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MEASURING URBANIZATION AROUND A REGIONAL CAPITAL

THE CASE OF BHOPAL DISTRICT

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School of Planning and Architecture, New Delhi

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INTRODUCTION TO THE SUBURBIN WORKING PAPER SERIES

The **SUBURBIN** Working Paper Series aims at disseminating the output of the ongoing ***Su**baltern **Urb**anization in **In**dia* (**SUBURBIN**) research programme on small towns in India.

The three-year **SUBURBIN** research project started in January 2011. It is a collaborative project with researchers of the Centre for Policy Research (New Delhi), the Centre de Sciences Humaines (New Delhi), the Centre for the Study of Regional Development (JNU, New Delhi), the Institut Français de Pondichéry, the University of Burdwan, the Department of Regional Planning at the School of Planning and Architecture (New Delhi), and the Indira Gandhi Institute of Development Research (Mumbai). This research network involves senior researchers, post-doctoral fellows, PhD candidates and several Masters students. The two French research centres in India - the Centre de Sciences Humaines based in New Delhi and the Institut Français de Pondichéry, are coordinating the programme. The project is primarily funded by the French National Research Agency.

SUBURBIN positions itself vis-à-vis a vision of global urbanisation reduced to metropolitanisation and competition between global cities, or "metrocentricity". It aims at challenging the usual approach that tends to consider the urban world only through the prism of very large cities - even though half of the world's city dwellers do not reside there. **SUBURBIN** acknowledges the continuous increase of the urban population and its projected doubling in Asia between 2000 and 2030. However, current urban research tends to emphasise megalopolises, which are considered as the privileged site for the production and concentration of national wealth, innovation and talent, as well as the central location of social movements and environmental problems. This leads to public policies focusing on large metropolitan areas and promotion of economies of agglomeration as seen in the World Bank's recent World Development Report 2009 Reshaping Economic Geography. The **SUBURBIN** programme aims to offer additional perspectives on urban transition by focusing on small towns from a multiplicity of disciplines, linking macro and micro analysis. It questions the restricted representations and existing measures and explanatory models. It also strives to actively contribute to the debates about the plurality of development models, to provide analytical tools to policy makers and to inform public policy debates.

India is an ideal site to shed light on this question since one out of ten urban citizens is from India and even more importantly because the urbanisation dynamics here seem to diverge from the canonical centre/fringe model where large metropolises dominate. In addition, India has a stringent definition for classifying a settlement as urban within the census and additional criteria, which varies among states, before it is accorded administrative urban status. It has a large number of densely populated large settlements, which are classified as rural. The first results of the 2011 census indicate a decline in demographic growth of existing metro cities; while at the same time the number of new settlements recognized as census towns, i.e., settlements under rural panchayat administration with strong urban characteristics, appears very high (more than 2,500). The census towns account for about one-third of the demographic urban growth between 2001 and 2011, indicating that reclassification is at least as important a process for urban transition as rural urban migration. Overall, the process of recognising new municipal areas is very slow and consequently the population benefiting from urban schemes grows relatively slowly. Only 242 new statutory towns have been recognized in the last ten years. This expanding world of small towns and

big villages remain widely unknown, badly documented and ignored. There is a need to understand this subaltern urbanization as a specific part of India's settlement structure and to understand the ongoing social, political and economic processes.

This project discusses the relevance of definitions related to the distinction between rural and urban by utilizing the **Indiapolis** geo-localised database developed in a companion research project funded by the French National Research Agency, **e-Geopolis**. It uses a two-pronged approach: on the one hand, economic and social indicators provided by large existing statistic databases, notably recent National Sample Survey rounds, contribute to develop a more precise and comparative analysis of agglomeration dynamics; on the other hand, field monographs allow for a qualitative field-based analysis of the observed trends. The rapid transformation of economies and persisting analytical gaps call for a deeper understanding and renewal of certain important questions which will be the concern of this collection of working papers. A few of these are highlighted below.

a. Where do we draw the line between the rural and the urban, i.e., the relative valorisation of administrative status, functional character and the experienced reality of residents? Accordingly, what is their level of social development when access to urban infrastructure is deficient, and how do these spaces relate to the containment of poverty?

b. What is the relation between the proliferation of small towns and economic processes, i.e., to what extent are these settlements dependent on or autonomous from the metropolitanisation process? Are they just the recipients of diffusion processes and of the (re)-location of low productivity activities or do they have an independent economic rationale? Three related questions assume importance - (i) the extent to which these small towns are engulfed in metropolitan regions or in economic corridors, (ii) the nature of their formation and subsequent development, and (iii) their contribution to the Indian economic growth story.

c. What kind of capital do actors in the smaller towns mobilize and for which activities? How do such actors articulate and connect their practices and knowledge to flows at different scales, from local to global? For **SUBURBIN**, such flows of capital and innovation are not restrictively defined. They encompass non-commoditised practices, social formations and modes of governance. Related to these dynamics are the types of innovations which emerge from small towns or networks of settlements and the role of land capital in contemporary transformation in relation to real estate activities, e.g., the emergence of new clusters of economic activity such as educational institutions.

d. How resilient are clusters and networks of small towns? Are these sites of informal small scale diverse activities dependent on daily-wage and casual work? Is their development linked with mobility, seasonal migration and remittance flows? To what extent are small towns engines of social change?

The present working paper by Anima Gupta is the first in the **SUBURBIN** Series. It tackles a central question of the program: ‘What is an Urban Area?’

The working paper is based on a Master Thesis in Regional Planning from the School of Planning and Architecture (SPA), New Delhi conducted under the supervision of N. Sridharan and P. Mukhopadhyay in 2011. It provides a very informed and stimulating report based on an explicit methodology, in-depth fieldwork and an excellent usage of mapping techniques. The location of fieldwork is in the district of Bhopal, which includes the capital of Madhya Pradesh. In a very clear manner, Anima Gupta presents the international variations in the definition of “urban”, and the issues raised by the Indian definition. Then, her paper explores a palette of potential indicators to measure, divide and categorize urban

and rural localities which open up an important debate on the notion of urbanity. A detailed analysis of eight selected localities in Bhopal's district follows, based upon this multi-criteria approach in order to assess the level of urbanity of these settlements.

This analysis of a set of localities questions the institutional limits of the metropolitan area, its mode of governance, and the dependence of localized growth. It shows that in the sub-metropolitan environment, localities are very diverse: one locality can remain a village while another changes into a town. Furthermore, the existing official criteria for urbanisation are insufficient and incomplete in describing the character of settlements. The research shows that transformation depends on multiple factors, ranging from accessibility and location to situated historical capital and the size of the settlement is not necessarily a determinant of this transformation.

Eric Denis & Marie-Hélène Zérah

Measuring Urbanization around a Regional Capital
The Case of Bhopal District

By Anima GUPTA

Abstract

The starting point of this study is the observation that many villages in India seem to possess urban characteristics. As compared to definitions of urbanization adopted by other countries, the Indian definition of urban area is actually unique in the world. One of the consequences of a restrictive definition is that it potentially excludes numerous localities. This paper consequently explores a multi-dimensional approach to answer the question of what is an urban area.

For this purpose, a literature review of various definitions of the notion of urban, urbanism and urbanity from different disciplines, enables to develop indicators susceptible to enter a multi-dimensional approach. The paper follows various approaches to operationalize such an indicator and goes beyond the census definitions. It suggests a palette of indicators (demographic, social, economic, spatial, infrastructural and administrative) to categorize rural and urban localities which open up an important debate on the notion of urbanity.

This methodological tool is then applied in a set of eight villages around Bhopal, the capital of Madhya Pradesh. In particular, the study identified two types of urban areas, those under the influence of Bhopal (suburban type) and those with a large degree of autonomy (growth-centre type). The results show that even in a sub-metropolitan environment, localities are very diverse and that factors of transformation depend on multiple factors ranging from accessibility and location to situated historical capital.

Finally, this working paper demonstrates that studying urbanization only within the Census classified urban local units is certainly limiting and a broader approach may help us better understand the spread of urban characteristics in India even in small settlements and micro agglomerations.

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1. Introduction to the Study

1.1 What is urban?

Today, the world's urban population is three billion people – the same size as the world's total population in 1960. During the 20th century, the world's urban population increased more than ten-fold. However, the question that remains is 'what is urban or what is an urban area?' Is it just a phenomenon related to location and concentration of population, to specific physical features, or is it the condition of style of living? What does the term 'town' or 'city' mean, and where does the real distinction between urban and rural lie, which is so easily made in everyday life, but is very difficult to reorder into precise and academic terms? (Carter, 2002). Basu (1997) says cities are obviously urban places as per the census criteria of different countries for delimiting urban areas. However, a wide range of definitions exists across continents (Annexure I). These criteria are defined by national census offices and vary greatly across countries. In many Latin American and West African countries, an urban settlement has 2000 people or more; in the US the threshold is 2,500 people; and in Italy an urban settlement has a population above 10,000. Clearly there is much global variation, and the figures appear to be arbitrary. In India the definition is more detailed as compared to other countries. All populations living within a specified urban authority (such as a municipal corporation or a cantonment board) are treated as urban. Otherwise, an urban area must have a minimum population of 5,000; 75 per cent of the male working population must be engaged in non-agricultural employment; and the population density must be at least 400 sq. km. The problem arising in defining the term 'urban' in various countries may be due to economic and cultural contexts. The dynamism involved in the urbanization process as stated by Carter (2002), that the reality and concept of what is urban is not static but subject to change, is another explanatory factor. Differences in definitions of the term 'urban' across the world and the changes that occur over time in defining this term are an issue for comparative studies. In addition, the term 'urban' is not only a physical mechanism or an artificial construction, but also a state of mind (Park, 2004), which means that apart from demographics as a classification parameter, other multi-dimensional indicators form the criteria for classification of an urban area.

There is a long history of researchers, politicians, and civil servants making normative judgments about urban areas, about particular cities having too many people or too much public investment, or about urban populations being privileged over rural populations in some way by the policies or expenditures of governments and international agencies (Satterthwaite, 2010, Beall et. al, 2010). This shows that rural areas are left out of the benefits, and that sometimes, settlements, which require more resources due to the presence of urbanity in their character, are not able to cope because of lack of policy intervention.

The 2001 Census shows that 28 per cent of the Indian population is urban and this number increased to 31.1 per cent in 2011. This number corresponds to the population that resides in urban areas as per the Census of India definition (in other words, either in statutory towns with an urban local body or in census towns). The situation is different if one uses different parameters and criteria. Satterthwaite (2010) writes that a simple classification system adopted for the collection and dissemination of population data does not reflect 'the blurring of rural and urban areas, the diversity of settlements within urban and rural contexts, the increasing scale and complexity of

urban systems, and the new forms of urbanization that are emerging' (Hugo et. al., 2004). Therefore there is a need to re-examine the urban in its multi-dimensional concept, moving a step ahead of the demographic criteria to have a realistic index. The first and foremost need is to reinterpret the concept of the term 'urban' and to explore distinctions between 'rural' and 'urban'. This requirement also arises due to the growing number of small settlements, which are not designated as urban areas but have urban characteristics, as analyzed by Denis & Marius-Gnanou (2011). They have investigated that, as per the 2001 census of India, there were 3,271 towns and 3,986 villages having a population of more than 10,000 (see Table 1.1). It is also seen that there are 227 urban areas in India with a population below 5,000. This shows that settlements can be considered 'urban' irrespective of their population base (statutory towns).

Table 1.1: Urban and Rural Settlements of India

	Towns	Villages
Above 10,000 Population	3,271	3,986
Below 10,000 Population	1,890	589,746
Total	5,161	593,732

Source: Denis, E. and Marius-Gnanou, K. (2011)

Against this background, this research deals with the urbanity level of small settlements, which are rarely debated as compared to mega and metro cities.

1.2 Scope of the research

The study has looked into various disciplines, but has come up with certain indicator sets that are possible to operationalize and are measurable in the field. The study at the micro-level has covered eight villages which have been identified on two parameters: (i) the population growth rate from 1991-2001 and (ii) location on the road and off the road on national highways and state highways. The villages considered for the micro-level study do not have any population threshold which is a basic census criterion. Some indicators, which could act as major components for defining urban areas have been dropped due to unavailability of data eg., long-term economic migration at the micro-level and household consumption. Another limitation in the study is that the demographic characteristics rely on the 2001 census since the 2011 census data were not available at the time of the study.

1.3 Selection of Parameters

In this section, the broad parameters have been discussed, which, all together, can form a framework for defining an urban area. These are basically based on the various aspects which influence a place and make it more urbane. Multi-dimensional criteria for preparing a framework for re-conceptualizing the term 'urban' have been discussed.

Demographic indicators are among the basic indicators to be taken into consideration for defining any urban area. These may include population concentration, population density, population growth and dynamics. A sociological point of view is also very important. This can include social bonding, language and crime rates. This may also include male and female literacy levels, which have a strong relation with their demographic condition.

History shows that economic development and urbanization are intimately associated and that the economic development process involves growth in urbanization. This may include occupational pattern, agglomeration economies and employment generation. The spatial aspect is as important as the other aspects. It may include built environment – concentration and expansion, land use/land cover, housing type materials and construction.

Infrastructural development indicators may also act as important characteristics of the urban area. These include all physical and social infrastructures present in the settlement. Other than this, the administrative setup also plays a very important role in urbanizing an area. More administrative powers will create more flow of funds and money, investments and budgets, consumption patterns etc. resulting in rural areas being converted to urban.

1.4 Framework of the study

This working paper is divided into five sections. The first section establishes the need for the study and its objective for broad identification of relevant indicators.

The second section presents the various concepts of 'urban' and the city and also discusses their different dimensions. It delves into definitions of urban areas in different countries and finds out the different types of indicators followed by different countries. It also examines the various approaches followed or researched by different authors for defining an urban area. After studying and reviewing the literature, the study comes up with basic indicators, which can be part of urban characteristics and which have been considered for further research.

Section three looks at the district of Bhopal and the city of Bhopal for analysis. In this section the study examines the settlement pattern, application of individual parameters of census definition and urban built-up growth at the macro-level.

Section four details the micro-level analysis, which covers the village level study. It discusses the existing condition of villages with respect to the identified indicators and also delves into the urbanity index for a set of indicators across all villages.

The last section presents the overall conclusions and the approach required to address the multi-dimensional definition.

2. Literature Review

2.1 A range of concepts to define the urban

Bergel (1955) says, 'Everybody seems to know what a city is but no one has given a satisfactory definition.' There are many things which are quite obvious and easily recognizable, but which defy definition. The concepts of the city and village are among these. The following are some of the difficulties in defining and distinguishing a city from a village:

1. There are no universally acceptable definitions of 'village' and 'city'.
2. The distinction between a village and a city is one of mere degree. There are no fundamental or qualitative differences.
3. Both villages and cities undergo changes.

The concept of an urban area is actually the difference in the environment from the surrounding rural area. This urban character is based on a wide range of criteria focusing on various dimensions. Wirth (1938) defined a city as a 'relatively large, dense and permanent settlement of socially heterogeneous individuals', which has been supported by Mitchell and Breese (1969). They went beyond demographic parameters and said, 'urbanization is a process of becoming urban, moving to cities, changing from agriculture to other pursuits common to cities and corresponding changes in the behaviour patterns.' 'Urbanity' and 'Urbanism' are also important notions. 'Urbanity' means the quality of being urbane. Urbanism is a way of life as practised by the urban population. Cities have a whole range of features including the loss of primary relationship, weaker social control, greater division of labour, greater importance of media and the tendency for urbanites to treat each other instrumentally (Hewlett, 1974). Beall et. al. (2010) argue that in an urban context, proximity, density, diversity and dynamics are closely associated with each other, and lead to increased complexity.

A central tool to qualify the process of understanding urban areas is the increase in the proportion of people living in areas or settlements to the total population over a period of time. Datta (2006) adds, 'urbanization is an index of transformation from traditional rural economies to a modern industrial one'. It is a progressive concentration. This criterion for designating urban areas is mainly the one used by national census offices. When this effect engulfs a cluster of towns together, it forms an urban agglomeration. It usually incorporates the population in a city or town in addition to that in suburban areas lying outside of but adjacent to city boundaries (World Urbanization Prospects: The 2009 Revision Population database - UN).

In all, a city is 'an inhabited place of greater size, population, or importance than a town or village'. Beall et al. (2010) say that for statistical purposes, three concepts are generally used to define urban areas and populations: the 'city proper', the 'urban agglomeration', and the 'metropolitan area'. The city proper is determined by legal and administrative criteria, and typically comprises only those geographical areas that are a part of a legally defined and often historically established administrative unit. However, many urban areas have grown far beyond the limits of the city proper, necessitating other measures. Beall et al. (2010) cite urban agglomeration as the 'de facto population contained within the contours of a contiguous territory inhabited at urban density levels without regard to administrative boundaries' as defined in the

UN 2006 glossary. A more comprehensive concept is 'metropolitan area'. This includes both urban agglomeration and any surrounding areas of lower settlement density that are also under the direct influence of the city (UN 2006: glossary). Populations in rural settlements can thus be counted as urban as long as they fall under the direct political or economic influence of the city as suggested by Beall et al. (2010). This suggests that populations beyond these areas are remote to urbanity. However, we make the assumption that some of these settlements can grow without any city's influence.

2.2 A multi-dimensional phenomenon

The urban is a concept with various dimensions that can either conflict with each other or add to each other. Mumford (1937) once observed that:

> 'The city in its most complete sense, is a geographical plexus, an economic organization, an institutional process, a theatre of social action, and an aesthetic symbol of collective unity, and there is not a single function performed in the city that cannot be performed – and has not in fact been performed – in the open country. Urban centres offer economies of scale in terms of productive enterprise and public investment. Cities are social melting pots; sites of innovation, political engagement, and cultural interchange; and drivers of social change' (Mumford, 1937 quoted in Beall et. al., 2010).

Features of urbanism are the result of density, diversity and dynamics. These key characteristics span different disciplinary approaches. Economists focus more on density (agglomeration effects) and dynamics (migration). The broader social sciences pay greater attention to diversity and heterogeneity in the urban population, and how this interacts with density and dynamics to produce urban politics, culture, social relationships and change.

Various views on urbanism have been discussed by Basu (1997). Demographers view cities as large agglomerations of people with high density, and made up of people who do not cultivate soil. Economic indicators are very essential in understanding urban areas. Economists view cities as agencies of economic enterprise. To them the city provides goods and services and is the site of a labour market. Geographers are more concerned with the spatial and physical aspects of cities. They view the city as an artificial landscape made up of streets, buildings, water mains and other material appurtenances which make city life possible. Historians tend to view the city as a legal entity and refer to these agglomerations as centres of civilization. Political scientists perceive the city as a form of political organization. They are interested in the city as a location of public and collective action to provide services, and in the degree of effective democracy. Finally, for sociologists, a city is more than the physical features of high density, busy streets and skyscrapers; it is a style of living and a culturally different manner of regarding life i.e., an urban way of life — sophisticated and with a faster tempo (Basu, 1997).

No discipline can explain the urban condition individually. It needs the proper juxtaposition of all the different elements to have a multi-dimensional set of urban indicators. Views of the city as expressed by some town planners are detailed. Gottman (1964) gave comprehensive characteristics of the world's very large cities which he called megalopolises. He said that they are the places where government, most of the banks, the big offices, the newspaper and broadcasting stations, the

important stores, schools, libraries and theatres are concentrated. A very universal explanation for a city by Erickson (1951, quoted in Yadav C.S. 1986) is that the city is a purveyor of essential services, a source of basic amenities and opportunities for personal development and an instrument for the maintenance of law and order.

Authors interested in the social dimension are concerned with human relations and their connection with land. Sharma (1997) articulates the relation between man and his environment as being one of divergence and essential dependence. The urban area represents the development of this relation of symbiosis in its extreme form. The city is an artifact of steel and stone. It represents a fully developed artificial environment which mocks at the vagaries of nature. He also states that, like any other sociological category, the city is an abstraction composed of concrete entities like residences and shops and an assortment of many functions. Attempts to define a city statistically have failed due to the absence of a representative measure. Others have defined the city as a place which has become so large that people no longer know each other. According to some scholars, the difference between village and urban society is merely one of structure, the largeness and smallness of it. Wirth (1938) has also suggested that urbanism is a category of relevant elements and terms. It is a developing concept like the urban life pattern itself, as it appears, as a developing and constantly changing phenomenon. There are a number of sociological propositions concerning the relationship between a habitat and (i) the size of the population, (ii) its density and (iii) heterogeneity, as the important factors defining the character of the urban way of life. Urban people are a fluid mass and hence collective behaviour there is unpredictable. Many cultural factors are also taken into consideration in understanding an urban community. These are:

1. Urban Tensions – physical irritations such as excessive noise, constant cacophony or mechanical sounds, incessant visual attacks on the eyes by multi-glared lights, mass congestion in public conveyances, restaurants, departmental stores and amusement places, and the strain caused by daily commuting.

2. Strain from competition – in rural areas a man's role in life and society is fixed, well defined and assured. On the other hand, competition over urban resources (jobs, housing..) on a large scale and to a greater extent is a regular feature of urban life.

3. Conflicts – an inherent feature of city life which is complex and heterogeneous in people's outlooks, attitudes, interests etc.

4. Cultural Diversity – a reservoir of various sub-cultures.

5. Insecurity – isolation and a sense of loneliness are the typical features of urbanism, which breaks up cohesive group life by its very nature and leaves the individual bewildered.

The economic aspect is another very important area of research, which interacts with land and human activities. Bloom et al. (2010) suggest that, when economic activities are clustered in small geographical spaces, firms have access to a larger labour pool and are in closer proximity to customers and suppliers, with the benefit that intra-industry specialization is encouraged. Economically, villages are changing. The main occupation of the villagers of India has changed from mere agricultural works to

evidently rural non-farm employment. As agriculture is on the downswing, most villagers see non-farm employment as their only escape route. This means that villagers do not only migrate or commute daily elsewhere for jobs, but also that more and more of them seek non-farming jobs while in the village (Gupta, 2009). Other than this, people are involved in dual work. Gupta states that, in most of the cases, nearly half the village economy is non-farm (or non-agricultural) today. He also states that, in India, the rural non-farm sector contributes as much as 45.6 per cent of the net domestic product. This shows the great shift from agricultural contribution to other pursuits. The availability of off-farm employment also drives local villagers to seek jobs outside the village, which are always due to push and pull factors. As per Gupta (2009), the village economy needs to be reconceptualised. It is no more just agriculture based. People have started doing 'mazdoori' and jobs in surrounding areas, within the village and are engaged in dual work.

Another strand of concern deals with the macro and micro-level spatial dimensions. Delimiting the area called 'urban' is an important aim for every decision maker and policy maker. Distinctions between 'rural' and 'urban' are on the basis of social organizations, social restrictions, relationships, economic life and cultural life. On the basis of various views, Susser (2002) states that, in the jungle of subtle definitions which sociologists have provided us, it is possible to distinguish very clearly two extremely distinct senses of the term urbanization.

1. The spatial concentration of a population on the basis of certain limits of dimension and density (Bogue and Hauser, 1963; Davis, 1965)

2. The diffusion of the system of values, attitudes and behaviour called 'urban culture' (Friedmann, 1953; Bergel, 1955; Anderson, 1959; Sirjamaki, 1961; Boskoff, 1962; Gist and Fava, 1964).

Since the quest for a single definition has met with little success, some authors, notably Sorokin and Zimmerman (1929), hold that a proper definition must consist of a combination of factors, in other words there must be multiple or 'compound' definitions. They enumerate eight characteristics in which the urban world differs from the rural world. These are: occupation, environment, size of community, density of population, heterogeneity, social differentiation and stratification, mobility, and systems of interaction.

