

Periurbanization in India

A review of the literature and evidence

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1. Introduction

This paper provides an overview of the periurbanization process in India. It draws on two components; namely, a literature review around periurbanization processes¹ and second, on semi structured interviews with key stakeholders in five major Indian cities, namely, Chennai, Ahmedabad, Patna, Guwahati and Chandigarh. These five cities were chosen in order to understand the diverse nature of urbanization and periurbanization processes. They are located in different parts of the country with different underlying agro-ecological contexts. Chennai, located in the Southern Indian state of Tamil Nadu presents the case of a city expanding along a coast-line; while the Union Territory of Chandigarh, located in the North, is expanding into the foot-hills of the Shivaliks. Ahmedabad, in the Western Indian state of Gujarat, presents threats to the riverine ecosystem. Patna is the administrative capital of the East Indian state of Bihar, located in the alluvial plains, while Guwahati is located in the North-Eastern state of Assam. Figure 1 below shows the location of the five cities on the map of India.



Figure 1: Five cities visited for the periurban study

¹ Though the focus is on the Indian literature, an effort is made to place in the context of the larger international literature on periurban issues.

In these five cities, semi-structured interviews were held with key representatives from the Government, NGOs (Non-Government Organizations), academics, researchers and students working on periurban issues. They were interviewed regarding the drivers shaping the urbanization process in these cities, the major environmental challenges confronting periurban contexts, emerging governance and institutional issues, as well as some recent initiatives to address these concerns. A snowball sampling technique was followed to select the interviewees; after an initial selection of respondents, further leads were obtained to interview other relevant informants.

The organization of the paper is as follows. The following section - section 2- presents an overview of conceptual issues in defining and characterizing periurban. Section 3 presents a discussion of the factors that shape periurbanization processes, i.e. the socio-economic drivers of periurbanization. Section 4 presents the major environmental and natural resource challenges that are confronted in periurban contexts, as well as their implications for health and human well-being. Section 5 concludes the paper by discussing major governance issues and policy options advocated to deal with periurban problems, as well as the practical constraints in implementing them.

2. Conceptualising, identifying and characterising the periurban

This section of the paper examines some of the debates surrounding the definition, conceptualization and characterization of 'periurban'. The recurring ideas in this body of work are the futility of place-based definitions of periurban as well as the emergence of this concept to straddle the traditional rural-urban dichotomy in the development literature and in conventional planning approaches. One of the important functions that the concept seems to perform is to defy the bracketing of all social and economic life as being either 'rural' or 'urban'. It seems that in the ultimate analysis what may count is not so much a consensus meaning of the word periurban, but rather an understanding that rural and urban are sheer points along a continuum and that they are labels or constructs that are closely related. Understanding and appreciating the flows of goods, services and resources across the rural and urban is essential not only for understanding periurban livelihoods – as widely argued in the periurban literature - but also for appreciating development processes in general.

Another – and closely related - theme in this body of work is that process or concept-based definitions of periurban seem to be more relevant than place-based definitions around geographically demarcated boundaries. It is easier to identify periurban areas by features and processes than to look at fixed geographical distances or boundaries from the city; periurban locations are areas of intense land use change, social and economic heterogeneity, contested natural resource use and occupational diversification.

These features were found to be present and common in the periurban locations visited around all the five cities for this study, though their extent varied depending on the nature and scale of changes witnessed. In all the five cities, it was difficult to demarcate a uniform distance from the core of the city that we could call periurban; it was at best a transition zone from the city core to the peripheral areas characterised by mixed and changing land use, often led by a real estate or IT (information technology) boom. There were important land use changes - creating new pressures on natural resources as well as potential for conflict - driven largely by real estate and policies for special economic zones. These received a further boost from the development of transportation corridors that facilitated migration as well as daily movement of people from the adjoining towns and villages. However, since many of these changes were unplanned, they resulted in several environmental and natural resource management problems arising mainly from the expansion of

these cities beyond their carrying capacity. A practical relevance of this concept thus is that that it helps us understand how the ecological foot-print² of cities is borne, straddling the rural-urban divide. Though there were important governance challenges, we notice several responses from civil society and non-government organizations in addressing them.

Defining periurban

There is no single satisfactory definition of the word 'peri-urban' and different definitions are understood to apply in different circumstances (Brook and Purusthothoman et al. 2003). However, broadly speaking, the word has come to be used in three different ways, namely, to denote a place, a concept or a process (Narain and Nischal, 2007). As a place, it refers to rural fringe areas surrounding cities. The terms used to describe such locations are periurban settlements, rural-urban fringe, urban outgrowth or hinterland. Since they bear the spillover of urban expansion, they are considered to be an extension of the main city. '... for many purposes, it is important to consider the periurban zone as an extension of the city rather than as an entirely separate area. Conversely, the periurban zone should also be considered as part of the adjacent rural area for purposes of a holistic approach to rural research and development since there are two-way influences and interactions (Simon and Mc Gregor et al., 2006: 9-10)'.

Place-based definitions of peri-urban however are questioned by many periurban scholars; they see the emphasis as not simply on a geographical space but focus instead on underlying features and processes. '....it appears that no single definition will fit all circumstances and situations unless couched in broad and functional terms, rather than attempting to set discrete spatial limits (Simon and McGregor et al., 2006: 10)'. Iacuinta and Drescher (2000), for instance, question the tendency to define periurban in terms of geographical location of a place vis a vis urban centers, but rather underpin the importance of the underlying institutional contexts. This means that proximity to the towns in itself does not define periurban; rather it is the co-existence of both rural and urban characteristics, rural-urban linkages and the flows of goods and services between them. This view is echoed by Bowyer- Bower (2006) who reiterates that what constitutes the peri urban is where rural and urban land uses co-exist, which may be in continuous or fragmented units in any one area; further this juxtaposition of the rural and urban land uses can geographically occur *anywhere - in the core of the city, at its periphery or in a village* (emphasis added). A UNFPA report (UNFPA, 2007) suggests that the varied processes of peri-urbanization defy a simple definition or quantification, but that there must be opportunities for more social and sustainable uses of peri-urban space.³

² Ecological foot-print is a measure of the resource consumption (Rees, 1992). Cities have a metabolism, that draws on resources from the periphery and throws back wastes into it.

³ That space-based definitions of periurban can be problematic is clearly brought out by the case of Chandigarh. In fact, we can define periurban differently for Chandigarh, depending upon what we take as the reference point or bench- mark for 'urban'. Within the U.T (Union Territory) of Chandigarh, there are both rural and urban demarcated areas. The area comprising the urban designated areas of Chandigarh along with the Mani Majra village – that provided land for the construction of the city's new residential areas, the IT (Information Technology) park and special economic zone - constitute the UA (Urban Agglomeration) of Chandigarh. In other words, if we consider as "urban", only the urban designated areas of the U.T. of Chandigarh, Mani Majra would be considered as part of the periurban. Conceptually, this makes sense since Mani Majra has provided land and other resources for the expansion of the capital city, including providing land for several residential areas, as well as the modern IT Park. If however we consider the UT of Chandigarh as a whole, then the periurban parts are the expanding frontiers of the city in the direction of the adjoining towns of Panchkula, Pinjore/Kalka and Mohali. Thus, a frame of reference is very important in defining what constitutes periurban.

Throughout the developing world scholars have attempted to analyze peri-urban areas in an effort to define 'mixed' rural-urban interfaces, and to construct a new rurality which undermines the notion of rural livelihoods being separate from urban. The peri-urban is portrayed as a space in itself, but one that envelopes dynamic interactions between the population and the landscape and their associated land uses and livelihoods. It supports a vibrant flow of agricultural goods and ecological services both within periurban zones and between peri-urban and urban core areas, but also potentially among more traditional rural communities (Lerner et al., 2011).

