sanskrit teaching and schools, traditional wrestling, folk art and craftsmanship, toy making, silk weaving, seasonal songs and associated singing assemblies, ..., etc.), giving overemphasis to (recreational) tourism and Western visitors (approximately more than a half million every year), neglecting the requirements of the huge mass of pilgrims (about 4 million every year), avoiding coordination with other development plans that are concerned with the transport system, sewerage drains, building construction, cultural activities, etc. Further, there are several such loopholes that may be looked into. If these issues be sorted out to a certain degree, the proposed HDP would be rationally fitting, accepted as eco-friendly, and activated for the sustainable future of this heritage city.

In view of experiences in the past, it is clear that with lack of any pilot project there is no way one could justify the relevance of the heritage conservation plan and details of related aspects that would lead to putting the main heritage zones and properties first in the 'Tentative List' of UNESCO WHL, and following up proceeding toward becoming enlisted in the 'Final List.' Additionally, sometimes controversial and false propaganda through media and newspapers and doubts created by the officials and politicians also become obstacles.

21.3 Inscribing the Riverfront Ghats in UNESCO WHL: Story of Fight and Failure

The story of realizing the issues of inscribing the Riverfront Ghats in UNESCO WHL goes back to 1989, when under the direction of M.S. Swaminathan, a Project Design Workshop on "Natural and Cultural Sites along the Ganga for inscription in the World Heritage List" was organized during 7–8 April 1989 under the auspices of the National Academy of Science (NAS) with the collaboration of several federal agencies of the Government of India such as the Planning Commission, Department

of Arts, Ministry of Human Resource Development, Ministry of Environment and Forests, Prime Minister's Committee on Heritage and Cultural Resources, INTACH, and the Ganga Project Directorate; this was undertaken as part of the Nehru Centenary Celebrations. This workshop turned to be only an academic and bureaucratic exercise. It is surprising that Riverfront Varanasi was not discussed at all.

Encouraged and inspired by the foregoing initiative, the author contacted H el ene Legendre-De Koninck, a Canadian heritage expert and writer, through a letter dated 6 April 1992, to learn about the criteria and procedures of inscription in the WHL. Her reply and advice (30 April 1992) helped us to contact ICOMOS, UNESCO World Heritage Committee, and concerned ministries of the Government of India. On these lines on 16 May 1992 a letter was sent to the President of ICOMOS by the author, attaching the details, potential grounds, and strong conditions fulfilled by the "*Riverfront Ghats and the Old City Heritage of Banaras*" for becoming inscribed in the WHL. Also a follow-up letter (18 May 1992, ref. NGJI/VSF/206) was sent to the Indian National Commission for cooperation with UNESCO (Ministry of Human Resource Development, Government of India). The ICOMOS has considered the request sympathetically and through the head of communication of IUCN (The World Conservation Union) sent the letter and documents to the Sectional Officer, Department of Culture (Ministry of Human Resource Development, Government of India); the office took note for appropriate action (ref. no. F.17-19/ 92-UU, dated 1 June 1992), and sent a copy to Singh. As a follow-up Singh had further contacted the Secretariat of the IUCN, who forwarded his letter and all documents to several persons concerned with the issue. Time passed and things went their own way, but nothing in support of the proposal resulted.

The foregoing story has encouraged publication of a paper taking into consideration all the criteria and characteristics that rationally and most viably justified nomination of "*The Riverfront and Old City Heritage Zone of Varanasi*" for being inscribed in the UNESCO WHL; the resultant essay was the first of such reports (Singh 1993). Again the author had tried to disseminate this noble idea by sending his essay to several persons and institutions, including INTACH New Delhi and the local Varanasi Chapter, but unfortunately no positive result had been noticed except a few other publications of papers on the line of similar ideas repeatedly (Singh et al. 2001; Michell and Singh 2005; Singh 2004, 2007, 2009a, b). Those involved in heritage conservation movements have felt humiliated and disappointed from all sorts of potential steps for public awakening, stakeholder active participation, noncooperation from the intellectuals and INTACH Varanasi Chapter, lack of serious concern from bureaucrats and administrators, and their consequential situations. Rarely now are these issues discussed.

With the initiative of Mr. Jag Mohan, then Government of India's Minister for Urban Development, an intensive exercise of about 4 months of preparing a 'Integrated and Integral Cultural Development Plan of Varanasi' was undertaken, resulting in a 2-day National Seminar, organized by the U.P. State Department of Tourism on 11–12 August 2000, and thus recommendatory plans for preservation and development of cultural and monumental heritage and also intangible heritage (fairs, festivals, celebrations, folk culture, etc.) were proposed. This comprehensive

project also included issues of development related to tourism, cleaning and repairing of the riverfront ghats and the ancient and heritage lanes, maintenance and repairing of roads and interlinking paths, a plan for developing the Panchakroshi pilgrimage circuit, environmental cleanliness, and pollution control, and energy conservation, etc. Soon the ministry changed, resulting in a change of priority and interest. In this project as usual INTACH Varanasi had in no way involved itself for any sort of support.

After a gap of about 7 years the Kautilya Society, an NGO working for cultural preservation, under the supervision of the present author held a meeting on 4 February 2001 and chalked out some plans for heritage documentation, preservation, and conservation, while collaborating with the Society of Heritage Planning and Environmental Health, SHPEH, a local NGO; this similarly resulted in a strong mass movement and activities that promoted the cause of heritage awakening and preservation, at least during the past 8 years.

As a follow-up program the Kautilya Society contacted the VDA (Varanasi Development Authority) and its senior authorities, including the then Commissioner (and Chairman VDA) and the Vice-Chairman, who had shown keen interest, and under their patronage the project for 'Nomination Proposal for Inscription in the UNESCO World Heritage List' had started its procedural preparation in November 2001. With common consensus a Working Group for Drafting UNESCO Proposal was formed consisting of 13 representative members from administration, bureaucrats, Varanasi Development Authority, intellectuals and activists, the department of tourism, the department of culture, faculty members teaching heritage tourism (e.g., from Banaras Hindu University), museums (e.g., Bharat Kala Bhavan), legal experts, eminent citizens, SHPEH, and Kautilya Society; this Working Group proceeded under the guidance of three unanimously nominated persons as honorary officials. As in the past, the INTACH Varanasi Chapter was completely silent and in spite of several calls and requests none of the associates attended any meeting or took part in any of the heritage programs. Finally, an agreement between VDA and Kautilya Society was made on 15 March 2002 for overlooking all the preparatory activities and a final draft proposal.

On the foregoing line of agreement, the Kautilya Society has prepared three reports (March/April 2002) under "Nomination Proposal for Inscription in the UNESCO World Heritage List," where all the listed properties are described under historical importance, aesthetics, locational characterises, present state of condition, and religious importance, also illustrated with GPS values, line drawings, cross sections, site plans, and photographs (cf. Singh 2009b, p. 363) within a year that concern (a) *Varanasi: Heritage Zones and Sites* (details of 53 sites and properties, covering the riverfront ghats, the core heritage area surrounding Vishvanath Temple, Sarnath, notable properties in the city, and Panchakroshi route); (b) *Varanasi: Heritage Zones and Sites* (details of 40 sites and properties, covering the same areas as the first report ('a') with additional illustrations and drawings); and the final (c) *The Riverfront and Old City Heritage Zone of Varanasi* (details of 73 sites and properties, covering the riverfront ghats and old heritage zone area, and also other side of the river Ganga, i.e., Ramanagar fort and Ramalila space and affiliated built-up

structures, also consisting of select bibliography, historical accounts, tourist statistics, critique and resume of other chapters' heritage activities, history of heritage laws and Indian context, suggested amendment on Urban and Town & Country Planning Acts, and finally a detailed schedule of plan of action 2002–2011). The final report (op. cit., c) was on the line of the *Master Plan of Varanasi 2011*, which was approved and passed by the UP Government Assembly on 10 July 2001 (ref. 2915/9-Aa-3-2001-10Maha/99); in this plan, five Cultural Heritage Zones were identified and in the purview of tourism development strategies were proposed (see Fig. 21.2).

After passage of time, by changing the government at state and ministerial changes into the central government, the local officials were transferred to other places, and the degree of peoples' involvement and interest, the whole intense exercise for inscribing the 'Riverfront and Old City Heritage Zone of Varanasi,' were gone in vain. However, with the initiation from the UNESCO Delhi branch and pressure of the Central government, again some attempts had been made on these lines, which started in March 2003. In continuation, to discuss the 3rd Report VDA had called an official meeting on 15 October 2003 and asked for revision and modification of the Proposal, which Kautilya Society had compiled and submitted on 21 October 2003, taking in view the recommendations made by ASI (Archaeological Survey of India) in its letter dated 28 July 2003, addressed to the Commissioner, Varanasi Division, and suggestions made by the VDA. Some bureaucratic formalities and forwarding transmission were performed, but nothing consequential resulted; and the officers were transferred from Varanasi, which resulted in putting the whole exercise into waste bins, as usual in such a system.

The latest initiative under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) of a similar proposal of a HDP (Heritage Development Plan) was started on 1 January 2009 under the auspices of INTACH New Delhi, that without any direct collaboration from its local chapter or and local organization had already prepared several plans and projects (Singh 2005a). Ultimately, no (detailed) document in the line of UNESCO's Guidelines to prepare proposal for inclusion (dossier) in the WHL has been made. Moreover, because of the time lag, there is little chance for such a proposal and its acceptance even in the Tentative List, because of the fact that Shantiniketan has been submitted and accepted for inclusion into the WH Tentative List (20 January 2010). [To be kept in mind, only one property or area is to be proposed by a country in a year.] And for the succeeding year (2011), processes are underway to get Le Corbusier's Capitol for Chandigarh, comprising four 'Edifices' (the High Court, the Legislative Assembly, the Secretariat, and the Museum of Knowledge) included in the WH List under twenty-first century modern heritage; it is noted that this is already on the UNESCO WH Tentative List (23 October 2006). These built-up architectures have maintained their originality since 1966 when they were built. At the earliest the Riverfront and Old City Heritage of Varanasi may probably be put on the tentative list in 2016, provided the project proposal is prepared strictly in accordance with the UNESCO WHC Guidelines, and to be reviewed, verified, and submitted as soon as possible.

21.4 Public Awakening (*Chetna March*): Raising the Voice

As a public awakening march, an open dialogue and press conference were called upon on 10 August 2009 in the evening at Asi Ghat, attended by about 100 persons raising a public voice to “Save the Heritage City of Varanasi,” taking view of the discrepancies and major drawbacks of the City Development Plan (CDP; especially transportation and morphology) prepared in haste by Feedback Turnkey Engineers Pvt Ltd, New Delhi, FV (2006), which was highlighted in a newspaper (Dikshit, 28 July 2009, *TOI*). Nor were the DPRs (Detailed Project Reports) prepared by INTACH Delhi and submitted to VDA on 16 July 2009 taken into consideration or was even any sort of coordination maintained between these two plans (Singh 2009c, *TOI*). The Convener of the INTACH Varanasi has already sent (29 July 2009) an appeal to Honourable Prime Minister of India and other concerned authorities of the Government of India to see the issues and intervene in such superimposed plans (prepared by an outside agency) that never fit the spirit and culture and are not viable; obviously they will turn into a serious threat to the holy and cultural city of Varanasi.

The budget of CDP is planned as Rs. 46,806.5 million (equals US\$ 965 million) and should be completed by the year 2030. In this plan the following six threatening issues are realized and petitions are sent by the public to media and government personnel, of course with little success.

1. ***Construction of permanent jetties along the ghats for boats*** will destroy the very purpose of the riverfront historical and cultural sceneries that serve as the most attractive landscape.
2. ***Construction sites of the five flyovers in the main heritage zones*** would destroy the functional character and heritage monuments.
3. ***Construction of the Ring Road*** outside the city territory without considering the sacred territorial pilgrimage path of “Panchakroshi,” which developed in the medieval period and is still so frequently used by pilgrims, will destroy the archetypal and cosmic symbolism of the city.
4. ***The construction of a new area for dyeing and polishing of fabrics*** outside the city will serve as an ‘outside’ pressure that will lose the traditional craftsmanship of the city.
5. ***Introducing a mass public transport system*** in the main city will create chaos and disaster to the heritagescapes; let the traditional system may be improved in a renovated way.
6. ***The lighting of the heritage sites*** will promote stress on the heritage component and further deteriorate the heritage environment. Modernity should be avoided if heritage is in danger.

A common consensus has been resolved by the public and the following alarming issues noted down for serious action programs that may run regularly (KSM 2009, pp. 1, 3):

1. The plan was completed at all speed within 3–5 months without consultation with the Banaras public, experts on Banaras, religious leaders, university academics, etc.
2. The current CDP and DPR both neglected the earlier heritage-concerned reports prepared for inclusion of Riverfront and Old City of Varanasi in the UNESCO World Heritage List.
3. Banaras is a historical, cultural, spiritual, and pilgrimage city, where traditions are alive and serve as the backbone of life; therefore, any ‘urban development plan’ should be along these lines as befitting its spirit and tradition, not in any way as a ‘tourist center.’
4. Banaras, especially the old historical town, needs *renovation, preservation, and maintenance*, not *transformation* in the name of urban planning. The City needs *urban revitalization*, not *urban transformation*.
5. The original *ghat* design and the network of linking and nearby *galis* (lanes) have to be preserved in a way to save the ‘lifeline’ and arteries of this organic city. The idea of constructing a ropeway for tourists from Dashashvamedh to the other side, or a skywalk from Godowlia to Dashashvamedh, will be like leprosy on the city’s body.
6. Banaras cannot be forcibly turned into a modern city by giving priority to motor traffic by indiscriminately enlarging roads or constructing flyovers and skywalks. Modernization should be done as patchwork and adjustment while preserving the architectural grandeur and culture.
7. One of the most important improvements urgently needed is developing an eco-friendly ‘green’ environment, but unfortunately this is almost never mentioned in any of the plans; rather, in the name of expansion the green areas are suggested for replacement.
8. The Master Plan of Varanasi was passed on 10 July 2001, in which five heritage zones (Singh 2009b, pp. 329–334) were identified; but in no way are these taken into consideration in CDP or DPRs.

Celebrating World Heritage Week during 19–25 November 2009, the cultural and archaeological departments and Archaeological Survey of India (ASI) had organized events such as seminars, cultural programs, photo exhibitions, and competitive programs in the city for public awakening, but such activities were neither performed properly nor were these taken seriously by the public. Of course, the basic objective of the event was to create awareness about the diversity of cultural heritage and the efforts to protect and conserve our precious heritage and ancient monuments; however, nothing fruitful resulted except mere formalities and the use of public funds for official satisfaction. The role of the local chapter of INTACH was also negligible in coordination, mostly from lack of vision, insights, and plans that were undemocratically handled by the present committee.

About 6 years ago, on 9 February 2009, with the initiatives of INTACH (Delhi) and the Ministry of Foreign Affairs and Cooperation (MFAC) of Spain, a

Memorandum of Understanding (MoU) was signed to conserve, protect, and preserve the heritage monuments and promote cultural heritage in the temple city of Varanasi and develop world-class infrastructure in the area, which will pave the path to inscribing Varanasi as a ‘World Heritage City.’ According to this MoU, experts from Spain will intensively work in Varanasi for documentation, inventory, and status reporting of the heritage properties and heritagescapes; however, no progress has yet been made, and also the local chapter of INTACH is silent. Such programs are mostly based on outsiders’ creations that are superimposed here, avoiding the assessment of local requirements and understanding and without hearing local voices; however, through the media they propagate the rationality and suitability of the plans and designs they have drafted.

On 9 June 2010, with the technical support and cooperation of German Technical Cooperation (GTZ), CEPT (Centre for Environmental Planning and Technology, Ahmadabad), and Advisory Services in Environmental Management (ASEM), a venture of the Indian Ministry of Environment and Forests, the Municipal Corporation of Varanasi has been working on a sanitation plan for environmental cleanliness and a hygienic urban habitat that will result to conserve, preserve, and maintain the aesthetic values of heritage; let us hope for action through a functioning “City Task Force.”

In spite of all such tragic situations, people are still hopeful for some good changes that would be fitting in maintaining the glorious culture and heritage of this heritage city. Let us hope for new light that may help to keep, continue, and envision its image as “the City of Light”!

21.5 Envisioning the Future and Livable City

There is no perfect optimal plan for making a city complete and ecologically livable. Although modern design, technology, and resource transformation are important ingredients, cities will flourish by creating opportunity through their own narratives while working with their history, tradition, cultures, resources, location, and population potentials to improve livability (Stanley 2010). A livable city is a concept in the minds of urban planners, developers, green builders, and stakeholders concerned for good and happy places around the world. Livable cities enhance the lives and well-being of their citizens, encouraging community and public participation through designing an urban infrastructure that brings people together (Murry 2011). Additionally, livable cities embody sustainability encompassing ecology, economics, culture, society, and humanity (Pal 2015, p. 278).

The following five general principles should guide the development of a livable city on the lines of ecological sustainability; these should be given more attention in the *Varanasi Master Plan 2031*:

- Be better places to live, for everyone
- Underpin growth and jobs
- Leave a sound legacy for future generations

- Offer better linkages to regions and other major cities
- Integrate within and between transport and land use, urban form, and new technologies

The following principles that are more specific should guide mobility within an accessible city:

1. Take a 'systems' approach to the whole network.
2. Limit the need for travel and, if this is not possible, limit the distance to be traveled, for example, by providing work opportunities close to home and making teleconferencing and augmented reality facilities available within local precincts.
3. Relieve people of the need to 'drive' vehicles, thus freeing their travel time for more personal or productive tasks, for example, using non-crowded 'public' transport and intelligent transport systems to permit automatic operation of road vehicles.
4. Separate major flows of freight and passengers via separate networks.

Although many city governments face unprecedented challenges, a number of steps can make cities more livable and protect the environment, including better urban planning, more public transportation, better sanitation and rational water use policies, energy conservation, urban farming, and waste recycling. In addition, slower population growth would ease pressures on cities and buy time to find solutions. Of course, sustainable urban development is a recent, yet controversial concept. Wheeler, in his 1998 article, defines sustainable urban development as "development that improves the long-term social and ecological health of cities and towns." He sketches a 'sustainable' city's features: compact, efficient land use; less automobile use, yet better access; efficient resource use; less pollution and waste; the restoration of natural systems; good housing and living environments; a healthy social ecology; a sustainable economy; community participation and involvement; and preservation of local culture and wisdom.

After 12 years have passed, now the concept of sustainable urban development and livable city planning are popularly conceived as a philosophical vision for city planning, especially for old cities; as also this would be fitting to Varanasi. Because of political and governance structures in most jurisdictions, sustainable planning measures must be widely supported before they can affect institutions and regions. Actual implementation is often a complex compromise among several stakeholders and policymakers, and in bridging machineries, which in our cases are quite complex and corrupt. Nevertheless, sustainability requires governments to stay engaged, public-private partnership to be appropriately designed and regulated to benefit the community (Yuen and Ooi 2010, p. 8); it may be difficult, but it is not impossible. A conflict between the preservation of the character of existing historic towns and "change" has formed the central argument for conservation and sustainable planning. Presently, heritage has superseded conservation, where marketing of heritage as a product according to the demands of the consumer, mainly tourists, has resulted in the commercialization of heritage over conservation values that also turn into

contestation. Today, the symbiosis of both tourism and heritage places has become a major objective in the management and planning of historic cities such as Varanasi (Nasser 2003).

As the regional capital, the city is serving as a nexus for economic development and its transactions, and also trying to maintain its status as a popular place of pilgrimage and tourism. But think of the period after two more decades when the population will be doubled, the requirements will be different and intense, transportation would require a complex network, the maintenance of the city's role as a bridge between rural and urban culture and also coping with India's urban share, that would be half by 2031—how will the city take the lead in these situations and transformations? Presently the City is unprepared and ill equipped to tackle the challenges it faces to create a new and better landscape and life.

Land acquisition is one of the biggest, most politically fraught obstacles to industrial growth and expansion of the city. Farmers have fought bitter battles against their land being taken for urban expansion and development of residential colonies, stalling some projects for years. There is lack of coordination among the three development institutions responsible for making plan and implementing them, viz. Varanasi Development Authority, Varanasi Municipal Corporation, District Urban Development Authority, and their affiliates.

The way *Master Plan 2031* manages its urban transformation will determine the course of its development and economic ascent. Unfortunately, rarely is public participation taken into consideration for making this Master Plan, which is mostly conceived as an extension of the old one and additionally chalked out as a manifestation of earlier model plans that are in no way concerned with the similar situation. There is another big gap between 'inside' (residents) and 'outside' (administration) approaches. Theoretically, tourism and heritage are also given consideration in preparing a development plan, but no rationales, threshold and land use plans based on 'pilot projects,' or case studies are yet prepared. INTACH, New Delhi, entrusted to work on the issues of heritage development plans, has completely avoided any sort of collaboration with local experts and resources. The situation is becoming that the residents unwillingly have to accept all such plans conceived by outsiders and theoreticians who have no experience or deeper interaction with the local society and culture. Let the authorities realize these drawbacks and that such studies need to be undertaken for planning strategies (Pal 2015, p. 281).

21.6 Postscript: Epilogue

Thanks to the recent vision and guidelines of the hon'ble Prime Minister of India Narendra Modi (joined on 26 May 2014, after winning his seat from parliamentary constituency of Varanasi city), that under the purview of Smart City development strategy through the interfacing programmes of HRIDAY (*Heritage city Development and Augmentation Yojana*) and PRASAD (*Pilgrimage Rejuvenation And Spiritual Augmentation Drive*) seek to promote an integrated, inclusive and sustainable

development of heritage sites (cities), focusing not just on maintenance of monuments but on advancement of the entire ecosystem including its citizens, tourists and local businesses. The scheme covers 12 heritage cities including Varanasi. Varanasi received major share, accounting to Rs 893.1 millions (i.e., US \$14.9 million) for various projects. On 26 November 2014, the UNESCO by an agreement with Ministry of Urban Development, GOI, has agreed in revitalising and conserving the rich cultural heritage of these cities, while taking care of the increasing pace of urbanisation. In this programme priority be given to conserve and preserve the heritages (natural and cultural: tangible and intangible), which may attract more tourists and pilgrims, and would also improve civic amenities for betterment of life and landscapes (Singh 2015a, p. 109).

Unfortunately, Varanasi does not figure in the recent shortlist of cities (October 2014) that could be nominated as a World Heritage City by the UNESCO. Experts blame bureaucratic delays, lack of coordination between Central and State governments, and shortage of documentation regarding the city's plans for Varanasi missing out on the opportunity. The approach lacks persistence. The dossier to be submitted to UNESCO requires a 10 year vision for the city that includes financial, management and structural plans and an intensive proof document on the city's heritage value. Most of it is already ready but unless civic bodies, NGOs and bureaucrats interact more, specific details will always be missing, making the document incomplete.

One has also to keep in mind the story for putting Varanasi at the margin, while proposing dossier for enlisting in the World Heritage City of the UNESCO, referring highlights of the Delhi's dossier that focuses on Old Delhi's Shahjahanabad area that served as the capital under Mughal Emperor Shah Jahan from 1638 to 1648, and the British capital planned by architect Edwin Lutyens; this was prepared in February 2014, and finally after approval by the ICOMOS evaluation experts in October 2014, already submitted to UNESCO, expecting that by June 2015 the final decision with favour will be declared. There is a little hope in this situation that the Riverfront Varanasi may compete with! Unfortunately, till date no final dossier has been prepared for the sacred city of Varanasi that may emphasise the Riverfront Heritage and the Old City Sacred Landscapes (Singh 2015b, p. 36).

21.7 Conclusion

Heritage is the mirror of mankind's growth, progress, and prospects; it is very important that it should be preserved. One has to remember that the modern way of life and science, and that of ancient wisdom and its messages, can work together to help in searching for a harmonious and peaceful path for mankind's integration with nature. That this heritage may become a resource for development, it needs to be first documented, then protected, maintained, and finally utilized according to specific heritage guidelines and legislations. Only then, combined with increased citizens' awareness and participation, will policy efforts and interventions become sustainable—environmentally, socially, and culturally (Singh 2011a, p. 251).