To operationalize this need to take into account multiple dimensions, we will attempt at constructing multi-dimensional indicators which will be used to qualify the intensity of urbanity and the degree and forms of agglomeration in our case study.

The notion of 'urban' has been discussed but there is also the need for understanding the counter-part, that is the 'rural area or village' (Gupta, 2008). Since there are ever-changing rural areas, the connection between rural and urban is becoming stronger over a period of time. Rural is defined as the area left after the urban has been declared, which is actually the residual part. These are not extreme points, but a continuum. Gupta also says that economically, villages develop an urban character, as 45.5 per cent of national domestic product from village produce is non-agricultural. That is why the country–town nexus exists i.e., the relationship between the rural and urban has become very dense. Villagers migrate to towns and cities due to push-pull factors. Villagers also commute to towns daily for their work, making the two-way traffic between the city and village influence each other. This shows the strong rural-

urban connection. Another method is to measure population as urban or rural rather than an area (Lang, 1986). The criteria selected is aggregate occupational and economic characteristics of households, housing characteristics, availability and use of certain types of public and private social and cultural services, organizations, and institutions for the entire population. The final approach is the household-aggregation approach. In this approach criteria would be applied to single households. Settlements would be considered urban if 50 per cent of their households are considered urban, irrespective of size. To relate it to land, population density, land use characteristics and settlement types would need to be included. This leads to a basic understanding of intensity of urbanity.

Uchida and Nelson (2010) recommend another approach 'Agglomeration Index'. This is a new measurement tool for urban concentration. This index does not define the exact meaning of urban but it delineates urban areas or areas influenced by urbanity. The way to calculate the Agglomeration Index is based on a few steps, which include; i) specifying the threshold value for each of the three criteria: minimum population density, maximum travel time, and the minimum population size that define large cities; ii) locating the centre of the large cities; iii) determining the border surrounding that large city centre, based on the maximum travel time; iv) determining the population and population density at one kilometer resolution within this border; and v) adding the populations in all the grid cells that satisfy all three thresholds. This kind of exercise needs very good technological support, which will show a spatial dimension of urbanization in the settlement system. On applying this system to India, it has been found that where the UN shows 27 per cent urban share, the Agglomeration Index shows 51.9 per cent and 42.9 per cent urban share on using largest city size threshold of 50,000 and 100,000 respectively (Uchida and Nelson, 2010).

A much sounder option is now found in the Geopolis approach (www.e-geopolis.eu). The Geopolis guidelines that are put forward by Denis & Marius-Gnanou (2011) are:

1. It defines all the physical agglomerates of over 10,000 inhabitants as urban
2. Agglomerate being considered as a contiguous built-up area.

The approach is based on:

1. A simple morphological criterion across space and time: the contiguity of built-up areas with a maximum of 200 meters separating constructions, and
2. A single threshold (10,000 inhabitants) applied uniformly across the board, even when national definitions use other criteria.

This study throws light on the fact that statistical and political considerations have made it difficult to understand the emergence of small agglomerations of between 10,000 and 20,000 inhabitants, which are quite high in number. The authors also argue that the emergence of these small agglomerations might be supported by the organic growth of small settlements into a city. Ellis (2011) states, cities exist for many reasons, and the diversity of urban forms can be traced to the complex functions that cities perform. Cities serve as centres of storage, trade, and manufacture. The agricultural surplus from the surrounding countryside is processed and distributed in cities. Historically, cities grew around marketplaces, where goods from distant places could be exchanged for local products. Throughout history, cities have been founded at the intersection of transportation routes, or at points where goods must shift from one mode of transportation to another, as at river and ocean ports. Religious elements have been crucial throughout urban history. Ancient peoples had sacred places, often associated with cemeteries or shrines, around which

cities grew. Ancient cities usually had large temple precincts with monumental religious buildings. Cities serve as centres of government. In particular, the emergence of the great nation-states led to the creation of new capital cities or the investing of existing cities with expanded governmental functions.

Thus, this section demonstrates that a multi-dimensional approach is necessary to understand the dynamics of urban changes.

2.3 Definitions of Urban Areas in Different Countries

The definitions of urban areas of different countries are based on national censuses. The census offices describe urban areas and delimit them. To a certain extent, the United Nations (1967) has conceded that it is not possible to have a single standard definition for the terms 'urban' and 'rural' that could be used globally. The UN has classified the definitions of different countries of urban areas into five principles (quoted in Lang, M. 1986: 126), which are:

i) Administrative Area – based primarily on historical, political, or administrative considerations rather than on statistical considerations.

ii) Population size – treats as urban those places (cities, towns, agglomerations, localities, etc.) having either a specified minimum number of inhabitants or a specified minimum population density.

iii) Local Government Area – urban is defined in terms of those plans, agglomerations, or localities possessing some form of local government; no minimum population size is used in this definition.

iv) Urban characteristics – require urban places to possess specific types of urban characteristics such as established street patterns, contiguously aligned buildings, and public services (sewer system, piped water supply, electric lighting, police service, hospital, school, court of law, etc.); can be updated regularly.

v) Predominant economic activities – places or other areas are classified as urban if they have at least a specified proportion of their labour force engaged in non-agricultural activities.

India's definition of an urban area is based on the formation of governmental bodies or on population, density and economic activity.

An urban area is:

- Statutory towns: Towns (places with municipal corporation, municipal area committee, town committee, notified area committee or cantonment board);

or

- Census towns: places having 5,000 or more inhabitants; a population density of more than 400 persons/ sq. kms.; and 75 per cent of male workforce employed in pursuits other than agriculture.

The process of census in India started in 1872. Before 1951 there was no distinction between town and cluster of towns. In 1951 the concept of 'town group' emerged and in 1961 the concepts of 'city' and 'town' came into being. Urban agglomeration was one more concept which came into the picture during 1971. Urban agglomeration is a continuous urban spread constituting a town and its adjoining urban outgrowths (OGs), or two or more physical contiguous towns together and any adjoining urban outgrowths of such towns. Examples of outgrowth are railway colonies, university campuses, port area, military camps etc. that may have come up near a statutory town or city but within the revenue limits of a village or villages contiguous to the town or city. For the 2001 Census, it was decided that the core town or at least one of the constituent towns of an urban agglomeration should necessarily be a statutory town and the total population of all the constituents should not be less than 20,000 (as per the 1991 Census). With these two basic criteria having been met, urban agglomerations could be constituted of:

i) a city or town with one or more contiguous outgrowths;
ii) two or more adjoining towns with or without their outgrowths;
iii) a city and one or more adjoining towns with their outgrowths all of which form a continuous spread.

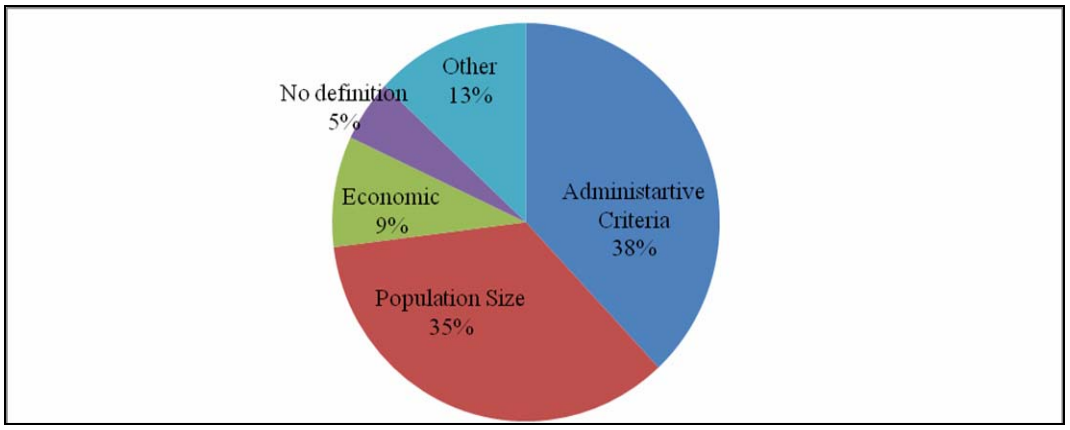
As discussed earlier, numerous countries use combinations of criteria rather than a single criterion in their classification of urban areas. Various differences in definitions are detailed in Annexure II. It shows how different components are present in defining urban areas in different nations. The components are administrative, governmental, demographic (population, density), economic, and spatial or physical. Most of the countries define urban settlements based on the administrative and governmental rule followed by the population base. However, the population criterion varies greatly across countries, may be due to their topography and development features. Very few countries take density and economic activity into account. Only Japan and France delve into the spatial component for defining urban areas. Table 2.1 shows the criteria followed for 101 countries. The table shows that India has a very unique definition as compared to other countries. Figure 2.1 shows that, amongst the definitions used for urban areas in World urban prospects samples, the administrative criterion is the highest, followed by population criteria.

Table 2.1: Criteria for Census Definition Across Countries

Population Size	Density	Economic Activity	Administrative	Others #	No. of Countries
■					22
	■				0
		■			0
■	■				7
	■	■			0
■		■			2
■	■	■			1*
			■		50
■			■		8(**)+1(*)
				■	2
■				■	9 (***)

Note: # Other Criteria: Infrastructure, Built-up density etc. A few examples have been shown in table 2.2.
*Administrative criteria or population, density and economic activity criteria
** All countries having administrative criteria and one among the criteria of population, density and economic activity
*** All countries with other criteria and any one among population, density and economic activity
Source: United Nations demographic Year Book, 2005, United Nations.

Figure 2.1: Definitions of Urban Areas used in World Urban Prospects Samples



Source: United Nations (2003)

Table 2.2 shows the definitions of a few selected countries, which use different criteria. The table also illustrates that other than population indicators, various components are a part of the urban concept.

Table 2.2: Definitions of Urban Areas in Selected Countries

Country	Definition
Panama	Localities of 1,500 or more inhabitants having essentially urban characteristics, such as streets, water supply systems, sewerage systems and electric light.
Chile	Populated centres which have definite urban characteristics such as certain public and municipal services.
France	Communes containing an agglomeration of more than 2,000 inhabitants living in contiguous houses or with not more than 200 metres between houses, also communes of which the major portion of the population is part of a multi-communal agglomeration of this nature.
Lithuania	Population areas with closely built permanent dwellings and with the resident population of more than 3,000 of which 2/3 of employees work in industry, social infrastructure and business.

Source: United Nations Demographic Year Book, 2005, United Nations.

After a review of how urban areas are defined across countries by censuses and by the various social sciences, we turn to formulate indicators to capture urban characteristics in the Indian context.

2.4 Indicators

Indicators have been identified on the basis of the above section. The number of indicators could be unlimited, so we have identified important indicators that are operational as well. The data required for the indicators and data sources are detailed in Annexure III.

2.4.1 Demographic Indicators

- Population density - persons/ sq. km. (built-up area and revenue area)
- Population growth rate (1991-2001)
- Percentage of floating population (work and other purposes)
  - Percentage of workforce going outside the village
  - The number of people coming to the village for different activities including work and shopping.

Economic activities unique to urban areas permit a high population density, and it is the most commonly used criterion to delimit urban areas. Censuses only provide density of the whole revenue area, which somehow hides the real building congestion or density within built-up areas (which is an urban characteristic as per sociologists). The population growth rate is taken to reflect the actual proximity or closeness of living. The percentage of the floating population towards the village and outside the village and for different purposes will characterize the interaction and inter-relation between rural and urban areas. It shows that people are either driven for their occupation to urban areas due to the non- availability of diverse occupation opportunities or that the village acts as a local hub by attracting people for a variety of activities.

2.4.2 Social Indicators

- Rate of nucleation of families (change in household size over the decades)
- Literacy rate in percentage
- Male-female differential in literacy rates

A high level of social development is a basic urban characteristic. The rate of nucleation of families component can be an outcome of urbanization, as explained by the reducing size of families and the changes in the family organization. A low male-female difference in literacy rate also shows female participation because it both directly and indirectly reflects the status of women, which, in urban areas, is in an improved state.

2.4.3 Economic Indicators

- Percentage of workers involved in rural non-farm employment (RNFE) within the village and outside the village;
- Percentage of land holding sizes of less than 2 Ha. area;
- Land values in Rupees (lakhs/ Ha.), market rates.

The percentage of people involved in rural non-farm employment and other non-agricultural work outside the village is an important driver for change and this indicator highlights the number of villagers involved in these establishments. The percentage of land holding sizes less than 2 hectares in area shows small farmers may be more involved in other works. High land values of agricultural areas can be a proxy for the increasing urbanization in rural areas.

2.4.4 Spatial Indicators

- Percentage of non-residential land use (*abadi* area or built-up area)
- Number of commercial establishments (Number/ 100 population)
- Built-up growth of the village area over a period of time. (percentage increase from 2002-05, 2005-09 and 2002-09)

Spatial indicators overall include the presence of different land uses within a village. The decrease in residential areas or low share of residential areas shows urbanism. The extent of commercial space shows the influence of urbanity in the settlement. This can be further supported by Ellis (2011) who suggests that a city grows like a market place. The expansion of the *abadi* area shows the built-up growth in the village *abadi* area. The very high increase in built-up areas of villages as compared to the city shows the complete control of urbanity.

2.4.5 Infrastructural Indicators

Physical Condition

- Percentage of households having *pucca* houses
- Number of telephone towers (Mobile towers)
- Percentage of *pucca* streets (Length)
- Number of street lights

Physical Infrastructure

- Percentage of HHs having
    a. Tap water (connected through pipelines)
    b. Sewer system (connected through pipelines)
    c. Electricity
    d. Drainage on streets

Social Infrastructure

- Number of medical facilities – both government and private
- Number of educational facilities – both government and private

Connectivity with town

- Approach road - metalled/ unmetalled road (National Highway, State Highway, Rural road under Pradhan Mantri Gram Sadak Yojana (PMGSY))
- Distance from the town in kilometers
- Frequency of bus/ para-transit through the village

No. of Banks/ Credit societies (type)

Communication Facilities

- Number of –
    a. Telephone centres
    b. Computer/ vocational centres
    c. Newspapers/ day

Percentage of Households having assets

a. Television sets
b. DTH Service (Dish T.V.)
c. Two-wheelers
d. Four-wheelers
e. Mobile phones
f. LPG

Pucca houses plus amenities are thought to indicate an urban lifestyle. The percentage of good and *pucca* houses shows the influence of urban areas. Availability of social infrastructure reflects a better standard of living, often equated with urban areas. Better connectivity through good roads influences rural areas which have a better chance of becoming urban. More communication facilities and assets reflect technological advancement and modernization that are a component of urbanization. The presence of mobile towers, *pucca* streets, street lights etc. indicate the level of services available in urban areas.

2.4.6 Administrative/ Governance Indicators

- Size of Local Body (*Panchayat*)
- Number of Institutional Buildings
- Fund allocation for the schemes in a year (2010-11)

The last set of indicators includes the size of the governing body, number and types of institutional buildings within the village including buildings such as *panchayat bhawans,* government offices, and public medical and educational facilities. Administratively, the most important function is the fund allocation for the village from the state/ central governments for implementation of various schemes for the development of an area.

All these identified indicators can be operationalized in practice. The indicators selected under each set are limited in number and might not always succeed in articulating the forces underlying the phenomenon.

Table **2.3** bellow shows the inter-relationships of different indicators. These are represented in two shades: A darker shade shows the primary affiliation of that particular indicator to various aspects of urbanization and the lighter colour represents a secondary affiliation. For example, population density shows primary connection to demographic aspects but has secondary relations with spatial aspects. Every indicator has been justified through discussions and has been used for the micro-level study (section 4).

Table 2.3: Relationships between Indicators and Urban Process

S. n	Indicator		Demographic	Social	Economic	Spatial	Infrastructural	Administrative
1	Population Density (persons/ sq.km - Built-up Area)		■			▒		
2	Pop. Growth Rate (1991-2001)		■					
3	Percentage of Workforce going out of the village		■		▒			
4	Number of people coming to the village for different activities		■		▒			
5	Rate of Nucleation of families (Change in HH size)		▒	■				
6	Literacy Rate (%)		▒	■				
7	Male - female differential in literacy rate (%)			■				
8	Percentage of workers involved in rural non-farm employment		▒		■			
9	Land Holding Sizes in percentage (Less than 2 Ha.)				■	▒		
10	Land Values in Rupees (Lakhs/ Ha)				■	▒		
11	Percentage of non-residential area					■		
12	Extent of Commercial space (Percentage area and No. of commercial establishments (no./100 pop.))				▒	■		
13	Built-up area change (2002-09)					■		
14	Physical Condition	Percentage of HHs having pucca houses			▒		■	
		No. of telephone towers					■	
		Percentage of pucca streets					■	▒
		No. of Street Lights					■	▒
15	Physical Infrastructure (percenatges of HHs having -)	Tap water					■	▒
		Sewer System (Septic Tanks)					■	▒
		Electricity					■	▒
		Drainage on streets (percenatge)					■	▒
16	Social Infrastructure (No. of medical and educational facilties	Medical-Govt.					■	▒
		Medical - Pvt.					■	
		Education - Govt.					■	▒
		Education - Pvt.					■	
17	Connectivity with town	Approach Road - Metalled/ unmetalled				▒	■	
		Distance from town (Km)				▒	■	
		Frequency of Bus/ Paratransit					■	
18	No. of Banks/ Credit Societies						■	▒
19	Communication facilities	Telephone centres					■	
		Computer/ vocational centres					■	
		Newspapers/ day					■	
20	Percentage of HHs having assets	T.V.			▒		■	
		DTH service (Dish T.V.)			▒		■	
		Two-wheeler			▒		■	
		Four-wheeler			▒		■	
		Mobile Phones			▒		■	
		LPG			▒		■	
21	Size of Local Body (Panchayat)							■
22	No. of Institutional Buildings							■
23	Funds allocation for different schemes (in Rupees)							■

Note: Black coloured indicators – data from primary survey; Red coloured indictors – data from secondary sources

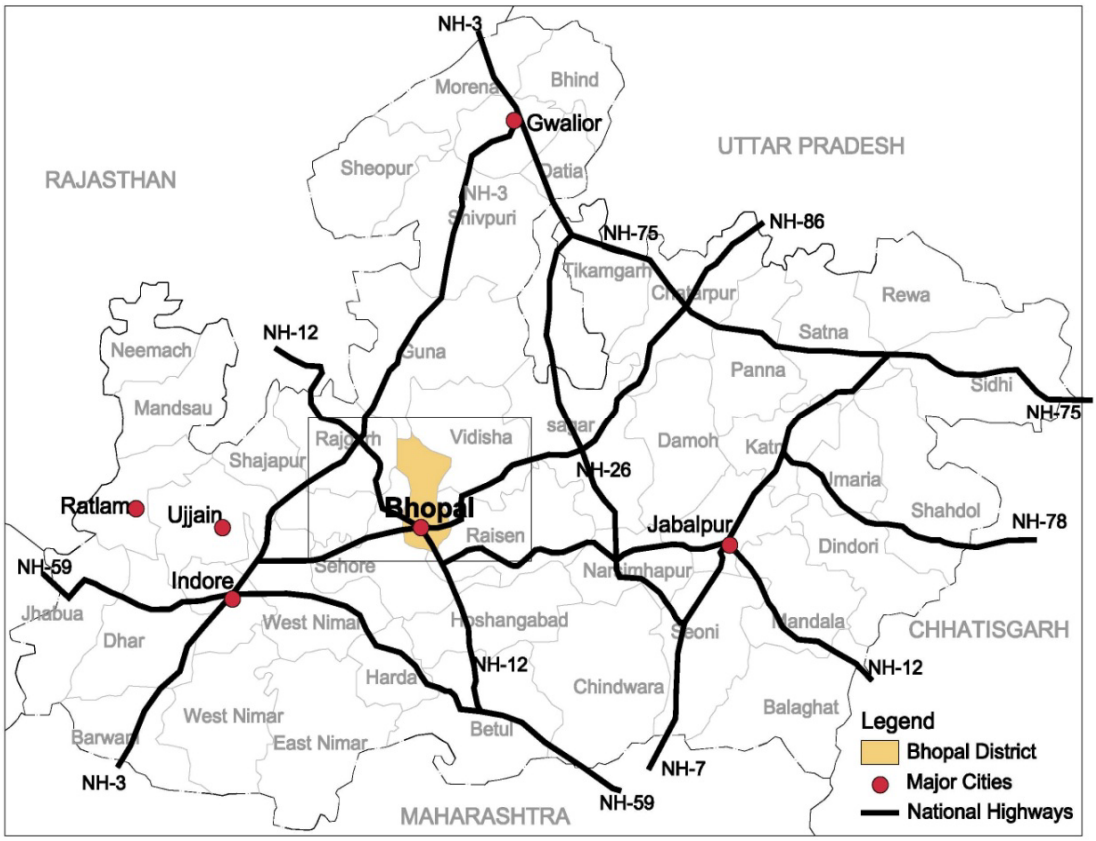
■ Primary Affiliation ▒ Secondary Affiliation

3. Macro-Level Analysis

This section presents the analytical part of the research at the macro-level. It introduces the district and city of Bhopal and the manner in which urban indicators are operationalized.

3.1 Introduction: Site for Case Study

Map 3.1: Location of Bhopal District in Madhya Pradesh State

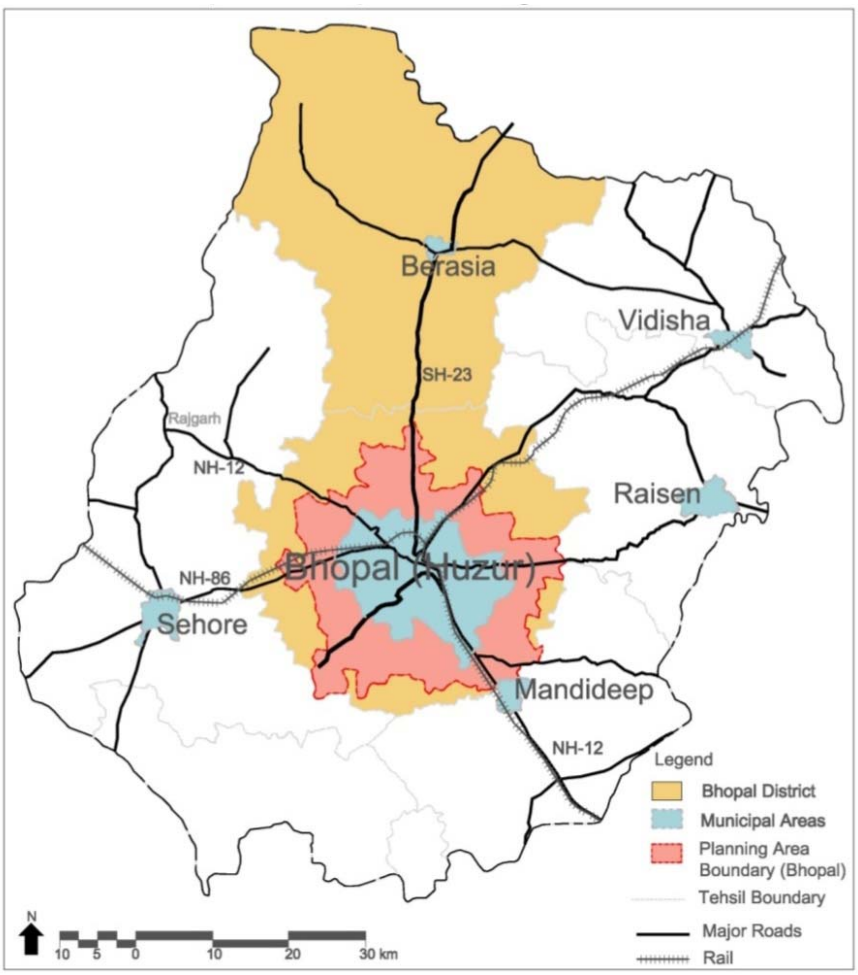


Source: Maps of India

Madhya Pradesh with a population of 60.3 million (2001 Census of India) and 72.6 million in 2011 is a State located in central India. It has nearly 26.67 per cent urban population, out of which 16 million people live in Class I towns of over 100,000 people. The density of the state was 196 persons/ sq. km. in 2001 and reached 236 persons / sq. km in 2011. During the last decade, the literacy rate improved from 63.7 per cent to only 74 per cent. There are six major cities in the state which are: Bhopal (1,433,875 inhabitants in 2001 and 1,883,381 in 2011), Indore (more than 1.5 million people in 2001 and more than 2 million in 2011 (2001: 1,597441 and 2011: 2,167,447), Jabalpur (951,469 people in 2001 and 12,67,564 in 2011), Gwalior (which crossed the one million mark population from 826,919 inhabitants in 2001 to 1,101,981 in 2011), Ujjain (429,933 people in 2001 and 515,215 in 2011), and

Ratlam (221,267 population in 2001), as shown in the Figure 3.1. (Source: Government of Madhya Pradesh, 2007).

