LAND OUTFLOWS FROM AGRICULTURE AND OCCUPATIONAL DIVERSIFICATION IN PERI URBAN AREAS OF LARGE METROPOLISES

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CERTIFICATE

I, PALLABI GUHA, certify and hereby declare that the dissertation entitled 'LAND OUTFLOWS FROM AGRICULTURE AND OCCUPATIONAL DIVERSIFICATION IN PERI URBAN AREAS OF LARGE METROPOLISES', for the degree of Master of Philosophy, is my bonafide work and may be placed before the examiners for evaluation.

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It is hereby recommended that the dissertation may be placed before the examiners for evaluation.

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CHAPTER 1

INTRODUCTION

Urbanisation in India had grown at accelerated rates and consequently cities are spilling over their boundaries into nearby rural villages. Large metropolises have spread out on the surrounding fringe areas, often termed as *peri-urban* regions. The term itself denotes at the same time, a place, a concept and process (Iquinta 2000 and Webster 2002). It is aplacein terms of rural fringes surrounding cities where rural & urban features coexist; as a concept it refers to an interface of rural-urban activities & institutions and in terms of process, it is the two-way flow of goods and services and a transitional stage between rural and urban. The growth of these regions are marked by unequal development in socio- economic infrastructure & haphazard change of land use from agriculture to non-agricultural use (e.g. industries, housing and transport network (Narain 2007).ks etc). These areas grow at the expense of forests, villages, water bodies and agricultural land. Often this expansion is along the roads in an asymmetrical pattern. The forces of globalisation create a heterogeneous mosaic with rural, agrarian and urban characteristics. Therefore, land use pattern is mixed. Diverse processes are in operation in creating polarised binaries where urban expansion takes place at the expense of the rural areas (Webster 2002 and Adell 1999).

The peripheries of these cities have experienced an increased demand for land due to the shift of industries & people preferring to live outside the core city. Government policies such as Rajiv Awas Yojna, JNNURM, for slum removal and rehabilitation and New Industrial Policy 1991 for relocation of industries aimed at decongestion of the urban cores have been the major driving force behind the peri-urbanization processes. Peri-urban areas also provide shelter to the migrant population who come from rural areas in search of employment. These areas are often unplanned and lack infrastructural facilities to support such high rate of population growth. This results in socio-spatial transformation and degenerative peri-urbanisation (Kundu 2003). In the case of large metropolitan cities, it is degenerative while in the case of upcoming new cities it is at the private initiative.

The dynamics of peri-urbanization in India has been unique as it has transformed the socio-economic structures in these areas. The processes transforming these regions have taken place in two key stages. In the first stage, rural areas have shown urban features with

occupational change and diversification as an impact of former. Secondly, the growth of urban land use has expanded into the rural areas for industries and residential purposes. The agricultural land had been acquired by the government and often given to MNCs which have set up their manufacturing units in these areas. Land speculation for real estate has resulted in a decline in agriculture around some cities & changing over to manufacturing or service based activities resulting in the marked impact in occupational structure & diversification. Proximity to metropolitan cities leads to diversification towards higher valued economic activities.

The interactions and linkages in the peri-urban have an impact on the livelihood as they tend to bridge the gap between the urban and peri- urban areas. Rural-urban continuum or peri-urban areas are marked by the two-way flow of goods. It provides the urban areas with the agricultural produce to meet the food requirements and rural area depends on it for infrastructure and services such as health, education etc. Proximity to urban areas provides a market for goods.

Peri-urban areas today have seen a sharp rise in land prices as a consequence of land use change. Mostly due to government policies favouring the industries to be located away from city core and lack of space for them to grow. Even real estate is eying the area residential purposes. In the midst of all this land for agriculture is getting more scarce.

Globalisation today has also played an important role in the development and change of these areas. It has changed the consumption patterns and cultural values. The tendency to move out in search of employment to cities and casualization of work has been notable among its well-known effects. Social polarisation has been found where the rich benefit and poor struggle to meet their needs.

Metropolitan cities of Kolkata, Mumbai and Chennai, in particular, are densely populated and faced acute problems in expansion and peri-urbanisation faces a challenge there due to geographical limitation. Since these cities are unable to grow there is maximum utilisation of space and resources at its peripheries. Policies and proper planning are required to make optimal utilisation of space and better management of resources.

The dynamics of peri-urbanization is characterised by a number of processes. The entire process can be primarily divided into the two-way process. In the first stage, the effects of urbanisation are felt in the fringe areas, in a way where agricultural land is encroached upon.

The land is taken up for non-agricultural uses such as industrial complexes, factories, housing estates, etc. Under the neo-liberal regime, the government had used its authority and law over the farmers to make way for itself. It had used state mechanism to acquire the land cheaper than market price from the farmers and distributed them among the rich industrialists. Although promises of a job are made at the time of acquisition but it is hardly kept.

Gradually it is noticed the farmers who previously worked in the agricultural fields now resort to other non-farm activities or take up jobs in cities as means for the survival of economically backwards households. Its patterns are much influenced by the age, sex, skills acquired and lack of social exclusion from network facilities. Therefore, there is the change in occupation as well as diversification which continues in cyclical form.

a) STATEMENT OF THE PROBLEM

Today peri-urban areas are coming apart at seams, both due to pressure from nearby urban centres as well as the rural interface. High demand for land for non-agricultural uses has resulted in the haphazard change in land use. This had left the major portion of the population depended on agriculture-related livelihoods underemployed or unemployed. In order to survive the induced transformation, the people had to diversify their activities to earn a living. Often they are victims of distress diversification, who are incapable of investing in high production cost to obtain better yield or get low wages or lack access to resources and assets. Sometimes as a survival strategy they tend to diversify towards high-value crops for higher returns. There is also demand diversification owing to technological innovation, higher wages and market development. Different cities respond differently to such pressures.

b) LITERATURE REVIEW

URBANISATION IN RECENT TIMES

In recent decades, Asian countries have witnessed accelerated growth in or rural and urban areas particularly since the 1970s (Kundu 2009). Urban population in India increased from 27.81% in 2001 to 31.16% in 2011. But it doesn't give the correct representation of the urban scenario. It has been seen that population growth in urban cores has declined. Urban shadow was found to be in the peripheries of the cities. These areas share the some characteristics of

the urban areas such as and prices, basic amenities, ease of transport etc (Sharma and Chandrashekar 2014).

Urban areas have expanded as large metropolitan centres according to 2001 census have continued their lateral spread. It is evident from the four major metropolitan cities that growth in the city cores has declined while it has increased in their outgrowths (Shaw 2005). In 2001-2011 urban growth is mostly attributed to migration. Two factors were responsible for the decline of population growth in the city cores and its rapid expansion in the peripheries. First being large-scale out-migration from the cities and secondly being the reduction of in-migrants. Cities are often not economically viable and welcoming new migrants, therefore, it is common for them to settle in the urban fringes (Sharma and Chandrashekar 2014).

The definition of urban by the Census has not changed since 50 years. Internationally urbanisation is defined by agglomeration index which takes into account population density of 150 square km, a minimum size of an urban centre being 50,000 people, and a commuting distance of 60 minutes. By that definition, India is 52% urbanised. Redrawing the boundaries of urban centres further complicated the situation. Between 2001 and 2011 census 2774 urban centres were added (Vishwanathan 2013).

Urbanisation is a natural outcome of the migration. Several attempts were made to limit migration, but in fact, it had negatively affected the poor or the marginalised section. Several such examples could be seen in the case of Dar-es-salam, Jakarta, China etc. Three important things were found to impact the population there is free market, production and degree of government intervention (Tacoli 1998). Small towns were found to develop around large metropolises possibly due to clustering of industrial activities and growth of infrastructure. This is the much more feasible arrangement as it is difficult to provide the same in the village. According to Rendinellis's model external forces such as MNCs Government, create urban biases (Tacoli 1998). The growth of small towns at the peripheries is essential as they lay a link between rural hinterland with the urban centres providing a market and economic opportunities.

Small towns depend on rural counterparts for production and consumption of their urban economies. Large centres attract industries usually located in peri-urban for competitive labour and flexible mode of production. Proximity to urban markets increases employment opportunities. Nature of the area determines an employment e.g leisure industry creates employment for service providers (Tacoli 1999).

Rapid urban growth in the population often exceeds the economic growth and production. Urbanisation is challenged population growth and occupational diversification. Spatial expansion over rural hinterland is the outcome. Living conditions here is poor and local bodies governing are not capable of providing basic services to the whole area (Dahiya 2003). Urban population grows by natural increase, encroaching upon the rural land, for expanding its settlement and boundaries. Urbanisation has the strong association with land use and economic growth. It can be well seen in the fringes of Kolkata and Chennai (Satterwhite et.al 2010). In developing countries urbanisation is due to migration in search of better livelihood and sustenance. Accumulation and generation of wealth are closely related to cities as they tend to accumulate it. Five largest economies of the world have 44% of the urban population residing in them. Urbanisation in Chennai is driven by the industrialization of the peripheries and diversification of the workforce. About 32 peri-urban centres were identified as towns and classified as peripheral towns (Dhiaya, 2003).

Urban growth was observed to decline since 1991. The emergence of New Towns, a merging of owns and jurisdiction changes were the responsible factors. Growth and agglomeration of towns have become sluggish. The population is concentrated in six most developed states such as Maharashtra, Gujarat, Tamil Nadu, Kerala, Punjab and West Bengal (Kundu 2003). The Urban scenario is dual in character there is the development of industries in cities as well as in small backwards towns mostly due to government interventions in development. In an attempt to accommodate the increasing population, local governing bodies have relaxed laws to increase Floor Space Index and thereby attracting investors in real estate. Eviction and rehabilitation of slum dwellers to the peripheries have resulted in ‘degenerated peri-urbanisation'. The increase in FSI also increased land values. Privatisation of public services has raised the affordability (Kundu 2003).

Economic reforms of 1991 opened up the economy to international investment which changed the urban scenario drastically. In 1991 there were 3168 cities in 2001 it became 4636 cities. Tamil Nadu is the most urbanised state, 70% of the population lives in urban centres with three metropolitan cities Chennai, Madurai and Coimbatore (Gnanou 2010).

URBAN SPRAWL AND PERI URBANISATION AS AN OUTCOME OF GLOBALISATION

Peri-urban is used to denote a place, space and concept. These areas have distinct social and institutional characteristics are heterogeneous and are in constant transition (Narain and Nishchal). The city and countryside together form a part of a continuum, which is a unique region of mixed and use. It gradually encroaches upon the rural areas forming the peri-urban interface. Urban fringe was first defined by Smith in 1934 in his study of Louisana. His definition was based on non-rural and no farm employment in the interstitial area between the urban area and rural farms (Sarkar and Bandhopadhaya 2013). Several scholars have interpreted it as a place where agricultural land use starts and urban land use extend. These areas are known to practice horticulture, aquaculture dairy farming etc to fulfil the needs of the city. Daily commutation to the city is possible and interaction takes place at global, national and local level (Ramachandran 1989). The process of urbanisation in developing countries are marked by dichotomies such as rural and urban, traditional and modern and formal and informal (Adell 1999).

Development of peri-urban can be explained in 5 stages (Adell 1999):

1. Rural stage
2. Land use changes from agriculture to manufacturing.
3. Occupational structural change,
4. Urban land uses growth and
5. Urban villages.

It is a dynamic area but lack of planning make it “degenerated peripheries” (Kundu 2003).

MacGee gives peri-urban the concept of ‘desakota', where first rural activities start to decline, and the population starts to increase and there is low economic growth. This paradigm applies to rural-urban convergence resulting from socio-economic labour changes in peri-urban. Globalisation entails deterritorialization (Adell 1999). The area is characterised by diversity in land use, strong rural-urban linkages and transitional in nature. A heterogeneous pattern of growth is observed as city encroaches upon farms and migrants create transitional social and economic space (Bowder 1995). Rich urban dwellers take advantage of land rent, the opportunity of land acquisition and speculation (Adell 1999).

The fringes are dynamic zones and spatially transitional in nature between fully urbanised and agriculture with mixed land use. It forms a zone of rapid economic and social change. Theories of development which explain its dynamics are Growth Pole Theory which explains it in terms of free market, trickles down effects and top-down approach to planning (Rakodi 2014).

Peri-urban is difficult to desegregate and delineate. Werherwein (1942) defines it as the city which extends beyond administrative boundaries. Mookerjee used two main principles town space and intensity of land use to define it. Rodeheaver puts it as the proportion of non-farm activities to the total non-farm activities, the density of non-farm families, land valuation and presence of natural boundaries. Blizzard based it on the extent of civil services. Other indicators such as land holding size, population density, employment, land use etc were also used to define and delineate the region. Recently scholars have used the distance from Central Business District to determine the area. The proportion of the rural population from Central Business District to 0-7 Km, 8-15 Km, 16-30 Km respectively was used by (Sharma and Chandrashekar 2014).

The concept of peri-urban poses difficulty in differentiating rural and urban. The distinction is based on livelihood whether its agriculture-based or manufacturing ones. Sectoral interactions make up the rural-urban linkages. Peri-urban is a widely used term such as urban fringe, edge cities, a post-urban landscape in developing countries where flows of people, labour, and information takes place (Adell 1999).

Tacoli identified three problems of defining the peri-urban they are firstly the set of demographic and economic criteria used to define what is rural or urban; secondly the difficult definition of urban boundaries in the extended metropolitan regions; and the confusing effect for urban-rural boundaries of the dependency of the cities on larger areas to assure their resources and to perform their ecological functions (Rees 1998).

Urbanisation process is heterogeneous and today finds its expression in the decentralisation of the economy due to globalisation. Food security emerges to be of primary concern as peri-urban in many ways solve the problem of food. Globalisation raises concerns in population, landscape change and food security (Lerner and Eakin 2011).Globalisation and Urbanisation bring in two preliminary challenges food production and access to basic amenities.

The rapid growth of urban centres does not support traditional divide between rural and urban (Simon 2004). Peri-urban Interface, in fact, is a melting pot of rural and urban activities (Brook and Davila 2000). Expansion causes surrounding areas to grow that rural areas become peri-urban and the peri-urban being absorbed in urban. Its nature is dynamic and of continuous change causing problems of livelihood and natural resource (Gregory 2005).

In recent times, peri-urban areas have emerged to be the fastest growing since it is relatively easy to set up manufacturing industries and new communities of migrant workers (Kundu 2009). Urban fringes develop due to pull from the core and also due to external forces such as real estate development, a global market which push people to the peripheries. Mostly poor are pushed away from the city core to the peripheries creating social polarisation (Tacoli 1998). Uneven economic processes of development in a nation state or geographical unit result in a restructuring of economic bases of cities (Sreekumar 1990).

Change in peri-urban is mostly due to urban development, continuum has dual relations in social and economic as well. Land use changes from urban sprawl create deagrianisation, in-migration of poor people, real estate development for rich, industrial relocation. Industrial relocation takes place by two-way process firstly by the proliferation of small industries and secondly by investment by large industries (Allen 1999). An uncontrolled urban spread is poorly planned and often viewed as "patchwork", land use with increased pressure on land, pollution and land degradation etc. This is mostly carried out through the development of special physical infrastructure such as airports, resorts, dams, power stations, drinking water and sewage treatment plants, landfills etc.

Male selective migration to peri-urban areas has affected sex composition of the population. Migration causes are economic. Land development and urbanisation take place in ‘leap frog 'pattern (Asif and Rehman 2013). Migration is also one of the diversification strategies (Adell 1999). Sometimes people migrate to take up jobs during the lean season since there is no work in the agricultural sector.

The outcome of peri-urbanisation is a result of the two-way process first being manufacturing driven zones characterised by high-tech zones and industrial parks in the form of SEZs. They are located mostly near highways and expressways and service towns for the skilled workers. Second is spill over peri-urban belts of unplanned growth of squatter settlements and slums of ‘new geography of poverty' (Webster 2002). Such a market is driven expansion process of drives the poor to the edge of the cities (Webster 2014). Amenity driven peri-urbanisation is

due to the improvement of fast modes of transport, middle class seeking villa type gated communities. Forces of globalisation and localization clash resulting in a hybridization process of peri-urbanisation mostly by exclusionary factors.

Spatial patterns follow a product cycle as new high-end production developed in cities as it is production gain economies of scale it is shifted to the periphery where production is at a lower cost (Vishwanathan 2013). The geography of job growth was different in south, stagnation in the north due to the poor performance of Mumbai and Delhi while Hyderabad and Bangalore and Chennai spread in logistics, wholesale, retail, trade and ICT.

Poverty in peri-urban (Rakodi 2014) is due to dependence, devaluation, urban influence and injustice. For example impacts on health are huge (Birdy and Lock 1990) as it receives a huge amount of wastes from urban areas. The areas are subject to both traditional as well as modern health hazards (Allen 1999).

Another feature of peri-urbanisation is the rise of satellite towns known as New Towns. Developments of new towns are promoted to ease urbanisation in large metropolitan centres. Municipalities due to lack of resources are forced to relax laws in attracting investors and Public Private Partnerships. New Towns develop to de-densify the city core and developed as major hubs of trade, business, industries, IT, education institutions and culture centres (Kundu, Cheng and Wang 2009).

Globalisation brings about cultural and consumption changes. It makes imported goods cheaper and local ones expensive precisely because technology is traditional. The Younger generation tends to move out seeking modern employment, which affects the occupational structure profoundly. Examples were found in south India and Tanzania. They defy the age old case based occupation system and move to cities for jobs. Peri-urban linkages cause a shortage of labour at the national level and curtailment of labour informal activities. Policies of the government aimed at strengthening marketing the agricultural produce always affects the poor negatively (Tacoli 2003).

An example of New Town in India is the one around Kolkata. This New Town is the largest state regulated township in India. Another one is developed totally with private investment is the Kolkata West International city near Haora aimed at revolutionising living, comfort and quality of life. These projects are initiated due to stagnation, congestion, of the core city in terms of socio-economic, demographic and severe housing shortage. Also, it is driven by

demand for a better institution, education and living standards. Growth if IT sector has facilitated the development of the town along with real estate demand (Kundu, Cheng and Wang 2009).

IMPINGEMENT OF GLOBALISATION ON LAND USE

Rapid expansion Rural Urban binary is often at the expense of forest, village common land, water bodies, and agricultural land etc. rate of increase at 30% in previous years is characterised by mixed land use pattern. Transformation at multiple levels takes place such as physical, morphological, social, demographic, cultural, economic, functional etc. Change of and use is mostly from agricultural to not- agricultural causing decrease in farmland. This kind of expansion is asymmetrical particularly along roads (Bhardwaj 2012).

Land use change in such haphazard manner has made the region more prone to pollution and vulnerable to hazards. Natural resource should be taken into consideration along with pollution in geo-social approach. Land use zoning should be used in hazard-prone areas to minimise damage during disasters. Careful planning is required for polluted areas, double-cropped areas, orchards etc. Development of industries needs to be taken with care (Bhardwaj 2012).

Agriculture intensification due land scarcity in order to increase production results in stagnating of output and shift towards high-value production. Intensification commercialization of agriculture, migration to non-farm employment is the strategies followed by diversification of livelihoods in order to sustain. Globalisation not only has its effects in land use pattern but also changes demand and production relations (Lambin et.al. 2012).

Land speculation in peri-urban areas is very significant for the cities as well as for agriculture and livelihood practices. There is a close link between the rural and urban population with regard to this (Tacoli 1998). Land markets are particularly volatile with strong linkages to outward market and modern means of transport (Adell 1999).

In India land use change changes every aspect of life. People who can afford to pay the commutation cost prefer to stay away from the congestion and pollution of the city core in the

peri-urban areas. The low-income group has to suffer the discrepancies of the former (Sarkar and Bandhopadhaya 2013).

Expansion of urbanisation has perpetuated loss of agricultural land. Urban sprawl has in particular raised the speculative value of land in peri-urban areas. People from metropolitan cities move out and settle in peri-urban areas as cost of living are cheaper than the metropolitan city for e.g. Delhi. Since Delhi is well connected by cheap and effective means of transport ribbon development has taken place along roads and industrial development has taken place along canals. HUDA here played an important role in land use planning under various sectors such as commerce, residence, recreation or industrial purpose (Goel 2011).

Industrialisation and urbanisation were preceptors of development. As per the models of Lewis and Nuske, marginal production from agriculture in developing countries diminished as a result transform of labour from agriculture to industry would not harm productivity. But the shift happened in short notice that the manufacturing industries couldn't grow at the rate that it could absorb the surplus labour. Hence, unemployment came up in urban areas and therefore the problem of over urbanisation (Tacoli 2003).

The absence of urban planning facilities haphazard land use planning. Land values or market change often by anticipation that selling them for non-agricultural use will give them higher speculative value. Regulations are smoothened by politicians (Satherwhite et.al 2010).

Urban centres grow at the expense of fertile agricultural land; historically they come up there because of fertile land. Cities have large ecological footprints for food, fuel and carbon sinks (Recs 1992). Local governments develop new urban spaces in the fringes of large urban centres in an attempt to globalise the local marked by high-rise development, shopping malls, recreation centres, high-tech business districts and state of art infrastructure. Stakeholders are mostly excluded from the benefits of development they exist either in cooperation or in conflict with the state (Kundu, Cheng and Wang 2009).

There are proposals to set up health city, knowledge city and a two-wheeler factory. The two new towns represent aggressive market-oriented reforms in housing. PPP was preferred due to the efficiency of the private and government control so that the benefits are accrued to all social groups but largely fail to do so. High-end industries and residential infrastructure are coordinated with the development of society and communities. It increases inequality and results in ‘splintering urbanisation' (Mauin 2001).

A real expansion of Noida in NCR has doubled in few years. Environmental concerns were not considered while developing the fringe areas, development should be on agriculturally consistent land. Growth in NCR is channelled towards settlement, land suitability; analysis for land use allocated should be taken into consideration along with pollution in geosocial approach (Bhardwaj 2012). Spatial transformation of peri-urban areas took place south of Chennai where land was taken for residence which sky-rocketed the land prices (The collaboration). It is argued that spatial transformation of urban agglomeration is essential for economic growth. Shortcomings of south Chennai include neglect of structural condition, exclusion of minorities and neglect of environmental issues (Homme and Bhole 2012).

In Kolkata land use has seen a drastic change with the coming up of satellite township at Rajarhat and polarisations blocks of North and South 24 Parganas about 7 km from the city. There was observed a decline in water bodies, agricultural land as inferred from satellite images since the land was taken up for settlement, roads and IT sector (Sardar and Hazra 2013).

Total stock of land and net sown area has declined in the fringe of urban areas in the last decade. The declines in these areas are higher than state and corresponds to growth in non agricultural land use (Mallick 2009).[1]

LAND ACQUISITION AND OCCUPATIONAL DIVERSIFICATION

The poles of growth have stagnated therefore its spread to the periphery. Peri-urban location of industries is due the political decision and planning to develop the underdeveloped regions fuelled by globalisation (Gnanou 2010). The government's prime objective has become Land acquisition in order to compete for investment, particularly in Foreign Direct Investment. Forced by the government for Land acquisition for private industries farmers have no option other than being evicted. The state determines the economic policies and is the main causative factor (Basu 2007).

Diversification is means of survival for marginal households to meet their needs when they are forced to abandon their traditional activities. Patterns are influenced by gender, age, skills

[1] Mallik C, (2008), "LAND AND WORK IN THE RURAL PERIPHERIES OF LARGE METROPOLITAN CITIES" Dissertation Submitted to Jawaharlal Nehru University in Partial Fulfillment of The Requirements for the award of the degree of MASTER OF PHILOSOPHY; CENTRE FOR THE STUDY OF REGIONAL DEVELOPMENT SCHOOL OF SOCIAL SCIENCES JAWA HARLAL NEHRU UNIVERSITY

acquired and lack of social exclusion from access to natural resources. Transfer of land and labour goes along with it (Tacoli 2003).

Technological innovations cause diversification of labour and poor ones are unable to acquire the skills necessary and therefore become unemployed. Globalisation has facilitated earning of rent from low wage countries. Rent extraction through global capital is alleviated by the immobility of labour (Basu 2007).

Agriculture although meets the demand for food but it is at the cost of an increase in Green House Gases. The determining factors of future demand are the decline in growth rate and ageing of the population (Satterwhite et.al 2010). Intensification of farming is a feature to meet high demands from urban areas. But land use security is essential for that. Also access to urban markets depends on physical infrastructure, information about market and relations between traders and producers. In Tamil Nadu access to information has improved the farmers' conditions. The shift towards high value may increase the cost of production but returns are expected to be high (Tacoli 2003).

Agriculture to be practised sustainably in limited land requires high input cost with low output price. Globalisation increased the gap further. The decrease in the size of holdings along with frequent droughts and erosion were also contributing factors. It affected the traditional agriculture. Therefore, farmers took to diversification; towards livestock rearing etc. urbanisation increases the demand for meat and milk products thus creates a new market. African countries were successful in it as the situation was further accelerated by proximity to European market which generated a huge demand. The whole situation created employment opportunities for the region (Neka and Ali 2012).

As government subsidies are in costly inputs it could be afforded by rich farmers only, who use it increase the production. Although it has increased production, it has increased the inequality between farmers (Tacoli 1998).

Urban agriculture for commercial purposes often produces pollution by use of fertilisers, pesticides etc which also affects the ground water. The increase in non-farm activities creates new employment opportunities and spatial dimensions for further growth. Such processes of occupational change in third world countries involve four processes such as a) Occupational adjustment, b) Income increase, c) social identity and d) spatial relocation (Tacoli 1998).

Diversification occurs in two types such as an increase in a number of workers or increase in participation of each member in more than one economic activity. Other determining variables include the proportion of household workers in non-farm employment, age education level, land and asset ownership, wage factors, work participation rate etc. (Unni 1996).

Economic diversification in terms of increase in non-farm employment is broken into three categories 1) regular, 2) casual and 3) self. Education and social status determine consumption and income (Lanjouw 2006). The main processes through which structural transformation takes place are the occupational structure and associated employment. Even technological and institutional changes are reflected in diversification (Saleth 1997).

Diversification can be classified into two types a) demand to pull involving technological innovation, market development and infrastructure. b) Distress diversification geographical limitations, isolation, low-quality information and low human capital resources. Prerequisites of occupational diversification are human capital, age, skills and education. Proximity to the market also plays a positive role (Saleth 1997). Inadequate land holding makes people shift from one job to another as an effect of distress diversification (Chakraborty 2003).

Economic transition consequently changes the social transition, created economic mobility. Social stratification and formation of class structure are inevitable. Occupational pattern also helps in studying rural transformation. Focus groups based on agriculture were used to study income and employment and income distribution across groups. Strong correlation between household income and non-farm employment was observed and its response to technology. It was also observed that rural non-farm employment can arise from sectors such as tourism and export-oriented mechanism (Saleth 1997). Access to urban centres determines the growth of non-farm activities and diversification as a livelihood strategy (Fafchampo and Shilpi 2003). Migration of labour to peri urban reduces unemployment rates and rural-urban differentiation in wages (Sharma and Chandrashekar 2014).

Agricultural diversification favours high-value commodities and is adopted as a strategy to survive in the competitive market. It is capable of increasing farm income , create jobs and reduces poverty. Evidence of such is found in the micro level study (von Braun 1995, Pingali, Rosegrunt 1991, and Chand 1996). Weak linkages between agriculture and non-agriculture give unequal distribution and different size of holding, cropping pattern. Relations with market and employment is directly proportional (Vyas and Mathai).

Rural poor are often induced into transformation. Low wage rates and lack of access to assets further prompt the situation. Trickle down effects from the benefits of large farmers is insufficient for the poor. Therefore, additional income from diversification has enormous benefits for them (Saleth 1997).

Land acquisition from farmers was mainly done to accommodate industries. It converted agricultural land for industries and residential purposes. Major drawback lies in the fact that land was acquired at very low prices compared to the market. Improved transport enabled commutation to cities for work. Many townships were also developed to house the growing urban population (Gnanou 2010). This has particularly been the case of Chennai.

Occupational Diversification is a tool to overcome poverty in rural areas of low-income and the risk or seasonal unemployment in agriculture. High production comes at high cost can strengthen livelihoods instead of degrading them. It is, in fact, an adaptation process whereby households add new activities and stop practising the older ones ((Lanjouw 2006). Poor people are less capable of taking advantage of Peri-Urban Interface compared to the rich; division of land in parcels has created more pressure on land with diminished returns (Gregory 2005).

Land acquisitions for industries dispossess small farmers who do not get the benefits of compensation but also lose their livelihoods. Involuntary displacement due to these activities causes major problems for these people. Government hardly pays attention towards such aspects of land acquisition (Guha 2004).

People lose the income of lifetime due to land use, particularly negative impact on the population. As primary occupation such as agricultural and fishing declined in many villages people resorted to other livelihood measures as compensation do not last a lifetime. Women then became earning members in order to support their families by selling vegetables, mills, and livestock or as domestic help (Acharya 2003).

Occupational diversification brings in high paid jobs which often destroys the older jobs. Farmers aren't compensated for the loss of land or livelihood from the land. Land owners get the compensation but landless daily wage labour is deprived of compensation as well as the livelihood (Sarkar and Bandhopadhaya 2013). Wages are found to decline with distance from the city; therefore, individuals in the peri-urban tend to take advantage of the wage gradient and low house rent (Kundu, Pradhan and Subramaiam 2002). There still is a lack of

constructive theory to explain the relationships between community migration and labour market. The industrial policy caused dispersion and diversification of industries to the rural areas (Chakraborty 2003 and Chakraborty and Lall 2007). An example is from Thane, Raigad in peri-urban Mumbai, due to investment impetus and the creation of non-farm jobs.

Peri-urban areas often support the urban by providing a fresh supply of fruits, vegetables and dairy products. Labour is often cheap as high demand keeps the wages low (Khan et.al). In the case of Aligarh, it is observed that small farmers lost land so they turned to other livelihoods such as dairy farming. Demand and speculative value of land also provide a new source of livelihood. Small farmers and landless labourers diversify more than others and have more than one income resource. This is useful especially in times when they face risks (Deb and Rao 2002).

Massive lifestyle changes are observed diversification and migration. Changes are observed in the consumption of food, articles etc. network of information about job opportunities and break up of caste based occupational structure further accelerates the process. Backwards castes have the most diversified activities but remain largely excluded due to lack of access to resources. They find it easy to migrate because of social reasons. Not all are able to climb up the social ladder. Diversification does not always result in upliftment often they are pushed into further poverty or people are forced to sell their lands due to indebtedness. Reduction in real income from agriculture causes diversification but not always is it associated with prosperity (Deb and Rao 2002).

Traditional activities from a security during the transition as they help people mitigate in times of crisis when they become marginalised. Farming and trading are the most important occupations where people are not engaged in traditional farming. The presence of casual unskilled labour is common in peri-urban agriculture (Gregory 2005). Labour is mostly seasonal, casual or daily with low wages. The increase in non-farm employment could be seen due to regularity and higher wages.

Expansion of cities is irreversible and changes the economic base of the urban fringe. Diversification has taken in the form of vegetable cultivation, dairy farming to meet the needs of upper-class residential estates. The land is converted to non-agricultural uses. Rural industries with diversified production also provide livelihood opportunities to the poor and enable sustainable development through resource utilisation. Example being cottage based

Khadi industries. Planning is needed to maintain equilibrium, employment and provide food security (Asif and Rehman 2013).

Kolkata peri urban areas specialise in fish farming and vegetable farming in the form of market gardening and horticulture. It generates employment and Aquaculture provided the poor with income at low investment and effectively managed the waste. In eastern fringes of Kolkata, wastewater is utilised to grow fish to meet the huge needs of urban centres. It is a feature in many Asian, African and Latin American countries (Gupta and Gangopadhyay, 2006).

Around Delhi in Gurgaon agricultural land is taken up for factories and brick kilns perpetuating opportunities of employment for the locals. Proximity to Delhi ensures the market. But loss was huge in terms of water bodies and common grazing land. Factories provided some employment in light of diminishing livelihood opportunities (Narain and Nischal).

Policies of urbanisation are designed to promote SEZs particularly in close proximity to the cities. Cities attract investment in spite of not being developed in terms of infrastructure but by growing income and demand for commercial real estate. State plays a major role in decision making. Townships or real estate developed as dynamic sectors due to demand from middle and upper-income groups. State involved in industrial infrastructure and its development, therefore, made land acquisition for roads and infrastructure inevitable (Kennedy 2009).

SEZ particularly have been epicentres of wars for land acquisition. The state serves as a mechanism of transfer of land to private MNCs. Accumulation by dispossession (Harvey 2003) occurs in the case of land as it is being taken away from poor farmers by the capitalists to develop information technology industries and real estates (Levien 2011). Such was the case of Nandigram in West Bengal and Gurgaon in Delhi where land was acquired for Reliance industries. These industries gain enormously by locating in peri-urban areas by taking advantage of the surplus labour. The growth of Gurgaon particularly has been due to proximity to Delhi. Land acquisition has taken place here on a massive scale for residential areas, shopping malls roads etc (Narain).

Haryana, in particular, has seen large scale industrialisation coming up, state government, therefore, has set up land banks. The state has received numerous proposals to set up SEZs

but had to halt their progress due to protests from farmers. Here state acquired land for private developers and investors. Guidelines for a land acquisition made provisions for payment and free rehabilitation of population and providing employment opportunities to the people. Firms were given full control to run operations without any restrictions. Industrial relations were quite disturbed with respect to labour. Compensation was low as land valuation was not carried out regularly. The state was unique in having a special policy of paying compensation to the landowners. Investors complained that state government was not facilitating land acquisition and charges were high. Government take into account the politics of grass root level here (Kennedy 2009).

In West Bengal, Singur Tata Motors planned to set up a plant in the land that was suitable for the multi crop. The here farmers land was a part of their household, culture and livelihood. The land was not treated as a commodity, by land acquisition they lost their opportunity to work. The state moved with its cultural transformation but eventually had to withdraw due to government protests (Basu 2007).

However whether diversification is always a coping strategy is debatable. The question remains how the main sources of livelihood have changed over time, how households especially the poor have diversified and why have they diversified their income? In what ways have the households responded in terms of their coping mechanisms? How far has diversification impacted on livelihood security and how far has it been effective in reducing inequality? (Deb Rao 2002)

MEASURES OF OCCUPATIONAL DIVERSIFICATION

Diversification is a rule and is often targeted towards industries which need labour resources. Human expectations can be viewed as an important class of resources as it comprises of a wide group of value added activities (Farjoun 1999).

International geographic diversification stabilises profit scale and performance through vertical operation in agglomerations. Skills are used as a strategy and differ widely between countries particularly developing ones. Many measures were used by scholars to measure occupational diversification Buhner used Herfindahl Index, Kim used Entropy Index and Grant had used three aggregate ratios for it (Vachani 1991). Entropy measure was most preferred as it allowed decomposition of overall diversification into additive related and

unrelated components (Jacquemin and Berry 1979). Kim et al. (1989) used a "global diversification" measure that decomposes into three additive components: unrelated (product) diversification, global market diversification, and globally related product diversification. He acknowledges the limitation of this measure in that it does not distinguish between related and unrelated geographic diversification. Under the given importance of measuring both related and unrelated international geographic diversification a new measure is proposed namely "Total Global Diversification".

Occupation diversification was measured and evaluated using NSSO data on agricultural labour, non-farm wage labour, cultivators and miscellaneous workers. Linear probability model was used for measuring diversification along with Duncan Index of Dissimilarity. No major change was seen in the households till the 1990s when the share of GDP from the agriculture was shrinking. Diversification created non-agricultural opportunities and further expanded non-farm activities. Another measure popular is the population work participation rates at the aggregate and household level (Skoufias and Bandhopadhay 2013).

Globalisation is a process of cross-border growth of raw materials, goods and information. Faster growing cities have attracted investment, migration and remittance flows. Two underlying factors are decentralisation of urban development and growth of advanced information technology (Satherwhite 2010). Globalisation and economic reforms have further increased regional inequality. Open trade policy has increased unemployment in the agricultural sector (Kundu 2009).

The degree of diversification varies across households and the level increases with age, income, wealth and education. It also indicates sophistication. Hachman Index was used and it gave a measure of the inverse of the weight of the sum of Location Quotients. Lower values meant less diversification and higher values, more diversification. Employment distribution was subject to the region (Moore 2001).

Livelihood diversification could also be measured in terms of land availability, insecurity at work, low returns from agriculture and low wages and Shannon-Weiner Index is an effective measure to estimate it. Women were more vulnerable due to their status as casual agricultural labour (Gregory 2005).

Measures of Occupational diversification takes into account demographic components such as density, sex ratio and literacy, economic components such as the ratio of agriculture to

non-agricultural workers and correlates with land use components such as Net Sown Area, Cultivable waste, Fallow, Barren, Pastures, Orchards etc. Villages in peri-urban were mostly chosen by distance decay composition along transport routes around fringe areas (Asif and Rahman 2013).

Percentage of households with a number of income sources, caste wise and with the type of land ownership gives an estimate of occupational diversification. The proportion of income derived from the farm and non-farm activities along with a change of percentages of workers in primary and secondary level give an estimate of diversification (Deb and Rao 2002).

IMPACT OF GLOBALISATION ON LIVELIHOODS

Livelihood is built upon human, financial, natural, social and physical capital. Adequate access to amenities and proper markets can generate sustainable livelihood and enhance sustenance of households while the opposite can happen due to lack of it. Access to land is essential for livelihood diversification and food security. Peri-urban areas are ‘grey zones' so state management is required manage resources or institutions (Lerner and Eakin 2011). This space has potential to solve food security and policies should be directed towards it.

Processes driving livelihood changes are urbanisation, land use, speculative land value, natural resource deterioration, the presence of cash based economy, declining soil fertility, consumer based trade, ease of transport and access to the market for perishable goods (Gregory 2005).