It is notable that the initiative by local NGOs, experts, and eminent citizens of the city to propose the nomination of the old city center of Varanasi for inclusion in the UNESCO World Heritage List has activated a sensitive and positive response in the city administration to think of the preservation of our cultural heritage. A mass movement of awakening (*chetna march*) is required for reverential development. But this should not turn into fundamentalism, nor should it cause any impacts on secular life.

That heritage may become a sustainable resource for development, it is essential that (1) heritage be protected and maintained; (2) heritage protection be continuously monitored, assessed, and strategies be changed according to appropriateness, priority, and in the need of the time; (3) the impact of heritage protection should be constantly evaluated and improved; (4) heritage protection activities should be supported by the residents and stakeholders; (5) city development plans should follow a specific heritage guidelines support system and the by-laws; (6) heritage should be promoted to bring sustainable economic benefits to the local population; and (7) information and cultural programs on heritage issues should be disseminated for building awareness among the citizens.

In our temporal frame we have to give respect to the past, search for solutions in the present, and make directions for the future. This attitude should apply to the issue of urban sprawl beyond the corporation boundary and interlinks with the surrounding areas (peri-urban), which were not considered in preparing the CDP or DPR. Remember, an action is right when it tends to preserve the integrity, stability, and beauty of the site as a living organism. That this heritage may become a resource for development, it needs to be first documented, then protected, maintained, and finally utilized according to specific heritage guidelines and legislations. Only then, combined with an increased stakeholder awareness and participation, will policy efforts and interventions become sustainable—environmentally, socially, and culturally. We may separate ourselves from the web of our heritage in the pursuit of modernity and secularism, but it would always be at the cost of our hearts and souls.

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Chapter 22

Socioeconomic Characteristics of Calcutta Slums: An Analysis of Intervention Policies

Animesh Halder, Ashok K. Dutt, and Qing Shi

Abstract Slums in the major cities of developing countries are primarily the result of the migration of the rural poor to urban areas. The metropolis of Calcutta (now Kolkata) has also witnessed its fair share of growth in slums during the past several decades. Through this study the authors examine the socioeconomic characteristics of slums in the Calcutta Metropolis, meaning the Calcutta Metropolitan Area (CMA). The study also considers the origin and socioeconomic basis of formation and proliferation of these slums. The problems and prospect of physical development of these slums have also been examined along with an assessment on upward mobility of slum dwellers toward a better quality of life. Thereafter, an attempt is made to make an appraisal of the process and contents of social development initiatives for alleviation of poverty over time in the CMA.

Keywords Calcutta • Kolkata • Slums • Urban poverty

22.1 Introduction

Slums are the habitats of the urban poor. In developing countries, the urban poor are mainly an overflow of rural poor into the urban area. Fundamentally, they belong to the same class as the rural poor (Dandekar and Rath 1971). Because of the large rural–urban differential in income and employment opportunities, the rural poor migrate from the hinterlands, either taking refuge in the slums or becoming pavements dwellers of the city. The inevitable result of continuous rural–urban

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migration is either redensification of the exiting slums or the proliferation of new ones (squatter settlements) on vacant public lands such as canals, rivers, and railway lines, while some of these people become pavement dwellers. The new entrants stake their claim over the existing infrastructural facilities, and thus new additional demand tends to disturb equilibrium as the supply is highly inelastic during the short term and more so because of budget constraints.

Note that the name of the city of “Calcutta” has been changed to “Kolkata,” but in this chapter we have used the old name. In this study we examine the socioeconomic characteristics of slums in the Calcutta Metropolis, meaning the Calcutta Metropolitan Area (CMA). We will examine its origin and the socioeconomic basis of formation or proliferation of these slums. The problems and prospect of physical development of these slums have also been examined along with an assessment of upward mobility of slum dwellers toward a better quality of life. Thereafter, an attempt is made at an appraisal of the process and contents of social development initiatives for alleviation of poverty over time in the CMA.

The CMA is an area delineated by a West Bengal Government statute composed of municipal, non-municipal urban (NMU), and rural areas covering an area of about 1,381 km² including 56 km² of the Hooghly River Component, as per delineation made under the West Bengal Town and Country (Planning & Development) Act, 1979, which came into operation on and from 16 January 1982. Nearly 66 km² of rural areas had been added to the CMA by a government notification in 2003. Thus, the geographic coverage of the CMA increased from 1,381 to 1,447 km². In this study our concern is with the slum dwellers who are considered the urban poor. As such, we undertake a study of the poverty profile of the urban component of CMA only, which constitutes the study area. It comprises three Municipal Corporations, namely, (1) Calcutta Municipal Corporation, (2) Howrah Municipal Corporation, and (3) Chandannagore Municipal Corporation and 38 other Municipalities (Fig. 22.1).

This study consists of five parts. The first part is an introduction. The second concerns the definition of the ‘Slums,’ its geographic location, and the size of the target group (slum dwellers) relative to the total urban populations of Calcutta Metropolis. In this section we overview the origin and growth of slums and the socioeconomic profile of slum dwellers, including the magnitude of poverty and vulnerability of this section of the urban population in CMA. The third section examines the nature, type, and locational characteristics of these settlements and the socioeconomic basis of the proliferation of these slums. The migration pattern and prospect of upward mobility of this section of the urban populations is also examined in this part. The fourth section examines the nature and type of public intervention, which was initiated for alleviation of poverty at different points of time. We examine critically the development proposals adopted over time for strength and weaknesses. The fifth section is an appraisal of the social development initiative of the government over time that examines the lessons learned and provides feedback to make future development proposals more acceptable to target groups, followed by some concluding observations.

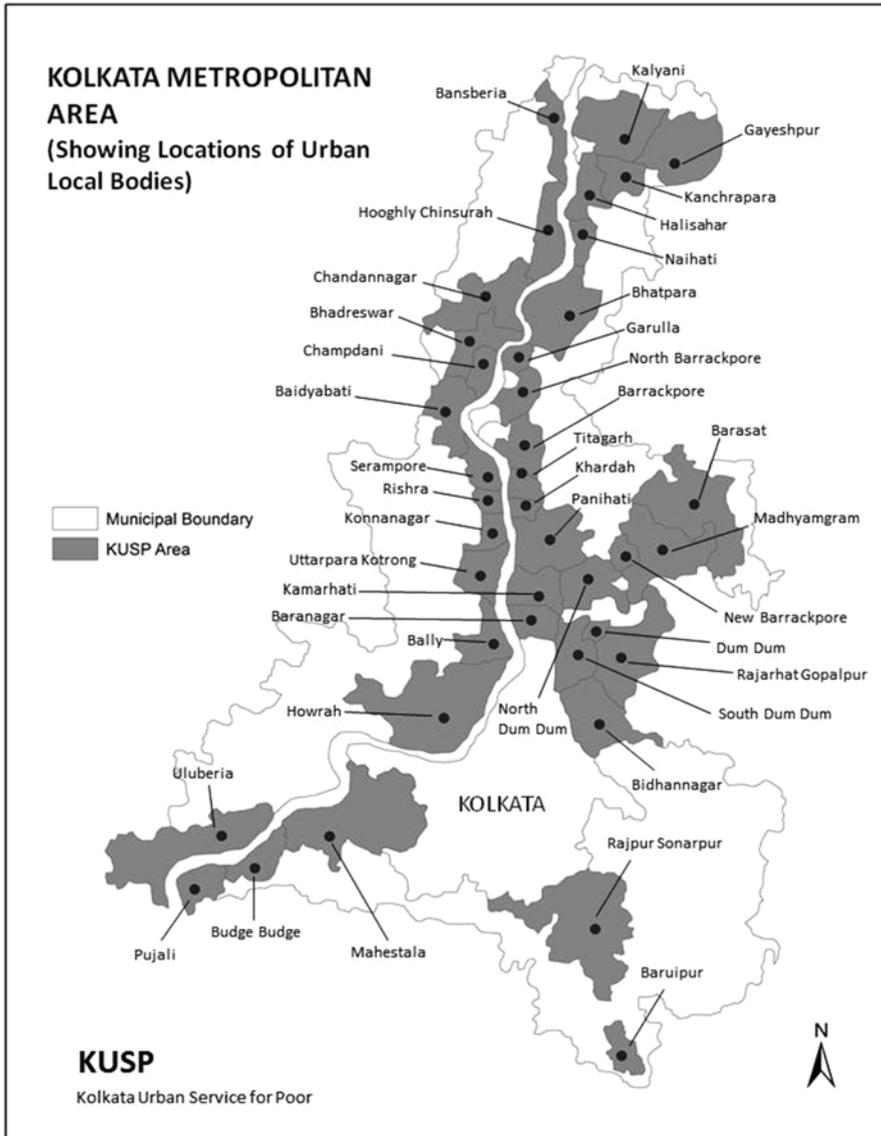


Fig. 22.1 Kolkata (Calcutta) metropolitan area (showing location of urban local bodies, ULBs)

22.2 Understanding Slums

22.2.1 *Physical Characteristics of Calcutta Slums and Slum Dwellers*

22.2.1.1 What Is a Slum?

Slum has been understood differently by various institutions. According to the Slum Area (Improvement and Clearance) Act, 1956, enacted by the Government of India, slums have been defined as those areas where buildings are in any respect unfit for human habitation. Physically, slums consist of clusters of hutments comprising several rooms constructed with temporary building materials, wherein each room is inhabited by a family sharing a common latrine, without arrangement for water supply, drains, disposal of solid waste, and garbage within the slum boundaries. Apart from degrading environmental conditions, slums in Calcutta are also characterized by an almost total absence of community and recreational facilities, hindering the mental development of the young. It is worth mentioning that in Calcutta some of these slums have another nomenclature, *Bustee*. In the Calcutta Municipal Act, 1899, a *bustee* is defined as an area containing land occupied by or for the purpose of any collection of huts standing on a plot of land not less than 10 *cottahs* (i.e., one sixth of an acre) in area and bearing one number in the Assessment Book. The definition of '*Bustee*' has undergone changes over time, although marginally. According to section 5(10) of Calcutta Municipal Act 1951, *bustee* means an area containing land occupied by or for the purpose of any collection of huts standing on a plot of land not less than 10 *cottahs* in area. Again, section 2(8) of The Calcutta Municipal Corporation Act 1980 (the Act came into effect on and from 16 January 1984) states that "*bustee* means an area containing land not less than 700 m² in area occupied by or for the purposes of any collection of huts or other structures used or intended to be used for human habitation." Some of the *bustees* are recognized by the Calcutta Municipal Corporation (CMC) while others are not. Thus, all *bustees* are slums but all slums are not *bustees*. In view of this slum–*bustee* differentiation, the slum dwellers may be typified into two groups: (1) *bustee* dwellers and (2) squatters. The squatters are, in fact, living in unauthorized settlements on public land without any basic amenities.

The Census 2001 defines all areas formally or not formally notified by the State/Local Government, under any Act, or compact areas of at least 300 people or about 60 to 70 households of poorly built congested tenements, in unhygienic environments usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities, as slums. Under the definition of the National Sample Survey Organisation (NSSO), Government of India, the size of the temporary dwelling (housing structures) has been decreased to 25 dwellings albeit it has retained the attributes of "practically no access to or inadequate access to latrines and water

facilities” (NSSO 2003). Further elaborations in the Draft National Slum Policy (DNSP) incorporate all under-serviced settlements, be they unauthorized occupation of land, congested inner-city built-up areas, fringe area unauthorized developments, villages within urban areas and in the periphery, irrespective of tenure or ownership or land use shall be covered under the definition of a slum/informal settlement. Besides physical space, DNSP suggests use of economic and social parameters (including health indicators) to define slums. The most recent definition of slum adopted by the Kolkata Environment Improvement Project (KEIP) states, ‘Nagar Pally (slum) means a compact area of at least 35–40 households of poorly built congested tenements, mostly of temporary nature, crowded together usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities on a parcel of land not less than 700 m².’

22.2.1.2 Origin and Growth of Slums

Calcutta has grown into a large metropolis since the days of Job Charnak during the past 300 years. It is said that the city of Calcutta was formally established by this English merchant in August 1690 on the banks of the River Hooghly, primarily to promote the trade and business interests of the East India Company (Chaudhuri 1995a). The river acted as the main artery of transport and communication. Later, railway lines running almost parallel to the river and two major highways, the Barrackpore Trunk Road on the east bank and the Grand Trunk Road on the West Bank, running from south to north, were constructed, resulting in almost linear growth of the city. Railways first established in 1852 became the main communication network with the hinterland. All these led to the growth of engineering, jute, and manufacturing industries in and around Calcutta.

Industrial growth and rapid urbanization led to the migration of cheap labor from the hinterland. These people found cheaper accommodation, mostly in huts made up of mud and bamboo constructed by middlemen, popularly known as *thikka* tenants on land leased out to them by landlords. The gradual densification in those huts without basic infrastructural facilities eventually led to the growth of slums in certain parts of the city. Apart from migration of a cheap labor force, two other factors contributed to the growth of slums in this city. The partition of Bengal in 1947 and the Bangladesh Liberation movement in 1971 resulted in large-scale migration of refugees from the erstwhile East Pakistan (now Bangladesh) to Calcutta, and driven by economic compulsions, a large number of refugees took shelter in slums. Second, the relatively better prospect of income and employment opportunities in the city encouraged a large number of people from the rural hinterland of West Bengal to come to this city in search of employment. This movement led to added pressures on existing settlements and helped new slums to emerge on vacant land, usually in low-lying areas (Chaudhuri 1995b).

22.2.1.3 Socioeconomic Profile of Slum Dwellers in Calcutta

In this part of the analysis, we rely on data generated through a field survey conducted by the Calcutta Metropolitan Development Authority (CMDA) for two studies (CMDA 1991).

The urban poor constitutes more than one third of the total population of the Calcutta Metropolitan Area (CMA). The largest subgroup is slum dwellers, who were estimated at 3.03 million, according to the 1981 census, of CMA's total population of 8.33 million. According to an estimate made by the Town and Country Planning Organization, Government of India, the slum population of Calcutta crossed the 4.38 million mark in 1990 as against the total population of 12.53 million for the same area (TCPO 1985). It transpired from the CMDA study that about 4.75 million (i.e., 35 % of the total population) are living in a slum environment in CMA of the estimated total population of 13.5 million in 1997 (Chatterjee et al. 1999). These data means that the ratio of the slum population in particular and the urban poor in general to the total population of Calcutta continues to remain the same. It may be noted that to decide whether the living environment of the respondent household was slum or non-slum, the CMDA study (1999) adopted the objective criteria set out in The Slum Area (Improvement and Clearance) Act, 1956, enacted by the Government of India. However, the study revealed further that the percentage of households (or population) living in slum areas was relatively high for Calcutta Municipal Corporation (CMC) and Howrah Municipal Corporation (HMC), around 42 to 46 %, but lower, between 26 and 32 %, for Other Municipal Urban (OMU), Non-Municipal Urban (NMU), and rural sectors of CMA (Fig. 22.2). We may, however, note that within the broad category of OMU, Titagarh Municipality, a factory-based industrial settlement with 96 % of its population living in slums, was by far the worst town insofar as living environment is concerned. Similarly, other towns much worse than average were Bhatpara (60 %), Champdani (58 %), Bansberia (57 %), and Budge Budge (52 %). Note further that for the purpose of the said study the CMA was divided into five geographic domains—CMC, HMC, OMU, NMU, and Rural—and that data were presented for each domain separately. The present communication on urban poverty in the Calcutta Metropolis has relevance with first three domains as these constitute the major urban area of CMA.

The CMDA survey revealed that about 41 % of households in Calcutta slums have been living there for more than a generation, and that 14 % have come from different districts of West Bengal. Refugees migrated from Bangladesh (erstwhile East Pakistan) accounted for 17 % of the respondent families, and some Nepalese families are also living in slums, whose share constitutes less than a percentage point (CMDA 1991). The remaining 27 % migrated from adjoining states of West Bengal and more particularly from the Hindi-speaking belt of Bihar, Jharkhand, Uttar Pradesh, and Madhya Pradesh. The distribution pattern is shown in Fig. 22.3.

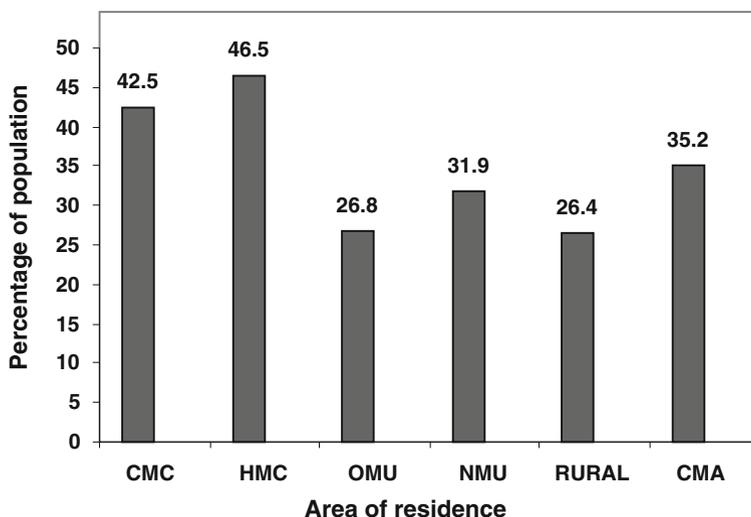


Fig. 22.2 Percentage of population living in slum environment. *CMC* Calcutta Municipal Corporation, *HMC* Howrah Municipal Corporation, *OMU* other municipal urban area in CMA taken together except CMC and HMC (From Chatterjee et al. 1999)

22.3 Locational Characteristics

22.3.1 Settlement Pattern of the Urban Poor

Where do these urban poor live? In other words, where could they be geographically located? The slum dwellers are found scattered over municipalities within the Calcutta Metropolitan Area (CMA). The distribution pattern of urban population vis-à-vis slum population is shown in Fig. 22.4. The share of Calcutta Municipal Corporation (CMC) is found to be as high as 62 %. The concentration can, perhaps, be explained by the concentration of economic activities in and around the metro core. In respect of other municipal areas, the concentration pattern tends to show that the higher the degree of industrial activities of long standing, the greater the number of slum dwellers over the area, and slums grew up in proximity to their working places as a logical necessity (Halder 1996). Moreover, it is found that the slum dwellers of Calcutta are mostly spatially immobile, because of the cycle of poverty (Dutt et al. 1997) that prevails in these slums. They earn extremely meager money because their low level of education and lack of technical training gets them only low-paying jobs, mainly in the informal sector. Rent, food, and clothing expenses consume most of their income, leaving very little expendable money. They simply cannot afford the cost of better housing but

Place of origin of Slum Dwellers

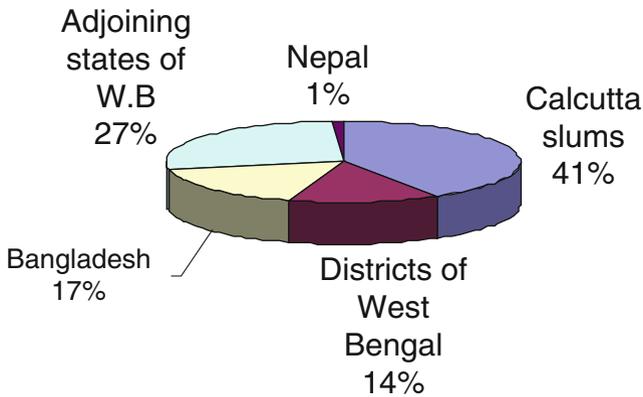


Fig. 22.3 Place of origin of slum dwellers

continue to live in slums as downtrodden residents of this city. As they become a part of the city, they and their children repeat the cycle of their stay in the Calcutta slum for generations.

The squatter settlements are growing along the canal banks and by the side of the railway lines over public lands. They are scattered all over the urban parts of CMA but their concentration has been found to be around the metro core. All these settlements are unauthorized, but some of them have been living there for decades. Economic considerations such as proximity to economic activity centers where a person can sell his labor are undoubtedly the key consideration of where they live. But conflict takes place, because the high price of legal housing and the land market make it impossible for the poor to have accommodation close to their place of work, which thereby forces them to live in unauthorized settlements on otherwise unutilized public land. This conflict led to high concentrations along Tolly's Nullah; on the banks of the canal extending from Bagbazar to Palmer Bazar; Panchanan gram canal; and Bagjola canal. Moreover, the slum dwellers also took shelter along the railway tracks from Sealdah to Dhakuria, Ballygunge to Majherhat in the south section, Sealdah to Dum Dum in the main section, and along the major length of the Circular Railway tracks (Halder 1998). Of late some of them have been evicted from their settlements, and they are now being resettled under the Kolkata Environment Improvement Project.

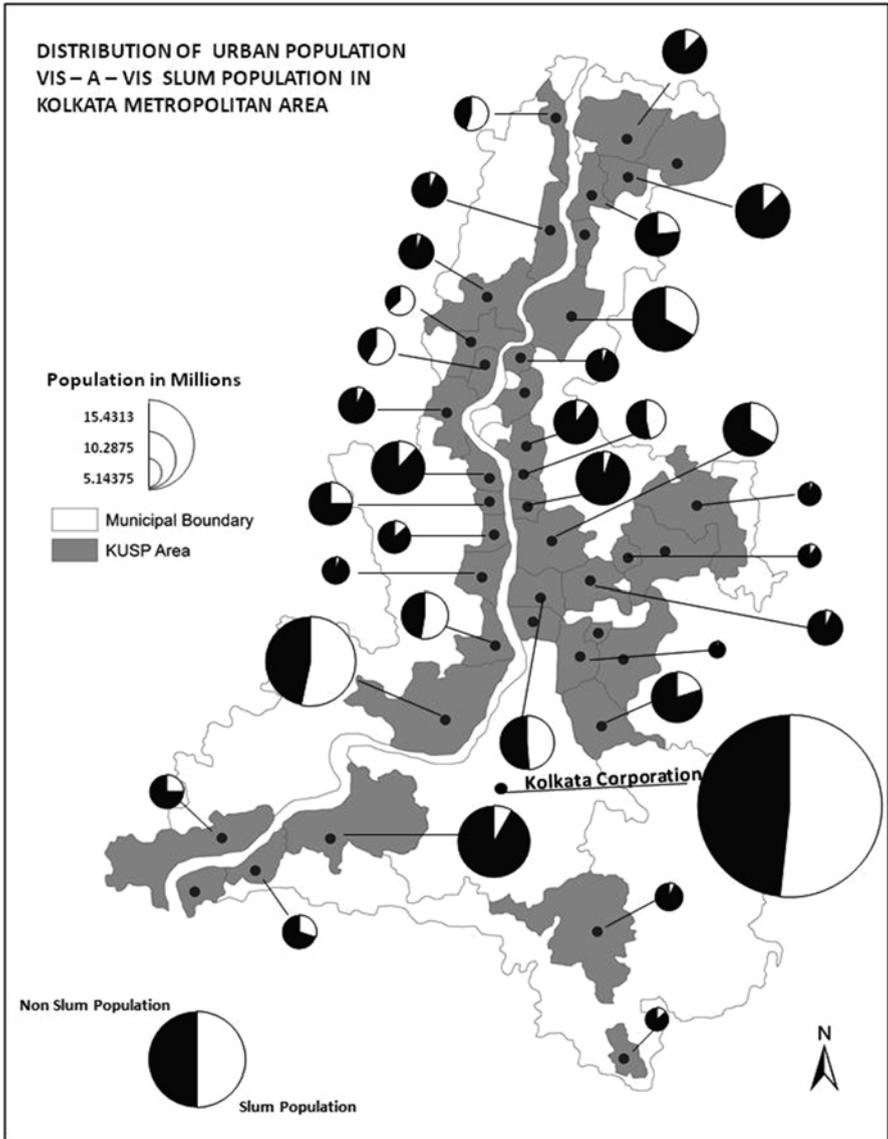


Fig. 22.4 Distribution of urban population vis-à-vis slum population in Kolkata metropolitan area

22.3.2 *Native Place Linkages*

While analyzing data on settlement pattern of slums, a visible trend of concentration was observed, based on either mother tongue or religion or place of origin or kinship ties. These connections were found to be the binding forces that help the formation of communities in different slum clusters. Eventually, a slum has grown in such a way that it can easily be identified as a predominant group of one community or other, such as Bengali speaking, Hindi speaking, Urdu speaking, etc. In this process of class formation, migration reinforces natural population growth. Persons migrating into this city are generally being helped by a relative or community member of the same native place who are already settled in the city. Generally at the time of leaving their place of origin the prospective migrants have had some a priori idea as to where they are going to settle down in the city, which is, in most cases, the respective locality of their kinsmen. An enquiry into the rural–urban linkages of the slum dwellers is likely to indicate the future population pressure in Calcutta slums resulting from migration could lead to re-densification of the area. Hence, a priori knowledge of the future flow of migration could be of great help in evolving a long-term development strategy for slum improvement. Chakraborty and Halder (1991) in their study examined the extent to which the slum dwellers maintain links with their respective native places and its impact on the future migration pattern in the city of Calcutta. The slum dwellers are either present-generation migrant families or have been living in Calcutta slums for more than one generation. The present-generation migrants again may be grouped into two categories, those who left their native places permanently and set up permanent homes in Calcutta and those who have not severed the relationship with their place of origin and are maintaining close contacts. For the purpose under reference, only the present-generation migrants have been taken as a reference population. The study revealed that about 40 % of the sample households had been living in Calcutta slums for more than one generation whereas the other 60 % of the households were present-generation migrants.