Map 3.2: Location of Bhopal District in Bhopal Metropolitan Region



Source: Bhopal Development Plan 2021 (Draft), 2005: DTCP, Bhopal

The Bhopal Metropolitan Region comprises of the districts of Bhopal, Rajgarh, Sehore, Raisen and Vidisha. Bhopal city is surrounded by a network of market towns named Berasia, Vidisha, Raisen, Obedullaganj, and Sehore. These towns are well-connected by regional roads with the city of Bhopal, but are poorly connected with each other. Consequently the city acts as a nodal centre of trade and commerce of regional importance. Furthermore the city being relatively well-provided with various services and facilities, acts as a major service centre for the region. In addition to these market towns, other nearby small and medium sized towns such as Hoshangabad, Budhni, Itarsi, Ganj Basoda, Narsinghgarh, Bari, and Ichchawar are also largely dependent on Bhopal. The spatial extent of the metropolitan region can be seen in Map 3.2. The total area of the region so delineated is nearly 7500 sq km. (Bhopal Development Plan-2021, 2005 Draft).

Bhopal District was carved out of Sehore District in 1972. The district has an area of 2,772 km², and a population of more than 1.8 million (precisely 1,836,784 people according to the 2001 census). The urban population of the district is 80.4 per cent, which is the 19th highest urban district in India and the highest in Madhya Pradesh.

There are strong variations across tehsil: Huzur tehsil has a 89.5 percent urban population while Berasia Tehsil has an 11.4 per cent urban population only. In 1961, Bairagarh and BHEL (Bharat Heavy Electricals Limited) area were included in the Bhopal Urban Agglomeration. The density of district is 665 persons/ sq. km, which is quite high as compared to the state average of 196 persons/ sq. km. The population growth rate of the district from 1991-2001 was 36.4 per cent (33.3 per cent in rural areas and 37.2 per cent in urban areas). Administratively, the district has two tehsils Berasia and Huzur – and two C.D. Blocks –- Berasia and Phanda – which have the same boundaries. The district is comprised of two towns (Bhopal and Berasia) and 538 villages.

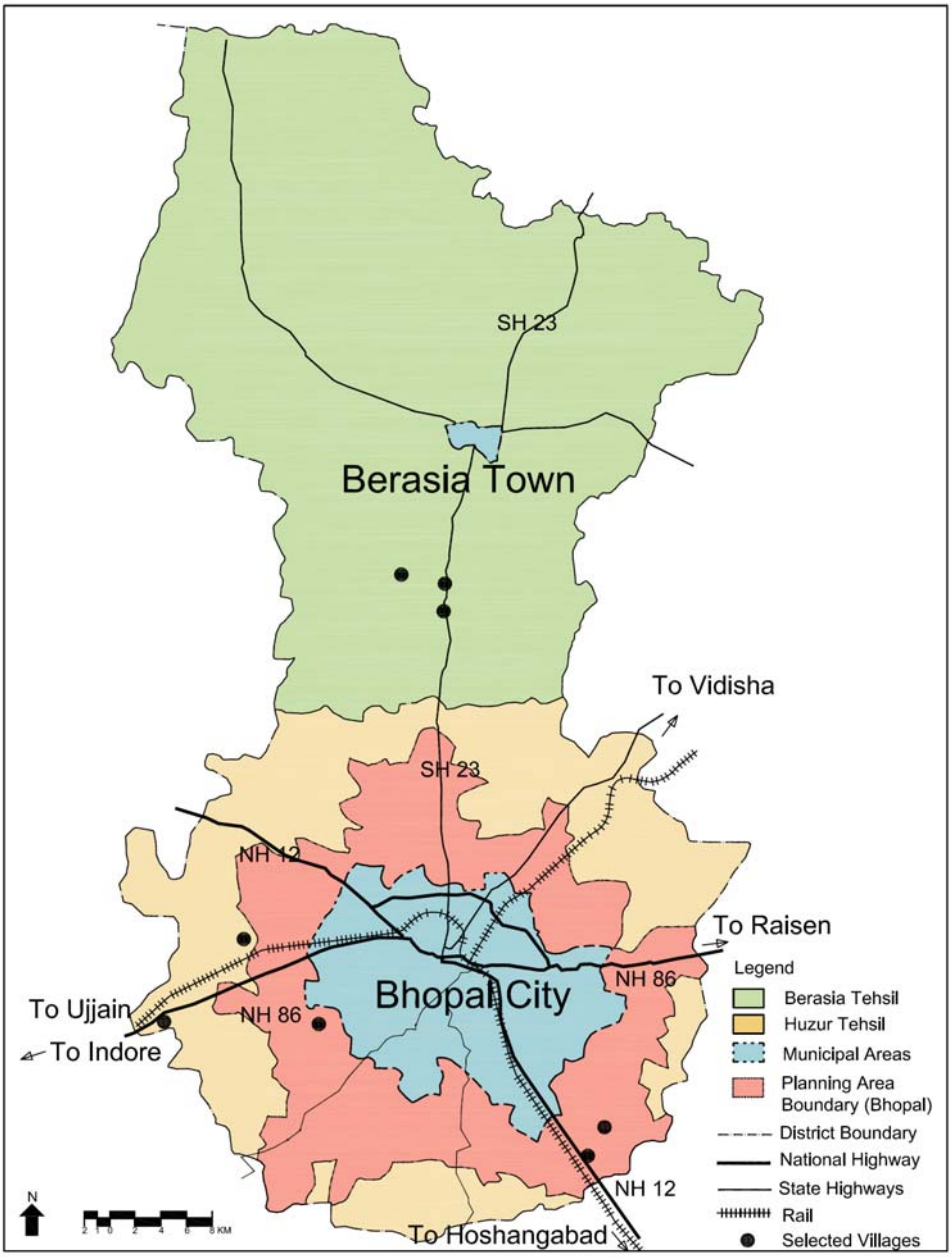
Regionally, Bhopal city is in the Southern part of the district. Bhopal is connected with Berasia by SH-23; NH-86 connects Bhopal and Sehore leading to Indore and NH-12 connects Bhopal with Hoshangabad, on which one big industrial town (Mandideep) lies (Bhopal Development Plan 2021 (Draft), 2005: DTCP, Bhopal). The district is in the shape of an elongated strip with its major axis lying in the North-South direction. The average width of the strip is 30 kms and the length is 94kms.

Bhopal Planning Area proposed for 2021 consists of Bhopal Municipal Area and has engulfed 124 new small rural settlements and has an area of 806 sq. km. The new planning area boundary has been delineated as per Section 23 of Town and Country Planning Act, 1973. The total population of the planning area comes to 120,000 people.

Bhopal city is surrounded by large and small towns like Vidisha (125,453), Sehore (90,333), Shyampur (50,075), Mandideep (39,859), Raisen (35,702), Narsingarh (27,723), Obaidullahganj (19,938), Sanchi (6,784) and innumerable small villages. These settlements depend on Bhopal for a large number of facilities like health and hospital services, educational facilities especially at higher secondary and college level, specialized shopping requirements. Small and large villages depend on the city for their economic activity, trade, commerce, and infrastructure. On the other hand, the city depends on the input that it receives from these areas in terms of flow of funds and food products. These dependences and interactions are further reinforced and encouraged by a network of roads and transport systems. The city, with time, has been transforming into a multifunctional regional growth centre. Being one of the nerve centres of socio-political and economic activities, the primacy of the city in the state is a historical legacy that will remain[1]. Bhopal like other Indian cities faces increased population pressure on resources and infrastructural systems (Pagare, 2006). The total population of the Bhopal Municipal Corporation is equal to 14.5 lakhs. It is the second largest metro after Indore and is the administrative capital of the state.

[1] In the 1998 National Commission on Urbanization, Bhopal was identified as a National Priority City.

Map 3.3: Administrative Boundaries in Bhopal District



Source: Bhopal Development Plan 2021 (Draft), 2005: DTCP, Bhopal

3.2 Settlement Pattern

The district has two tehsils. Berasia tehsil has 306 villages with only 24,302 urban population whereas Huzur tehsil has an urban population of 1,458,416, as shown in table 3.1.

Table 3.1: Demographic Details of Bhopal District

Tehsil	No. of Villages	Population	Name of town	Population (U)
Berasia	306	189,537	Berasia (M)	24,302
Huzur	232	171,255	Bhopal (Huzur) (M.C.)	1,458,416
Total	538	360,792		1,482,718

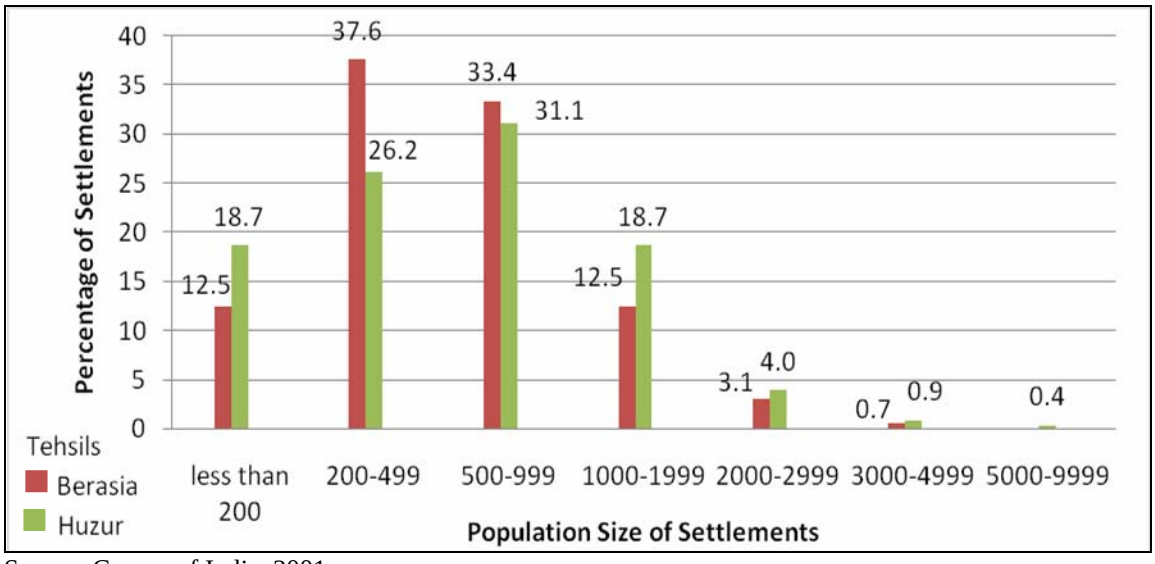
Source: Census of India, 2001
Note: M – Municipality
M.C. – Municipal Corporation

Table 3.2: Settlement Distribution in Bhopal District

Tehsil	Inhabited villages	Size of the Settlements						
		< 200	200-499	500-999	1,000-1,999	2,000-4,999	2,000-4,999	5,000-9,999
Berasia	287	36	108	96	36	9	2	0
Huzur	225	42	59	70	42	9	2	1
Total	512	78	167	166	78	18	4	1

Source: Census of India, 2001.

Figure 3.1: Settlement Distribution in the District



Source: Census of India, 2001

The rural population is very low in Huzur tehsil, with 20 uninhabited villages. Berasia tehsil has a higher percentage of smaller settlements whereas Huzur tehsil has a higher number of larger settlements. .

3.3 Application of Census Parameters

The macro-level study also focuses on the application of individual parameters of census definition which are: population equal to or more than 5,000; more than 75 per cent of male working force engaged in non-agricultural pursuits; population density (revenue area) equal to or more than 400 persons/ sq. km. Across all the villages of Bhopal district, only one village has a population of above 5,000, and 10 villages are above the male working force criterion. A large number of villages have a population density above the limit of 400 persons/ sq.km. (see Table 3.3). There are some villages which are very close to the prescribed limit of census definition. Some villages have a population of between 3,000 and 5,000 with a male working force between 65 per cent and 75 per cent and a density ranging from 350 to 400 persons/ sq. km. It has been noticed that 71 per cent of the villages complying with one single parameter are within the notified planning area of Bhopal city (see Map 3.4). If individual parameters are considered sufficient for defining an urban area, something which has already been observed in many countries earlier, then there are 31settlements in total which could become urban areas. (see Map 4.1). This macro-level analysis highlights the strong agglomeration trends near Bhopal City.

Table 3.3: Application of Individual Parameters of Census definition

Criteria	No. of Villages	
	Above the Limit	Near the Limit
Population	1	4
Male working force	10	6
Pop. Density	25	21

Source: Census of India, 2001
Note: #Population – 3,000 to 5,000; Male working force – 65 to 75 per cent; Population density – 350 to 400 persons/ sq. km.

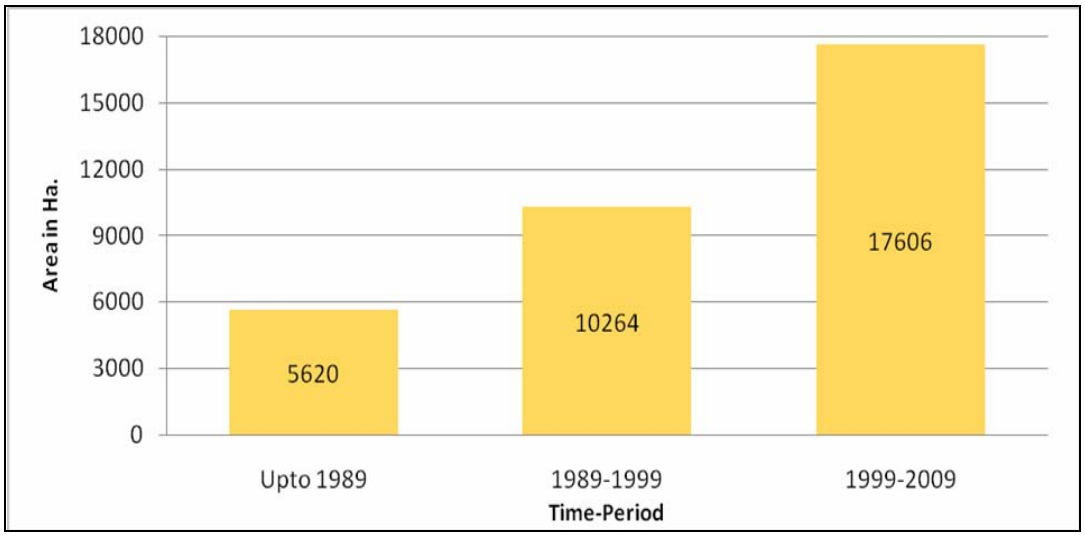
3.4 Built-up Growth of Bhopal City

The built-up growth of the city has been studied to understand the growth pattern and the sprawl of the city and also the relation between the city sprawl and rural settlements. The overall built-up area of the city was 5,620 Ha. until 1989. It increased by 82.6 per cent between 1989 and 1999 and then by 71.5 per cent from 1999 to 2009. Overall in twenty years, from 1989 to 2009, the increase in built-up area was 213.3 percent which shows that the city is expanding horizontally at a great speed instead of expanding vertically (see Figure 3.2).

Overall the city has the shape of an arc, from the north-west to the south, in a clock-wise manner. From the built-up growth map (see Map 3.5), various observations can be made. Prior to the year 1989, the activities in the city were concentrated mainly around industrial areas (Bharat Heavy Electricals Ltd.) and the old city in the central and eastern parts of Bhopal. From 1989 to 1999 the city expanded mainly in the northern direction. The growth pattern of Bhopal between 1999 and 2009 indicates a shift in preference for areas in the south and south-east, mainly between Kolar road and Hoshangabad. It is apparent from the map that during the 1989 to 1999 period, growth was concentrated around the transportation corridors, both railway lines and major road network, which was carried further in the 1999 to 2009 phase. Urban

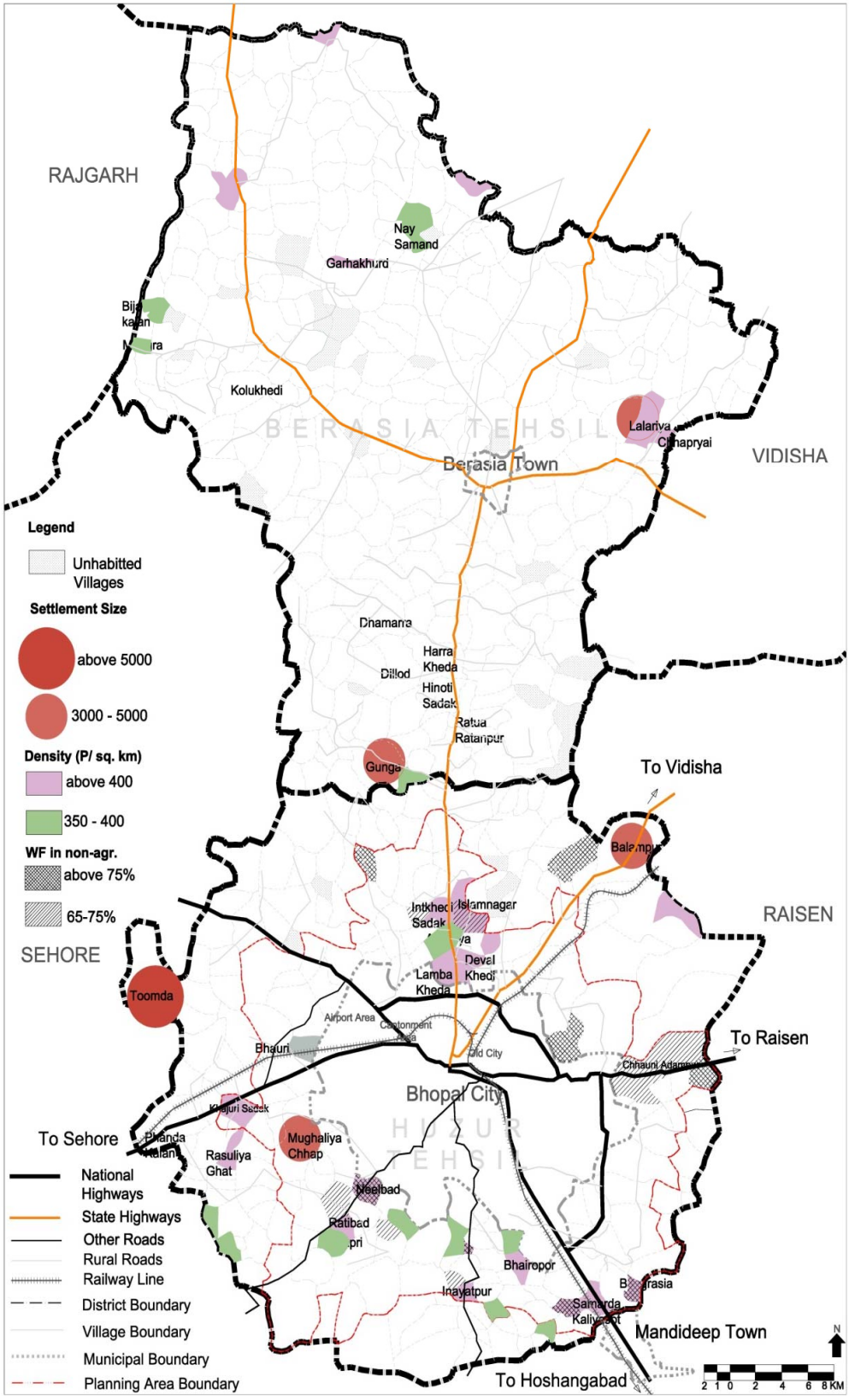
sprawl on the western part of the city was discouraged due to the presence of the Upper Lake. (Bhopal Development Plan 2021 (Draft), 2005: DTCP, Bhopal). The city also expanded towards the south on NH-12, in the direction of Mandideep industrial area. The recent built-up sprawl is around the airport and cantonment areas as well.

Figure 3.2: Built-up Growth of Bhopal City



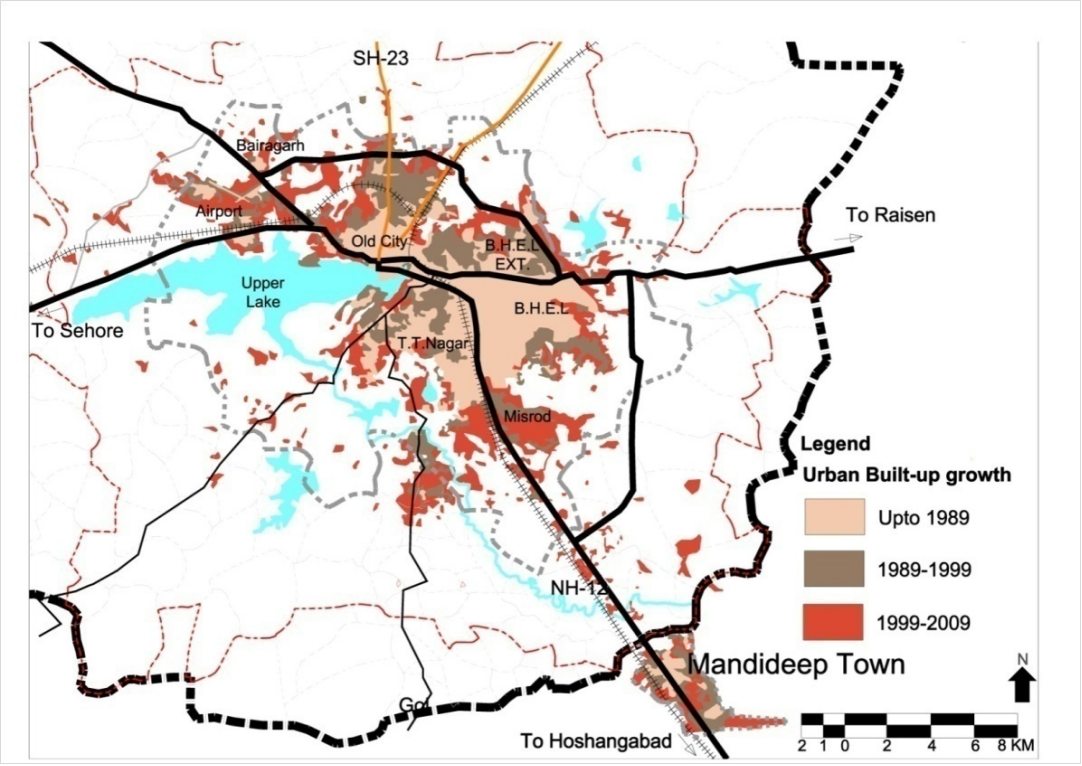
Source: Bhopal Development Plan 2021 (Draft, 2005), DTCP* and Google Earth Images, 2009

Map 3.4: Application of Individual Parameters of Census Definition



Source: Census of India, 2001

Map 3.5: Built-up Growth of Bhopal City



Source: Bhopal Development Plan 2021 (Draft, 2005), DTCP and Google Earth Images, 2009

The built-up growth in some areas has sprawled out of the municipal limits, in the south-eastern direction towards Mandideep town on Hoshangabad road (NH-12), in the southern direction of T.T. Nagar on Kolar road and also in the north-western direction near the airport area (see Map 3.5). The overall built-up area of the city beyond the municipal area is almost equal to 9.25 sq. kms and may increase at a higher rate in the future.