'Periurban' has thus come to serve as a term to denote the intermediary zone between the 'rural' and the 'urban', that is, a geographical space where the rural meets the urban. This is echoed in terms that have similar connotations in other languages. The nearest equivalent to the term peri-urban in Dutch is *halfstedig*, meaning semi-urban; in German it is *urban landlichen zonen* (urban rural zones); and in Afrikaans it is *buitestedelik* (outer city or beyond the city). In East Asia the term often used is '*desakota*' (city village) (Simon and McGregor et al., 2006; McGee, 1991), highlighting the periurban to mean a space where both rural and urban features co-exist.

The futility of place based definitions comes out further when we consider that even 'rural' and 'urban' constitute fluid spaces, open to redefinition and reconstitution. Shenk (2005) emphasises that the peri urban cannot be understood based on the traditional dichotomy of urban and rural, more so because these spaces themselves are fluid and with geographically shifting boundaries. The urban fringes expand and shrink geographically, 'eating' their way into the countryside, while they are swallowed by the expanding urban core area.⁴ Hence, Shenk suggests 'the concept of a two-fold dynamism in a "rolling" fringe'. Simon (2008) asserts that the classic urban-rural dichotomy no longer exists and the peri-urban area is now a recognized entity for both study and

⁴ For instance, urban areas in India are defined as follows, as per the Census of India 2011:

1. All places with a municipality, corporation, cantonment board or notified town area committee, etc.
2. All other places which satisfy the following criteria:
 - i) A minimum population of 5,000;
 - ii) At least 75 per cent of the male main working population engaged in non-agricultural pursuits; and
 - iii) A density of population of at least 400 persons per sq. km.

All areas which are not categorized as urban areas are considered as Rural Areas.

The first category of urban units is known as Statutory Towns. These towns are notified under law by the concerned State/UT Government and have local bodies like municipal corporations, municipalities, municipal committees, etc., irrespective of their demographic characteristics as reckoned on 31st December 2009. The second category of Towns (as in item 2 above) are known as Census Towns.

The census also defines an Urban Agglomeration (UA), which is perhaps what comes closest to the notion of periurban: An urban agglomeration is a continuous urban spread constituting a town and its adjoining outgrowths (OGs), or two or more physically contiguous towns together with or without outgrowths of such towns. An Urban Agglomeration must consist of at least a statutory town, and its total population (i.e. all the constituents put together) should not be less than 20,000.

policy planning. Despite social and economic factors that are different in the peri-urban regions across the world, there are enough common causes and concerns that warrant a common approach to a study of the peri-urban areas and addressing the problems typical to them.

For these reasons some scholars (see, for instance, Brook et al. 2003) argue that peri-urban is better understood as a process, rather than a fixed geographical place. In this sense, it represents the two-way flows of goods and services between villages and urban centres and the transition from rural to urban. More broadly, it could be understood as a concept that describes an interface between three systems, namely, the agricultural system, the urban system, and the natural resource system (Allen, 2003). In this sense, it serves as an analytic construct to study rural-urban relationships (Narain, 2009a); many scholars characterise it therefore as a periurban interface(PUI) (Allen, 2003; Brook and Purushoththoman et al, 2003).

The significance of the concept of periurban may therefore lie much more in the fact that it raises a fundamental question about the relevance of the rural-urban dichotomy – common in development studies and in government planning machinery – rather than as a tool to help demarcate certain geographical regions. As Simon and McGregor et al (2006) note, rapid urban population growth and expansion of the built-up area, technological change, global economic restructuring and the impact of externally driven macro-economic adjustment policies have combined to alter the interface between ‘urban’ and ‘rural’ quite profoundly in many places. Though the terms ‘rural’ and ‘urban’ are still used colloquially as mutually exclusive terms, and most people have clear mental conceptions of some ideal-type landscape corresponding to each, this simple dichotomy has long ceased to have much meaning in practice or for policy-making purposes in many parts of the global south, where the distinction between rural and urban tends to get blurred, as urbanization advances. A focus on conceptual distinctions is thus understood to be more appropriate for examining the continuum between the poles of urban and rural and understanding the dynamics of change as they characterise urbanization processes.

Periurban as spaces of social and institutional transition

Periurban areas are characterised by not only geographical, but also social and institutional transition. Socially, periurban areas are dynamic in nature, wherein social forms are constantly created, modified and discarded (Iaquinta and Drescher 2000). They are understood to be areas of social compression or intensification where the density of social forms, types and meanings increases, fomenting conflict and resolution. On account of land use change and the diversity of economic interests that this engenders, social groups tend to be heterogeneous and in constant transition (Allen 2003). Small farmers, informal settlers, industrial entrepreneurs and urban middle class commuters may all co-exist in the same territory, though with different and competing interests, practices and perceptions.

Much of the social dynamism and flux comes from the presence of migrants and new settlers. These social changes and transitions further have spin-off effects in terms of the range of economic activities that they foster. Periurban settlements often draw migrant labor that seeks employment in adjacent towns and cities, adding to the heterogeneity of the population. It is also common for relatives of periurban dwellers to migrate to the periurban settlements in search of better living conditions, amenities or jobs in adjoining towns. In periurban Faridabad and Gurgaon districts of the NorthWest Indian state of Haryana, for instance, the influx of migrant labor in periurban settlements was found to have altered the social composition of the periurban settlements (Narain and Nischal 2007; Narain 2009a). This, in turn, lead to a demand for rented accommodation in these settlements and renting out of accommodation emerged as a major new economic activity.

Migration processes have played an important role in the emergence of UAs (Urban Agglomerations) around large cities like Delhi as well (Kundu, 2008). Migration was found to be an important feature as well as driver of the periurbanization processes in all five cities visited for this project, namely, Chennai, Chandigarh, Ahmedabad, Patna and Guwahati. Many of these migrants engaged in construction and other economic activities that had come to take shape in the emerging cities.

An important observation made on migration in the periurban literature is that rural out-migrants do not generally directly go to large cities (laquinta and Drescher, 2000). Instead, a series of moves is involved, called step migration, wherein rural migrants move first to villages or small towns and successively to more urban environments. In a study on patterns of maternal mobility in Kenya, Molyneux and Mung'ala –Odera et al. (2002) found that most rural to urban migrants were familiar with urban environments before moving and having moved, continued to maintain strong ties.

Institutionally, too, periurban areas are in transition as rural governance bodies may become defunct, without being replaced by urban governance bodies. Periurban areas lie outside the legal jurisdiction of the cities and sometimes even outside the legal jurisdictions of municipal boundaries (Shaw, 2005). This can contribute to the challenge and complexity of addressing periurban as a policy space, as many subjects requiring attention may fall within the jurisdiction of neither urban nor of rural governments. For instance, in a study of Hubli-Dharwad in South India, the idea of a sewage treatment plant was dropped, as it was not clear – who – the urban or the rural government would pay for it (Brook et al, 2003). Conflicts may also arise between rural and urban governments over issues of land acquisition for urban expansion, as witnessed in Gurgaon (Narain, 2009a) or between rural and urban claimants over resources like land and water as witnessed both in Chennai and Gurgaon (Janakarajan 2009, Narain 2009a).

Contested natural resource use

With the onset of urbanization, periurban areas grow in importance. This is because they provide the much needed land and water for urban expansion, while receiving much of the urban wastes. Since they involve resource reallocations across uses, they are fertile grounds for studying questions of justice and equity, as well as raise fundamental questions about the politics of urban expansion and planning. As they represent a transition from rural to urban, a study of periurban areas gives insight into the nature of urbanization processes, as well as who the gainers and losers in this process are.