About 85% of the people depend on agriculture as livelihood, food security is essential. To support the urban needs peri-urban agriculture is important as it provides food security, income and employment for the poor. Stakeholders associated with it have unequal access to policy making (Marshall and Lintelo). Participation and action planning project should be aimed at enhancing livelihoods for the poor and management of Natural resource base. Landless agricultural labourer and women need to look for alternative livelihoods since they do not have assets such as land or livestock. Formation of community groups ‘Sanghas' was necessary among them for capacity building. Urban opportunities in form of large markets overcame one of the hindrances faced by ‘Sanghas', which is to market their produce. Collaboration of rural-urban hierarchy was needed (Halkatti et.al).

Rising demand from rapid urbanisation would increase intensive cultivation of land. Lifestyle changes such as the move towards fast food due to the shortage of time will also have an impact. Proximity to urban centres would vary as they will provide the market for goods e.g food chains. This mechanism would be favouring the large farmers and change the system of distribution; it will cause people working in the non-farm sector to change. High demand would prompt the farmers to shift towards high-value crops which increase the scope for peri-urban agriculture (Satterwhite et.al 2010). Agriculture complimented by new job opportunities is a source of upliftment for low social groups (Homme and Bhole 2012). Food production is market oriented and based on household needs but it also provides an additional income. Small producers key to the diversification of agriculture (Lerner and Eakin 2011).

Lack of credit is a hindrance to livelihood. Loss of land is not compensated with an alternative livelihood. People land and politics have little role in decision making (Gregory 2005). Constraints to human capital include lack of skills and knowledge which increases vulnerability.

Peri-urban regions are impacted by the urban and rural pattern of production consumption, mobility and livelihood transformation both inside and outside. The two foremost challenges are a vulnerable condition of the poor related to poor housing and access to basic amenities and sustainability of resources and balancing these effects on the environment and minimising it while drawing maximum benefit from resources (Adell 1999).

Agriculture in contrast to services in case of employment has low production jobs on low wages. MNCs play a major role in it by attracting labour at a comparatively higher wage. Industries coming up in small towns use this cheap labour. Thus, poor are absorbed in the periphery. Low education prevents them from good jobs. The problem of unemployment and job security remains (Sardar and Hazra 2013). Manufacturing driven peri-urban become more economically and physically diversified and complex (Webster 2014). The question remains whether the state can change the aforesaid pattern of urbanisation (Kundu 1990).

Livelihoods are complex and are therefore widespread in the way individuals or households construct them. Diversification in occupation is not limited to some social groups but within groups also (Tacoli 1999).

Globalisation has also caused polarisation and segmentation. Master plan of cities changed the relation with peri-urban. Real estate development and global markets are pushing the poor

at the fringes of the cities, causing the structure of the cities to change also (Aurobindoo). Social polarizations is found where rich benefit while the poor struggle to meet their needs. Rural residents who are wealthy can avail the urban services and remittances from urban relatives while urban residents may invest in high-value crop cultivation for profits thus strengthening interaction (Tacoli 2003).

In post liberalisation period there was negative growth in workers in agriculture in peri urban districts, with rise in workers in non agricultural sector due to shrinkage of available natural resources. At the state level changes are less drastic. The economic reforms are felt more in the peri urban districts in comparison to the cities (Mallik 2009 and 2014).

Development models have not been successful in explaining the development and growth of peri-urban areas. Various models such as Myrdal's trickle down approach were taken into consideration to explain the relation between core and periphery (Kundu 2002).

RURAL-URBAN LINKAGES

The rural-urban definition is often oversimplified in reality. Interactions and linkages impact livelihood as they tend to bridge the gap in the peri-urban areas. Rural depend on urban areas for infrastructure and services such as education and health. Low returns from farming forces farmers to shift to high-value crops and non-farm activities. Nearness of urban areas provides the market for such goods. Urban expansion causes and uses change from agriculture to residential and industrial along with changes in livelihood (Tacoli 2003). Rural-urban continuum is a two-way flow of goods agricultural produce from rural and manufacturing goods to cities and also migration of population. These are called forward and backwards linkages. Rural-urban dichotomy is difficult to explain.

Neo-liberal economic factors further play a role in increasing the gap between rural and urban as well as between small and big farmers (Tacoli 1998). Establishment of linkages to markets both national and international are essential. A cycle where export-related production created demand for goods in rural areas thus creating non-farm jobs and absorbing surplus labour.

Linkages are often used to analyse rural diversification process. Increased demand from large commercial farmers puts the linkages of consumption before the linkages of production (Basant 1994).

Technology in agriculture plays an important role in production increase by fertilisers etc. it favours well to do farmers while the poor farmer suffers and therefore move to other areas. Non-farm activities are associated with social background and power relations. Forward linkages promote the establishment of industries in rural areas and generate employment. However it is dependent on agriculture and devaluing would them a lot. Linkages are strong in peri-urban areas where living is cheap with good transport (Tacoli 1998).

Areas of intense rural-urban linkages have an outflow of labour and natural resources in the urban areas and inflow of migrants and wastes in peri-urban (Gregory 2005). These areas respond to external pressure and opportunities (Scoones 1998).

Agencies involved in Tamil Nadu for peri-urban economic development was TIDCO and SIDC along with the development of EPZ and SEZ. Information industry benefitted most from technology along with manufacturing industries (Gnanou 2010).

ENVIRONMENTAL PROBLEMS AND GOVERNANCE ISSUES

Peri-urban ecosystems form dynamic semi-natural ecosystem, where natural resources interact and land uses are not fixed (Dutta). Management of natural resources in peri-urban also come under scrutiny as access to it safeguards the needs of vulnerable groups (Tacoli 2003). Peri-urban areas suffer from *deprivation* in various levels of education, health and even income. Spatial distributions of these amenities do not decline smoothly with distance but are spread unevenly. Pollution levels are high because of the absence of regulations and availability of cheap labour and land (Kundu 2009). Expansion of urban areas affects peri-urban areas by altering their natural resource base, converting land use, changing labour relations, patterns, increasing pollution and reducing natural resource based livelihood. Poor are faced with the challenge to survive the transition.

Cities view peri-urban areas in isolation although they provide food for sustenance and avail environmental services such as dumping of waste, serving as a carbon sink and provide cheap labour. In third world rural and urban are intertwined (Davila 2002).

Government policies push the poor out of the city even at the cost of providing low-cost housing at the peripheries as a part of reorganising and segmentation of city (Kundu 2009). Privatisation of basic services decreases the affordability thus halting migration to cities.

Reuse of wastes in peri-urban agriculture manages the waste from urban areas in a beneficial way. Pressure on land drives internal competition for land and drives land use change. Lack of access to land negatively affects the livelihoods of the poor, compensation received is not adequate. Decline in soil fertility and natural resources and increase in pollution from waste disposal are the major environmental problems (Gregory 2005).

Industrial policies of decentralisation have relocated factories in the peri-urban. The presence of these factories has not only reduced livelihood opportunities but also the quality of life. An example from peri-urban Delhi shows chemical discharges from factories affect ground water and has converted vacant land to dumping grounds for cities as regulations are less stricter here (Narain and Nishchal 2007).

Peri-urban growth at such an unprecedented rate is environmentally unsustainable and directed towards the weakest regions. Developing countries sell their carrying capacity of land to the richer nations in the form of food production (Adell 1999).

Policies are aimed at strengthening the market infrastructure for agriculture produce always affected negatively by it. Transformation of the economy takes time and takes the toll on natural resources base. Locally rural-urban interactions are based on factors such as population, topography, farming system, institutions and infrastructure. Local government role is prominent here and is useful in regulating backwards and forward linkages. Support in positive outcome cam help in better integration and planning (Tacoli 2003).

Neoliberal policies of the government are bipolar in nature, with the coexistence of liberalism as well as protectionism. Policies are designed so that Foreign Direct Investment moves to cities. Neoclassical regional development models seek equilibrium and convergence and are driven by export and agglomeration (Chakraborty 2000).

It is a challenge for the government to design and carry out policies that generate livelihoods. The increase in backwards and forward linkages may be a solution for value added convergence production (Deb and Rao 2002).

Institutions must be built to regulate at the individual level rather than through representatives for the maximum benefit of people. Institutions should also be built to manage land use, livelihoods and associated problems. Governance through Institutions is estimated to avoid conflicts among stakeholders through knowledge and skills (Mattingly 1999).

Restructuring of the economy has resulted in a reduction of public expenditures on infrastructure. Income growth has been uneven and there has been the growth of casual and unskilled employment. Sectors which were unable to secure credit for themselves stagnated in this exclusionary nature of consumption (Kundu 2003). Analysis of the processes and decision making gives weight to clusters and urban suitability value of land (Dutta 2012).

Access to information as well as political decision-making body tends to respond better in urban areas as compared to rural areas. Better planning is needed for ecological balance for the future. Cities occupy 2% of the world's landscape yet consume the majority of the natural resources and generate 70% of the wastes. Epistemological as well as political and professional barriers between rural and urban tend to misuse of resources or inequality and exclusionary forms of development (Davila 2002).

Local government is important in decision making often coming in conflict with higher governing bodies particularly in the case of delivering basic services which is much affected (Tacoli 2003). Peri-urban areas lack institutional cover and administrative capacity to provide basic amenities and infrastructure. Poor public health and roads without proper drainage are serious impediments to development. Water supplies in most cases are met with ground water and sewage management is not enough for a large population. Improper waste management leads to degeneration of environment and pollution (Dhaiya 2003).

Conflicts in arise Peri-urban areas when land is taken up for residential and commercial zones replacing agricultural areas with green belts (Dupont 2007). An example of such conflict, mismanagement, social exclusion and segmentation could be found in peri-urban Chennai (Kundu and Schenk 2002).

DEFICIENCY IN LITERATURE:

Literature on Peri-Urban has been unable to give it a much need proper definition making delineation of the area challenging. Although vast amount of literature gives a variety of definition of Peri-Urban it neglects the much need definition which is central to further research. On the other hand Census as well as literature limits the definition of Urban area to 1961 Census criteria which is insignificant in the present day. Much of the literature concentrates on either land use change or on occupational change but is insufficient in correlating the both. Peri-Urban areas are environmentally fragile therefore most of the

literature concentrates on environmental issues and ignore the vital social issues. Land acquisition has been a highly debatable topic and contested issue in peri urban areas there more intricate research should be carried out exploring its various issues which the present literature lacks

Issues from Literature Review:

The following issues emerge from the review of literature and needs to be analysed in the new light.

1. Unprecedented urbanisation has resulted in the spill over effects in the peri-urban areas surrounding it. It changes the entire structure of these areas with respect to land use, livelihood as a consequence of that and demographic composition too.
2. The expansion is driven by policies as well as market-based demand and the forces of globalisation. This has changed the face of these areas irreversibly and made them[2] vulnerable to external forces such as economic changes, in migration of population etc.
3. The backward and forward linkage such as supply of food, providing market for goods and access to urban infrastructure has been successful in creating interdependence and development of peri-urban areas. Occupational diversification is driven by these mechanisms. Although it has brought the rural areas at a global stage but it has caused much environmental degradation.
4. Since these areas lie outside the city boundaries the urban services and amenities do not extend to these areas. It has created a further problem as these regions are not well planned and face the problem of handling a large number of migrant populations.
5. Land acquisition for industries, townships and SEZs have taken away land from poor farmers robbing them of their livelihoods and reduced them to destitute. The payoffs from the development do not reach the people who need it the most. There is the lack of planning and measures of providing alternative livelihoods.

c) RESEARCH QUESTIONS

How does urban expansion impact occupational diversification and occupational structural change in at the peripheries of large metropolitan cities?

a) In what way has urban expansion and occupational shifts have taken place in the peripheries of top largest Class I cities (25) as in 2001 (base year) Class I cities as a consequence of land acquisition and urbanisation?
b) What is the nature of occupational transition of workers and land from agricultural activities to non- agricultural activities that had taken place in cities which has experienced high growth rate and are they different from the other cities?

d) OBJECTIVES

The broad objectives follow:

1. To observe the impact of urban sprawl on land use changes with particular reference to the extent of land loss through land acquisition trends in the areas (districts) around top largest Class I cities (25) as in 2001 (base year) of India having highest population growth.
2. To understand the economic and extra-economic significance of agricultural land to both men and women who are engaged in cultivation in the above mentioned areas.
3. To analyse the occupational changes from agriculture to non-agriculture and whether they are consistent with the land use shifts in the above mentioned areas.

SCOPE OF THE STUDY

The limitation of the study presents itself in the definition of peri-urban and its changing notions. Peri-urban areas are not well defined since districts are large spatial unit blocks in proximity to the city are more urbanised and bear more profound imprint as compared to the ones far off. This poses a hindrance to the study. Data from Census 2011 provides data on workers up to 4 categories only instead 16 in 2001 and 9 in 1991 which doesn't let us compare in detail across the sectors. Age wise data for workers is also available up to district level and for 2011 the age wise classification of the detailed categories is yet to be released which limits our analysis to total workers, main marginal non workers and persons seeking

and available for work. This dissertation partly adopts the methodology from (Mallik 2008) and updates it[3].

e) DATABASE

Secondary data sources are:

a) Primary census abstract 1991, 2001 and 2011
b) B series, Economic Tables, Census 1991, 2001 and 2011.
c) District Statistical Abstract, Bureau of applied economics & statistics. Various years.
d) Dacnet Land Utilization tables, 2000-01 and 2010-11.
e) Landsat Archives 2000-01 and 2010-11.
f) Bhuvan LISS III 2011.

f) METHODOLOGY

1. Study Area

The study area is selected on the basis of physical contiguity of the districts around the metropolitan cities; those which share a common boundary have been counted for study. Top largest class I cities (25) as in 2001 (Base Year) were considered for analysis. Districts were chosen on the basis of physical contiguity to the cities. Districts which share a common boundary with the Metropolitan cities were chosen. For a detailed analysis of the changes in the peripheries top two districts with highest peri urban population growth, highest corresponding change in net sown area and non agricultural land use i.e. having significant land outflows from agriculture were chosen. The peri urban districts of Mumbai and Delhi metropolitan areas having the highest population growth in its cities and corresponding percentage change (decline) in net sown areas and (increase) in non-agricultural land use at district level complied with the above selection. The similar conditions applied in case if Chennai peri urban areas had the similar conditions such as high population growth rate and land use but its land outflow from agriculture was less in comparison to Mumbai and Delhi. Also Chennai unlike Mumbai has an opportunity and space to grow, i.e. its geographical

[3] Mallik C, (2008), "LAND AND WORK IN THE RURAL PERIPHERIES OF LARGE METROPOLITAN CITIES" Dissertation Submitted to Jawaharlal Nehru University in Partial Fulfillment of The Requirements for the award of the degree of MASTER OF PHILOSOPHY; CENTRE FOR THE STUDY OF REGIONAL DEVELOPMENT SCHOOL OF SOCIAL SCIENCES JAWA HARLAL NEHRU UNIVERSITY

limitation is only on the eastern side while western part faces no such hindrances as in case of Mumbai, being bound by the Western Ghats. The districts are as follows:

Table 1: Peri urban Districts

Cities	**Districts**	**States**
Mumbai	Thane	Maharashtra
Delhi	Gurgaon, Faridabad, Rohtak, Jhajjar, Sonipat, Palwal, Mewat Ghaziabad, Gautam Buddha Nagar	Harayana Uttar Pradesh
Kolkata	North 24 Parganas, South 24 Parganas, Haora , Hugli	West Bengal
Chennai	Thiruvallur, Kanchipuram	Tamil Nadu
Bangalore	Bangalore Rural, Ramanagar	Karnataka
Ahmadabad	Ahmadabad, Gandhinagar	Gujarat
Hyderabad	Rangareddy, Medak	Andhra Pradesh
Pune	Pune	Maharashtra
Kanpur	Kanpur	Uttar Pradesh
Lucknow	Lucknow	Uttar Pradesh
Nagpur	Nagpur	Maharashtra
Indore	Indore	Madhya Pradesh
Bhopal	Bhopal	Madhya Pradesh
Vadodara	Vadodara	Gujarat
Agra	Agra	Uttar Pradesh
Jaipur	Jaipur	
Nashik	Nashik	Maharashtra
Meerut	Meerut	Uttar Pradesh

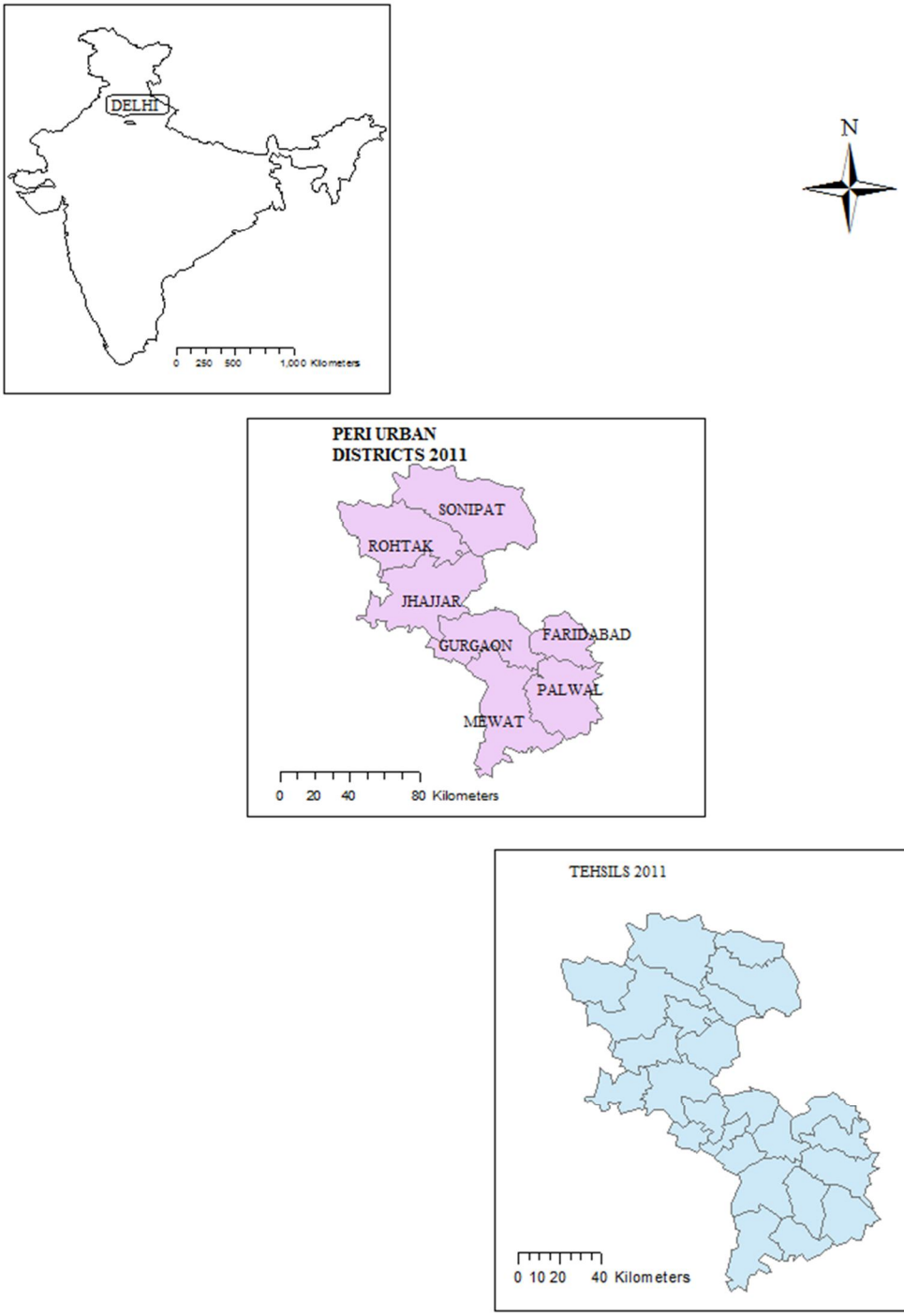
Allahabad	Allahabad	Uttar Pradesh
Varanasi	Varanasi	Uttar Pradesh
Visakhapatnam	Visakhapatnam	Andhra Pradesh
Patna	Patna	Bihar
Ludhiana	Ludhiana	Punjab
Amritsar	Amritsar	Punjab

SOURCE: Census of India, 2011

Map No 1: Peri Urban Districts

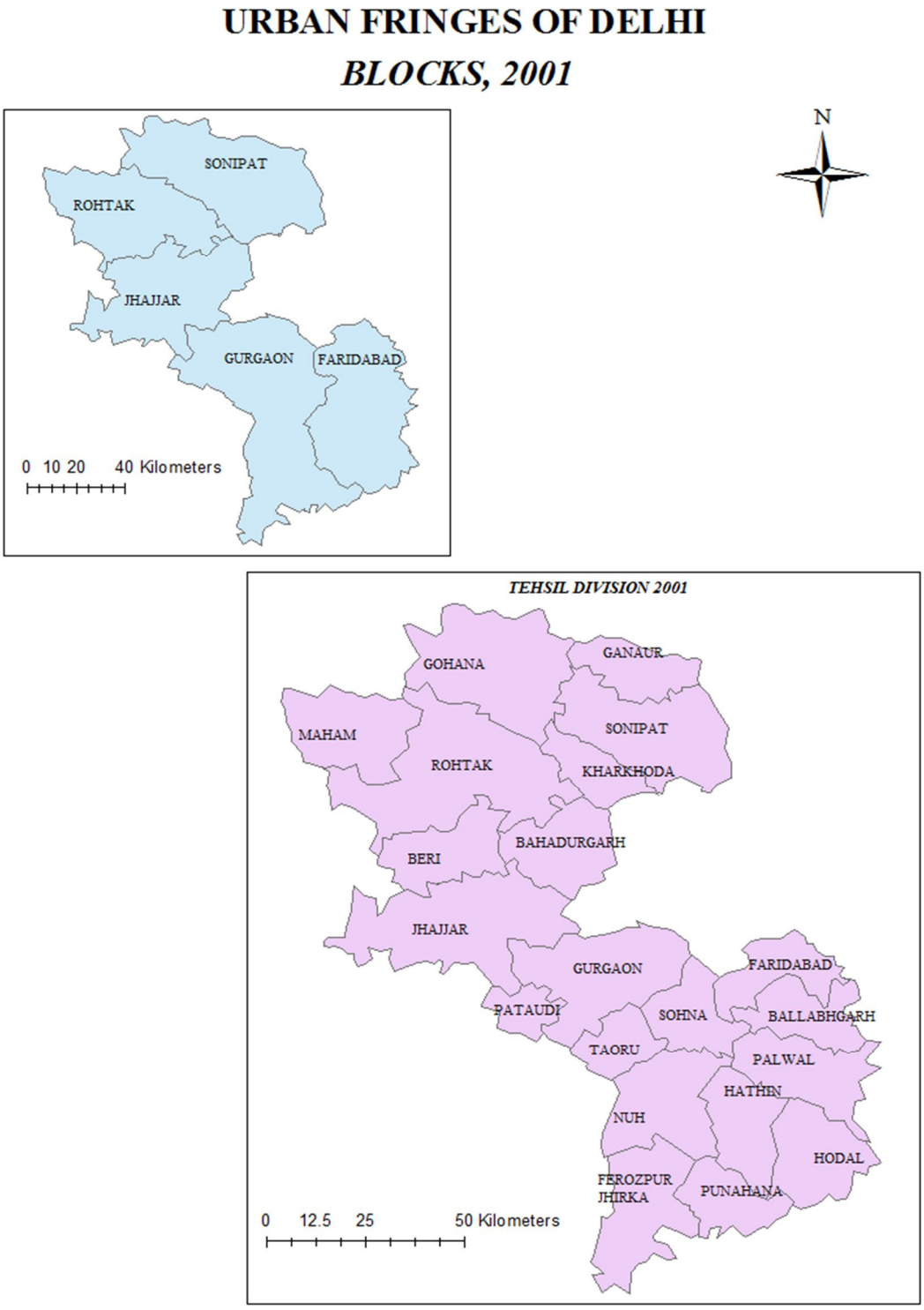
SOURCE: Census of India, 2011

URBAN FRINGES OF DELHI



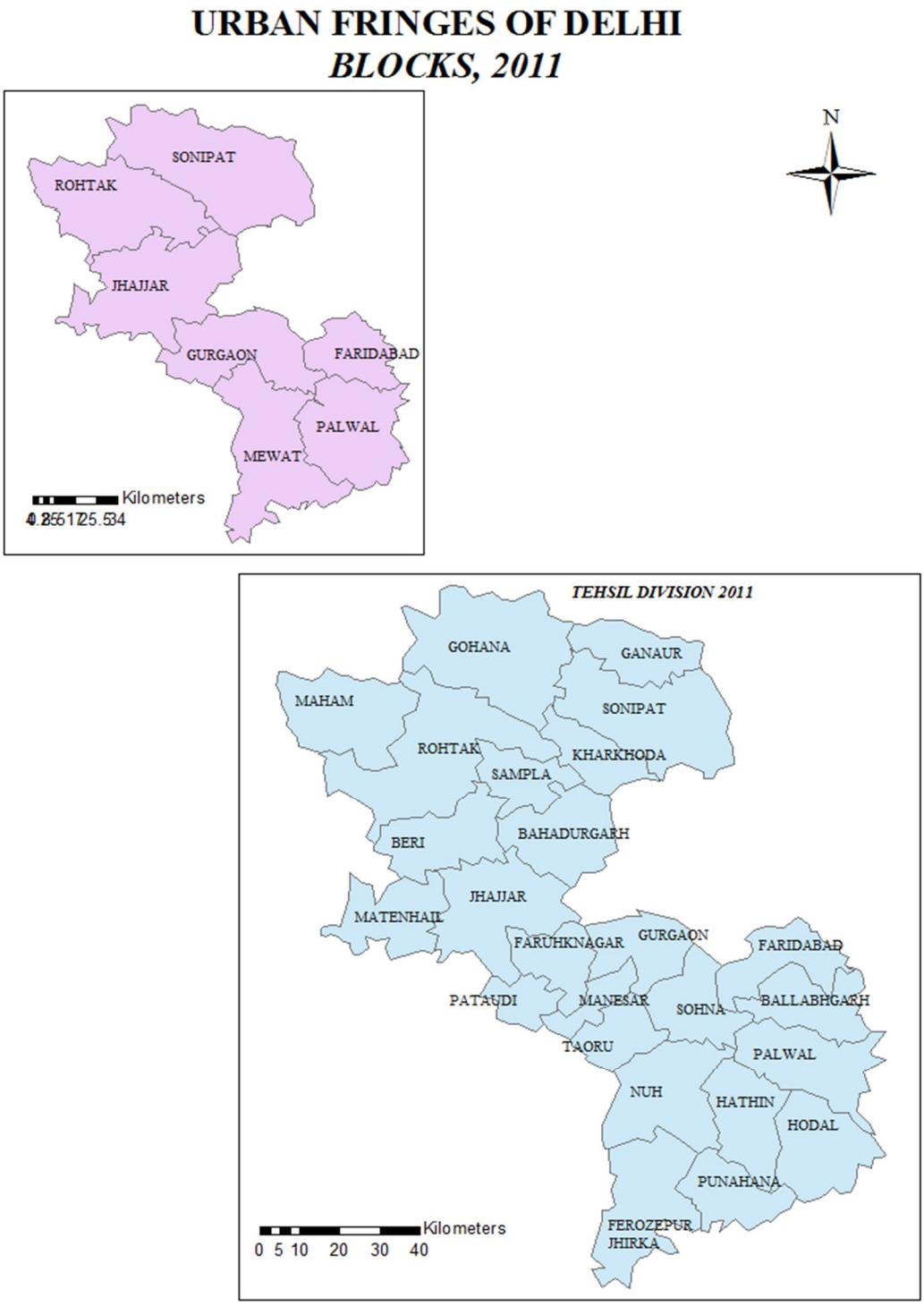
SOURCE: Census of India, Adminstrative Atlas 2011

CHANGES IN ADMINSTRATIVE DIVISIONS (BLOCKS)



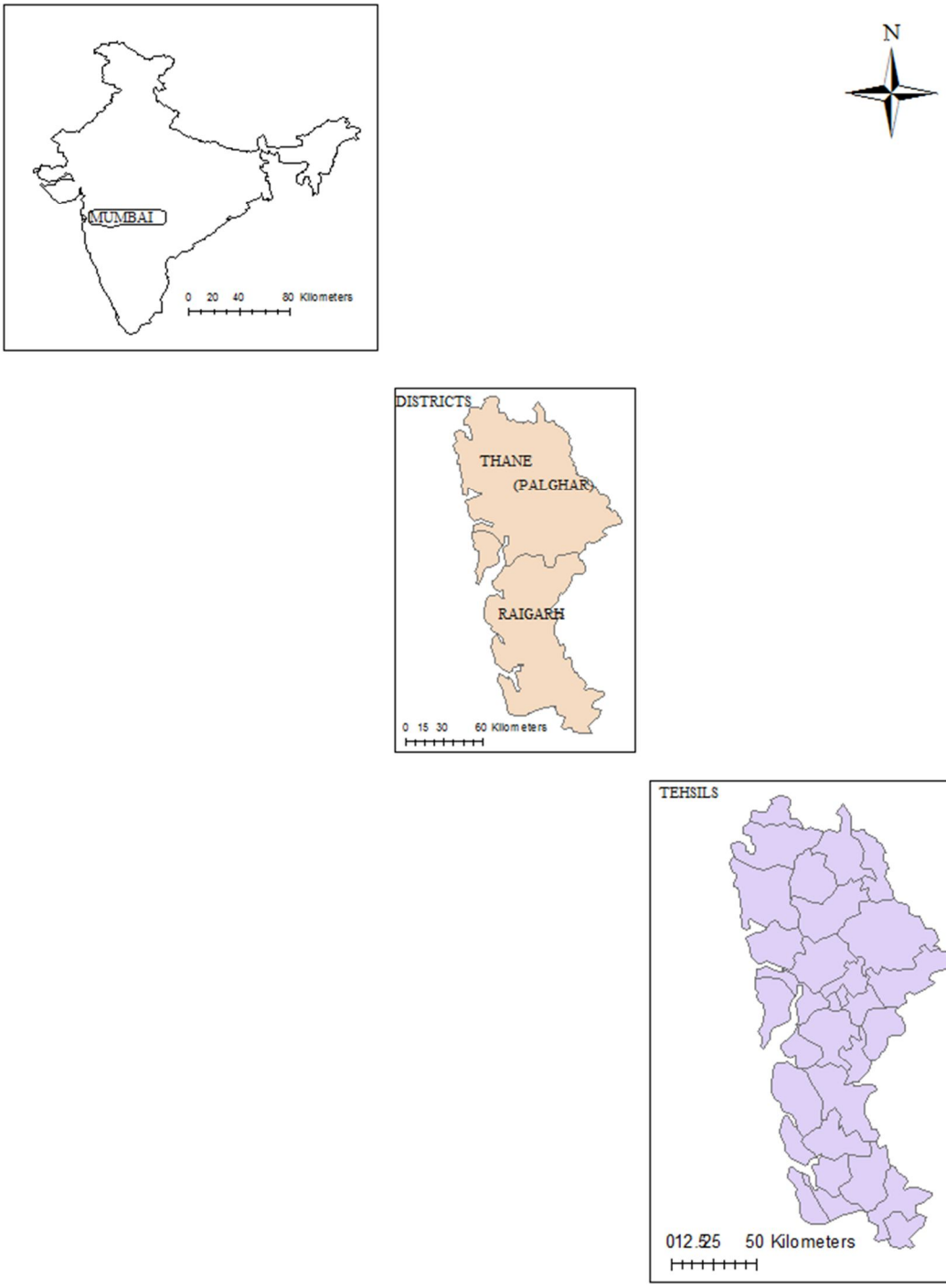
SOURCE: Census of India, Adminstrative Atlas,2011

CHANGES IN ADMINSTRATIVE DIVISIONS (BLOCKS)

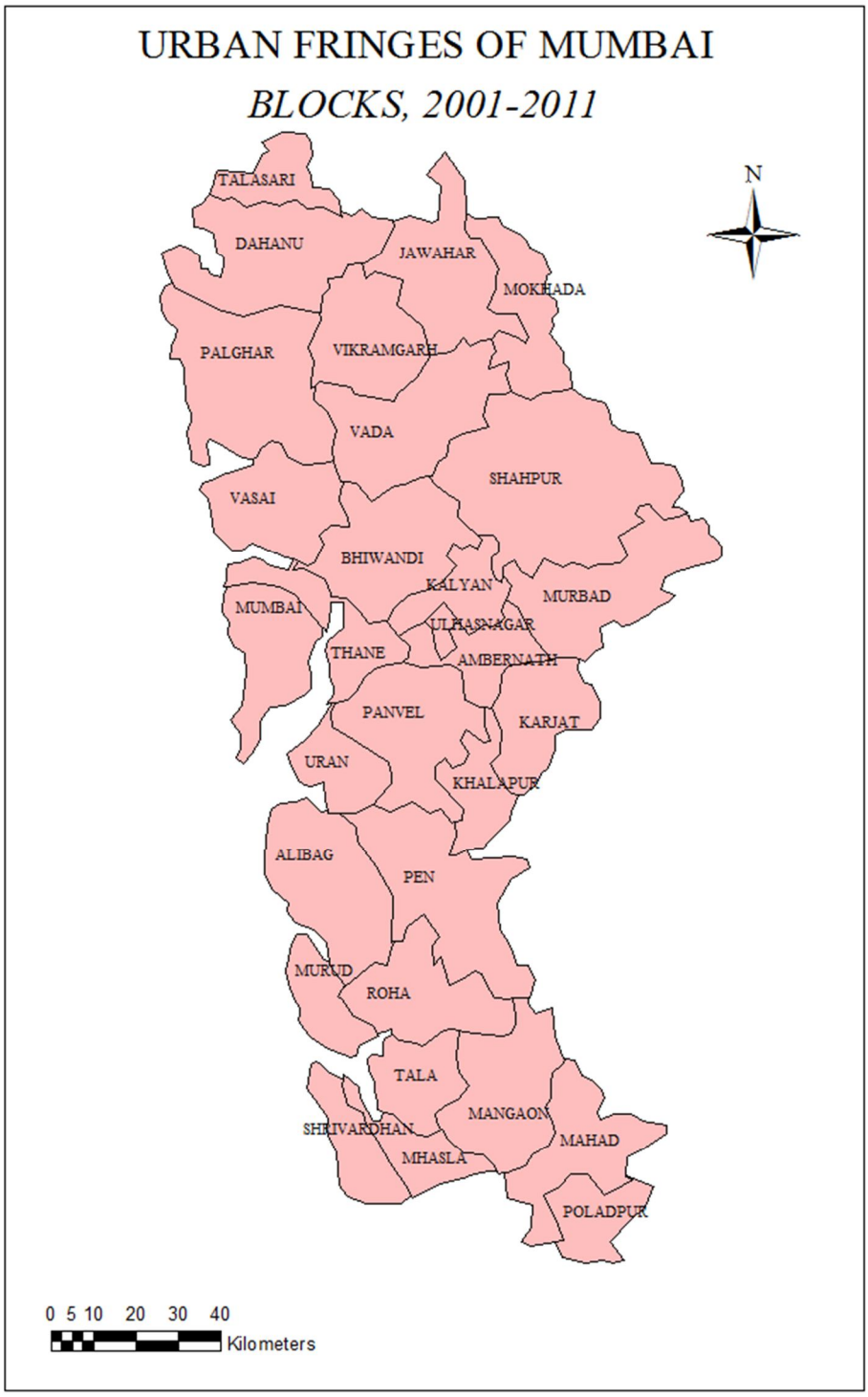


SOURCE: Census of India, Adminstrative Atlas,2011

MUMBAI AND ITS URBAN FRINGES



SOURCE: Census of India, Adminstrative Atlas,2011



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SOURCE: Census of India, Adminstrative Atlas,2011

The Census provides data for city and town wise population in its Town Directory, and for workers both main and marginal (4 categories), non-workers and urban population in its primary census abstract and economic tables therefore enabling the observance of decadal changes trends and patterns over a time. .

Following methods were used to estimate the computations:

- For changes in population ***exponential growth rate*** is to be calculated for the urban population in the peri urban districts, metropolitan cities and total population for the corresponding state. Exponential growth rate is to be calculated using the following formula:

  R = ((Log (P,;Po))/t)* 100

- ***Correlation coefficient*** is to be computed to establish a relationship between (X) and (Y) of Level of Urbanisation with the rate of Land use Change, with trend line using the Best Fit Method and Pearson's method.
- Workers: In order to observe the changes in all four categories of workers first main and marginal are grouped and converted in percentages for analysis.
  1. Cultivators
  2. Agricultural Labourers
  3. Household Industrial Workers
  4. Other workers
- The data for the change in ***land use under 9 categories is grouped and converted into percentages*** & used for comparison. The analysis of the results will be done by observing the changes in other sectors as well. The same would be validated using satellite images and land use maps generated from it using ***EDRAS and Arc GIS software***. The nine categories are as follows:
  1. Forests
  2. Area Under Non-Agricultural Use
  3. Barren and Uncultivable Land
  4. Permanent Pastures and Other Grazing Land
  5. Land under Miscellaneous Tree Crops and Groves not included in Net Area.
  6. Culturable Waste

7. Fallow Land
8. Net Sown Area
9. Area Sown More than Once.

Land use data was grouped into the following Categories:

1. Net Sown Area (NSA)
2. Area Under Non-Agricultural Use (NAU)
3. Land Available for Agriculture (LAA)= (NSA+Fallow+ Permanent Pastures and Other Grazing Land+ Land under Miscellaneous Tree Crops and Groves not included in Net Area+ Culturable Waste)
4. Total Cultivable Land (Net Sown Area+ Fallow Land)
5. Land Not Available for Cultivation= (Area Under Non-Agricultural Use+ Barren and Uncultivable Land)

In order to study in detail about the pattern of work engagements in the selected peri-urban districts. Simple percentages were computed for the age group and results interpreted accordingly for the selected peri-urban district.