3.5 Conclusion

The macro-level study demonstrates that those villages which are not urban areas as per the census definition are getting engulfed in the urban sprawl, due to the presence of connectivity and various other factors. Urban sprawl is taking place in the areas to the north, east and south in an arc form and is blurring the urban-rural dichotomy in the Huzur tehsil of Bhopal district. Based upon this primary analysis, eight villages have been selected for a micro-level analysis.

4. Micro–Level Analysis

This section examines rural settlements and identifies the driving forces which make them increasingly urbane. For this purpose eight villages have been selected on two parameters. They have been studied in detail with respect to all the aspects for identifying the level of urbanity within these rural settlements. This section also delves into the analysis of various indicators to identify the drivers for urbanization and to find a multi-dimensional approach for defining an urban area.

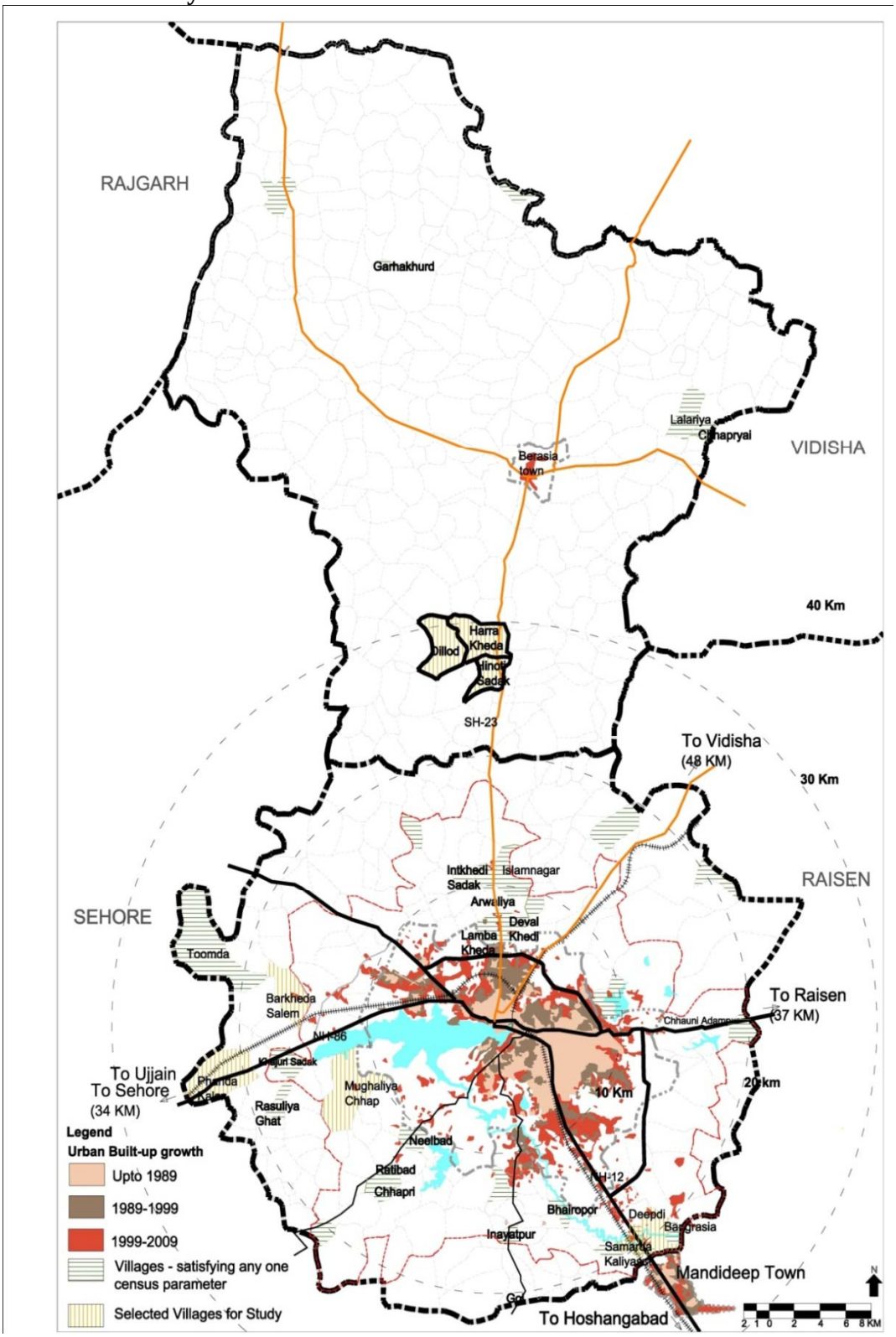
4.1 Selection of Villages

A matrix has been prepared to identify different types of villages and to study the differences and the influence of urbanity on these villages. This matrix is based on two parameters only, the decadal population growth rate and the spatial location of villages on or off the road corridors. Decadal population growth rate has been considered slow if it is less than 25 per cent and fast if it is over 25 per cent. Secondly, villages which are located just next to the main road (National Highways or State Highways) have been considered under the corridor category, whereas others have been considered off the corridor.

Table 4.1: Matrix for Selected Villages

		Population Growth Rate	
		Fast Growth	**Slow Growth**
Corridor	**On Corridors**	**CATEGORY I**	**CATEGORY II**
		Samarda Kaliyasot	Phanda Kalan
		Harra Kheda	Hinoti Sadak
	Off Corridors	**CATEGORY III**	**CATEGORY IV**
		Mugaliya Chhap	Deepdi
		Dillod	Barkheda Salem

Map 4.1: Built-up growth of Bhopal City and Location of Selected Villages for Micro-Level Study



Source: Bhopal Development Plan 2021 (Draft, 2005), DTCP and Google Earth Images, 2009

On the basis of these parameters, the matrix has been prepared (see Table 4.1), with eight villages, two in each category. Villages have been selected in different

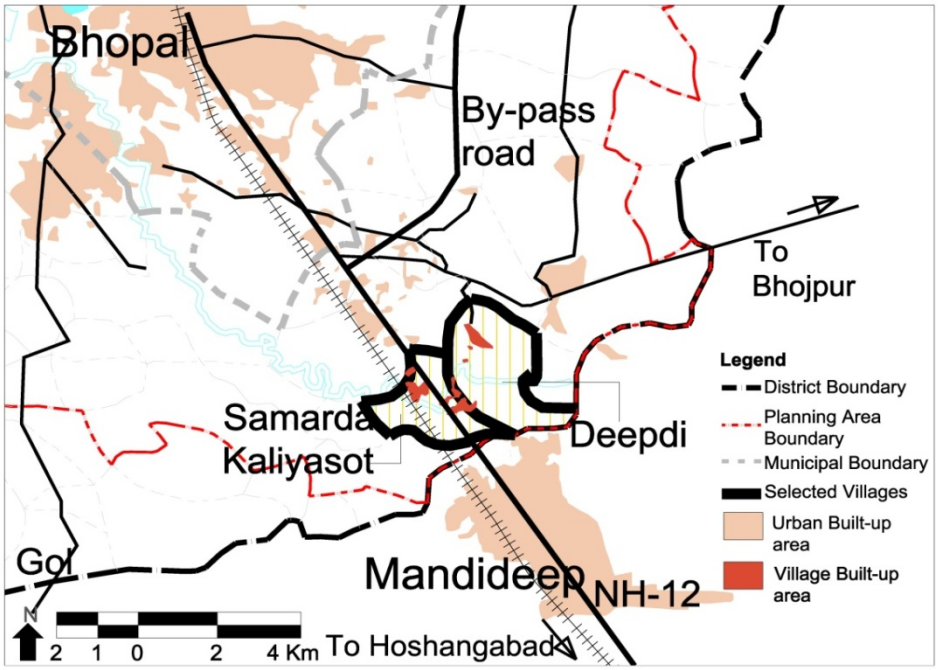
directions from Bhopal City. The selected villages under different categories are quite close to each other (see Map 4.1). So, even if they belong to different categories as per the matrix, the existing condition of villages is discussed as a cluster of villages. The discussion starts with the villages to the south of Bhopal city, followed by those to the north, in Berasia tehsil, and finally to the cluster of villages that lies to the west of the city.

4.2 Villages to the south of Bhopal City

A first set of villages has been selected to the south of Bhopal city as this side shows the most built-up growth and the expansion and sprawl of the city beyond the municipal limits (see

Map 4.1) This urban sprawl merges with the existing abadi areas of villages, blurring the urban-rural dichotomy.

Map 4.2: Selected Villages to the South of Bhopal City



The two villages selected in this direction are Samarda Kaliyasot belonging to category I (fast growth, on corridors) and Deepdi village belonging to Category IV (slow growth, off corridors). Samarda Kaliysot lies on NH-12, with many other locational benefits. Deepdi village is 2 kms away from Samarda Kaliyasot, connected with a *kutcha* (non paved) road. Deepdi village is connected to Bhojpur road, which is further connected with NH-12 thanks to the PMGSY governmental programme (Pradhan Mantri Gram Sadak Yojana) (see Map 4.2). The details of the villages and their demographic, spatial, social, economic, infrastructural and administrative profiles are discussed below.

4.2.1 Samarda Kaliyasot Village

Samarda Kaliyasot village lies on NH–12 which connects Bhopal to Mandideep (Industrial area) and further to Hoshangabad. As per the 2001 census, the population of the village was 2,052 people, which has increased to 5,500 people in 2011 (Primary Survey, February 2011).

Photo 4.1: Pucca Houses in Old Abadi Area

Photo 4.2: Commercial Establishments on State Highway

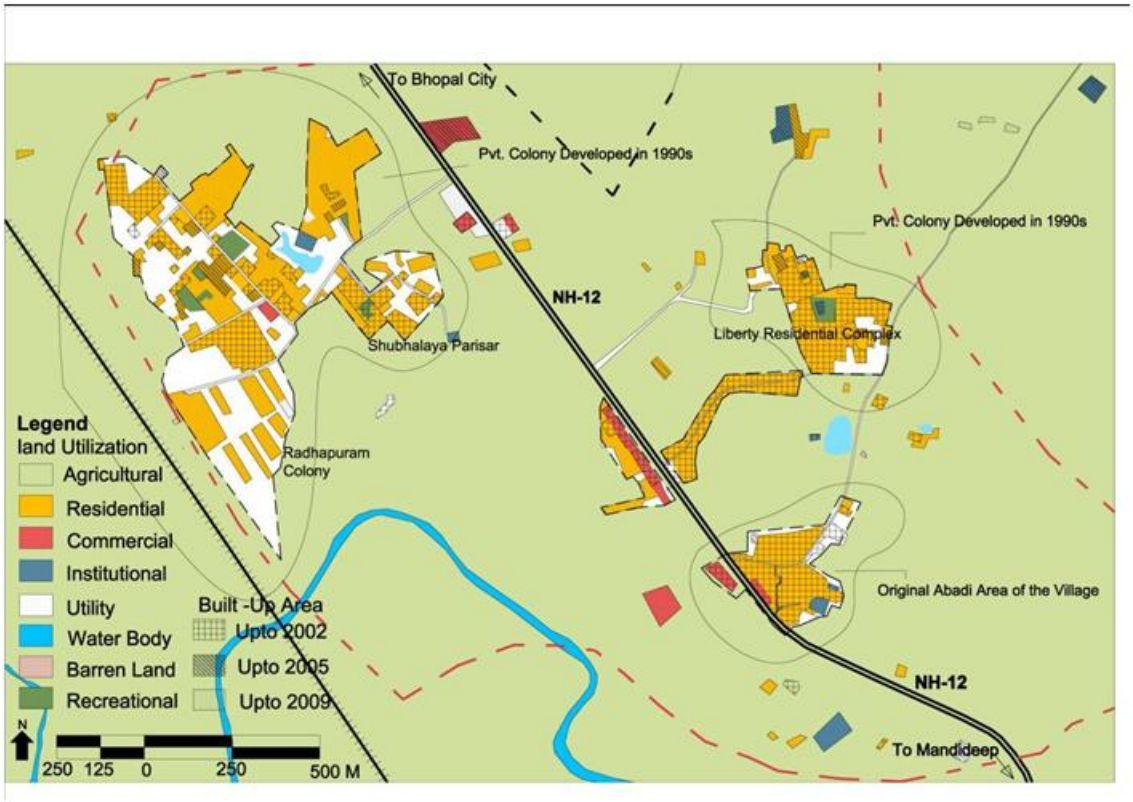
The huge increase in the population growth rate is due to the sudden increase in the population in private colonies formed in the revenue area. The Samarda village's abadi area has a population of 1,100. The revenue area has got three private complexes (see Map 4.3), which were sanctioned in 1994 and are still in the process of construction. These complexes have been made by local builders of Bhopal.

Photo 4.3: Pucca Streets in Colony

The private colonies are the Liberty Residential Complex, 70 per cent of which is comprised of people from Bihar and Uttar Pradesh; 20 per cent from Rewa and Satna and 10 per cent from the local villages. The Radhapuram Complex has 40 per cent of

people from Uttar Pradesh and Bihar, 50 per cent from other districts of Madhya Pradesh and 10 per cent from other states. Shubhalaya Parisar has 50 per cent of people from Uttar Pradesh and Bihar, 30 per cent from Madhya Pradesh and 20 per cent from other states. (Primary Survey, February 2011). Almost the entire working population in the new settlements is working in factories at Mandideep and only a few of the workers go to Bhopal. The companies at Mandideep get their cheap labour (lower professionals) from these villages surrounding it. Since Samarda Kaliyasot village is just three kilometers away from the industrial area of Mandideep, 20 per cent of the people living in the village (abadi area) are tenants, paying a rent of Rs. 1,000/ room/ month.

Map 4.3: Land Utilization and Built-up Growth of Samarda Kaliyasot Village



Source: Google Images, 2002, 2005 and 2009 and Primary Survey, Feb 2011

The total revenue area of the village is 323 Ha of which the abadi area covers 18.5 per cent. From 2002 to 2009, the built-up area increased considerably, with a growth of 119.3 per cent. The big share of the built-up area can be attributed to private colonies in the village (see Map 4.3).

In the 1990s, builders bought land at Rs. 30,000/ acre (around 71,000 Rs. / hectare) and today the land value is as high as Rs. 1 crore/ hectare near the National Highway and Rs. 50 lakh/ hectare inside the village. This urban sprawl and urban-rural merger has totally transformed the economy of the village. Within the village there are approximately 50 shops, all of which are privately-owned and which include groceries, cycle repair shops, tailors, cement shops, beauty parlours and mobile repair shops. No autos or rickshaws ply upto the villages from Bhopal or Mandideep; only small buses travel from Bhopal to Hoshangabad via Mandideep and vice versa every two minutes. Since there is no state government undertaking for bus transport, all the

buses are private. The infrastructure of the private colonies is in better condition as compared to original abadi areas of the villages, whether it is the condition of houses or physical infrastructure. Details of the existing condition of the village are given in Annexure V. The panchayat institution covers two villages. Five members are from Samarda. The Sarpanch is a woman from this village. If we look at the availability of institutional buildings within the village other than government schools and medical facilities, there is only a Panchayat Bhawan. Regarding the finances of the panchayat, only 200,000 rupees were allotted for different schemes under the central or state governments. (Primary Survey, February 2011).

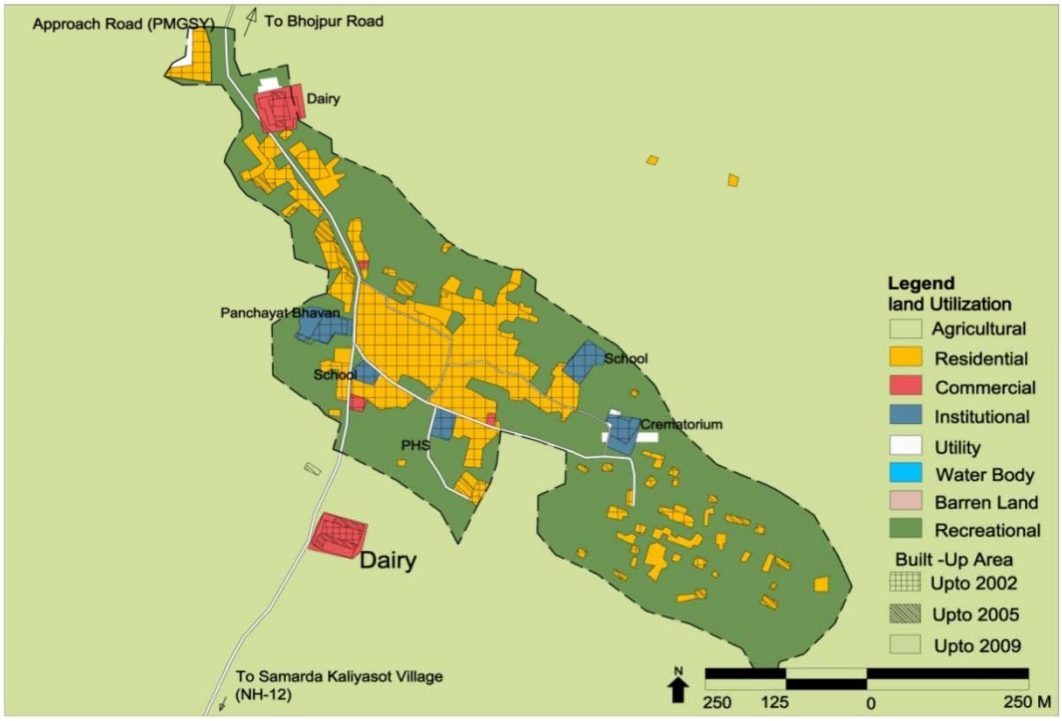
4.2.2 Deepdi Village

The village lies two kilometers inside the National Highway–12 as seen in Map 4.4. Its population of 815 people (Census of India, 2001) increased to 1,100 in 2011 (Primary Survey February 2011). This change is not very high and follows the previous trend of 25 per cent decadal growth.

Photo 4.4: Pucca Houses in Deepdi Abadi Area

The density of the village for the whole revenue area is 285 persons per sq. km. A few teachers and agricultural labourers come for their work from the surrounding villages of Bhopal. The non-agricultural male workforce of the village is just 38 per cent. Only eight per cent of the total workforce works in rural non-farm employment (RNFE), as borne out by the presence of just five grocery shops and two milk dairies, which produce almost 500 litres of milk sent to Bhopal daily. In this village, the percentage of small land holding sizes is very high at 78.8 per cent. Land values are lower than in Samarda Kaliyasot, and are almost equal to rupees 35-40 lakhs/ hectare. Other infrastructural conditions show a lesser degree of urbanity (in terms of lower non agricultural work force, density, built-up area changes and social changes) (see annexure V). A phenomenon observed is the high presence of assets such as television, satellite television service (DTH), two-wheelers and mobile phones in the village. A few houses in Deepdi village have a completely urban look as shown in photo 4.4. This village is part of the Samarda Kaliyasot Panchayat but only five of its residents are members of the panchayat. Like in Samarda, there is a Panchayat Bhawan in the village to which 200,000 rupees were allotted last year through central or state schemes. (Primary Survey, February 2011).

Map 4.4: Land Utilization and Built-up Growth of Deepdi Village

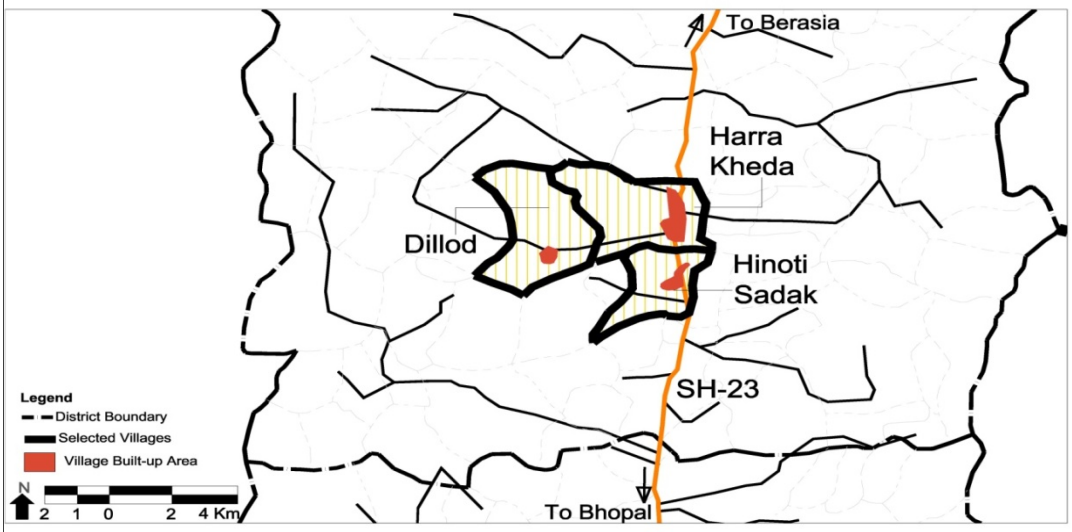


Source: Google Images, 2002, 2005 and 2009 and Primary Survey, February 2011

4.3 Villages to the North of Bhopal City

The second group of villages has been selected to the north of Bhopal city towards Berasia town in Berasia tehsil, which is almost 30 kms from Bhopal (see Map 4.5). Three villages have been selected: Harra Kheda (Category I: fast growth on corridors), Hinoti Sadak (Category II: slow growth on corridors) and Dillod (category III: fast growth off corridors). These villages are in the proximity of State Highway–23: Harra Kheda and Hinoti Sadak are located on the state highway, whereas Dillod lies 4 km inside the state highway. Dillod village is connected to the state highway by a road built by PMGSY (Pradhan Mantri Gram Sadak Yojana). The village road up to Dillod further covers many villages with a circular road. A detailed analysis of the characteristics of the villages is made below.

Map 4.5: Selected Villages to the North of Bhopal City



4.3.1 Harra Kheda Village

Harra Kheda village lies on the State Highway 23, which connects Bhopal to Berasia, at a distance of 30 km from Bhopal and 13 kms from Berasia. Its population was 1632 people in 2001 (Census of India) and reached 2080 people in 2011 (Primary Survey, February 2011).