Periurban areas perform different functions for several people (Douglas, 2006) - for the poor, they serve as places where it is easier to build shelters and to occupy land for agriculture; for industry, they serve as sources of materials essential for urban life such as water, bricks or clay; for the middle class, a place for houses in a rural setting with recreational facilities; for local governments, sites for discarding urban wastes; for conservationists, the site of valuable protected areas; for education and human well-being, the place of first urban contact with major areas of natural vegetation and biodiversity. For these reasons, a periurban location soon becomes a 'contested space (Douglas 2006: Pg 20)'. Such competing interests exert pressure on the natural resources of the region, often leading to rural-urban conflicts around natural resources such as land and water.⁵ These in turn can have important equity effects, further triggering off social and economic changes like migration. Janakarajan (2009) describes how water moving out from the villages to the city in periurban Chennai triggered off migration by farmers into the city, further stressing the already overstretched infrastructure.

⁵ See also Du Pont (2005), Du Pont (2007) and Ruet and Gambiez et al (2007).

Diversity of economic activities and the role of periurban agriculture

Peri-urban areas encompass a wide range of economic activities, including farming, husbandry and cottage industries, together with industrial expansion, land speculation, residential suburbanization and waste disposal (Tacoli, 2006). They fulfil other key functions for urban areas as well, ranging from the supply of food, energy, water, building materials and other essentials, to the provision of ecological services such as wildlife corridors, microclimates and buffer areas against flooding. This involves a complex readjustment of social and ecological systems as they become absorbed into the urban economy.

Peri urban agriculture is in particular an essential feature of the peri urban context and is an important facet of rural urban relationships. It involves processes both of the rural-urban flows of water – as it is carried out often using urban wastewater, and land use change.

The emergence of the periurban interface creates important changes in livelihood opportunities and options, affecting the scale and pattern of agricultural activities. However, the nature and direction of these changes is hard to predict and depends on local contexts. Changes in livelihoods can be complex and generalizations difficult, unless the understanding of these generalizations is rooted in very local contexts. In the Hubli-Dharwad region in South India, for instance, the creation of urban markets combined with the availability of irrigation created an opportunity for farmers to raise cash crops (Brook and Purushothoman et al., 2003). As agricultural workers commuted to the cities for work, there occurred a shift to the less labour-intensive crops such as mango cultivation. Dairying turned out to be an important livelihood for periurban landless near the city; buffalo numbers increased over the previous decade, particularly in the landless households. In contrast, in periurban Gurgaon, farmers moved increasingly from commercial to subsistence farming as they were left progressively with smaller parcels of land, in the face of land acquisition (Narain, 2009a).

While urbanization processes can engender transformations in agricultural practices, their sustainability is often challenged by other uses, often those of more powerful interest groups. Kundu and Konar *et al.* (2001) describe the process of the emergence of the periurban area adjacent to Kolkata and the transformations in agricultural practices engendered by this. This region was found to practice three productive activities namely pisciculture, vegetable and paddy culture, utilizing the city's sewage and garbage. The periurban agriculture in the rural fringe area of the city was traditionally confined to the production of rice, wheat, potato and vegetables like in other rural areas of West Bengal. Subsequently, construction of new roads and railway tracks opened up the possibilities of transportation of the area's produce to the urban market. Garbage farming (sewage fed agriculture), and sewage fed aquaculture emerged as the major forms of cultivation. Garbage scavenging also emerged as a source of livelihood for a small but significant section of the population.⁶ More than fifty per cent of the work force was reported to be directly engaged in the sewage fed agriculture (rice and vegetables) in the waste recycling region. These activities co-existed with other activities; a good number of people were found to be engaged in ancillary activities such as transportation, packaging and wholesale retail of the produce for their livelihood. While most environmentalists would opt for the continuance of the *bheris* (fish farms) in the region, land developers were bidding higher prices for turning these *bheries* into a concrete jungle to cater to the housing needs of the metropolis.

Periurban livelihoods : across rural and urban spaces

⁶ However, despite proximity to the city market, the local farmers were reluctant to sell their produce directly to urban markets due to problems relating to transportation (Kundu and Konar et al., 2001). Besides, farmers received too little a price for their efforts.

Peri-urban areas are characterized by a mixture of land uses associated with a range of urban and rural livelihoods. Settlements are generally inhabited by communities of different economic status relating to land prices, which are affected by location in relation to the city, and which are considerably higher than in rural areas (Parkinson and Tayler, 2003).

A distinguishing characteristic of periurban livelihoods is the role of both rural and urban resources in maintaining household security (Baker and Wallevik, 2003). Periurban households draw their income both from agricultural activities as well as casual or regular employment in the neighbouring cities. Further, inequalities tend to exist widely as the elite are able to pre-empt both urban and rural resources for accumulation while the not-so-well off negotiate and struggle for survival (Tacoli, 2003).

Processes of “periurbanisation” distribute risks and opportunities unequally. The urbanization and expansion processes underway and the diversity in access to resources such as land and water can create wide disparities within periurban contexts. For instance, in periurban Gurgaon, farmers who had their agricultural holdings geographically dispersed suffered less from the risks of land acquisition than did farmers whose lands were geographically concentrated (Narain, 2009a). Further, farmers were found to be able to gain from diversity in sources of irrigation depending upon the location of their fields. Farmers with lands lying adjacent to sewerage canals were able to gain from sewerage irrigation, while others had to stay content with others sources, predominantly tubewells.

Multiple income generation and the involvement of children in economic activities are largely strategies of poor periurban women who do not have access to sufficient cash to guarantee access to the basic needs of life (Brook and Purushothaman et al., 2003). In some studies on livelihoods in the periurban interface, migration is shown to provide a socially acceptable alternative for young women who try to escape from familial and community control (Tacoli, 2002). Remittances are another essential aspect of periurban livelihood strategies. Sending remittances is perceived as a moral obligation, as well as a way to maintain claims on assets in home areas.

Rural-urban links: essential in supporting periurban livelihoods

An understanding of the periurban interface requires an understanding of these linkages and flows of goods and services between towns and rural areas. These linkages tend to be mutually supportive and cyclical. They also perform important functions in terms of maintaining the social bonds between migrants and residents. For instance, migrant networks have been reported to perform important functions in facilitating migration and in channeling support to the wider home community (Tacoli, 2002).

Tacoli (1998) notes that the flows and links between rural and urban areas, their scale and strength, in turn, are determined by the nature of economic, social and cultural transformations (Tacoli, 1998). These can be divided further into three broad categories: the global, the national and the local levels. At the global level, the liberalization of trade and production has changed or reshaped rural-urban interlinkages in most regions. At the national level, macroeconomic policies linked to reform and adjustment have an impact on rural-urban interactions. At the local level, the nature and scope of rural-urban interactions is influenced by several factors, ranging from geographical and demographic characteristics, to farming systems, and to the availability of roads and transport networks linking local settlements to a number of urban centres where markets and services are located.

The spatial dynamism in periurban

The concept of a peri-urban zone or interface cannot be a static one, that would refer to distinct and fixed boundaries, but should on the contrary be understood as a dynamic concept. Peri-urban zones undergo a continuous evolution. Very often villages get reclassified as towns, and towns as cities. As aptly underlined by Hans Schenk who draws on the Asian experience, they expand and shrink geographically, 'eating' their way into the countryside, while they are swallowed by the expanding urban core area. Some authors therefore refer to the peri-urban interface as 'a region of change' (DFID, 1999 cited in Rohilla, 2005). Lintelo et al (2001) refer to the demographic and economic expansion of cities, through processes such as migration and industrialization that tend to be accompanied by spatial expansion, resulting in encroachments by cities upon adjacent peri-urban areas. At the same time, they suggest that areas that were earlier distant from the city and rural in character will subsequently start falling within the cities' reach or band of influence and typically, increased interaction with and access to the city economy, in terms of capital, labour (public and private) goods and services will subsequently trigger the transformation of the rural to peri-urban areas. The rural-peri-urban- continuum itself is thus dynamic in nature and the changes tend to be more marked around cities that are rapidly urbanizing or growing both economically and spatially, as compared to slower-growing or stagnant urban cores.