CONCEPTUAL FRAMEWORK

In the era of globalisation and rapid urbanisation, cities tend to spill over on the surrounding hinterland. This encroachment has massive implications in the peri-urban areas. First consequence of urban expansion is growth of outgrowths, new towns and cities in the peripheries. Second outcome is the Land-use change in these areas, there is conversion of agricultural land for non agricultural purpose such as (built up) in order to accommodate the growing population and their infrastructural needs. This results in a decline in agricultural land and a mixed pattern or a complex mosaic type of land use. Thirdly conversion or outflow of agricultural land to non-agricultural uses results in loss of a valuable source of livelihood for the people and shrinkage of natural resource base. Work structure undergoes change due to availability of work. There is shift of workers from agriculture to non agricultural work and more marginalisation of work. This shift is more in this transitory region in comparison to urban or rural areas causing the effects of globalisation to be impacting more deeply. Therefore under the circumstances it has different implications among the different sector of workers as well as among male and female workers.

In order to analyse above outcome and the forces providing impetus to it population data from census is used to work out the population growth rates of the peripheral areas of top largest Class I cities of India and compare their growth rate with that of the city and the state. The pace of their growth would be used as a basis of explanation of land use change and shift in work. Changes in the latter would be analysed according to land use in different and to working age population (15-59) years and above 60 years in the region (districts around Mumbai and Delhi) which has undergone the most drastic change. Detailed analyses of the processes and its effect would be studied at the tehsil level of the latter areas.

The variables used for the study would be analysed at two levels:

1. Districts around the metropolitan cities
2. The corresponding State.

Peri urban districts reflect the transitory space between urban city and rural hinterland while the corresponding state stands for the rural scenario. The census provides age-wise data of workers up to district level which poses limitation to the study. A two level outline is used to understand the variability in the behaviour of the districts around metropolitan cities in comparison with the states, deviations from the state level would be understood as an effect from the city.

In light of the scenario present detailed analysis would be made at the tehsil level of districts around Mumbai and Delhi (Haryana) to understand the impact of urbanisation and its consequent effects and draw a comparison between them. The process of growth and development is different for both the cities yet they reflect most of the critical effects of globalisation and also due to their response to geographical impediments. Both the cities occupies prime importance as Mumbai being the financial capital with its vicinity facing limitations to growth owing to its seaside and hilly backdrop. In contrast to it Delhi being the administrative capital having no such limitations to grow in its hinterland.

Several terms for example peri urban, urban peripheries, rural urban fringe, peri urban interface, districts around metropolitan cities and related terms and phrases were used alternatively to denote and refer the areas in the vicinity of the city or sharing contiguous boundaries with it. The analysis covers the time period from 1991 to 2011 in an attempt to observe the effects of post liberalisation and neo liberal era after 1990's and 2000's.

g) CHAPTERISATION

1. First chapter deals with the introduction of the topic, literature review, objectives, study area, methodology and conceptual framework.
2. Second chapter consists of population dynamics and growth of peri urban areas.
3. Third chapter discusses land use change in the peripheries if the cities.
4. Fourth chapter tries to bring about the relationship between the 2nd and 3rd chapter along with shift in workers.
5. Conclusion

CHAPTER 2

POPULATION GROWTH AND PERI URBANISATION

INTRODUCTION

Urbanisation and urban expansion in India have grown and spread spatially at a very fast rate. It has been culmination of processes for example regional development and economic growth and globalisation are involved in it. This process has been very prominent in the post economic reform period, indicating liberalisation accelerated the urban growth but Census data argues that such growth has been mainly concentrated in and around large metropolitan cities (Kundu 2003). Large metropolitan cities consist of huge agglomerations in the surrounding periphery areas, often denoted as *peri-urban* regions, spread spatially over the rural hinterland. Rural peripheries surround the cities where rural & urban features are found in close proximity and often in coexistence termed as “rurban" or "rural-urban continuum" (Webster 2002). With unprecedented growth they unable to contain themselves within their administrative boundaries. Therefore in order to accommodate or redistribute its growing population it spreads over to these rural peripheries absorbing the agricultural land and outgrowths and municipalities of towns (Vishwanath 2013).

As a consequence of this there are three major outcomes. First there is massive growth in number of towns and cities in lieu of redistribution of the population in the peripheries across the various size classes (Census 2001, 2011).The towns and cities or urban population to regard as a whole have experienced faster growth in the lower order cities in comparison to the core metropolitan cities, giving rise to the shrinking city and growing hinterland concept (Narain 2008).

Secondly due to increase in population land in the peripheries undergoes immense change resulting in “complex structure characterized by heterogeneity and segmentation, creating new forms of segregation, polarisation and socio-spatial fragmentation” (Arabindoo 2006). Growths of these regions are marked by uneven and erratic development in socio-economic parameters and haphazard change of land use as well as a transition from agriculture to non-agricultural use (e.g. industries, housing, transport networks etc). The peripheries of these metropolitan cities have experienced a huge increase in demand for land due to the shift of

industries & people preferring to live in the suburbs due to its pollution free environment, therefore, much of the development is being unplanned (Narain 2007).

Third outcome is the change in the occupational structure or work force of the peripheries as an inevitable outcome of the former two processes. Growth of urban areas comes at a cost ie decline of net sown area, village common lands, or total stock of agricultural land correspondingly rise in non-agricultural land use in the urban peripheries. Therefore causing loss of agricultural land and reduction in natural resource base, prompting shift in livelihood strategies from agriculture to non-agricultural activities (Mallik 2009).

In recent decades, peripheries of large metropolitan cities were observed to grow at a much faster rate in comparison to the city and the state. The trend is more evident in case of top ranking metropolitan cities than in cities of smaller size. Urbanisation and the forces of globalisation have been concentrated around major metropolitan cities. Land use changes are therefore more drastic in and around these metropolitan cities so is the emergent nature of work (Shaw 2005),hence giving rise to the importance of a spatiotemporal analysis of population growth, land use dynamics and work force in the peripheries of the largest class I cities (2001 base year). Empirical research assumes greater significance in the parlance of urban growth over the landscape. In order to observe the pattern of urban outgrowth, land use change land loss and corresponding work force changes whether or not it is specific to a particular city, a study and analysis of the largest class in cities of India (2001) has been attempted in this chapter.

a) CONCEPTUAL FRAMEWORK

This chapter is divided into two sections. The first section deals with population growth of the largest twenty five class I cities (2001 base year) with respect to peri urban areas across various size classes and their distribution. Further analysis is undertaken to explain the growth rates with respect to workers in transition.

The second section briefly attempts to study in depth the peripheries of two fastest growing metropolitan cities significant or highest change in land use with respect to net sown area and establishes a link with change in workers. In this case districts around Metropolitan cities of Mumbai (Thane and Raigarh) and Delhi (Sonipat, Rohtak, Faridabad, Gurgaon, Mewat, Palwal, Jhajjar) were chosen for the study as these districts have the highest urban population

growth rate and consequently decline in net sown area and corresponding increase in non agricultural land use across all the other metropolitan cities.

Mumbai being the financial capital is the largest metropolitan city in India as well as has the high growth rate and corresponding land use in its peripheries. Over the decades since liberalisation in 1990's its number of towns and cities in the peripheries have grown from 77 in 1991 to 93 in 2011 and three new tehsils carved out of older ones and recently a new district Palghar has been carved out of Thane owing to its immense growth and for administrative feasibility. However the region faces geographical limitation to spatial growth as it is bound on the west by the Arabian Sea and in the east by the rugged mountains of the Western Ghats making its situation more unique. The following table explains the same:

Table No 1: Block Division Delhi Peri Urban

Peri Urban Districts	***Blocks (1991-2001)***
Thane	Talasari,Dahanu, Jawhar, Mokhada,Vada, Palghar, Vasai, Thane,Bhiwandi ,Shahapur, Kalyan, Ulhasnagar, Murbad, Vikramgad, Ambarnath,
Raigarh	Uran,Panvel, Karjat,Khalapur Pen ,Alibag Murud , Roha Sudhagad,Shrivardhan Mhasla, Mahad, Managaon, Tala, Poladpur

Source: Census Administrative Atlas of Maharashtra 1991 2001 and 2011

Delhi on the other hand is the administrative capital of India and second to Mumbai in terms of size. As with Mumbai it also has high growth in its peripheries and more momentous change in land use in its peripheries. Effects of Economic reforms are more evident here as it is one of most sought after destination for foreign investment. This is very much apparent in the huge spurt in growth of towns and cities from 44 in 1991 to 87 in 2001 and 123 in 2011. This area also has undergone changes in administrative boundaries owing to its population with increase from five districts and 15 tehsils of Sonipat, Rohatak, Gurgaon, Faridabad and

Ghaziabadin 1991 to 7 (Jhajjar and Gautam Buddha Nagar) districts and 20 tehsils in 2001 and further division of 9 (Mewat and Palwal) districts and 25 blocks in 2011. The following table depicts the changes in boundaries and creation of new districts and tehsils:

Table No 2: Block Division Delhi Peri Urban

Peri Urban Districts	**Blocks**	***New Districts***	***New Blocks***
FARIDABAD	Faridabad Ballabhgarh Palwal Hathin		Faridabad Ballabhgarh Palwal Hathin Hodal
		PALWAL	Palwal Hathin Hodal
GURGAON	Pataudi Gurgaon Nuh Ferozepur Jhirka		Pataudi Gurgaon Taoru Nuh Ferozepur Jhirka Punahana Sohna
		MEWAT	Taoru Nuh Ferozepur Jhirka Punahana
ROHTAK	Bahadurgarh Jhajjar Maham Rohtak		
		JHAJJAR	Beri Bahadurgarh Jhajjar Matenhail
SONIPAT	Gohana Ganaur Sonipat		Kharkhoda
GHAZIABAD	Modinagar, Ghaziabad, Hapur, Dadri,Garhmukteshwar		
		GAUTAM BUDDHA	Dadri, Gautam Buddha Nagar,

		NAGAR	Jewar* (Bulandshahr)

Source: Census Administrative Atlas of Haryana and Uttar Pradesh 1991 2001 and 2011

b) POPULATION GROWTH AND URBAN EXPANSION

In the previous three decades, all the states have witnessed a spurt in urban growth. Mainly natural growth, migration from rural areas in search of employment, better living standards and educational opportunities are the major contributing factor for urban growth. This uncontrolled growth puts a pressure on the resources of the cities forcing them to spread over to their peripheries. The major metropolitan cities, as well as other Class I cities, and other medium size class cities in India, have witnessed expansion and drastic changes in the last three decades. Large metropolitan cities have declined in growth while their peripheries have spatially expanded. New territories are being created outside existing Indian metro cities, scaling up territorial expansion, which Sassen (2006, p. 72) calls as 'a system of variable territorial insertions often creating territorial and institutional conflicts'. Government policies of sanitisation and development have also played a major role by pushing the poor people away from the central cities to the suburbs thus contributing expansion and development of peri-urban areas (Dupont 2013).

Indian census represents the urban population in six-fold classification as follows (Jain, et al. 1992):

- Million Plus Cities- 1 million or more.
- Class I – 1 lakh and above
- Class II- 99999-50000
- Class III- 49999-20000
- Class IV- 19999-10000
- Class V- 9999-5000
- Class VI- less than 5000.

The size class at the census (2001 base year) were undertaken in the calculation of urban growth rates for the study. Outgrowths of cities and towns as notified by the Census are also treated as urban in the census and therefore included. The level of urbanisation in India was 27.78 percent in 2001 and 33.11% in 2011, which was much lower than the average level of urbanisation in developing countries (40 per cent in 2001, Vishawnath 2013). In India, the

definition of urban is rigorous and stringent as civic statutes, and demographic criteria, are taken into account for declaring a settlement urban. The census of India defined the urban places on the basis of the following criteria (Census of India 2001).

i) All places with a municipality, corporation, cantonment board or notified town area committee etc.

ii) All other places which satisfy the following criteria:

a) Minimum population of 5000

b) At least 75 % of the male working population engaged in non-agricultural pursuits and

c) A density of population of at least 400 persons per square km. (1000 per sq mile).

The definition adopted in India assumes that urbanisation is the consequences of industrialisation and therefore urban areas must have a preponderance of non-agricultural activities. It considers only male workforce in the non-agricultural sectors, as the quality of census data on women workforce is doubtful (Bhagat 2002). In 2001 it may be observed that among the six largest metros except Delhi, all have shown a decline in their growth rates. The city core concept also shows a greater decline in all of them except Bangalore, which is affected by changes in the municipal boundary during the last decade. The metros of Pune, Surat, Patna, Kanpur, Jaipur, and Indore have maintained the tempo of high urban growth during the last two decades (Bhagat 2003). These are however the only secondary metro cities seem to have benefited by the economic forces unleashed during the last decade. The increasing congestion and crowding of the primary metro cities was an advantageous to them. For example, a fast-growing metro of Faridabad has emerged adjacent to Delhi along with Meerut in 2001. As a result, two clusters of metropolitan dominance are clearly emerging in the western and northern region of the country around the core of Mumbai and Delhi within the urban space of India (Bhagat 2004). A detailed study of population growth in of the six largest mega cities of Delhi, Kolkata Mumbai, Bangalore, Hyderabad and Chennai, and for the last two decades is presented in Table No 1.

Table No 3:Population Growth of six largest metropolitan cities 2001-11

DISTRICT	TOWNS	GROWTH RATE 2001-11	GROWTH RATE1991-01
DELHI	DMC (U) (M Corp.)	2.089	-0.737
KOLKATA	Kolkata (M Corp.)	-0.182	-0.576
MUMBAI	Greater Mumbai (M Corp.) Part	0.392	1.881
HYDERABAD	GHMC (M Corp. + OG) (Part)	0.286	1.980
BANGALORE	BBMP (M Corp. + OG)	6.780	2.670
CHENNAI	Chennai(M.Corp)	0.677	1.231

Source: Census 1991, 2001 and 2011.

The Greater Mumbai urban agglomeration is the largest in India in terms of population; in fact, it has the distinction of being among one of the largest metropolitan cities of the world. In 2001, the population exceeded 11 million with the main satellite towns, each of which has a population exceeding one lakh, are Kalyan-Dombivli, Thane, Navi Mumbai, Mira-Bhayander and Ulhasnagar. In 2011 satellite towns being added were Ambarnath and Badlapur.

Delhi with a population of 12.8 million ranks second after Mumbai and Kolkata. It shows a higher growth rate exceeding 50 percent during 1991-2001 compared to 47 per cent of the previous decade. The growth in Delhi Urban Agglomeration is therefore primarily due to the census towns that have shown extremely high growth rates in 1991-2001 as Ghaziabad, Loni, Faridabad and Gurgaon. The pattern of growth is clearly centrifugal in the last two decades, a continuation of the trend observed in previous decades (Brush 1962). Kolkata is the third largest metropolitan city with a population of 4.5 million as per 2001 census. The core area of Kolkata urban agglomeration such as Kolkata and Haora Municipal Corporation areas show one of the lowest growth rates during 1991-2001 (Bhagat 2003) and presently. On the other hand, the peripheral area shows a reversal and three times more growth.

Chennai ranks fourth with a population of over 4 million in 2001. The growth rate has declined in 2001-2011 compared to 1991-01 showing similar trends as other cities.The growth rate in Chennai UA is therefore primarily due to numerous satellite towns, namely, Ambattur, Avadi, and Tiruvottiyur etc. The city of Bangalore ranks fifth with a population exceeding 5.6 million. The growth rate in 2001-2011 was marginally lower than in the earlier decade. The tempo of growth in the central city continued, unlike other cities where the decline in growth rate was distinctly noticeable. The satellite towns like Byataryanapura,

Dasrahalli and Mahadevapura have shown a phenomenal increase in growth rate during the recent decade. Hyderabad with a population of nearly 4 million is ranked sixth, among the million plus Cities in India. The growth rate of the city has substantially decreased during 1991-2001 compared to the earlier decade, and further declined in the present decade 2001-11, especially in the central city. Hence, the growth rate in peripheral towns continues to be higher compared to the central city of Hyderabad. This is consistent with forces of privatisation and liberalisation of the economy, which have more benefited the cities compared with towns. The growth of small towns might be due to higher natural increase among them as they are not very different from villages as the rural poor have little choice but to migrate only to short distances to small and medium towns as their destinations. The cost of living in cities as well as metros has also risen enormously and is often beyond the affordability of the poor along with saturation of informal sector and decline in jobs in organised sectors (Kundu 1997; Planning Commission 2001). At the state level, most of the states show that the cities are growing faster than the small towns. But the state like Tamil Nadu, West Bengal, Karnataka and Gujarat show that cities are growing slowly than the small towns. The poorer states like Bihar, Jharkhand, Uttar Pradesh, Madhya Pradesh, and Rajasthan reveal the large difference between the growth rates of small towns and cities (Kundu and Sarangi 2011).

The lowest growth rate among cities was found in Andhra Pradesh followed by West Bengal. But the small towns of West Bengal have grown much faster compared with other categories of towns and cities in the state. A contrast could be observed between the faster growth rate of small towns in the state of West Bengal and Haryana as all categories of towns and cities have grown faster, while in West Bengal it is the small towns only.

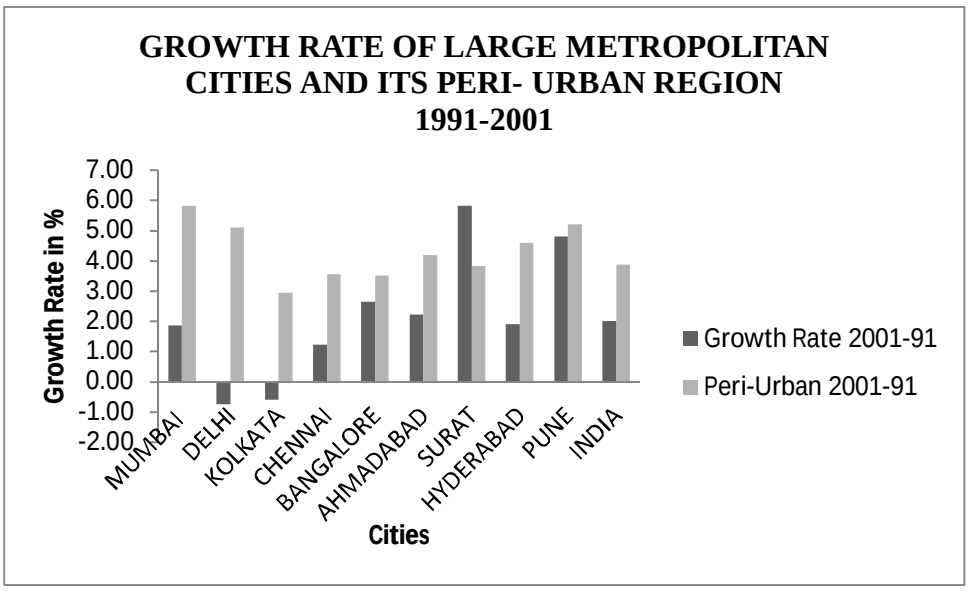
It is quite natural that as the city grows it expands the economic base and increased advantage to the trade and commerce and industries from the agglomeration economy. But it cannot be sustained very long. The decline in growth rate will certainly set in with an increase in the size of the city in the long run. Hence, an effort to restrict city size is not always necessary and it could even be detrimental to the economic growth at the early stages of economic development in a country (Mills and Becker 1986). The cities of Bangalore (also known as Bengaluru) and Hyderabad gained recognition recently as leading centres of high-tech industry and high-level services. They have catapulted to their present status as modern metropolises of national and international significance ever since the 1990s. These cities are linked to the global economy and markets through firms that develop software and hardware,

call centres that meet the needs of firms located in the United States and in Europe and superior educational and research institutions (Heitzman 2004; Nair 2005; Ramachandraiah and Bawa 2000).

i) PERI-URBAN POPULATION GROWTH

Peri-urban areas have recorded very high population growth as they accommodate the naturally growing population as well the migrant population. In recent decade exclusionary urbanisation (Kundu 2009) has caused the growth of peri-urban or the fringes of the large metropolitan cities with the decline of the core areas. In the present Census highest population growth was recorded in Vasai-Virar, in Thane district, in peri-urban Mumbai. The city has the highest growth rate in India of 23.302%. High growth rates were observed in peri-urban Delhi with Gurgaon and Ghaziabad (Loni) with growth rates of over 14% about 10% and 7 % increase in the previous decade. Part of Hyderabad and its outgrowths in Medak district forms too has high growth of over 10%. Most of this growth has been due to the development of the aforesaid Information Technology. The following Table depicts the picture and figure shows the results in the form of bar graphs.

Figure 1: Growth Rate of Large Metropolitan Cities and Its Peri- Urban Region 1991-2001

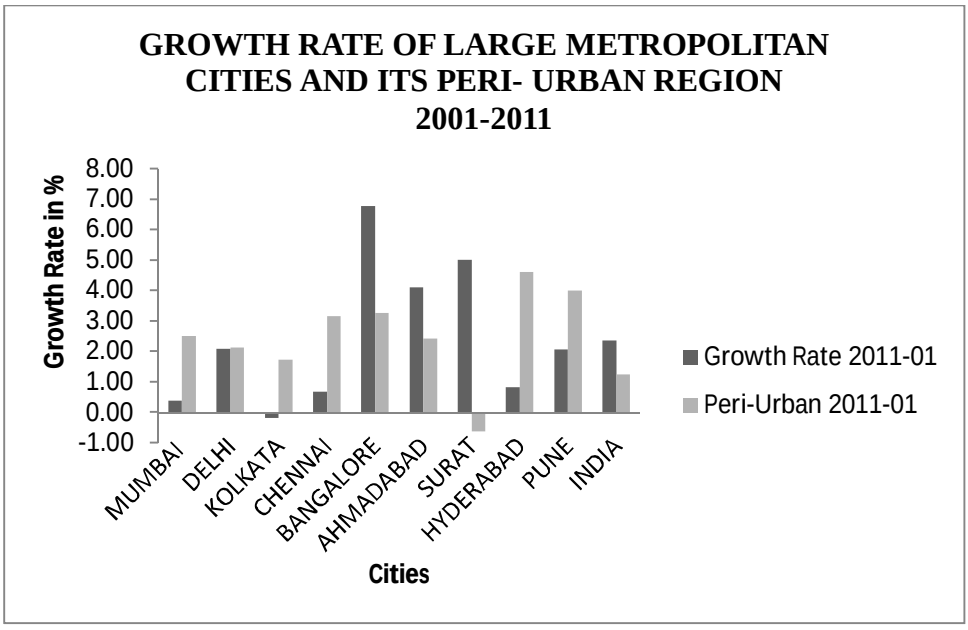


Source: Census of India 1991 and 2001

India's largest metropolitan city Mumbai has a growth rate of 0.39% declined by -1.49 from the previous decade when it was 1.88%. Its peri-urban areas have grown immensely particularly the areas which lie in close proximity to Mumbai. Its peri-urban areas have

recorded a growth rate of 2.51% in 2011, which had decreased by -3.33% since the last decade. The trend is declining since the previous decade as urbanisation and urban growth in during 1991-01 was more evenly distributed across the state among other metropolitan cities, while the present decade showed more polarised nature of urbanisation concentrated only in large metropolitan cities. The trend is shown in figure 2.

Figure 2: Growth Rate of Large Metropolitan Cities and Its Peri- Urban Region 2001-2011



Source: Census of India 1991 and 2001

Delhi the capital city and the National Capital Territory have a growth rate closer to Mumbai around 2.09%, higher in comparison to Mumbai and higher than Kolkata. It has shown a positive growth in comparison to Mumbai. The peri-urban areas also recorded a growth rate of 2% in 2011-01, which is a huge increase as the previous decade witnessed a negative growth rate. In the peripheries of Delhi also there was a massive change in the neighbouring districts of Gurgaon, Faridabad, Sonipat, Jhajjar and Ghaziabad. This could be observed by the fact that urban centres in Faridabad and Gurgaon recorded high population growth 2, 10 and 4% from the decade 2001-11.

Kolkata has shown a decline in population in two consecutive decades. The negative growth rate is found in the city cores while the peri- urban areas have grown but at a declining trend. Industrial growth and the over importance of Kolkata and its urban agglomeration has declined over the last two decades. Economic progress had been stagnant thus resulting in

out- migration of population in other metropolitan or smaller cities. Chennai has shown consistent growth in population over the two decades, with minuscule decline.

Bangalore and Hyderabad show trends similar to Chennai, with exception Bangalore city having a higher growth rate of 6.8% highest among all the 25 cities chosen for analysis. The peri-urban areas of these cities have shown considerable growth but at a consistent rate. This is the case with Bangalore and Hyderabad, where local governments, private and public sectors and skilled personnel converged to develop the economic bases, infrastructure and cultures necessary for their transformation and development. The cities have acquired ‘‘trade recognition" as hubs in the Indian and global IT industry. There has been a rapid increase in the number and strength of the financial, industrial and commercial linkages between firms and institutions in Bangalore and Hyderabad and those in the developed world, in part due to the efforts of state and city governments, which offered incentives to business enterprises and institutions to locate in their city. Tax breaks, the setting up of special economic zones and the development of suitable infrastructure made the cities attractive to prospective IT firms (Government of Karnataka 2006).

Apart from the large metropolitan cities, many other large cities have crossed the million plus population. Ahmedabad is one such city which had a positive population growth over the two decadesbut its peri-urban areas have declined, which may be due to the population shift to newly designated state capital Gandhinagar. While on the other hand Surat being an exception to have a marginal decline as the city core itself has grown. Pune and is adjoining peri-urban areas have shown a decline over the two decades. The city population in had declined by -2.75% from in 4.82% in 1991-01 to 2.07% in 2001-11. Pune's peri-urban has still managed to have a consisting growth with little decline. This is in may have been due to the primacy of Mumbai and development of other agglomerations which has caused a shift in its population. Nagpur is different as its city although has marginally declined but its Peri-urban has declined drastically even more than the city core. The growth rate still remains positive (Sridharan, 2006).

In Uttar Pradesh other than the part in proximity to the National Capita Territory of Delhi has declined in the city as we as a peri-urban region. It had a vast change from a high negative growth to less than 1% positive was a very long way to come. In 1991-01 the city growth rate was -29.18% and 0.78% in 2001-11, while the peri-urban was moderate, 1.37% in 1991-01 to 3.56% in 2001-11, a decline by -2.18%. Rearrangement of administrative boundaries and the

emergence of erstwhile villages may be the causative factor. Lucknow also displays a similar trend the difference is that its city population shows a marginal decline of -0.46% in comparison to -3.01% declines in the peri-urban. Meerut, Allahabad and Varanasi also show a similar trend.

In Madhya Pradesh, the city of Indore has been growing at a declining trend, but the peri-urban areas have shown the positive growth rate of population from 1991-01 to 2001-11. Jaipur in Rajasthan, the only metropolitan city in the state along with Patna in Bihar, has shown a decline of population in the city as well as its outgrowth over two censuses. Ludhiana and Amritsar as of 2001 has shown trends and characteristics little different. Amritsar city has the declining trend but is has shown marginal peri-urban growth at a budding stage of 0.11% increase in two decades. Ludhiana city has both declining city as well as peri-urban growth in spite of its recent economic prosperity and emergence as a woollen textile manufacturing centre.

There are twenty five largest million plus cities which have been undertaken for analysis, such as Mumbai, Delhi, Kolkata, Chennai, Hyderabad, Bangalore, Ahmadabad, Surat, Vadodara, Pune, Nagpur, Nashik, Kanpur, Agra, Lucknow, Meerut, Allahabad, Varanasi, Bhopal, Indore, Jaipur, Patna, Vishakapatnam, Ludhiana and Amritsar. In the comparison to all these twenty-five cities in Table No on an average an India level although the peri-urban population has declined, the urban population still remains negative -2.047%, indicating the dominance and primacy of the cities over the rural cum urban hinterland. In spite of that small, towns and cities are growing at a faster rate. The following, results are displayed in the Charts and tables below

In a comparison of the growth rates, it is found that peri –urban population is larger when compared to that of the city and less in comparison to the states. For Mumbai, It is seen how the trends of the residuals varied closely with that of population growth. The rates have decreased in the present decade, in comparison to the previous one.

Peri urban areas of Mumbai, Kolkata, Chennai, Hyderabad, Pune, Kanpur, Nagpur, Indore and Amritsar have experienced faster growth than the city core. While the city cores of the cities of Delhi, Bangalore, Ahmadabad and Vishakapatnam have observed fastest growth in the present period 2001-11. Among the peri urban fastest growth was observed in peripheries of Indore and Vishakapatnam. The peripheries of all the large metropolitan cities although have higher growth rate but it was at a declining rate in comparison to the previous decade

1991-01. Indore has a faster and higher peri urban growth rate but Vishakhapatnam is a unique example to have growing city core as well as fast expanding periphery. More of the outliers are found in the cities of Surat and Vadodara which noted decline in (negative) population growth in the peripheries while their core cities haven't grown that much. This may be due to regional causes or change in administrative boundaries. Others cities with huge decline in peripheries include Agra, Meerut and Allahabad. Massive decline in cores was seen in cities of Mumbai, Agra, Jaipur, Nashik, Meerut, Patna, Ludhiana and Amritsar. Mumbai, Kolkata, Chennai, Hyderabad, Pune, Kanpur, Nagpur and Amritsar portrayed the typical picture of declining core and growing periphery, Delhi has in the present decade growing cores and peripheries. Although growth is still concentrated in and around the largest metropolitan cities smaller cities are now growing out in peripheries such as Pune Kanpur, Indore etc. Growth in previous decade was higher and more uniformly spread in present decade it is more biased towards large cities and unbalanced with marked top heaviness of the largest cities. The relationships between the core and the periphery have been close and interlinked as with most cases decline in core caused expansion of peripheries, while in some cases there was decline with increase in city core. The above analysis depicted in Fig No 1 and 2 and Table No 4

Table No 4: Growth Rate of Large Metropolitan Cities 1991-2011

Cities			
City	Growth Rate 2011-01	Growth Rate 2001-91	Decadal change
MUMBAI	0.39	1.88	-1.49
DELHI	2.09	-0.74	2.83
KOLKATA	-0.18	-0.58	0.39
CHENNAI	0.68	1.23	-0.55
BANGALORE	6.78	2.67	4.11
AHMADABAD	4.12	2.24	1.88
SURAT	5.03	5.85	-0.82
HYDERABAD	0.84	1.92	-1.08
PUNE	2.07	4.82	-2.75
KANPUR	0.74	-29.19	29.93
LUCKNOW	2.54	3.00	-0.46
NAGPUR	1.57	2.33	-0.76
INDORE	2.81	3.22	-0.41
BHOPAL	2.10	3.16	-1.07
VADODARA	2.17	2.84	-0.68

AGRA	2.18	3.58	-1.39
JAIPUR	2.72	4.65	-1.93
NASHIK	3.22	4.95	-1.73
MEERUT	2.00	3.49	-1.50
ALLAHABAD	1.38	2.33	-0.95
VARANASI	0.83	1.69	-0.86
VISAKHAPATNAM	5.06	3.26	1.79
PATNA	1.62	4.03	-2.41
LUDHIANA	1.47	2.93	-1.47
AMRITSAR	1.65	3.48	-1.83
INDIA	2.23	1.56	0.67
Mean	2.23	1.56	
SD	1.61	6.58	
COV	71.97	421.23	

Source: Compiled from Census of India 1991 and 2001

Effect of Urbanisation has been very strong in the peripheries in comparison to the city or state. Bangalore and Ahmadabad has a different trend from the above mentioned metropolitan cities. The residuals of the city to the peri-urban have been negative indicating a decline in peri-urban growth. Hyderabad has trends similar to Mumbai, Kolkata or Delhi. Vishakapatnam, on the other hand, has negative residue across the two decades and in the city as well as state, meaning urbanising and growth has no taken place in an extensive way.

Pune and Nagpur have positive residuals for both the decades in the city, indicating the dominance of peri-urban growth. Nashik displays an opposite trend, as in declining peri-urban rate, for both the decades in correspondence with the growth rates. Ahmedabad, Surat and Vadodara have the aforesaid trend (Sivaramakrishnan et al. 2005).

Patna, Ludhiana and Amritsar, has positive, residuals in the present decade in the case of the city, highlighting the growing importance of peri-urban areas in the recent decade. The respective states of Bihar and Punjab have not been able to keep up with their city's rate of Urbanisation. Even at all India level, the city has a minuscule decline, while positive values all over indicate hopeful future of urban fringes.

Table No 5: Growth Rate of peripheries of Large Metropolitan Cities 1991-2011

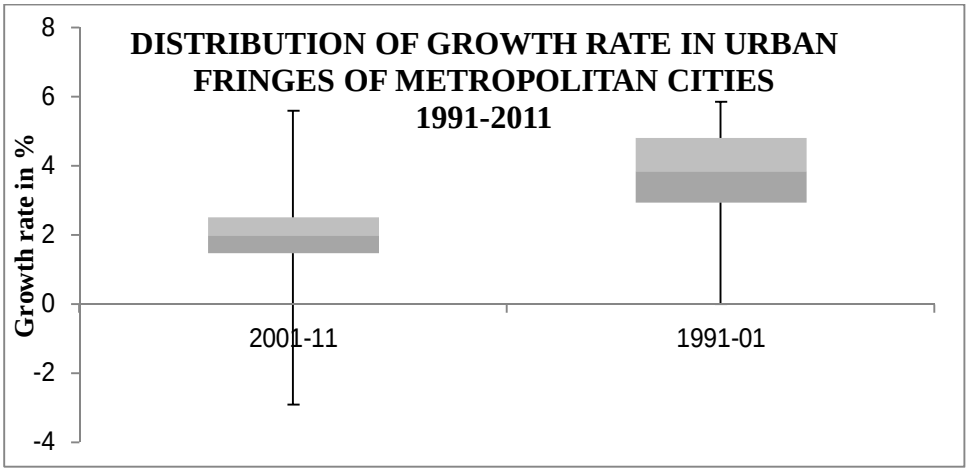
peri-urban	Population Growth (Urban)		
City	Growth Rate 2011-2001	Growth Rate 2001-1991	Decadal change
MUMBAI	2.51	5.85	-3.34
DELHI	2.13	5.12	-2.99
KOLKATA	1.74	2.96	-1.22
CHENNAI	3.17	3.58	-0.42
BANGALORE	3.28	3.53	-0.25
AHMADABAD	2.43	4.21	-1.78
SURAT	-0.61	3.85	-4.47
HYDERABAD	4.61	4.62	-0.01
PUNE	4.02	5.23	-1.21
KANPUR	1.38	1.07	0.31
LUCKNOW	1.11	3.97	-2.86
NAGPUR	3.17	5.80	-2.64
INDORE	5.59	3.88	1.71
BHOPAL	2.39	0.00	
VADODARA	-2.91	0.60	-3.51
AGRA	1.57	4.81	-3.24
JAIPUR	1.88	1.71	0.17
NASHIK	0.65	1.39	-0.74
MEERUT	2.00	5.50	-3.49
ALLAHABAD	1.47	5.69	-4.21
VARANASI	1.42	3.38	-1.96
VISAKHAPATNAM	2.15	0.81	1.34
PATNA	1.73	3.34	-1.61
LUDHIANA	1.52	4.37	-2.86
AMRITSAR	2.13	2.95	-0.81
INDIA	2.02	3.53	-1.67
Mean	2.02	3.53	
SD	1.63	1.73	
COV	80.74	49.10	

Source: Compiled from Census of India 2001 and 2011

The dominance of million plus cities continues to be increasing very strongly since the last two decades. Delhi being the capital of the country is growing faster compared to its counterparts like Mumbai, Kolkata and Chennai. Among the first six metros namely Mumbai, Kolkata, Delhi, Chennai, Hyderabad, Bangalore, all of them have declining core except Banglore which has a growing core as well as growing periphery. Unlike Surat its fringes are growing but at a slower rate in comparison to the core. The analysis of six metros reveals that

the peripheral growth plays a significant role in the growth of city through urban sprawl. The following results are depicted in a table below and Figure 3.

Figure 3: Distribution of Growth Rate In Urban Fringes Of Metropolitan Cities 1991-2011



Source: Census of India 1991 2001 and 2011

The nature of urban growth in the peripheries of the largest 25 metropolitan (Table No and) cities is characterized by large variation over the two decades. The decade of 1991-01 has experienced high but more or less a stable and uniform across the cities in the previous decade. The outliers are more consistent and positive in character. The next decade has seen a contrasting picture, while growth rate had declined than the previous decade it is more unbalanced in nature and uneven in character concentrated in and around large Metropolitan cities creating top heaviness. The outliers are highly variable and depict negative picture. The results are shown in the chart above.

ii) Size class of cities

The number of towns and cities in the peri-urban areas has increased phenomenally. Mumbai has 11 class I towns, 3 class II towns, 12 class III town, 24 class IV and 23 class V-town. Smallest class size of IV has 4 towns. Delhi in is peripheries has around 12 class I towns, 5 class II towns, 13, class III towns, 7 class IV and 4 class V towns. Class IV has a minuscule number of 3 towns. It is seen that class III, IV, and V towns have are more in number having been increased over the decades. These towns are mostly concentrated around large metropolitan areas and almost absent in the case of other smaller in size, metropolitan towns. The above results are depicted in the table No 6 and figure 4 below.