Photo 4.5: Vehicles on Road and telephone towers in Harra Kheda village

Photo 4.6: Hard ware shops in Harra Kheda

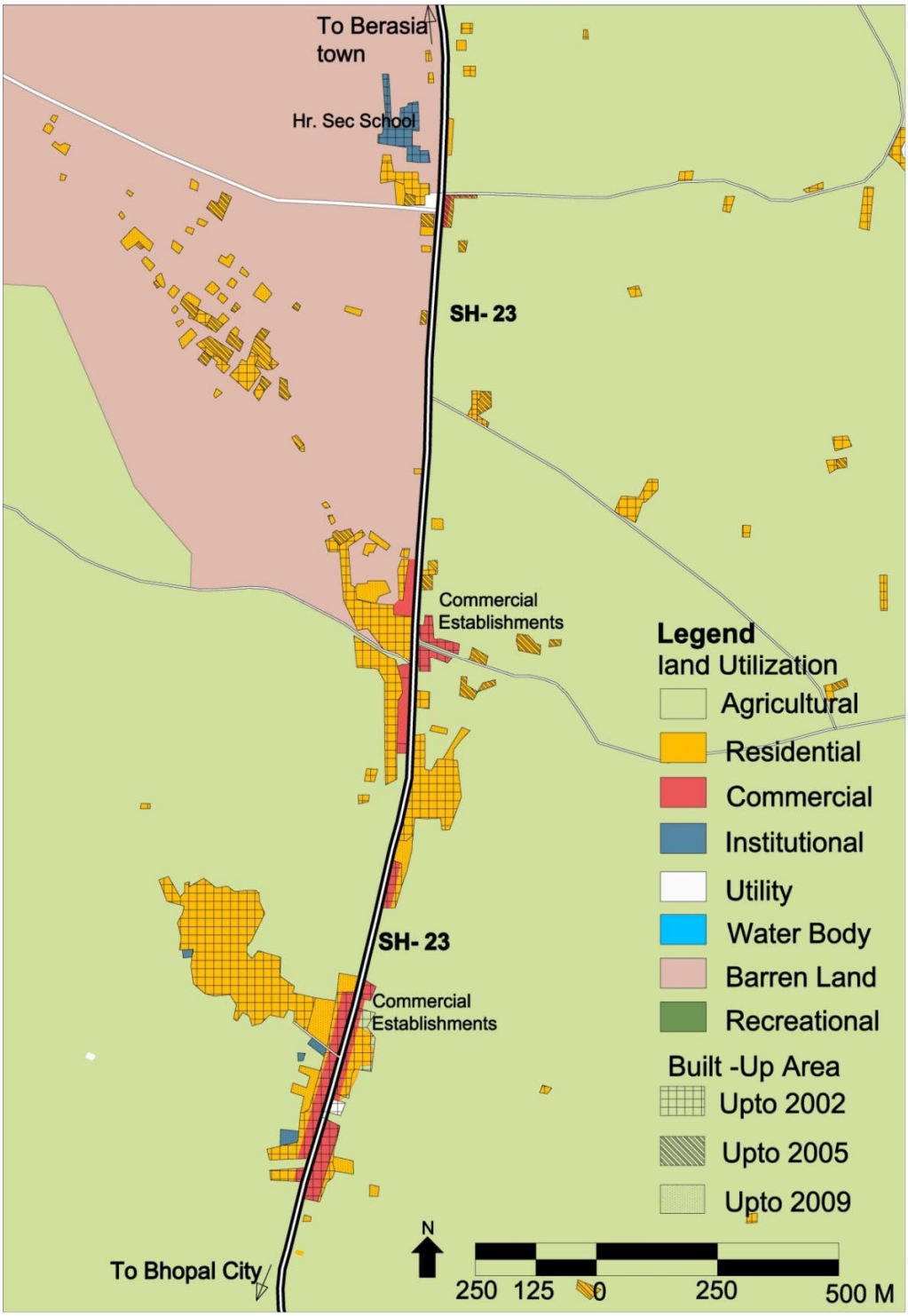
The total revenue area of the village is 691 ha. People commute to Bhopal for work. The village has developed in a linear fashion along the highway. (see Map 4.6). It acts as a convergence point for around 35-40 surrounding villages and provides educational facilities and commercial areas. The village has 180 shops of a large variety and nature. They include repair shops, stationery shops, bakeries, groceries, hardware shops, tent houses, clothes and plastics shops etc. Overall, 25 per cent of the workforce is engaged in agriculture and the rest in other works. Six households are totally dependent on a dairy production of 400 litres/ day, which is sent to Bhopal and Berasia. The number of commercial establishments is very high compared to other villages (with one commercial establishment for 7.2 persons). Consequently, the percentage of rural non-farm employment (RNFE) population is high at 54 per cent.

In terms of infrastructure, there are no water pipelines and no sewerage system (all households have septic tanks). The village also has a moderate percentage of pucca houses. There are mobile towers in the village area that belong both to private and government agencies. The level of assets is comparable to other villages. Since the village lies on the state highway, the frequency of buses is quite high (one bus every fifteen minutes).

The panchayat institution is constituted of sixteen members and nine of them are women. The village acts as a nodal point of public services with more than five institutional buildings, which include the Panchayat Bhawan, the Post office, a Police Chowki, a Forest Divisional office and a veterinary office. This village received the most funding during last year, around 15 lakh rupees for the implementation of various schemes.

Even though the population is very low, thanks to the presence of large commercial, development and government institutions, Harra Kheda plays the role of a market town and an administrative centre.Its role as a nodal point for 35-40 villages may also be due to its ideal location in the district between Bhopal and Berasia.

Map 4.6: Land Utilization and Built-up Growth of Harra Kheda Village



Source: Google Images, 2002, 2005 and 2009 and Primary Survey, Feb 2011

4.3.2 Dillod Village

Dillod village is four kms from state highway 23. It is connected by a Pradhan Mantri Gram Sadak Yojana (PMGSY) road, which starts from Harra Kheda, passes through Dillod and goes on to other villages (see Map 4.5 and Map 4.6).

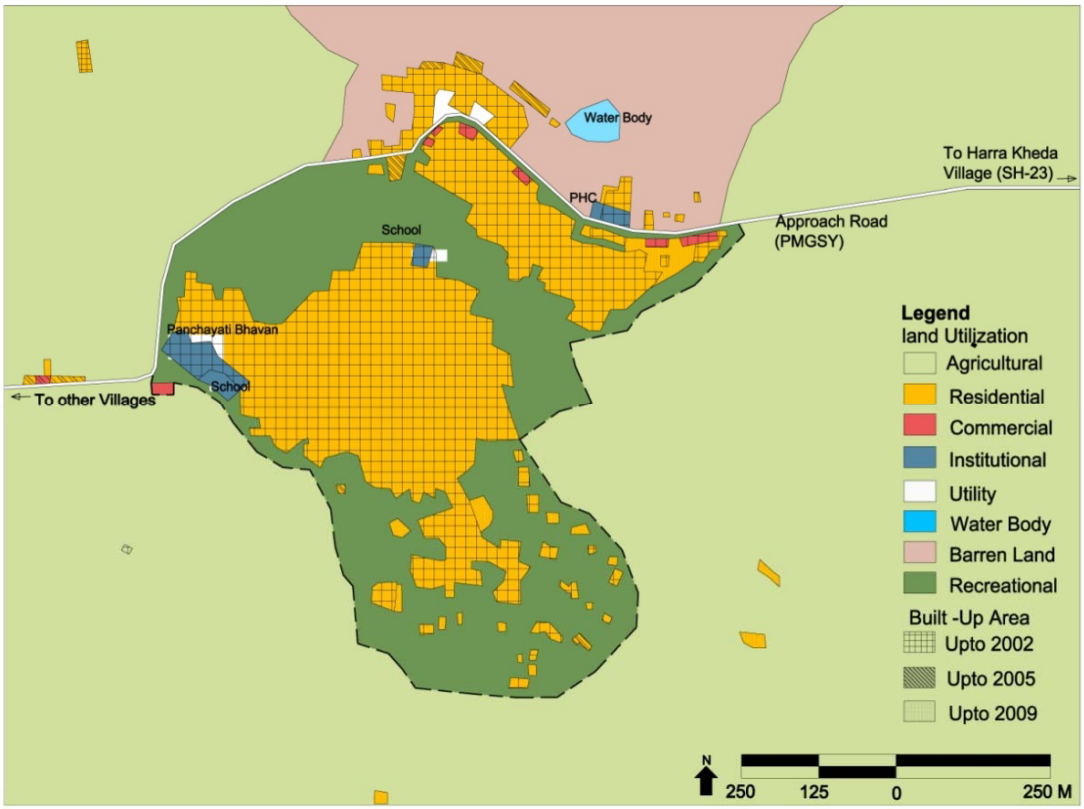
Photo 4.7: Bus plying in Dillod Village

Photo 4.8: Commercial Establishments in Dillod Village

The population of the village was 2216 in 2001 (Census of India, 2001) and increased to 2900 in 2011. (Primary Survey, February 2011). The density is also not very high at 285 persons/ sq. km. The economic base of this village is very different from other villages: 75 per cent of the male workforce is involved in non-agricultural activities and sixty seven per cent of the total workforce commutes to surrounding villages. This workforce is mainly engaged in the teaching service, due to political influence.

People from this area have been involved in politics, which has led to investment in education, educational facilities and has raised the literacy rate of the area. The village has a 20 year-old higher secondary private school. It also has a workforce which is involved in dual activities: people have farms on which they work during the harvesting season and move to other work for the rest of the year. This village acts as a nodal centre, from where people move to provide their services. Almost 15-20 villages are covered under it. The village has one private medical clinic, a primary health centre and a government ayurvedic clinic, which shows that the village has a higher order of government medical services than the other study villages. One more observation is that five buses pass through the village everyday. These are special buses which ply on the circular road that connects other villages (see Map 4.5). The panchayat of the village is constituted of 21 members (including 11 women) and it was allotted 200,000 rupees in 2010 for different development schemes. Institutional buildings comprise of the panchayat bhawan and a post office.

Map 4.7: Land Utilization and Built-up Growth of Dillod Village



Source: Google Images, 2002, 2005 and 2009 and Primary Survey, Feb 2011

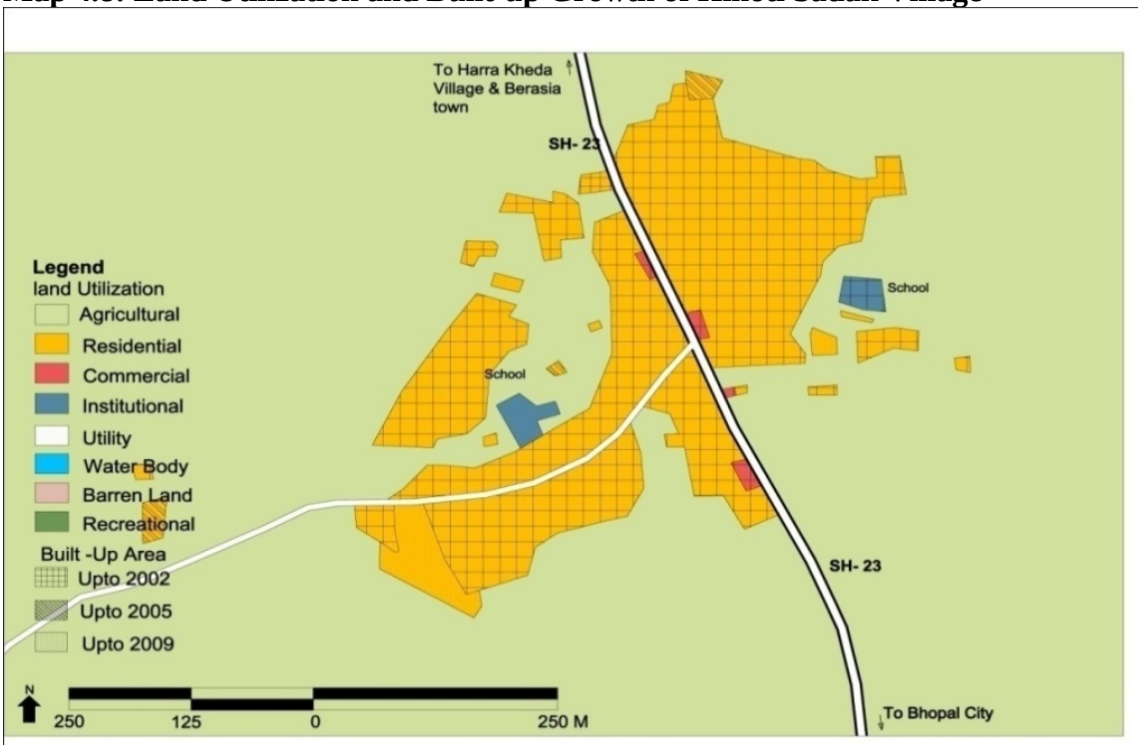
4.3.3 Hinoti Sadak Village

The village lies on state highway 23 connecting Bhopal and Berasia and two kms to the south of Harra Kheda village (see Map 4.5). Even though the village is on the state highway, it has a low population growth rate.

Photo 4.9: DTH Service in the houses of Hinoti Sadak Village

This could be due to the role of Harra Kheda as a growth centre for the whole area. Few commercial establishments have come up on the state highway and there is little expansion. Built-up growth is also just 10 per cent in the last eight years (see Map 4.8). Physical facilities and social infrastructure are less developed than in Harra Kheda, though household assets are as high. The sarpanch of the village is one among nine women who are part of the sixteen-member panchayat. This village has just a panchayat bhawan and post office as institutional buildings and received only three lakh rupees in 2010 for the implementation of development schemes.

Map 4.8: Land Utilization and Built-up Growth of Hinoti Sadak Village

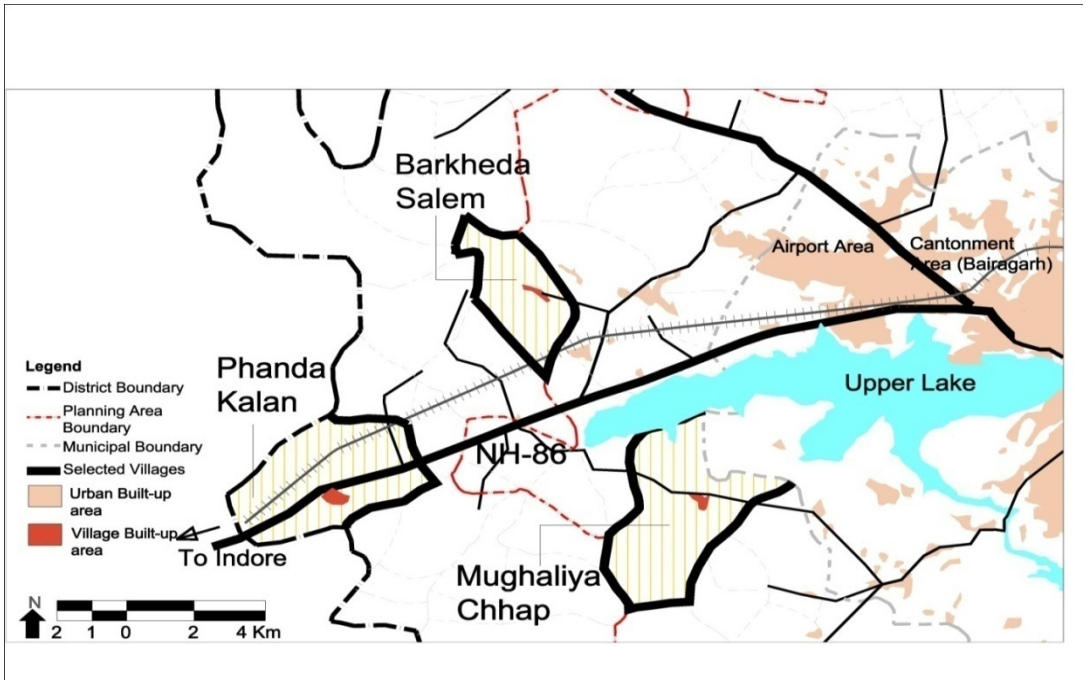


Source: Google Images, 2002, 2005 and 2009 and Primary Survey, Feb 2011

4.4 Villages to the West of Bhopal

The third group of selected villages is located to the west of Bhopal towards Sehore and Indore (see Map 4.9). Phanda Kalan lies on National Highway 86, which goes to Sehore and then further to Indore. This village belongs to category II (slow growth on corridors) while Mugaliya Chhap is from category III (fast growth off corridors). It is located seven kms from National Highway 86. The third village, Barkhede Salem, is in category IV (slow growth off corridors). It is located four kms away from the state highway and is connected by a PMGSY road. These villages have different characteristics because of the presence of a watershed area and of the highway. Other than this, regulatory and locational constraints show different results in different villages. The details of the villages and their demographic, spatial, social, economic, infrastructural and administrative profiles are discussed below.

Map 4.9: Selected Villages to the West of Bhopal City



4.4.1 Phanda Kalan Village

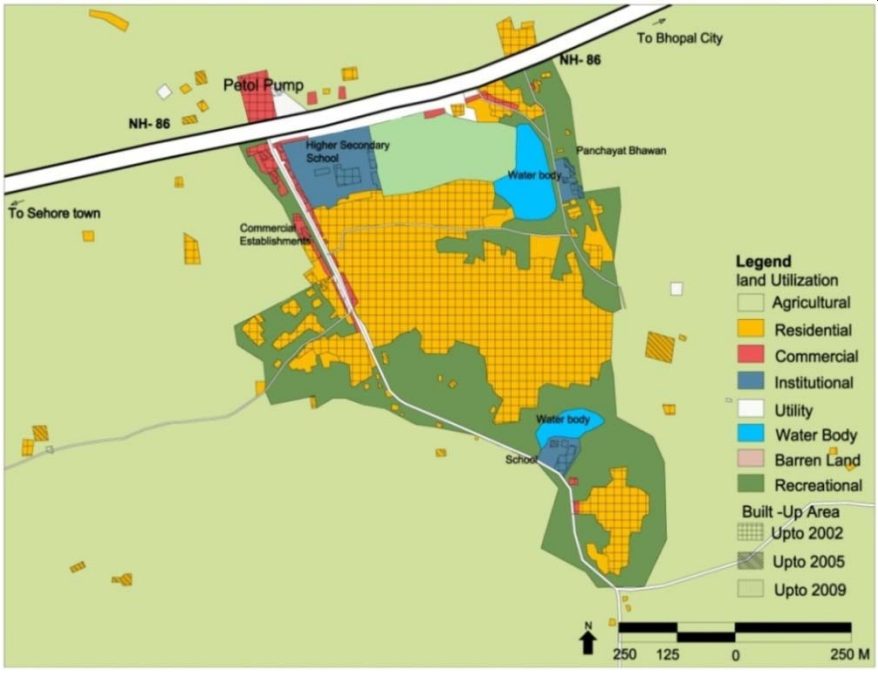
Phanda Kalan village lies on National Highway 86, 25 kms from Bhopal city. The population of the village was 2,995 in 2001 (Census of India, 2001) and 3,800 in 2011 (Primary Survey, February 2011). Because of its location, many commercial establishments have come up here, mainly eating joints, bike repair shops, and a petrol pump. Overall, 33 per cent of the male workforce is involved in non-agricultural pursuits.

Photo 4.10: Commercial Establishments in Phanda Kalan Village

Photo 4.11: Vehicle service centre on National Highway in Phanda Kalan Village

Out of the total workforce 26 per cent is engaged in RNFE and works in these shops. Even though the village has 90 shops, the number of shops per 100 persons is just 2.37, which is very low as compared to Harra Kheda village. Phanda Kalan does not show a large change in built-up area. Products in the village cater mainly to its population and to travellers between Bhopal and Indore. It is a nodal point for educational facilities only because of a higher secondary school, which caters to 10-15 surrounding villages. In terms of infrastructure, it fares better than other villages and the percentage of assets in the village is high. This village also has a large panchayat body with 21 members, out of which eleven are women. There are only two institutional buildings: the panchayat bhawan and the post office. In 2010, the village received ten lakh rupees for the implementation of rural schemes in the village.

Map 4.10: Land Utilization and Built-up Growth of Phanda Kalan Village



Source: Google Images, 2002, 2005 and 2009 and Primary Survey, Feb 2011

4.4.2 Mugaliya Chhap Village

The village is connected to Bhopal and to the National Highway 86 by two PMGSY roads of 12 kms and 7 kms each (shown in Map 4.9). The village had 3,165 inhabitants in 2001 (Census of India, 2001) and the existing population is 4,600 (Primary survey, February 2011).

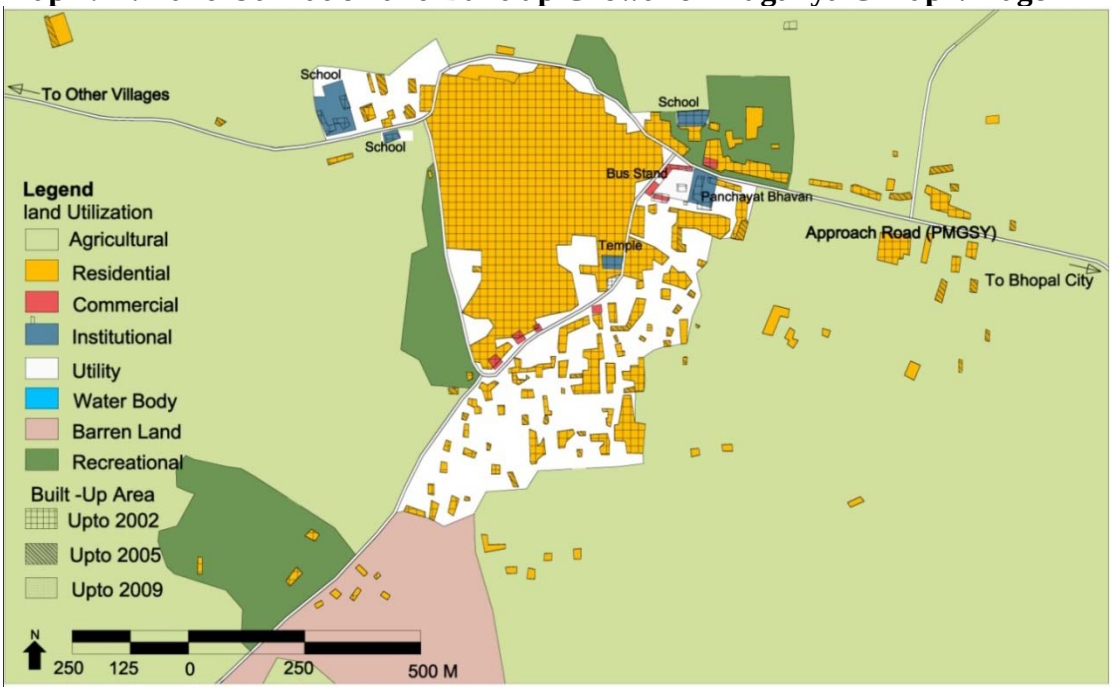
Photo 4.12: Pucca buildings in Abadi Area of Mugaliya Chhap Village

This area does not lie on the corridor but in the watershed area of the upper lake of Bhopal (see Map 4.9). The Bhopal development plan prescribes development restrictions in watershed areas and this explains the low rate of spatial expansion of the village. The built-up growth from 2002 to 2009 was just 10.7 per cent (see Map 4.10) and the land values in the revenue area are also very low at ten to twenty lakh rupees / hectare.

Photo 4.13: Pucca buildings in Abadi Area of Mugaliya Chhap Village

Because of the watershed management regulations, land divisions are not very high and the percentage of small-size land holdings is lower than in other villages. The workforce is mainly involved in agricultural pursuits. Fourteen per cent of the male workforce is involved in non-agricultural pursuits and most of them commute daily to Bhopal. They work in the transport sector (jeeps, which ply daily in the morning and evening between village and city). The village has 21 members in the panchayat, with eleven women. This village has a post office and a panchayat bhawan and received eight lakh rupees in 2010 for implementation of schemes.