3. Socio-economic drivers of Peri Urban

Urban transition in India reflects a metropolitan region, comprising UAs (Urban Agglomerations) or cities and their outgrowths (Kumar, 2001). The spilling over of population from India's major cities into these areas has occurred since the 1990s, sustained by a middle class housing demand that has caused the population to move to the outskirts of the city where land is cheaper (Shaw, 2005). Typically, rapid population growth in the main city results in increased demand for land and higher housing costs which in turn result in the outward movement of people from the main city to the city fringes, where they look for cheaper accommodation and residential land (Kumar, 2001). This phenomenon is now happening in several metropolises in India.

Increases in urban population and the need for better connectivity to cities, in turn, fuel the growth of urban related infrastructure. This drives up land prices and changes land use patterns. As a consequence, land in the periurban areas gradually becomes monetized (Brook et al., 2003; Kumar, 2001). This process of periurbanization is witnessed conspicuously in major Indian cities where a real estate boom has transformed the pace of development. There has been a massive land acquisition process; land has been acquired by the state and private corporations for several industrial, residential and recreation purposes, changing land use away from agriculture and allied activities.

Other factors contributing to the growth of UAs in India are the process of industrial decentralisation and the imposition of stricter policies for reducing pollution in major cities in order to comply with global requirements. The failure of the state executive and legislature to effect changes in the urban environment, coupled with the increasing pressures of investment agencies, Multi National Companies (MNCs) and Trans National Corporations (TNCs) has resulted in peripheral areas facing the brunt of relocation of polluting industries. The Supreme Court of India has often issued directives for the closure of hazardous polluting industries in the urban core areas and their relocation in periphery areas, preferably in the extended metropolitan zones or the peri-urban regions (Kumar 2001). Neo-liberal policies giving greater space to private enterprise and large transnational corporations and policies for the creation of special economic zones have clearly played an important role in the creation of periurban spaces (Shaw, 2005; Narain, 2007; Reddy 2005; Keivani et al, 2007).

Residential development

Residential development acts as a major driver of peri urbanization. The UNFPA's Status of World Population Report (UNFPA 2007) highlights the fact that change in the value systems in the people residing in the urban areas to return to rural living and being close to nature was a part of the search for better quality of life and this precipitated in the middle and upper middle classes looking for residences in the peri urban spaces. Further, the intensive use of the automobile for daily commuting was both a cause and a consequence of urban sprawl (Arbury, 2006). This pattern of settlement spawned new locations for trade and services and this, in turn, further promoted automobile use and outward city growth.

The above mentioned report points out that the suburban model of urban sprawl was closely associated with lifestyle preferences and the widespread availability of the automobile in a particular cultural setting. Housing, road-building and zoning policies, also inspired by suburban ideals, combined to promote low-density housing. Further, catering to the needs of the suburban population stimulated decentralization of economic activities and the diversification of outlying areas (UNFPA, 2007). These value changes, and the greater availability of personal transport, especially the automobile, are spreading cities outward (Monte Mor, 2006 cited in UNFPA, 2007).

Land speculation and Industrial Expansion

Another perspective- as noted above and relevant particularly to the context of India - is that peri-urbanization is fuelled, in part, by land speculation, nurtured by the prospect of rapid urban growth. Speculators hold on to land in and around the city, expecting land values to increase. They do not bother renting, especially if they fear that users might gain some rights to continued use or controlled rents. People who need land for residential or productive purposes must therefore find land further from the centre (UNFPA, 2007). Changes in the structure and location of economic activity contribute greatly to peri-urban growth. Better communications and transportation networks make outlying areas increasingly accessible. Globalization encourages economies of scale in production and distribution, which, in turn, encourage large facilities occupying large tracts of land. Tacoli (1999) talks about a deconcentration and decentralization of production, often found on the outskirts of the more dynamic cities, where growing workplaces and workforces can no longer find space in city centres, making spill-over growth inevitable. In turn, the periphery offers cheaper infrastructure, land and labour, which encourage further peri-urbanization. Policies for setting up special economic zones and giving a boost to the outsourcing industry have been very influential in shaping the periurbanization processes in the five cities that were visited for this study. Industrial expansion played an important role especially in Ahmedabad, giving rise to a range of supporting economic activities, while the IT boom was an important factor shaping the expansion of Chennai and Chandigarh.

Availability of cheap labour and export driven policies

Peri-urbanization draws a migrant workforce and abruptly changes many rural residents' economic activity from agriculture to manufacturing and services. Such changes have been particularly pronounced in East Asia, where agrarian villages have become leading edges of urban change (Leaf, 2002 cited in UNFPA, 2007). In East Asia, the combination of ill-defined property rights, export-driven policies and imperfect land markets has contributed to particularly rapid peri-urban growth (Webster, 2002). The UNFPA report cited above uses the example of China and demonstrates how in China, foreign investments have transformed rural economies and communities, often triggering major changes in social structure and human-environment relations.

Slum Rehabilitation

Peri-urban areas often provide more accessible housing for poor residents and migrants in informal and scattered settlements. There is a general competition between the residents and the poor settlements, while the latter tend to be more insecure and subject to removal, the residents generally lack services and infrastructure. They compete with agriculture for space, and both can be displaced by other economic uses. Land conversion, market opportunities, and rapid flows of labour, goods, capital and wastes force land prices up (Allen et al., 1999). Peri-urbanization also increases the cost of living for the original rural population (Rostam, 1997).

Weak Government Regulation

Since peri-urban areas are generally beyond or between legal and administrative boundaries of central cities, the capacity of government authorities to regulate economic activity is particularly weak (Parkinson and Tayler, 2003). As a result, the process of urbanization can be, to a great extent, unplanned, informal and illegal, with frequent struggles over land use.

Looking at the factors driving periurbanization in the five cities visited for this study, the IT boom clearly stands out particularly in Chennai and Chandigarh. IT enclaves along the Old Mahabalipuram Road in Chennai and Mani Majra in Chandigarh have been a new major claimant of land and water, as have been gated communities, up-market medical facilities as well as new and upcoming educational institutions. The development of transport corridors, roads and networks has played a clear role in causing a concentration of population in these periurban zones.

The most interesting case of expansion is perhaps that of Chandigarh. The planning of the city of Chandigarh started in the 1950s and most of it came to fruition in the 1960s. The Periphery Controlled Area Act, 1952, recommended a wide green belt (initially of 8km which later increased to 16 km) around the entire Union Territory of Chandigarh. The idea was to curtail further expansion. This Act sought to regulate the development and prohibited establishment of any other town or village and forbid commercial and industrial activities in the periphery zone. The idea was that Chandigarh would always be surrounded by the country side.⁷ However, the provisions of this Act were violated both by the state governments of Haryana and Punjab, as they sought to develop Panchkula and Mohali, respectively.

The original plan prohibited any construction activity within 16 km of city limits. The State Governments of Punjab and Haryana nevertheless created satellite townships within this prohibited zone. Besides, a large cantonment was set up at Chandi Mandir and the Union Territory Administration developed Mani Majra, a village just beyond the capital project area as a residential complex. To the South of the city, the Government of Punjab created Sahibzada Ajit

⁷ One of the main assets of Chandigarh has been the continuity of its green space. Chandigarh has been considered to be a good example for other Indian cities that have been trying to struggle with how to attend to their problems of urban sprawl; Chandigarh has a green corridor that runs through its environmental length with several supplemental green spaces around it. There are well-planned self-contained residential sectors traversed by wide roads. The roads and pavements are adorned by plants, trees and vegetation – a different species on each.