To examine native place linkages, “remittances” and “visits to native places” had been chosen as explanatory variables. The households who still maintain contacts with their native places, either through transferring parts of their incomes to their native places or by visiting native places or both, constitute the target group for the present analysis. The findings of the study are as follows. (1) About 60 % of households in Calcutta slums are present-generation migrants and hence their linkages with native places are of considerable significance so far as future migration is concerned. (2) In overall terms, 25 % of migrant households are making monetary remittances to their native places on a regular basis. In Hindi-speaking slums, the proportion of sender households to migrant households varies from 26 to 50 %. In the Bengali/Urdu-speaking areas, the corresponding share is below the overall average and in some cases it is as low as 8 %. In other words, native place linkages are much higher for Hindi-speaking households (originating from the adjoining states of West Bengal, such as Bihar, Jharkhand, and Uttar Pradesh) than Bengali-speaking

or Urdu-speaking households. (3) About one fourth of migrant households are found to be visiting their respective native places; the proportion of visiting households to migrant households in respect of the Bengali-speaking group is considerably less than that of other linguistic groups. (4) A good number of migrant households in Calcutta slums are in close contact with their respective native places, either by sending money or by paying visits or both. Thus, the rural–urban linkages are maintained by adoption of either of the two aforesaid modes of contact or both. Hence, it can be logically argued that these linkages are stronger when the households adopt both modes for maintaining contacts with their rural homes. The survey data indicate that the proportion of households who adopt both modes account for three distinct categories of households (one group sending money only, the other paying visits to native places, and the third group sending money as well as paying visits): all together, 35.80 % of slum households are found to be maintaining regular contacts with their native places. Ranking the sample slums according to two modes of linkages (i.e., incidence of remittance and visit), the Spearman's rank correlation has been calculated as 0.727, indicating a reasonably high degree of agreement between the two series of ranks: this means that both modes of rural–urban linkage are equally effective and that the clusters that exhibit a high incidence of remittances also show a high incidence of visits to native places and vice versa. Such high native place linkages are likely to act as a catalytic agent for future in-migration into the metropolis.

22.3.3 Family Characteristics

Among the people living in Calcutta slums, we found diverse social and cultural patterns. Although some social rigidities, such as religion and the caste system, are very much prevalent, these are less pronounced as compared to rural life because of the impersonal urban environment.

22.3.4 Household Types

Slum dwellers are found to be socially organized into four types of living units: single-member family, nuclear family, joint family, and mess (some unrelated persons living together in the same house and sharing meals). The 'nuclear families,' consisting of husband, wife, and minor children, are the most popular family institution among slum dwellers. The percentage share of this group, as a whole, had been found to be 54 %, followed by 'joint family' at 33 %. The joint family concept appears to be on the wane, presumably the result of economic reasons, weak family size preferences, a self-centered style of living, and desire for achieving a higher standard of living.

22.3.5 Household Size

The arithmetic mean of the family size of the sample households in the 1990s study has been determined to be 5.05 persons, with an estimated median value of 4.31. The compiled data would suggest that the median value of family size differs significantly among different linguistic groups: Bengali-speaking, 4.15; Hindi-speaking, 3.47; Urdu-speaking, 6.27; and others, 3.13 (Chatterjee et al. 1999).

The following inferences can be drawn from the aforesaid analysis. First, in contrast to the prevalent theory suggesting that poor families are large-size families, the average size of households in the Calcutta slums is found to be moderate, which can perhaps be explained by (a) the prevalence of nuclear families among urban poor; (b) the completely monetized urban economy, discouraging higher family size; (c) that some of the relatively better off households that originated from the rural hinterland of this city are in close contact with their native places, where part of their families live (implying that the dwelling units in Calcutta slums may be considered as the second home) and the size of these households in the slum is maintained as economically manageable units; (d) that the majority of households with a mother tongue other than Bengali living in the Calcutta slums generally migrated from the adjoining states in search of jobs, leaving behind some members of their families in their permanent homes at their places of origin; consequently, the households in the Calcutta slum, being part of the total size, appear to be small; and (e) that the slum dwellers have greater access to family welfare practices compared to the rural poor and the greater exposure of slum dwellers to extension activities under the Mother and Child Health Program.

22.3.6 Occupational Pattern and Income

The vast majority of urban poor earn their livelihood through physical labor, although income levels differ across and within occupational categories.

22.3.7 Slum Dwellers

For slum dwellers, the occupations of 37 % are found to be service related whereas sales-related occupations constitutes about 23 %. The percentage share of 'Profession' and 'Production' groups is comparable. In the marginal sector, the major occupation group is 'casual labor,' which constitutes 23 % of the total households.

22.3.8 *Income Level*

Among each of the occupational categories of slum dwellers, wide variation in income level is observed. For instance, the average monthly income in the clerical group is highest, being Rs. 1,222,¹ whereas the corresponding figure for casual workers is only Rs. 643.

22.3.9 *Absolute Poverty in CMA*

The most common approach to measurement of absolute poverty in the country has been the poverty line criterion, which is defined as the normative minimum of per capita total consumer expenditure (PCE), taken as a proxy for income. All persons with PCE below the poverty line are treated as poor in the absolute sense.

22.3.10 *Poverty Estimates Among Slum Dwellers*

Looking at the poverty estimate of slum dwellers, as a class in isolation, made by CMDA, one would notice that the poverty estimates worked out on the basis of calorie intake and expenditure were at par (Chakrabarti and Halder 1991). According to the calorie criterion about 53 % of households fell below the poverty line, while the corresponding figure, adopting the expenditure yardstick, was 52 %. The income measure, on the other hand, showed a lesser incidence of poverty whereby 42 % of households had been found to be below poverty line. Note further that the estimated Head Count Ratio (HCR) (47 %) based on income method for OMU (i.e., other municipal urban area of CMA excluding CMC area), as per CMDA's Report of 1999, appears to be in close proximity to that of slum dwellers (52–53 % below poverty line) (Chatterjee et al. 1999).

22.3.11 *Migration Characteristics and Prospect of Upward Mobility*

22.3.11.1 *Nature of Migrants*

People who live in the slums are mostly migrants from the rural hinterlands. Dutt et al. (1997) in their study examined spatial mobility as well as vertical mobility in income of the slum dwellers, taking three sample slums, namely, Paikpara,

¹ 1 \$ US=Rupee 60.17 on May 4, 2014.

Narkelbagan, and Betbagan, in Calcutta. In this study they have classified these migrants into four types.

Permanent Migrants They migrate to the city and turn into permanent city dwellers. It is they who form the stable population of the slum.

Long-Term Circular Migrants The long-term circular migrants migrate to the city during the whole or part of their life's working-age span. They stay with a stable population, and save money while working so that they can live the remaining part of their life on those savings when they return to their native villages. They are often replaced by their sons and relatives in the slum households, who continue their stay.

Seasonal Migrants They migrate to the city in specific seasons and may be called short-term circular migrants. These are landless workers or poor peasants who come to find work in the city during the lean season of agriculture (intervening time between harvesting and sowing months). The construction industries make use of such seasonal laborers.

Occasional Migrants The occasional migrants are rural inhabitants who migrate to the city following any disaster or unusual catastrophe in the village such as drought, famine, or flood. Most of them go back to the villages after mitigation of the disaster.

The migrant populations found in the study slums of Calcutta are either permanent or long-term circular migrants. Most are long-term slum dwellers. Thus, the first two categories of migrants constitute the major share of the urban poor in Calcutta. They have become permanent city dwellers and a constituent part of the stable population of the Calcutta metropolis.

It is found that slum dwellers of Calcutta are mostly spatially immobile. The reason for this lies in the cycle of poverty that prevails in these slums. These slum dwellers earn extremely meager pay because of their low education level and lack of technical training, which gets them only low-paying jobs, mainly in the informal sector. They mostly live in rented houses. Rent, food, and clothing expenses consume most of their income, leaving little expendable money. Thus, they eat low-calorie diets and very few of them send their children to the secondary school. Therefore, the question of moving to a place that is better than their one-room household accommodation does not arise. They simply cannot afford the cost of such housing. Proximity to place of work and amount of rent required are deciding factors for the choice of slum locations, and in making such selections, the native place linkage very often acts as a catalytic agent.

22.4 Public Policy Intervention

The first two categories of migrants constitute the major share of the urban poor in Calcutta. They have become permanent city dwellers and a constituent part of the stable population of the Calcutta metropolis. They constitute the target group

for poverty alleviation programs. An attempt will be made to examine the efficacy and adequateness of public policy interventions, in the form of projects undertaken by the government(s) over time, indicating the process of evolution of a development approach to address the urban poverty in this metropolis of Calcutta. Keeping in view the feasibility consideration, the Government of West Bengal and other agencies, such as the Calcutta Metropolitan Development Authority and Calcutta Municipal Corporation, took up some projects from time to time to ameliorate the sufferings of the urban poor of Calcutta, as detailed next. For improvement of the living conditions in slums and providing healthcare and recreational facilities to slum dwellers, and with a view to making efficient use of this real estate and economies on expenditures, different models were tried out at different points of time.

22.4.1 Slum Clearance Model

During the 1950s, the government adopted a bulldozing policy aimed at clearance of slums and of building new housing. Unfortunately, these new properties generally housed the middle class and the rich whereas the original poor slum dwellers were pushed to other slums or forced to form new ones. The Indian Five Year Plan (1951–1956) had clearly indicated that its housing scheme was “for slum clearance and re-housing of slum dwellers” (Planning Commission 1951).

Attempts were made to re-house the slum dwellers in single-room tenements by borrowing ideas from the developed nations. The administration constructed four-storied walk-up buildings at suitable places. In contrast to the expectations of the town planners, the slum dwellers mostly refused to move to those apartments. The main arguments advanced by slum dwellers for not shifting to the four-story buildings were that these buildings were situated far away from their place of work. Ultimately, this model had to be abandoned (Halder 1998).

22.4.2 Slum Redevelopment Model

To obviate the difficulties of the Slum Clearance Model, urban experts and town planners came up with the model of “Slum Redevelopment.” The slum redevelopment model envisaged that the slum dwellers would be provided with accommodation in single-story small tenements in walk-ups constructed at the same site. By increasing the density of occupation, it should be possible to obtain some free land for subsequent sale at market price to meet part of the cost of construction of the tenements. This time the slum dwellers did not object to moving to the new tenements, but they vehemently opposed the idea of paying additional rent toward maintenance of these tenements. The cost-effectiveness of this model was seriously impaired and as such it was rejected (Halder 1998).

22.4.3 *Slum Improvement Model (Sanitization Model)*

Learning from the failure in implementation of the “Slum Clearance” and “Slum Redevelopment” models, it was ultimately decided to shift to limited slum improvements. This idea was effectively a “Sanitization Model,” aimed at providing basic infrastructure facilities to slum dwellers without attempting to provide conventional housing to the target group. Operation of this development model started in the late 1960s. The Calcutta Metropolitan Development Authority, which was set up in 1971, started functioning with the Slum Improvement Project in the name and style of the Bustee Improvement Program (BIP) as one of the major assignments. It was an International Development Agency-assisted project (Calcutta Urban Development Program I), and initially the work of improvement was confined to development of physical infrastructures in slum areas. The ingredients of the action program included conversion of service latrines, providing potable water supply connections, surface drainage facilities, construction of paved roads and pathways, arranging street lighting, and providing garbage vats and dustbins in adequate numbers in slum areas. BIP recognized slums a part of the city housing stock occupied by people who had been priced out of all conventional forms of housing. This development model did not involve interference with the rights and interests of the landowners and “*Thika Tenants*” and physical shifting of slum dwellers further from the place of their employment. The fact that this model of development was comparatively less expensive and improvements in living conditions could be done in stages were considered to be its strengths. However, BIP had covered about 2 million slum dwellers at a cost of about Rs. 515 million (Halder 1998).

During the implementation of this program, it was thought that creation of better infrastructural facility without providing for basic healthcare services would fail to make any tangible impact on the health standards of the target group. To meet the deficiencies, a comprehensive healthcare program—India Population Project VIII—was instituted to provide primary health services, covering maternity, child health, immunization, and a family welfare program. This program was included in CMDA’s Slum Improvement Project package in late 1978–1979 under Calcutta Development Program II. Similarly, a program for generating income and employment opportunities in the slum areas was added to the action package under the Small Scale Enterprise Program (SSEP) from 1978 to 1979, and a number of primary schools were also set up in slum areas under CMDA’s ‘Primary School Program’ (Halder 1998).

Regarding the infrastructure facilities to be created in slums, it transpired that providing water connections and sanitary latrines to slum dwellers without enlargement of the city infrastructures around slum locations would be exercises in futility. In some of the areas, sufficient water was not flowing in main water pipes to make water available to each of the slums. The underground sewer systems in the city in many places did not have the capacity to receive all the sewerage coming from slums. It, therefore, became necessary to integrate the infrastructures created in slums to those in the city proper after necessary augmentations. It was also felt that appropriate legal provisions should be made so that the actual inhabitants in the

slums were not evicted by the *thika* tenants after creation of these facilities by taking advantage of increased market values of the tenements. This concern led to enactment of The West Bengal *Thika* Tenancy (Acquisition and Regulation) Act in 1981, providing legal protection to slum dwellers against eviction (Halder 1998).

It was experienced that maintenance of assets created in slums would pose difficulties if actual occupiers and the municipal authorities did not take interests in proper upkeep of these assets. To obviate difficulties in mobilizing sufficient resources for maintenance of assets, a separate account, the “*Bustee* Service Account,” had been set up in the Calcutta Municipal Corporation Act 1980 for proper maintenance of assets. Moreover, it was decided to keep the slum dwellers and people’s representatives fully involved in selection of slums and implementation of programs from the very outset so that they took an interest in maintenance of the assets.

22.4.4 Integrated Development Approach

The said piecemeal approach made over time for slum development under the “Sanitization Model” could not achieve the desired objective. To that end, an Integrated Slum Improvement Program, namely, the Calcutta Slum Improvement Program (CSIP), containing a package of physical infrastructural facilities, health-care facilities, and community development components, was taken up by CMDA. The project was funded by the Department for International Development (DFID), Government of the United Kingdom. Experiments of this integrated development model had been proved to be working well in some other Indian cities, namely, Visakhapatnam, Vijayawada, Hyderabad, and Indore.

The CSIP (more precisely known as CSIP-1A and CSIP-1B) was implemented with the Kolkata Metropolitan Development Authority (KMDA) as the implementing agency, during the period 1991–1992 to 1997–1998 in 15 wards of the Calcutta Municipal Corporation, covering about 0.3 million urban poor residing in 185 slums or low income neighborhoods. The total expenditure incurred for the project (1A and 1B taken together) worked out to be Rs. 463 million. The third phase of the project (1C) covered the slum population of about 35,000 in selected wards of Titagarh and Barrackpore Municipalities with a cost of about Rs. 121 million. Working through a participatory process, the CSIPs focused on improving infrastructure and people’s health. The major interventions were environmental physical infrastructural inputs, primary healthcare inputs, and community development inputs, and all these factors were supported by training inputs. Although CSIPs benefited a large number of poor people, little linkage was built up with the local governments, and operations and maintenance of community assets remained a major concern. To meet the deficiency, a follow-on project, CSIP 1C, was taken up from April 1998 in two municipalities, namely, Barrackpore and Titagarh, covering about 35,000 urban poor. In contrast to its predecessors, this plan attempted to bring the municipalities (Titagarh and

Barackpore) and the slum communities together in a participatory planning framework. Despite all those efforts, the participatory development approach could not be effectively implemented for various reasons and more particularly because of narrow political interest. Under the circumstances, it would be desirable to identify an alternative means to achieve effective community participation in program implementation. One such alternative could be to invite nongovernmental organizations (NGOs) to act as copartners of the corporate sector in slum improvement (Halder 1996).

22.4.5 Kolkata Urban Services for the Poor (KUSP)

To work toward the goal of improved quality of life, opportunities for urban poor to have access to basic services, and elimination of poverty in the Kolkata Metropolitan Area (KMA), the Government of West Bengal launched this project, The Kolkata Urban Services for the Poor (KUSP), with the financial assistance of DFID.

It is, in fact, a follow-up of CSIP. The CSIP was primarily confined to the Calcutta Municipal Corporation area whereas the KUSP was intended for the 40 urban local bodies (ULB) in the Calcutta Metropolitan Area other than the CMC area. (Note that erstwhile Calcutta is now known as Kolkata.) The operational area of KUSP is shown in Fig. 22.4.

The project had a wider vision. It seeks to improve urban planning and governance, and access to basic civic services for the poor, and to promote economic growth in the Kolkata Metropolitan Area through active participation of the target groups. It is an integrated approach for development of physical infrastructure facilities and social development with a focus toward improved access of created facilities to urban poor. The means to achieve the desired end is to ensure and institutionalize the participation of target population, more particularly the vulnerable groups—women, Scheduled Caste/Scheduled Tribes, slum dwellers, squatters, pavement dwellers—all along the process of development, starting from project planning to implementation. People's participation can be ensured by setting up and institutionalizing Neighborhood Committee(s) for each of the project areas in the concerned municipalities and making them a part of the project management team. Through this venture of democratic decentralization in urban areas, a hitherto neglected section of the urban population can be brought within the list of beneficiaries of basic urban services. Moreover, involvement of local NGOs could act as a catalytic agent for the proposed development. Beside the equitable distribution of services under the project, the aspect of self-sufficiency is to be ensured through capacity building and improved financial management of Urban Local Bodies (ULBs) so that after completion of the project period, the concerned municipalities are capable of taking over the project.

The central theme to KUSP is the preparation of Comprehensive Development Plans by each of the 40 municipalities within the Kolkata Metropolitan Area. The said development plans would incorporate, among others, an Integrated Action Plan for

Social Development including an Anti-poverty Program and Local Economic Development Plan. Under the KUSP program, the democratic decentralization process could be strengthened to make municipal administration more efficient, dynamic, and accountable. Measures would be taken to ensure representation of vulnerable groups in ward committees and its effective functioning to achieve good governance. In fact, it would facilitate people's initiative to achieve meaningful, balanced, environmentally friendly, and sustainable development in each of the 40 municipalities.

The project was designed to establish an inclusive and participative planning framework in the KMA municipalities. The project has benefited nearly 2.4 million poor people in the KMA outside the KMC area. Another novelty of the project was its operational mechanism, which is different from conventional bureaucratic control. The project was administered through an independent unit, namely, a Change Management Unit (CMU), under overall control of Municipal Affairs Department, Government of West Bengal.

It is worth mentioning that DFID funded both CSIP and KUSP. The basic difference between the two projects is that the former is project oriented, which is designed to extend direct benefits to the urban poor to improve their quality of life, while the latter is program oriented, in that built-in mechanisms will be developed in the ULBs, the local self-governments of municipal areas, for capacity building and improved financial management system, so that they can take up an Integrated Action Plan for social development including the anti-poverty program with active participation of the target group.

22.4.6 Kolkata Environment Improvement Project (KEIP)

KEIP is an on-going project. It is a multi-agency endeavor to arrest environmental degradation and improve the quality of life in Kolkata. The key objective of KEIP is to improve the quality of life of the people, especially the poor, measured in terms of (1) availability of basic social infrastructure, (2) moving toward a change in behavior pattern of the people, and (3) causing a rise in real income of the people, especially the poor. KEIP is being co-financed by the Asian Development Bank (ADB), Department of International Development (DFID), Government of West Bengal, and Kolkata Municipal Corporation (KMC). Key components of KEIP include the following.

Sewerage and Drainage These needs account for 74 % of the project cost, amounting to Rs. 7,350 million, wherein work is being carried out in seven boroughs (47 wards of 141) of KMC, covering a population of nearly 1.5 million people.

Canal Rehabilitation Works This aspect accounts for nearly 11 % of the project cost (Rs. 105 crores) and focuses on resettlement and rehabilitation (R&R) of identified canal bank dwellers in four phases. The total number of affected families is about 3,000.

Slum Improvement This component aims at improving the conditions in 100 slums in Kolkata (1 slum in each of the 1–100 numbered wards of KMC) with an allocated budget of Rs. 72 crores, accounting for nearly 8 % of the project cost.

Solid Waste Management (SWM) SWM forms a very small part of the project and accounts for approximately 7 % of the project cost. This project primarily consists of development of a sanitary landfill site for Kolkata.

22.4.7 The Swarna Jayanti Rozgar Yojana (SJSRY)

Differing from CSIP and KUSP, the Swarna Jayanti Rozgar Yojana is an employment generation scheme of the Government of India. The Yojana started in December 1997 throughout the country. It seeks to provide employment to the unemployed or under-employed urban poor, relying on community structures such as Neighborhood Group (NHG), Neighborhood Committee (NHC), and Community Development Society (CDS). The program was implemented through urban local bodies and the afore-mentioned community structures. There are two specific schemes, namely, the Urban Self Employment Program (USEP) and the Urban Wage Employment Program (UWEP).

22.4.8 Jawaharlal Nehru National Urban Renewal Mission

The latest intervention to improve the quality of life of urban poor was made by the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), which came into operation from December 2005. This national program is the single largest initiative of the Government of India for planned development of selected Indian cities. The objective is to improve urban infrastructure and provide urban services for the poor, while governance reform constitutes the third element of the Mission. In essence, the ‘Basic Services for the Urban Poor’ (BUSP) constitutes one of the major sub-missions of this Mission. The Calcutta Metropolis (i.e., the instant study area) and the Asansol Durgapur Planning Area are the selected cities of West Bengal for implementation of this project.

22.5 Conclusion

These are some of the public policy interventions so far made to improve the quality of life of slum residents of the Calcutta metropolis. Looking back, one could notice that during the 1950s the Slum Clearance model was adopted, followed by the Slum Redevelopment Model, and that these created resentment and agitation among slum dwellers as both models were repressive in nature. Thereafter, from the early 1970s

more humane approaches were adopted by the government, when the Slum Improvement Model (Sanitization Model) came into operation. Under the Bustee Improvement Program of Calcutta Metropolitan Development Authority (CMDA), physical infrastructures were provided in slum areas, covering about 2 million slum dwellers in Calcutta. The ingredients of the action program included conversion of service latrines, providing potable water supply connections and surface drainage facilities, construction of paved roads and pathways, street lighting, and providing garbage vats and dustbins in adequate numbers in slum areas. Notwithstanding the program brought about a substantial improvement in living environment in slums of Calcutta, yet it had two basic limitations.