Map 4.11: Land Utilization and Built-up Growth of Mugaliya Chhap Village



Source: Google Images, 2002, 2005 and 2009 and Primary Survey, February 2011

4.4.3 Barkheda Salem Village

This village lies in the planning area and is three kms away from National Highway 86 (see Map 4.9) It is located 20 kms from central Bhopal but lies very near the airport and the cantonment area. The population of the village was 1513 in 2001.

Photo 4.14: DTH Service in Semi-pucca houses in Barkheda Salem Village

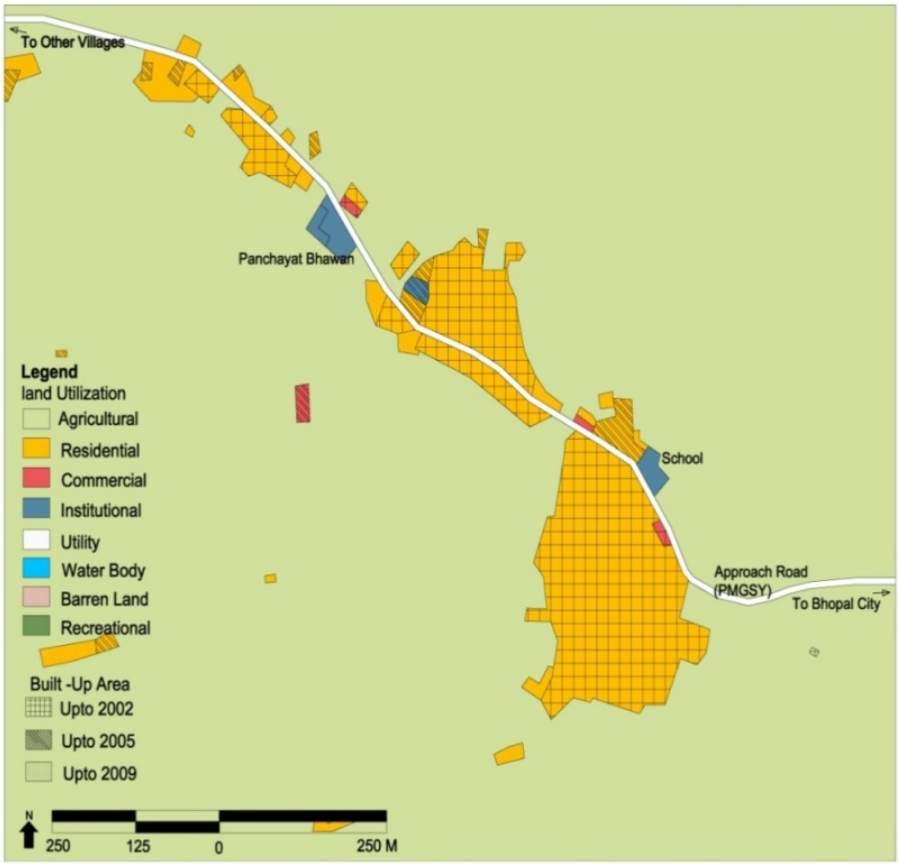
Even though the village lies within the planning area, there is no bus connectivity and villagers have to walk three kms till the national highway. The village has a very small workforce (seventeen percent only), which is involved in non-agricultural pursuits. Only four percent of the total workforce is part of RNFE, the rest of the people go to Bhopal for daily labour.

Photo 4.15: Commercial Establishments in Barkheda Salem Village

The village has higher land values than Mugaliya Chhap and Dillod since it is near Bhopal. This proximity explains the 25.9 per cent increase in built-up area between 2002 and 2009. The difference in male and female literacy rates is the highest in this

village because of the scanty educational facilities. In terms of infrastructure, the village shows rural traits with a low percentage of pucca houses, medical facilities, and bank and communication facilities. Administratively, it has a panchayat body of sixteen members, which includes eight women. Only two lakh rupees were allocated to the panchayat body in 2010 for implementation of rural schemes in the village. (Primary Survey, February 2011)

Map 4.12: Land Utilization and Built-up Growth of Barkheda Salem Village



Source: Google Images, 2002, 2005 and 2009 and Primary Survey, February 2011

4.5 Special Characteristics of Villages

The overall study of these villages shows that rural non-farm employment is considerable, both in terms of numbers and of scope and nature. A large number of people are involved in dual work, and this leads to an increase in the number of non-agricultural workers within villages. Other than this, the flow of people daily from village to city and village to village forms a strong connection between different settlements. This is also linked to the condition and availability of approach roads, bus frequency and the high level of ownership of two-wheelers and four-wheelers. These factors increase the dynamics in settlements and facilitate networks for voluminous flow of people. As clearly noticeable in some of the photographs above, the structural condition and designs of houses match urban standards. Higher land values and reducing landholding sizes are correlated with other indicators, such as built-up expansion and reducing household sizes. Commercial expansion within a

rural settlement is a very strong factor as well, and the presence of a large number of commercial establishments attracts people from the surrounding areas to work and avail of commodities. This phenomenon gives rise to a growth centre and to market places catering to 35-40 villages. Further, villages near urban limits show large growth in built-up area due to urban sprawl beyond urban limits.

4.6 Analysis of Indicators at the Village Level

Indicators identified in chapter two, which represent urban characteristics, have been applied to eight selected villages. These indicators were collected in each village through primary surveys and secondary sources. Different dimensions of urbanity have been related to various indicators as shown in Annexure V. The table in Annexure V shows that density of revenue area is quite high, but if calculated for the abadi area (that is the built-up area of the village, other than farms), it is even higher, which shows the actual dense concentration of population. A floating population in search of jobs is mainly seen in the villages near Mandideep Industrial Area (Samarda Kaliyasot and Deepdi).

From an economic point of view, these villages are no more agricultural. People shift to other works due to various push factors resulting in RNFE and commute to nearby cities and towns. A higher percentage of small holdings is also observed in the village which lies on the corridor NH-12, and in the planning area. Family restructuring is again observed in the same villages. The literacy rate is also very high in Samarda Kaliyasot, where rapid urban sprawl is taking place on the corridor.

The infrastructural set shows that, other than Dillod, villages which are on corridors have higher infrastructural facilities. The presence of assets such as two-wheelers has completely changed the rural scenario. There is a good coverage of communication facilities, such as mobile phones. Overall, Samarda Kaliyasot is very urbane due to its location (it lies on the corridor and in the planning area) followed by Harra Kheda which also lies on the State highway and is a growth centre for 30 villages.

This section classifies indicators into three categories. First, indicators with similar and low values are clustered together, across villages. Then indicators with similar and high values are clubbed together. The final clustering includes indicators which show variations in values across villages.

Indicators which have similar and low values are: percentage of pucca streets (length); street lights; percentage of households having tap water; sewer systems; electricity; drainage on streets; number of banks/credit societies; telephone centers; computer/ vocational centres; newspapers/per day and percentage of households having assets such as LPG. Indicators such as the presence of tap water and sewer systems in houses show high values but, in reality, they are not connected with pipeline systems, so they come under this category. Even electricity parameters show that almost all houses have electricity connections, but no village gets electricity for more than eight to ten hours in a day. This group of indicators comprises of the facilities provided by the government except newspapers and provision of LPG.

The indicators which have similar high values across villages are: the rate of nucleation of families; literacy rate; percentage of non-residential land use; number of telephone towers (mobile towers); number of medical facilities; number of educational facilities; approach road - metalled/ unmetalled road (NH, SH, PMGSY);

percentage of households having assets – TV, DTH Service, two and four-wheelers, mobile phones; size of local body (Panchayat) and small land holdings.

Table 4.2: Indicators showing similar and high values across villages

Criteria (Range)		CATEGORY I		CATEGORY II		CATEGORY III		CATEGORY IV	
		Samarda Kaliysaot	Harra Kheda	Phanda Kalan	Hinoti Sadak	Mugaliya Chhap	Dillod	Deepdi	Barkheda Salem
Percentage of small land holding size (53.5– 89.6 per cent)									
Literacy rate (50.7–81.5 per cent)									
Number of telephone towers (1 – 3)									
Number of telephone centres (0 – 1)									
Percentage of HHs having	Television (80 -95 per cent)								
	DTH Service (60-80 per cent)								
	Two-wheeler (50-90 per cent)								
	Mobile Phones (80-95 per cent)								

Legend: Weightages

Above 75	
50-75	
Below 50	

Indicators having similar and high values have been weighted and indexed from 0 to 100 so as to identify the urban character of different villages. It is clearly visible that asset concentration in all villages is above 50 (see Table 4.2). A few villages show less weightage in the table, but they are not low in value. For example the presence of a single tower in a village is also a high value, but as compared to three towers in a village, it shows a low index.

For indicators which show extreme values across villages, based on identified sets of indicators, spider web diagrams have been made by indexing from 0 to 100. In all, twelve indicators have been considered for the preparation of spider web diagrams. All of these indicators have been converted into percentages, where the highest value is taken as 100. Two indicators (distance and differential literacy rate) have been reversed to get the positive relation to other indicators. Their inverse value has been calculated as X*100/Y, where X is the lowest value and Y is the value for that village. Inverse values have been indicated as proximity to the city and gender equality in the case of literacy rate.

Two sets have been prepared for spider web diagrams. The first set of indicators are built-up growth, population density for built-up area, land values, number of commercial establishments per 100 persons, fund allocation in the previous year, and

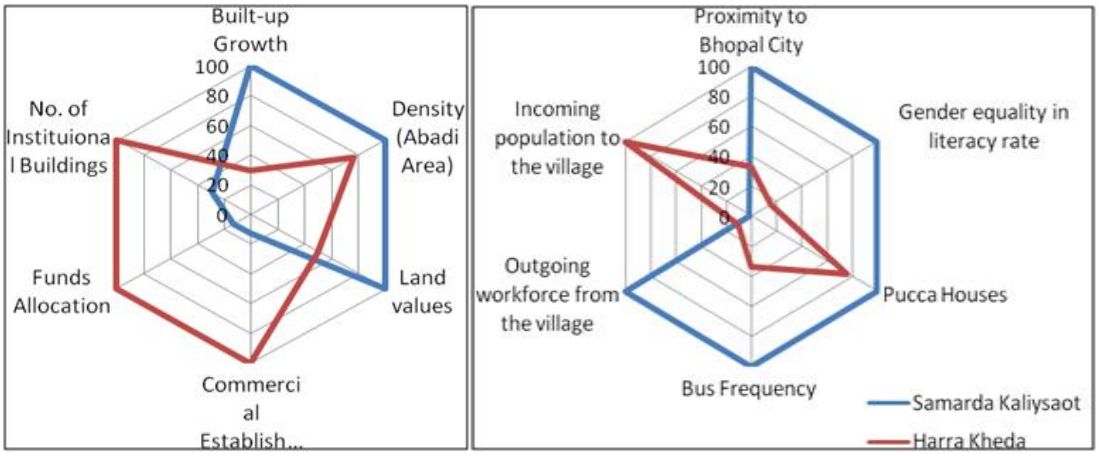
number of institutional buildings which consist of office buildings, government buildings and medical and educational facilities. The second set includes more than six indicators: distance of the village from Bhopal, bus frequency, percentage of pucca houses, male-female differential in literacy rate, incoming population to the village and outgoing workforce from the village.

Variations have been observed across different categories and in villages within the same category (see Figure 4.1, Figure 4.2, Figure 4.3 and Figure 4.4). Category I (fast growth on corridors) shows the highest values across all variables as compared to other categories. Differences between villages within category I are mainly due to proximity to Bhopal, leading to the evolution of different types of urbanization. Eight indicators and four indicators in Samarda Kaliyasot and Harra Kheda show the highest values, more economic in nature in the case of Harra Kheda. The proximity to Bhopal acts as a very strong indicator as it affects other indicators also.

Densities are high in all categories, irrespective of the category and proximity to the town. This is due to the calculation of population densities for built-up areas only and not for revenue areas. It is also apparent that, except Dillod and Barkheda Salem, all villages have a high percentage of pucca houses. Dillod also shows very high weightage in the outgoing workforce from the village.

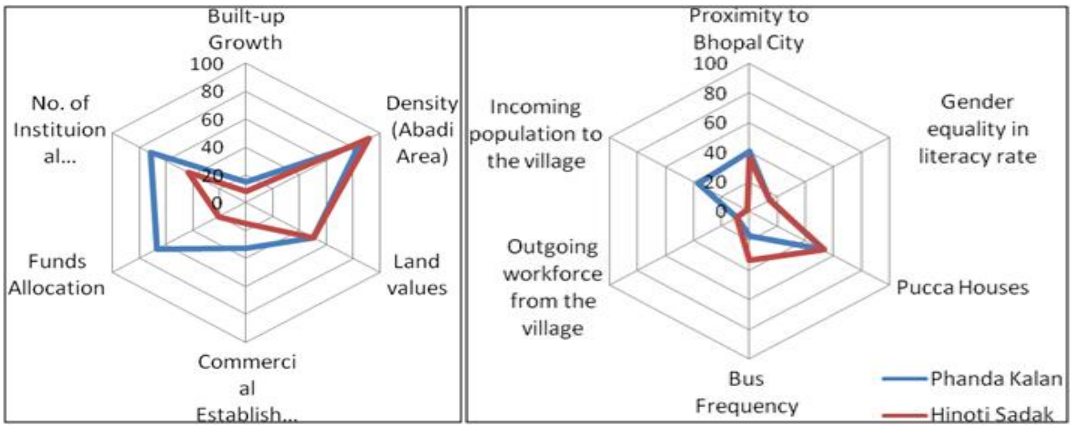
Categories II, III and IV show variations but show very low levels of values in more than half the indicators. The first category which is on the corridor has a high population growth rate and shows the highest level of values of indicators. This reveals that these two characteristics lead to other characteristics of urban character.

Figure 4.1: Spider Web Diagram for Category I Villages



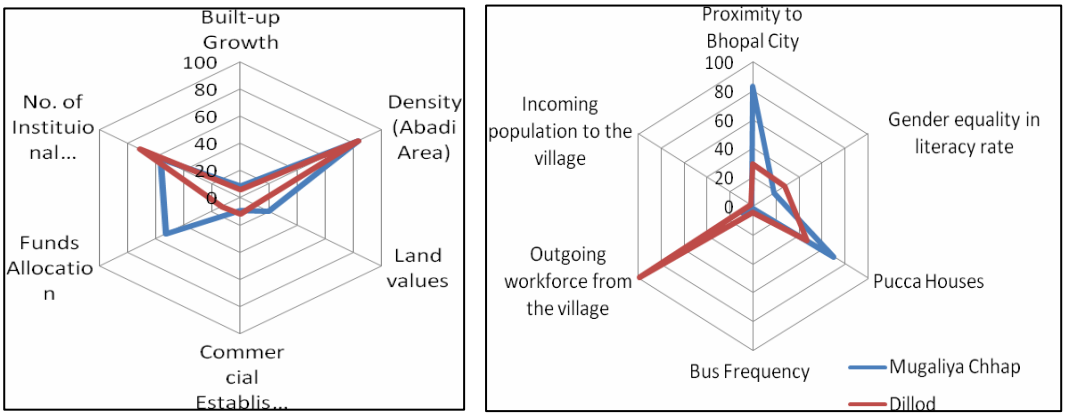
Source: Primary Survey, February 2011; Census of India, 2001 and 1991; and Google images, 2002, 2005 & 2009.

Figure 4.2: Spider Web Diagram for Category II Villages



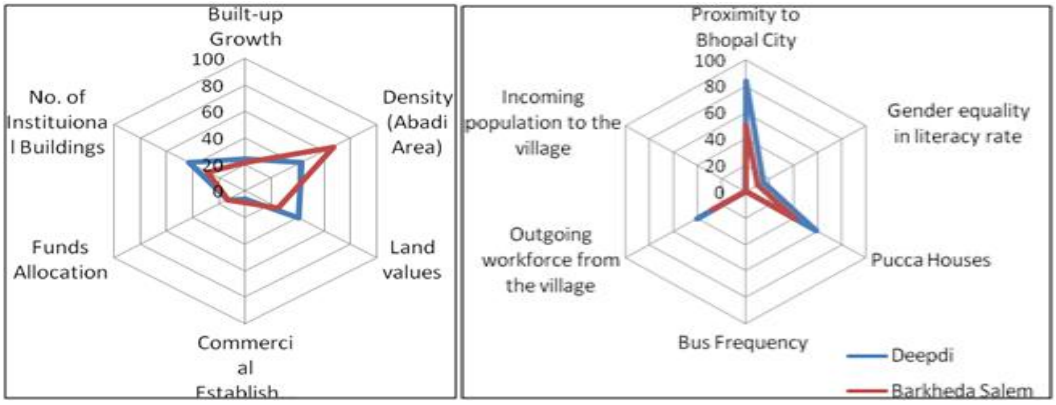
Source: Primary Survey, February 2011; Census of India, 2001 and 1991; and Google images, 2002, 2005 & 2009

Figure 4.3: Spider Web Diagram for Category III Villages



Source: Primary Survey, February 2011; Census of India, 2001 and 1991; and Google images, 2002, 2005 & 2009

Figure 4.4: Spider Web Diagram for Category IV Villages



Source: Primary Survey, February 2011; Census of India, 2001 and 1991; and Google images, 2002, 2005 & 2009

Table 4.3: Indicators showing variation in values across villages

Criteria (Range)	CATEGORY I		CATEGORY II		CATEGORY III		CATEGORY IV	
	Samarda Kaliysaot	Harra Kheda	Phanda Kalan	Hinoti Sadak	Mugaliya Chhap	Dillod	Deepdi	Barkheda Salem
Built-up Growth (7.5 - 119.3%)								
Density (Abadi Area) (3,132 – 7,334 persons/sq. km)								
Land values (Rs.10-100/ Ha)								
Commercial Establishments (0.45 – 7.2 shops/ 100 pop.)								
Fund Allocation (Rs.2 -15/ year)								
No. of Institutional Buildings (2 - 7)								
Proximity to Bhopal City (10 – 34 km)								
Gender equality in literacy rate (4.1 - 42.2%)								
Pucca Houses (35 – 85%)								
Bus Frequency (0-120/ day)								
Outgoing population from the village (7-76%)								
Incoming population to the village (10– 1,500)								

Legend: Weightages

Above 75

50-75

Below 50

4.7 Conclusion

Overall, detailed village studies have shown that, officially, rural settlements have a number of urban characteristics across different dimensions and different categories. A number of physical indicators of urbanity are visible in these villages, especially when they relate to household durables or services given by private providers like cellular telephony. On the other hand, for a number of indicators that depend on public service provision, like street lighting, drainage, household water connections, etc. these villages rank low. A multi-dimensional approach for defining an urban area thus leads us to question and go beyond the official census definition. The village study also indicates that two villages with the most number of urban characteristics, viz. Samarda Kaliyasot and Harra Kheda, exhibit two different types of urbanization, focusing on two complementary sets of characteristics. This is examined more in detail in the next and final section.

5. Conclusions

The study proposes a multi-dimensional indicator approach to identify an urban area beyond physical and demographic components. It also suggests the need to re-examine the notion of population density. The specific suggestion is to calculate the population density of a village for its built-up area instead of its revenue area which also includes farm land. The study concludes with the identification of two types of urbanization, based on the indicators of Samarda Kaliyasot and Harra Kheda villages. The study has suggested a quick set of indicators also, which are the common components between Samarda Kaliyasot and Harra Kheda villages. These common components are connectivity through road corridors and movement of people, both being inter-related. These indicators act as key drivers for increase in urbanity levels.

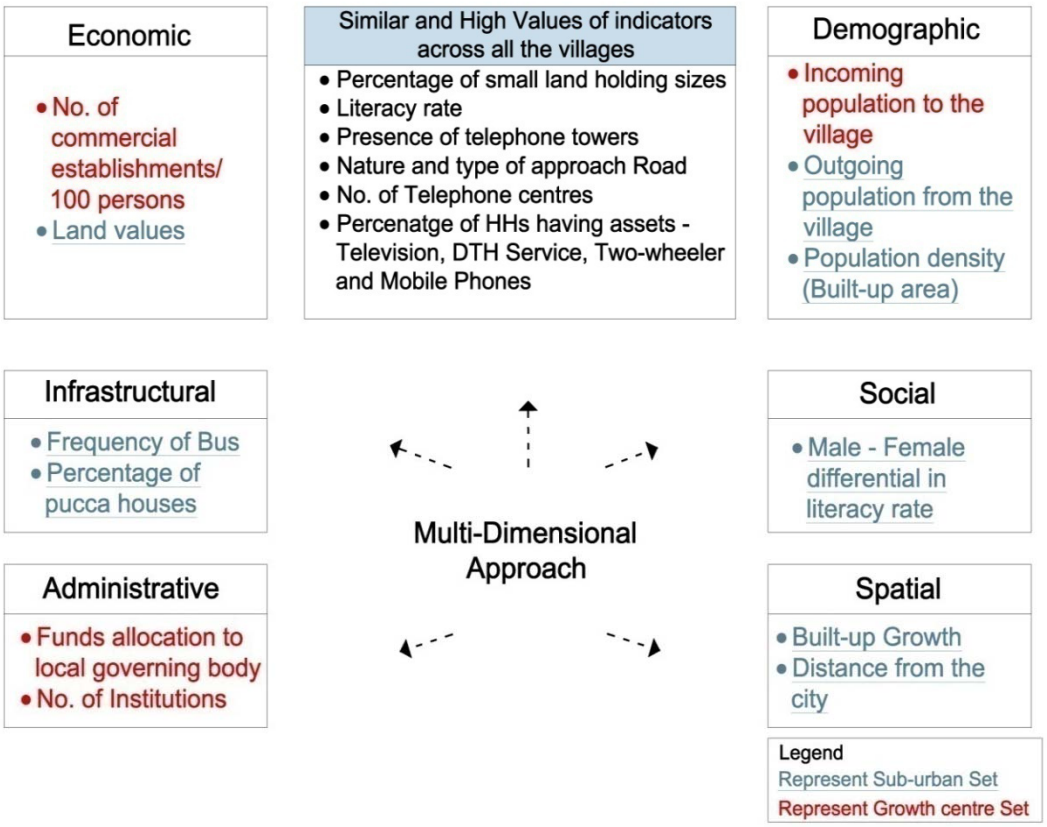
5.1 A Multi-Dimensional Approach

Defining urban areas is really a very hard task, which needs many detailed and exhaustive studies. In the existing study, a set of multi-dimensional indicators has been developed for defining the notion of 'urban area'. The different dimensions include demographic, spatial, social, economic, infrastructural and administrative indicators (see Figure 5.1).

The first set of indicators having similar and high values across all villages will remain as an additional step of the multi-dimensional approach. This is because, if only this set is taken to define an area, then all villages will become urban areas due to indicators which will show high intensity of urbanity.

The colour coding of different indicators shows the different types of urbanization which evolve over a period of time, as discussed further in the concluding section. The population density indicator has been highlighted, as it has been calculated for built-up area. It has further been suggested that the definition should include population density for built-up area instead of for revenue area. This is discussed below.

Figure 5.1: Indicator set for defining an 'Urban Area'



5.2 Population Density of Built-up area or Revenue area

No selected village (settlement) for the study was an urban area in 2001, as per the census definition. But Samarda Kaliyasot complied with one parameter: its population density (revenue area) was more than 400 persons/ sq. km. However, if this density is calculated for *abadi* areas (built-up area) in all the selected settlements, it works out to be more than 3,000 persons/ sq. km. This reinforces the argument that the concept of density needs to be changed from population density for the whole revenue area to population density in the *abadi* area of the village.

To examine this, a small exercise has been carried out which shows that built-up ratio of an urban area in its municipal area is fairly high as compared to the built-up ratio of rural area in its administrative boundary i.e., revenue area. This comparison has been done for urban areas of Bhopal district and selected villages (see Table 5.1).