Singh Nagar, or SAS Nagar informally known by its old name, namely, Mohali. To the East of the city lies Haryana's newly created town of Panchkula.

As regards Chennai, it is basically a migrant city and there has been a cross-flow of people "in" and "out"; the new migrants into Chennai chose to settle at the outskirts. What was once mainly a centre for tourism and primarily a tourist road, the OMR (Old Mahabalipuram Road), was soon engulfed by the IT industry. The IT boom converted this road into an IT corridor; it is now called the IT expressway. Infrastructural and road development followed. Policies for Special Economic Zones created an environment for urban expansion. There was a rise in the price of land and a real estate boom ensued. Much of Chennai's resulting urban expansion has been southwards. It is bound on the East by the Bay of Bengal, and Northwards, it touches the boundary of Andhra Pradesh. Thus, it is predominantly the South that has provided space for the city to grow. In this context, the Old Mahabalipuram Road (OMR) has been the seat of urban expansion, expanding the frontiers of the city towards the World Heritage site and tourist attraction of Mahabalipuram. Parallel to this is the East-Coast Road that has also witnessed some development over recent years.

Chennai has traditionally been an agglomeration of agriculture and fishing villages. With the expansion of South Chennai as an IT corridor, the city has engulfed several such villages and hamlets. This has in turn created several ecological and environmental challenges that the current governance and administrative machinery is unable to cope with. Many of these problems have resulted from the growth of the city beyond its carrying capacity and the disconnect between urban and environmental planning.

In Patna, the improvement in the law and order situation and political stability has played a role in giving a boost to real estate. In Guwahati, easier loans have encouraged people to invest in real estate. Ahmedabad's expansion has experienced more industry led growth rather than the IT led growth witnessed in Chennai and Chandigarh. However, the relocation of slum populations in the periurban areas of Ahmedabad has been an important issue to deal with.⁸

4. Issues of natural resource depletion, environmental deterioration and human health consequences

Improvements in the quality of life of urban systems are often made at the expense of extra-urban or peri-urban areas, which are likely to bear a disproportionate share of environmental burdens (Satterthwaite, 2006). Environmental transformations in the peri-urban to a large extent happen due to pressures exerted by external and nearby systems (Allen, 1999). Among the pressures exerted on peri urban systems are inadequate development processes, unequal distribution of services and investments, the relationship between households' assets and consumption, the conditions of the natural environment, the inadequate localisation and functioning of economic activities, the lack of provision of adequate services, the scale and nature of demographic growth and the absence of institutional management capacities. These pressures often result in:

- Environmental hazards threatening the quality of life, such as the depletion and degradation of environmental resources and loss of agricultural land
- Ill-health and malnutrition for the poorest and other conditions derived from precarious living environments

⁸ For a detailed review of the experience, see Mathur (2012).

- Other environmental hazards resulting from the disposal of wastes beyond the local and regional absorptive capacities (Universities of Nottingham and Liverpool, 1999)

The aspect of environmental deterioration is elaborated in the work of Simon (2008) who emphasises that the diverse urbanization and peri-urbanization processes have had diverse and complex human consequences but the environmental implications of such processes are serious and that urgent remediation and prevention are deemed essential. Levels of river, soil, and groundwater contamination from often toxic waste are high, resulting in health problems and severe agricultural contamination. Air pollution is chronic, not just in large cities, but also in peri-urban and rural areas characterized by often (but by no means always) outdated technologies and lack of controls. Simon points out that an encouraging sign is the awareness of the problem by governments and a conversion of this concern into positive action.

A recent article in the Indian media (Jena 2012) talks about how India, like other Asian countries, has focused its climate change adaptation strategies on rural and urban areas while neglecting the urban fringes and how this climate change threatens the poor in the peri-urban. The article underlines the notion that peri urban areas are places where nobody is in charge and it points out that populations residing in peri-urban areas are most vulnerable to climate change because they have neither the modern infrastructure nor clean water, and sanitation available in urban areas nor the ecosystems that rural folks fall back on.

However, recent research in India has begun to draw attention to the vulnerability of the periurban communities. Mukherjee's (2001) focus on 'social' rather than the 'scientific' aspects of air pollution in selected urban and peri-urban villages from the Indian cities of Varanasi and Faridabad, located in the States of Uttar Pradesh and Haryana respectively, provides an alarming and illustrative picture of the potentially irreversible peri-urban changes from the perspective of poor farmers. However, she argues that that this field still remains largely under researched; hence caution must be applied when identifying causal factors, as many of the problems encountered and attributed to air pollution such as 'fruit drop' can also be caused by irrigating with contaminated water, particularly where farmers are abstracting from wastewater canals - a common facet of periurban locations.

Many industries are located at the edge of the cities, in peri urban areas, because the waste they produce rarely receives adequate treatment (Parkinson and Taylor, 2003). Community members take advantage of the fact that in peri urban areas the regulatory capacity of the government is weak, particularly in areas outside the municipal boundaries. A specific example in India of such industrial contamination in the peri urban is provided in the Hubli- Dharwad case study by Brook et al (2003) which found evidence of environmental degradation attributable to the influence of the city. The examples cited are mining of clay in fields for making bricks (particularly prevalent in Kelageri) and quarrying for building blocks and road stones (particularly in Mandihal). These resulted in degradation of the top soil and loss of some land for farming. For periurban Faridabad, Narain and Nischal (2007) note the negative effects of the close proximity of factories to the periurban settlements resulting in contamination of local aquifers and disturbing noise from the operation of the units.

On account of the availability of open space and good accessibility from urban areas, the PUI tends to be the backyard of urban waste disposal, often surpassing the absorptive capacity of these areas and imposing severe impacts on the health of the ecosystem and human population (Phillips et al., 1999 cited in McGregor et al, 2006). Waste disposal and consequent contamination in peri-urban areas are areas of specific concern. In particular, refuse dumps and sewage treatment plants in the peri-urban areas pose problems for local residents. Rivers flowing through major urban areas commonly emerge with a heavy pollution load and peri-urban residents downstream of

cities are thus forced to drink and utilize contaminated water (Simon, 2008). On account of all these factors, not only does the environment deteriorate drastically but there are also severe long term negative consequences in terms of health for the local peri urban residents.

Among the cities visited for his study, disposal of urban waste and the lack of landfill sites was identified as an important periurban problem especially in Chennai, Guwahati and Patna. This happens because modern industrial establishments and gated communities develop with out planning the disposal of their wastes. With an IT corridor booming towards the South of Chennai, there is a major sewage problem brimming. Though several sewage treatment plants have been built, there is inadequate capacity to deal with sewerage. Even in the westward periurban area of Chennai there is dumping of sludge from the new gated communities. New residential areas have come up with reverse osmosis plants but with no concrete plans to dispose off the sludge. This sludge is eventually disposed off into the wetlands.

Natural resource problems in peri-urban areas are not significantly different from those in the core urban areas in terms of their causes and effects. However, it should be noted that there are distinguishable patterns of activities. The final technical report on the natural resources production systems in the peri urban by the Universities of Nottingham and Liverpool (1999) highlights that a variety of infrastructural developments and activities are characteristically situated within the periurban zone. Their location is dictated by a number of factors, notably the amounts of land which they require, the price of land, pollution and safety considerations, location of natural resources, and environmental benefits. Airports, reservoirs, drinking water and sewage treatment plants, power stations, quarries and brickfields, industrial plants, golf (and certain other) clubs and military installations all provide obvious examples. All of these developments have biophysical impacts, which extend beyond their immediate boundaries.