First, there was no provision for maintenance of assets created under the program, and of course, no budget allocation for that purpose. As such the physical assets created in slums under this program did not survive for long, leading to rapid deterioration of the living environment. Second, the program envisaged development of physical infrastructures only with total disregard for the basic needs of healthcare facilities and community development components, such as income and employment generation, primary education, or recreational facilities. The situation called for a more comprehensive and integrated program of slum development. Consequently, The Calcutta Slum Improvement Project (CSIP) was developed by CMDA with the financial assistance of DFID of the U.K. It was an endeavor to provide a comprehensive and integrated development of selected slums in the Calcutta Municipal Corporation area so that the investments under the program could be more sensitive to the needs and aspirations of the slum dwellers and at the same time be sustainable. The project had four distinct components: (1) physical infrastructures, (2) healthcare services, (3) community development components, and (4) training and evaluation. Although CSIP benefited a large number of poor people, little linkage was built up with local government and operations, and maintenance of community assets remained a major concern. Although the project proposal envisaged participation of a target group in project planning and its implementation process, this remained on paper. The slum dwellers had to be content with feeling their participation through their political leaders. The Neighborhood Committee, being formed by the target populations of a particular locality (neighborhood), as envisaged, would be supposed to participate in project planning and implementation, and eventually they should take over the project after completion of the project period. But unfortunately political considerations took the lead, and formation of a Neighborhood Committee in the true sense of the term remained a dream.

The next social development initiative is KUSP. It is, in fact, a follow-up of CSIP with a wider vision. The CSIP was primarily confined to the Calcutta Municipal Corporation area whereas the KUSP is meant for 40 urban local bodies (ULBs) in the Calcutta Metropolitan Area other than the CMC area. Thus, CSIP and KUSP taken together would cover the urban poor (slum dwellers) of Calcutta Metropolitan Area. It is an integrated approach for development of physical infrastructure facilities and social development with a focus toward improved access of created facilities to the urban poor. The means to achieve the desired end is to ensure and

institutionalize the participation of the target population, more particularly the vulnerable groups—women, SC/ST, slum dwellers, squatters, pavement dwellers—all along the process of development, starting from project planning to implementation. Beside the equitable distribution of services under the project, the aspect of self-sufficiency is to be ensured through capacity building and improved financial management of ULBs, so that after completion of the project period, the concerned municipalities are capable of taking over the project.

The latest intervention, Jawaharlal Nehru National Urban Renewal Mission (JNNURM), is a big and positive step toward alleviation of urban poverty in Indian cities. It will make a dent on urban poverty in a big way. With introduction of this Mission, the ULBs within CMA have more opportunities and more access to funds for carrying out their projects incorporated in the Draft Development Plan (DDP) prepared under KUSP. This Mission along with other projects, and more particularly KUSP, would be likely to bring about a positive change in the quality of life of the urban poor of the Calcutta metropolis.

The forgoing analysis tends to indicate a positive and pro-people change in the process of evolution of public policy intervention over time in the Calcutta Metropolitan Area. Nevertheless, some notes of caution would likely be necessary to lead the process of development toward the right path.

(1) The participatory approach of development has not yet been effectively implemented: this is true for both the projects, namely, KUSP and KEIP. People's participation can be ensured by setting up and institutionalizing a Neighborhood Committee(s) for each of the project areas in the concerned municipalities and making them a part of a project management team. The Committee could be a Society registered under the Societies Registration Act and as such it would become a legal entity. Through this venture of democratic decentralization in urban areas, the hitherto neglected section of urban population can be brought within the list of beneficiaries of basic urban services. Moreover, involvement of local NGOs could act as a catalytic agent for the proposed development. (2) Democratic decentralization or participation of the target group would not by itself make the right types of project proposal for sustainable development of urban local bodies. The elected bodies would, of course, take the lead in deciding the projects among the alternatives, keeping in view the budget constraints and the perceived needs of the target group (urban poor), but they should be guided and the projects should be vetted by the technical experts, such as planners, engineers, and economists, to ensure techno-economic feasibility. This is one of the deficiencies in the KUSP project. (3) A noteworthy positive aspect is found in the proposal of KUSP, that is, the financial incentives for the front runners among 40 urban local bodies (municipalities) within CMA. This aspect has created an atmosphere of competitiveness among the municipalities, which led them to work in a timely and efficient way. Moreover, another positive aspect is preparation of a Draft Development Plan (DDP), which has been made the basic component of the project (KUSP) and which is a prerequisite for getting development funds. The Municipality would be required to prepare a DDP incorporating therein schemes for development, which will reduce if not eliminate ad hoc attitudes in scheme selection by the local bodies. (4) To ensure people's participa-

tion in project formulation and implementation, participatory public expenditure management (PPEM) is fast becoming the standard practice in public finance. It takes particular interest in increasing the “voice” of the poor as well as their representatives and intermediaries. It is turning out to be an effective element in good governance advocacy because it promotes a surgical approach to examining government spending and performance. Participatory public expenditure management may be described as a cyclical function of government that begins with budget formulation where citizens groups can either participate in actual allocation of public resources or formulate an alternative budget. The final stage of the cycle is performance monitoring wherein the performance of a government agency (sometimes the entire government) is measured in relationship to the amount of funds spent. This is a new, important advocacy track that needs to be examined and explored.

The high degree of rural–urban linkages tends to suggest further migration from the rural hinterlands, leading to re-densification of the area. There is no reason to expect that the migration of the rural poor to the city of Calcutta would be arrested in foreseeable future, but land will continue to remain a scarce commodity in Calcutta. The situations in different cities of South Asian countries in this regard are not very much different from Calcutta. Thus, there is need for giving more emphasis to better utilization of land in slum areas, stepping up low-cost housing activities for urban poor alongside the sites of housing projects for middle- and high-income groups, and ensuring a participatory development approach for the sustainable development of the city.

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Part VIII
Cities

Chapter 23

Spatial Structure and Urban Development in Indian Cities

P.R. Sharma, Akhilendra N. Tiwary, and G.N. Singh

Abstract If geographic space is considered as a set of interacting elements or phenomena, spatial structure must be understood as the principle of organization of the geographic entity under study. The spatial structure leads to a systematic theoretical setup as well as formulation of geographic models and development plans. This analysis aims to arrange urban public spaces judiciously, so that such factors as functional morphology, accessibility, connectivity, environmental sustainability, social equality and security, cultural creativity, and economic productivity are ensured. The spatial arrangements of both differentiations and similarities in the real world are interpreted in the spatial structures by geographers. Spatial structure in the urban setting in general and for the developing world in particular has great significance. The developing world is urbanizing every day. The existing models of spatial structure do not signify the real developing world. Therefore, it is needed to have a model of spatial structure for the development planning of this world. The present study concentrates on the urban development of Indian cities, taking as case studies Lucknow and Mirzapur City, both in Uttar Pradesh, India. The former is the capital of Uttar Pradesh State; the latter is a very ancient city having a long cultural heritage.

Keywords Developing world • Heritage city • Public–private partnership • Spatial structure • Sustainable urban development • Urban development and planning

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23.1 Introduction

Cities are currently home to nearly half the world's population, and during the next 30 years most of the increase in global population of 2 billion-plus persons is expected to occur in urban areas in the developing world (Cohen 2005). Theories concerning the spatial structure of cities in the developing world are broad generalizations that may not necessarily be applicable in individual countries. Many cities in this part of the world have a very long history, and it is very difficult to theorize their evolution and development trends based on the theories and models developed in the Western world in the past two centuries. Spatial structure and development in cities in the developing world have been affected by sociocultural, economic, political, and natural changes operating at all levels in the urban hierarchy through a long time span. Keeping these points in mind, the evolution of spatial pattern and urban development in two Indian cities has been briefly examined and is discussed in this chapter. The various processes influencing contemporary spatial patterns in the cities are analyzed. The cities of Lucknow and Mirzapur City differ in evolution, shape, and size. The former is the capital of Uttar Pradesh, the largest state of India in terms of population, whereas the latter is a very small city near Varanasi, very significant culturally and worth the status of 'Heritage City of India' along with Varanasi. The poor availability and poor quality of statistical data in this part of the country make it difficult to compare many points statistically. Lucknow, as a metropolis and capital of the state of Uttar Pradesh, is one of the largest states of the Indian Republic. The River *Gomati*, a tributary of the *Ganga* River system, presently almost bifurcates the city of Lucknow: the first part forms the core of *Nawabian* and the British evolution of the city structure, whereas the second half is the urban sprawl of the post-Independence evolution of the city structure and form. The urban land use and architecture may be seen in the perspective of these two periods in understanding the evolution and growth related to the histogenesis and morphogenesis of the Lucknow Metropolis. The present city of Lucknow has been divided into 40 wards and a cantonment with a population of 22.67 lakh persons (2001 census), covering an area of 337.50 km². Mirzapur City (25°7'15"N–25°11'15"N and 82°30'E–82°36'30"E) is situated on the southern bank of the River Ganga in Eastern Uttar Pradesh. The city has been divided into 28 wards with a population of 2.05 lakh and area of 38.85 km² (Fig. 23.1).

23.2 Objectives

With this introduction, the objectives of this study are as follows: (1) to examine how the spatial structures of Indian cities are affected by socioeconomic variations; (2) to examine how the socioeconomic variations among Indian cities are manifest in their changing internal structure, population characteristics, and social patterns; and (3) to study the changes occurring in the spatial patterns of Indian cities in general, with the analysis of the two cities representing different size categories of urban centers to evaluate spatial similarities and contrasts.

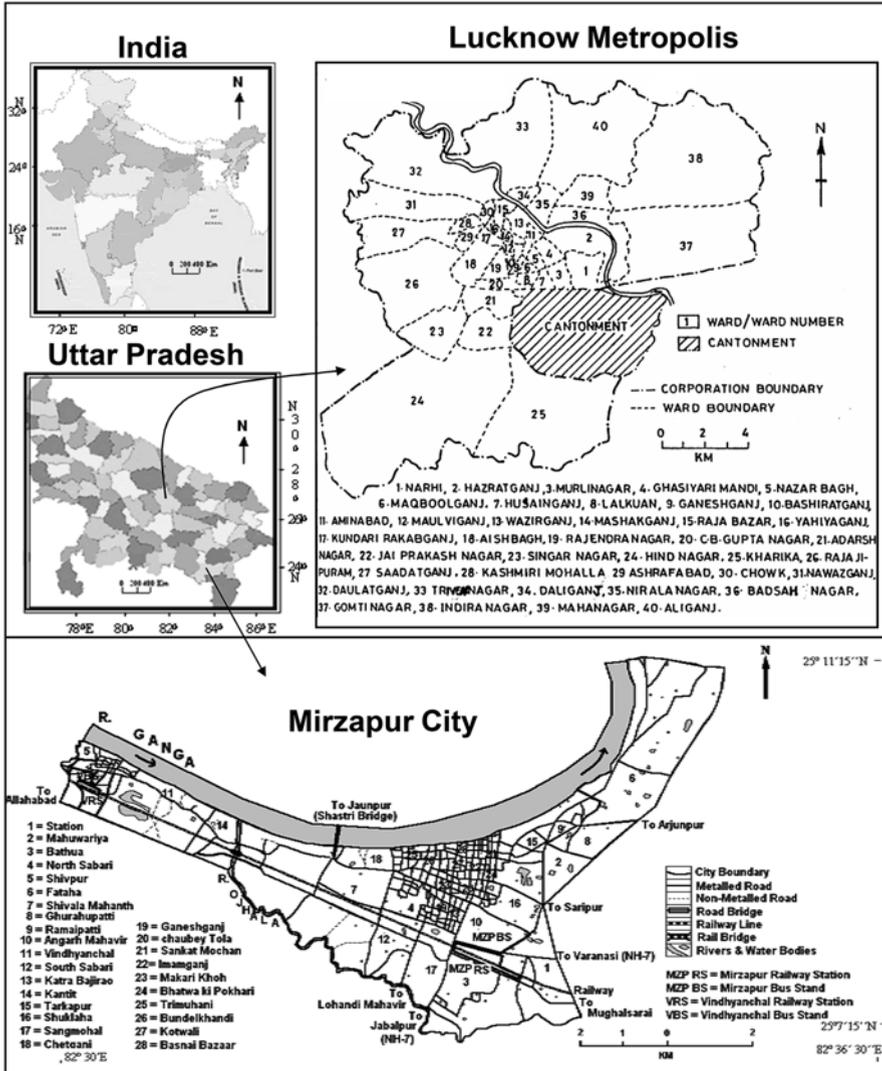


Fig. 23.1 Location of Lucknow Metropolis and Mirzapur City

23.3 Database and Methodology

This study is based on both primary and secondary data. The reconstruction of the phases of development in the two cities is based on the different available literary sources. Because reliable data are not available, the focus of the study has been mainly on the field survey that has been carried out at different periods of time during the years 2008 and 2009. The master plans of Lucknow and Mirzapur have been taken into account while comparing and studying the spatial structure and urban

development of Indian cities. The Google Earth Satellite image has been mosaiced on Adobe Photoshop 12.0 separately. The maps have been prepared by digitization of the mosaic image on MapInfo Professional 8.5 software.

23.4 Spatial Structure of Indian Cities

Indian cities have unique, very complex shapes. Ramachandran (2008) says about Indian cities that they originated as a result of the ruling classes: people who controlled and regulated the distribution of goods and services within the society as a whole. The spatial structure of Indian cities has not always been visible from the ground but it appears when analyzing data. Many cities that appear very dissimilar on the ground share the same spatial structure. Understanding the spatial organization of a city allows planners to predict the main directions of future development. Development strategies that are compatible with the current spatial structure are required at every level. However, the evolution of the current spatial structure in a manner consistent with municipal objectives is not practically possible in India, because the nexus of politicians, bureaucrats, businessmen, and contractors mold it according to their own desire. The lack of awareness and participation of the local people in the development process makes the situation worse. In countries with diverse economic, social, and political characteristics, towns and small cities have helped to transform the economies of rural areas by providing access to services, facilities, and nonagricultural employment opportunities and by providing incentives for the commercialization of agriculture. When adequate linkages have been forged between towns and small cities and their hinterlands, these centers have been able to articulate the settlement systems in these regions and to help integrate them into the economy of the country. A study of the settlement system in India concluded that the failure of central places to form a hierarchical structure meant the absence of “an intermeshed system of exchange that will provide the requisite incentives for increased application of labor, capital and human skills” (Johnson 1970, pp. 70–71).

This research also reveals that many cities in developing countries in general, and India in particular, have a very complex spatial structure. These cities lack infrastructure development, public facilities, and amenities needed to promote the spatial integration that would ensure sustainable urban development. The spatial relationships between these cities and their hinterlands have more often been exploitive. Such relationships do not ensure development of the human and physical resources in these areas. As already discussed, the spatial structure of the Indian cities is the direct outcome of sociocultural, economic, political, and natural interactions. Spatial structure thus provides a morphology that is unique to each and every city. Still, it has some generalizations that are of the utmost importance to a geographer. Cities may be geographically studied in term of their morphology, that is, in terms of layout and build, considered as expression of their origin, growth, and function, which has given rise to concepts and generalizations related to the

character and intensity of land use within the city and to the spatial interactions of one part of a city with another. The internal structure of a city can first be described on the basis of its morphology, that is, the urban land use, physical form, and functional landscapes that pertain to a particular function or work of an urban area. As these attributes are intimately related, it is first necessary to analyze the evolution of the broad morphological pattern of the city and then that of its detailed development of forms and functions and their distinctive patterns (Mayor and Kohn 1967). Urban spatial forms are, after all, a direct outcome of processes, and in a real sense the embodiment of the attitudes pertaining at the time and in the place of their creation (Conzen 1960). In the morphological study of Indian cities, the evolution and growth of the urban landscape of Lucknow City and Mirzapur City have been discussed. The study is concerned with the total identity of a habitat, which has grown in response to spatial force, creating functions and structures and finally leading to its shape and form.

23.5 Lucknow

Lucknow, by virtue of its central location in the state, was rightly selected as the seat of administration for Uttar Pradesh. It was the capital of the *Oudh* kingdom during the *Nawabian* period because of its strategic location. Then, the city of Lucknow originated around the *Lakshman Tilla* and *Machchi Bhawan*, asserted to be the site of an old fort built for defense at that time, and which is considered the nucleus of the city. In the early period of growth, the city expanded by the left bank of the River *Gomti*. The earlier *Rajputs*, *Shekhs* of *Bijnaur*, and *Pathans* of Ram Nagar lived in an area between *Lakshman Tilla* and the present Residency. Although the buildings of Lucknow were initiated by *Shekhs*, building increased in momentum in the *Nawabian* period. The network of roads generally becomes the cause of development of any town. In the case of Lucknow, the earlier roads were developed by the side of River *Gomti* in a semicircular fashion. Therefore, the city expanded according to the road network. Roads were not planned before the British period: roads were irregular, narrow, zigzag in shape, and also not metaled. The morphology of Lucknow is the result of different phases of its evolution and growth following the internal structure, that is, its layout and form and the spatiofunctional development of urban landscape in the city.

- (A) Pre-British/Nawabian period: slow growth
- (B) British period: moderate growth
- (C) Post-Independence period: rapid and steady growth
 1. The early period (1947–1971): urban expansion
 2. The later period (after 1971): urban sprawl

The city grew because of its land use pattern and functions, and these different kind of functions laid the formation of its morphological development. In the

Nawabian period, residential colonies developed around *Chowk*, with peripheral surrounding areas (*Classical Chowk Model*): *Baradari*, *Rumi Darwaja*, *Gol Darwaja*, *Akbari Darwaja*, *Bazar Ghaulal*, *China Bazar*, *Aminabad*, *Terahi Bazar*, *Aminganj*, and *Fatehganj* were some of the other markets along the River *Gomti*. The *bazaars* (markets) were developed with enormous economic activity related to unique embroidery, Chikan works, and jewelry. Handwork on garments was popular at that time. Architecture was at its peak in the Nawabian period: imambara, forts, mohallas, etc. were built by them in Lucknow as a symbol of Nawabian architecture. At the time of Asaf-ud-Daula, Lucknow started spreading along the River *Gomti*. In 1816, Gasi-Uddin Haider built an iron bridge (New Daliganj Bridge) down the river to facilitate transportation between points north and south of the *Gomti*. This bridge was mainly constructed for the purpose of the northward development of the city. At that time, the land was generally used for residential, commercial, and recreational purposes. In the reign of the British rulers, Lucknow became an administrative center. Rapid progress started in the planned development of Lucknow with the advice of Patrick Geddes, an urban planner. The road pattern was modified (mixed colonial street mode), and straight and broad roads were constructed. *Machchi Bhawan* was selected as the residence of the British military. At that time Lucknow occupied an area of about 16 km². After 1857, Brigadier General Sir Robert Napier drew a plan for the city that was designed for the defense of the city. A new era began in Lucknow after the birth of the Municipal Board in 1862. The Municipal Board undertook planned management of metaled straight roads, new avenues, many gardens, parks, and open spaces. In 1866, *Nishatganj* Bridge was constructed over River *Gomti* near *Hazaratganj* for development of the eastern area (mixed colonial street model). In 1867, many markets were established at *Sadatganj*, *Daliganj*, *Shahganj*, *Aminabad*, *Rakabganj*, and other locations. Railway lines and the *Charbagh* Railway Station were constructed in 1867. By 1870, the city had spread over a total of 31.77 km², of which 9.21 km² of land was fully built up with 57,256 houses. The cantonment was developed in the southeastern part of Lucknow, and the military was shifted from *Machchi Bhawan* and other areas to this area. The cantonment occupied an area of 27.40 km²: this area had well-planned roads, buildings, playgrounds, and a rifle range. It lies in the outer area near Dilkusha Railway Station. In the new century (1900), the Municipal Board invited Patrick Geddes, a town planner of Britain, to advise them. It was the true phase of a planned layout of the city's development for urban design and a flag in the evolution of urban landscapes. Planned markets were developed at *Nazirabad*, *Ghasiari Mandi*, *Chikmandi*, *Nazar Bagh*, *Raniganj*, *Ganeshganj*, etc. In 1928, the capital functions were shifted from Allahabad to Lucknow, and the city became the administrative center of Uttar Pradesh. The *Hazaratganj* became the focal point of all important activities, administrative as well as commercial. All important offices related to the administration and big hotels were constructed around the *Hazaratganj* market. The introduction of administrative and business activities allowed structural development in the urban process. In 1930, Lucknow was proclaimed the state capital, and with the efforts of Sir Hercourt Buttlar, the Governor of the state, several state offices were transferred from Allahabad to Lucknow and were established toward

the north and east of the main city. The new Civil Lines, Mall Avenue, Council House, Residency, Clock Tower (Ghantaghar), etc. were added to the city. The Aishbagh area developed as an industrial part of the city. Some small industries such as paper mills and oil mills were established on the northwestern bank of River Gomti. Thus, administrative, commercial, and industrial functions became prevalent in the urban growth of Lucknow. In the second decade of the century, the university was established across the river in Niralanagar. The decaying Machchi Bhawan, which was the most suitable site on the Gomti bank, was used for establishment of a medical college.

After Independence, the Development Trust, Municipal Corporation, and other statutory bodies also ventured in construction of new colonies in a planned manner. Labor colonies have also emerged as a distinct landmark in the new pattern of the city. Housing schemes for lower- and middle-income groups further emerged in the development of housing colonies. After 1971, Lucknow was extended toward *Niralanagar*, *Aliganj*, *Mahanagar*, *Nishatganj*, *New Haiderabad*, *Sitapur Road*, and *Faizabad Road*. *Tal Katora Road* and *Aishbagh* were declared sites for heavy industries. Some planned and organized colonies, such as *Kanausi*, *Chandranagar*, *Singarnagar*, *Ramnagar*, *Indralok*, *Krishnanagar*, and *Vijai Nagar*, were developed along the Kanpur Road. The polytechnic college and *Amausi* Airport were also settled in the southeastern part along the Kanpur Road. The direction of the growth of the city was primarily envisaged along only two accesses, that is, along the Kanpur and Sitapur Roads. After 1991, the city's growth swelled along every outgoing road, added to which are the Raebareli, Sitapur, Hardoi, and Faizabad Roads: this really provided an access to city sprawl along the transport network (Fig. 23.1). This accessibility confirmed the movement of commodities and people, not only in the intraurban space but also in the interurban space in the regional economy. The overall functional morphology of Lucknow may be analyzed through this axial growth in all directions by these major roads passing from the city (Fig. 23.2). A number of new colonies developed, such as HAL, *Ram Sagar Mishra Colony*, *Sarojini Nagar*, *Gomti Nagar*, *Aliganj Extension*, and PAC Colony. In the south of Lucknow, the *Telibagh* and *Kharika* residential areas were established with the Sanjay Gandhi Post Graduate Institute of Medical Sciences. The intermittent filling of residential areas between major roads allowed the development of spatial structure by evolving the layout, form, and shape of the city. The planned city developed to the north of the River Gomti. This area has developed colonies such as *Mahanagar*, *Aliganj*, *Niralanagar*, *Vikas Nagar*, *Vishnupuri*, *Indiranagar*, *Gomtinagar*, and *Triveninagar*, which happened in the process of urban development models occupying an Indian metropolis such as Lucknow.