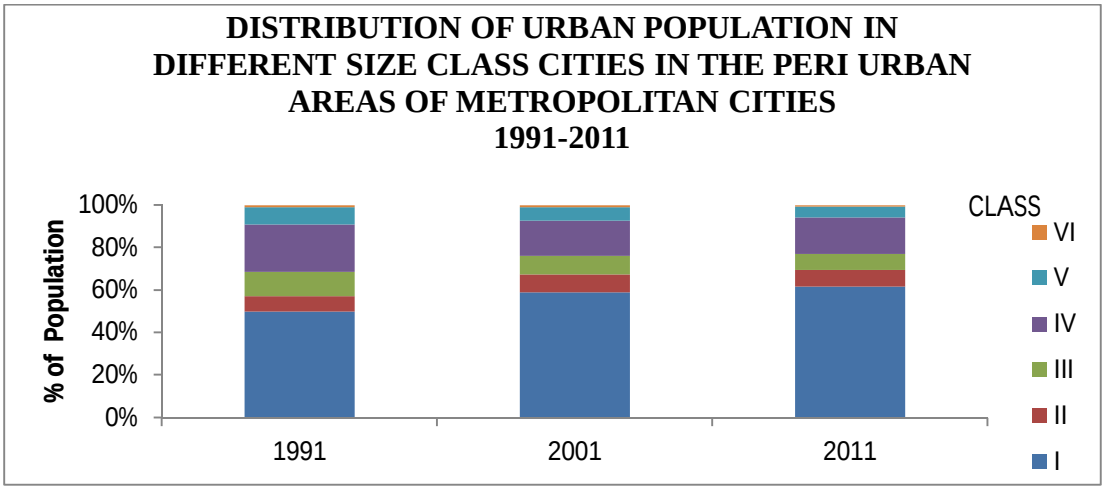
Table No 6: Growth Rate of Cities and its peripheries in size class wise

CLASS	2011	% of Urban POP_11	2001	% of Urban POP_01	1991	% of Urban POP_91
I	31229734	61.66	20326042	58.98	13032168	49.64
II	3906325	7.71	2928397	8.50	1885848	7.18
III	3839512	7.58	2931896	8.51	2931896	11.17
IV	8779356	17.33	5800591	16.83	5823734	22.18
V	2548724	5.03	2106718	6.11	2106718	8.03
VI	347566	0.69	370148	1.07	266122	1.01
Total	50651217	100.00	34463792	100.00	26046486	99.22

Source: Census of India 1991 2001 and 2011

This 'top heavy trend of urbanisation' (Kundu and Sarangi, 2005) has enormous implications on the nature and dimensions of metropolitan growth. In fact, it has been diffused outwards, and the process of accretion outside the city has generated a transition zone between rural and urban landscapes. This transition zone similar to 'regulatory fractures' (Sassen, 2006), often characterised by illegal space, violates the normal norms and standards followed in city development process but is accepted as an essential space for rent seeking. The core–periphery expansion (Sassen, 2006, Sivaramakrishnan et al., 2005; Sridharan 2006, in Dupont & Sridharan: 2005) is often fuelled by the ever-shifting equations between 'legal and illegal, formal and informal, and authorised and unauthorised' (Roy, 2009). Akin to what Sassen (2006) states as 'scattered territorialities', expansion in the Indian context also fuels 'crisscrossing jurisdiction, diverse alliances and organisations'.

Figure 4: Distribution of Urban Population In Different Size Class Cities In The Peri Urban Areas Of Metropolitan Cities 1991-2011



Source: Census of India 1991 2001 and 2011

Indian cities are characterized by top heaviness in their urban structure and class wise distribution of cities. Share of class I cities have particularly in the urban fringes of large metropolitan cities have grown steadily from about 50% in 1991 to 59% in 2001 and 61% in 2011. In class II cities the share had increased from 1991 to 2001 but has declined in 2011 by 1% from 8.5% to 7.18%. Size class which was observed to have a positive increase in urban load were class III and class IV and V cities. Class VI cites has the minimum share of urban population of less than 1 % in 2011 which is barely significant. This proves that urban growth has been concentrated around large metropolitan cities or their agglomeration and the distribution of the cities has been stagnant over the decades. Urban expansion has not been consistent all over the country and is concentrated in few pockets indicating unequal urban growth.

The population growth rates of these different size class cities also corresponds as the Class I has the highest growth rates over the two decades having minimal decadal changes. Growth rates over all the size classes have been negative supporting the above hypothesis. Urban growth is more favoured towards the higher class cities as highest decline was suffered by the class VI cities.

Table No 7: Growth Rate of peripheries of large cities in size class wise

CLASS	2001_11	1991_2001	Change
I	4.07	4.75	-0.68
II	2.60	2.86	-0.26
III	3.40	5.48	-2.08
IV	2.53	4.85	-2.32
V	1.98	3.30	-1.32
VI	-2.66	3.64	-6.30

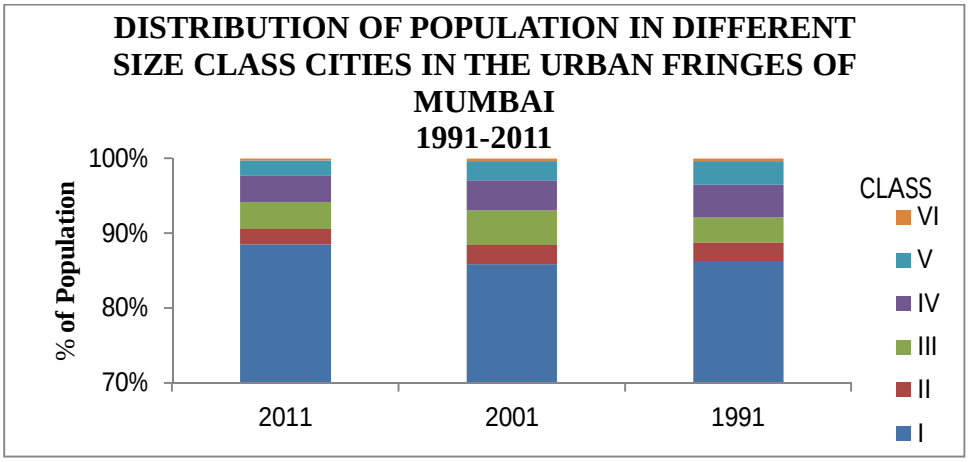
Source: Census of India 1991 2001 and 2011

c) PERIPHERIES OF MUMBAI AND DELHI

In this section we try to delve into more micro level of the chosen two cities (Mumbai and Delhi) for analysis to see whether the same trends and patterns are displayed in case of larger analysis or not and to understand the relationship between urban core and periphery. Peri urban Mumbai and Delhi have high urban growth rates of 2.51% and 2.13% respectively although declined from the previous decade. Its peri-urban areas have grown immensely particularly the areas which lie in close proximity to Mumbai marked by growth of cities such as Kalyan-Dombivli, Thane, Navi Mumbai, Mira-Bhayander Ulhasnagar, Ambarnath and Badlapur. Delhi peri-urban areas also recorded a huge increase but declining in comparison to the previous decade. Delhi with its status as the capital attracts population, especially from the working age group. Ever since the new liberal policy of the government has eased up labour market and entry of foreign investors there has been a massive change in the city as well as in the neighbouring districts of Gurgaon, Faridabad, Sonipat, Jhajjar and Ghaziabad.

In peri -urban areas of Mumbai it is observed that class I cities have remained at the top of the urban load having a large share of the population nearly 88%. Class II cites has a very low share of population in comparison to the former class indicating the primacy of the class I cities. Other size classes cities have which are of significance are class III and Class IV cities. Class VI on the lowest order has the least. In terms of growth rate also it is seen that there has been an overall decline in growth rate similar to other metropolitan cities in India exception being the class IV cities. Higher growth rates in class III cities indicates more inequality in the distribution of urban centres and population.

Figure 5: Distribution of Urban Population In Different Size Class Cities In The Peri Urban Areas Of Mumbai 1991-2011



Source: Census of India 1991 2001 and 2011

Table No 8: Growth Rate of peripheries of Mumbai in size class wise

CLASS	2011	2001	1991
I	88.60	85.94	86.34
II	2.04	2.50	2.47
III	3.60	4.66	3.34
IV	3.48	4.02	4.40
V	2.10	2.57	3.12
VI	0.18	0.31	0.33

Source: Census of India 1991 2001 and 2011

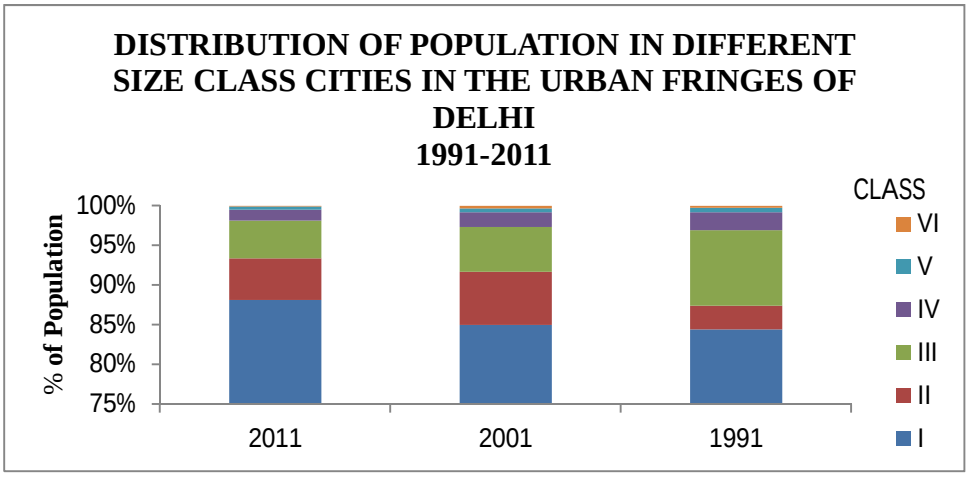
Table No 9: Change of Growth Rate of peripheries of Mumbai in size class wise.

Mumbai	Cities	2011_01	2001_91	Change
I	9	5.189	7.003	-1.814
II	5	4.055	6.173	-2.173
III	7	1.194	14.104	-12.91
IV	26	4.076	4.69	-0.614
V	32	2.58	2.93	-0.35
VI	5	-5.04	4.767	0.28

Source: Census of India 1991 2001 and 2011

In case of Peri urban Delhi similar to Mumbai it retains the top heaviness of the urban structure in its Class I cities. Unlike Mumbai it has more population distributed in Class II and Class III cities and miniscule in class V and VI, indicating more uniform urbanization in comparison to Mumbai. This is supported by population growth rates, which has a positive value in case of class III. A huge decline was noted in Class VI cities which bespeak the similar biasness in urban growth as found in Mumbai. The table 10 and 11 and figure 6.below gives the size class distribution and the growth of cities in Peri Urban Delhi.

Figure 6: Distribution of Urban Population in Different Size Class Cities In The Peri Urban Areas Of Delhi 1991-2011



Source: Census of India 1991 2001 and 2011

Table No 10: Growth Rate of peripheries of Delhi in size class wise

CLASS	2011	2001	1991
I	88.14	84.99	84.44
II	5.25	6.71	2.94
III	4.73	5.61	9.50
IV	1.42	1.89	2.30
V	0.34	0.45	0.55
VI	0.13	0.34	0.27

Source: Census of India 1991 2001 and 2011

Table No 11: Change in Growth Rate of peripheries of Delhi in size class wise

Delhi	Cities	2011_01	2001_91	Change
I	5	5.18	5.65	-0.47
II	2	2.86	4.01	-1.15
III	13	4.44	2.76	1.68
IV	7	2.73	3.01	-0.28
V	4	2.51	4.86	-2.35
VI	3	-5.60	9.33	-14.93

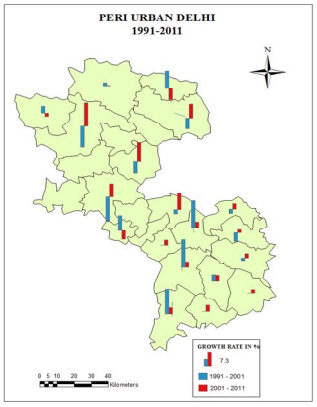
Source: Census of India 1991 2001 and 2011

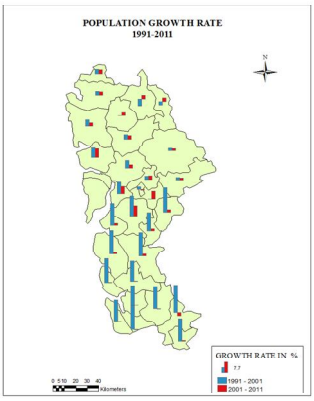
As previously mentioned the districts and tehsils of the peripheries of these two metropolises have undergone change of boundaries numerous times. Three new tehsils carved out of older ones and recently a new district Palghar has been carved out of Thane due to its increase ingrowth. Delhi has undergone more changes in administrative boundaries due to similar reasons with increase from five districts and 15 tehsils of Sonipat, Rohatak, Gurgaon, Faridabad and Ghaziabad in 1991 to 7 (Jhajjar and Gautam Buddha Nagar) districts and 20 tehsils in 2001 and further division of 9 (Mewat and Palwal) districts and 25 blocks in 2011.

The given map of Mumbai shows the exponential growth rate of population in Mumbai. In the peripheries of Mumbai 2001, the highest growth rate is that of Poladpur, followed by Alibaug and Pen. All of these tehsils are in the Raigad district. The belt of higher growth rate is found in the southern part which graduates to the lower growth rate in the northern portion. The zone of lowest growth rate, however, is found in the northern region namely in Jawhar and Mokhada. The growth of population in 2011 shows a completely different scenario, lowest growth rate now is of the tehsil Poladpur which located in the southern most corner of the Mumbai region. The belt of higher growth rates has shifted towards the northern part of the Mumbai city where Vasai and Thane show the highest growth rate of 5.24 and 4.18 respectively. This shows that these cities are acting like population magnets, pulling out the population from the Mumbai city. This is shown in.
Map No 2 : Population Growth in Mumbai and Delhi

POPULATION GROWTH IN PERI URBAN DELHI AND MUMBAI: A COMPARISON

1991-2011



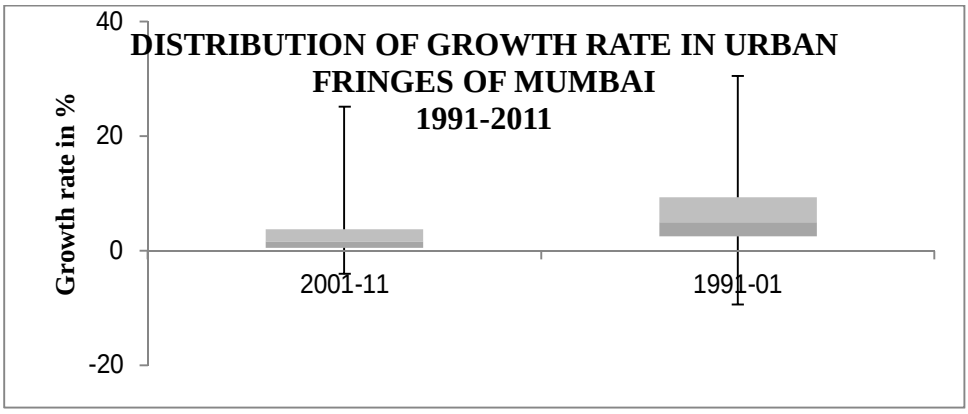


Source:

Census of India 1991 2001 and 2011

The given map of Delhi shows the exponential growth rate of population in the fringes of Delhi. In the peripheries of Delhi 2001, the highest growth rate is that of Ganaur, followed by Pataudi and Maham. All of these tehsils are spread over the districts of Gurgaon , Jhajjar and Sonipat. The belt of higher growth rate is found in the northern part which graduates to the lower growth rate in the southern portion. Jhajjar commands a growth rate of -12.72% slowest among all the tehsils. The zone of lowest growth rate, however, is found in the central region namely in Sohna and Jhajjar and Rohtak. The growth of population in 2011 shows a completely different scenario, Rohtak which previously had the lowest growth rate in 2001; do not show the similar scenario in 2011. The lowest growth rate now is of the tehsil Beri which located in the central part of Jhajjar region. The belt of higher growth rates has shifted towards the southern and central part of the Delhi city where Gurgaon, Rohtak and Bahadurgarh shows the highest growth rate of 8.83% and 10.5% respectively. This shows that these cities are acting like population magnets, pulling out the population from Delhi city. The figure 7 describes population growth in Mumbai and its hinterland.

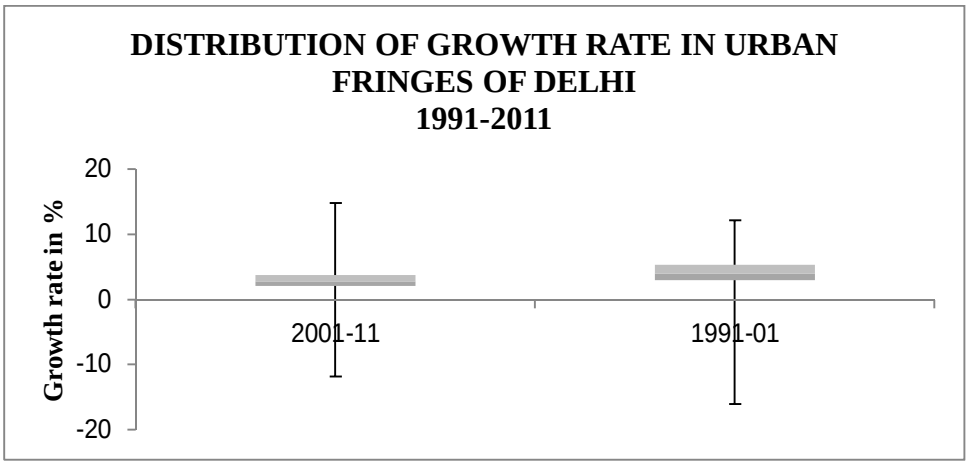
Figure 7: Distribution of Growth Rate In Urban Fringes Of Mumbai 1991-2011.



Source: Census of India 1991 2001 and 2011

The nature of urban growth in the urban peripheries of the Mumbai is characterized by lesser fluctuation over the two decades. The decade of 1991-01 has experienced higher growth rate with more stable and uniform across the cities in the previous decade. The outliers are more variable and even negative in character. The next decade has seen a more or less similar scenario; while growth rate has been less than the previous decade it is less exclusive in nature and displays slight evenness in character. The results are depicted in the figure 8 below.

Figure 8: Distribution of Growth Rate In Urban Fringes Of Delhi 1991-2011



Source: Census of India 1991 2001 and 2011

Delhi and Mumbai peri- urban in comparison displays different picture, although it has the same trend and character over the two decades. The decade of 1991-01 has experienced low and negative growth across the regions. Its outliers in case of Mumbai are more uniform

across the region in the previous decade. The outliers of towns and cities in context of growth rate are more variable and display negativity in character. The next decade has seen a familiar picture, while growth rate of towns and cities has been less than the previous decade. It is more even in character. The outliers are highly variable and depict negative picture. The results are shown in the chart above.

d) CONCLUSION

In the post-2001 census period, many metropolitan cities went for spatial expansion. These include: Hyderabad, Bangalore and Chennai. As Shaw (2005) shows, the peri-urban expansion of metropolitan cities is threatening the quality of life of these transformation zones. The 'neoliberal urbanism' has brought in unevenness in inter-urban and intra-urban development processes in India (Guha, 2009). As revealed by the 2011 census report, the dispersal of urban population, especially in southern states of India during the period 1991–2011 has been significant; hence, the extent of expanded area in million plus cities of southern states is also significant.

However, if we look at the relationship of population growth and area across million plus cities, it becomes clear that there is a marked imbalance between the growth of population and expansion of area; the population growth rate has been consistently higher than the growth rate of the area in these cities[1].

The peri urban areas of the largest metropolitan cities like Mumbai, Kolkata, Chennai, Hyderabad have grown faster than the city exceptions to this is Delhi and Bangalore which has grown simultaneously at the core and the fringes. These cities have not grown sufficiently to achieve stagnantation and thereby decline as in case of others. Enormous population growth on the other hand resulted in lateral spread in order to accommodate the population. Metropolitan cities of smaller size such as Pune, Nagpur, Indore, Kanpur, Amritsar and Vishakhapatnam had grown at a faster rate than its peripheries in the present decade (2001-11). There growth was faster in comparison to the large metropolitan cities indicating bright future as these smaller metropolitan cities would be joining the six largest metropolitan cities in decades to come.

Urbanisation in the recent decade is in-equally distributed and unbalanced developed in pockets mostly in and around the largest metropolitan cities displaying top heaviness. Both

the nature of urban growth has been exclusionary (Kundu 2009) in nature. Lack of a metropolitan-level government in India and the multiplicity of institutions at various spatial and organisational levels has resulted in ‘scattered territorialities' and ‘crisscrossing jurisdiction' (city and the villages), new alliances (coalitions between bureaucracy, politicians and the rent seekers) and ‘organizations' (private and public). It got reflected in the form of core–periphery inequalities, and intra-city inequalities in the land as well as infrastructure development.

CHAPTER 3

LAND USE CHANGE IN PERI-URBAN AREAS

INTRODUCTION

In recent times, urban expansion beyond city limits had lowered agricultural land use in the peripheral districts. The major metropolitan cities, as well as other cities such as satellite towns in India, have witnessed vast changes in the last two decades in comparison to the state. Growths of these regions are marked by a huge spurt in population growth, in socio-economic parameters & haphazard change of land use from agriculture to non-agricultural use (e.g. industries, housing, transport networks etc) due to exposure to rural urban interaction and shifting focus of the economy towards non agricultural activities.These areas lying in close proximity to the metropolitan cities are characterised by a marked decline in net sown areas escalation and competitiveness of land values. The peripheries of these cities have experienced a huge increase in demand for land due to the shift of industries, high returns from non-agricultural land use& people's preference to live in the outskirts (Chadha et al 2004). This effectively displaces people following agricultural livelihood. Management of land for the remaining agricultural land becomes more efficient as barren and fallow lands brought under cultivation lowering their shares (Chadha *et al* 2004). Land for agriculture gives way for industries & real estate. In fact many MNCs have set up their manufacturing units in these areas as a method of outsourcing. Locals previously engaged in agriculture have been forced to look for alternative work in factories, construction sites etc. This resulted in a significant change in the economy as well as the unprecedented decline in agricultural areas and much of the development taking place is unplanned (Narain 2007).

On this occasion, the peripheries of largest twenty five million plus cities (2001 base year) are discussed in context to the land use change. This chapter consists of two parts; the first part broadly explains the land use change over the two decades with focus on outflow of agricultural land to non agricultural use focusing particularly on the peripheries of two largest metropolitan cities of Mumbai and Delhi with aid of satellite images.

a) CONCEPTUAL FRAMEWORK

The framework of analysis involves land use in all the categories from net sown area to forests involving barren land, fallow land, pastures land for non agricultural land uses etc. the land use is first grouped into categories then the figures is converted into percentages for comparison across the two decades. The aim of the analysis to understand whether land use change from agriculture to non agricultural use a direct consequence of population growth and urban expansion in the peripheries. Also it attempts to explain the causative factors of land use change in the peripheries of large metropolitan cities and observe the relationship between population growth land use change, has it been consistent.

Maharashtra has the highest level of urbanisation with the latter being the most urbanised state in India and the former second, in terms of absolute urban population, with one of the underlying causes of such expansion is migration (Bhagat 2003). Mumbai, Maharashtra's largest city with its vast periphery although Delhi has much larger periphery. Migrating to the urban areas is a livelihood strategy that sets off the chain of events that follow. The growth of the cities in their peripheries is a strategy to sustain its growing population. Presently they are facing limitations to growth due to geographical impediments and on the other hand, overpopulation is creating pressure on the carrying capacity of the land, thereby resulting in the growth of hinterland at the cost of narrow stretch of fertile agricultural land of the coastal plains in between the city and the Western Ghats.

Delhi on the other hand situated on the Indo Gangetic flood plain is unhindered in spatial expansion on the rural hinterland. Therefore its pace of growth as well as change in land use is far more drastic in comparison to Mumbai. Its status as the capital and core of the National Capital Region attracts migrants, investment and much sought after for SEZ's. Therefore spatiotemporal analysis of land use and occupation change is studied in detail.

b) LAND USE CHANGE

Agricultural lands in the urban fringes are being continually periled to competition from urban uses resulting in volatile land values near the urban centres.Land in the peripheries of large metropolitan cities (million plus) are increasingly utilised by high return non-agricultural uses displacing agriculture (Nkambwe and Arnberg, 1996) as well as the agrarian population from their livelihoods. The present study is mainly directed at the appreciation of

variation in agricultural land use over the peripheries of million plus cities of India (2001 Census) over two decades. It is also related to the changes undergone in the spatial distribution of agricultural use of land, which is the result of the direct application of efforts to the available land resources. The quality or the nature and the quantity of the efforts applied are related to the decision made by farmers regarding the actual use of land.

Land is a sought-after resource in the peripheries, its supply is affected by such factors as location of city, laws related to land-use, the structure of land markets and urban management. Nevertheless, increasing population size of cities and physical expansion of the built-up area beyond the city limits as well as rising demand for more land for various purposes induce changes in urban land-use. The land related problems are impounded in these cities because of the distorted land markets and ineffective urban land management (Bernstein: 1994). In most developing countries, the expansion of urban population has resulted in a rapid rise in the demand for housing, land for industry and commerce, and public buildings and infrastructure.

Land use change in the peripheries of large cities

Land use change was observed in the following nine categories of forests, Forests, Area Under Non-Agricultural Use, Barren and Uncultivable Land, Permanent Pastures and Other Grazing Land, Land under Miscellaneous Tree Crops and Groves not included in Net Area, Culturable Waste, Fallow Land, Net Sown Area, Area Sown More than Once. The following terms are explained below:

1. Reporting Area for Land Utilisation Statistics: The Reporting area stands for the area for which data on land use classification are available. In areas where land utilization figures are based on land records, reporting area is the area according to village papers, i.e. the papers prepared by the village accountants. In some cases, the village papers may not be maintained in respect of the entire area of the State. For example, village papers are not prepared for the forest areas but the magnitude of such area is known. Also there are tracts in many States for which no village paper exists. In such cases, estimates of classification of area from agricultural census, 1995-96 and 2000-01 are adopted to complete the coverage.
2. Forests: This includes all land classified either as forest under any legal enactment, or administered as forest, whether State-owned or private, and whether wooded or maintained as potential forest land. The area of crops raised in the forest and grazing

lands or areas open for grazing within the forests remain included under the "forest area".

3. Net sown area: This represents the total area sown with crops and orchards. Area sown more than once in the same year is counted only once.
4. Area under Non-agricultural Uses: This includes all land occupied by buildings, roads and railways or under water, e.g. rivers and canals, and other land put to uses other than agriculture.
5. Barren and Un-culturable Land: This includes all land covered by mountains, deserts, etc. Land which cannot be brought under cultivation except at an exorbitant cost is classified as unculturable whether such land is in isolated blocks or within cultivated holdings.
6. Permanent Pasture and other Grazing Land: This includes all grazing land whether it is permanent pasture/meadows or not. Village common grazing land is included under this category.
7. Land under Miscellaneous Tree Crops, etc: This includes all cultivable land which is not included in 'Net area sown' but is put to some agricultural use. Land under casuring trees, thatching grasses, bamboo bushes and other groves for fuel, etc. which are not included under 'Orchards' are classified under this category.
8. Culturable Waste Land: This includes land available for cultivation, whether taken up or not taken up for cultivation once, but not cultivated during the last five years or more in succession including the current year for some reason or the other . Such land may be either fallow or covered with shrubs and jungles which are not put to any use. They may be accessible or inaccessible and may lie in isolated blocks or within cultivated holdings.
9. Fallow Lands other than Current Fallows:This includes all land which was taken up for cultivation but is temporarily out of cultivation for a period of not less than one year and not more than five years.
10. Current Fallows: This represents cropped area which is kept fallow during the current year.
11. Net Area Sown: This represents the total area sown with crops and orchards. Area sown more than once in the same year is counted only once.

The above terms weregrouped into the following categories of Net sown area, Non agricultural land use, Total cultivable land, Land available for cultivation Land not available

for cultivation and forests for analysis.The following terms used for analysis are explained below:

1. Forests
2. Net sown area
3. Area under Non-agricultural Uses
4. Total cultivable land: This includes land under net sown area and fallow lands.
5. Land available for cultivation: includes total cultivable land as well as barren land, permanent pastures and land for miscellaneous groves etc.
6. Land not available for cultivation: Land not available for cultivation would include forest area under non-agricultural use, barren and uncultivable land.

Net sown area (NSA)

Net sown area is an important indicator of land use change in peri-urban areas. As urban expansion takes places agricultural land is first encroached upon. Areas near the city are very fertile and hence they produce food and other perishable commodities for the daily needs of the city. Their decline has brought about important changes in the occupational structure of the workers. In peri-urban districts of Mumbai (Raigarh and Thane), there has been a marginal decline of -1.38% in land under net sown area. The changes over the two decades were 1 to less than one with declining trend. The decline in net sown area was more on the fringes of Pune, from 66% in 1991 to 58% in 2001 to 56% in 2011.Changes over the two decades was less than -3.5%. The peripheries of Nagpur and Nashik also report a similar trend.

Peri-urban Delhi, which consists of areas partly in Haryana and in Uttar Pradesh, has a higher area under net sown area of about 67% in 2011 and 74% in 2001 and 74% 1991 respectively. It has not shown much decline over the decades only the major decline of about-7% was noted in the present decade. The area around Delhi being in close proximity to the capital has undergone massive changes; land from agriculture has been taken up for industries a real estate in order to accommodate its growing population. Other cities in Uttar Pradesh have too undergone a decline in net sown area such as Kanpur, Lucknow, Agra, Allahabad and Varanasi. All these cities have shown an increase in net sown area in 2001 corresponded to an increase in land under non-agricultural use. In the next decade, there has been a decline in net sown area followed by the increase in the latter. Meerut and its fringes have shown

exceptional characteristics in comparison to other cities as it has shown the consistent decline over the decades.

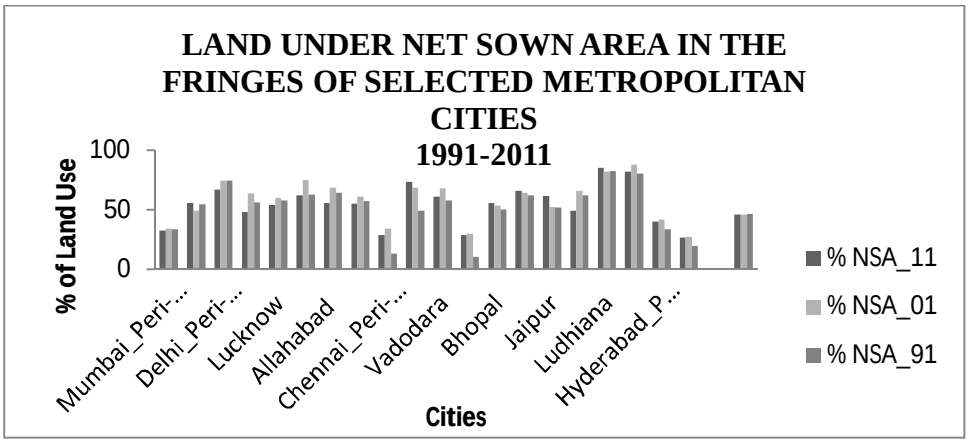
In case of the peri-urban fringes of Kolkata also had about 61% of net sown area in 1991, followed by an increase in 2001 to 61% a change by 4% and again a decline in the present decade to 55% by almost 6%. The increase in net sown area may have been due to better land management facilities in and around the city.Chennai and its peri-urban areas have a similar trend like Kolkata. Unlike other metropolitan cities, peri urban Bangalore has noted an increase from 22% in 1991 to 47% in 2001 to 23% in the next decade. The peri-urban areas in comparison to the city have a lesser percentage of the area of around 2-4% under net sown area which has declined over the decades (D' Souza and Nagendra 2011).

Ahmadabad and its peri-urban areas, unlike other cities, have shown an increase in net sown area from 49.7% in 1991 to 69% in 2001 and 69.01% in the present decade. The decadal changes were large and much of it is attributed to the changing boundaries and expansion of the city. Cities of Surat and Vadodara also show a similar trend.

In comparison to the states, the urban fringes of Bhopal and Indore have shown far more increase from 1991 to 2001 and then increase but at a lesser rate. Net sown area have in case of Bhopal have increased from 50% to 53% from 1991 to 2001. Fringes of Jaipur have shown the similar trend like the latter. The peripheral areas of Patna depicted fluctuations over the decades. The peripherals areas of Amritsar and Ludhiana recorded an abrupt increase in net sown area followed by a decline in land under non-agricultural use. In Hyderabad the area under net sown area underwent a decline (-1.95%) in 2001, again an increase of around 9% in the following period. Vishakhapatnam, on the other hand, shows increasing trend in net sown area, followed by the slight decrease in the recent decade.

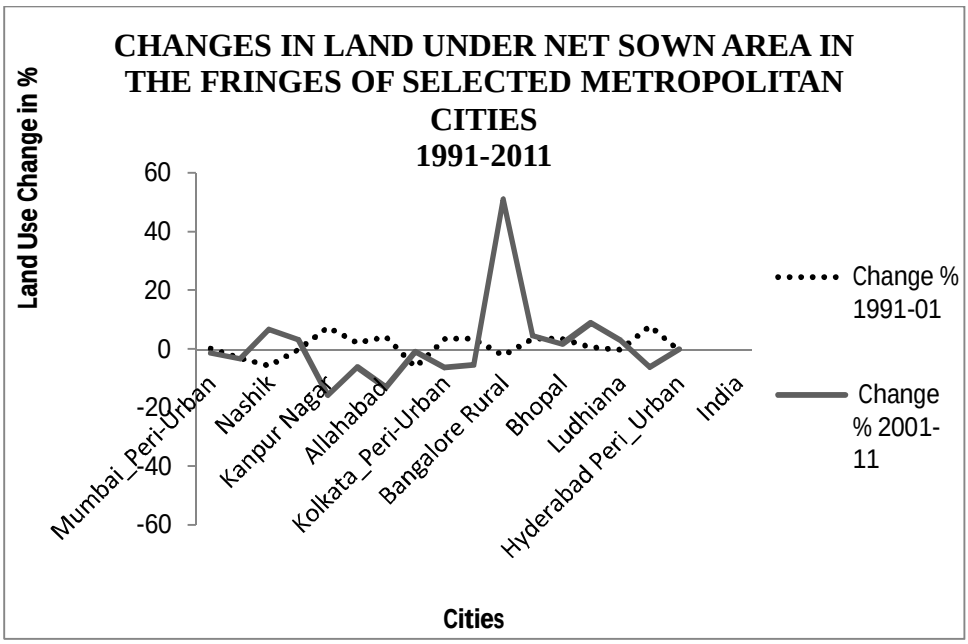
One of the main contributing factor to the urbanisation process in the periphery, emerges from the pattern of foreign direct investment (FDI) reaching the mega-city, which is a preferred locations as they have better infrastructure and access to the centrality of the megacities. Therefore, the recent emergence of the urban fringe within the regional development framework has assumed significance owing to the location of 'new' economic activities in these spaces that have been superimposed upon the pre-existing order and constitute an outcome of both internal and external investment (Mallik 2014). Thus, peri-urban space provides the platform wherein the forces of globalisation and localisation intersect (Webster, 2002).

Figure 1: Trends in Net Sown area 1991-2011



Source: DACNET 1991-2011

Figure 2: Changes in Net Sown Area 1991-2011



Source: DACNET 1991-2011

Non agricultural land use (NAU)

Peri-urban areas around Mumbai have to shown the similar trend. Much of the increase in Non-agricultural land is due to the urban expansion for both residential as well industries. Although the increase has been marginal but it had been consistent over the decades. Therefore changes over the decades didn't have major fluctuations. Pune and Nagpur are the next largest urban centres in the state. These two cities also have the same characteristics as

in the case of peri-urban districts of Mumbai. Nasik is an exception a decrease in non agricultural land use.

In Delhi and its surrounding peri-urban areas the increase in non-agricultural land use has grown in leaps and bounds, at a fast pace. From over 10% in 1991, to 13 in 2001 and now 22.7% in 2011. With a change of 3% to 11% in two decades, the urban fringes have undergone massive changes and have transformed immensely. One of the main contributing factors is the emergence of SEZ's. In Haryana, largest area has been devoted for SEZ (89%) from Gurgaon which is also agriculturally highly developed. Its location has been influenced by urban bias and rank in terms of income (Sen; 2008) (Banerjee and Das 2008)

The picture is not same as in the case of other cities in the region such as Kanpur where it has declined over the decades and the values have gone in negative. Lucknow, on the other hand, has witnessed an increase of less than 0.5% from 1991-2001 and a huge leap of 10% from 2001-11. Agra and Varanasi depicts a steady increase from 8% and 11% in 1991 to 9% and 13% in 2001 and 10% and 17% in 2011; changes were stable over the decades.

In the urban fringes of Kolkata land under non-agricultural use has gone up from 16% in 1991 to nearly 24% in 2001 and 29% in the present decades. The change in land use was greater about 7.79% in the previous decade from 1991-01 more than all over the state in comparison to the next decade where it was about 5% nearly 2% less. This may be attributed to the stagnation of the industries and urbanisation process as a whole in the region has declined. There has also been a spurt in growth of population and towns and cities in the peripheries of the city producing the above picture. Land in many instances have been forcefully acquired from farmers for the purpose of SEZ, particularly around Kolkata which is second highest after Delhi (Sen et al 2008) (Pradhan and Mukerjee 2009).

Fringe districts of Chennai like Kolkata had reported an increase in non-agricultural use steady over the decades like the former it has seen more increase in the previous decade in comparison to the present decade. From 21% in 1991 to 30% in 2001 and 32.5% in 2011 is a remarkable increase. There has been a decadal change of 2.07% in the present decade in comparison 9.54% in the previous decade. Large scale industrialisation processes in the liberalisation period have been the major factor for growth and slowing down in the next decade (Mallapattu and Reddy 2013) an (Nagaranjan et al 2011).

Peri-urban areas of Bangalore have a unique trend. The peri-urban area has registered a decline in non-agricultural land use steadily over the decades the values being in negative. The state unlike the city or the peri-urban has shown a marginally increasing rate. The increase in foreign direct investment particularly in information technology industry has been the causative factor of growth in the recent decades. Urban fringe into country-sides adjoining big cities like Bangalore shows indisputable evidence of the mindless acquisition of huge tracts of agricultural land by land sharks, speculators in real estate and money lenders. They have become 'urban deserts' or fenced-in enclosures. Neither are they in agriculture nor constitute urban build-up area, but are lying idle and barren with practically no economic returns. Chunks of land are now semi-developed layouts with attractive billboards waiting for prospective buyers. This kind of unproductive lands with barbed wire fences extent up to 30–35 km from the city boundary (Lakshmana 2014) (Sheshadri 2012).