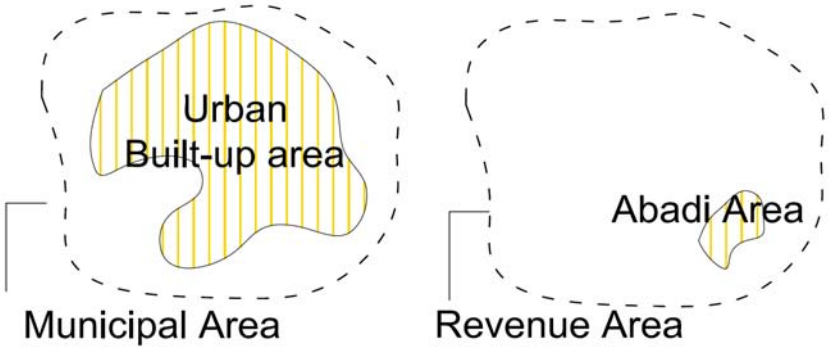
Table 5.1 shows that Bhopal has a high built-up ratio, which goes above 50 percent, whereas in villages it is somewhat low. This leads to huge differences in population density when calculated for administrative areas. In the village, the nucleated and concentrated form of *abadi* area is distributed over the whole revenue area for the purpose of calculation, showing false results (see figure 5.2). This leads to a situation where one is unable to see the real density prevailing in the village and the possibility of enhanced human interaction, which is one of the most important elements leading to urbanization.

If population densities are calculated for just *abadi* areas/built-up areas of villages and for urban areas, they are similar across urban and rural areas (see table 5.1).

Table 5.1: Built-up ratio of urban and rural areas in proportion to their administrative areas

Settlements		Built-up Area/ Total Area (%)	Revenue density (p/ sq. km.)	Abadi Area density (p/ sq. km)
Urban	**Bhopal City**	**55.9**	**4,886**	**8,617**
	Berasia town	**19.3**	**1,737**	**7,594**
Rural	Samarda Kaliyasot	12.4	635	7,334
	Deepdi	2.7	156	3,132
	Harra Kheda	3.8	236	5,620
	Dillod	2.6	217	6,126
	Hinoti Sadak	2.8	303	6,712
	Phanda Kalan	1.8	207	6,182
	Mugaliya Chhap	2.3	239	6,134
	Barkheda Salem	1.6	182	4,870

Figure 5.2: Built-up ratio to administrative boundary in urban and rural areas



So the reality is that the census definition which covers the whole revenue area for calculation of population density, does not show the actual level of congestion and land used up by people for residence. It gives us the wrong picture of the village with low value of densities. Even the urban character of intense interaction which comes from dense living is a feature in the villages.

So what Denis and Marius-Gnanou (2011) have discussed about built-up concentration and agglomeration is observable even in small villages with low populations. High densities across all villages show the need to reassess the existing threshold of population density from 400 persons/ sq. km to a higher level, since rural population densities are almost equivalent to urban population ones and are quite above the threshold and above 3,000 persons/ sq. km.

5.3 Types of Urbanization

Different types of phenomena have been observed, leading to different types of urban sets which have been observed on the basis of inter-relationships between various indicators. These sets are sub-urban type and growth-centre type.

a. Sub-Urban Type: Samarda Kaliyasot

A suburb is defined as a residential area located on the outskirts of a city or all of the continuous urbanization that extends beyond the core city (all of the urban area

except the historical core municipality and other adjacent historical municipalities) (*Demographia*, 2009). The key element of such an area is the absence of an indigenous economic base, with residents commuting to nearby centres for their economic activity.

Among the villages studied, this type has been observed in Samarda Kaliyasot. To the south of Bhopal, built-up growth has sprawled beyond the municipal limits, blurring the rural–urban dichotomy, resulting in sub-urban types. This phenomenon has become more aggressive due to the presence of an industrial town to the south of Bhopal. The overall concept of connectivity developed by Gupta (2008) also gets reflected here.

Based on Samarda Kaliyasot, the key elements for creation of sub-urban types include eight indicators from cluster setting. These are:

- More built-up expansion
- High population density
- Land values
- Proximity to the city
- Higher frequency of buses
- Higher floating population to the city
- High percentage of *pucca* houses
- Gender equality in literacy rate

Map 5.1: Sub-urban growth (Samarda Kaliyasot) beyond municipal limits

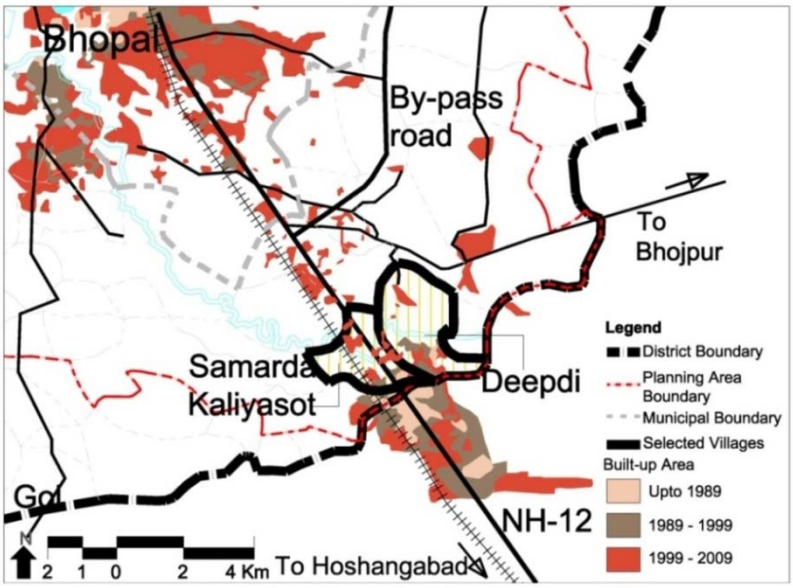
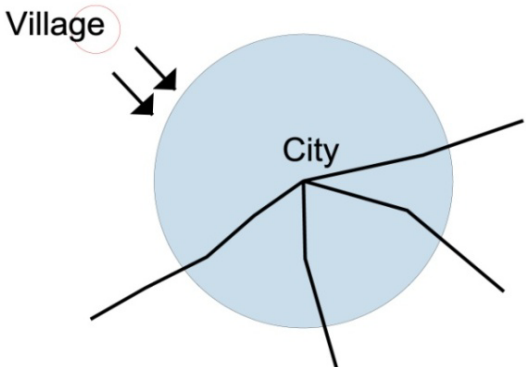


Figure 5.3: Conceptual Diagram showing movement of people from village to city or vice-versa



b. Growth Centre Type: Harra Kheda

This type reflects organic urban growth. As Ellis (2011) notes, cities are centres of storage, trade, and manufacture. They grew around marketplaces, where the 'economic base' of production for external markets was crucial. Centres of government and administration as well as religious functions led to urban growth. Among the villages studied, Harra Kheda falls into this type of urbanization.
Harra Kheda acts as a point of convergence for activities of people of surrounding villages. In Map 5.2, the influence area of Harra Kheda village is shown in green.

The main elements for the creation of growth-centre sets include four indicators from cluster setting. These are:

- Larger number of commercial establishments
- Fund allocation to the local governing body for the development of the settlement
- Floating population coming to the settlement
- Number of institutional buildings

Map 5.2: Growth-Centre type (Harra Kheda) in Northern part of Bhopal district

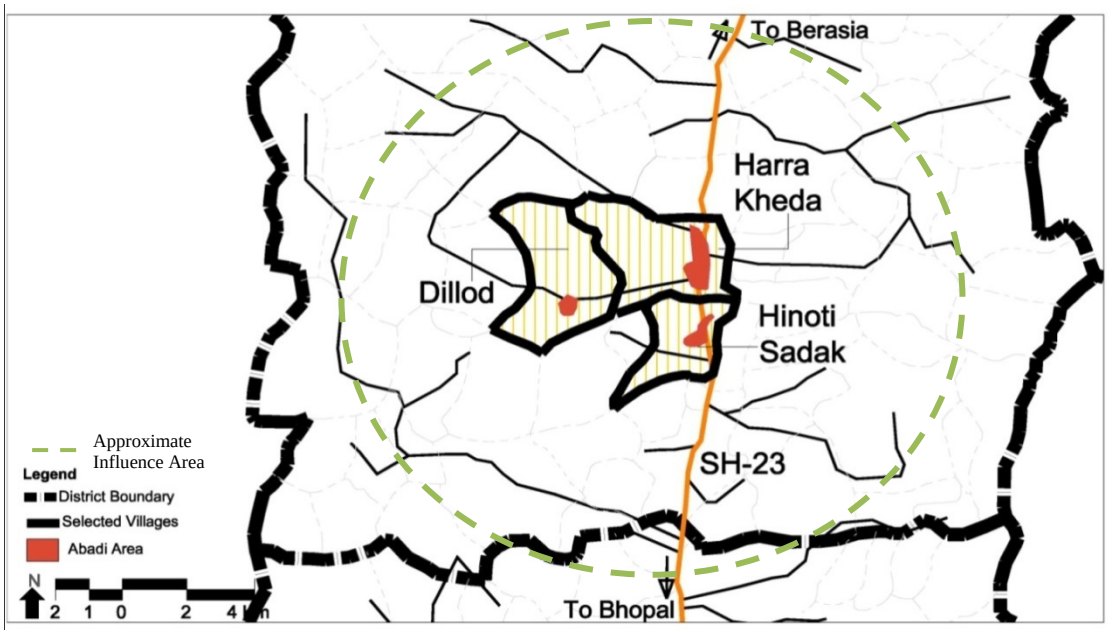


Figure 5.4: Conceptual Diagram showing movement of people from many villages to one village or vice-versa

The two types presented here make us wonder whether to follow an argument for inclusion of settlements into urban areas even if they do not satisfy either statutory or census criteria. Some of these settlements which are in a transitional phase may be officially classified as towns in the near future, while others will continue to be unable to satisfy existing criteria.

The sub-urban type which includes Samarda Kaliyasot shows that the population has increased beyond 5000 and density is above 400 persons/ sq. km. and the non-agricultural workforce is also high i.e., 64 per cent. This village may satisfy all the census parameters in the near future and may become a census town categorized as an urban area. The other growth-centre type, i.e., Harra Kheda, shows that it is growing

as a market place and administrative centre, but since it shows very low values for all the census parameters, it will remain out of the urban category.

This leads to speculation about considering small settlements and micro agglomerations which do not satisfy census parameters, but show natural evolution into a market-place or administrative structure as per the multi-dimensional approach adopted in this study — as 'urban areas'.

5.4 Key Drivers for Urbanization

A multi-dimensional approach is time consuming and difficult to implement. However, it may be possible to identify some key parameters that indicate a high possibility of urban characteristics. Based on this study, two characteristics that can be suggested are: (a) location on corridor and (b) the dynamism of population movement from village to village and cities. The use of movement to define an urban area has also been supported by Gupta (2008) and Uchida and Nelson (2010). 'Dynamism' (movement of people) and Location (on transport corridor) act as key drivers for both types of urbanization. Other characteristics become necessary to determine the type of urbanization. These two parameters can be used for quick identification of a prospective urban area. Detailed studies can then be undertaken in such areas to understand their nature of urbanization more fully.

5.5 Conclusion

This study was provoked by the observation that many villages seemed to possess urban characteristics and many cities included areas with rural characteristics. On closer examination, it was found that the Indian definition of urban area is actually unique in the world. As a consequence, a closer examination of areas excluded from the urban definition was possibly warranted. For this, a set of eight villages around a metropolitan capital city, Bhopal, was chosen for detailed investigation. It was found that a multi-dimensional approach can offer a rich alternative perspective to the question “What is an urban area?” In particular, the study identified two types of urban areas and it is interesting that these types can exist without satisfying the census criteria either now or in the near future. Thus, narrowing the study of urbanity to only the census classified areas may be limiting and a broader approach may help us better understand the spread of urban characteristics in India.

Annexure I: Definition of "Urban"

SOURCE: *Demographic Yearbook 2005, Table 6*

AFRICA

- **Botswana:** Agglomeration of 5 000 or more inhabitants where 75 per cent of the economic activity is non-agricultural.
- **Burundi:** Commune of Bujumbura.
- **Comoros:** Administrative centres of prefectures and localities of 5 000 or more inhabitants.
- **Egypt:** Governorates of Cairo, Alexandria, Port Said, Ismailia, Suez, frontier governorates and capitals of other governorates, as well as district capitals (Markaz).
- **Equatorial Guinea:** District centres and localities with 300 dwellings and/or 1 500 inhabitants or more.
- **Ethiopia:** Localities of 2 000 or more inhabitants.
- **Liberia:** Localities of 2 000 or more inhabitants.
- **Malawi:** All townships and town planning areas and all district centres.
- **Mauritius:** Towns with proclaimed legal limits.
- **Niger:** Capital city, capitals of the departments and districts.
- **Senegal:** Agglomerations of 10 000 or more inhabitants.
- **South Africa:** Places with some form of local authority.
- **Sudan:** Localities of administrative and/or commercial importance or with population of 5 000 or more inhabitants.
- **Swaziland:** Localities proclaimed as urban.
- **Tunisia:** Population living in communes.
- **United Republic of Tanzania:** 16 gazetted townships.
- **Zambia:** Localities of 5 000 or more inhabitants, the majority of whom all depend on non-agricultural activities.

AMERICA, NORTH

- **Canada:** Places of 1 000 or more inhabitants, having a population density of 400 or more per square kilometre.
- **Costa Rica:** Administrative centres of cantons.
- **Cuba:** Population living in a nucleus of 2 000 or more inhabitants.
- **Dominican Republic:** Administrative centres of municipalities and municipal districts, some of which include suburban zones of rural character.
- **El Salvador:** Administrative centres of municipalities.
- **Greenland:** Localities of 200 or more inhabitants.
- **Guatemala:** Municipality of Guatemala Department and officially recognized centres of other departments and municipalities.
- **Haiti:** Administrative centres of communes.
- **Honduras:** Localities of 2 000 or more inhabitants, having essentially urban characteristics.
- **Mexico:** Localities of 2 500 or more inhabitants.
- **Nicaragua:** Administrative centres of municipalities and localities of 1 000 or more inhabitants with streets and electric light.
- **Panama:** Localities of 1 500 or more inhabitants having essentially urban characteristics. Beginning 1970, localities of 1 500 or more inhabitants with such urban characteristics as streets, water supply systems, sewerage systems and electric light.
- **Puerto Rico:** Agglomerations of 2 500 or more inhabitants, generally having population densities of 1 000 persons per square mile or more. Two types of urban areas: urbanized areas of 50 000 or more inhabitants and urban clusters of at least 2 500 and less than 50 000 inhabitants.
- **United States:** Agglomerations of 2 500 or more inhabitants, generally having population densities of 1 000 persons per square mile or more. Two types of urban areas: urbanized areas of 50 000 or more inhabitants and urban clusters of at least 2 500 and less than 50 000 inhabitants.
- **U.S. Virgin Islands:** Agglomerations of 2 500 or more inhabitants, generally having population densities of 1 000 persons per square mile or more. Two types of urban areas: urbanized areas of 50

000 or more inhabitants and urban clusters of at least 2 500 and less than 50 000 inhabitants. (As of Census 2000, no urbanized areas are identified in the U.S. Virgin Islands.)

AMERICA, SOUTH

- **Argentina:** Populated centres with 2 000 or more inhabitants.
- **Bolivia:** Localities of 2 000 or more inhabitants.
- **Brazil:** Urban and suburban zones of administrative centres of municipalities and districts.
- **Chile:** Populated centres which have definite urban characteristics such as certain public and municipal services.
- **Ecuador:** Capitals of provinces and cantons.
- **Falkland Islands (Malvinas):** Town of Stanley.
- **Paraguay:** Cities, towns and administrative centres of departments and districts.
- **Peru:** Populated centres with 100 or more dwellings.
- **Suriname:** Paramaribo town.
- **Uruguay:** Cities.
- **Venezuela, Bolivarian Republic:** Centres with a population of 1 000 or more inhabitants.

ASIA

- **Armenia:** Cities and urban-type localities, officially designated as such, usually according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.
- **Azerbaijan:** Cities and urban-type localities, officially designated as such, usually according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.
- **Bahrain:** Communes or villages of 2 500 or more inhabitants.
- **Cambodia:** Towns.
- **China:** Cities only refer to the cities proper of those designated by the State Council. In the case of cities with district establishment, the city proper refers to the whole administrative area of the district if its population density is 1,500 people per kilometre or higher; or the seat of the district government and other areas of streets under the administration of the district if the population density is less than 1,500 people per kilometre. In the case of cities without district establishment, the city proper refers to the seat of the city government and other areas of streets under the administration of the city. For the city district with the population density below 1,500 people per kilometre and the city without district establishment, if the urban construction of the district or city government seat has extended to some part of the neighboring designated town(s) or township(s), the city proper does include the whole administrative area of the town(s) or township(s).
- **Cyprus:** Urban areas are those defined by local town plans.
- **Georgia:** Cities and urban-type localities, officially designated as such, usually according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.
- **India:** Towns (places with municipal corporation, municipal area committee, town committee, notified area committee or cantonment board); also, all places having 5 000 or more inhabitants, a density of not less than 1 000 persons per square mile or 400 per square kilometre, pronounced urban characteristics and at least three fourths of the adult male population employed in pursuits other than agriculture.
- **Indonesia:** Places with urban characteristics.
- **Iran (Islamic Republic of):** Every district with a municipality.
- **Israel:** All settlements of more than 2,000 inhabitants, except those where at least one third of households, participating in the civilian labour force, earn their living from agriculture.
- **Japan**: City (shi) having 50,000 or more inhabitants with 60 per cent or more of the houses located in the main built-up areas and 60 per cent or more of the population (including their dependants) engaged in manufacturing, trade or other urban type of business. Alternatively, a shi having urban facilities and conditions as defined by the prefectural order is considered as urban.
- **Kazakhstan:** Cities and urban-type localities, officially designated as such, usually according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.
- **Korea, Republic of:** Population living in cities irrespective of size of population.

- **Kyrgyzstan:** Cities and urban-type localities, officially designated as such, usually according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.
- **Malaysia:** Gazetted areas with population of 10,000 and more.
- **Maldives:** Malé, the capital.
- **Mongolia:** Capital and district centres.
- **Pakistan:** Places with municipal corporation, town committee or cantonment.
- **Sri Lanka:** Urban sector comprises of all municipal and urban council areas.
- **Syrian Arab Republic:** Cities, Mohafaza centres and Mantika centres, and communities with 20 000 or more inhabitants.
- **Tajikistan:** Cities and urban-type localities, officially designated as such, usually according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.
- **Thailand:** Municipal areas.
- **Turkey:** Population of settlement places, 20,000 and over.
- **Turkmenistan:** Cities and urban-type localities, officially designated as such, usually according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.
- **Uzbekistan:** Cities and urban-type localities, officially designated as such, usually according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.
- **Viet Nam:** Urban areas include inside urban districts of cities, urban quarters and towns. All other local administrative units (commues) belong to rural areas.

EUROPE

- **Albania:** Towns and other industrial centres of more than 400 inhabitants.
- **Austria:** Communes of more than 5,000 inhabitants.
- **Belarus:** Cities and urban-type localities, officially designated as such, usually according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.
- **Bulgaria:** Towns, that is, localities legally established as urban.
- **Czech Republic:** Localities with 2,000 or more inhabitants.
- **Estonia:** Cities and urban-type localities, officially designated as such, usually according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.
- **Finland:** Urban communes. 1970: Localities.
- **France:** Communes containing an agglomeration of more than 2,000 inhabitants living in contiguous houses or with not more than 200 metres between houses, also communes of which the major portion of the population is part of a multicommunal agglomeration of this nature.
- **Greece:** Population of municipalities and communes in which the largest population centre has 10,000 or more inhabitants. Including also the population of the 18 urban agglomerations, as these were defined at the census of 1991, namely: Greater Athens, Thessaloniki, Patra, Iraklio, Volos, Chania, Irannina, Chalkida, Agrinio, Kalamata, Katerini, Kerkyra, Salamina, Chios, Egio, Rethymno, Ermoupolis, and Sparti.
- **Hungary:** Budapest and all legally designated towns.
- **Iceland:** Localities of 200 or more inhabitants.
- **Ireland:** Cities and towns including suburbs of 1,500 or more inhabitants.
- **Latvia:** Cities and urban-type localities, officially designated as such, usually according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.
- **Lithuania:** Urban population refers to persons who live in cities and towns, i.e., the population areas with closely built permanent dwellings and with the resident population of more than 3,000 of which 2/3 of employees work in industry, social infrastructure and business. In a number of towns the population may be less than 3,000 since these areas had already the states of “town” before the law was enforced (July 1994)
- **Netherlands:** Urban: Municipalities with a population of 2,000 and more inhabitants. Semi-urban: Municipalities with a population of less than 2,000 but with not more than 20 per cent of their

economically active male population engaged in agriculture, and specific residential municipalities of commuters.

- **Norway:** Localities of 200 or more inhabitants.
- **Poland:** Towns and settlements of urban type, e.g. workers' settlements, fishermen's settlements, health resorts.
- **Portugal:** Agglomeration of 10,000 or more inhabitants.
- **Republic of Moldova:** Cities and urban-type localities, officially designated as such, usually according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.
- **Romania:** Cities, municipalities and other towns.
- **Russian Federation:** Cities and urban-type localities, officially designated as such, usually according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.
- **Slovakia:** 138 cities with 5,000 inhabitants or more.
- **Spain:** Localities of 2,000 or more inhabitants.
- **Switzerland:** Communes of 10,000 or more inhabitants, including suburbs.
- **Ukraine:** Cities and urban-type localities, officially designated as such, usually according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.

OCEANIA

- **American Samoa:** Agglomerations of 2,500 or more inhabitants, generally having population densities of 1,000 persons per square mile or more. Two types of urban areas: urbanized areas of 50,000 or more inhabitants and urban clusters of at least 2,500 and less than 50,000 inhabitants. (As of Census 2000, no urbanized areas are identified in American Samoa.)
- **Guam:** Agglomerations of 2,500 or more inhabitants, generally having population densities of 1,000 persons per square mile or more, referred to as "urban clusters".
- **New Caledonia:** Nouméa and communes of Païta, Nouvel Dumbéa and Mont-Dore.
- **New Zealand:** All cities, plus boroughs, town districts, townships and country towns with a population of 1,000 or more.
- **Northern Mariana Islands:** Agglomerations of 2,500 or more inhabitants, generally having population densities of 1,000 persons per square mile or more. Two types of urban areas: urbanized areas of 50,000 or more inhabitants and urban clusters of at least 2,500 and less than 50,000 inhabitants.

  Vanuatu: Luganville centre and Vila urban.