The urban area is represented by the movement of commodities and people in the regional economy. This movement is basically initiated by the urban functions such as trade and commerce, education, health, industry, administration, transport and communication, defense, and recreation and sports. These functions provide specific land use patterns to be performed by human activities throughout an urban space. Thus, the development of spatial structure occurred as the consequence of interactions and movements created by sociocultural and economic factors as the

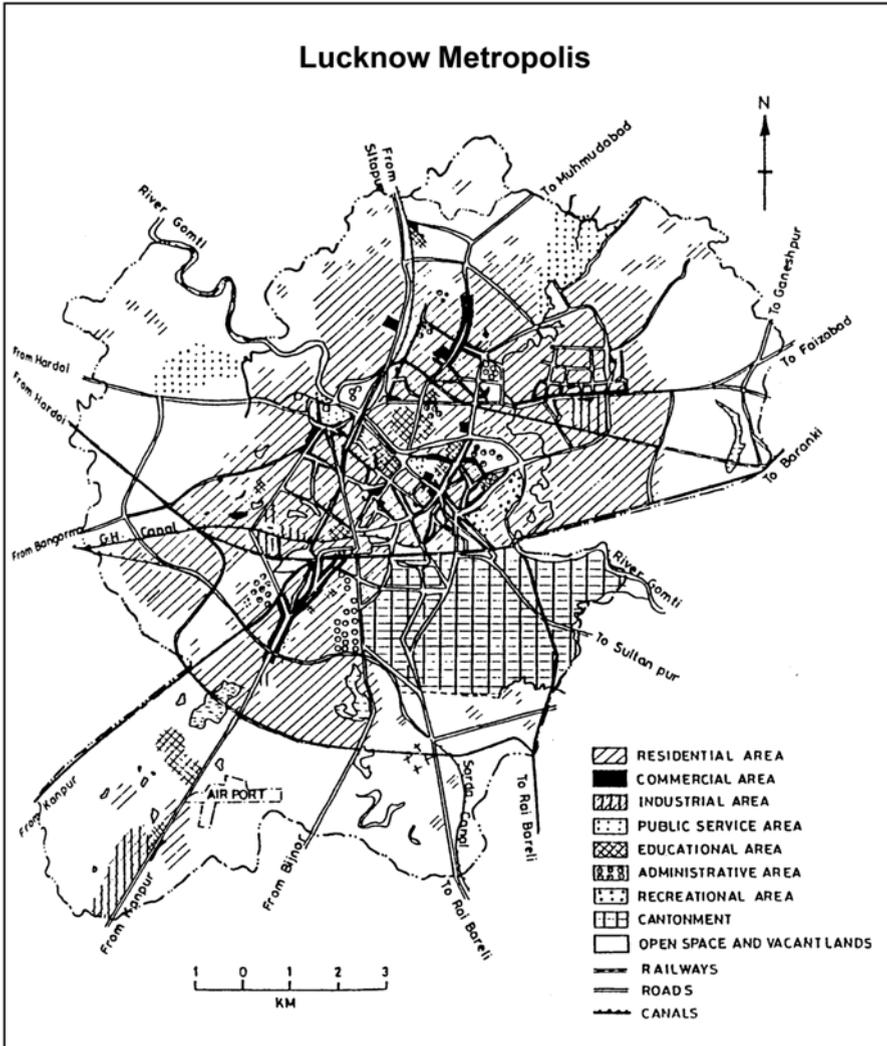


Fig. 23.2 Spatial structure of Lucknow Metropolis

result of form, function, and land use in the city. The specific land use pattern gives the birth of specific functional areas of a city, and these functional areas provide a functional morphology. The functional morphology of Lucknow presents a vivid urban landscape of mixed urban metropolitan spatial structure with its developed economic and cultural activities (Fig. 23.2).

In urban areas, the residential part of the city covers the largest area. The city covers about 41.18 % of the total urban area, that is, 139 km² in 1997. Because of its early settlement in Mughal and British times, the city expanded much more horizontally and still is expanding in the same manner, covering vast areas in the north,

northeast, south, southwest, and western as well as eastern parts of the metropolitan area. In the outer zone of the city, the sprawling of urban areas such as *Gomtinagar*, *Indiranagar*, *Triveninagar*, *Aliganj*, and *Mahanagar* in the north, northeast, and eastern parts of the city in the later post-Independence period has a typical horizontal growth of land use, whereas urban areas such as *Rajajipuram*, *Ashoknagar*, and so many residential colonies as well as housing schemes under different boards and societies are expanding horizontally in the southwest, south, and southeast directions of the metropolis. The commercial area occupies 6.87 km², that is, 2.03 % of the total area covering the central commercial area (CCA) of *Chowk*, *Hazaratganj*, *Aminabad*, *Hussainganj*, and *Sadar*. The other principal markets are located in the newly planned colonies and along the major roads, such as *Kapurthala*, *Nishatganj*, *Janpath*, and *Lekhraj* as well as along *Gautam Budha Marg*, *Ganga Prasad Marg*, and *Nandan Mahal Road*. Most of the major planned colonies such as *Gomtinagar*, *Indiranagar*, *Niralanagar*, *Mahanagar*, *Rajajipuram* and several others have shopping complexes, local markets, and neighborhood markets in the sectors/*khands* (*Vivek Khand*, *Vishal Khand*, *Vikas Khand*, etc.) as well as along the residential roads, crossings, and cooperative societies. The old markets and bazaars, located in narrow streets and lanes, are in poor and dilapidated condition. The haphazard and unplanned growth of such markets requires restructuring and improvement, not only in buildings but also in the alignment and broadening of roads, streets, and lanes in the city.

The industrial area occupies about 4.02 % (1997) of the total urban area in the city. The city has small-scale as well as medium- to large-scale industries in the well-demarcated areas on the Kanpur and Rae Bareilly Roads. The city form includes household and cottage industry spreading over the central and middle part of the city. The light manufacturing industries are well located in the Aishbagh area as well as in the industrial estate on the Kanpur Road. There are many units of textile, pharmaceutical, and oil mill activity in the densely settled part of the city, which creates problems for both the industry and the citizens. The defense area lies in the southern part of the city known as the Cantonment area, spreading over 27.40 km² (8.12 % of the total area). It has well-planned roads, buildings, playgrounds, a rifle range, open space for the military, animal shelters and grounds, etc., which lie in the outer zone near Dilkusha railway station: this area is strictly prohibited and detailed information is restricted; it is not for public use. The administrative area is significant, being the state capital since Nawabian as well as British times. The present area is about 13.03 km² (i.e., 3.96 %) and includes the secretariats and offices of the state and central governments. Most of these are generally located along Rani Lakshmi Bai Marg, Vidhan Sabha Marg, Kalidas Marg, and Ashok Marg as well as many other roads in the newly developed part of the city. Many of the offices have been in the Hazaratganj area continuously since British times, and such offices have grown very fast in the post-Independence period. The educational area covers about 9.27 km², that is, 2.75 % of the total area of the city. A few nuclear educational areas that are very prominent are Lucknow University, Sanjay Gandhi P.G. Institute of Medical Sciences, K.G. Medical University, U.P. Technical University, B.R. Ambedkar Central University, engineering colleges, and many state and cen-

tral governments science and technology institutes. These educational areas are located in the north and east as well as south and southeast of the city, particularly in the newly developed outer and middle zones.

Areas for other public uses include health, transportation, communication, electricity, water supply, and recreational uses in the city. The semipublic uses cover historical monuments, parks, gardens, fire stations, cremation grounds, etc. The city has the privilege of good and highly specialized medical facilities of national level in the Sanjay Gandhi P.G. Institute of Medical Sciences and K.G. Medical College. It has many hospitals, such as the District Hospital, Balrampur Hospital, and other highly specialized hospitals such as the T.B. Hospital, Veterinary Hospital, etc.; the urban area covers a high level of health facilities through private hospitals, nursing homes, and dispensaries as well as health clinics in most parts of the metropolis. The city has now high accessibility in terms of transportation and communication facilities, although the heavy traffic creates many problems in different parts of the urban area, especially in the central and middle part of the city. The congestion, pollution, jams, and accidents caused by uncontrolled traffic are severe problems in the densely settled part of the urban area. Power supply (electricity) is certainly one of the severe problems in urban areas and Lucknow is in no way exceptional as the capital of the state. The old infrastructure of electric plants as well as distribution system hamper regular and proper supply in the city and the same problem is linked with water supply and sewage facilities. The city, being a metropolis and capital, needs improvement and restructuring on a long-term basis to meet future needs. The city is known for gardens, parks, and open spaces with historical monuments since Nawabian to British times. Maintenance and renovations are very much needed for the cultural city of Lucknow to maintain the heritage of excellence. Other recreational areas are sports stadiums, playgrounds, and fields in the university, colleges, and different training centers. The schools have fields and grounds for physical education as well. Mostly these facilities are not in good condition, and many of them are in very poor and dilapidated condition for the use of children.

23.6 Mirzapur City

The written account of the population of Mirzapur City dates back to 1801 when Hamilton gave the figures to be roughly 50,000 persons. The city was flourishing during the British period in the later decades of the nineteenth century. It was the main center of trade in cotton, indigo, lac, and shellac coming from the south, and Persian carpets and bronze and brass metalware were produced in the city itself (Mishra 1988). The well-built inland waterways via River *Ganga* provided the city with all the advantages. The boundary of the present city was demarcated in 1867. The area of the city has been constant since then because the southern, western, and eastern boundaries of the city are natural. The northern and southern boundaries are made by the Rivers *Ganga* and *Ojhala*, respectively. In the west, the *Vindhyanchal* rugged topography limits its further expansion (Sharma and Tiwary 2008). The

main city was planned during the British Period with well-defined land use zonation. Extension of settlements began about 1850 toward the east, which was uninhabited, and then a little to the west along a thoroughfare running roughly parallel to the river that is now represented by *Puranibazar*, *Trimuhani*, *Satibazar*, and *Chetganj* (Singh 1955).

In Mirzapur City, two clusters of settlements have developed with time: one in the main city in the east that has developed around *Great Deccan Road* and the other one in the west around *Vindhyanchal*. The core of the main city has been basically the main commercial area consisting of 14 wards, which have more than 7,500 of the population (2001). It is noticeable that the smallest population is in *Trimuhani*, which falls in the middle of the core; it is packed with a variety of commercial activities and also forms the core of the commercial area. Population distribution in the city is not even. The middle zone of the city is characterized by a less dense population, covering 8 wards. The peripheral zone of the city is marked by 6 wards that have relatively low to very low populations. Another cluster has developed around *Vindhyanchal*, the ancient mythological site of goddess *Vindhyavasini*. Three wards fall in this cluster: *Vindhyanchal*, *Shivpur*, and *Kantit*. The middle zone of this cluster includes *Kantit*, having a population greater than 6,000. The peripheral zone of this cluster is around *Shivpur* in the west and *Ojhala* in the east. In 1991, the population was 169,336, which increased to 205,053 persons in 2001. The population increased in the core of both clusters as well as the peripheral areas of the city. Residential land use occupies 36.20% of the area, concentrated both in *Vindhyanchal* and *Shivpur* in the west and the main city in the east. Household density in the city is 7 houses/ha. Residential land use can be classified into three categories. The high-density residential areas (10–25 houses/ha) include 11 wards occupying 39% of the total area, namely, *North Sabari*, *Mahuwariya*, *Angarh Mahavir*, *Bajirao Katra*, *Tarkapur*, *Ganeshganj*, *Chetganj*, *Imamganj*, *Sankat Mochan*, *Kotwali*, and *Makari Khoh*. The medium-density residential areas (5–10 houses/ha) include 13 wards occupying 46% of the total area: *Trimuhani Station*, *Bundelkhandi*, *Bhatua ki Pokhari*, *Chaubey Tola*, *Shuklaha*, *Bathua*, *Ghuruahupatti*, *Ramaipatti*, *South Sabari*, *Sangmohal*, *Basnai Bazar*, and *Vindhyanchal*. The low-density residential areas (<5 houses/ha) include 4 wards occupying 14% of the total area: *Shivpur*, *Fataha*, *Shivala Mahanth*, and *Kantit*. The master plan of Mirzapur Vindhyanchal Development Authority proposes 36.29% of residential land use for the population of 3.05 lakh (estimated) by 2011. It is important to prepare a plan with public participation by which uncontrolled and unplanned residential growth can be properly regulated. Commercial land use, which covers 2.80% of the city, may be further subclassified as retail shopping, general business and commercial centers, and wholesale warehouses and godowns. The present commercial area of the main city can be demarcated starting from *Trimuhani* near *Pakka Ghat* to *Vasliganj* in the north and from *Mukeri Bazar* to *Railway Station* in the south. This commercial area has developed along the old *Great Deccan Route*, which starts from the *Olior Ghat* in the north, passes via *Ghanta Ghar* (Clock Tower) through the city, and meets *National Highway No. 7* at *Station Crossing*, which has connected North India to South India since very ancient times. There is one *Mandi Samiti* west of this cross-

ing, where district-level commercial activity (agricultural products) takes place. Commercial land use has developed in the city on both sides of the roads, although during the British period some of the commercial areas were demarcated and planned. The important commercial markets are *Trimuhani*, *Pakka Ghat*, *Purani Bajaji*, *Satti Bazar*, *Dhundhi Katra*, *Basnahi Bazar*, *Pasarhatta*, *Kasarhatti*, *Pan Dariba*, *Gurhatti*, *Mukeri Bazar*, *Laldiggi*, *Bajirao Katra*, *Vasliganj*, *Ghanta Ghar*, *Eliot Bazar*, *Denisganj*, *Teliabag*, *Dunkinganj*, *Sangmohal*, *Station*, and *Dhundhi Katra*. In the Vindhyanchal, markets have been developed along both sides of the roads, selling mainly religious and food items.

23.6.1 *Central Part of the Main City*

The central part of the city, as mixed residential and commercial, may be regarded as the organizing core of the city around which the morphology of the city can be studied (Fig. 23.3a, b). Although the central part of the city does not fulfill the criterion of a typical Central Business District (CBD; Burgess 1925), yet it can be delimited using land use data as proposed by Murphy and Vance (1954). The central area of the city revolves around the *Ghanta Ghar* (Clock Tower), which came into existence by 1886–1891. It became the central part of the city during the British period, and its surrounding market was called Elliot Bazar. The nearest *Ghat* is *Olior Ghat*. The city *Kotwali* is 100 m west of it. The markets of the city start from *Trimuhani* in the west and extend to *Vasliganj* in the west; the *Ghanta Ghar* falls midway between them. Today it contains the offices of the Mirzapur Municipal Board. The *Great Deccan Route*, which has been the main circulatory artery of the city, starts from the *Olior Ghat* and passing through the *Ghanta Ghar* meets the National Highway No. 7 at *Station*. The commercial area extends further west to *Lal Diggi*, passing through *Mukeri Bazar*. The highest population is in *Chetganj*, more than 8,000 persons, in *Chetganj*, *Ghurahupatti*, *Angarh Mahavir*, *Emamganj*, *North Sabari*, *Fataha*, *Katra Bajirao*, *Kantit*, and *Shuklaha*. New settlements have come up outside the civil lines, mainly in *Ghurahupatti*, *Ramaipatti*, *Shuklaha*, and *Fataha*. New settlements have also grown along *Jangi Road* and *Bathua Road*.

Industrial land use, which includes household and small-scale industries, is only 1.87 %. The present industries fall under the following four main categories: carpet industry, brass metalware industry, dye industry, and lacquer (lac) and shellac industry.

23.6.2 *Carpet Industry*

This industry is located mainly south of *Jangi Road*. There are more than 100 carpet-making units working in the residential areas as unregistered by government authorities. Some famous carpet industries of the city are in *Nakhra Road* (ABC

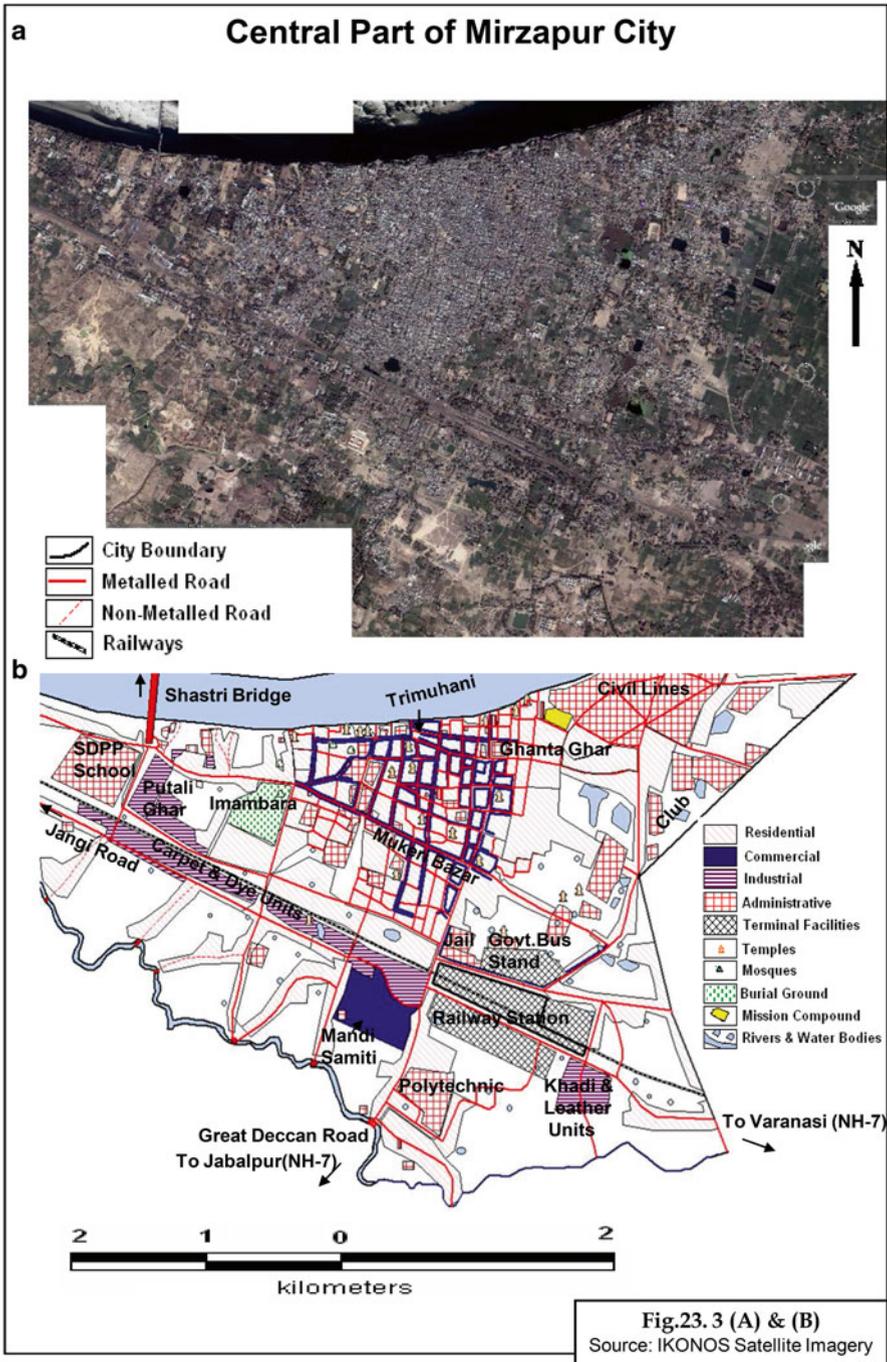


Fig. 23.3 Mirzapur City a, b (From IKONOS satellite image)

Industries), Jangi Road (HAG Carpets), Civil Lines (OBEETEE Pvt. Ltd.), Imambara (Mirzapur Carpets), and near Ojhala Bridge (India Carpets).

23.6.3 Brass Metalware Industry

The main area is located around *Casarhatti Bazaar* in the main city; this is the oldest household industry of the city.

23.6.4 Dye Industry

It is located along the Jangi Road, which is in a very poor condition.

23.6.5 Lac and Shellac Industry

Because there are cheaper alternatives to lac (lacquer) and shellac, the demand has declined, and therefore the industry is in poor condition.

Public and semipublic land use includes administrative, educational, health, social, cultural and religious, and cremation and burial grounds. Administrative land use covers 5.20 % of the total land use in the city. The main administrative area extends from the court to Fataha where most of the administrative offices are located. The tourism department office is in Hotel Janhvi near Shastri Bridge, and some other offices, such as fisheries, dairy, and income tax, are also located nearby. Educational land use occupies 5.50 %. The educational institutions are mainly situated in Musaffarganj on the road connecting *Chetganj to Naar Ghat*. Among the technical institutions, the Binani Group of Institutions are situated in *Bhairwan*, Govt. Polytechnic is on Bathua Road, and the college for alternative medicines at *Puri Katra*, Lal Diggi, etc. There are three degree colleges (one for girls), seven Inter colleges, and more than 50 schools, both public and private. There are four libraries in the city, of which *Sahitya Sadan* at *Naar Ghat* and *Mayo* at *Vaasliganj* are significant. Some new educational institutions have emerged along the road from Shastri Bridge to *Vindhyanchal*. Land use for health-care and related fields occupies 3.40 % of the total area in the city. The main government hospital (Yusuf Imam Memorial Govt. Hospital) and the Tuberculosis (T.B.) Hospital are in civil lines. Further, more than two dozen private nursing homes, clinics, and maternity centers are in the city. Land use under social, cultural, and religious institutions occupies 9.12 % of the total area in the city. There are two government hotels (one near Shastri Bridge in the city and another one at *Vindhyanchal*), two guest houses (run by trusts in *Vindhyanchal*), and more than two dozen private guest houses and hotels (both in the city as well as in

Vindhyanchal). However, the guest house at Kantit is in very poor state. There are two community halls, one run by the municipal board at *Bariya ghat* and another (*Khaitan Bhavan*) by a trust at *Musaffarganj*. There are four clubs in the city: Lions, Rotary, Press, and City Club. The temples and mosques of Vindhyanchal (*Vindhyavasini*, *Batuk Bhairo*, *Bandhwa Mahavir*, *Kali Khoh*, *Ashtabhuja*, *Bhairav Kund*, *Rameshwar Temple*, *Vishal Hanuman Temple*, *Maa Tara Temple*), Kantit (*Kantit Sharif*, *Lal Bhairo*, *Naag Kund*, *Nageshwar Temple*, etc.), and the city (*Imambara*, *Tarkeshwar Mahadev*, *Lohandi Mahavir*, *Budhe Nath Temple*, *Sankat Mochan*, etc.), and the mission compound in civil lines are included in religious land use. Land use for cremations and burial grounds occupies 2.50 % of the total area in the city. The main Hindu cremation grounds are *Olior Ghat*, *Badali Ghat*, and *Chaubey Ghat*. The main Muslim burial grounds are in *Kantit* and *Imambara*. The Christian burial ground is in the mission compound.

The land use under transport and communication covers 12.56 %. Mirzapur City has a very advantageous position in the road transport network. The city has a very well developed network of roads built during the British period. It is connected with the National Highway No. 2 (Grand Trunk Road) by a 10-km-long connecting road running from Aurai (District: Bhadohi), which passes via River *Ganga* through *Shastri* Bridge. National Highway No. 7 (the longest in India, connecting Varanasi to Kanyakumari) enters this city from the east, runs parallel with the main railway line, and turns almost perpendicularly toward the south as it leaves for Jabalpur. This road was earlier called the *Great Deccan Route*. Another road arises from this road at Bathua Crossing that runs almost parallel to the rail line and National Highway No. 2, called Jangi Road. The broad-gauge railway line connecting Kolkata to Mumbai runs midway through the city. There is one railway station at Mirzapur and another at *Vindhyanchal*. There are two bus depots, one near the railway station in the city and another at Vindhyanchal.

Other land uses include water bodies and open spaces, which comprise 20.85 % of the area. The water bodies cover 6.50 % of the total area. Besides the two rivers already mentioned, there are two significant water bodies in the city: *Sagra Nadi* at Vindhyanchal and *Kajrwa Pokhra* at the city. There are also many wells and small ponds. There is one artificial water reservoir at *Lanka Pahari* for the drinking water supply of the city, which receives water from the Tanda reservoir. Open spaces cover 14.35 % of the total area of the city. There are four parks in the city. The *Shahid Udyan* Park at *Naar Ghat* is significant because it is probably the only park in India dedicated to the martyrs who gave their life for the freedom of Mother India. There is one 20-m-high martyr gate established in the middle of the *Shahid Udyan* in remembrance of the martyrs who gave their lives for the motherland in the wars of 1962, 1965, and 1971. There are 20 important ghats in the city, starting from Ramgaya Ghat in the west in Vindhyanchal to Fataha Ghat in the east. The most significant among them are Ramgaya Ghat and Dewan Ghat in Vindhyanchal, Kantit Ghat in Kantit, and Naar Ghat, Pakka Ghat, Sunder Ghat, Olior Ghat, and Bariya Ghat in the city. There are some open spaces that were famous industrial units before Independence: Putali Ghar (earlier, Shri Ganga Ram Cotton Mill), Raidani Palace, Radha Krishna Cotton Mill, and Shefton Mill. The major problem

with these open spaces is that they are in the possession of wealthy and powerful businessmen, politicians, criminals, and contractors. This powerful nexus has caused hindrance in the development of these open spaces for any uses other than personal farm houses.