Agriculture and Agricultural land in Peri Urban

One of the most conspicuous manifestations of urban expansion and its implications for natural resource use is the irrevocable loss of agricultural land (Douglass, 1992 cited in Universities of Nottingham and Liverpool Report, 1999). The reasons for this loss are multiple and varied ranging across a wide spectrum. Some of the reasons include:

- The abandonment of farming on the urban periphery in the face of land purchases for speculative purposes
- The occupation, often illegal, of land for temporary housing

Impacts on the remaining agricultural lands are likely to include:

- Productivity decline due to the heavy pollution of soil and water by industries
- Degraded soil quality because of the use of fertilisers, pesticides and insecticides
- Land degradation in the areas surrounding agricultural lands

On account of their proximity to urban areas, urban fringe areas where land use was predominantly agricultural, become sites for rapid, unplanned urban development (Malaque 2007). Land use change is a basic driver of periurbanization processes and with it, emerge changes in access to other natural resources such as water, engendering further socio-economic changes in livelihoods, migration, social composition of the population, and posing new challenges for governance and conflict resolution.

The appropriation of land for urban expansion has been a constant reality in the expansion process of all major Indian cities (Shaw, 2005). Land acquisition for urban expansion has been noted to be a cause of great dissent among periurban residents against urban authorities in periurban Gurgaon (Narain, 2009a). Keivani et al (2007) note the significant impact of economic globalization on peripheral land and the local economies of major cities of south India. In many cases there is an expansion/ encroachment onto the peripheral land, and the restructuring of existing development there. There is also a restructuring of the institutional set up and a new form of governance and a rationalization of the planning framework and regulatory structures in tune with the location requirements of transnational corporations. As illustrated in Bangalore, these cause not only conflicts of interest between new demands of international capital and existing demands of local firms and populations, but also conflicts between different tiers of administrative and governance circuits as they vie for influence and areas of competence.

While there were positive aspects of the IT led growth in Bangalore by creating opportunities in terms of IT support services and greater demand for a range of rental and owner-occupied housing and small-scale commercial developments, the work of Keivani et al (2007) points out that urban researchers and policymakers in Bangalore failed to identify mechanisms that optimized the results for both the overall urban economy and local economic development. They suggest that this was perhaps mainly because they were insulated from popular politics — working in parastatal agencies away from elected councils and subject to little accountability. Over-concentration on the needs of the trans-national and high-tech companies by and large may have led to a neglect of such local considerations. There is thus an issue of governance. Similarly, drawing on his research on land acquisition and land use change in North India, Shahab (2000) makes a case for a stricter implementation of agricultural land conversion laws and greater encouragement for farmers to remain in farming activities, since this would reduce the incentive for rural to urban migration.

Land use change and periurban water insecurity

Water is a limited and important natural resource in most places, especially in the peri urban locations due to the competing interests and claims on this resource by various actors and agencies. With changing land use, pressures on water can come from many quarters; farmers and periurban communities may lose access to water for irrigation as ground water is channelled towards other competing uses like those for industrial units, farmhouses and recreational activities (Narain 2012). Further, people's access to water sources diminishes as the land on which they are located is acquired for urban and residential purposes. Besides, factories are often located at the village peripheries and they may pollute local water sources. The inhabitants of peri urban settlements are often outside the ambit of organised sources of water supply as they lack tenurial status. This makes them dependent on other (and often contaminated) sources of water (Kundu, 2008).

Rural-urban water conflicts have already begun to be noticed in Chennai (Janakarajan 2009) and Gurgaon (Narain, 2009b). Janakarajan et al (2006) focus on water conflicts in the peri-urban areas of Chennai city. The key idea that they develop in their work is that cities continue to expand at a rapid rate and eat into resources (such as land and water) available in peri-urban areas. While land in peri-urban villages is grabbed for urban housing, industrial establishments and for dumping urban wastes (both solid and liquid), very little is ploughed back by way of developing these areas. Despite the claims of public officials, recent studies show drinking water is not prioritised ahead of industrial uses (Allen, 2006). The industrial activities reduce water availability for the poor and also deteriorate the quality of water and the long-term sustainability of this resource.

Narain and Nischal (2007) note the changing locus of control over village water bodies such as village ponds (Johads) as urban residents begin to take part in their auction. The periurban water insecurity engendered by changing land use in periurban contexts affects the livelihood security of periurban communities. The filling up of water bodies for urban expansion is reported from several Indian cities such as Hyderabad (Prakash et al., 2011), Gurgaon (Narain 2009b) and Faridabad (Narain and Nischal, 2007). This has implications for the livelihoods of those who depend on them such as potters – who have been used to desilting the village ponds and *dhobis* or washerfolk who depend on these sources for their water supply

Dumping of industrial and urban wastes into periurban water bodies was a common issue in almost all locations visited for this study. Once again, problems related to water insecurity were acute indeed in Chennai. Due to ground water extraction along the coast, the sea water enters and mixes with the ground water, making it saline. Fresh water is thus lost and this process is irreversible. Further, the building of embankments and roads is often done without any regard to the hydrology of the areas. Developments have taken place without regard to the carrying capacity of the aquifers as well. Sandmining for urbanization was identified as another emerging issue.

The dumping of industrial wastes along the coast-line was identified as an important issue, as was encroachment of village ponds and water bodies. The filling up of water bodies and wetlands has been an important means of urban expansion in Chennai and Guwahati contributing often to the problem of urban flooding, that has emerged as a new concern in periurban areas. This has disturbed eco-system resilience, just as the expansion of Chandigarh into the foot-hills of the Siwaliks.

Water use and health in periurban contexts

Several health problems are caused due to lack of safe drinking water and sanitation in periurban areas (Narain, 2012; Narain, 2013). The high incidence of waterborne diseases in peri-urban areas is the result of poor access to water and unsafe hygienic conditions. Several waterborne diseases such as cholera, diarrhoea, and gastroenteritis are known to be a common cause of poor health and high morbidity. Sharma et al. (2007) note that cholera is endemic in Delhi and its peripheral areas. Children below five constituted about 33 per cent of the cases in their study conducted between 2003 and 2005. Certain vector borne diseases like malaria are on the rise due to certain counter productive activities in the peri urban areas like the lack of proper sanitation and open faecal matter (Konendijk 2004).

In his work on periurban Delhi, Kundu (2008) notes wide variations in access to water between the core and the peripheral areas. In the absence of access to organised sources of drinking water supply, a large number of households in the peripheral areas depend upon hand pumps or tubewells that are not safe sources of water. This explains the incidence of epidemics and a variety of skin diseases in the peripheral towns, especially in the low income areas and slums. Microbial contamination of groundwater is known to be widespread and even deeper layers of groundwater may not be regarded free from disease-causing micro-organisms (Sharma et al., 2003).

Among the cities visited for this study, water related health problems were found to be particularly conspicuous in Patna. Dumping of solid wastes and neglect of sewerage and sanitation facilities were found to be associated with increased incidence of waterborne diseases. Dumping of untreated wastes and open drainage has resulted in a preponderance of water borne diseases. Diarrhoeal cases are very common in the fringes, particularly in slums and squatter settlements. A study carried out by Nidan, an NGO, in association with WaterAid points out that most of the low

lying areas in outskirts are victims of malaria, conjunctivitis, worms and skin related diseases. Primary health care facilities are extremely poor and inadequate.