Fringes of Ahmedabad and its peri-urban areas have reported the gradual increase from 6.47% in 1991 to 9.53% in 2001 and 10% in 2011. Surat on the other had has represented the decline over the decades. In the state level land has been devoted to SEZ's in large scale from districts where agricultural development is medium to low therefore the nature of land devoted to SEZs has not been major (Sen et al 2008) and (Sheshadri 2012).

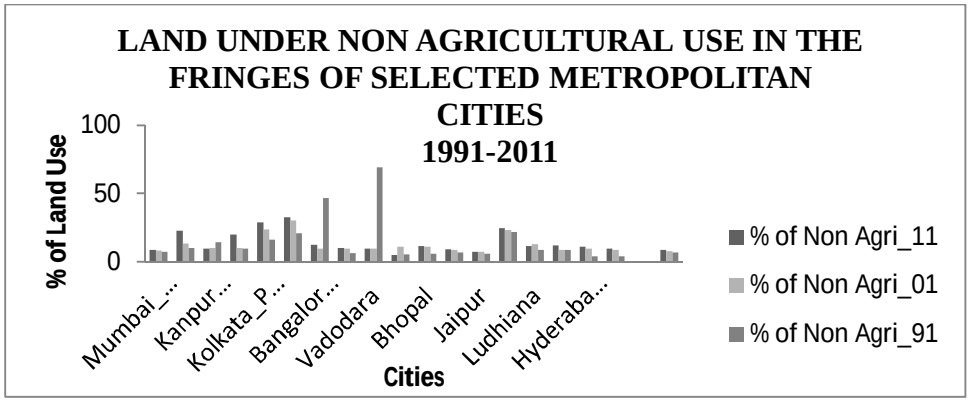
Peripheral areas of Bhopal and Indore have seen a massive decline in non-agricultural land use in from 1991-01 from 58% and 67% respectively to 11% and 8%. A huge decadal change of -47% and -58% was noticed. This corresponds with the decline in the population of these two cities and their fringe areas. Present decade shows a change of 0.5% and 0.7% approximately. This indicates shrinkage of cities in some areas where the growth has slowed down. Peri-urban Jaipur and Bihar has shown similar trends.

Ludhiana and Amritsar peri urban has a slightly different picture. Its non-agricultural land use has seen a decline from 1991 to 2001, from 65% to sharply coming down at 8% and then an abrupt increase in the next decade to 74%. The sharp rise and fall is largely unexplained and might be due to the impact of green revolution. Hyderabad and its fringes have declined sharply by -32% in 1991, followed by an increase in 2001 by 7.8% and 8.5% in 2011. There is a huge decadal change from 1991-01 by -29% followed by a positive change in the next decade by 2.75%. The huge increase in growth has been attributed to the foreign investment and development of information technology industry. Visakhapatnam another port city in the state has seen immense growth in the present decade. Non-agricultural land use has gone up

in this place in the recent decade by 1%, owing to the growth of trade and commerce and shipping industry and also due to a high quantum of land has moved out for SEZ purpose in Nellore and Vishakhapatnam (Sen et al 2008).

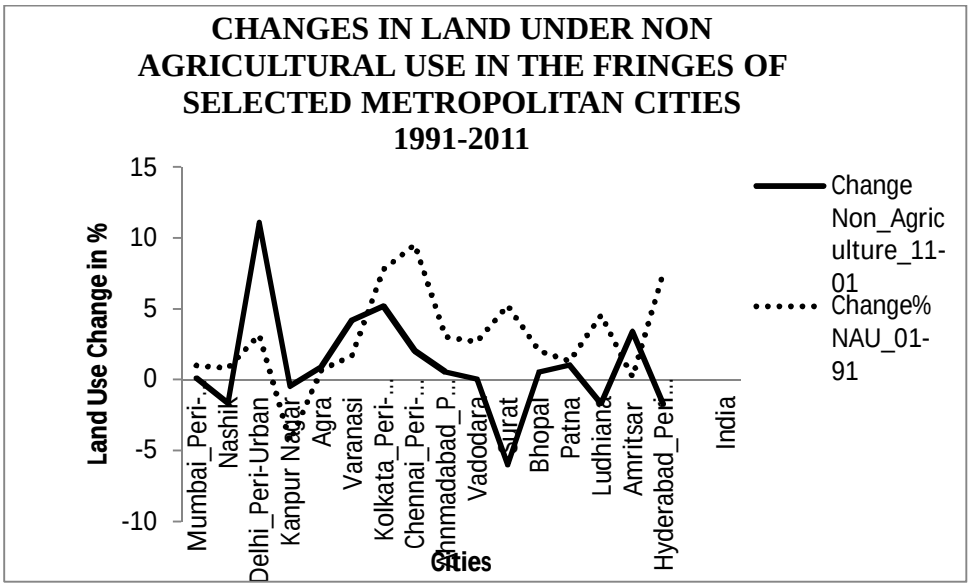
Large increase in urban area, especially in million plus cities, has been eating away useful agriculture land, and hence this phenomenal growth has changed the entire natural landscape and land use pattern. Drastic reduction of flora and fauna, encroachment of lakes, drying up of water bodies, decline in bio-diversity, etc. were the direct consequences of the changed land use pattern (Lakshmana 2014).The following figure 3 and 4 depict the above results

Figure 3: Trends in Non Agricultural Land use 1991-2011



Source: DACNET 1991-2011

Figure 4: Changes in Non Agricultural Land use 1991-2011



Source: DACNET 1991-2011

The following g table gives a summary of Land use changes from 2011-01

Table No 1: Land use changes from 2011-01 in the peripheries

Peri-urban							
Cities	Population Growth 2011_01	Change NSA	Change Non_Agricultural land use	Change forest	Change_LAA	change_TCL	change_LNAA
MUMBAI	2.51	-1.38	0.11	1.12	43.13	-0.76	0.11
DELHI	2.13	3.30	11.08	-0.29	-18.14	-17.24	-7.17
KOLKATA	1.74	-6.20	5.22	0.19	-7.39	-7.46	5.17
CHENNAI	3.17	-5.44	2.07	0.00	-19.65	-1.73	2.06
BANGALORE	3.28	51.02	2.48	-1.59	3.98	5.17	6.26
AHMADABAD	2.43	-26.50	-6.00	-13.49	9.78	-26.03	-0.37
SURAT	-0.61	-26.50	-6.00	-13.49	9.78	-26.03	3.20
HYDERABAD	4.61	0.10	11.22	-2.42	-0.22	-0.24	0.37
PUNE	4.02	-3.31	0.08	0.22	77.11	-2.78	0.21
KANPUR	1.38	-15.66	-0.46	0.34	-15.82	-13.93	1.29
LUCKNOW	1.11	-5.99	10.17	2.75	-11.76	-11.24	9.01
NAGPUR	3.17	0.40	0.04	0.00	55.64	-3.61	4.21
INDORE	5.59	1.47	0.69	0.00	-2.02	0.25	2.02
BHOPAL	2.39	1.87	0.56	0.00	-0.79	-0.57	0.79
VADODARA	-2.91	-7.29	0.08	89.41	-1.52	-8.63	-0.01
AGRA	1.57	-1.63	0.93	-2.47	1.93	0.16	0.54
JAIPUR	1.88	9.07	0.05	0.07	-0.92	-1.03	0.85
NASHIK	0.65	6.82	-1.67	-3.05	64.32	3.12	-1.56
MEERUT	2.00	-12.67	4.21	-0.47	-3.09	-2.48	3.56
ALLAHABAD	1.47	-13.17	2.12	2.71	-4.14	-4.36	1.43
VARANASI	1.42	-0.89	2.82	-1.90	16.52	-0.97	16.21
VISAKHAPATNAM	2.15	-2.60	-0.20	1.03	-0.91	1.26	1.17
PATNA	1.73	-16.49	1.07	0.00	-0.83	-0.90	-27.07
LUDHIANA	1.52	3.04	-1.65	0.13	1.52	1.52	-1.65
AMRITSAR	2.13	-6.00	3.42	1.11	-4.47	4.50	3.36

Source: DACNET 1991-2011

It has been observed that land use change with regard to agricultural use (Net sown Area, Land available for agriculture) has shown an inverse relationship with population growth.

With exceptions to Delhi, Indore, Jaipur, Nashik and Ludhiana all the metropolitan cities have reported decline. Population growth has caused decline in agricultural land use (net sown area). Peripheries of Delhi and other cities which have shown increase in NSA may have been because of intensification of agricultural land and better land management practices.

Non agricultural land use change is directly proportional to population growth increase in population has caused increase in non agricultural land use. With exceptions to Ahmadabad and Surat there has been decline in non agricultural land use in all the cities. This may have been because the city core had been growing and the peripheries were not able to grow fast enough to cause land use change. Over the years as agricultural land was taken up for settlements and other public uses such as SEZs, barren uncultivable land was converted for agriculture in an intensive way as it had declined by -2.11%. Often government agencies were directly involved in regulating land acquisition, to ease the transfer of land to the industries such as DDA or HUDA, HUDCO etc. Government acquire them through various agencies at lower than market prices from the farmers and sold them to private investors at high price. The following table 2 gives a summary of Land use changes from 1991-01.

Table No 2: Land use changes from 2001-91 in the peripheries

Peri-urban							
Cities	Population Growth 2001_91	Change % NSA	Change % NAU	Change % Forest	Change % LAA	Change % TCL	Change % LNAA
MUMBAI	5.85	0.23	1.01	0.00	12.62	12.21	-0.38
DELHI	5.12	-0.14	3.17	-1.49	71.52	71.39	3.65
KOLKATA	2.96	3.60	7.80	0.00	0.00	4.02	7.77
CHENNAI	3.58	3.54	9.54	0.00	0.00	0.00	0.00
BANGALORE	3.53	-2.05	1.59	0.00	-0.20	1.18	1.93
AHMADABAD	4.21	3.06	6.47	0.50	54.46	53.46	-4.03
SURAT	3.85	19.22	5.65	0.06	42.98	43.36	-15.45
HYDERABAD	4.62	-0.31	7.54	-30.69	16.21	11.78	0.16
PUNE	5.23	-3.01	0.43	-0.05	61.88	60.83	0.23
KANPUR	1.07	7.47	-4.33	-7.55	43.92	48.03	-2.24
LUCKNOW	3.97	2.20	0.43	-2.07	50.10	53.21	0.17
NAGPUR	5.80	-2.16	1.46	-0.24	53.19	47.88	1.28

INDORE	3.88	2.42	5.28	0.00	58.16	59.10	1.99
BHOPAL	0.00	3.54	2.06	2.01	45.66	47.04	0.84
VADODARA	0.60	10.15	2.69	-8.07	60.48	60.74	-0.60
AGRA	4.81	1.75	0.70	2.54	60.51	61.65	-0.93
JAIPUR	1.71	0.71	1.44	2.09	52.22	53.26	-0.97
NASHIK	1.39	-5.67	0.81	-0.29	53.78	52.43	0.25
MEERUT	5.50	12.55	1.73	-14.73	64.12	62.88	6.30
ALLAHABAD	5.69	4.21	1.21	-1.62	54.31	55.79	0.69
VARANASI	3.38	-6.03	0.45	7.67	59.75	59.90	-11.23
VISAKHAPATNAM	0.81	0.00	3.54	-20.35	24.66	21.75	-0.80
PATNA	3.34	3.46	1.35	0.00	41.32	41.87	3.19
LUDHIANA	4.37	-0.15	4.58	0.04	72.70	72.70	1.77
AMRITSAR	2.95	7.85	0.21	-0.38	76.02	78.87	-1.28

Source: DACNET 1991-2011

Total cultivable land (TCL)

Total cultivable land includes land under net sown area and follows land. This indicates the amount of land that could be engaged in agriculture in the present scenario. Maharashtra has slight decline over decades in total cultivable land from 66% in 1991 to 65% in 2001 and 64% in 2011. The fringes of Mumbai, have seen the increase in total cultivable land from 27% in 1991 to 39% in 2001 and the marginal decline in 2011 by 1%. The changes over the decades have been more prominent from 1991-01 in comparison to 2001-11. The cities of Pune Nagpur and Nashik have a surge in the increase in total cultivable land from 1991 to 2001 followed by an increase but at a declining trend in the next decade.

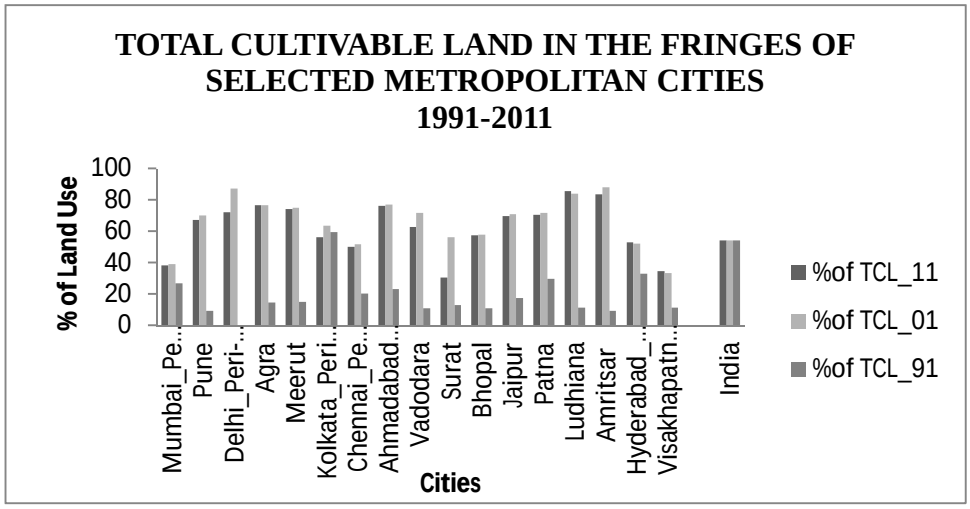
Delhi and its peri-urban areas have reported an increase in total cultivable land from 26.16% in 1991 to 87% in 2001 and again a decline of 72% in 2011. The rate of change has been around 71% from 1991-01 to -17% in negative in the present decade. The cities of Kanpur, Lucknow, Agra, Varanasi, Allahabad and Meerut have a familiar trend to that of Delhi, with large decadal variations from 1991-01 and marginal variations from 2001-11.

The peripheral districts of Kolkata and Chennaiand Bangalore reported a slight increase in total cultivable land in 1991 to in 2001 and again a decline in 2011. The decadal changes were positive in the previous decade and negative in the next decade.

Ahmadabad,Jaipur and Patna and its fringes have seen an increase in total cultivable land in 1991 to 2001 and further in 2011. There is the major change of about 53% from 1991-01 followed by a slight decline in the next decade. The cities of Vadodara and Surat have a similar trend.

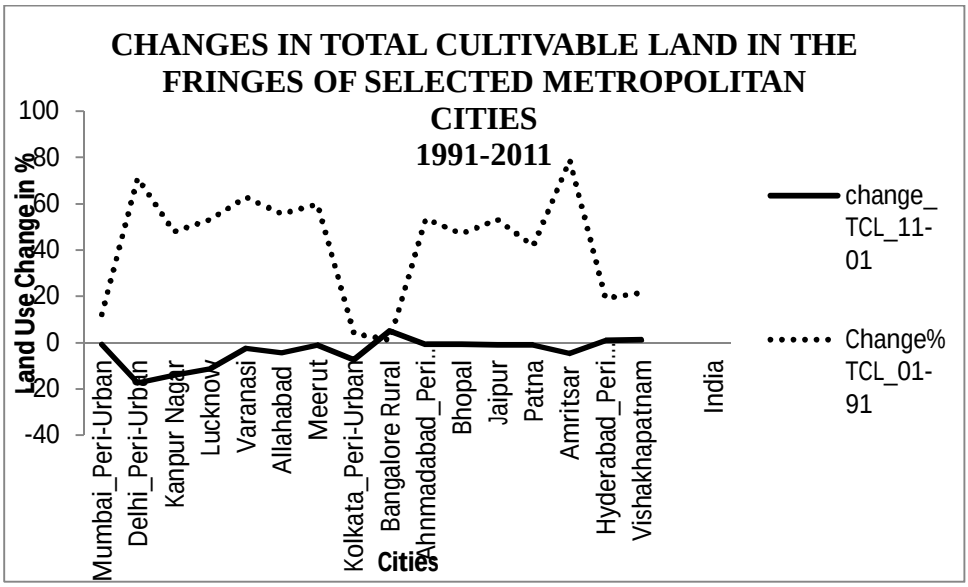
The peripheries of Ludhiana and Amritsar follow the similar trend. There has been a significant increase in total cultivable land in this region which is sufficed to a large extent by an increase in net sown area. Hyderabad and its peripheral areas have witnessed a decline in the total cultivable land over the decades from 21% in 1991 to -9% in 2001 and -10% in 2011. Vishakhapatnam in contrast has witnessed huge increase by 22% from decade 1991-01 followed by a slight decline in the next decade. It is depicted in figures 5 and 6.

Figure 5: Trends in Total Cultivable Land 1991-2011



Source: DACNET 1991-2011

Figure 6: Change in Total Cultivable Land from 1991-2011



Source: DACNET 1991-2011

Land Not Available for Agriculture (LNAA)

Land not available for cultivation would include forest area under non-agricultural use, barren and uncultivable land. This would indicate the potential stock of land which could be con converted in for non-agricultural use and with better land management techniques into agricultural land. The peri-urban districts of Mumbai have not reported having any change in a land not available for cultivation over the decades. The cities of Pune and Nagpur hardly have any marked changes in a land not available for cultivation. They keep on having an increasing trend. Nagpur is an exception as it has nearly 4% changes in a land not available for cultivation during the decade 2001-11.

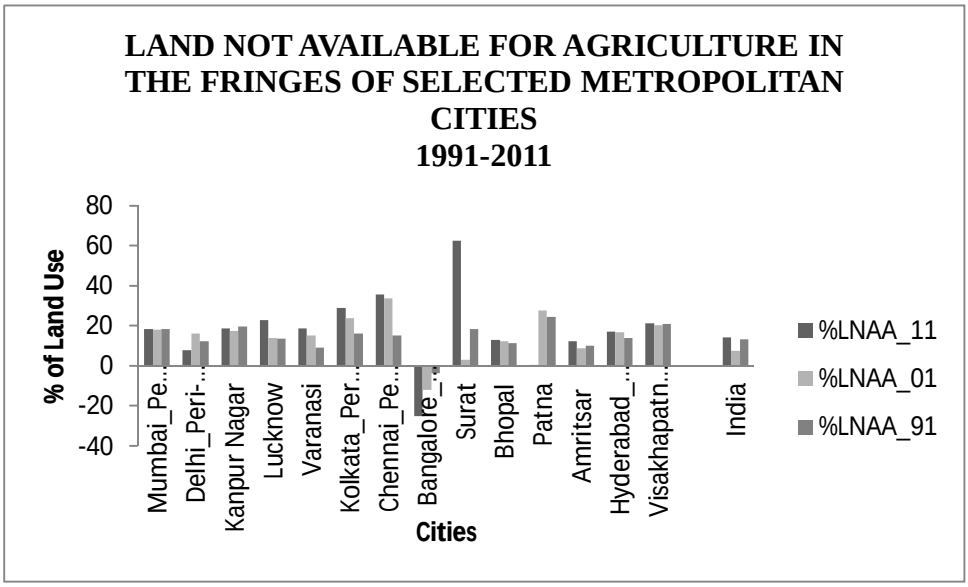
Delhi and its peri-urban areas follow the same trend as the state of Haryana. Land not available for cultivation is around 12% in 1991, followed by 16% in 2001 and 7% in 2011. Increasing the percentage of land not available for cultivation by 3% from 1991-01 and decreasing by -7%. Cities of Kanpur and Lucknow, Agra, Varanasi and Allahabad have the same trend of Delhi whereby it increases first then decreases.

Kolkata and its peri-urban areas have a consistent increase in a land not available for cultivation from 16% in 1991 to 23% in 2001 and 29% in 2011. Changes over the decades have been 7% and 5% respectively without much fluctuation.

Peri-urban fringes of Chennai, Bangalore Ahmadabad, Vadodara, Surat, Bhopal and Indore has noted a sharp increase in the percentage of land not available for cultivation from 15% to 33% a change for about 18% from 1991-01. Slight increase in the same was seen in the next decade. In case of Bangalore the decadal changes are contrasting over the two decades.

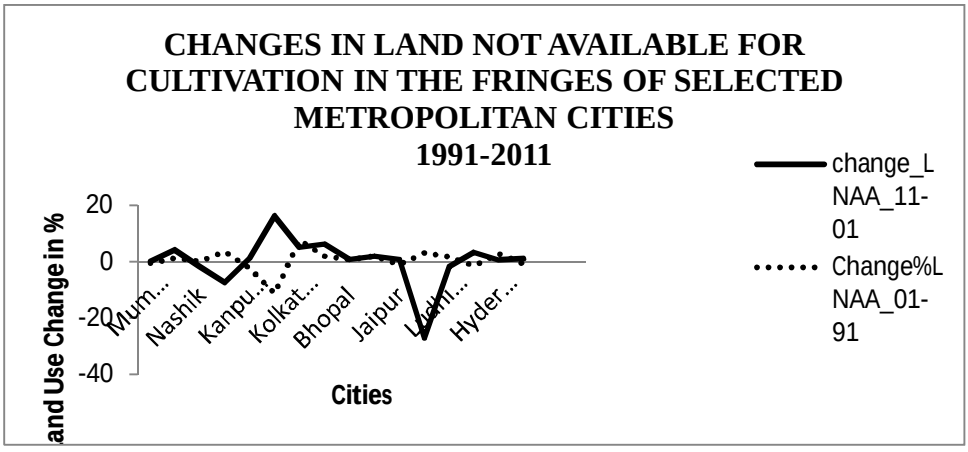
The peripheries of Jaipur, Patna and Amritsar have increasing trend in the percentage of land not available for cultivation, without much change over the decades. Outlier being Ludhiana and Hyderabadwhich has slight fluctuations, over the decades.

Figure 5: Trends in Land not available for agriculture 1991-2011.



Source: DACNET 1991-2011

Figure 8: Change in Land Not available for Agriculture from 1991-2011



Source: DACNET 1991-2011

Forests

Forests were an integral part of the environment and serves as a buffer zone for the cities, absorbing its pollutants etc. Recent wake of urbanisation has seen a decline in forest land as they are being encroached upon for land necessary for cultivation as well as non-agricultural uses of the urban areas. Mumbaiperi-urban districts, on the other hand, have seen a marginal increase in the percentage of land under forest cover over the decades. The increase in the percentage of land under forest cover is due the change in the definition of forest and also due to geographical reasons as the region situated in the Western Ghats, therefore, is densely covered by tropical monsoon forests. In the fringes of Pune and Nagpur, there has been a slight increase in the percentage of forest cover over the decades. Nashik is an exception as it increases slightly from 1991-01 but again declines in 2011.

Delhi and its urban fringes have a minor decrease in forest cover over the decades. Cities of Lucknow, Kanpur Agra, Allahabad and Meerut have increased in forest cover over the decades from 1991-01 and followed by a decline in the next decade.

Peri-urban areas of Kolkata had a sharp increase in the percentage of land under forest cover from 0.7% in 1991 to 13% in 2001, followed by minor fluctuations after that due to above reason. The fringe of Chennai and Bangalore which already has minuscule percentage land under forest cover is declining. In fact, the trend is same over Gujarat,(Ahmadabad, Vadodara and Surat), Madhya Pradesh (Bhopal and Indore), Bihar, Punjab (Ludhiana and Amritsar) and Andhra Pradesh (Hyderabad and Vishakhapatnam).

The change in the forest cover in particular context to its increase can be misleading as the definition of forest cover has changed over the decades, thereby showing an increase. Land near the city is often effectively managed to produce more yields, therefore, causing an increase in net sown area. Urban areas will grow inevitable at the cost of agricultural land but there should be proper planning and strict regulations with regard to land use planning in the expanding areas.

c) Land use change in the fringes of Mumbai and Delhi

Mumbai and Delhi are the largest Metropolitan cities with vast expanding peripheries but urbanisation and growth scenario is different for both due to their geographical location

Mumbai has limitations to growth due to coastal location while Delhi has abundant opportunity to grow in its peripheries. Therefore further micro level analysis have been in the districts around metropolitan cities of Delhi and Mumbai carried out using satellite imageries for understanding the in depth analysis and validating of land outflow being converted from agriculture to non agricultural use. Land use data from district statistical handbook gives us data regarding land use in four categories but for further classification and in order to understand it spatially satellite imageries are used. It is an attempt to find out whether there have been in discrepancies in the ground level and the reported level. Land use is classified in to four basic categories, water bodies, and forest, built up areas (including settlements, roads etc), agricultural land, marshes, scrubland, tidal mudflats, for each decade in two contrasting seasons. Imageries are chosen for analysis according to peak agricultural season (October-November) and (February-March).

Land is very limited in Mumbai and its urban fringes, real estate prices have sky rocketed in the last decade. Owning of renting even a decent single room apartment in the city is a dream for the middle class family. Apartments in prime location have values in crores. Land for non residential purpose such as offices, warehouses, public buildings (hospitals, banks, educational institutions) is also equally expensive. In 1990s when the cotton mills in prime location closed down land mafias raced to get land in order to build luxury apartments there as it had very high speculative value.

During the decade 2001-2011 water bodies had increased by 2.79%, which may have been attributed to the disappearance or conversion of tidal mudflats, marshes etc. Although it is corresponded by decline in the forest cover by -1.13%. Agricultural land in Mumbai and its surrounding districts have declined by more than 4% (-4.69%). About more than 5% growth in built up area has been at the cost of over 4% of the land being transferred from agricultural land.Marshes, scrubland, tidal mud-flats etc havedeclined to the extent of vanishing totally. It may have been that water bodies have been encroached as more land was put to non-agricultural use or submergence of land due to poor land use practices. In the initial stage of land filling water bodies are partially filled up with rubbish, wastes etc. This has probably resulted in the formation of marshes, swamps and tidal mud flats. Land sharks are after each and every parcel of land available and water bodies have the potential to become prime land in future. This speculative value of land coupled with increasing demand from the growing population which became the major driving force behind the urban expansion and land use change. Land is a much sought after resource in Mumbai and its surrounding areas as unlike

Delhi it has geographical limitation to growth, being a coastal location and guarded by the dense forests and Western Ghats on the east. Therefore its options for expansion are very limited. It has grown linearly following the coast in Vasai, Bhiwandi, Uran etc. Table No 3 and 4 gives the percentage of land use change for Mumbai and Delhi, and the following map No 3 and 4 shows the decadal change in land use.

Table No.3. Categories of Land use Mumbai

MUMBAI			
Categories of Land use	**2001**	**2011**	
Land use	% of land	% of land	%_Change
Water bodies	2.28	5.07	2.79
Forest	10.85	9.72	-1.13
Built up areas(including settlements, roads etc)	40.04	45.12	5.08
Agricultural/cultivable land	44.78	40.09	-4.69
Marshes,scrubland, tidalmudflats	2.06		

Source: Land SAT images 2000-2011

In Delhi land use change is more drastic and at a much faster rate. Its geographical location in flat alluvial plains and ease of accessibility to the northern mountains as well as the central plateau has hastened its expansion in the urban fringes. There has been seasonal variation as the post monsoon time has considerable natural cover on land and water bodies are recharged. Seasonal variation for Delhi has been minimal , around 7 % for forest cover, 8% for built up area around 10%, agricultural land has the highest change from post monsoon to pre monsoon about --17% in 2001.

The following decade 2011 shows lesser seasonal variation not exceeding about 5%. Water bodies and forests in peri-urban Delhi have slightly increased by 1.5% which may have been due to better administration of the fragile zones and wetlands. Built up areas has increased over 10% from 43% in 2001 to 53% in 2011. Agricultural land has correspondingly declined. This is also seen simultaneously with the shift of workers from agriculture to non agricultural activities.

Much of the agricultural land has been in and around Delhi particularly in Gurgaon Faridabad and Sonipat was converted to make for industrial complexes, townships and Special Economic Zones. Proximity to the national capital and being situated in the national capital

territory has attracted investment from both foreign and domestic sectors as well. Government policies of decongesting the cities have resulted in the relocation of not only industries but administrative bodies as well. Central and State governments have made laws which have effectively made land acquisition relatively easier and inexpensive. Fertile agricultural acquired at less than market prices in most cases are given away to private entrepreneurs. Although these entrepreneurs develop the area or hasten the urban expansion often people who derive their livelihood from land are forced into further destitution. Land use change haphazardly in unplanned way creating environmental damage and creating ecological imbalance (Narain 2009).

Table No.4. Categories of Land use Delhi

DELHI			
Categories of Land use	**2001**	**2011**	
Land use	% of land	% of land	%_Change
Water bodies	0.73	2.32	1.59
Forest	7.62	6.07	1.55
Built up areas(including settlements, roads etc)	43.16	53.19	10.03
Agricultural/cultivable land	48.49	38.41	-10.08

Source: Land SAT images 2000-2011

Table No.5 Land Use Comparison

Land Use	**Mumbai**	**Delhi**
Water bodies	2.79	1.59
Forest	-1.13	1.55
Built up areas(including settlements, roads etc)	5.08	10.03
Agricultural/cultivable land	-4.69	10.08

Source: Land SAT images 2000-2011

The Land use depicted in the Map No. 5 and 6 and 7 and 8 shows the change in the land use in Mumbai and Delhi. The growth of settlements and built up area is evident by the increase in the proportion of the red patches. Encroachment of forest and agricultural land has taken place. Hence the urban land use conversion could be said to have taken place at the cost of agricultural land and the forest area.

Mumbai and its surrounding areas have seen tremendous growth in the recent decades. The city being the financial capital of India attracts huge migrants. These migrants have are mostly from low socioeconomic background possessing poor skills. They tend to eke out their living mostly by working in the informal sector. Hence they are unable to afford the high cost of living in the city. As a result of this it can be seen that near Mumbai itself there has been growth of several cities such as Thane, Bhiwandi etc along with many satellite towns.The land use map also shows how agricultural land which was more prevalent in the north east and the south east had been converted in to build up area. Land for agriculture has diminished further in the present decade. Unsuccessful yields in agriculture have forced people to move out to cities in search of alternative occupation to the urban centres. This is further supported by the fact that workers in agriculture had diminished considerably while it had the opposite effect in the non agriculture sector. Districts around Mumbai,Thane and Raigarhhad negligible workers in agriculture,by (-1.05%) respectively which saw further decline in 2011 in comparison to the previous decade. Agricultural sector declined, while non agricultural category including the industrial ones saw a rise by (55%).

Delhi, in comparison to Mumbai has a similar trend but at a more decreasing rate. But unlike Mumbai which had expanded in its peripheries linearly, Delhi has spread laterally in all direction. Enormous amount of fertile agricultural land about was transferred to the non agricultural category (Narain 2009). It is well depicted in the figures where agricultural land suffered a decline by -10%, while built up areas have increased by 12%. It is well supported by change in the percentage of workers as well as the present decade showed a decrease among percentage of agricultural workers.

e) CONCLUSION

From the above analysis of land use change it can be observed that the change in land use is more observable and far reaching in the districts around Metropolitan cities in comparison to that of the corresponding states. The trends of land use change reveal that there has been shift from agricultural land use to non agricultural ones at a very fast pace.Some states such as Uttar Pradesh and Bihar do show that there has been a difference with the trend in peri urban districts. It may have been due to discrepancies in the land reported under classification or due to better land management practices converting land from other categories. Peripheries of major metropolitan citiesof Mumbai, Delhi, Kolkata, Chennai and Hyderabad and Bangalore

have seen major changes in comparison to other cities, changes here are consistent while in the case of other cities it is more variable. These areas are surrounded by fertile agricultural land and havecities have grown at the cost of them (Narain 2008). Decline in net sown areas has been in consistent with the increase in non agricultural use. In most cases where there is deviation from the trend there is change in total cultivable land or land available for cultivation. Land as also been acquired using state instruments in these areas for the purpose of setting up industries or Special Economic Zones notably in the late 1990s and throughout 2000's.Industrially developed and high-income states of Maharashtra, Andhra Pradesh, Haryana, Karnataka, Tamil Nadu, Gujarat and West Bengal, account for 75% of the SEZ approvals(Mate, 2007; Palit and Bhattacharjee, 2008). Spatial analysis shows that in most of the districts adjacent to large metropolitan centres. Scarcity of land has also prompted in better land management practices which enabled conversion of barren land or Permanent pastures or grazing land in to cultivable land (Chadha et al 2004).

CHAPTER 4

CHANGES IN WORKFORCE IN PERI URBAN AREAS

INTRODUCTION

From discussion in the previous chapter it was noted that land in the peripheries of the largest metropolitan cities (million plus 2001) has been shifting out from agricultural use to non-agricultural uses. Agricultural activities were found noted to decline in with the outflow of land from agricultural uses adversely affecting the framers who eke out their living from cultivation of the land. With loss of land and livelihood there has been emergence of casual labour in agriculture as well as in the non agricultural sector in the peripheries. The people who are displaced are often induced to take up other means of livelihood in the non agricultural sector or the non-farm sector. As market forces are instrumental in triggering off the recent processes in the peri-urban areas, this often results in the displacement of the vulnerable sections residing there (Keivani and Mattingly, 2007), along with differentiation and polarisation between capitalists and subsistence producers (Keivani and Mattingly, 2007; Rakodi, 1999), (Brook and Davila, 2000).In many cases these alternative livelihoods have not been able to provide them with better standard of living as they lack skill for entering into formal sectors which emerges as a consequence (Mallik 2006).

a) CONCEPTUAL FRAMEWORK

Therefore the primary line of inquiry revolves round the fact whether change in workers is consistent with the changes in the land use shifts in the districts around metropolitan cities. Secondly, whether induced urban growth, land conversion and occupational change have a benefitting effect on the population of the peripheries of metropolitan cities and the significance of land among agricultural workers. Therefore the framework of analysis involves workers in different sectors, firstly two broad categories of workers main and marginal and then further subdividing into four categories of cultivators, agricultural labourers, household industrial workers and other workers. Workers are in the different categories are converted into percentages for comparison across decades and to establish a relation with changes in land use. Land use change is one of the reasons for occupational shifts and takes place as a consequence of the former. The analysis is based on the framework

of how population growth in the fringes, land use change from agriculture to non agriculture has its effect in causing occupational shift in workers from agriculture to non agriculture.

An attempt has been made to analyse two agreements in this chapter. First part discusses correlation between land use shifts and change in workers in the above mentioned area and second part tries to understand how the induced shift from agriculture to non agricultural workers has lead to marginalisation of the workers through sectoral trends and status of workers in the same with special reference to metropolitan cities of Delhi and Mumbai.

Delhi and Mumbai are both the metropolitan cities are the top ranking metropolitan cities with large peripheries surrounding them. These two cities share the same colonial history development and growth of but have different urbanisation processes and characteristics. The dynamics of growth and change are different providing a scope for good comparison.

b) SHIFT IN WORKERS

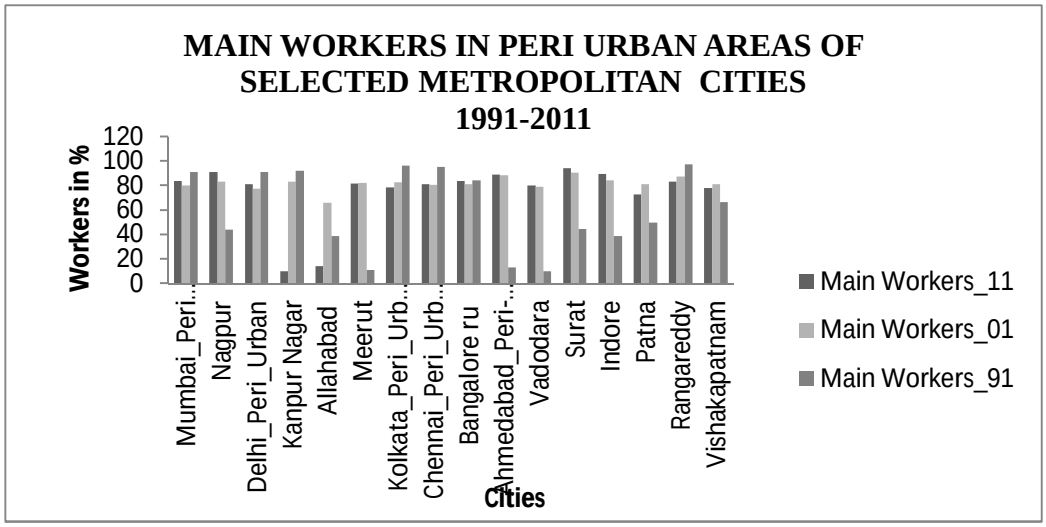
As a concomitant effect of land use change, one of the effects is change in the occupational structure although it's not the only reason, of the region also. The change in occupation structure is reflected among the workers. In Mumbai Peri urban areas have reported a decline by nearly10% shift in main workers from 1991 to 2001 while there has been slight increase in 2011. The decline may be attributed to changing nature of the economic policy which under the globalization forces favours growth of informal sector. Pune. Nagpur, Nashik on the other hand has a surge in main workers from 1991 to 2001 and further increase in the present decade. This increase supported by increase in population growth.

The peripheries of Delhi had over 90% main workers in 1991 which had a sharp decline in 2001 to 77.49% and slight increase in to 81% in 2011. The same factors of globalization and changes in the migration pattern which had affected it. Main driving force behind it has been the casualisation work which had been promoted by the government in its neoliberal agenda ever since the liberalization policies of 1990's. The decadal change has been more in 1991-01 period in comparison to the next decade. Kanpur which has maintained the trend similar to Delhi, although it appears to be eluding as the change of district boundaries may have been the underlying cause.