23.7 Vindhyanchal

The spatial structure of the *Vindhyanchal* cluster (Fig. 23.4 a, b) has developed around the main shrine of *Vindhyavasini* Temple. It is surrounded by very dense settlements predominated by shops selling items to the pilgrims. The economy of the clerics and local people is directly dependent on this source as they have no other source of income than these shops and the many guest houses. One cannot expect good quality of service from any of these shops or facilities. There are three significant routes for approaching the main shrine, one starting from *Batuk Bhairon* Temple in the east, passing via *Sadar bazaar*, and another named *New VIP Road* meeting the shrine from south, and the last, named *Old VIP Road*, meeting from the west. The shrine is surrounded in the northwest by the *Jaipuria* guest house, in north by *Vindhyeshvar Mahadev* Temple, and in the south by *Bhagirathi Palace Hotel*. There are many other small temples and shrines in the core of this cluster. On the south of the main road starting from the *Batuk Bhairon* crossing are situated the main administrative areas and terminal facilities of *Vindhyanchal*. The government guest house, *Hotel Rahi*, along with the palace of *Raja Madhubani*, followed by many other private guest houses and one *Primary Health Centre*, are situated south of this road. The *New VIP road* meets this main road from the northern side. Proceeding west on this road, the large campus *Vindhya Vidyapeeth* and *Vindhyanchal* roadways are seen. Further west at *Patehara*, a new road approaching the main shrine has been developed by *Amar Singh Fans Association*. It is very well maintained and is connected with the *Old VIP road*. *Moti Jheel*, an old water body, is situated on this route. In the middle part of this cluster begin the private terminal facilities in the east that extend up to *Kantit*. Further south is the large ancient water body, *Sagra Nadi/Nala*, which is very old but is used for washing purposes by the washermen. Further south of *New VIP* crossing, the road leads to *Bankhandi Mahadev* Temple and *Vindhyanchal* railway station. This road meets the *Jangi Road* at *Amravati* Crossing. This road extends further south to *Devraha*. Another road starts west of this road, passes semicircularly through *Bandhwa Mahavir* Temple, and meets the *Jangi Road*. The *Rameshvar Mahadev* Temple is situated west of *Patehara* in *Shivpur Ward*. The *Maa Tara Temple* is also situated near *Ramgaya Ghat*. There are two significant heritage sites, *Ram Shila* and *Pret Shila*, west of *Ramgaya Ghat* on *River Ganga*. The outer part of the *Vindhyanchal* cluster is more significant in the east and extends up to *River Ojhala*. The population west of *Kantit* and covering *Vindhyanchal* and *Shivpur* has not grown significantly in comparison to the main city. The main reason is that in the city the means of livelihood in the rudimentary manufacturing sector of carpets, metalware, weaving, etc.

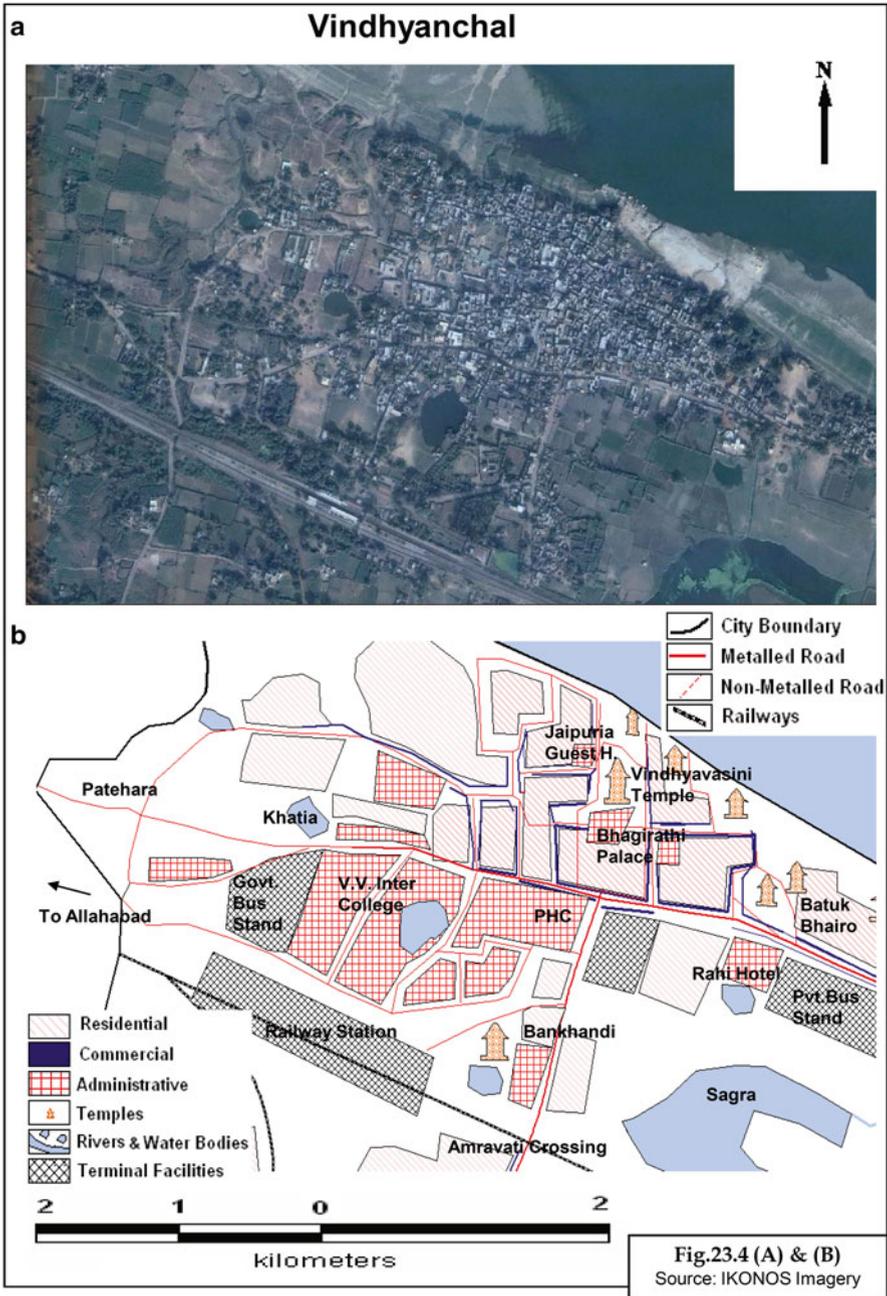


Fig. 23.4 Vindhyanchal a, b (From IKONOS satellite image)

is still available in some way or another, but in Kantit, Vindhyanal, and Shivpur, no significant means of livelihood is available for the common people. The priest class is dominant in these places.

23.8 Conclusion

Urban development is a multidimensional process involving the reorganization and reorientation of the entire urban system involved in the development process. It involves radical changes in institutional, economic, social, and administrative structures, popular attitudes, and even customs and beliefs, as well as the reduction of inequality and eradication of poverty. Development represents the entire gamut of change by which the entire socioeconomic system is tuned to the diverse basic needs and desires of the individuals and social groups within that system who move toward a condition of life that is materially and spiritually better. It is a continuous process, intended to promote constant improvement in the health and prosperity of the people. Peet (2005) views development as a founding belief of the modern world that has long since replaced God as the icon of the age. In development, all the modern advances in science, technology, democracy, values, ethics, and social organization fuse into the single humanitarian project of producing a far better world. Ever since the adoption of Agenda 21, we are more concerned with sustainable urban development that goes beyond ecological sustainability to include other dimensions of sustainable development such as equity, economic growth, and popular participation. Thus, it is mainly a people-centered development, an amalgamation of various independent processes such as the urban environmental movement, the decentralization of local governance, and Agenda 21, followed by Habitat II (UNCHS 1996).

The pursuit of sustainable urban development is set against the background of the present globalized world dominated by the developed countries. Underdeveloped countries have had development models in the form of Structural Adjustment Programmes (SAPs) imposed upon them by the multilateral funding agencies. These models have had adverse impacts on social sectors (Cornia et al. 1987) and on the environment (Reed 1995). SAPs have triggered the privatization and commercialization of infrastructure, and the curtailment of state responsibility for social welfare (Stubbs and Clarke 1996; World Bank 1990), in both rural and urban areas. India has a low level of urbanization (28.7 % in 2001), but a large urban population in absolute terms (about 300 million in 2001). The country has 3 of the 20 largest cities in the world (Mumbai, Kolkata, and Delhi), and had 35 cities of 1 million-plus inhabitants in 2001 (NIUA 2010). Its urban settlement pattern is concentrated in the western and southern parts of the country, and there is a high incidence of urban poverty. One of every three persons (Dubey and Gangopadhyay 1998) and one of every five persons in the cities of more than 1 million inhabitants (Dubey and Mahadevia 2001) lives in poverty. Large cities are the focus of urban policies and programs (Mahadevia 1999), although poverty is concentrated in the small towns

(Dubey and Gangopadhyay 1999), which also have lower levels of basic services than the large cities (Kundu and Basu 1999). The latter are integrated into the global system and the smaller towns into the local economy, with no continuum between the two (Kundu and Basu 1999). Urban employment has become increasingly informal since the early 1980s (Kundu 1996) as the manufacturing sector has become more capital intensive, leading to a decline in formal secondary sector jobs. Researchers attribute the declining rate of urbanization during the 1980s to this phenomenon (Kundu 1996; Mohan 1996).

The contribution of the urban sector to the national economy increased from 29 % in 1951 to 55 % in 1991 (Suresh 2000). The condition of the big cities such as Delhi, Kolkata, Mumbai, Chennai, and Bangalore is quite different from the majority of the other Indian cities, which are less urban in quality, and in comparison to the European and American cities they are completely agrarian. In contrast to the centrifugal pattern of urban population change in advanced societies, the centripetal processes of urbanization and urban growth continue to dominate urban population dynamics in the Third World (Pacione 2009). In India, urban development and planning has been much more often adopted, following on British town planning. The master plan, which has been taken as a process rather than a conclusive statement, is a design for the physical, social, economic, and political framework for the city. It was adopted to guide development of a city in an orderly manner so as to improve the quality of life of the people, to organize and coordinate the complex relationships between urban land uses, to chart a course for growth and change, be responsive to change and maintain its validity over time and space, and be subject to continual review; to direct the physical development of the city in relationship to its social and economic characteristics based on comprehensive surveys and studies on the present status and the future growth prospects; and to provide a resource mobilization plan for the proposed development works (Hall 1982). The Five Year Plans have also stressed the need to undertake town planning and evolve a National Town Planning Act so as to provide for zoning and land use, control of ribbon development, location of industries, clearance of slums, civic and diagnostic surveys, and preparation of master plans. Although a significant step in urban development was undertaken in the Five Year Plans in the form of central assistance to the states for the preparation of master plans for selected urban areas, comprehensive action was not taken by the states for the adoption and implementation of the plans. Urban development planning should, essentially, be supportive of the economic development in the country. At present, barely 20 % of the urban centers have some sort of a Master Plan, which in many cases is just a policy document. It is estimated that there are about 1,200 master plans prepared by various agencies responsible for plan preparation, but their implementation is not encouraging. The implementation of master plan facilitates the orderly and planned development of cities in a sustainable manner, which would ultimately help in good governance (Tiwari 2010). Since the adoption of the 74th Constitution Amendment Act (1992), the scenario has changed: power has been decentralized, and democracy at the local level has been strengthened. The 74th Constitution Amendment Act (74th CAA), 1992, provides for a democratic and participatory

planning process to incorporate the needs of the people, particularly the poor and socially disadvantaged, in the planning process. The 74th Constitutional Amendment (1992), adopted in India with its provisions to decentralize the responsibility for urban management, to increase the participation of the people and accountability in the administration, was revolutionary in approach. The development authorities were to play only a supportive role to the elected bodies rather than taking over the functions, which properly belonged to the Urban Local Bodies (ULBs). To augment the financial position of ULBs, reforms were introduced through introduction of an accrual-based double-entry system of accounting, e-governance, property tax reforms, levy of reasonable user charges, etc., by ULBs. Much has changed since then, but it will take some time to see any tangible change in the spatial structure and development of the urban places in India.

23.8.1 Policy Issues and Recommendations

The master plan approach adopted in India has been based on the British town planning system, which is concentrated mainly on zoning regulations. It has been unduly slow and ineffective because of its centralized character.

The diverse social structures in India in the form of castes and communities find their spatial expression in the division of the city into quarters, localities or *mohallas*, and colonies. It is difficult to remove these divisions, so it is better to incorporate them in urban development plans, which is seldom done in India.

Urban development requires infrastructure development of the civic amenities and facilities in the form of roads, streets, terminal facilities, riverfront *ghats*, bridges, power supply, water supply, drainage, sewerage, solid waste management, etc. These provisions require a huge amount of capital. Thus, introduction of alternative mechanisms is needed. Heavy reliance on HUDCO (Housing and Urban Development Corporation) and other government agencies will not be effective. Thus, civic bodies can issue tax-free municipal bonds to finance infrastructure development projects in the city.

Power is the base of any development in any place. In India the huge shortage of power can also be met by developing nonconventional/alternate/new and renewable sources of energy such as solar, wind, and bio-energy to avoid heavy reliance on thermal and hydro power.

Heavy investment is also required in education and health, without which the human resources in Indian cities will remain disdained and underdeveloped. The governmental machinery has failed in these two fields.

For the revival of industries and commerce, again huge investment as well as good governance is required. The Expo-zones can be promoted at district level to attract investors and potential buyers to buy region-specific products.

There is need to diversify agricultural and allied activities. For this, the removal of mediators and the introduction of liberal financial support from the rural branches of the banks are required. Also required is increase in the amount of cold storage,

seed and fertilizer stores, agro service centers, and Veterinary Hospital and Animal Husbandry Centres.

The present generation is one of information and communication technology (ICT), not only in public and private sectors but also at the domestic level. The more information the people have, the greater will be their awareness toward the development of the city. Thus, mobile and Internet broadband connections should be made easily available.

A better law and order situation in the cities has to be ensured. Coordination among different institutions of public administration as well as an active role of the public and NGOs (non-government organizations) is also required. These institutions should work for the welfare of the citizens. Functional overlap of the duties among these institutions should also work positively for the development of the city.

There is a need for welfare homes for old persons, widows, and destitute children. The parks and open spaces in the Indian cities are easily encroached, and even those still existing are very poorly maintained. Thus, serious steps in this regard must be taken. Ideally, the cities should appear green and not resemble a forest of concrete buildings.

The most challenging role for development of the urban slums is to provide the inhabitants with good living conditions: the means of livelihood, shelter, education, and health facilities.

There should be a high-level study and vast research for the heritage sites of the cities, and proper steps for their conservation and development must be taken.

Use of the modern tools and techniques of remote sensing (RS), the Geographical Information System (GIS), the Global Positioning System, etc., is required for urban development planning of the cities. Computers, survey analysis software (such as SPSS, NUD*ST), and mapping software (ARC GIS, Map Info, ERDAS, GEOMEDICA, etc.) are the need of the hour.

The participation and awareness of the people is directly related to their socio-economic status. Thus those with fairly good status are able to decide about land utilization and development of the respective areas. On the other hand, the poor are not able to do this because of their socioeconomic and cultural deprivation. In this regard, need of people's participation is vital. Thus, participatory planning and public-private partnership (PPP) is required at all levels of urban development and planning.

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Chapter 24

The Informal Sector in Kolkata Metropolitan Area: Appraisal and Prospects for Local Economic Development

Annapurna Shaw

Abstract No plan for local economic development within the larger metropolitan region of Kolkata can realistically succeed unless based on an understanding of the informal sector and taking account of it in subsequent local development strategy. The objective of this chapter is to provide a detailed look at the state of the informal sector in the larger metropolitan region of Kolkata since 1991. This information would provide a means to understand the impact of economic liberalization on the local economies of the various smaller towns/municipalities that constitute the Kolkata Metropolitan Area (KMA) and to suggest ways to incorporate the informal sector in the growth process. The study is based on aggregate-level secondary data that present trends in growth and structure of the informal sector in the KMA. The study also considers informal manufacturing activities and informal service activities, and highlights ways to include the informal sector in the local economic development process.

Keywords Informal sector • Local economic development • Kolkata Metropolitan Area

Since economic liberalization began in 1991, the larger metropolitan regions in India, particularly those located in the southern and western parts of the country, have experienced much change (Shaw 1999; Shaw and Satish 2007). However, these metropolitan regions are extensive in area and often comprise a mix of urban local bodies of different sizes and include even village bodies and rural stretches. The change has not been evenly spread, either geographically or in terms of economic sector. Thus, although some areas of the metropolitan region have seen a clustering of the new economy with sectors such as information technology (IT) and

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information technology-enabled services (ITeS) dominating the growth process, the remainder of the metropolitan region has often remained unchanged, with an ever-growing informal sector. Because of its large and ubiquitous presence, no plans for local economic development within the larger metropolitan region can realistically succeed unless based on an understanding of the urban informal sector and taking account of it in subsequent local development strategy. In fact, the informal sector is, in many ways, a sort of economic barometer, reflecting changes in the overall economy of the metropolitan region as changes in its size and composition are closely related to what is happening in the formal economy. Focusing on the informal sector can be a means, then, to understand the impact of economic liberalization, started in 1991, on the local economies of the various smaller towns and municipalities that compose the larger metropolitan region.

The Kolkata Metropolitan Area (KMA), approximately 1886.67 km² in size and composed of three Municipal Corporations and 38 municipal towns, is one of the largest metropolitan areas in the country. With a population of 14.11 million in 2001, it is the third largest, in terms of population, after Mumbai and Delhi. The KMA has a very large and heterogeneous informal sector. By the informal sector, we are referring to that section of the workforce that is not covered by protective legislation and is characterized by low incomes and lack of job security. Such workers would include not only wage earners employed in small-scale enterprises but also subcontracted laborers in large factories and the vast numbers that undertake different types of home-based work for larger units or middlemen. The informal sector is also composed of small units or enterprises run on family or hired labor producing goods or selling goods and services (Shaw and Pandit 2001). It includes a wide range of low-level service workers who may have more than one employer or customer. Thus, wage work with varying degrees of stability/permanence and self-employment with varying levels of earnings constitute the two main forms of work in the informal sector.

The objective of this chapter is to provide a detailed look at the state of the informal sector in the larger metropolitan region of Kolkata since 1991. This information would provide a means to understand the impact of economic liberalization on the local economies of the various smaller towns and municipalities that constitute the KMA and to suggest ways to incorporate the informal sector in the growth process. Section 24.1 describes the methodology of our study; Sect. 24.2, based on aggregate-level secondary data, presents trends in growth and structure of the informal sector in the KMA; Sect. 24.3 considers informal manufacturing activities; Sect. 24.4 overviews informal service activities; and Sect. 24.5 highlights ways to include the informal sector in the local economic growth process.

24.1 Methodology

Given the heterogeneity of labor status, income, and occupations within the informal sector, I have used whatever aggregate data are available and also a questionnaire survey and field visits. The aggregate data, taken from published sources such

as the NSS and the Census, have been used to understand past trends in growth and composition of the sector. The questionnaire and field visits have helped understand recent developments within the sector and suggest ways to include its diverse elements in the growth process. A local economic development (LED) questionnaire administered in July 2005 contained questions to the chairpersons of municipalities and the mayors of municipal corporations within the KMA on both the formal and the informal sector but was focused more strongly on the informal sector.¹ Information was sought on the predominant informal sector occupations by numbers of workers, daily earnings, and the residence of workers. There were also open-ended questions on what programs the municipality was providing for the poor. Completed questionnaires were received from 25 of 40 urban local bodies. In addition to these, field visits were made to 6 local bodies in the Kolkata Metropolitan Area to get first-hand information on local economic development issues. The following local bodies were visited: New Barrackpore (M), Uluberia (M), Baruipur (M), Hooghly-Chinsura (M), Howrah (MC), and Kalyani (M).²

During the field visits, there were detailed discussions with the chairperson/mayor of the local body and some senior officers on their plans for the local body and the problems they were facing. The major sources of employment in the urban local body (ULB), the economic condition of the local population, and suggestions as to what would facilitate the development of the local body were sought. Several informal enterprises/workshops were visited to examine in detail the predominant types of manufacturing activity carried out within the informal sector. There was considerable variety in small-scale manufacturing activity, ranging from the making of musical instrument parts, gloves, and foam leather products in New Barrackpore; *zari* work, *biri* rolling, and shuttlecocks in Uluberia; and surgical instruments in Baruipur to ballpoint pen manufacture in Hooghly-Chinsura. However, in contrast to manufacturing, as the main service activities within the informal sector were broadly similar across most municipalities, for these activities, focus group discussions were used with key representatives; for instance, the hawkers' union leaders in Howrah and the rickshaw pullers' association representatives in New Barrackpore and Hooghly-Chinsura.

24.2 Trends Based on Secondary Data

Over the years, the informal sector has grown in size and as a proportion of the total workforce of the Kolkata metropolitan area. Early estimates based on surveys of the city of Kolkata made in the 1950s indicate that the informal sector accounted for roughly 50 % of the city's workforce (Dasgupta 1973). Three surveys, one by the

¹The Kolkata Municipal Corporation was left out of the survey because of its large size and specific problems. It cannot be treated on a par with the smaller municipal towns and corporations within the KMA.

²M refers to Municipality and MC to Municipal Corporation.

Table 24.1 Informal sector workers as percentage of total workers in the Kolkata Metropolitan Area (KMA), 1990

Urban local body	Informal sector employees (wage workers)	Self-employed workers	Unemployed with odd jobs	Informal sector: total workers
Kolkata city	27.22	24.46	6.73	58.41
Baruipur	27.79	28.09	8.06	63.94
Budge Budge	18.81	17.01	12.70	48.52
Champany	17.48	24.35	7.80	49.63
Kanchrapara	24.16	33.26	6.25	63.67
Khardah	12.80	13.98	6.10	32.88
Konnagar	20.35	25.83	4.41	50.59

Source: State Planning Board Report (1990)

NSS on employment in Calcutta City in 1953, a government of West Bengal State Statistical Bureau survey on unemployment in 1957, and Sen's (1960) socio-economic survey of the city form the basis of the foregoing estimate. Although "this is only an approximate estimate" (Dasgupta 1973, p. 54), I use it as a starting point to understand more recent developments.

In this regard, the first question is this: What has been the growth of the informal sector since the 1950s? By how much has it increased and what have been the growth areas? Answers to these simple questions are not easy, as there are very few large-scale studies of the informal sector since the 1950s that can be used as a benchmark. There are many smaller studies by individual scholars and organizations that have focused on particular localities or slums, but there is a lack of data for the metropolitan area as a whole. One exception is 'A Survey of the Informal Sector in CMA' done in 1990 by the State Planning Board as part of the Perspective Plan for Calcutta 2011. This is a detailed study based on a large sample size of 20,002 households (97,030 persons), and the sampled areas include five wards within the Calcutta Municipal Corporation, that is, Ward 2 (DumDum), Ward 57 (Beliaghata), Ward 72 (Bhowanipur), Ward 101 (Bagha Jatin). and Ward 117 (Behala), the Howrah Municipal Corporation (Ward 47), and six municipalities (Baruipur, Budge-Budge, Champany, Kanchrapara, Khardah, and Konnagar) in the metropolitan area.

Based on the foregoing survey, in 1990, that is, more than three decades since the surveys of the 1950s, the informal sector has been estimated to have increased to around 58 % of the workforce in the city of Kolkata (Table 24.1). For the surrounding municipalities, the size of the informal sector has varied depending on the availability of jobs in the formal sector. Thus, in Budge Budge, Champany, and Khardah municipalities, which depended heavily on the jute industry, the size of the informal sector was small. The percentage of wage earners in formal sector jobs was 31.50 %, 36.11 %, and 55.9 %, respectively, which was much higher than the average for both the city and non-jute industry areas. In other municipalities, the informal sector already exceeded 60 % of the workforce.