Annexure II – Analysis of definitions of different countries

	Country	Administrative	Population	Density	Economic Activity	Spatial/ Physical	Others	Remarks
Africa	Botswana		5,000		75% non-agr. activity			no mention about workers
	Burundi	commune						
	Comoros		5,000					
	Egypt	governorates						
	Equatorial Guinea	district centres	300 dus/ 1,500 pop					
	Ethopia		2,000					
	Liberia		2,000					
	Malawi	townships/ town planning areas/ district centres						
	Mauritius	towns with proclaimed legal limits						
	Niger	capital city						
	Senegal		10,000					
	South Africa	local authority						
	Sudan	administrative importance	5,000		commercial importance			Any one of these
	Swaziland	locality proclaimed as urban						
	Tunisia	communes						
	United Republic of Tanzania	gazetted townships						
	Zambia		5,000		Majority in non-agr. activity			
North America	Canada		1,000	400 p/ sq. km				
	Costa Rica	administrative centres						
	Cuba		2,000					
	Dominican Republic	municipalities/ municipal districts						include suburban zones of rural character
	El Salvador	municipalities						
	Greenland		200					
	Guatemala	municipality						
	Haiti	communes						
	Honduras		2,000				essential urban characteristics	
	Mexico		2,500					
	Nicaragua	municipalities	1,000				streets and electric lights	

	Country	Administrative	Population	Density	Economic Activity	Spatial/ Physical	Others	Remarks
	Panama		1,500				urban characteristics - streets, water supply systems and electric light	
	Puerto Rico		2,500	1,000 p/ sq mile				+
	United States		2,500	1,000 p/ sq mile				+
	U.S. Virgin Islands		2,500	1,000 p/ sq mile				+
South America	Argentina		2,000					
	Bolivia		2,000					
	Brazil	municipalities/ districts						
	Chile		populated centres				definite urban characteristics - certain public and municipal services	
	Ecuador	province capitals/ cantons						
	Falkland Islands	town						
	Paraguay	**						
	Peru		100 dus					
	Suriname	town						
	Uruguay	cities						
	Venezuela, Bolivarian Republic		1,000					
Asia	Armenia	**						*
	Azerbaijan	**						*
	Bahrain		2,500					
	Cambodia	towns						
	China	cities - designated by state council		1,500 p/ sq. km				
	Cyprus	defined by local town plans						
	Georgia	**						*
	India	municipality	5,000	1,000 p/ sq mile or 400 p/ sq. km	75% of male workers in non-agr. activity			
	Indonesia						urban characteristics	*
	Iran	municipality						

	Country	Administrative	Population	Density	Economic Activity	Spatial/ Physical	Others	Remarks
	Israel		2,000				at least 1/3rd of HHs, participating in the civilian labour force, earn their living from agr.	
	Japan		50,000		60 % of pop (including dependents) engaged in manufacturing, trade or other urban type of business	60% of the houses located in the main built-up area	urban facilities and conditions as defined by prefectural order	
	Kazakhstan	**						*
	Republic of Korea	cities						
	Kyrgyzstan	**						*
	Malaysia	gazetted areas	10,000					
	Maldives	capital						
	Mongolia	capital/ district centres						
	Pakistan	municipality						
	Sri Lanka	urban council areas						
	Syrian Arab Republic	cities	20,000					
	Tajikistan	**						*
	Thailand	municipal area						
	Turkey		20,000					
	Turkmenistan	**						*
	Uzbekistan	**						*
	Vietnam	urban districts of cities, quarters and towns						
Europe	Albania	towns/ industrial centres	400					
	Austria		5,000					
	Belarus	**						*
	Bulgaria	towns - legally established						
	Czech Republic		2,000					
	Estonia	**						*
	Finland	urban communes						

	Country	Administrative	Population	Density	Economic Activity	Spatial/ Physical	Others	Remarks
	France		2,000			contiguous houses or with not more than 200 mts. between houses		
	Greece		10,000					
	Hungary	legally designated towns						
	Iceland		200					
	Ireland		1,500					
	Latvia	**						*
	Lithuania		3,000		2/3 employees work in industry, social infrastructure and business	closely built permanent dwellings		
	Netherlands		2,000					++.
	Norway		200					
	Poland						urban type settlements - workers' settlements, fishermen's settlements, health resorts.	
	Portugal		10,000					
	Republic of Moldova	**						*
	Romania	municipalities						
	Russian Federation	**						*
	Slovakia		5,000					
	Spain		2,000					
	Switzerland		10,000				including suburbs	
	Ukraine	**						*
Oceania	American Samoa		2,500	1,000 p/ sq. mile				
	Guam		2,500	1,000 p/ sq. mile				
	New Caledonia	communes						
	New Zealand	cities/ towns	1,000					
	Northern Mariana Islands		2,500	1,000 p/ sq. mile				

	Country	Administrative	Population	Density	Economic Activity	Spatial/ Physical	Others	Remarks
	Vanuatu	capital						

* according to the criteria of number of inhabitants and predominance of agricultural, or number of non-agricultural workers and their families.

** Cities and urban type localities - officially designated

+two urban area - urbanized area - 50,000 + & urban cluster - 2500 + inhabitants

++ Semi-urban: Municipalities with a population of less than 2 000 but with not more than 20 per cent of their economically active male population engaged in agriculture, and specific residential municipalities of commuters.

Annexure III: Data required and Data Sources

	District level analysis
	Village level analysis

S.no.	Indicator	Data required	Data Sources
1	Density - persons/ sq km (Built-up area and not Revenue area)	Population data of the villages	Census, 2001
		Abadi areas of the villages , revenue areas	Revenue map from TCPD, Census and Google image
2	Population Growth Rate	Population of 2001, 1991, 1981	Census, 2001, 1991, 1981
3	Percentage of migrated people (all the streams)	No. of migrated people	NSS (64th round – Bhopal region)
			Primary survey for proxy at village level (FGDs and Panchayats)
4	Percentage of floating population	No. of people commuting daily for their work (type and distance and means)	No. of buses/ frequency - State transport authority
			Movement of private vehicles (FGDs and Panchayats)
			Para-transit vehicles (ownership and business model)
5	No. or percentage of commercial establishments	No. of these establishments (type and scale)	Observational surveys and FGDs and Panchayats
6	Percentage of workers involved in Rural Non-farm employment (RNFE) within the village	No. of people employed in these sectors and services	FGDs and Panchayats
7	Production and consumption of products within the village (Extent of marketing, non-farm activities eg. Aata chakki, beauty parlour, video hall, vehicle repair)	Crop production in tones (different crops) – Panchayats	Panchayats
		Production in other sectors and type	Panchayats
		Any storage place, if yes what is the capacity	Panchayats
		If surplus, how is it transferred to storage place	Panchayats
8	Changes in the land holding sizes	Land holding sizes (Areas and numbers)	Department of statistics/ NIC/ Land revenue office
			Panchayats
9	Increase in land values	Circle rates of land (Rs/ unit area)	Panchaytas
		Market rates (any recent sale of land in the village)	Panchayats, FGDs
10	New townships/ development projects/ industrial projects (sanctions and building permits)	No. of sanctions and locations over last 5 years	TCPD
		At village level	Panchayat
11	No. of industrial clusters in the district	Industrial clusters, type and areas	TCPD/ DIC
12	Rate of nucleation of families (Decrease/ Increase in HH size)	Household sizes 1981, 1991 and 2001	Census Data, 1981, 1991 and 2001
		Transition in sizes of families	FGDs, Panchayats
13	Male/Female literacy rate	Literate population 1981, 1991, 2001	Census data, 1981, 1991 and 2001
14	Male/Female differential in literacy rate	Male/ Female literacy rates	Census data, 1981, 1991 and 2001
15	Percentage of non-residential land use (Abadi Area)	Percentages of different land uses	Primary survey of villages (Observational Surveys)
16	Extent of commercial space (percentage)	Percentage and area of this use	Primary survey of villages (Observational Surveys)
17	Expanse of the village area over a period of time. (percentage increase)	Percentage increase over the years	Khasra map of the village (Land revenue office, TCPD, Panchayat)
			Google image
18	Percentage of HHs having pucca houses	Percentage of pucca houses/ big houses	Observational Survey of the village
19	Percentage of HHs having tap	No. of HHs having these	Census data, 2001

S.no.	Indicator	Data required	Data Sources
	water, sewer system, drainage system, electricity	infrastructural facilities	
20	No. of medical and educational facilities/ 1000 population	No. of these facilities in the villages	Census Data, 2001
21	No. of recreational facilities/ 1000 population	No. of these facilities in the villages	Census data, 2001
22	Connectivity with town (approach road – metaled/ unmetaled road)	Road maps (all hierarchy)	PWD (B&R)
		Type of road approaching the village	Census data, 2001
23	Distance from the town (proximity)	Distances of towns	Google maps
			Census data, 2001
24	Frequency of bus/ pvt. vehicle passing through the village	No. of buses plying and their frequency in the villages (list)	State transport authority
			Panchayats – at village level
25	No. of banks/ credit societies (type)/ 1000 population	No. of these facilities in the villages	Census data, 2001
26	Communication facilities / 1000 population	No. of telephone booths/ 1000 population	Observational
		Computer centre or other vocational centres	Observational
		Newspapers/ 100 HHs (no. and types)	Census Data, 2001
27	Percentage of HHs having assets – television sets, refrigerators, two-wheelers, four-wheelers, computers, mobile phones.	No. of HHs having these facilities	FGDs, sales by dealers
28	Presence of telephone towers, pucca streets, street lights	No. and locations of such constructions	Observational primary survey
29	Size and type of local body	Members, elections etc.	Panchayats, FGDs
30	Governing practices in the village, with maintenance and scheme implementation	Schemes, funding, budgeting	

(*) These need to be rechecked at micro-level during village study; it is possible that people now use facilities outside the village due to improved connectivity

(#) Need some information on the governance practices. Who maintains roads, street lights? Who gives permission for towers? What kind of government presence do you see in the village (central – signboard of schemes, state government, e.g., police, anganwadi, and local government, e.g. village level worker),? What kind of political party presence, offices, etc.?

Annexure IV: Data Checklists/ Questionnaire for Authorities

Questionnaire for Primary Survey (Panchayats and Group Discussions)

General Information

1. Name of the village
2. Area of the village
3. Population of the village
4. Name of the Panchayat
5. Members in the Panchayat
6. Number of villages in the Panchayat
7. Election system, number of members of Panchayat

Demography

8. Population of the village
9. Number of villagers who have migrated in the last ten years and the reason.
10. Number of people commuting daily for different purposes.
11. How far do they travel for work and how do they travel up to their work? (They travel to nearby towns – which one or nearby village or industrial area – how far?)
12. Mostly do people travel by government bus, self-owned vehicles or auto rickshaws or grameen sewa?

Economy

13. How many commercial establishments/ service offices are present in the village? (Shops, institutional buildings etc. – scale and type and location)
14. How many people are working in RNFE within the village? Name the various works and scale and people employed in these pursuits.
15. Types of crops produced in the village and their quantity (in tonnes); where are they exported and how are they transported?
16. Any other material or product that is produced in the village? If yes, how is it exported or delivered to nearby places? (eg. dairy etc.)
17. Has the number of land holding sizes increased over the last twenty years? What are the numbers of different holding sizes? Less than 2 acres, 2-5 acres, 5-10 acres and above 10 acres?

18. What is the value of land? How much money was negotiated during the recent sale of land?

19. What are the main purposes for which land is being sold?

20. Khasra map of the village

Social Aspect

21. Are there any variations in the family structure over the last twenty years? Joint to small families, land division or any such cases observed?

22. Are females/ girls given equal opportunities for education and work?

Infrastructural Aspect

23. Number of private vehicles and connectivity service to nearby places.

24. Number of HHs having assets – television sets, refrigerators, two-wheelers, four-wheelers, computers, mobile phones.

25. Number of HHs having tap water, sewer system, drainage system, electricity, cooking gas (Number of agencies)

26. Number of medical and educational facilities in the village

27. Number of recreational facilities in the village

28. Number of banks/ credit societies (type) in the town and how much loan is being provided?

29. Number of communication facilities in the village - telephone booths, computer centre, vocational centre, training centres etc.

30. Number of HHs receiving newspapers

Infrastructural Aspect

31. Number of members of Panchayat (Male/ Female)

32. Fund Allocation during the last five years.

33. What types of institutional buildings exist in the village?

34. What are the development schemes in the village presently?

Annexure V: Indicators of Rural Settlements of Bhopal District

S.No.	Indicator		VILLAGES							
			CATEGORY I		CATEGORY II		CATEGORY III		CATEGORY IV	
			Samarda Kaliysaot	Harra Kheda	Phanda Kalan	Hinoti Sadak	Mugaliya Chhap	Dillod	Deepdi	Barkheda Salem
CENSUS INDICATORS (2001)										
Population			**2,052 (5,500)**	**1,632 (2,500)**	**2,995 (3,800)**	**1,502 (2,400)**	**3,165 (4,600)**	**2,216 (2,900)**	**815 (1,100)**	**1,513 (1,950)**
Density (persons/ sq. km)			**635 (1,703)**	**236 (362)**	**207 (263)**	**303 (484)**	**239 (348)**	**217 (285)**	**156 (211)**	**182 (235)**
Percentage of Non-agr. male WF			**64%**	**62%**	**33%**	**15%**	**14%**	**70%**	**38%**	**17%**
DEMOGRAPHIC										
1	**Density (persons/ sq.km)**	Abadi Area	**7,334**	5,620	6,182	**6,712**	6,134	6,126	3,132	4,870
2	**Pop. Growth Rate**	81-91	67%	41%	22%	29%	29%	30%	24%	23%
		91-2001	**232%**	**47%**	37%	26%	38%	25%	23%	24%
3	**Percentage Floating Population (existing population)**	(Work & Other purposes) outgoing	33%	6%	4%	5%	4%	30%	13%	15%
		Only work - Outgoing	**76%**	8%	7%	7%	7%	75%	**31%**	21%
		Incoming	20	**1,500**	**550**	20	10	25	10	10
ECONOMIC										
4	**Percentage of Non-agr. population**	RNFE within village	**5%**	**54%**	26%	6%	7%	8%	8%	4%
5	**Land Holding Sizes**	Less than 5 Acre in percenatge	**89.60%**	65.30%	55.80%	52.60%	66.24	53.50%	**78.80%**	65.90%
6	**Land Values (Lakhs/ Ha)**	Circle Rates	25-30	7 - 8	20 - 22	7 - 8	20	2	20 - 22	10 - 15
		Market rates (Near Road)	100	40 - 50	40 - 50	40 - 50	10 - 20	10	35 - 40	20 - 25
		Market rates (away from raod)	**30-40**	10 - 15	20 - 25	10 - 15	6 - 8	5 - 6	**10 - 15**	10 - 15
SOCIAL										
7	**Rate of Nucleation of families (Change in HH size)**		**6-4**	5-5	6-6	5-6	6-6	6-6	**6-5**	6-6
8	**Literacy Rate (%)**		**81.5**	55.6	55.6	61.3	54.8	**79.2**	67.9	50.7
9	**Male - female differential in literacy rate (%)**		**4.1**	25.7	28.8	28.6	21.8	**14.8**	28.4	42.2
SPATIAL										
10	**Percentage of non-residential area**		21.70%	31%	22%	12%	16%	21%	18%	12%
11	**Extent of Commercial space**	Percentage area	6.90%	4.10%	4.50%	1.20%	1.10%	2.10%	2.60%	1.10%
		No. of commercial establishments (no./100 pop.)	50 (0.9)	**180 (7.2)**	**90 (2.37)**	26 (1.08)	30 (.65)	25 (.86)	5(.45)	12 (.61)
12	**Built-up area change**	2002-05	20.4%	14.0%	4.2%	1.8%	4.2%	1.9%	9.3%	8.9%
		2005-09	84.7%	18.3%	12.8%	7.4%	6.9%	5.4%	17.8%	16.4%
		2005-09	**119.3%**	**35.0%**	17.5%	9.3%	10.7%	7.5%	28.8%	25.9%
INFRASTRUCTURAL										
13	**Physical Condition**	Percenatge of HHs having pucca houses	**85%**	**65%**	45%	45%	60%	40%	50%	35%
		No. of telephone towers	1	**3**	2	1	2	2	1	1
		Percentage of pucca streets	**80%**	**40%**	30%	40%	40%	40%	20%	45%
		No. of Street Lights	No	No	no	no	no	no	(only 1 - Solar)	no
14	**Physical Infrastructure (percentages of HHs**	Tap water	80%	0	**100%**	60%	70%	26%	**100%**	40%
		Sewer System (Septic Tanks)	80%	100%	60%	60%	25%	100%	100%	20%

S.No.	Indicator		VILLAGES							
			CATEGORY I		CATEGORY II		CATEGORY III		CATEGORY IV	
			Samarda Kaliysaot	Harra Kheda	Phanda Kalan	Hinoti Sadak	Mugaliya Chhap	Dillod	Deepdi	Barkheda Salem
	having -)	Electricity	100% (8 hours)	100% (6 hrs)	100 % (12 hrs)	85% (10 Hrs)	100% (8 hrs)	95% (10 hrs)	100% (10 Hrs)	100% (10 hrs)
		Drainage on streets (percenatge)	70%	40%	30%	40%	35%	20%	20%	40%
15	Social Infrastructure (No. of medical and educational facilties, facility/ 1000 population)	Medical-Govt.			1Allopethic Dis		1 Allopathic Dis	1 PHC, 1 Ayurvedic Clinic	1 PHS	
		Medical - Pvt.	1 Pvt. Clinic	2 RMP, 10 Pvt. Clinic	2 Pvt. Clinic	2 RMP	2 Pvt. Clinic	1 Pvt. Clinic		1 Pvt. Clinic
		Education - Govt.	1 P	1 M, 1 Hr. Sec	1 P, 1 Hr. Sec.	1 M	1 M	1 P, 1 M	1 M	1 P, 1 M
		Education - Pvt.	3 M	3 P	1 M	1 M	3 P, 1 M	1 Hr. Sec	1 P, 1 M	1 M
16	Connectivity with town	Approach Road - Metalled/ unmetalled	NH	SH	NH	SH	PMGSY Road	PMGSY Road	PMGSY road	PMGSY
		Distance from town (Km)	10 Km (Bhopal)	30 Km (Bhopal)	25 Km (Bhopal)	28 Km (Bhopal)	12 Km (Bhopal)	34 Km (Bhopal)	12 km (Bhopal)	20 Km (Bhopal)
			3 km (Mandideep)	13 Km (Berasia)		15 Km (Berasia)		17 Km (Berasia)	3 Km (Mandideep)	
		Frequency of Bus/ Pvt. Vehicle	1 bus/ 2minutes	1 bus / 15 minutes	1 bus/ half an hr	1 bus/ 15 minutes	2 jeeps/ day	5 Buses/ day	1 bus/ 4 hrs (1 km away)	1 bus/ half an hour (2 km away)
17	No. of Banks/ Credit Societies		Yes (Bank)	Yes (1 bank and 2 credit societies)	1 Bank, 2 Credit Societies	No	1 Bank	1 credit society	No	No
18	Communication facilities	Telephone centres	1	1	1	1	1	1	1	No
		Computer/ vocational centre	No	1	no	1	no	no	no	no
		News papers/ day	200	80	110	40	60	250	50	40
19	Percentage of HHs having assets	T.V.	90%	95%	85%	85%	80%	90%	80%	75%
		DTH service (Dish T.V.)	80%	80%	80%	70%	70%	75%	60%	70%
		Two-wheeler	85%	90%	75%	70%	70%	80%	50%	70%
		Four-wheeler	45%	5%	20%	5%	20%	25%	5%	10%
		Mobile Phones	95%	95%	90%	80%	85%	95%	90%	85%
		LPG	70%	40%	25%	20%	5%	50%	40%	15%
			Mandideep	Berasia	Bhopal	Berasia	Bhopal	Berasia	Mandideep	Bhopal
ADMINISTRATIVE										
20	Size of Local Body (Panchayat)		20 members (5 from Samarda, 13 females)	16 (9 females)	21 (11 females)	16 (9 females)	21 (11 females)	21 (11 females)	20 members (15 from Deepdi)	16 (8 females)

S.No.	Indicator	VILLAGES							
		CATEGORY I		CATEGORY II		CATEGORY III		CATEGORY IV	
		Samarda Kaliysaot	Harra Kheda	Phanda Kalan	Hinoti Sadak	Mugaliya Chhap	Dillod	Deepdi	Barkheda Salem
21	**No. of Institutional Buildings**	P.B.	**P.B., PO, Police Chowki, Forest Div. O., Vet. Clinic**	P.B., PO	P.B.	P.B., PO	P.B., PO	P.B.	P.B.
22	**Funds allocation for different schemes (in Rupees)**	2 lakhs	**15 lakhs**	**10 lakhs**	3 lakhs	8 lakhs	2 lakhs	2 lakhs	2 lakhs

Source: Primary Survey, (Feb,2011) and Census of India (1991, 2001) and Google images

Annexure VI: Indexing of Selected Indicators for Spider Web Diagram

Exact Values of Selected Indicators

Indicators	CATEGORY I		CATEGORY II		CATEGORY III		CATEGORY IV	
Set I	**Samarda Kaliysaot**	**Harra Kheda**	**Phanda Kalan**	**Hinoti Sadak**	**Mugaliya Chhap**	**Dillod**	**Deepdi**	**Barkheda Salem**
Built-up space expansion	119.3%	35.0%	17.5%	9.3%	10.7%	7.5%	28.8%	25.9%
Density (Abadi - persons/sq km)	7,334	5,620	6,182	6,712	6,134	6,126	3,132	4,870
Land values (Lakhs/ Ha)	100	40 - 50	40 - 50	40 - 50	10 - 20	10	35 - 40	20 - 25
No. of Commercial Establishment	50 (0.9)	180 (7.2)	90 (2.37)	26 (1.08)	30 (.65)	25 (.86)	5(.45)	12 (.61)
Funds Allocation	2 Lakhs	15 Lakhs	10 lakh	3 lakh	8 Lakhs	2 Lakhs	2 Lakhs	2 lakh
No. of Instituional Buildings	2	7	5	3	4	5	3	2
Set II								
Proximity to Bhopal City	10 Km (Bhopal)	30 Km (bhopal)	25 Km (Bhopal)	28 Km (Bhopal)	12 Km (Bhopal)	34 Km (Bhopal)	12 km (Bhopal)	20 Km (Bhopal)
WF going outside the village	76%	8%	7%	7%	7%	75%	31%	21%
Population incoming to the v.	20	1,500	550	20	10	25	10	10
Bus Frequency (No./ day)	1 bus/ 2minutes	1 bus / 15 minutes	1 bus/ half an hr	1 bus/ 15 minutes	2 jeeps/ day	5 Buses/ day	1 bus/ 4 hrs (1 km away)	1 bus/ half an hour (2 km away)
Percentage of Pucca Houses	85%	65%	45%	45%	60%	40%	50%	35%
Gender equality in literacy rate	4.1	25.7	28.8	28.6	21.8	14.8	28.4	42.2

Indexing of Indicators by taking highest values as 100.

Indicators	CATEGORY I		CATEGORY II		CATEGORY III		CATEGORY IV	
Set I	**Samarda Kaliysaot**	**Harra Kheda**	**Phanda Kalan**	**Hinoti Sadak**	**Mugaliya Chhap**	**Dillod**	**Deepdi**	**Barkheda Salem**
Built-up Growth	100	29	15	8	9	6	24	22
Density (Abadi Area)	100	77	84	92	84	84	43	66
Land values	100	50	50	50	20	10	40	25
Commercial Establishment	13	100	33	15	9	12	6	8
Funds Allocation	13	100	67	20	53	13	13	13
No. of Institutional Buildings	29	100	71	43	57	71	43	29
Set II								
Proximity to Bhopal City *	100	33	40	36	83	29	83	50
WF going outside the village	100	11	9	9	9	99	41	28
Population incoming to the v.	1	100	37	1	1	2	1	0
Bus Frequency	100	33	17	33	2	4	0	0
Pucca Houses	100	76	53	53	71	47	59	41
Gender equality in literacy rate*	100	16	14	14	19	28	14	10

*Two indicators (Proximity to Bhopal City and Gender equality in literacy rate) show inverse relation i.e. Low value has high index. In this case indexing has been by taking the lowest values as 100% by inversing the values i.e. 1/value.

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