Even districts around large metropolitan cities like Kolkata, Chennai, Bangalore, Agra, Meerut, Lucknow, Allahabad and Varanasi has trend similar to Mumbai and Delhi. All of them have more than 90% main workers in 1991 which decline considerably in 2001 and sees marginal increase in 2011. Growth in urban population may be the attribute for the change in the present decade. Their trend is supported by growth in population in the peripheries in Table No 4 and 5 in Chapter 1 .The peripheries of Hyderabad are exception to the large metropolitan cities as it has shown consistent decline over the decades. This is depicted in the figure No 1 below.

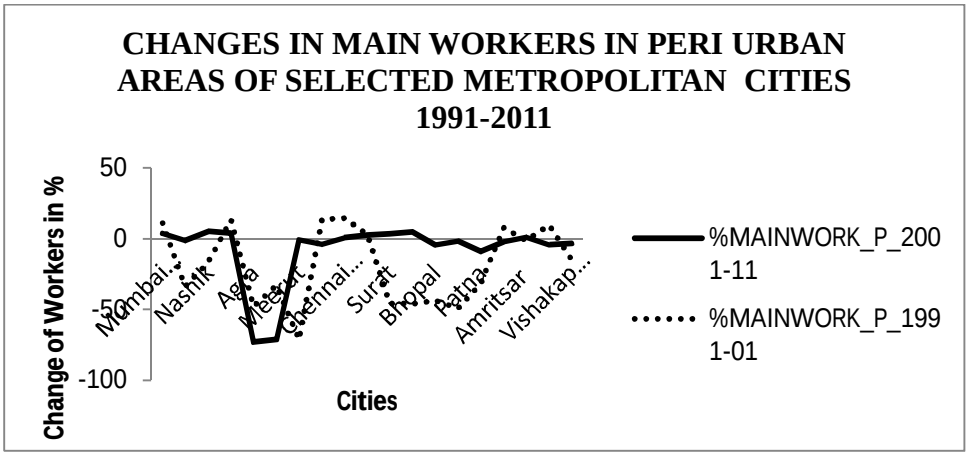
In peri urban areas of Ahmadabad, Vadodara, Surat, Indore, Bhopal, Jaipur, Patna, Ludhiana and Amritsar have very low percentage of main workers in 1991 which increases abruptly in the following decade and remains consistent in the next. Therefore there decadal changes also have been more in 1991-01 in comparison to 2001-11. The above results are depicted in the figure below.

Figure No 1: Main Workers in Peri Urban Areas of Selected Metropolitan Cities 1991-2011



Source: Census of India 1991-2011

Figure No 2: Decadal change in Main Workers in Peri Urban Areas of Selected Metropolitan Cities 1991-2011



Source: Census of India 1991-2011

With changes in the main workers there has been consequential effect on marginal workers also. Post liberalisation period there has been manifold increase in marginal workers over the decades. Its effect being more prominent in 2001-11 period in comparison to 1991-01. In Mumbai Peri urban areas marginal workers have reported a decline by nearly 6% from 1991 to 2001 and further decrease by 4% in 2011. It may have been due to casualisation of work and growing nature of informalisation of the economy under the globalization policies. Pune, Nagpur, Nashik on the other hand has a slump in marginal workers from 1991 to 2001 and further decrease in the present decade which is supported by marginal increase in main workers.

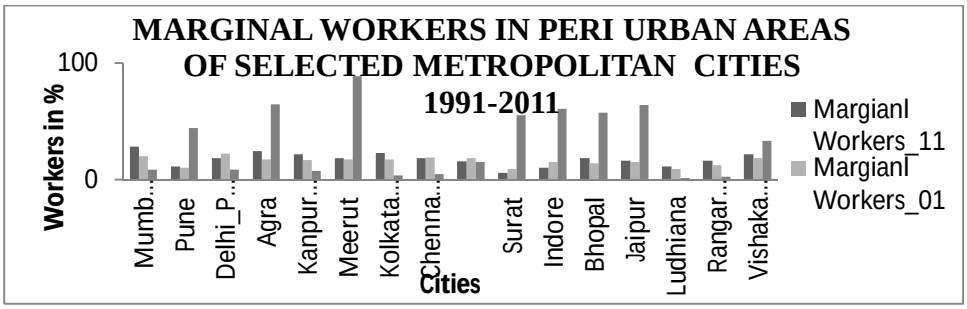
The peripheries of Delhi had over 8% marginal workers in 1991 which had a sharp surge in 2001 to 22.51% and slight decrease to 18% in 2011. Economic change and changes in the migration pattern and change in patterns of main workers which had resulted in it.

Even large metropolitan cities like Chennai, Bangalore Kanpur, Lucknow, Allahabad and Varanasi has trend similar to Mumbai and Delhi. All of them have more than 5-6% of marginal workers in 1991 which decline considerably in 2001 and further declines marginally in 2011. Only exception being Kolkata and Meerut. Change in main workers may be the causative factor for the change in the present decade.

The peri urban areas of Ahmadabad, Vadodara, Surat, Bhopal, Jaipur, Patna, Ludhiana and Amritsar have very low percentage of main workers in 1991 which increases in the following

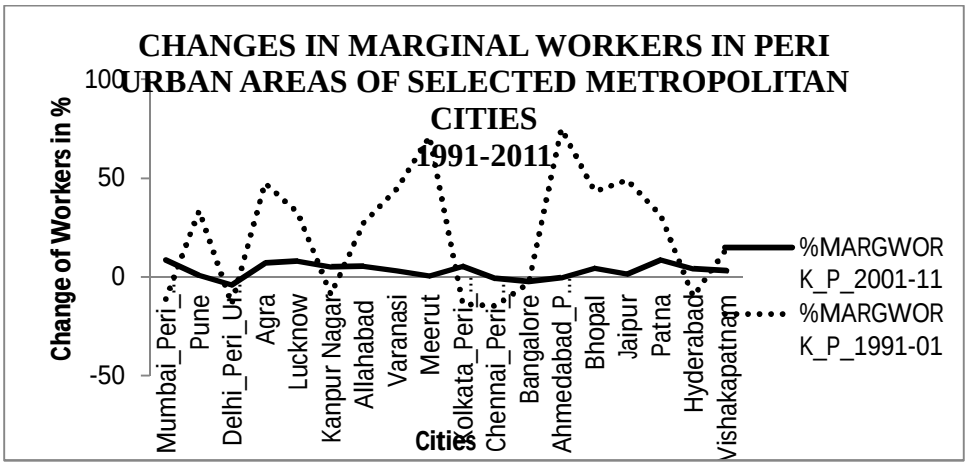
decade and remains consistent in the next.An outlier to this trend is Indore and Surat which has slight decline in the present decade. It may be because rapid casualisation and migration from rural areas have accelerated the present process in the late 1990's and early 2000's. The changes are consequent with an increase in population growth, which results in decline in land under net sown area and increase in non agricultural land use giving way to change in workers. The above results are depicted in the figure No 3 below.

Figure No 3: Marginal Workers in Peri Urban Areas of Selected Metropolitan Cities 1991-2011



Source: Census of India 1991-2011

Figure No 4: Decadal change in Marginal Workers in Peri Urban Areas of Selected Metropolitan Cities 1991-2011



Source: Census of India 1991-2011

The resultant effect accelerated urbanization could be seen in cultivators also. In Mumbai Peri urban areas have reported a decline in cultivators by nearly 15% from 1991 to 2001 while there has been lesser decline in 2011. Often distress in agriculture such as drought, crop failure, indebtedness seasonal unemployment of lack of employment and loss of agricultural

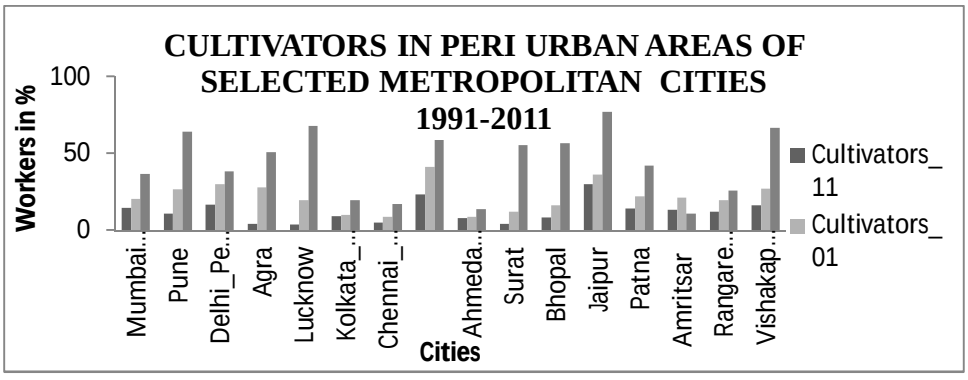
land to agencies for non agricultural use prompt migration of people involved in agricultural activities to migrate to cities in search of livelihood. Pune. Nagpur, Nashik on the other hand has a decline in cultivators from 1991 to 2001 and further decrease in the present decade only exception being Nagpur. This decrease supported by increase in urban population growth.

The peripheries of Delhi had over 38% cultivators in 1991 which had a sharp decline in 2001 to 30.02% and is further diminished to 16% in 2011. It may have loss of land due to land being transferred from agriculture to built- up areas or for other purposes. Main driving force behind it has been the loss of land employment in agriculture much of it attributed to land being forcefully acquired without proper compensation of rehabilitation which had been promoted by the government in order to attract domestic as well as foreign capital. The decadal change has been more in 1991-01 period in comparison to the next decade.

Even peripheries of large metropolitan cities like Kolkata, Chennai, Bangalore, Agra, Meerut, Lucknow, Allahabad and Varanasi has trend similar to Mumbai and Delhi. All of them have more than 20-50% of cultivators approximately in 1991 which declined considerably in 2001 and further reduced in 2011. Growth in urban population due to migration from rural areas as a consequence of loss of livelihood in agricultural activities may be the attribute for the change in the present decade and it can be related to the figures in Table No .

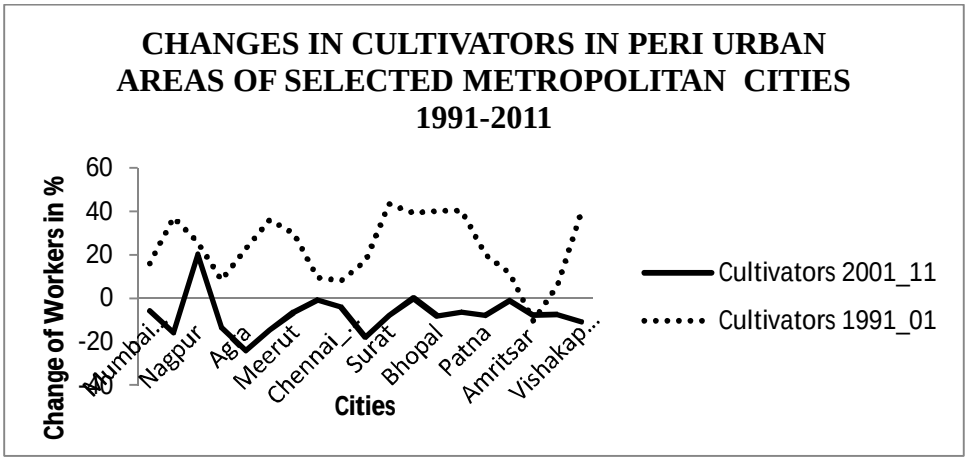
Urban fringes of Ahmadabad, Vadodara and Surat have very low percentage of cultivators in 1991 which decreases in the following decade and declines consistently in the next. Similar picture is seen in Indore, Bhopal, Jaipur, Patna, Ludhiana and Amritsar. Therefore there decadal changes also have been more in 1991-01 in comparison to 2001-11. The above results are depicted in the figure No 5 below.

Figure No 5: Cultivators in Peri Urban Areas of Selected Metropolitan Cities 1991-2011



Source: Census of India 1991-2011

Figure No 6: Decadal change in Cultivators in Peri Urban Areas of Selected Metropolitan Cities 1991-2011



Source: Census of India 1991-2011

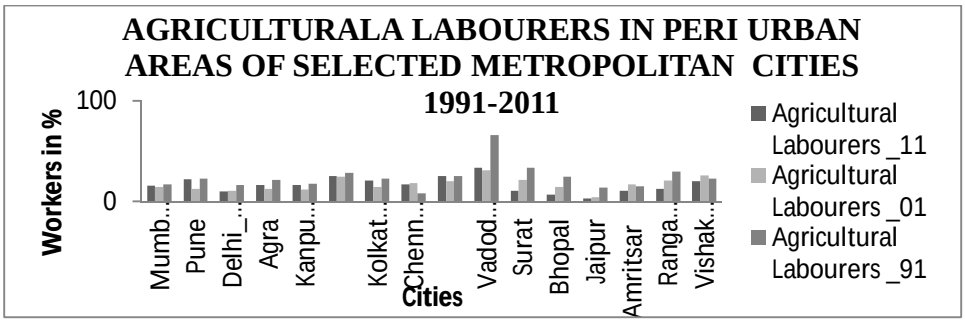
Considerable changes were observed among agricultural labourers, i.e. those who work in field as wage labourer. In Mumbai Peri urban areas have reported a decline in agricultural labourers by nearly 2% from 1991 to 2001 while there has been marginal increase in 2011. Lack of employment in agriculture and loss of agricultural land to agencies for non agricultural use prompt migration of people involved in agricultural activities to shift their livelihood and move to urban areas as a strategy to survive. Pune. Nagpur, Nashik shows similar trend.

The peripheries of Delhi had over 16% cultivators in 1991 which had a sharp decline in 2001 to 10% and is constant in 2011. It may have been the same factors of globalization, industrialization loss of land due to land being transferred from agriculture to built- up areas. Being the national capital it attracts investment from all fields and government initiatives in forma of affirmative land acquisition policies make way for it.

Even large metropolitan cities like Kolkata, Chennai, Bangalore, Agra, Meerut, Lucknow, Allahabad and Varanasi has trend similar to Mumbai and Delhi. All of them have more than 20-25% of agricultural labourers approximately in 1991 which declined marginally in 2001 and further reduced in 2011. Migration from rural areas all over the country, as a consequence of loss of livelihood in agricultural activities may be the attribute for the change in the present decade.

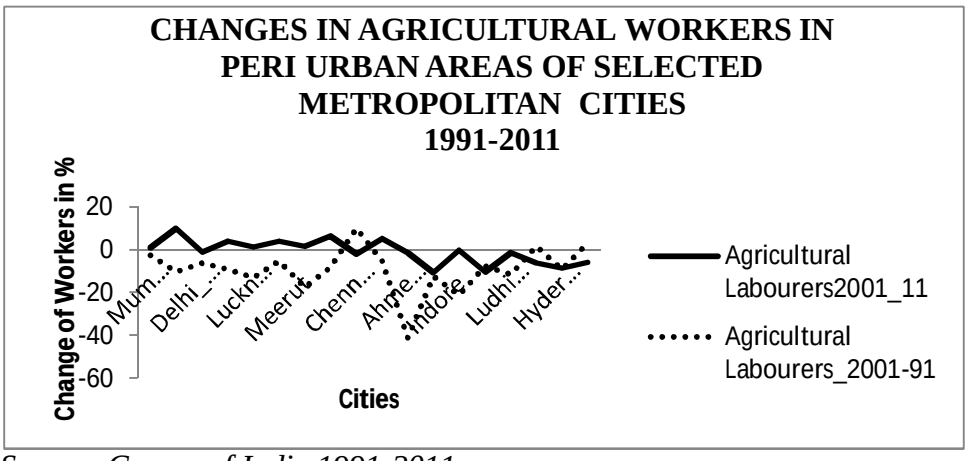
In peri urban areas of Ahmadabad, Vadodara and Surat have very low percentage of agricultural labourers in 1991 which decreases in the following decade and declines consistently in the next. It may have been due to regional industrialisation, growth of diamond cutting industry and oil fields and petrochemical industries which caused the shift. Same trend is found in Indore, Bhopal, Jaipur, Patna, Ludhiana and Amritsar. The above results are depicted in the figure no 7 below.

Figure No 7: Agricultural Labourers in Peri Urban Areas of Selected Metropolitan Cities 1991-2011.



Source: Census of India 1991-2011

Figure No 8: Decadal change in Agricultural Labourers in Peri Urban Areas of Selected Metropolitan Cities 1991-2011



Source: Census of India 1991-2011

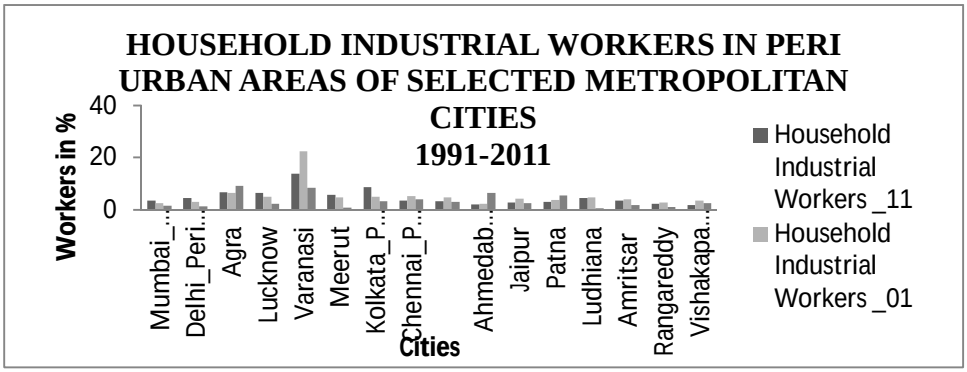
A major change was observed in non-agricultural sector of workers which includes the household industrial workers and other workers. In Mumbai urban fringes have reported an increase in household industrial workers by nearly 1% from 1991 to 2001 while there has been marginal increase in 2011. Loss of agricultural land to agencies for non agricultural use and growth of industries prompt migration of people involved in agricultural activities to shift

their livelihood and move to urban areas for employment. Pune, Nagpur, Nashik show similar trend.

The peripheries of Delhi had over 1% household industrial workers in 1991 which had a increase in 2001 to 3% and further increase in 2011. It may have been due to factors such as globalization, industrial growth and relocation of industries as government policies of decongestion of cities. Being the national capital it is sought after destination for industries small as well as large scale. The decadal change has been uniform in 1991-01 period and in the next decade.

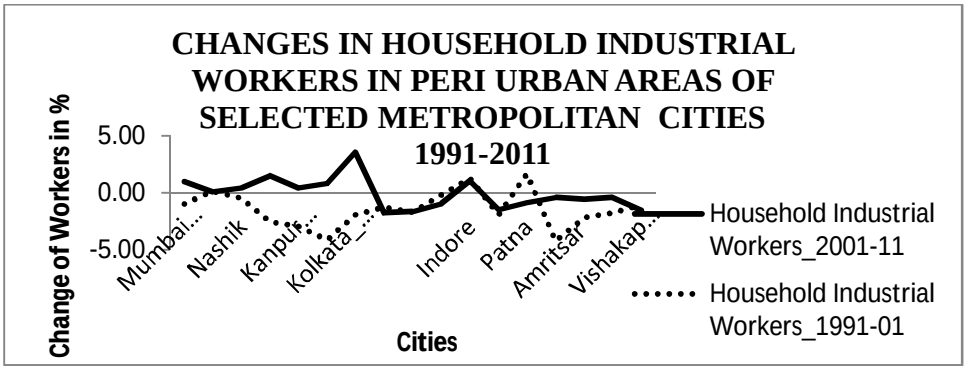
Even large metropolitan cities like Kolkata, Chennai, Bangalore, Agra, Meerut, Lucknow, Allahabad and Varanasi have little different trend than to Mumbai and Delhi. All of them have more than 2% of household industrial workers approximately in 1991 which increase marginally in 2001 and 2011. Peri urban areas have Ahmadabad, Vadodara and Surat, have 6-2% of household industrial workers in 1991 which decreases in the following decade and declines consistently in the next. Contrasting picture is seen in Indore, Bhopal, Jaipur, Patna, Ludhiana and Amritsar. The above results are depicted in the figure No 9 below.

Figure No 9: Household Industrial Workers in Peri Urban Areas of Selected Metropolitan Cities 1991-2011.



Source: Census of India 1991-2011

Figure No 10: Decadal change in Household Industrial Workers in Peri Urban Areas of Selected Metropolitan Cities 1991-2011



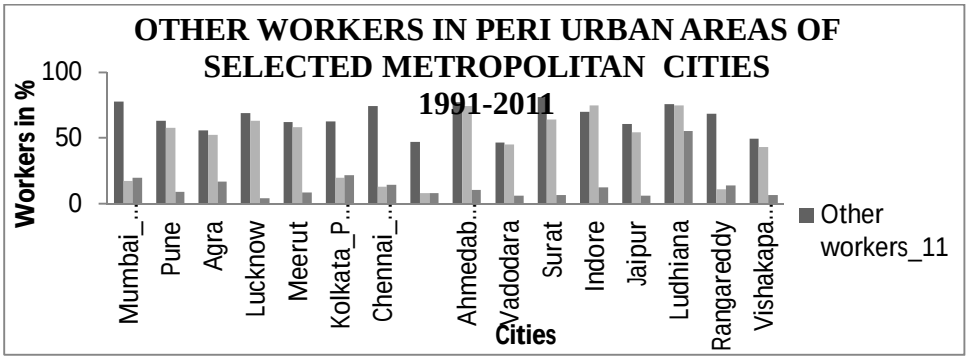
Source: Census of India 1991-2011

One of the major effects of outflow of agricultural land and occupational shifts have manifested in huge increase in huge increase in other workers. In Mumbai urban peripheries have reported a decrease in other workers by nearly 2% from 1991 to 2001 while there has been phenomenal increase in 2011. Decline of agricultural land and increase of non agricultural land use for industrial and other infrastructural purpose promotes such occupational shift and migration to urban areas for employment. Pune, Nashik on the other hand has an increase in other workers from 1991 to 2001 and further increase overall in the present decade. The only exception being Nagpur, which had a decline in the present decade.

The peripheries of Delhi had over 14% other workers in 1991 which had a decreased in 2001 to 13% and further increase in 2011 to 68%. It may have been due to factors such as globalization, industrial growth and relocation of industries as government policies of decongestion of cities and neoliberal labour policies which favour cheap unskilled labour by facilitating easy entry in job market. Being the national capital it is sought after destination for industries small as well as large scale as well informal sector activities. The decadal change has been marginal in 1991-01 period and huge in the next decade.

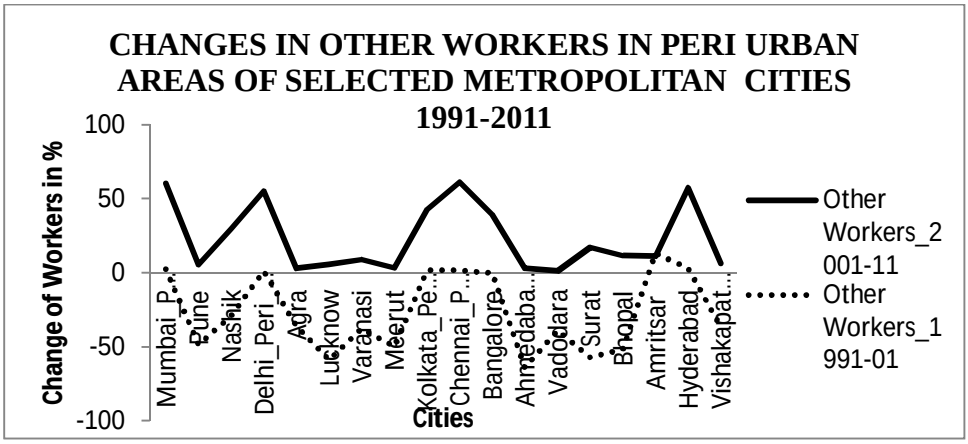
Fringes of metropolitan cities like Kolkata, Chennai, Bangalore, Agra, Meerut, Lucknow, Allahabad, Varanasi, Ahmadabad, Vadodara and Surat, Indore, Bhopal, Jaipur, Patna, Ludhiana and Amritsar have similar trend than to Mumbai and Delhi. All of them have more than 20-15% of other workers approximately in 1991 which increase marginally in 2001 and magnanimously in 2011. It is shown in figure No 11.

Figure No 11: Main Workers in Peri Urban Areas of Selected Metropolitan Cities 1991-2011



Source: Census of India 1991-2011

Figure No 12: Decadal change in Cultivators in Peri Urban Areas of Selected Metropolitan Cities 1991-2011



Source: Census of India 1991-2011

c) LAND USE CHANGE IN RELATION TO SHIFT IN OCCUPATION

Share of land use under agriculture low in the peripheries of the large metropolitan cities in comparison to the state. The region is more vulnerable to change as the forces of localisation and globalisation intersect here (Webster 2002). The transformation of rural land into urban land uses is unrestrained. (Rahman et al. 2011).On observing the land use changes among the large metropolises it is noted that there has been marked a decline in net sown area in peri-urban Mumbai, Delhi, Chennai and Kolkata compared to peri-urban areas of other cities. Districts around Delhi has registered decline of as low as -7% while Mumbai has seen a decline of -1.38%. Major changes in urbanisation have taken place in these metropolitan cities has taken place in a previous decade. In the following decade, effective management of

land use has led them to convert land from other categories such as culturable waste, fallow land for agricultural purpose due to demand from growing the urban population. In this decade land use changes were very much distinct & were a consequence of the change in the economic policies in terms of liberalisation of the economy (Chadha et al. 2004).

The physical location of Delhi is the main cause of the increasing population in the form of migration as it is surrounded by populous states like Haryana and Uttar Pradesh. The migration data released by Registrar General of India for the census 2001 indicates that the total population of Delhi of 138.50 lakhs includes 82.04 lakhs from within Delhi and 53.18 lakhs as migrated population from various states in which 43.56% and 10.26% of migration are contributing from Uttar Pradesh and Haryana respectively.

Land from agriculture gets transformed due to urban encroachment. Land from other categories is brought under the plough. Land under this category has seen the decline in Delhi by as much as -5.38% in the present decade which is half that of last decade when it was around -1.38%. Mumbai had the same amount of decrease as compared increase it had the previous decade. The Decentralisation efforts on behalf of the government supported the restrictive policies on industrial and office development in the city of Mumbai and have denied the city an opportunity to renew, adjust and keep pace with the changing technology and changing demands on its products and services. In the category of land not available for cultivation it is seen that in the case of Delhi there had been a decrease of -7.79% while previous decade had a growth of 2.38%. In the case of districts around Mumbai, it is seen that due to increasing in Net sown area there had been a decrease in a land not available for cultivation but there was the increase in the previous decade.

Land use changes in the decade of 2001-11 were very much profound & have many consequences. In terms of comparison with the state, it is seen that Delhi had more than 40% in case of net sown area while in the states of Haryana & Uttar Pradesh when taken together outside the peri-urban areas have seen an increase in net sown area. Districts around Kolkata have shown a similar trend but the differences are not as huge as in Delhi. Districts around Mumbai have shown an increase in net sown area more than the state by 0.48% & 33% approximately.

A number of socioeconomic factors were responsible for the land use pattern change in Delhi on a large scale change in the last 30 years. The urban, built-up area is coming up on the fertile agricultural land and hence it is decreasing. The increase in the built-up land can be

termed as the positive increase whereas the decrease in the agricultural land can be termed as the negative change.

The major transformation was recorded from agriculture to urban (built-up) (Shridharan 2008). About 10,245.13 ha of agricultural land have gone to urban land and at the same time, 694.89 ha of agricultural land has been converted into the institutional area. The net decrease in agricultural land, wasteland and waterbodies' together accounts for the total decrease of 258.20 sq.km against an increase of 251.18 sq.km of the net built-up area.

Thus, it is obviously clear that increase in built-up area in the city has been at the expense of majorly from the agricultural and wasteland together with the shrinking water bodies. The silver lining here is the balance 7.02 sq.km of the above increasing and decreasing land use classes which have resulted due to increase in forest cover in the city. As the city developed, the built-up category replaced most of the land classes like sandy areas, fallow land and scrubland this could be interpreted from the land use map No compiled from satellite images.

Land under non-agricultural use has seen a decline by -5.38% around Delhi while at the state level there has been an increase by 1.45%. Mumbai also observed a decline mostly because there has been exceptionally high increase in net sown area, at the state level there has been a marginal increase of 0.26%. Barren & unculturable land has seen a decline in peri-urban Delhi and Mumbai has shown a huge decline in of more than 10%. Land under cultivation including Net sown area, both types of fallow land & culturable waste around Delhi had declined to as low as -44.72%. Mumbai has a very high rate of growth of over 50%.

Land not available for cultivation has seen a decline in peri-urban Delhi while the contiguous states show an increase of about 1%. Mumbai saw a huge decline as there has already been a huge increase in land under cultivation. The figures are depicted in table no 1 & 2 while the trends are shown in table no 3 and 4. Other cities have similar trend.

Table No 1: Decadal change in land use peri urban area of 6 large metropolitan cities (2001-2011)

Land Use in %	Mumbai	Maharashtra	Delhi	Haryana	Kolkata	West Bengal
Net Sown area	-1.38	-1.42	-7.30	-0.24	-6.20	-5.00
Land under non-agricultural Use	0.29	0.27	11.08	2.63	5.22	2.95
Total cultivable land	-0.76	-0.96	-17.24	-1.31	-7.46	-2.52
Land Available for Agriculture	-1.09	43.13	-18.14	4.70	-7.39	-2.65
Land not available for cultivation	0.11	0.88	-7.17	-10.16	5.17	2.84
Forest	1.12	0.22	-0.29	-0.93	0.19	-0.19

Continued……..

Land Use Change in %	Chennai	Tamil Nadu	Hyderabad	Andhra Pradesh	Bangalore	Karnataka
Net Sown area	-5.44	-2.81	0.10	5.54	51.02	0.59
Land under non-agricultural Use	2.07	1.42	11.22	0.34	2.48	0.62
Total cultivable land	-1.73	-1.09	-0.24	0.57	5.17	-0.20
Land Available for Agriculture	-19.65	-1.39	-0.22	-1.22	3.98	-0.60
Land not available	2.06	1.51	0.37	0.10	6.26	7.47

for cultivation						
Forest	0.00	-0.12	-2.42	0.06	-1.59	0.02

Source: DACNET 1991-2011

Table 2. Trends of Land use change in the peri urban districts of six large metropolitan cities & the state (2001-11)

Land Use in %	Mumbai	Maharashtra	Delhi	Haryana	Kolkata	West Bengal
Net Sown area	↓	↓	↓↓↓	↓	↓↓↓	↓↓↓
Land under non-agricultural use	↑	↑	↑↑↑↑	↑↑	↑↑↑	↑↑
Total cultivable land	↓	↓	↓↓↓↓	↓	↓↓↓	↓↓
Land available for agriculture	↓	↑↑↑↑	↑↑↑↑	↑↑↑	↓↓↓	↓↓
Land not available for agriculture	↑	↑	↓↓↓	↓↓↓↓	↑↑↑	↑↑
Forest	↑	↑	↓	↓	↑	↓

Continued

Land Use Change in %	Chennai	Tamil Nadu	Hyderabad	Andhra Pradesh	Bangalore	Karnataka
Net Sown area	↓↓↓↓	↓↓	↑	↑↑↑↑	↑↑↑↑	↑

Land under non-agricultural use	↑↑	↑	↑↑↑↑	↑	↑↑	↑
Total cultivable land	↓	↓	↓	↑	↑↑↑↑	↓
Land Available for Agriculture	↓↓↓↓	↓	↓	↓	↑↑↑	↓
Land not available for cultivation	↓↓	↓	↓	↓	↓↓↓↓	↑↑↑↑
Forest	↔	↓	↓↓	↓	↓	↔

Source: Chadha *et al.* (2004) State of the Indian Farmer (Adapted).

Notations:

↔ No or marginal change (up to 0.02%)

↑ Increase less than 2%. ↓ Decline up to 2%.

↑↑ Increase between 2-4%. ↓↓ Decline between 2-4%.

↑↑↑ Increase between 4-8%. ↓↓↓ Decline between 4-8%.

↑↑↑↑ increase more than 8%. ↓↓↓↓ Decline more than 8%

Table 3: Decadal change in land use peri urban area of 6 large metropolitan cities (1991-01)

Land Use Change in %	Mumbai	Maharashtra	Delhi	Haryana	Kolkata	West Bengal
Net Sown area	0.23	-0.16	-0.14	5.91	3.60	-0.46

Land under non-agricultural Use	1.01	0.89	3.17	1.90	7.80	-0.38
Total cultivable land	12.21	-0.91	71.39	5.39	4.02	1.11
Land available for Agriculture	12.62	-0.71	71.52	4.35	2.00	0.59
Land not available for Agriculture	-0.38	0.35	3.65	1.46	7.77	-0.54
Forest	0.00	0.07	-1.49	-5.81	0.00	-0.05

Continued…..

Land Use in %	Chennai	Tamil Nadu	Hyderabad	Andhra Pradesh	Bangalore	Karnataka
Net Sown area	3.54	-3.16	-0.31	-5.20	-2.05	-1.19
Land under non-agricultural use	9.54	1.06	27.93	-8.57	1.59	0.67
Total cultivable land	-12.83	-1.30	11.78	-0.27	1.18	0.75
Land available for agriculture	17.26	-0.75	16.21	-14.11	-0.20	2.02
Land not available for agriculture	2.40	0.82	0.16	1.32	1.93	-6.22
Forest	0.00	-0.07	-30.69	-0.30	0.00	0.07

Source: DACNET 1991-2011

Table 4: Trends of Land use change in the peri urban districts of six large metropolitan cities & the state (1991-01)

Land Use in %	Mumbai	Maharashtra	Delhi	Haryana	Kolkata	West Bengal
Net Sown area	↑	↓	↓	↑↑↑	↑↑	↓
Land under non-agricultural use	↑	↑	↑↑	↑↑	↑↑↑	↓
Total cultivable land	↑↑↑↑	↓	↑↑↑↑	↑↑↑↑	↑↑↑↑	↑
Land available for agriculture	↑↑↑↑	↓	↑↑↑↑	↑↑↑	↑↑	↑
Land not available for agriculture	↓	↑	↑↑	↑	↑↑↑	↓
Forest	↔	↑	↓	↓↓↓	↔	↓

Continued

Land Use Change in %	Chennai	Tamil Nadu	Hyderabad	Andhra Pradesh	Bangalore	Karnataka
Net Sown area	↑↑	↓↓	↓	↓↓↓	↓↓	↓
Land under non-agricultural use	↑↑↑↑	↑	↑↑↑↑	↓↓↓	↑	↑
Total cultivable land	↓↓↓↓	↓	↑↑↑↑	↓	↑	↑
Land Available for Agriculture	↑↑↑↑	↓	↑↑↑↑	↓↓↓↓	↓	↑↑
Land not available for cultivation	↑↑	↑	↑	↑	↑	↓↓↓↓
Forest	↔	↓	↓↓↓↓	↓	↔	↓

Source: Chadha *et al.* (2004) State of the Indian Farmer (Adapted).

Notations:

↔ No, or marginal change (up to 0.02%)

↑ Increase less than 2%.	↓ Decline up to 2%.
↑↑ Increase between 2-4%.	↓↓ Decline between 2-4%.
↑↑↑ Increase between 4-8%.	↓↓↓ Decline between 4-8%.
↑↑↑↑ increase more than 8%.	↓↓↓↓ Decline more than 8%.

As a consequence of land use change, there has been a change in occupational structure as people who were eking out their livelihood out of agriculture have to change over to other means of livelihood. In order to bring out the causal relationship between the land use changes with that of occupation structure following observations was made. There was a decline in cultivators in districts around Delhi by about -13.69% while it is about 2% less in Haryana. Net sown area & total cultivable land has registered a decline simultaneously there has been an increase in non-agricultural use & land not available for cultivation. The slight increase was noted in the case of land under current fallow & forest overall.

According to 1991 and 2001 census, the work force in Mumbai and Chennai is about one-third of the total population of which, maximum proportion of workers is found to be in secondary and tertiary sectors. The tertiary sector includes, trade and commerce and other services. The trade and commerce sector is the largest sector, contributing over one-third of the workforce in Greater Mumbai and one-fourth of the workforce in Chennai.

In Chennai, the manufacturing sector comprises large industries such as petrochemicals and chemical industry, electrical and automobile and related ancillary industries. Many chemical industries are clustered in Manali area. Chennai has now emerged as the automobile capital of India. Some of the largest industrial estates include Ambattur and Manali and small industrial estates include Guindy, Thirumazhisai and Thirumudivakkam in CMR. There are large-scale public sector industries, such as Integral Coach Factory, Heavy Vehicles.

In other cities, such as, Kolkata and Hyderabad, where domestic entrepreneurial activity has been weak and private capital less eager to invest, the state government has been the dominant agency of change. By the early 1990s the state government realized that a revival of the manufacturing sector and a revival of Kolkata were important to the future of the state.

But by then, the image of the city as a destination for investment had fallen to a very low level and even today, in spite of efforts by the state government, it has not yet fully recovered and the city is rarely the first choice as a destination option to industrialists, both domestic and foreign. Economic revival in West Bengal since 2000 is bleak.

In case of agricultural labourers there is marginal decline of -1.16% in Delhi. Kolkata shows an increase of about 2.08%. Peri urban Hyderabad has although a decline of more than 5% while districts around Chennai have shown an decline of about -8.98% which is double in comparison to the state. Bangalore has a marginal decline of -2.18%.

Household industry workers have increased in Delhi by 1.65, Kolkata by 1.39%. Chennai & Bangalore also has seen decline by -1.73% & -0.64% respectively. Peri urban Mumbai has shown a increase by 0.38% while Maharashtra has seen decline. All the major metropolitan peri urban areas had in increase in land under non agricultural use.

Other than household workers has increased by 57.75% in Delhi. Kolkata has a declining trend of 4.25%. Peri urban Hyderabad also has a huge increase by 57.38% nearly 28% higher than state. Chennai & Bangalore has huge increase in this category Chennai being 63.61% over 20 %. Bangalore follows the similar trend by the difference is not more than 2%. Peri urban Mumbai has seen a huge increase by 54.645 more than 20% higher than the state. The figures are depicted in table no 5 & 6 while the trends are shown in table no. 7 & 8.