What is interesting to note in the foregoing table is that, if we consider the unemployed with odd jobs to be a part of the self-employed, which the CMA report itself has suggested (p. 3 of the report), then the proportion of the self-employed in the informal sector exceeds that of wage workers. Some researchers have already noted this (Mukhopadhyay 1998) and regard it as a positive development because earnings in self-employment exceed those in informal sector wage work.

Moving forward from 1990 to the present, aggregate information of the size and growth of the informal sector is still incomplete as the Census of 2001–2011 has not yet provided detailed industrial classifications, below the one-digit level, of workers (main and marginal), and non-workers by city. However, several developments discussed in regard to the formal sector would suggest that the size of the informal sector has increased further. For instance, the closure of many large industries, particularly jute mills, would have resulted in a concomitant increase in informal sector work. The Primary Census Abstract of Census 2001 for the Kolkata Urban Agglomeration (KUA) indicates a significant increase in home-based manufacturing work, from 45,558 workers in 1991 to 157,335 workers in 2001, that is, an increase by 2.45-fold or around 24.5 % a year during the past decade. Home-based work is referred to as 'household industry' in the census, by which is meant small-scale industry conducted by one or more members of the household within the precincts of a house in urban areas. In fact, for West Bengal as a whole, household industry as a percent of the total workforce has increased from 4.24 % in 1991 to 7.37 % in 2001. A gender breakdown of workers reveals that 57.77 % of them (1,254,890) are female and 42.3 % (917,180) are male.

For the KUA, the increase in home-based workers in terms of the total workforce, from 1.35 to 3.43 %, although significant in numbers, has been lower than that for the state. Second, much of the increase has been confined to specific pockets within the KUA. For instance, within the Kolkata Municipal Corporation (KMC), several wards (137, 138, 139, 140, and 141) constituting the Metiabruz area, have experienced a large increase in home-based workers and accounted for 36 % of the total of such workers in the KMC in 2001. Similarly, not all municipalities that are a part of the KUA have seen an increase in home-based work, but certain areas have, for instance, those that are under the Haora District. Here, in Uluberia Municipality, home-based work as a percentage of the total workforce has increased from 4.23 % in 1991 to 14.24 % in 2001. For women workers, the increase has been from 9.50 % in 1991 to 31.03 % in 2001.

A major portion of wage work in the informal sector is done in small production units/workshops that are not covered under the Factories Act of 1948 or registered with the SSI Directorate. The 1990 State Planning Board study of the informal sector had revealed that 21 % of informal sector employees in the municipalities worked as skilled workers in factories, whereas in the city it was 20 %. The importance of production-related work can also be inferred from the 1996–1997 socio-economic survey of households in the Kolkata Metropolitan Area conducted by the KMDA (CMDA 1997). The report indicates that within the KMC area, production and related workers accounted for 22.6 % of all households whereas in other municipal areas within the KMA the percentage was as high as 29.4 % and was the single

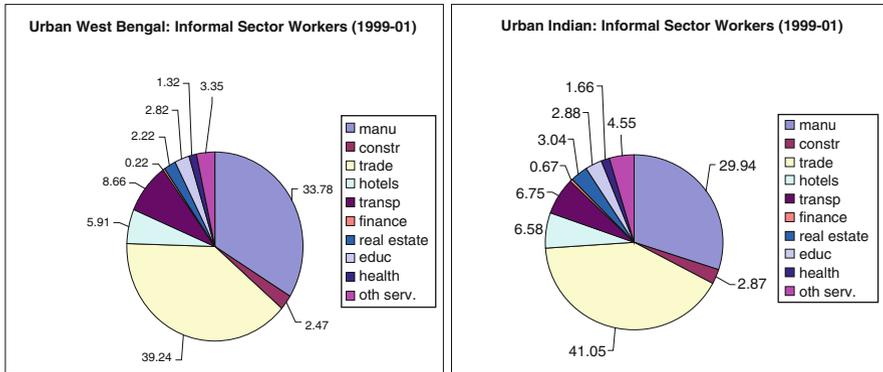


Fig. 24.1 Informal Sector in India (Source: Based on employment numbers given in Table 4, page A-26, of NSS Report No. 459: Informal Sector in India, 1999–2000, Salient Features)

largest occupational group. However, the foregoing figures relate to both the formal and informal sectors combined.

Obtaining recent data on informal sector production units alone was. However, the importance of this type of work to the economy of West Bengal and the nation is evident from the fact that the recently completed fourth all India census of small scale industries 2006–2007 indicates that, after U.P., West Bengal with 2,080,000 units has the highest number of unregistered small-scale factories/workshops and accounts for 10.47 % of the country’s total, 13.44 % of its employment, and 14.06 % of its gross output (MSME 2007).

The NSS 1999–2000 report on the informal sector provides us with actual estimates of workers in informal sector production and service enterprises (NSSO 2001). The pie diagrams given in Fig. 24.1 indicate the percentage distribution of estimated numbers of workers by tabulation category. It can be inferred from the diagrams that in 1999–2000 informal sector trade was the most important in terms of total numbers of workers in both urban West Bengal and in urban India as a whole. Next in importance was manufacturing, which we see has a significantly higher percentage of workers in urban West Bengal as compared to urban India. Thus, despite the overall trend toward services, the secondary data continue to highlight the importance of manufacturing activities in the informal economy of urban West Bengal.

The NSS 1999–2000 report, however, does not tell us anything about growth, and for this we need to turn to the Economic Census, All India Report (1998), which provides some information on the growth of small, unincorporated enterprises (manufacturing and services) and the workers employed by them during the period 1990 to 1998 (GOI 1998). Referring to Table 5.2 of this report, we find that the urban areas of West Bengal experienced a growth rate of small enterprises of 3.11 %, which is higher than the national average for urban areas at 2.5 %, but that the growth rate of workers employed by such enterprises was much less, at 1.80 %, whereas the national average was 1.34 %. However, data from the latest Economic Census, conducted in 2005, reveals a slowing down of the annual growth of enter-

prises to 2.67 % and of employment growth to 0.29 % in the urban areas of West Bengal (GoI 2008).

Turning now to the self-employed in the informal sector, the Planning Board study of 1990 indicates that, in the municipal areas, the leading five occupations were running shops (37.56 %), domestic and personal services (11.06 %), hawkers (10.91 %), craftsmen (9.53 %), and transport operatives (7.39 %). For the city areas of Kolkata and Howrah, the leading occupations were very similar. In contrast to the case of the enterprises, systematic data on growth and change since 1990 among the self-employed in the informal sector who do not own an enterprise are not available. The views of local experts and the field study of July 2005 indicate a growth in transport workers (rickshaw and van-pullers), home-based workers, and domestic services.

To summarize, there are several data sources that seem to indicate an increase in the percentage of workers in the informal sector of the KMA. However, some of these sources are qualitative in nature, and estimations of the increase in size of this sector are difficult to make on this basis. Based solely on the hard data available from the 2001 Census, which indicated a yearly increase of 24 % in household industry workers in the KMA, it can be estimated that the size of the informal sector within Kolkata City has exceeded 60 % now, whereas for the smaller municipalities it would be nearer 70 %.

24.3 Informal Sector Manufacturing Activities in the KMA

Field-based observations are mainly used for this section.

24.3.1 Those Located in Workshops or Small Factories

Informal sector manufacturing activities carried out in small workshops/factories displayed some common characteristics regardless of which municipality was visited. (1) Most production units were registered with the municipality and paid an annual tax; a few of the larger ones such as a ballpoint pen plant in Hooghly-Chinsurah, a musical instrument workshop in New Barrackpur, and a garment factory in Kalyani were registered with the SSI Directorate. (2) The premises of the workshop/small factory was a residential building; there were in most cases no signboards to indicate the presence of the workshop; without local knowledge and contacts, it would be difficult to find these workshops, and thus they are, in that sense, 'invisible' to outsiders. (3) The workshops ran on hired labor paid daily wages or on a piece-rate basis for work done in 1 day; Rs. 50 a day seemed to be an average wage, but there were wide variations depending on skill levels. In the glove factory, women workers doing the cutting took home Rs. 150–300 a week, which is around Rs. 25–50 a day, while workers doing the pasting, the most difficult job, received

Rs. 1,500–2,000 a week. (4) The size of these workshops was fairly large, ranging from 55 workers in the case of the glove factory to 10 workers in the case of musical instrument parts. (5) Manufacturing processes tended to be labor intensive rather than capital intensive; machinery was mostly limited to lathes and sharpening and grinding tools operated by motor. (6) Workshops produced on orders received from larger units/middlemen, who also supplied design specifications. (7) Working conditions were poor to very poor, particularly with regard to lighting and the worker's comfort and safety.

To compare these characteristics with those of other states, it is necessary to turn to the NSS 1999–2000 report on salient features of the informal sector. Findings in the field can be seen against the report's findings for informal sector establishments located in urban areas. By establishments, the NSS refers to "those enterprises which have got at least one hired worker on a fairly regular basis."

Regarding registration, the report reveals the following. In West Bengal, the proportion of urban establishments per thousand that register with the local body is considerably higher, at 530 per 1,000, than that found in the country as a whole (304 per 1,000); this is particularly true in larger states such as Maharashtra (162 per 1,000) and Tamil Nadu (336 per 1,000). Smaller states, on the other hand, such as those in the northeast, have fairly high proportions per 1,000 registered with the local body. This difference could have something to do with trust or assurance that local officials will not interfere or disrupt the functioning of the enterprise.

Regarding the location of the enterprises, the report indicates that the proportion per 1,000 of urban establishments located within household premises in West Bengal is 185, which is higher than the national average of 104. However, a much larger proportion, that is, 780 per 1,000, is located outside household premises in urban West Bengal as in the country (837 per 1,000). My finding that many of the manufacturing units were located within a residential premise can be explained by the fact that the NSS data on urban establishments cover all kinds of activities, not only manufacturing. Included under establishments are sectors such as construction, trading, hotels, transport, finance, real estate, education, health, and other community services, most of which would require premises separate from the household.

Turning now to payment for hired labor, the report indicates that this is significantly lower in the urban establishments of West Bengal, at Rs. 15,839 a year, as compared to the national average of Rs. 21,681. Monthly wages in urban West Bengal stand at an average of Rs. 1,320, which is around Rs. 330 a week or Rs. 55 a day for a 6-day working week. The field-based finding, that the average payment is Rs. 50 a day in most workshops, is very close to this figure derived from aggregate data. Annual payments for hired labor in urban establishments in Maharashtra (Rs. 25,804), Gujarat (Rs. 28,108), Tamil Nadu (Rs. 20,301), and Andhra Pradesh (Rs. 18,499) highlight the smaller earnings made in West Bengal.

Regarding the average size of informal sector establishments in the urban area, the NSS report indicates that the all-India average is 4.3 workers. For urban establishments in West Bengal, it is 4.0. There is very little variation among the states regarding size, with Maharashtra (4.9), Gujarat (4.6), Karnataka (4.3), Tamil Nadu

(4.2), and Andhra Pradesh (4.2) being a little more than West Bengal. What is clearly evident, then, is that the units visited were much larger in size as compared to most establishments and possibly even manufacturing establishments, in the informal sector. Second, in the economically better-off states, generally units employing more than 10 workers with power or more than 20 workers without power are registered under the Factories Act, 1948. Detailed field studies of the ceramic industry in Gujarat (Das 2004) and bakeries in Mumbai (Dewan 2001) reveal this to be the case. Thus, in the small-scale ceramics industry in Gujarat, units registered under the Factories Act had an average of 23.2 employees whereas those unregistered had 6.3 employees. Similarly, in the bakeries of Mumbai, formal sector units had an average of 21 workers and the unregistered units had an average of 4.5 workers.

Regarding the labor intensity of manufacturing processes and poor working conditions in informal sector manufacturing units, detailed case studies from different parts of the country have verified these aspects. For instance, in the case of the ceramic industry in Gujarat (Das 2004), it was noted that the technology used was simple, and workers experienced long hours of work, unprotected from the handling of hazardous substances. It was also noted that the gross value added in the registered sector was about seven to ten times higher than that in the unregistered sector.

Finally, regarding the fact that owners of informal sector manufacturing units produced on orders received from middlemen, the NSS survey of 1999–2000 indicates the following: for home-based enterprises, 851 enterprises per 1,000 manufactured on the basis of orders from a larger enterprise or a contractor/middleman. For all urban establishments, in general, there is predominantly one agency for purchase of basic inputs (813 per 1,000) and one agency for sale of the final product (856 per 1,000). Thus, our findings in the field are supported by the aggregate data.

Apart from the common characteristics of the informal manufacturing units that have already been discussed, the field visits also revealed some interesting contrasts among small entrepreneurs. The contrasts centered on whether the entrepreneurs were interested in supplying export markets or content with their existing markets, which were generally local and, sometimes, national. Those who were already supplying export markets, for instance, the makers of musical instrument parts in New Barrackpore, produced high-quality products made of the best materials available and with an excellent finish: these items included violin chin rests, tailpieces for double basses, violin chord frames, violin shoulder rests, and pegs for violins, violas, and cellos made from ebony and rosewood for buyers in Europe, the United States, and Taiwan. Entrepreneurs were optimistic about the market and available local skills. They recognized the skills of their workers and believed that they could compete successfully.

A second category of entrepreneurs were a few who were currently producing only for the local market but were aiming to enter the export market very soon. An example of this was the owners of a fairly large surgical instruments factory in Baruipur producing ophthalmic instruments. The workshop, one of the largest of its kind in Baruipur, had 18 workers and was 16 years old. It was owned and managed

by a husband-wife team who now planned to export their products. They wanted to make their company a private limited one and take all the necessary steps to fulfill the quality requirements of an export market, including payment of full benefits to workers. They had already begun their search for customers through the Internet. This category of entrepreneurs was also optimistic.

A third category of entrepreneurs consisted of those who were just about breaking even and did not see much potential for growth in the specific industry. The manufacturers of shuttlecocks and ballpoint pens were in this category. The shuttlecock small industry was shrinking in Uluberia partly because of the entry of numerous small units undercutting the profits of larger units such as the one we visited that had 20–22 workers. A shortage of the supply of fine-quality white duck feathers from Bangladesh was another major constraint. In the case of the ballpoint pen industry, the competition was from larger units and from outside the country. A local manufacturer in Hooghly Chinsura with a 5-year-old factory and 20 workers explained to us that unless he shifted from hand-molding his products to auto-molding, he would not be able to survive the competition from big companies and Chinese products. To make this transition, he needed a large loan, which was very difficult to procure.

A final category is made up of the manufacturers of artisanal products for which demand has fallen to such an extent that the industry is in rapid decline, for instance, the production of brass metal utensils. We visited a factory in Hooghly Chinsura employing around 10 workers and operated without mechanical power. Entrepreneurs of such units were barely surviving.

24.3.2 Formal Sector Factories Operating on the Basis of an Informal Workforce

Estimates of the size of the informal sector are complicated by the presence of many formal sector factories that employ workers on an informal basis. A notable example of this is many of the foundries of Howrah, which are covered under the Factories Act of 1948 but employ contract labor. Two such foundries were visited. They too provided a contrast in entrepreneurship styles and prospects for growth. The first had six permanent workers and 36 contract laborers and produced around 200 metric tons of iron castings a month, 95 % of which was being exported to the U.S. and Dubai. In spite of being a vertically integrated plant where upgradation of technology takes place every 4–5 years, we found the processes to be very labor intensive and the quality of output at a basic level. Daily wages began at Rs. 50 a day. However, the commercial manager of the plant, a B.Com graduate, was optimistic about growth in the foundry industry, which he pegged at 7–8 % a year. Although no new foundries were coming up, there was a good demand for their output through exports. In contrast to this, the second foundry with 28 workers produced iron castings for the local market and was just about breaking even. Technologically, both plants were at the same level, the difference being largely one of markets served.

24.3.3 *Home-Based Manufacturing Activities*

As has been indicated earlier, this is an important component of informal sector work, one which has been growing within West Bengal and within the Kolkata Urban Area. The most important kinds of home-based work that were encountered in the field visit were *zari* work and *bidi* rolling. *Zari* is basically a brocade of tinsel thread meant for weaving and embroidery, and *bidi* is a thin Indian cigarette filled with tobacco flake and wrapped in a leaf with a string at one end. Similar to the informal production units located in residential premises, these activities too are almost invisible to outsiders, and only with known contacts can such production sites be located. However, in contrast to the former, these activities are based on family labor and involve both adults and teenage children of the family.

In Uluberia there are at least 20,000 people, mostly Muslims, engaged in *zari* work, which is done via small workshops as well as in the home, the ratios being 25:75, respectively. We visited a few workshops as well as a few homes of *zari* workers. The workshops, run by middlemen, referred to locally as *ostagars*, are located in large huts containing two or more wooden frames for doing the *zari* embroidery. All workers are young men. Working about 13–15 h a day, they make about Rs. 100 a day. It is intense work requiring very good eyesight and concentration. Generally, the material to be embroidered is supplied by the *ostagar*. Workers have to buy their own thread, beads, and other decorating accessories. A number of such shops flourish in the local bazaar.

Within the homes, both men and women do this work, often to the sound of taped music to maintain their concentration. With three family members working several hours each day, they make about Rs. 1,000 a week. It is very laborious work with high penalties for small errors, for instance, a small mark or stain in the material can result in rejection of the product by the *ostagar*. The families who undertake to do *zari* work are very poor and have little bargaining power against the *ostagar*, who dictates prices, quality, and designs. Since the early 1970s, Uluberia has become a centre for *zari* work, particularly among the poorer households. Although some of the finished work caters to the local and national market, some of it is exported to countries such as Dubai. Although the final prices charged for embroidered work are very high, the profits go to the *ostagar* and not the workers, who have remained an impoverished group.

Similarly, *bidi* rolling is also done by poorer households to supplement their incomes and is done both as home-based work and in small workshops. As home-based work it is done by women, and earnings are very low in spite of intense and long hours. For every 1,000 *bidis* rolled, the payment is Rs. 35. Generally, it takes 1 week to roll this quantity. When done in a workshop, the payment is higher, around Rs. 60–80 a day, but for the poor women taking in home-based work is more convenient than having to go to a workshop, and lacking bargaining power, they accept a lower rate from suppliers/middlemen.

24.4 Informal Sector Service Activities

In contrast to the manufacturing work done within the informal sector where invisibility is a prominent characteristic, given that the location of such activities is most often the home or residential premises, service activities in the informal sector, other than personal services, are highly visible. Activities such as hawking, peddling, driving rickshaws and vans, working at construction sites, lifting loads at transport terminal points, are all eye catching and can involve the use of public space, for example, the streets. Hence, there is often a tendency to see the informal sector through its service activities and to report growth and change in terms of these activities alone. In this study we have avoided this overemphasis on the more visual elements within the informal sector by our detailed discussion of the more 'invisible' production activities within the informal sector. However, it is now necessary to focus on the service activities as they constitute an important aspect of informal sector work and also engage a growing majority of the self-employed.

In all the field visits and from many of the filled questionnaires returned, representatives of the municipalities have repeatedly highlighted the significant increase in occupations such as street hawking and rickshaw/van driving. This change has been noted in particular in the jute-dominated municipalities where the gradual loss of jobs in the jute industry caused by the closure of the jute mills is forcing workers to look for other avenues of work. As we have noted earlier, the average daily earnings in these occupations are higher than in informal sector manufacturing work. In Howrah, the average daily earnings of a rickshaw driver are Rs. 150 while that for a hawker are between Rs. 200 and 250 a day. In the small-scale factories that we visited, only the very highly skilled, including masons or *raj mistris*, made such high daily earnings. However, too many entrants into rickshaw pulling and hawking would not only reduce individual earnings through excessive competition but also lead to other problems such as overcrowding in streets. Second, in spite of higher earnings as compared to production workers, they are still a poor group with fluctuating earnings. For rickshaw and van drivers, there are also health-related problems.

Of the 40 local bodies to which the LED questionnaire was sent, 24 responded with the details we sought. The following is based on a summary of these 24 questionnaires. The importance of the informal sector emerges very clearly from the survey. Of the five leading occupations of households in the local body, the informal sector accounted for at least three. In Uluberia (zari), Maheshtala (tailoring), Halisahar (construction work), Bansberia (construction work, *bidi*), Baranagar (wage work in small manufacturing), Uttarpara-Kotrung (brickmaking), and Hooghly-Chinsura (small manufacturing), the leading occupation in terms of numbers of workers is in the informal sector. The table given next indicates the informal sector occupations mentioned by municipal chairpersons/mayors as being among the leading five occupations of the ULBs; it highlights the leading informal sector occupations in different local bodies by economic sector (Table 24.2).

What emerges very clearly is that agriculture and other primary sector activities are now marginal in all the municipalities and the majority of the informal sector

Table 24.2 Leading informal sector occupations in 24 municipalities of the Kolkata metropolitan region

Urban local body	Informal sector manufacturing	Informal sector services	Informal sector: primary activities
Uluberia	Zari, biri	Rickshaw/van pullers, housemaids	
Maheshtala	Tailors, leather and leather products, firecrackers	Construction workers	
Baidyabati	Saree printing, wooden furniture making	housemaids, small vegetable vendors	
North Barrackpore	Making bricks	Construction workers, rickshaw/van pullers	
Kalyani	–	Construction workers, housemaids	
Garulia	–	Rickshaw/van pullers, housemaids, hawkers	
Panihati	Small entrepreneurs	Hawkers, rickshaw/van pullers	
Halisahar	Small entrepreneurs	Construction workers	
Khardah	Small entrepreneurs	Rickshaw/van pullers	
Bansberia	Biri	Construction workers	Fish
Baranagar	Wage work in small manufacturing units, plastic goods	Housemaids, hawkers, rickshaw/van pullers	
Chandanagar	–	Shop workers, rickshaw/van pullers, hawkers	
Uttarpara-Kotrung	Brick making	Rickshaw/van pullers, construction workers	
Baruipur	–	Housemaids, rickshaw/van pullers	Agriculturalists
Bhadreshwar	Small entrepreneurs	Rickshaw/van pullers, housemaids	
New Barrackpore	Small manufacturers	Small shops, rickshaw/van pullers, housemaids	
Budge Budge	Small entrepreneurs, small manufacturers		
Barrackpore	–	Construction workers	
Rishra	Small manufacturers		
Kachrapara	Small entrepreneurs	Daily laborers, housemaids	
Hooghly-Chinsura	Small manufacturers		
Bhatpara	–	Construction workers, rickshaw/van pullers, hawkers	
Madhyamgram	Home-based industries, small entrepreneurs	Hawkers, rickshaw/van pullers	

Source: LED Questionnaire Survey (2005)

occupations are either in small-scale manufacturing or in services. The importance of rickshaw/van driving, hawking, construction work, and domestic work is clearly highlighted.

24.5 Including the Informal Sector in Local Economic Development

The large and growing size of the informal sector has many implications for local economic development. It is the source of employment and earnings for the majority of the municipal population; urban local bodies need to pay this sector much greater attention, particularly in view of the fact that employment in the formal sector and, specifically, the organized manufacturing sector, has, since 1984–1985, grown very slowly (Rani and Unni 2004).³ The formal sector's ability to absorb low-skilled labor has been very limited. Most of the municipalities that responded to our questionnaire already had in place some programs to assist the informal sector. We need to focus on these to highlight their strengths and shortcomings.

24.5.1 Programs and Activities Currently Being Followed by ULBs in the KMA

The LED questionnaires have provided details on the activities undertaken by the municipalities to assist the poor, as follows.