Wastewater use, food security and health

Wastewater constitutes an important aspect of rural-urban flows that sustain periurban livelihoods. It has been noted that wastewater has a high potential for reuse in agriculture (Winrock International India-International Water Management Institute [WII-IWMI] 2006). It offers an opportunity for increasing food and environmental security while preventing direct pollution of rivers and surface water. This practice conserves a significant proportion of the river basin waters and disposes off municipal wastewater in a low-cost, sanitary manner. Besides, wastewater production is continuous, making it a reliable and demand-based source of water available to farmers whenever they need it, unlike canal irrigation (IWMI 2003). It also allows farmers to grow crops that are more sensitive to water stress, such as vegetables. The nutrients present in wastewater are an added benefit, saving farmers money (in terms of chemical fertilisers) and increasing crop yields. Though wastewater use in agriculture is an age-old practice, there is understood to be not enough systematic information on it, particularly on issues such as farmers' needs and preferences and health and environmental risks (WII-IWMI 2006).

The use of wastewater is an important aspect of irrigation in periurban agriculture, enhancing local food and livelihood security. Food security and income generation are secured through biodiversity of crops and despite the multifarious adaptations and advantages there is also a risk involved especially when using waste water for irrigation; this could be hazardous for health (Jacobi 2009). Plant samples of crops grown under sewage-irrigated fields in a periurban area near Vadodara city in the western Indian state of Gujarat were collected to determine the composition of trace elements and also for the assessment of the contamination of heavy metals in relation to tube well water irrigated fields of adjoining areas (Patel et al., 2008). The findings of the results emphasize the contamination of plant system in sewage irrigated periurban areas, especially with heavy metals, viz. Lead, Nickel and Cobalt. In their study in South India, Brook et al (2003) note that sewage irrigation was a lifeline for vegetable producers but resulted in what farmers referred to as soil sickness, leading to poor crop growth, low seed germination and lower water infiltration rates into the soil. Furthermore, the attraction of pests resulted in excessive use of pesticides which further contaminated vegetables used by urban consumers. Likewise, Kaur and Rani (2006) observed that chromium concentrations in the wastewater used for irrigation in Alipur and Shahdara blocks of peri-urban Delhi were far above the maximum permissible limit of one ppm (parts per million). Available manganese concentrations in the soil sampled at Kanjhawala, western Najafgarh and Alipur peri-urban regions in Delhi were also observed to be above maximum permissible limit of 10 ppm.

A study by Rattan et al. (2005) focused on peri-urban agricultural lands under the Keshopur Effluent Irrigation Scheme in Delhi where various cereals, millets, vegetables and fodder crops are grown. Their study found that sewage effluents contained higher amounts of phosphorus, potassium, sulphur, zinc, copper, iron, manganese and nickel compared to groundwater. Risk assessment of metal contents in some vegetable crops grown in such contaminated soil indicated that these vegetables could be consumed safely by humans.

To check their heavy metal content, Singh and Kumar (2006) studied samples of vegetables like spinach and okra and samples of irrigated water and soil collected from five peri-urban sites in Delhi. While the presence of heavy metals in the soil was below the maximum prescribed limit by WHO, the metal load was higher in the water and vegetable samples. The spinach and okra samples showed zinc, lead and cadmium levels higher than the prescribed WHO limits. The level of copper, however, was within safe limits. It was observed that metal contamination was higher in

spinach than in okra. A study done by Jacobi (2009) in peri urban Hyderabad, suggests that industrial and domestic effluents be segregated and only the latter be used for irrigation purposes.

5. Periurban as a policy space: prescriptions for reform

The periurban interface has been described as a 'space crying out for attention' (Brook and Purushothoman et al., 2003: 134). Given the unique characteristics of the periurban interface, developing policy options for sustainable periurban settlements is a challenging task indeed. Scholars and researchers of the periurban interface make several suggestions for management of periurban settlements. Policy prescriptions focus on improving the access of periurban dwellers to a wide range of assets, improving transportation and connectivity, involving both rural and urban governments at the local level, and most importantly, overcoming the rural urban dichotomy in planning for development. Given the huge diversity in periurban settings, a strong case is made for a decentralized approach that is driven by local demands and priorities in which both urban and rural specialists need to work with each other. It is argued that this requires the straddling of the rural-urban divide, that has been normally ignored by policy-makers and calls for interventions rooted in local contexts while avoiding generalizations (Tacoli, 2003; Brooke et al. 2003; Simon 2008; Allen 2003; Jacobi 2009).

Livelihoods and occupational diversification

Given the wide diversity in the occupational structure and in economic activity in periurban contexts, Tacoli (1992) argues that an important ingredient of policy interventions for periurban areas should be interventions aimed at protecting livelihoods and facilitating occupational diversification. Such interventions should aim at improving access to a wide range of assets with the aim of expanding livelihood options, rather than assume that agriculture is the best, or indeed the preferred activity for rural residents and that urban residents' reliance on rural resources is limited to backyard farming for household consumption. This recommendation is based on the premise that periurban livelihoods are constructed both across rural and urban resources and spaces.

Further, it is important that policy interventions concentrate on improving access to assets with the aim of expanding livelihood options, rather than assuming that households are spatially homogeneous and that individuals engage in one type of activity only (Tacoli, 2003). The assumption of rural households and communities as relatively stable units of production and consumption are no longer valid in many locations, and this needs to be taken into account in the formulation and implementation of rural development initiatives. In fact, one of the reasons for the failure of policies that, since the 1960s, have attempted to draw upon rural-urban linkages to promote regional development, Tacoli argues, is that they were based on assumptions that did not necessarily reflect the real circumstances of specific locations and the people living and working there.

Transport and access to markets

Since periurban settlements are located away from the city core, they often receive less attention and priority. Transport authorities often focus on the widening of highways, acquisition of new lands for this purpose and the development of link roads connecting major cities. Connecting roads to periurban villages typically receive lesser attention. On the other hand, it

has been argued that given the dependence of periurban residents on linkages with urban centres, policies that improve access to towns and cities need a clear emphasis. In periurban research in Faridabad district of Haryana, the improvement of roads was cited by residents as a top priority (Narain and Nischal 2007). Further, the demand for periurban transport was found to be gendered. Men could often get a lift on a bicycle or bike to the point where connecting transportation was obtained for the highway, while women were forced to walk.

This calls for a focus on improving and meeting local transportation needs more effectively. Often this entails the creation of some intermediary form of transport that connects the village to the city centre, or to the main highways. An important dimension of periurban transport as seen both in Faridabad and Gurgaon districts was the reliance on semi-public transport such as auto-rickshaws, that rose in popularity on account of the poor reliability of public buses (Narain and Nischal 2007; Narain 2009a). However, this form of transport remains unorganized, and a common problem faced by periurban residents is that of cramped vehicles, uncertain timing and overcharging by the vehicle operators.

High transport costs are often identified as bottlenecks in shaping access to markets (Tacoli, 2002). Improved roads greatly enhance rural-urban linkages by increasing the value-added and marketability of certain kinds of rural produce such as citrus fruits, tobacco, and timber. Improvements in rural-urban links would also increase accessibility to urban social services, such as medical facilities and secondary schools for rural people. During the construction of transportation infrastructure, however, authorities need to pay heed to the livelihoods of periurban population that may be affected through road construction, as demonstrated in the work of Brook and Purushothoman et al. (2003) in the Hubli-Dharwad region in South India. The construction of highways is often at the expense of farmers' agricultural lands, and their access routes to fields and places of work get disrupted, as witnessed in research in periurban Gurgaon (Narain 2007).

Agriculture and access to assets

While agricultural production is assumed to benefit from proximity to urban markets and the development of infrastructure and transport, the degree to which households can take advantage of this proximity depends on their physical, human and financial resources as well as their social capital and their access to markets. Within specific regional contexts, while there is potential for rural-urban linkages to contribute to poverty reduction, it is argued that this will only occur in a climate in which policies, social relations, institutions and incentives allow an equitable access to the assets necessary to support sustainable livelihoods (Tacoli, 1998).