Table No 5. Change in occupation in the peri urban districts of six large metropolitan cities & the respective states (2011-01)

Change of Workers in %	Mumbai	Maharashtra	Delhi	Haryana	Kolkata	West Bengal
Cultivators	-5.58	-3.36	-13.37	-11.64	-0.53	-4.42
Agricultural labourers	1	0.92	-0.90	5.14	6.36	-8.30
Household industry workers	1	-0.16	1.45	2.99	3.59	-0.34

Other than household industry workers	60.38	35.06	55.47	30.36	42.66	38.29

Continued ……

Change of Workers in %	Chennai	Tamil Nadu	Hyderabad	Andhra Pradesh	Bangalore	Karnataka
Cultivators	-3.84	-6.14	-7.48	-6.08	-17.86	-1.45
Agricultural labourers	-1.84	-4.98	-8.36	3.37	5.20	-8.15
Household industry workers	-1.75	-1.44	-0.39	-1.04	-1.59	0.15
Other than household industry workers	61.44	1.49	57.38	31.22	39.30	0.11

Source: Census of India 1991- 2011

Table No 6. Trends in the shift of Workers in the peri urban districts of six large metropolitan cities & the state (1991-01)

Change of Workers in %	Mumbai	Maharashtra	Delhi	Haryana	Kolkata	West Bengal
Cultivators	↓↓↓	↓↓	↓↓↓↓	↓↓↓↓	↓	↓↓↓
Agricultural labourers	↑	↑	↓	↑↑↑	↑↑	↓
Household industry workers	↑	↓	↑	↑↑	↑↑	↓
Other than household industry workers	↑↑↑↑	↑↑↑↑	↑↑↑↑	↑↑↑↑	↑↑↑↑	↑↑↑↑

Continued….

Change of Workers	Chennai	Tamil	Hyderabad	Andhra	Bangalore	Karnataka

in %		Nadu		Pradesh		
Cultivators	↓↓	↓↓↓	↓↓↓	↓↓↓	↓↓↓↓	↓
Agricultural labourers	↓	↓↓↓	↓↓↓↓	↑↑	↑↑↑	↓↓↓↓
Household industry workers	↓	↓	↓	↓	↓	↓
Other than household industry workers	↑↑↑↑	↑	↑↑↑↑	↑↑↑↑	↑↑↑↑	↑

Source: Chadha *et al.* (2004) State of the Indian Farmer (Adapted).

Notations:

↔ No or marginal change (up to 0.02%)

↑ Increase less than 2%. ↓ Decline up to 2%.

↑↑ Increase between 2-4%. ↓↓ Decline between 2-4%.

↑↑↑ Increase between 4-8%. ↓↓↓ Decline between 4-8%.

↑↑↑↑ increase more than 8%. ↓↓↓↓ Decline more than 8%.

In previous decade of 1991-01, land use change had its effect on the occupational structure as people whose livelihood was depended on agriculture have to change over to other means of livelihood. In order to bring out the causal relationship between the land use changes with that of occupation structure following observations was made. There was decline in cultivators in districts around Delhi, Hyderabad, Chennai, Mumbai, Bangalore and Kolkata by about -9.81%. also has a sharp decline by -17.45%. Peri urban Delhi, Kolkata, while increase is seen in total cultivable land in districts around Kolkata, Hyderabad & Mumbai. Land under non agricultural use has seen an increase in near the entire metropolitan except Delhi & Mumbai.

In case of agricultural labourers there is moderate decline of -5.91% in Delhi. Kolkata and Hyderabad flows similar trend. Districts around Chennai have shown an increase of about 17.21% while Bangalore has a moderate decline of -5.29%. Mumbai has a decrease of -3.18% but the state shows a similar trend. Although there is a decline among cultivators & agricultural labourers increase may have been because of better land management practices.

Household industry workers have increased in Delhi and six other metropolitan regions. Other than household workers have decreased by -1.10% in Delhi, Kolkata, Hyderabad, Chennai, Bangalore and Mumbai has a similar trend as it has a decline of -4.31% nearly 4%.The figures are depicted in table no 3 & 4 while the trends are shown in table no. 7& 8.

In Mumbai, the number of industries dealing with fabricated metals, garments and hosiery, wood and furniture works, printing, rubber and plastic, chemicals and motor vehicles, etc. is higher and they provide large-scale employment opportunities.There are four major industrial clusters in MMR (Murthy et al., 2001) — (a) Thane–Belapur belt, (b) Kalyan–Ulhasnagar–Ambernath belt, (c) Western shore of Thane Creek and (d) Around Patalganga River.

The construction industry workers increased nearly two times from 1961 to 2001 (Singh, 2010). The economic base of the city has traditionally been industry, trade, commerce and services. However, in the last decade or so the contribution of Information Technology (IT) sector to their economy has increased phenomenally.

Bangalore along with the southern metropolitan city of Chennai has attracted substantial foreign and Indian investment since economic reforms were started in 1991 (Shaw, 1999). Its rise to an internationally recognized centre for IT and ITES has occurred gradually over the last two decades, starting from the mid-eighties.Today multinational technology majors like IBM, Texas Instruments, Microsoft, Motorola, Digital, Novell, Intel, Oracle and General Electric have their branch offices and developmental centers in Bangalore.

The growth of the IT and ITES sector and their demand for a work environment that included smart offices and large exclusive campuses has led to the peripheralization of development in the city (Aranya,2003; Madon, 1997). This peripheralization was encouraged by the state government which set up Electronics City and Software Technology Park of India (STPI) with an earth station about 20 km south of Bangalore. IT and ITES firms thus found it convenient to locate their exclusive campuses in and around Electronics City. Prominent domestic IT firms such as Infosys and Wipro and other MNC firms are located around Electronics City while the southern residential suburb of Koramangala became the preferred residential location for the IT work force. Local government, through simplified local building bye laws and zonal regulations provided incentives for IT industries, andthereby encouraged the shift of work spaces to the periphery (Aranya, 2003).

Table No 7: Change in occupation in the peri urban districts of six large metropolitan cities & the respective states (1991-01)

Change of Workers in %	Mumbai	Maharashtra	Delhi	Haryana	Kolkata	West Bengal
Cultivators	16.23	8.43	8.46	16.27	9.59	11.59
Agricultural labourers	-2.51	-3.43	-5.99	1.88	-8.30	-1.71
Household industry workers	-0.95	-0.84	-1.74	-0.09	-1.92	-2.92
Other than household industry workers	2.59	2.05	1.07	-0.71	1.89	1.88

Continued….

Change of Workers in %	Chennai	Tamil Nadu	Hyderabad	Andhra Pradesh	Bangalore	Karnataka
Cultivators	8.25	19.23	6.25	6.61	17.45	9.47
Agricultural labourers	10.14	-23.47	-8.97	-25.99	-5.29	-6.25
Household industry workers	-1.75	-1.44	-1.75	-1.07	-1.67	-2.04
Other than household industry workers	1.49	4.09	2.89	-0.02	0.11	1.59

Source: Census of India 1991- 2011

Table 8: Trends in the shift of Workers in the peri urban districts of six large metropolitan cities & the state (1991-01)

Change of Workers in %	Mumbai	Maharashtra	Delhi	Haryana	Kolkata	West Bengal
Cultivators	↑↑↑↑	↑↑↑↑	↑↑↑↑	↑↑↑↑	↑↑↑↑	↑↑↑↑
Agricultural labourers	↓↓	↓↓	↓↓↓	↑	↓↓↓↓	↓
Household industry workers	↓	↓	↓	↓	↓	↓↓
Other than household industry workers	↑↑	↑↑	↑	↓	↑	↑

Continued….

Change of Workers in %	Chennai	Tamil Nadu	Hyderabad	Andhra Pradesh	Bangalore	Karnataka
Cultivators	↑↑↑↑	↑↑↑↑	↑↑↑	↑↑↑	↑↑↑↑	↑↑↑↑
Agricultural labourers	↑↑↑↑	↓↓↓↓	↓↓↓↓	↓↓↓↓	↓↓↓	↓↓↓
Household industry workers	↓	↓	↓	↓	↓	↓↓
Other than household industry workers	↑	↑↑↑↑	↑↑	↔	↑	↑

Source: Chadha *et al.* (2004) State of the Indian Farmer (Adapted).

Notations:

↔ No or marginal change (up to 0.02%)

↑ Increase less than 2%. ↓ Decline up to 2%.

↑↑ Increase between 2-4%. ↓↓ Decline between 2-4%.

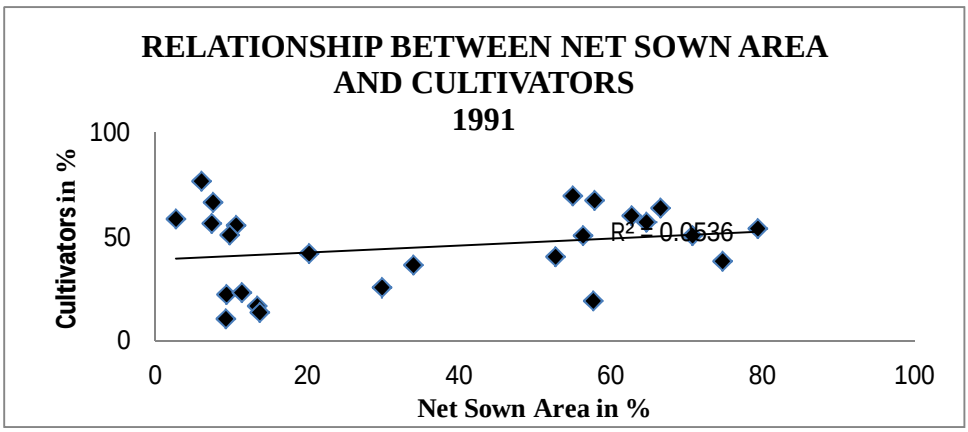
↑↑↑ Increase between 4-8%. ↓↓↓ Decline between 4-8%.

↑↑↑↑ increase more than 8%. ↓↓↓↓ Decline more than 8%.

d) RELATIONSHIP BETWEEN LAND USE CHANGE AND SHIFT IN WORKERS

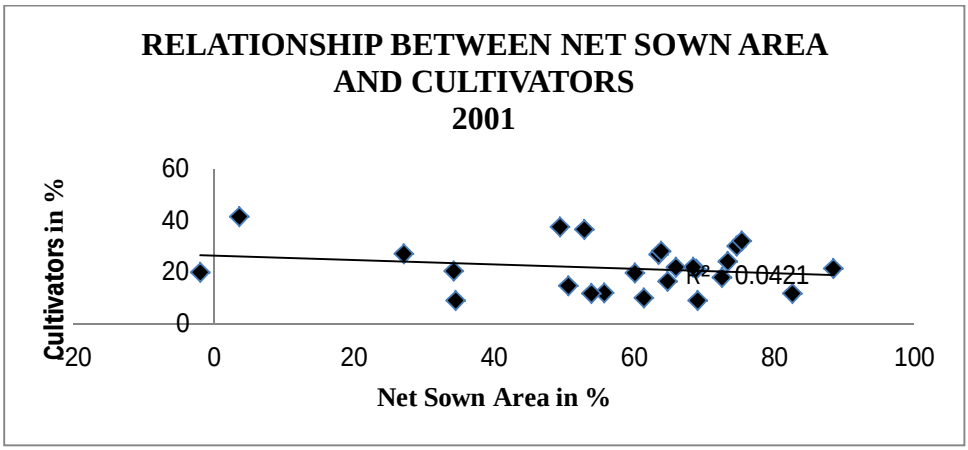
The net sown areas and the workers involved in cultivation (*cultivators)* have a positive relationship as decline in net sown area will cause decline in *As* a result there are changes in the net sown areas as well. Mostly it is characterized by decline in cultivators as well. This is because of loss of agricultural land leaves the cultivators without work, therefore inducing them to take up other non-farm work, agricultural labourers or non-agricultural activities. Net sown area increases in some cases as there is increase due to intensification in cultivation, better land management practices such as bringing more waste and barren land under cultivation. In the decade 1991 there was weak positive correlation between net sown area and Cultivators their degree of relationship was linearly positive of each other. The following decade in 2001 there has been very weak negative correlation with coefficient values of 0.04% between the two variables. In 2011 there has been almost zero degree of correlation between the net sown area and cultivators. The below figure depicts the scatter diagram illustrating the relationship between net sown area and cultivators with the corresponding trend line by best fit method.

Figure No 13: Relationship between Net Sown Area and Cultivators 1991



Source: Census 1991- 2001 and DACNET 1991- 2001

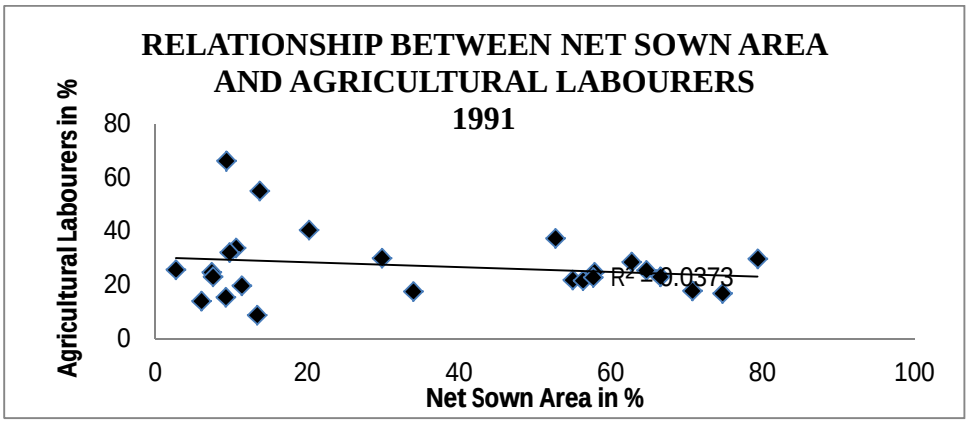
Figure No 14: Relationship between Net Sown Area and Cultivators 2001



Source: Census 1991- 2001 and DACNET 1991- 2001

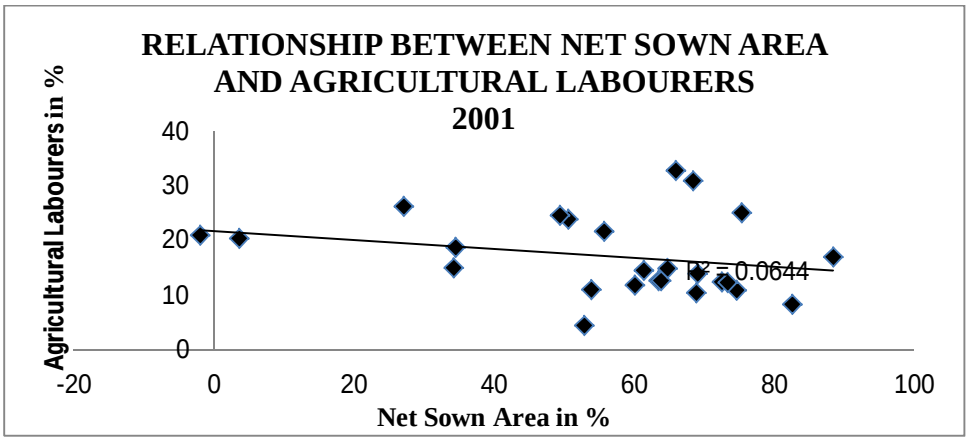
The net sown areas and the workers involved as wage labourers (*agricultural labourers)* have a complex relationship. As a result of decline in net sown areas there is in some cases increase in agricultural labourers. The trend in most cases is decline in net sown ares with decline in agricultural labourers. In the decade 1991 there was weak positive correlation between net sown area and agricultural labourers their degree of relationship was linearly negative of each other. The following decade in 2001 follows the same trend but the relationship is stronger as there correlation of coefficient is of higher value of 0.06. In 2011 there has been a negative correlation between the two variables and the relationship has emerged more stronger in a negative non linear fashion. The below figure depicts the scatter diagram illustrating the relationship between net sown area and cultivators with the corresponding trend line by best fit method.

Figure No 15: Relationship between Net Sown Area and Agricultural Labourers 1991



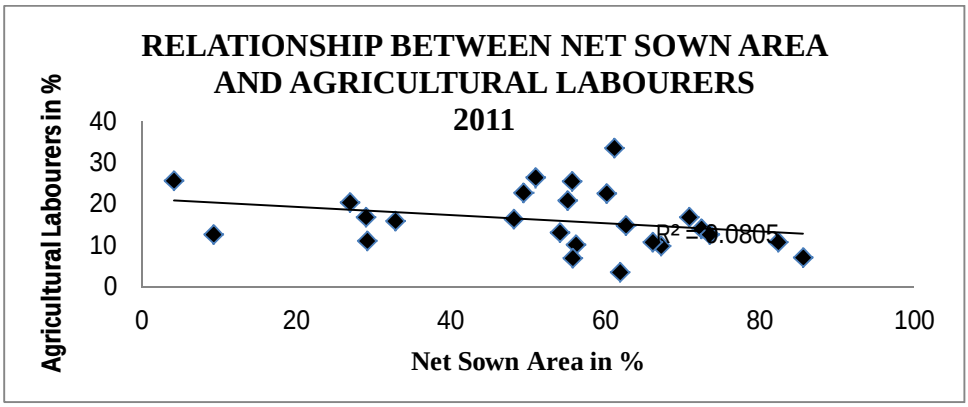
Source: Census 1991- 2001 and DACNET 1991- 2001

Figure No 16: Relationship between Net Sown Area and Agricultural Labourers 2001



Source: Census 1991- 2001 and DACNET 1991- 2001

Figure No 17: Relationship between Net Sown Area and Agricultural Labourers 2011

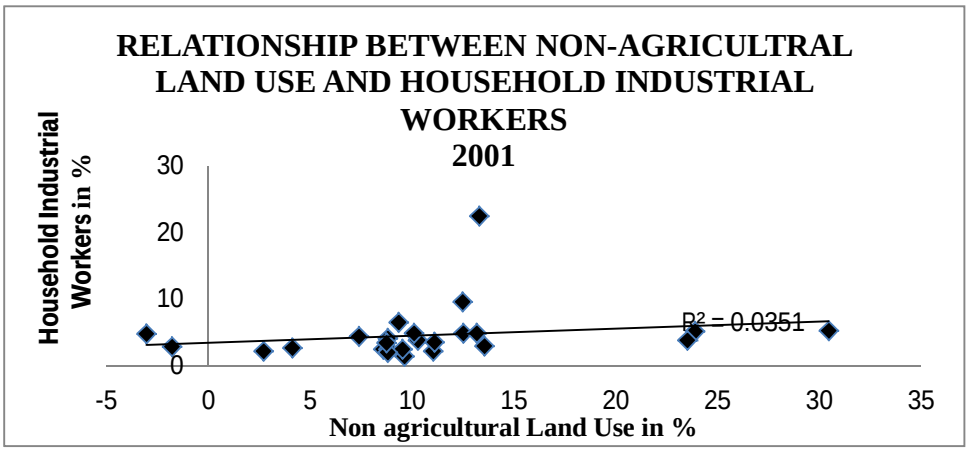


Source: Census 2001-2011 and DACNET 2001-2011

Non agricultural land use and workers non-agricultural workers (Household Industrial Workers and Other workers) have a direst correction. As urban areas expand spatially over the peripheral regions of the metropolitan city there is increase in the built up areas as a consequence. Mostly it is characterized by increase in non agricultural land use in the region. Outflow of agricultural land in similar fashion renders people dependent on it unemployed thus shifting over to other means of livelihood. In the decade 1991 there was nearly zero correlation between non agricultural land use and Household industrial workers and their degree of relationship was independent of each other. The following decade in 2001 there has been weak positive correlation with coefficient values of 0.035% between the two variables and the displayed a very slight non linear positive relationship. In 2011 the correlation between the two variables is positive and stronger with value of 0.178% and degree of

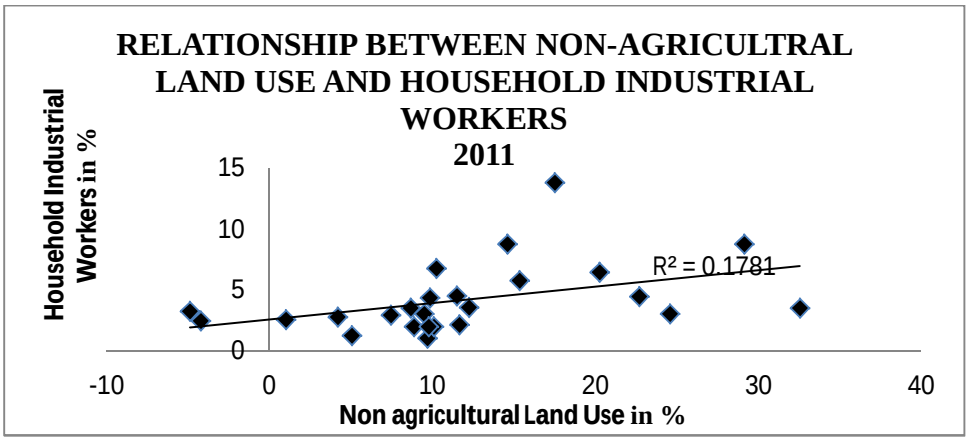
relationship is nonlinearly positive. The relationship being much stronger in comparison to the previous decade. The below figure shows the scatter diagram depicting the relationship between level of urbanization and non agricultural land use with the corresponding trend line by best fit method.

Figure No 18: Relationship between Non agricultural Land Use and Household Industrial Workers 2001



Source: Census 1991- 2001 and DACNET 1991- 2001

Figure No 19: Relationship between Non agricultural Land Use and Household Industrial Workers 2011

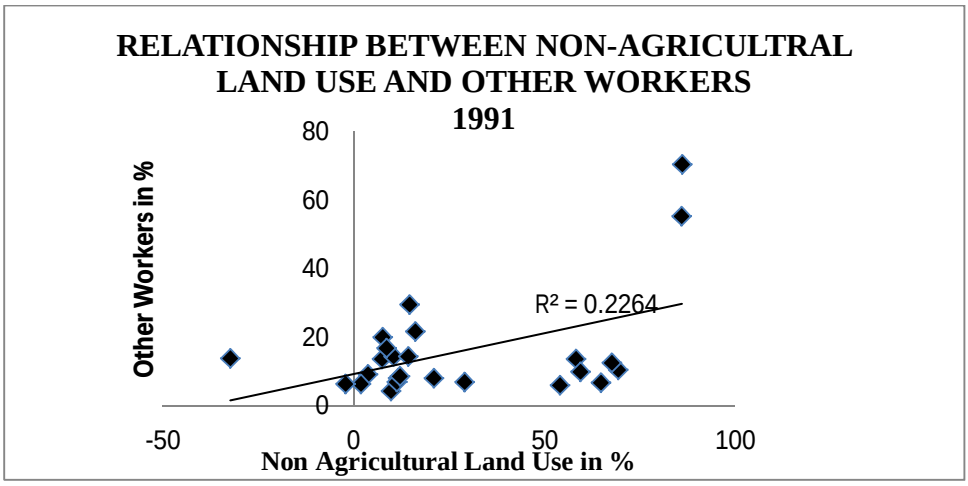


Source: Census 2001-2011 and DACNET 2001-2011

Non agricultural and other workers have a direct correlation. As a consequence of peri urbanization and land use change there has been a huge surge in the other workers category

which includes all industrial swell as service based work. In the decade 1991 there was a positive correlation between non agricultural land use and other workers. The following decade in 2001 there was a slight negative correlation with coefficient values of 0.003% between the two variables and the displayed a very slight non linear negative relationship. In the following decade the correlation between the two variables remains the same. The below figure 20 shows the scatter diagram depicting the relationship between level of urbanization and non agricultural land use with the corresponding trend line by best fit method.

Figure No 20: Relationship between Non agricultural Land Use and Other Workers 1991



Source: Census 1991- 2001 and DACNET 1991- 2001

e) WORKERS SHIFT IN THE FRINGES OF DELHI AND MUMBAI

A micro level analysis of shift of workers from agriculture to non agriculture was undertaken keeping with the flow of the previous chapters. Mumbai has limitations to growth due to coastal location while Delhi has abundant opportunity to grow in its peripheries. Therefore further micro level analysis have been in the districts around metropolitan cities of Delhi and Mumbai in order to understand the relation between land use change and shift in workers. Occupational pattern also helps in studying rural transformation.

In financial capital of India, Mumbai and its peri-urban areas have grown immensely in the recent times. In spite of its physical limitation to space it has seen a steady rise in towns and has the one of the highest population growth rates in India. Its main workers have seen a steady rise of 83% in 2011 an increase of about 3% since the last decade, although it has declined since 1991 when it was about 91%. Marginal workers have seen a steady increase of 8% from 1991 to 2001, have declined slightly in the present decade owing to a slight

increase in the main workers. The marginal workers are more concentrated in young age groups of 5-14 years, 15 -19 years or older age groups who are out of the active labour force. Easy entry, lack of formal regulations, low competitive wages and high demand for cheap labour has been the contributing factor.

In the case of Delhi, there is drastically decline of main workers from 1991 to 2001 by 14 %but there is increase by 4% in the last decade. Total Marginal workers also follow the same trend as the main workers. The peripheries of both the cities have decline in agricultural workers and increase in other workers as concomitant to land use change. Increase of marginalisation has taken place in both places. More change in marginal workers in agriculture was observed in Delhi marked by an increase while such an increase was found among other workers in Mumbai peri urban areas. Feminisation of work was more in case of agricultural workers in peripheries of Mumbai while Delhi reported a decline in female workers.

f) CONCLUSION

Urban fringes develop due to pull from the core and also due to external forces such as real estate development, global market which push people to the peripheries. Mostly poor are pushed away from city core to the peripheries creating social polarization.

Land use change is inevitable, and happens in such haphazard manner that it makes the region more prone to pollution and vulnerable to hazards. A recent example can be drawn from the Chennai floods, which was totally edaphic in nature. The failure of the city planning and design perpetuated to a disaster of such a massive scale. Natural resource should be taken into consideration along with pollution in geo-social approach. Both the peri urban areas face similar problems and have seen a relatively similar process of growth and transformation but the causes driving them and their outcomes vary. Mumbai faces lack of space of growth, population pressure and deficiency in provision of basic infrastructure. Delhi on contrary hardly has any limitations to spatial expansion but faces far severe shortage of potable water and transportation power etc. Expansion causes the hinterland to grow, transforming the rural areas into peri urban spaces which eventually get totally absorbed within the urban. It is dynamic in nature, continuously metamorphosing the structure of a city and causing problems of livelihood and natural resource (Gregory 2005).

The occupation structure has indeed undergone a change as a consequence of land use and there has been overall decline in agricultural workers as a result of decline in net sown area while non agricultural workers have gone up consequently with increase in non-agricultural land use. Tremendous increase was found in other workers all over the metropolitan cities. More casualisation of work and marginalisation of workers are seen to have taken place. The impact of conversion of land and neoliberal economic policies in the urban fringes were more than the states are very well evident. The change in workers was more marked in the peripheries of the largest six metropolitan cities in comparison to other metropolitan cities. There is a trend of pauperisation of the workers engaged in agriculture is marked in the peri urban areas in comparison to the states.

Rural poor are often induced into transformation as land acquisition also creates a loss of their most important source of livelihood. Low wage rates and lack of access to assets further prompt the situation. Trickle down effects from the benefits of large farmers is insufficient for the poor. Therefore, additional income from diversification has enormous benefits for them.

CHAPTER 5

CONCLUSION

Peripheries of the large metropolitan cities have grown at a very rapid pace inducing massive land use changes. As a consequence of it people are involved in agriculture are losing work hence moving on to other non agricultural work leading to diversification of work. This shift in work and land use change is varying across the cities and in a haphazard way such that making irreversible changes on the landscape. The forces in operation are mostly under the effect of globalisation. Its effect largely is concentrated in and around the large metropolitan cities. Therefore the purpose of the study is to find out how fast the peripheries of larger cities have grown in comparison to the core and have the smaller cities been able to keep up with the pace. Also to study how population growth has growth affected land use change and to the extent it has caused shift in occupation. The frame work involved analysis population growth, land use change and shift in occupation cross two decades 1991-01 and 2001-11 across the peripheries of twenty five metropolitan cities in India.

Urbanisation in India has taken place at a rapid pace than it is normally expected. It has been fuelled by urban growth and industrialisation. Urban growth has been so fast that it lacks uniformity in the distribution of the population economic activities as well as basic infrastructure, amenities and transport. Therefore it has resulted in the cities growing beyond their boundaries, in to the rural hinterland. This leads o he formation of the peri urban areas of or the urban fringes. This is a common phenomenon in the peripheries of large metropolitan cities and is emerging in case of other smaller metropolitan cities. The underlying factors of peripheralisation are migration from rural countryside and from city core as well.

The growth of peripheries is a manifestation of diverse processes, such as economic, demographic, urbanisation, industrialisation etc. Although the growth of peripheries has been phenomenal, studies on it are marked by lack of definition. Census defines urban areas but the definition has been obsolete, being in use for 50 years. According to it India is a 33% urbanised (Census 2011) and doesn't define or mention the about the growth of fringes. Therefore 'peri urban' needs to be defined. Literature gives a variety of definition for peri

urban but they often fail to reach a consensus. Therefore peri urban remains arguably a contested space.

Peri urban space is dynamic characterised by high population growth and unrestricted use of land. Its proximity to the urban metropolitan cities makes it a sought after place to accommodate the city's growing population, migration population who find it cost effective, commuting feasible and industries. A strong inter-linkage exists between the city and its rural hinterland as the cities depend on rural hinterland for resources.

From the study across three censuses from 1991 to 2011 there has been immense growth in urban population growth. The six largest metropolitan cities have shown the major changes and were more dynamic in nature. The decade 1991 to 2001 shows more drastic changes in comparison to the decade 2001-11. Although spatial expansion, of the cities were more evident in post 2001. Analysis of the growth rates of the city and its peripheries reveal that city cores have declined in population growth. Almost all the twenty five million plus cities have shown decline in population growth in the present decade from 2001-2011. Outliers to this trend are Kanpur and Bangalore. Bangalore is the only largest metropolitan city to have a different trend of growing core as well as periphery. The city has seen a huge impact of Globalisation. MNC's in recent decade has made their presence felt causing population growth by pull factors. The city is able to attract the skilled labour needed for the information technology sector ata relatively cheaper rate as per global standards. Thus resulting in high growth in the city core as well as the periphery itself too. Other major cities have grown to their maximum capacity and urbanisation become stagnant. Growth in these cities has slowed down and city cores were shrinking. Other smaller metropolitan cities such as Pune and Indore are also growing faster in their peripheries.

The peripheries of the cities in comparison have grown immensely and at a faster rate in comparison to the city cores (Shaw 2005). Peripheries have provided suitable accommodation for the migrant population as well as the affluent class who have shifted here for better environment and to avoid the congestion and pollution of the city. Growth is marked by increase in the number of towns and cities and development of new towns (Shivaramakrishnan 2005). The trend in growth suggests that population growth although is higher than the cores and is growing faster but it has declined since the previous decade. The growth of urban population is reflected in the spurt in number of towns and creation of new districts and blocks.

Size class distribution reveals that the lower order cities in the peripheries particularly Class III and IV have been increasing at a much faster rate. Large metropolitan cites display these characteristics. Class I cites in the peripheries of large metropolitan cities have the largest share of population and crate a top heaviness in the urban structure.

The respective states of the large metropolitan cities have the similar trend but they are at a much lower value indicating that the forces of globalisation urbanisation and policy effectiveness have remained concentrated to the urban areas and more evident in case of fringes. There is urban biasness of exclusionary nature of urban growth. Two largest metropolitan cites of Mumbai have displayed these distinct characteristics although it has been more in case of Delhi.

Second characteristic of peri urban growth has been land use change as a consequence of urban growth in the peripheries. Land is a sought after resource in the peripheries and it's marked by scarcity. Its speculative value makes its markets volatile. Land use change as a result of urbanisation mainly in form of residential areas and industries has been drastic and haphazard (Narain 2007). Lack of regulations, enforcement authorities and institutions with regard to land use (Aurobindoo 2006). Urban expansion grows at the expense of the agricultural land in the peripheries (Adell 1999). In recent times there has been outflow of agricultural land for non-agricultural use as result of this. In analysis of land use under 9 categories, there has been decline in the net sown area and increase in the non agricultural land use. Barring few exceptions this has been the trend throughout the largest metropolitan areas. Peripheries of cities which had seen an increase may have been due to intensification of agriculture or better land management of bringing barren uncultivated land etc under agriculture practices in order to meet the food requirements of the city (Chadha et.al 2004) (Leaf 2000). One such example is in Peri urban Delhi and Bangalore. Simultaneous changes were observed in other categories of land use.

A direct consequence of the land loss or land outflow from agriculture to non agriculture had been change in the occupational structure. This is depicted in scatter diagrams in chapter 4. There is inverse relationship with net sown area and workers involved in agriculture (cultivators or agricultural labourers), while a direct relationship in case of non agricultural land use with non agricultural workers. The land use change was stark in large metropolitan cities; same trend was observed in case of smaller order cities which had experienced high growth rate. Workers on the other hand had undergone decline in agricultural activities, the

decline being more in the recent decade of 2001-2011 and had considerable shift over to non agricultural workers (household industries and other workers) throughout the twenty five million plus cities. Workers in the peripheries of large cities have undergone more shifts from agriculture to non agriculture in comparison to smaller cities to exception being cities such as Pune and Indore which is corresponded by high population growth of 4% and 5% respectively. The effects of liberalisation and government slowly adopting neoliberal agenda came into effect in 2001-2011 decades as major changes and massive shift of workers by 40% were seen in this time period. In close observance at micro level of the peripheries of two large metropolitan cities Mumbai and Delhi it was reported that the workers even more and more female workers were seen to emerge in marginal workers category possibly due to easy entry and low wages. In case of peri urban Mumbai, they were in all sectors while Delhi they were limited to non-agricultural workers.

Population growth in the peripheries of large metropolitan has indeed grown faster to cause land use change in a massive manner and resulting in shift of workers. There three factors are inter related and change in one triggers of causes chain reaction in other sectors.

As a result of land loss there has been shift of workers from agriculture to non agricultural activities. Loss of land results in loss of livelihoods of the people associated with land therefore as a strategy to survive the workers involved in agriculture adopt other work of non agricultural sector (Mallik 2008). Analysis reveals a more detailed picture of marginalisation for workers and phenomenal increase of workers in the non agricultural sector (other workers) indicating casualisation of work (Kundu 1999). The changes are starker in the recent decade than in the previous one indicating that change in land use has been due to direct consequence of urban growth hand and finally causing change in occupational structure, i.e. decline in agriculture and increase in non agriculture activities.

a) POLICY SUGGESTIONS

There should be a well structured and recognised definition of peri urban in the census as rural and urban as been defined. The definition for designating urban areas needs to be updated according to international structures. Secondly there should be authorities, institutions and bodies for planning development and regulating land use in the peri urban areas to bring about lesser distortion in the scenario and also protecting environment from

degradation. Thirdly the farmers who lose land due to acquisition should be adequately compensated and rehabilitated in the other work though proper means. Land acquisition Laws should suit more of the interests of agricultural workers than the industries or private players. Labour policies should be more inclined in favour of labourers instead of having a neoliberal outlook. Policies and laws should be brought in to control marginalisation of Work.