1. Provision of training in various skills

Almost all the municipalities have in place training programs under the centrally sponsored SJSRY (Swarna Jayanti Shehari Rojkar Yojna). Through this, training is being provided to individuals from BPL (below the poverty line) households in vocational trades such as radio and TV repair, computer training, tailoring, soft toy making, beauty parlor skills, making jute products, auto rickshaw/rickshaw repair, making of foam leather bags, knitting, and *batik* and *zari* work. However, unless such training is backed by market demand for the specific products or services, earnings from such activities will remain uncertain. In fact, in several instances, for example, in Uluberia, only the training provided in *zari* work has been successful in that it has actually led to an increase in the numbers of poor families doing this to supplement their incomes. In Bhadeswar, some training courses have succeeded, for instance, tailoring, knitting, beautician courses, soft toys, telephone repairs, nursing, and furniture repair. However, others such as the making of jute products, food

³ According to these entities, the annual growth in the organized sector was 0.65 % between 1984–1985 and 1989–1990, 2.13 % between 1989–1990 and 1994–1995, and 0.70 % between 1994–1995 and 1999–2000. Immediately following economic reforms there was a surge in organized sector employment, but this did not last long.

processing, radio/TV repairs, two- or three-wheeler repair, watch repairing, and refrigerator repairing have not worked, because of the lack of credit. These vocational trades require some investment of capital, for instance, for the basic tools needed for repair work or a sewing machine for tailoring/making bags. Unless some credit is extended to trainees, these trades are not engaged in and many trained individuals are unable to set up the service/activity on their own.

2. Assistance in procuring credit

A few municipalities have assisted the poor in securing credit. The Panihati municipality has helped people to get loans from banks. Halisahar, Baranagar, and Uttarpara municipality have helped by providing references for bank loans.

3. Employment generation

Regarding employment generation, only 1 municipality of the 24 that have responded to the LED survey had in place innovative projects to generate employment among the poor. In Kalyani municipality, there is a small restaurant called 'Tripti Mahal' run by ten poor women through the SJSRY scheme. The land and the building have been provided by the municipality. The building is an old municipal pump house that was not in use. Similarly, the organization 'Astha,' run by a few women, manages a number of bicycle stands such as those at the stadium and near the municipal markets. The women charge 1 rupee for keeping the bicycles. 'Nasta' is another example of a canteen set up near the central park and run by ten women. It provides home delivery food items as well.

4. Creation of infrastructure to facilitate economic activities

Several municipalities have gone ahead to build markets, marketing zones, etc. to facilitate economic activities in the informal sector. In Kalyani, rows of small shops have been built on municipal land for hawkers. Thus, the hawkers are now formal owners/renters of the stalls. In Kalyani there is also Saptaparni, a large marketing complex with more than 200 small shops created to house small shopkeepers. Chandanagore has created some marketing infrastructure such as stalls for its hawkers along the riverfront. In New Barrackpore there is 'Kristi,' a marketing complex built by the municipality for small shops. Rishra municipality is in the process of providing space to vegetable and fish vendors.

24.5.2 Future Directions for Greater Inclusion

Although the foregoing attempts at improving the lot of the informal sector have brought some success, there is need for greater inclusion of the informal sector in local economic development. For this, both broad-based strategies as well as targeted strategies are needed. The broad strategies include the following:

1. Improving the available skill set of the local population through education remains a cornerstone for any long-term success in improving prospects for people in the

informal sector. Because the ULBs own and manage a large number of local schools, an improvement can help the processes highlighted here.

2. Improving health facilities and social security nets for the poor is another fundamental need of informal sector workers. The health centers run by the municipality can be improved to provide better services. The state social security programs, for instance, the PF Program for unorganized workers, can be implemented via local government. Because local-level government in small towns has an established presence and is known through direct contact, it may be more successful in alerting the targeted group to enroll in such programs.

However, ULBs need to view the informal sector not just in welfare terms but also as a vehicle for serious economic development, and for this aspect, strategies targeted at the different components of the informal sector are needed. The capacity of the informal sector to absorb low-skilled labor in a diversity of manufacturing activities that generate considerable output for the state must be kept in mind. Viewing the informal sector only in welfare terms will limit any long-term goal of local economic development and not lead to any sustained increases in efficiency and productivity or to any improvement in the quantity and quality of jobs in the local area. Second, because there is considerable variation in earnings and opportunities within the different segments of the informal sector, no blanket policy can be offered. Some of these segments are highlighted here and suggestions offered.

1. There is a small dynamic element within the informal sector characterized by export-oriented entrepreneurs who value skilled work and produce high-quality goods; opportunities for growth and the improvement of wages and technology exist in such enterprises. ULBs need to facilitate the growth of the dynamic elements within the informal sector. Recognizing dynamic individuals and assisting them locally via access to upgradation programs and marketing outlets, such as provided in national and international fairs, can go a long way in nurturing local enterprise. Municipalities can also use dynamic entrepreneurs as resource persons to impart training to other local entrepreneurs in the same industry. Some successful entrepreneurs have expressed willingness to be involved in this way. Mr. Prasanta Biswas, owner of the Usha Art Emporium and a manufacturer of musical instrument parts in New Barrackpore municipality, is an example.
2. The majority of producers within the informal sector operate at very low levels using cheap labor as the main competitive point to remain in the market; poor wages and poor working conditions coupled with low-end technology characterize such units. The future for these 'sweatshops' and their workers is uncertain unless they upgrade. However, even apart from contributing to the manufacturing output of the state, such units provide employment to large numbers of the local population, and their upgradation and improvement should be an important concern of the ULBs. The ULBs must try to be more proactive regarding these units rather than simply turning a blind eye to their activities.

The approach in regard to these units has to be facilitatory/advisory and regulatory. Loans are a major requirement for technological upgradation. Facilitating access to loans from local banks and state-level institutions would immensely

help those entrepreneurs wanting to upscale and improve production. Efforts can be made by ULBs for a minimum improvement in the working conditions and safety of workers. Some of the units visited were in violation of basic building codes and of health and safety norms. The municipality can also send local entrepreneurs for training and expose them to better ideas and technology through encouraging participation in state/national trade fairs.

3. Home-based work wherein high levels of skill and long hours of work are not remunerated adequately because of the presence of middlemen traders who siphon off the profits through trade is unfair. Thus, zari workers and *bidi* workers in the informal sector are among the most impoverished.

Forming a co-operative of home-based workers in a particular area and helping them to sell directly to the market would ensure that a greater amount of the profits remain with the workers. However, organizing the workers to form a co-operative itself is a difficult task and is best done by experienced NGOs. The municipality can invite such an NGO to undertake this task on its behalf and assist by providing a marketing outlet or display center in the municipal building itself. The experience of SEWA (Self-Employed Women's Association) in forming cooperatives of home-based embroidery workers in Kutch and Patan is worth considering.

4. For service sector workers, supportive policies in regard to their presence via the issue of licenses, building of proper rickshaw stands, provision rate charts, access to credit facilities, and social security were among the suggestions made by their representatives.

24.6 Conclusion

One concludes with the observation that many of the municipal authorities had indicated their feeling that, in recent years, the increased efforts of the state government to bring industry into the state has meant that municipal control over local economic development is declining. The state government directly allots land to these industries and monitors them. The new economy industries are thus mostly out of the control of local government. However, as has been highlighted in this chapter, there remains a large segment of the economy of metropolitan areas supporting a majority of the working population wherein the activities of local government can play a critical developmental role. The informal economy of the small municipal towns within the KMA can be assisted both in targeted ways through sector-specific policies as well as through a general improvement in public goods such as education, public health, and social security. This assistance would lead to long-run improvements in the local economy through an upgradation of local skill sets, health and life expectancy, and productivity from small enterprises.

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Chapter 25

Playfully Negotiating Publics: Children, Space, and Activism in the City

Ann Marie F. Murnaghan and Ranu Basu

Abstract The multiple dimensions of urbanity can be examined and understood through the creative agency of children who redefine and mold cities. Despite the many barriers that children face in negotiating city spaces, particularly those in vulnerable and marginal situations, we argue that children express an active citizenship through their playful everyday lives. Framing children's geographies within a governmentality framework, we demonstrate through two case studies that children are able to renegotiate power relationships within city spaces in exciting new ways. The multiple, layered, and textured dynamics of a city are brought into full view that often escapes rational planning exercises. By means of the case studies of New York newspaper sellers at the turn of the twentieth century and child panhandlers in Fatehpur Sikri, we argue and theorize for a new city-child-scape that is less formidable and democratically engaging. This new landscape bridges the difference through the sameness of humanity, emotion, and possibilities.

Keywords Children's geographies • Governmentality • Urban spaces

Urban spaces are sites of contradiction and contestation. For many social and political geographers, it is in fact these negotiations or struggles over space, its meanings and its substance, that make the urban environment an important site to study. Public spaces in cities are made public through the struggles over the contradictions between *intended* users and uses of space (exemplified by their naming or planning purposes) and their *actual* users and uses (as seen on the ground or in historical records). Children in public spaces often disrupt taken-for-granted ideas about adult use and understandings of space and what it means to participate in the democratic public sphere. As holders of rights, but not-yet-citizens in the eyes of the direct democracy, the discourses of children are laden with meanings most often imposed

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by adults, but we rarely accept children as social actors in their own right. These claims to space are important and valuable contributions to counter-histories and accounts of subjugated knowledge.

One of the many dimensions of urbanity can be examined and understood through the creative agency of children redefining cities across the globe. Despite the many barriers that children face in negotiating city spaces, particularly those children in vulnerable and marginal situations, we argue that children still struggle to express an active citizenship through their playful everyday lives. Framing these children's geographies within a governmentality framework, we demonstrate how children are able to renegotiate power relationships within city spaces in exciting new ways. The multiple, layered, and textured dynamics of a city are brought into full view through the cracks that emerge using the lens of children's perspectives. These cracks and fissures are precisely those that often escape rational planning exercises, which often form the dominant discourses in discussions of urban space.

We begin with a discussion underlying the theoretical premise of this chapter, the disciplining and regulating power of governmentalities. We move on to discuss why examining children in cities is a useful technique for exploring power as children's ability to change urban landscapes is often overlooked because of their political marginality as agents. The third section of this chapter explores the two case studies that we use to illustrate how children negotiate their own livelihoods through unique spatial experiences. The first case is an historical analysis of striking newspaper sellers at the turn of the twentieth century in New York, United States. The second case is a contemporary discussion of child-hawkers in the ruins of the ancient Moghul city of Fatehpur Sikri, India. These two different methodological avenues complement each other and help to illustrate the similarities in the regimes of power and resistance across space and time. The fourth section discusses how these cases are linked, and points to the political possibilities that emerge from these incidents, and the importance of reading these situations differently but together. We conclude with an assertion about the ways that these insights can re-inform discussions of governmentality at a variety of scales and sites. Ultimately, we argue and theorize for a new city-child-scape that is less formidable and more democratically engaging. This new landscape bridges differences through linkages afforded by the sameness of humanity, emotion, and the possibilities that are coiled in the everyday.

25.1 Children in Cities

In this chapter, we examine children primarily because of their particular position in urban discourses: that is, they are part of representational discussions of the city as well as the physical spaces of the city. These two sets of discussions overlap, and we should always be conscious of how these two sets interact and relate to each other. As geographers we are interested in the ways that the spaces used by children are in place and out of place (Cresswell 1996). Examining these places over time can help

us to understand how “unnatural” the natural spaces are for children. We discuss three conceptualizations of the concept of “child” that will help to define how children can be biological, or a social invention.

A fundamental assumption of children’s studies states that childhood is a social construction, an idea that is embedded in a very particular nexus of historical and geographic knowledge. Until recent times, children were seen as miniature adults (Ariès 1962) and not a separate category that were to be held apart and made to be seen as different (Foucault 1990). This definition came with an increasing conception that children should be treated differently than adults, and by the twentieth century in North America, Child Saving Movement emerged that sought to set (certain) children aside from adults, providing them with separate services and spaces to cater to their different needs (Platt 1977; Zelizer 1985). The new behavior that this separate category inspired allowed for a whole different set of institutions that changed the relationships between adults and children by creating exclusive spaces that would ensure their separation outside the home. Children’s prisons and hospitals were created, and children forced out of workplaces and off the streets into schools were two of the main legislative effects of this categorical creation.

Another key contribution of the New Social Studies of Childhood is the assertion that children are social actors in their own right and are by no means a homogeneous category (James and Prout 1990). The category of child previously alluded to is usually determined in two ways: socially and biologically. In social relationship to the state, children are primarily defined by age, that is, exclusive to the group of individuals who are adults defined by age of majority rules: the age of majority that enables certain rights of personhood to certain groups of people, such as the ability to vote or participate in elected office. Other rights are accorded by age, including driving rights, the ability to give sexual consent, the ability to engage in the labor market, and the requirement to attend school. These categories are socially determined and have important geographic and historical particularities. Even within nations, the age at which an individual can drive a car can vary. Globally, there is little agreement on when an individual can purchase and consume alcoholic beverages, hinting at the culturally specific and constructed nature of the responsibilities of persons.

Biologically, adult can refer to the point at which children reach sexual maturity and can reproduce. This marker is important physiologically, and in many non-Western cultures it is still an important indicator of maturity and entrance into the adult role. In North America, this marker was an important one in terms of regulating children’s work: 12 and 15 were important years in the labor legislation of the turn of the twentieth century. As the length of time that children spend in public education has increased, the importance of the bodily relationship to childhood seems to have diminished, and has been pushed further to the end of adolescence, which was itself a concept created in the mid-twentieth century! However suitable this distinction is for people’s ability to reproduce, it varies from individual to individual and as such has limited usefulness for creating groups of people, especially in the regularized society of current times.

Children's geographers have shown how important it is to examine how children's agency and political capacities are often overlooked in cities, especially North American ones (Chawla 2002). What the contemporary research has also shown us is how children live differently in non-North American cities where their labor is part of the behavior of the family unit. We want to expand the boundaries of children's geographies and show how children's labor has been a useful site for the assertion of their own identities and subjectivities across space and time. Here children are seen as competent social and spatial actors, even if (as all of us) they are living in a highly regulated world. Children's constant play in the public sphere disrupts the homogeneity of regulated and disciplined space. Although children are often disciplined in public space, it is often public space in which they in fact have the most privacy (Valentine 2004). Play can disrupt taken-for-granted ideas about space (Flusty 2000), and allows flexibility in a way that we can understand how public ideas are negotiated and renegotiated on a daily basis.

25.2 Using Governmentality

Governmentality, Michel Foucault's neologism for the complex regime of knowledge, apparatus, and tactics employed to control groups of people, has been employed in geographic analysis for more than 15 years (Huxley 2007). Governmentality is particularly useful in understanding the complicated negotiations of children's playful geographies that we would like to put forward in this chapter as it links together concepts of regulation and discipline, from their broadest and most abstract notions all the way down to the minuscule details of bodies, objects, and their articulations. Governmentality, or the art of governance in a much wider sense, is not limited to state politics alone but is linked to a much broader array of control techniques from the 'self' to the management of populations (biopolitics). In the case of children such control would enter the realm of institutions such as schools, orphanages, hospitals, juvenile prisons, and into the public sphere and beyond, where control is diffused through the techniques of power. Governmentality rethinks governments and societies through various ways of operationalizing children, for example, how they must learn to live and behave, disciplining the mind and body and confirming to a normalization of values (class/gender/age/race/caste) and moralities deemed necessary for a capitalist state to survive and reproduce itself along these axes of power.

Foucault's understanding of power as diffuse, decentred, and uncoupled, however, challenges static ways of power as limited and bounded. As a contested realm, technologies of power operate through a variety of strategies and tactics that redefine autonomy and freedom. Knowledge–power relationships, particularly, as we illustrate in the following examples, are negotiated 'playfully' through public spaces of cities to defy the hardship and excruciating circumstances of life and death. In other words, we highlight the counter-mentalities and counter-governmental rationalities through the creative alternative conducts of children. This emphasis allows

us to understand how children, and particularly the most marginalized of children, are connected to state, space, and society and how we as a society respond to their claims.

25.3 Case Study 1: Working Children in the West: *Newsies in the Recent Past*

In the Disney musical *Newsies* (directed by Kenneth Ortega, 1992; recently reprised in live action on Broadway), the Newsboys Strike of 1899 is fictionalized into a story about the protagonist, played by actor Christian Bale. In this film we see the public spaces of the city as the places of the newsboys. We travel from their home in the Newsboys Orphanage to the paper distributors where they pick up the papers that they are going to sell. From there we see them organizing, playing, and working together to sell their papers, while trying to avoid Snyder, who wants to put them in “The Refuge,” a House of Refuge, which was the equivalent of a youth correctional facility, or prison. This film resembles the narrative of *Hugo* (book written by Brian Selznick 2007; film directed by Martin Scorsese 2011) wherein the protagonist Hugo keeps the clocks running at Station Sud in Paris after the death of his father and his abandonment by his uncle. Hugo must evade the station’s inspector, who does not know that Hugo, not his uncle, is in charge of the station. The narrative of the abandoned child (or group of children) making it on their own is a classic in the coming-of-age genre of books and films. Freed from the authority of parents, the children become autonomous subjects in a world that does not recognize them as having any legal rights. They thus spend their time trying to elude the grips of authority, which makes for risky and adventuresome stories.

So, although *Hugo* is set in a fantastical world, the set of the *Newsies* story is highly realistic. A fascinating look at the primary documents around *Newsies* is currently available at <http://newsieshistory.tumblr.com>. In the 1800s, the main source of news was newspapers sold by children on the streets of North American cities and towns (Nasaw 1985). These boys and girls sold the morning, afternoon, and evening editions of dailies, which often based their sales on sensational stories and gripping headlines. Children were employed in many other occupations that worked in the streets, such as bootblacks, messengers, pencil and flower sellers; in homes, working on sewing and other handicrafts by piecework; and in factories, rolling cigars and working textile machines. Before reformers such as Jacob Riis and Lewis Hine were documenting the deplorable working conditions that children as young as 5 years of age were facing in the factories that has mushroomed in the wake of the industrial revolution, it was business as usual for children who were supporting themselves or helping to augment their family’s income with their earnings.

One of the key sites in the film *Newsies*, and in the lives of many of the newspaper-selling children, is the orphanage or Newsboys’ Home. Across North America, these institutions sprang up in response to the high number of children paper sellers living on the streets in the 1800s. Children’s Aid Societies, philanthropic

organizations that were established to address the problem of homeless children, often ran these institutions to help children, in contrast to the Houses of Refuge, which were organized around punishing children for their situations. The Newsboys' homes would become important places for the children to congregate and organize around issues that were important to them.

The main event in the film is the Newsboys Strike of 1899 in New York City when more than 5,000 paper sellers went on strike to improve their working conditions and wages. Newsboys had struck before, as early as 1844, but the strike of 1899 was the biggest and most influential: the children had the ability to significantly limit the transmission of news by stopping delivering the papers of Joseph Pulitzer (*The World*) and William Randolph Hearst (*The Journal*). The strike was incited by an increase in the amount the sellers had to pay for their papers (from five to six cents per paper). The main historian of this event, David Nasaw (1985), argues that the union was organized on July 19, 1899 after a spring-long discussion of the events in their main public meeting place of City Hall Park and the newspaper offices on Park Row. In contrast to many other occupations, paper sellers work on the streets and sidewalks, the main public spaces of most cities. These areas became their organizing and striking grounds, blocking the delivery wagons, intimidating scab workers, and posting signs imploring patrons not to buy the *World* and *Journal*. The competing newspapers tellingly documented with great detail the news of the strike, which carried on until August 2, 1899 when the papers agreed to buy back unsold papers (the costs of which the boys had to previously cover themselves). Although the union was an informal network instead of an institutionalized form, the work that it did through the uniting of the sellers limited the production runs by more than two hundred thousand papers per day. Other groups of child workers, such as the boot blacks and messengers, also learned from the case and organized some of their own strikes throughout the next decades for better working conditions and fairer wages (Nasaw 1985).

25.4 Case Study 2: Fatehpur Sikri: Enlivening a Ghost City

Fatehpur Sikri, the grand capital of the Mughal Empire in the late sixteenth century, is a UNESCO World Heritage Site. The archaeological site contains an array of monuments (built of red sandstone), mosques, and temples and is a tourist mecca en route (with a slight detour) for those visiting the Taj Mahal in Agra. Built in 1571 by Emperor Akbar, the 'City of Victory'/'Dream City' holds a particular significance as the place where his spiritual guide Salim Chisti predicted the birth of his son Jehangir. Fatehpur Sikri was the capital for around 10 years and was abandoned by 1585 because of the shortage of water. A part of the city-fort remains, exhibiting the architectural beauty of the Jamma Masjid (grand mosque), Diwan-i-Kas (Hall of Private Audience), Panch Mahal, the pavilion of Anup Talao, the palaces of Jodha Bai (Empress) and Birbal (minister), a monument dedicated to Hira Minar (his favorite elephant), and Buland Darwaza as the grand entrance. Aside from

architectural and historical interests, Fatehpur Sikri is also regarded as a pilgrimage site for women interested in fertility and who have had difficulty bearing children.

On two most recent visits (2011, 2009), I was able to spend 2 days at the site and observe the rhythms of this city. What is of particular interest is the way Fatehpur Sikri is inhabited by child-hawkers: active citizens enlivening the ghost city with their own particular ways of being. In an ancient city where women travel from far and wide to pray for fertility and children, it is paradoxical to note the benign neglect of the 'othered' children whose presence imbues the essence of this city. Selling wares (necklaces, key chains, pottery, and figurines), tourist booklets, albums, and even (most impressively) reciting 'shaharis' (poetry) and performing magic, they use their creative energy and entrepreneurial skills in many different ways to earn a meager livelihood. The fierce intelligence of these children often took me unawares as they recited long complicated poetry with style and dexterity, memorized and watched tourists purchases, noting preferences and waiting for the best moment to persuade what might be the 'best deal' or what they had forgotten to purchase, to navigate behind guards and the ruins of the city to offer you a rare glimpse of some history that might not have caught your radar.

Survival, however, does not allow brilliance to triumph over class, caste, and histories of oppression. Some worked on behalf of other shopkeepers while most, surviving from day to day, contributed toward the family income. The extreme poverty of the children who are often dismissed or disciplined by local guards when attempting to make a livelihood is a cruel reminder of the continued state of neglect and exclusion of children, despite the progress and change touted in the twenty-first century in both developing and developed nations across the world.

In fact, the extreme social polarization and income inequality alongside exploitation suggests that the 'rights of the child' are variegated deeply embedded along lines of class/caste/gender and further become subsumed in a growing middle-class society catching the global wave of economic development. Yet the children are acutely aware of these divisions and try to bring awareness in their own playful way to the conditions of their lives to the visitors that pass through from far and wide. In a capitalist society, however, rendering such poverty invisible and away from the tourist gaze is important in maintaining the grand image of a heritage site as majestic and devoid of any kind of exploitation. Tourists' reactions align with such sentiments, ranging from irritation to annoyance, from pity to amazement.

The children of Fatehpur Sikri are a microcosm of the conditions and plight of children around the world facing poverty and neglect. Yet, through their everyday resistance they find strategies and techniques of empowering their selves and livelihoods. Childhood is understood differently for those most marginalized and regulated by various agents of the state and civil society. Yet the children of Fatehpur Sikri play an important role for us to rethink social justice, notions of childhood, and civil rights in an ever-changing global world. However, their message has a long way to travel to symbolically merge the grand narratives of the 'UN World Heritage Site' with the grounded everyday street-level realities of the UN 'Rights of the Child'.

25.5 Conclusion

At the outset of this chapter, we argued that the multiple dimensions of urbanity can be examined and understood through the creative agency of children who redefine and mold cities. Despite the many barriers that children face in negotiating city spaces, particularly those in vulnerable and marginal situations, we have illustrated how children express an active citizenship through their playful everyday lives. The two case studies highlight how children are able to renegotiate power relationships within city spaces in exciting new ways yet are bound and restricted by deep poverty, and sometimes by class, caste, race, and gendered structures and histories of exploitation. Multiple, layered, and textured dynamics of a city (including ghost cities) are brought into full view that often escape rational/touristic planning exercises. Through the case studies of New York newspaper sellers at the turn of the twentieth century and child panhandlers in Fatehpur Sikri, we argued to think through a new city–child-scape that is less formidable and democratically engaging, a city that does not neglect, dismiss, and sanitize poverty, but which actively engages in discussions of social justice and equality. Acknowledging the creative agency and deep intelligence that children possess indicates new ways of knowing and understanding societies. For those most marginalized children, it is the responsibility of adults to facilitate and bring their concerns forward and to ensure an equitable space for their civil rights. This new landscape bridges difference through the sameness of humanity, emotion, and possibilities. It urges us to rethink spaces of freedom and justice through the playful geographies of children.

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