Public participation and institutional contexts

Given the patterns of flows of goods and services between rural areas and urban centres, there are implications for patterns of control over resources. Households who stay behind in rural areas often have little say in the management of local resources as control remains with the migrant members (Tacoli, 1998). This is particularly the case for women although it is also mediated by a range of factors such as culturally-specific gender roles and relations, gender divisions of labor within households, land tenure and women's workloads. This should be taken into account when targeting extension messages in periurban settlements, so that assumptions are not made about who controls resources.

Drawing on their study in South India, Rengasamy and Devaraman et al. (2002) argue that it is also important that any definition of target groups for specific policies correctly reflects the some times wide variations within these groups in terms of their needs and priorities. This means

understanding the characteristics of the livelihoods of different groups (including those not specifically targeted by the initiative but likely to be affected by it), the direct and indirect impacts of the policy initiative on their livelihoods, and incorporating the policy elements which address potential negative impacts on specific groups. Drawing on his study in Hyderabad in South India, Kennedy (2005) notes that the regional policies in Hyderabad have been successful in many respects, attracting private firms both domestic and international and creating wealth and employment. At the same time, they have raised important questions with regard to governance. Private sector actors have emerged on the scene but locally elected representatives have been largely excluded from the policy process, as have civil society groups, learning about major decisions only after the fact. Large tracts of peri-urban space are being transformed into special purpose enclaves, governed by specific regulatory frameworks. By subdividing peri-urban spaces and increasing spatial differentiation, such policies appear to weaken prospects for governance institutions at the metropolitan scale.

One key question that Kennedy raises here is the extent to which such top-down decision-making, in conjunction with regulatory tools that carve out selected areas for development within largely undeveloped peri-urban spaces, are effectively weakening prospects for participatory urban governance at the metropolitan scale. Local actors are conspicuously absent from the policy process. Governance continues to be characterised by centralised political institutions (Kennedy, 2005).

Policy in practice: bottlenecks to developing and implementing policy options for the periurban interface

While scholars and researchers have presented several prescriptions for dealing with the management of periurban areas, in practice, these prescriptions are difficult to implement. This section of the paper examines some of the practical challenges in addressing periurban problems from a perspective of governance.

First, the co-existence of interests, groups, activities and institutions as diverse as those described in the preceding sections of this paper poses practical problems in developing policy options for the periurban interface; this is aggravated by the fact that geographically, the boundaries of periurban keep shifting as rural activities and processes are replaced by urban activities and processes. At the same time, the very nature, pace and location of the periurban interface makes it difficult to bring it under direct means of control and regulation, both for urban as well as for rural authorities. For instance, from our study of Chennai city in this project, we know that what were once considered as periurban areas are now brought into the fold of the Chennai Municipal Corporation.

An understanding of what constitutes the periurban interface is further complicated by the ambiguity in definitions of urban and rural itself (Tacoli, 1998). What is defined as an urban centre may vary from one country to another. Further, households may not be purely "rural" or "urban". They could be multi-spatial, with some members residing in rural areas and some in towns, as well as engaging in agriculture within urban areas. As noted earlier in this paper, conventional approaches to planning take a limited focus of either planning for urban or planning for rural areas; in practice, populations and activities described either as rural or urban are more closely linked both across sectors and space than is usually thought.

There are also important issues related to definition and concepts of the periurban, which is perhaps an important reason why periurban does not receive the attention of policy-makers. As an example, the Indian census had no concept of periurban for a long time (Kundu and Konaret

al., 2001). Town groups, urban outgrowths, and urban agglomerations have been accepted concepts to denote core-periphery relationships.

Drawing on their work in the Hubli-Dharwad region in South India, Halkatti and Purushothoman et al. (2003) argue that frequent interventions by urban institutions and visits by politicians and government generate patron-client attitudes in periurban villages. Since their natural resources are controlled by urban or rural institutions, natural resource management is much more difficult to organise. Further, options for earning incomes in the city year-round and consequent migration is an incentive for people to seek opportunities, but can also be a disincentive for self-help and for investing in their own villages. Thus, whilst multifaceted solutions are possible in peri-urban areas, drawing on both rural and urban opportunities, mobilization of the community is often more difficult.

Devising and implementing policy interventions for the periurban interface can be further complicated by inherent tensions between peri-urban dwellers and municipalities. These tensions concern changes in land-use, the management of waste from the urban centres and that of water resources; since these issues are likely to become increasingly central, mechanisms for inter-local government negotiation need to be developed (Tacoli, 2002). Residents of periurban Gurgaon, for instance, were found to harbour feelings of resentment against urban planning and development authorities for forced acquisitions of land, delayed compensation and their inability to participate in the opportunities thrown up by the rapidly growing and expanding Gurgaon city (Narain, 2009a). In fact, periurban residents in one of the villages filed a case against HUDA- the Haryana Urban Development Authority - when the payment for their land acquisition was delayed.

The relationship between elected local governments and traditional authorities can be quite critical; this is especially where there are tensions between the statutory rights system of land tenure and the customary system (Bah and Salmana et al., 2003; Tacoli, 2002). In periurban areas, these are underpinned by informal land markets and the resulting conflict of interest between traditional chiefs who attempt to retain control, including over private sales of land under customary tenure, and elected governments whose responsibilities include the provision of infrastructure for which access to land is essential. The potential for conflict is particularly higher in areas with low levels of social and political cohesion (Tacoli, 2002). Tensions between rural and periurban communes and urban municipalities also concern changes in land use, and the management of water resources and of domestic and industrial waste from the urban center (Bah and Salmana 2003).

Finally, developing interventions for the periurban interface requires both urban and rural authorities to collaborate, for which there may be no precedent. An example is sewage flowing into periurban areas, which is partly the responsibility of the urban government and partly of the rural government. As noted earlier in the paper, in the Participatory Action Planning Project undertaken by Halkatti and Purushothoman et al. (2003) in the Hubli-Dharwad region in South India, the solution of a sewage treatment plant had to be dropped as it was not clear who –the urban or the rural government- would pay for it. Similarly, in research in periurban Gurgaon and Faridabad in the North-West Indian state of Haryana, the interaction between the village Panchayats – the unit of village level governance and the urban municipalities and planning authorities was found to be conspicuous by its absence (Narain and Nischal 2007; Narain 2009a). HUDA, the Haryana Urban Development Authority, defines its mandate narrowly in terms of developing urban Haryana. However, it has thus far evolved no mechanism for dealing with the rural consequences of this activity, apart from financial compensation of villagers whose lands are acquired.

Tacoli (2002) notes that improving synergies between local governments, NGOs, local civil society and the private sector can play an important role in supporting the positive aspects of rural-urban interactions while reducing their negative impacts. In particular, local governments can play an important role in supporting positive rural-urban linkages and while local decision-making, supported by adequate resources, can facilitate this, wider issues such as land tenure systems, institutional structures of markets and broader national development strategies are likely to affect local initiative (Tacoli, 2003).

In the Indian context, an important thrust in the report of the Rural Urban Relationship Committee (1966), was to explore inter-institutional problems to deal with rural-urban interactive growth; essentially the committee recommended urban development in the twilight zone of rural urban interaction. The 74th Amendment to the Constitution of India provides for the creation of District Planning Committees and Municipal Planning Committees for effective integration of rural and urban planning and spatial and economic development for the entire district (Brook and Purushothoman, 2003).⁹ There is a need for creating such organizations on a larger scale to integrate and address the concerns of the periurban interface.

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⁹ In the study of the Hubli-Dharwad Area, conducted by Brook and Purushothoman et al., (2003), the Hubli-Dharwad Urban development Authority was found to focus purely on physical planning rather than taking a broader holistic approach.

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