APPENDIX

Table 1: Growth at State Level

STATES	GR_UR2011_01	GR_UR2001_1991	GR_Total_2001_91
MAHARASHTRA	2.12	2.97	11.54
NCT OF DELHI	2.63	4.21	4.92
HARYANA	14.22	4.11	16.52
UTTAR PRADESH	17.55	2.24	17.95
WEST BENGAL	14.04	1.81	14.55
TAMIL NADU	2.39	3.65	11.85
KARNATAKA	2.74	2.55	13.35
GUJARAT	3.07	2.84	12.69
ANDHRA PRADESH	3.05	1.51	14.50
BIHAR	3.03	-2.68	19.89
PUNJAB	2.30	3.21	14.02
MADHYA PRADESH	2.29	0.40	13.70
RAJASTHAN	2.55	2.72	17.25
India	2.76	12.91	15.62

SOURCE: Census of India 1991-2011

Table 1: Forest

Land Use	Column2	Column3	Column4
Name	%Forest_11	%forest_01	%Forest_91
MAHARASHTRA	16.96	16.74	16.67
Mumbai	0.00	3.95	2.49
Mumbai_Peri-Urban	29.63	28.51	27.68
Pune	11.21	11.00	11.05
Nagpur	16.11	16.11	16.35
Nashik	16.87	19.91	20.21
HARYANA	0.88	2.62	3.88
UTTAR PRADESH	6.86	6.98	17.34
AV HARAYANA+UTTAR PRADESH	3.87	4.80	10.61
Delhi_Peri-Urban	1.14	1.52	2.78
Kanpur Nagar	1.92	1.58	9.14
Lucknow	5.20	2.45	4.52
Agra	8.95	11.41	8.88
Varanasi	0.00	0.47	15.20
Allahabad	3.85	1.14	2.76
Meerut	7.81	9.71	2.04
WEST BENGAL	13.52	13.70	13.75
Kolkata			
Kolkata_Peri-Urban	11.28	11.08	0.78
TAMIL NADU	16.31	16.42	16.49

Chennai	0.00	1.75	1.75
Chennai_Peri-Urban	5.57	5.57	#DIV/0!
KARNATAKA	16.13	16.11	16.03
Bangalore	2.33	1.52	1.52
Bangalore_Peri-Urban	3.83	2.23	2.15
GUJARAT	9.75	9.89	10.01
Ahmadabad_peri-Urban	1.18	1.17	0.67
Vadodara	100.00	10.59	18.65
Surat	4.84	18.33	18.27
MADHYA PRADESH	28.28	28.14	32.41
Bhopal	15.87	15.87	13.86
Indore	13.63	13.63	13.63
RAJASTHAN	8.00	7.61	6.92
Jaipur	7.44	7.37	5.29
BIHAR	20.68	6.59	17.02
Patna	0.02	0.02	0.02
PUNJAB	5.84	5.57	4.17
Ludhiana	2.85	2.72	2.68
Amritsar	3.65	2.54	2.92
ANDHRA PRADESH	22.65	22.59	22.89
Hyderabad_Peri-Urban	12.90	12.89	13.20
Visakhapatnam	39.53	42.12	42.12
India	22.89	22.85	22.20

SOURCE: DACNET 1991-2011

Table 3: Net Sown Area

Land Use	Column1	Column2	Column3
Name	% NSA_11	% NSA_01	% NSA_91
MAHARASHTRA	56.59	58.01	58.18
Mumbai	0.00	0.00	0.83
Mumbai_Peri-Urban	32.84	34.22	33.99
Pune	60.18	63.50	66.50
Nagpur	50.98	50.58	52.74
Nashik	56.17	49.35	55.01
HARYANA	80.50	80.09	80.01
UTTAR PRADESH	68.65	69.52	57.78
AV HARAYANA+UTTAR PRADESH	74.57	74.81	68.90
Delhi_Peri-Urban	67.20	74.55	74.70
Kanpur Nagar	48.13	63.79	56.33
Lucknow	54.09	60.08	57.87
Agra	70.88	72.51	70.76
Varanasi	62.62	75.29	62.73
Allahabad	55.69	68.86	64.65

Meerut	72.46	73.35	79.38
WEST BENGAL	57.36	62.36	62.81
Kolkata			
Kolkata_Peri-Urban	55.13	61.33	57.73
TAMIL NADU	38.01	40.82	43.98
Chennai	0.00	0.00	98.25
Chennai_Peri-Urban	29.04	34.48	13.39
KARNATAKA	55.24	54.65	55.84
Bangalore	23.17	47.88	22.41
Bangalore_Peri-Urban	4.21	3.61	2.75
GUJARAT	52.68	50.30	49.39
Ahmadabad_peri-Urban	73.53	69.01	49.71
Vadodara	61.14	68.42	9.39
Surat	29.16	55.66	10.67
MADHYA PRADESH	49.16	47.68	43.67
Bhopal	55.76	53.89	50.39
Indore	66.16	64.69	7.45
RAJASTHAN	53.54	46.30	45.22
Jaipur	61.91	52.84	6.12
BIHAR	56.19	60.50	44.52
Patna	49.43	65.92	20.22
PUNJAB	82.62	84.45	7.61
Ludhiana	85.63	82.59	11.40
Amritsar	82.35	88.36	9.31
ANDHRA PRADESH	40.58	35.04	40.24
Hyderabad_Peri-Urban	9.27	-1.95	29.88
Visakhapatnam	26.91	27.12	7.58
India	46.04	46.12	46.84

SOURCE: DACNET 1991-2011

Table 4: Non- Agricultural land Use

Land Use	Column1	Column2	Column3
Name	% of Non Agri_11	% of Non Agri_01	% of Non Agri_91
MAHARASHTRA	4.71	4.43	3.55
Mumbai	86.73	80.79	37.81
Mumbai_Peri-Urban	8.69	8.58	7.57
Pune	4.21	4.13	3.70
Nagpur	8.88	8.84	7.38
Nashik	1.03	2.70	1.89
HARYANA	11.94	8.35	6.32
UTTAR PRADESH	11.73	10.07	8.30
AV HARAYANA+UTTAR PRADESH	11.84	9.21	7.31

Delhi_Peri-Urban	22.70	13.56	10.40
Kanpur Nagar	9.84	10.30	14.62
Lucknow	20.27	10.10	9.67
Agra	10.26	9.34	8.63
Varanasi	17.52	13.31	11.57
Allahabad	14.61	12.48	11.27
Meerut	15.34	12.53	12.08
WEST BENGAL	20.99	18.04	18.42
Kolkata	100.00	100.00	100.00
Kolkata_Peri-Urban	29.12	23.90	16.10
TAMIL NADU	16.70	15.29	14.23
Chennai	98.25	98.25	0.00
Chennai_Peri-Urban	32.54	30.47	20.93
KARNATAKA	7.51	6.89	6.21
Bangalore	53.14	39.94	46.93
Bangalore_Peri-Urban	-4.88	-3.03	-2.11
GUJARAT	6.23	6.05	5.96
Ahmadabad_peri-Urban	10.10	9.53	64.73
Vadodara	9.70	9.62	69.32
Surat	5.05	11.05	54.07
MADHYA PRADESH	6.79	6.14	5.42
Bhopal	11.66	11.11	58.29
Indore	9.51	8.82	67.59
RAJASTHAN	5.51	5.08	4.78
Jaipur	7.44	7.39	59.45
BIHAR	18.16	17.50	12.27
Patna	24.60	23.53	64.74
PUNJAB	74.02	8.14	65.63
Ludhiana	11.52	13.17	85.90
Amritsar	12.24	8.82	86.18
ANDHRA PRADESH	10.19	9.85	8.57
Hyderabad_Peri-Urban	-4.20	-1.79	-32.47
Visakhapatnam	9.79	8.76	29.10
India	8.60	7.84	6.96

SOURCE: DACNET 1991-2011

Table 5: Land Available for Agriculture

Land Use	Column1	Column2	Column3
Name	% of LAA_11	% of LAA_01	% of LAA_91
MAHARASHTRA	72.71	73.80	72.33
Mumbai		6.58	47.60
Mumbai_Peri-Urban	96.36	53.23	52.93
Pune	155.31	78.20	79.12

Nagpur	133.89	78.25	70.42
Nashik	132.80	68.48	67.82
HARYANA	84.84	86.72	87.48
UTTAR PRADESH	91.68	80.40	70.94
AV HARAYANA+UTTAR PRADESH	88.26	83.56	79.21
Delhi_Peri-Urban	74.45	90.62	31.24
Kanpur Nagar	64.90	80.72	36.80
Lucknow	71.87	83.63	33.52
Agra	79.80	77.87	17.36
Varanasi	81.02	84.11	19.99
Allahabad	78.65	82.79	28.48
Meerut	91.99	75.48	17.02
WEST BENGAL	65.30	67.95	67.35
Kolkata			
Kolkata_Peri-Urban	57.37	64.76	61.12
TAMIL NADU	63.23	64.63	65.38
Chennai	0.00	938.68	98.25
Chennai_Peri-Urban	58.66	78.32	24.46
KARNATAKA	72.24	72.84	70.82
Bangalore	40.92	56.35	47.69
Bangalore_Peri-Urban	2.12	2.73	0.51
GUJARAT	70.63	70.28	70.16
Ahmadabad_peri-Urban	104.87	84.68	30.23
Vadodara	75.54	77.06	16.58
Surat	72.56	62.78	19.80
MADHYA PRADESH	103.59	61.33	57.62
Bhopal	71.05	71.83	26.17
Indore	74.14	76.16	18.01
RAJASTHAN	157.32	79.83	75.56
Jaipur	80.09	81.01	28.78
BIHAR	77.06	69.81	64.85
Patna	71.48	72.32	31.00
PUNJAB	83.58	85.75	10.68
Ludhiana	85.63	84.11	11.41
Amritsar	84.03	88.51	12.49
ANDHRA PRADESH	58.75	59.97	74.08
Hyderabad_Peri-Urban	-13.49	-13.71	29.92
Visakhapatnam	39.00	39.90	15.25
India	62.87	62.67	64.43

SOURCE: DACNET 1991-2011

Table 6: Total Cultivable Land

Land Use	Column1	Column2	Column3
Name	%of TCL_11	%of TCL_01	%of TCL_91
MAHARASHTRA	64.86	65.83	66.73
Mumbai	#DIV/0!	1.84	66.84
Mumbai_Peri-Urban	38.58	39.34	27.13
Pune	67.48	70.26	9.43
Nagpur	57.23	60.84	12.96
Nashik	64.41	61.29	8.86
HARYANA	83.35	85.36	85.84
UTTAR PRADESH	75.90	76.50	64.63
AV HARAYANA+UTTAR PRADESH	79.62	80.93	75.24
Delhi_Peri-Urban	72.50	87.62	#DIV/0!
Kanpur Nagar	59.96	73.89	25.86
Lucknow	67.64	78.88	25.67
Agra	76.85	76.69	15.04
Varanasi	77.88	80.36	17.48
Allahabad	74.00	78.36	22.58
Meerut	74.36	75.34	15.43
WEST BENGAL	64.30	66.81	65.70
Kolkata			
Kolkata_Peri-Urban	56.44	63.89	59.87
TAMIL NADU	57.92	59.01	60.30
Chennai	0.00	938.68	98.25
Chennai_Peri-Urban	50.44	52.17	20.66
KARNATAKA	63.77	63.97	63.22
Bangalore	33.14	48.21	37.42
Bangalore_Peri-Urban	2.26	3.89	4.32
GUJARAT	55.49	55.23	55.18
Ahmadabad_peri-Urban	76.25	77.06	23.60
Vadodara	63.18	71.81	11.08
Surat	30.56	56.60	13.23
MADHYA PRADESH	77.44	52.21	47.73
Bhopal	57.68	58.25	11.21
Indore	68.19	67.94	8.85
RAJASTHAN	139.96	60.48	58.75
Jaipur	69.91	70.94	17.68
BIHAR	62.83	66.65	60.21
Patna	70.89	71.79	29.92
PUNJAB	83.35	85.31	9.74
Ludhiana	85.63	84.11	11.41
Amritsar	83.93	88.43	9.56

ANDHRA PRADESH	54.51	53.94	54.21
Hyderabad_Peri-Urban	-10.15	-9.91	21.69
Visakhapatnam	34.77	33.50	11.75
India	54.34	54.60	54.54

SOURCE: DACNET 1991-2011

Table 7: Land Not Available for Agriculture

Land Use	Column1	Column2	Column3
Name	%LNAA_11	%LNAA_01	%LNAA_91
MAHARASHTRA	10.34	9.45	9.11
Mumbai	#DIV/0!	89.47	79.21
Mumbai_Peri-Urban	18.37	18.26	18.64
Pune	11.01	10.80	10.57
Nagpur	16.47	12.26	10.98
Nashik	10.05	11.61	11.36
HARYANA	1.49	10.66	8.64
UTTAR PRADESH	1.46	12.62	11.72
AV HARAYANA+UTTAR PRADESH	1.48	11.64	10.18
Delhi_Peri-Urban	7.86	16.17	12.52
Kanpur Nagar	18.98	17.70	19.94
Lucknow	22.93	13.92	13.75
Agra	11.25	10.71	11.64
Varanasi	18.98	15.42	9.12
Allahabad	17.50	16.07	15.38
Meerut	16.21	0.00	11.23
WEST BENGAL	21.19	18.35	18.89
Kolkata			
Kolkata_Peri-Urban	29.13	23.96	16.19
TAMIL NADU	20.46	18.95	18.13
Chennai	0.00	0.00	98.25
Chennai_Peri-Urban	35.76	33.71	15.23
KARNATAKA	11.64	4.17	10.39
Bangalore	3.43	42.13	26.28
Bangalore_Peri-Urban	-24.83	-11.84	-3.69
GUJARAT	197.90	19.83	19.82
Ahmadabad_peri-Urban	137.80	14.14	18.17
Vadodara	123.41	12.35	12.96
Surat	62.74	3.08	18.53
MADHYA PRADESH	11.13	10.53	9.98
Bhopal	13.08	12.30	11.45
Indore	12.23	10.21	8.22
RAJASTHAN	12.45	12.57	12.82
Jaipur	12.47	11.62	12.60

BIHAR	3.27	22.17	18.13
Patna	0.59	27.67	24.47
PUNJAB	10.59	8.68	9.02
Ludhiana	11.52	13.17	11.40
Amritsar	12.31	8.95	10.23
ANDHRA PRADESH	17.55	17.45	16.12
Hyderabad_Peri-Urban	-0.46	0.83	0.67
Visakhapatnam	21.47	20.30	21.11
India	14.23	7.78	13.35

SOURCE: DACNET 1991-2011

Table 8: Change in Net Sown Area

Name	Change NSA_11-01	Change%NSA
MAHARASHTRA	-1.42	-0.16
Mumbai	0.00	-0.83
Mumbai_Peri-Urban	-1.38	0.23
Pune	-3.31	-3.01
Nagpur	0.40	-2.16
Nashik	6.82	-5.67
HARYANA	0.40	0.08
UTTAR PRADESH	-0.87	11.74
AV HARAYANA+UTTAR PRADESH	-0.24	5.91
Delhi_Peri-Urban	-7.30	-0.14
Kanpur Nagar	-15.66	7.47
Lucknow	-5.99	2.20
Agra	-1.63	1.75
Varanasi	-12.67	12.55
Allahabad	-13.17	4.21
Meerut	-0.89	-6.03
WEST BENGAL	-5.00	-0.46
Kolkata		
Kolkata_Peri-Urban	-6.20	3.60
TAMIL NADU	-2.81	-3.16
Chennai	0.00	-98.25
Chennai_Peri-Urban	-5.44	3.54
KARNATAKA	0.59	-1.19
Bangalore	-24.71	25.46
Bangalore Rural	51.02	-2.05
GUJARAT	2.39	0.91
Ahnmadabad_Peri-Urban	4.53	55.20
Gandhinagar	-0.59	54.01
Vadodara	-7.29	59.03

Surat	-26.50	44.99
MADHYA PRADESH	1.48	4.01
Bhopal	1.87	-3.50
Indore	1.47	57.24
RAJASTHAN	7.24	1.08
Jaipur	9.07	46.72
BIHAR	-4.32	15.98
Patna	-16.49	45.70
PUNJAB	-1.83	76.83
Ludhiana	3.04	71.19
Amritsar	-6.00	79.05
ANDHRA PRADESH	5.54	-5.20
Hyderabad	0.00	-93.29
Hyderabad Peri_Urban	0.10	-0.31
Visakhapatnam	-2.60	0.00
India	-0.08	-46.84

SOURCE: DACNET 1991-2011

Table 9: Change in Non Agricultural Land use

Land Use Change	Column1	Column2
Name	Change Non_Agriculture_11-01	Change%NAU_01-91
MAHARASHTRA	0.27	0.89
Mumbai	5.65	42.98
Mumbai_Peri-Urban	0.29	1.01
Pune	0.08	0.43
Nagpur	0.04	1.46
Nashik	-1.67	0.81
HARYANA	3.59	2.03
UTTAR PRADESH	1.66	1.77
AV HARAYANA+UTTAR PRADESH	2.63	1.90
Delhi_Peri-Urban	11.08	3.17
Kanpur Nagar	-0.46	-4.33
Lucknow	10.17	0.43
Agra	0.93	0.70
Varanasi	4.21	1.73
Allahabad	2.12	1.21
Meerut	2.82	0.45
WEST BENGAL	2.95	-0.38
Kolkata	0.00	0.00
Kolkata_Peri-Urban	5.22	7.80
TAMIL NADU	1.42	1.06
Chennai	0.00	98.25

Chennai_Peri-Urban	2.07	9.54
KARNATAKA	0.62	0.67
Bangalore	13.20	-6.98
Bangalore Rural	2.48	1.59
GUJARAT	0.17	0.09
Ahnmadabad_Peri-Urban	0.56	-55.20
Gandhinagar	0.19	-60.08
Vadodara	0.08	-59.70
Surat	-6.00	-43.01
MADHYA PRADESH	0.65	0.72
Bhopal	0.56	-47.18
Indore	0.69	-58.77
RAJASTHAN	0.43	-4.78
Jaipur	0.05	-52.06
BIHAR	0.66	-12.27
Patna	1.07	-41.21
PUNJAB	65.88	-65.63
Ludhiana	-1.65	-72.73
Amritsar	3.42	-77.36
ANDHRA PRADESH	0.34	-8.57
Hyderabad	0.00	98.30
Hyderabad_Peri Urban	11.22	27.93
Vishakhapatnam	-0.20	19.54
India	0.76	-6.96

SOURCE: DACNET 1991-2011

Table 10: Change in Forest

Land Use Change	Column1	Column2
Name	Change forest_11-01	Change%Forest_01-91
MAHARASHTRA	0.22	0.07
Mumbai	0.00	0.00
Mumbai_Peri-Urban	1.12	0.00
Pune	0.22	-0.05
Nagpur	0.00	-0.24
Nashik	-3.05	-0.29
HARYANA	-1.74	-1.25
UTTAR PRADESH	-0.12	-10.36
AV HARAYANA+UTTAR PRADESH	-0.93	-5.81
Delhi_Peri-Urban	-0.29	-1.49
Kanpur Nagar	0.34	-7.55
Lucknow	2.75	-2.07

Agra	-2.47	2.54
Varanasi	-0.47	-14.73
Allahabad	2.71	-1.62
Meerut	-1.90	7.67
WEST BENGAL	-0.19	-0.05
Kolkata		
Kolkata_Peri-Urban	0.19	0.00
TAMIL NADU	-0.12	-0.07
Chennai	-1.75	0.00
Chennai_Peri-Urban	0.00	0.00
KARNATAKA	0.02	0.07
Bangalore	0.81	0.00
Bangalore Rural	-1.59	0.00
GUJARAT	-0.14	-0.13
Ahnmadabad_Peri-Urban	0.01	0.50
Gandhinagar	0.00	0.97
Vadodara	89.41	-8.07
Surat	-13.49	0.06
MADHYA PRADESH	0.14	-4.26
Bhopal	0.00	2.01
Indore	0.00	0.00
RAJASTHAN	0.40	0.69
Jaipur	0.07	2.09
BIHAR	14.09	-10.43
Patna	0.00	0.00
PUNJAB	0.27	1.40
Ludhiana	0.13	0.04
Amritsar	1.11	-0.38
ANDHRA PRADESH	0.06	-0.30
Hyderabad	0.00	0.00
Hyderabad_Peri Urban	-2.42	-30.69
Vishakhapatnam	1.03	-20.35
India	0.05	0.65

SOURCE: DACNET 1991-2011

Table 11: Change in Land Available for Agriculture

Name	Change_LAA_11-01	Change%LAA_01-91
MAHARASHTRA	-1.09	-0.71
Mumbai	0.00	0.00
Mumbai_Peri-Urban	43.13	12.62
Pune	77.11	61.88
Nagpur	55.64	53.19
Nashik	64.32	53.78

HARYANA	-1.88	-0.77
UTTAR PRADESH	11.27	9.47
AV HARAYANA+UTTAR PRADESH	4.70	4.35
Delhi_Peri-Urban	-18.14	71.52
Kanpur Nagar	-15.82	43.92
Lucknow	-11.76	50.10
Agra	1.93	60.51
Varanasi	-3.09	64.12
Allahabad	-4.14	54.31
Meerut	16.52	59.75
WEST BENGAL	-2.65	0.59
Kolkata		
Kolkata_Peri-Urban	-7.39	2.00
TAMIL NADU	-1.39	-0.75
Chennai	-938.68	840.44
Chennai_Peri-Urban	-19.65	17.26
KARNATAKA	-0.60	2.02
Bangalore	-15.43	8.67
Bangalore Rural	3.98	-0.20
GUJARAT	0.35	0.12
Ahnmadabad_Peri-Urban	20.19	54.46
Gandhinagar	11.73	58.72
Vadodara	-1.52	60.48
Surat	9.78	42.98
MADHYA PRADESH	42.25	3.71
Bhopal	-0.79	45.66
Indore	-2.02	58.16
RAJASTHAN	77.49	4.27
Jaipur	-0.92	52.22
BIHAR	7.25	4.96
Patna	-0.83	41.32
PUNJAB	-2.17	75.07
Ludhiana	1.52	72.70
Amritsar	-4.47	76.02
ANDHRA PRADESH	-1.22	-14.11
Hyderabad	0.00	-96.14
Hyderabad_Peri Urban	-0.22	16.21
Vishakhapatnam	-0.91	24.66
India	0.20	-1.76

SOURCE: DACNET 1991-2011

Table 12: Change in Total Cultivable Land

Land Use Change	Column1	Column2
Name	Change_TCL_11-01	Change%TCL_01-91
MAHARASHTRA	-0.96	-0.91
Mumbai	0.00	0.00
Mumbai_Peri-Urban	-0.76	12.21
Pune	-2.78	60.83
Nagpur	-3.61	47.88
Nashik	3.12	52.43
HARYANA	-2.01	-0.48
UTTAR PRADESH	-0.60	11.87
AV HARAYANA+UTTAR PRADESH	-1.31	5.69
Delhi_Peri-Urban	-17.24	71.39
Kanpur Nagar	-13.93	48.03
Lucknow	-11.24	53.21
Agra	0.16	61.65
Varanasi	-2.48	62.88
Allahabad	-4.36	55.79
Meerut	-0.97	59.90
WEST BENGAL	-2.52	1.11
Kolkata		
Kolkata_Peri-Urban	-7.46	4.02
TAMIL NADU	-1.09	-1.30
Chennai	-938.68	840.44
Chennai_Peri-Urban	-1.73	-12.84
KARNATAKA	-0.20	0.75
Bangalore	-15.07	10.79
Bangalore Rural	5.17	1.18
GUJARAT	0.26	0.05
Ahnmadabad_Peri-Urban	-0.82	53.46
Gandhinagar	-4.02	57.23
Vadodara	-8.63	60.74
Surat	-26.03	43.36
MADHYA PRADESH	25.23	4.48
Bhopal	-0.57	47.04
Indore	0.25	59.10
RAJASTHAN	79.48	1.74
Jaipur	-1.03	53.26
BIHAR	-3.83	6.44
Patna	-0.90	41.87
PUNJAB	-1.96	75.58
Ludhiana	1.52	72.70

Amritsar	-4.50	78.87
ANDHRA PRADESH	0.57	-0.27
Hyderabad	0.00	-96.04
Hyderabad_Peri Urban	-0.24	11.78
Vishakhapatnam	1.26	21.75
India	-0.26	0.05

SOURCE: DACNET 1991-2011

Table 13: Change in Land not Available for Agriculture

Land Use Change	Column1	Column2
Name	Change_LNAA_11-01	Change%LNAA_01-91
MAHARASHTRA	0.88	0.35
Mumbai	0.00	10.26
Mumbai_Peri-Urban	0.11	-0.38
Pune	0.21	0.23
Nagpur	4.21	1.28
Nashik	-1.56	0.25
HARYANA	-9.17	2.02
UTTAR PRADESH	-11.15	0.89
AV HARAYANA+UTTAR PRADESH	-10.16	1.46
Delhi_Peri-Urban	-7.17	3.65
Kanpur Nagar	1.29	-2.24
Lucknow	9.01	0.17
Agra	0.54	-0.93
Varanasi	3.56	6.30
Allahabad	1.43	0.69
Meerut	16.21	-11.23
WEST BENGAL	2.84	-0.54
Kolkata		
Kolkata_Peri-Urban	5.17	7.77
TAMIL NADU	1.51	0.82
Chennai	0.00	-98.25
Chennai_Peri-Urban	2.06	2.40
KARNATAKA	7.47	-6.22
Bangalore	-38.70	15.84
Bangalore Rural	6.26	1.93
GUJARAT	178.07	0.01
Ahnmadabad_Peri-Urban	123.65	-4.03
Gandhinagar	100.00	-8.78
Vadodara	111.05	-0.60
Surat	59.66	-15.45
MADHYA PRADESH	0.61	0.55

Bhopal	0.79	0.84
Indore	2.02	1.99
RAJASTHAN	-0.11	-0.26
Jaipur	0.85	-0.97
BIHAR	-18.90	4.03
Patna	-27.07	3.19
PUNJAB	1.90	-0.34
Ludhiana	-1.65	1.77
Amritsar	3.36	-1.28
ANDHRA PRADESH	0.10	1.32
Hyderabad	0.00	0.00
Hyderabad_Peri Urban	0.37	0.16
Vishakhapatnam	1.17	-0.80
India	6.45	-5.57

SOURCE: DACNET 1991-2011

Table 14: Main Workers in %

Column1	2011	2001	1991
Districts	%MAINWORK_P	%MAINWORK_P	%MAINWORK_P
Maharashtra	88.54	84.33	90.63
Mumbai_Peri_Urban	83.76	80.02	91.10
Pune	88.56	89.54	55.77
Nagpur	91.30	83.41	44.19
Nashik	92.65	87.45	70.88
Harayana	78.68	74.34	81.42
Uttar Pradesh	67.82	72.89	91.69
Haryana+Uttar Pradesh	69.12	73.08	90.63
Delhi_Peri_Urban	81.55	77.49	91.13
Agra	9.92	82.71	35.13
Lucknow	11.84	82.86	50.10
Kanpur Nagar	10.30	83.37	92.30
Allahabad	14.47	66.21	38.86
Varanasi	13.92	78.49	33.69
Meerut	81.69	82.29	10.97
West Bengal	73.90	77.98	93.52
Kolkata_Peri_Urban	78.75	82.64	96.42
Tamil Nadu	84.97	85.23	91.31
Chennai_Peri_Urban	81.41	80.69	95.31
Bangalore ru	84.80	82.25	90.78
Karnataka	83.94	81.55	84.51
GUJARAT	82.23	80.10	35.40
Ahmedabad_Peri-Urban	88.96	88.41	13.30

Vadodara	80.35	79.18	9.86
Surat	94.19	90.78	44.80
MADHYA PRADESH	71.90	74.06	56.62
Indore	89.67	84.63	38.96
Bhopal	81.39	85.80	42.37
RAJASTHAN	70.46	73.37	42.83
Jaipur	83.57	85.00	35.91
BIHAR	61.51	75.26	54.18
Patna	72.87	81.51	50.00
PUNJAB	85.39	85.85	8.19
Ludhiana	88.62	90.60	98.61
Amritsar	85.77	84.35	83.43
Andhra Pradesh	83.80	83.27	94.66
Hyderabad	83.55	87.60	97.32
Vishakapatnam	78.37	81.46	66.83

SOURCE: Census 1991-2011

Table 15: Change in Main Workers in %

Districts	%MAINWORK_P_2001-11	%MAINWORK_P_1991-01
Maharashtra	4.21	6.30
Mumbai_Peri_Urban	3.74	11.08
Pune	-0.98	-33.77
Nagpur	7.90	-39.22
Nashik	5.19	-16.57
Harayana	4.34	7.08
Uttar Pradesh	-5.07	18.80
Haryana+Uttar Pradesh	-3.97	17.55
Delhi_Peri_Urban	4.06	13.64
Agra	-72.78	-47.58
Lucknow	-71.02	-32.76
Kanpur Nagar	-73.06	8.93
Allahabad	-51.74	-27.35
Varanasi	-64.57	-44.80
Meerut	-0.60	-71.32
West Bengal	-4.08	15.54
Kolkata_Peri_Urban	-3.88	13.78
Tamil Nadu	-0.26	6.09
Chennai_Peri_Urban	0.73	14.63
Bangalore ru	2.55	8.53
Karnataka	2.40	2.96
GUJARAT	2.13	-44.70
Ahmedabad_Peri-Urban	0.55	-75.11
Vadodara	1.17	-69.32

Surat	3.41	-45.98
MADHYA PRADESH	-2.16	-17.44
Indore	5.05	-45.67
Bhopal	-4.41	-43.43
RAJASTHAN	-2.91	-30.54
Jaipur	-1.42	-49.08
BIHAR	-13.75	-21.07
Patna	-8.64	-31.51
PUNJAB	-0.46	-77.66
Ludhiana	-1.97	8.02
Amritsar	1.42	-0.92
Andhra Pradesh	0.54	11.40
Hyderabad	-4.05	9.73
Vishakapatnam	-3.09	-14.63

SOURCE: Census 1991-2011

Table 16: Cultivators in %

Column1	2011	2001	1991
Districts	%MAIN_CL_P	%MAIN_CL_P	%MAIN_CL_P
Maharashtra	25.43	28.79	37.23
Mumbai_Peri_Urban	14.82	20.40	36.63
Pune	11.06	26.86	64.25
Nagpur	35.01	14.65	40.64
Nashik	21.90	37.69	69.87
Harayana	27.82	36.23	44.30
Uttar Pradesh	28.96	41.12	58.16
Haryana+Uttar Pradesh	28.82	40.46	56.74
Delhi_Peri_Urban	16.65	30.02	38.48
Agra	4.06	28.02	50.92
Lucknow	3.78	19.67	67.85
Kanpur Nagar	2.64	17.85	50.84
Allahabad	10.24	32.14	60.54
Varanasi	6.66	21.15	57.41
Meerut	17.98	24.24	54.30
West Bengal	14.72	19.14	31.13
Kolkata_Peri_Urban	9.34	9.87	19.46
Tamil Nadu	12.25	18.39	37.62
Chennai_Peri_Urban	5.06	8.90	17.15
Bangalore ru	27.78	29.23	38.70
Karnataka	23.61	41.47	58.92
GUJARAT	21.99	27.30	49.18
Ahmedabad_Peri-Urban	7.89	8.98	13.96
Vadodara	18.43	22.03	22.57

Surat	4.29	12.02	55.72
MADHYA PRADESH	31.18	42.79	54.97
Indore	11.90	11.80	51.27
Bhopal	8.46	16.41	56.66
RAJASTHAN	45.57	55.29	75.66
Jaipur	30.20	36.47	77.07
BIHAR	20.72	29.29	62.72
Patna	14.41	22.03	42.32
PUNJAB	19.55	22.62	41.19
Ludhiana	10.95	11.84	23.61
Amritsar	13.58	21.39	10.90
Andhra Pradesh	16.47	22.54	29.15
Hyderabad	12.34	19.81	26.07
Vishakapatnam	16.27	27.06	66.82

SOURCE: Census 1991-2011

Table 17: Change in Cultivators in %

Maharashtra	-3.36	8.43
Mumbai_Peri_Urban	-5.58	16.23
Pune	-15.80	37.39
Nagpur	20.36	25.99
Nashik	-15.79	32.18
Harayana	-8.41	8.07
Uttar Pradesh	-12.16	17.04
Haryana+Uttar Pradesh	-11.64	16.27
Delhi_Peri_Urban	-13.37	8.46
Agra	-23.95	22.90
Lucknow	-15.89	48.18
Kanpur Nagar	-15.22	32.98
Allahabad	-21.90	28.40
Varanasi	-14.49	36.27
Meerut	-6.26	30.07
West Bengal	-4.42	11.99
Kolkata_Peri_Urban	-0.53	9.59
Tamil Nadu	-6.14	19.23
Chennai_Peri_Urban	-3.84	8.25
Bangalore ru	-1.45	9.47
Karnataka	-17.86	17.45
GUJARAT	-5.31	21.88
Ahmedabad_Peri-Urban	-1.09	4.99
Vadodara	-3.60	0.54
Surat	-7.73	43.71
MADHYA PRADESH	-11.61	12.17

Indore	0.10	39.48
Bhopal	-7.96	40.25
RAJASTHAN	-9.72	20.38
Jaipur	-6.27	40.60
BIHAR	-8.57	33.43
Patna	-7.62	20.29
PUNJAB	-3.08	18.56
Ludhiana	-0.89	11.77
Amritsar	-7.81	-10.49
Andhra Pradesh	-6.08	6.61
Hyderabad	-7.48	6.25
Vishakapatnam	-10.80	39.76

SOURCE: Census 1991-2011

Table 18: Agricultural labours in %

Column1	2011	2001	1991
Districts	%MAIN_AL_P	%MAIN_AL_P	%MAIN_AL_P
Maharashtra	27.28	26.36	29.79
Mumbai_Peri_Urban	16.00	15.01	17.52
Pune	22.67	12.68	23.07
Nagpur	26.43	24.00	37.40
Nashik	10.24	24.71	21.80
Harayana	17.14	15.35	21.29
Uttar Pradesh	30.30	24.86	21.75
Haryana+Uttar Pradesh	28.73	23.58	21.71
Delhi_Peri_Urban	9.99	10.89	16.88
Agra	16.87	12.68	21.67
Lucknow	13.16	11.89	24.73
Kanpur Nagar	16.46	12.44	17.77
Allahabad	25.62	25.10	28.56
Varanasi	14.92	10.44	25.57
Meerut	14.12	12.33	29.79
West Bengal	29.32	24.93	26.63
Kolkata_Peri_Urban	20.91	14.56	22.86
Tamil Nadu	26.07	31.05	54.52
Chennai_Peri_Urban	16.97	18.81	8.68
Bangalore ru	18.29	26.44	32.69
Karnataka	25.67	20.47	25.76
GUJARAT	27.61	24.28	36.67
Ahmedabad_Peri-Urban	12.73	13.96	55.08
Vadodara	33.68	31.03	66.41
Surat	11.12	21.71	33.93
MADHYA PRADESH	21.99	28.69	24.99

Indore	10.92	11.06	32.25
Bhopal	7.04	14.90	24.64
RAJASTHAN	8.07	10.62	17.92
Jaipur	3.53	4.49	13.96
BIHAR	29.28	47.96	31.64
Patna	22.73	32.89	40.55
PUNJAB	12.66	16.32	51.75
Ludhiana	7.22	8.38	19.72
Amritsar	10.89	17.04	15.35
Andhra Pradesh	43.04	39.67	65.66
Hyderabad	12.66	21.02	30.00
Vishakapatnam	20.45	26.31	23.20

SOURCE: Census 1991-2011

Table 19: Agricultural labours in %

Maharashtra	0.92	3.43
Mumbai_Peri_Urban	1.00	2.51
Pune	9.99	10.39
Nagpur	2.43	13.40
Nashik	-14.48	-2.91
Harayana	1.79	5.93
Uttar Pradesh	5.44	-3.10
Haryana+Uttar Pradesh	5.14	-1.88
Delhi_Peri_Urban	-0.90	5.99
Agra	4.19	8.99
Lucknow	1.27	12.84
Kanpur Nagar	4.02	5.33
Allahabad	0.52	3.46
Varanasi	4.48	15.12
Meerut	1.79	17.46
West Bengal	4.39	1.71
Kolkata_Peri_Urban	6.36	8.30
Tamil Nadu	-4.98	23.47
Chennai_Peri_Urban	-1.84	-10.14
Bangalore ru	-8.15	6.25
Karnataka	5.20	5.29
GUJARAT	3.33	12.38
Ahmedabad_Peri-Urban	-1.23	41.12
Vadodara	2.65	35.38
Surat	-10.59	12.23
MADHYA PRADESH	-6.70	-3.70
Indore	-0.14	21.18
Bhopal	-7.86	9.74

RAJASTHAN	-2.55	7.30
Jaipur	-0.96	9.47
BIHAR	-18.68	-16.33
Patna	-10.16	7.66
PUNJAB	-3.66	35.43
Ludhiana	-1.17	11.34
Amritsar	-6.16	-1.69
Andhra Pradesh	3.37	25.99
Hyderabad	-8.36	8.97
Vishakapatnam	-5.85	-3.11

SOURCE: Census 1991-2011

Table 20: Household industrial workers in %

Column1	2011	2001	1991
Districts	%MAIN_HH_P	%MAIN_HH_P	%MAIN_HH_P
Maharashtra	2.48	2.64	1.80
Mumbai_Peri_Urban	3.54	2.53	1.58
Pune	2.81	2.67	2.82
Nagpur	2.03	2.48	7.42
Nashik	2.61	2.18	1.74
Harayana	2.94	2.54	1.60
Uttar Pradesh	5.92	2.59	2.59
Haryana+Uttar Pradesh	5.57	2.58	2.49
Delhi_Peri_Urban	4.49	3.04	1.30
Agra	6.78	6.61	9.19
Lucknow	6.47	4.97	2.46
Kanpur Nagar	4.37	3.90	1.02
Allahabad	8.80	9.66	3.73
Varanasi	13.83	22.60	8.62
Meerut	5.79	4.94	0.86
West Bengal	7.09	7.43	4.51
Kolkata_Peri_Urban	8.77	5.18	3.25
Tamil Nadu	3.92	5.36	5.42
Chennai_Peri_Urban	3.52	5.27	4.03
Bangalore ru	4.23	4.08	2.04
Karnataka	3.28	4.87	3.20
GUJARAT	1.39	2.02	1.98
Ahmedabad_Peri-Urban	2.03	2.49	6.46
Vadodara	1.04	1.49	1.88
Surat	1.29	2.24	2.10
MADHYA PRADESH	2.05	4.01	3.02
Indore	3.06	2.01	3.30
Bhopal	2.15	3.55	4.40

RAJASTHAN	1.68	2.85	1.53
Jaipur	2.94	4.40	2.50
BIHAR	2.25	3.93	1.91
Patna	3.05	3.88	5.57
PUNJAB	3.04	3.66	2.09
Ludhiana	4.55	4.91	0.69
Amritsar	3.59	4.13	2.00
Andhra Pradesh	3.65	4.69	3.62
Hyderabad	2.47	2.86	1.11
Vishakapatnam	2.00	3.52	2.53

SOURCE: Census 1991-2011

Table 21: Change in Household industrial workers in %

Districts	%MAIN_HH_P_2001-11	%MAIN_HH_P_1991-01
Maharashtra	-0.16	-0.84
Mumbai_Peri_Urban	1.00	-0.95
Pune	0.14	0.15
Nagpur	-0.44	4.94
Nashik	0.43	-0.45
Harayana	0.40	-0.94
Uttar Pradesh	3.34	0.00
Haryana+Uttar Pradesh	2.99	-0.09
Delhi_Peri_Urban	1.45	-1.74
Agra	0.17	2.58
Lucknow	1.51	-2.50
Kanpur Nagar	0.47	-2.89
Allahabad	-0.86	-5.92
Varanasi	-8.78	-13.98
Meerut	0.84	-4.08
West Bengal	-0.34	-2.92
Kolkata_Peri_Urban	3.59	-1.92
Tamil Nadu	-1.44	0.06
Chennai_Peri_Urban	-1.75	-1.24
Bangalore ru	0.15	-2.04
Karnataka	-1.59	-1.67
GUJARAT	-0.63	-0.04
Ahmedabad_Peri-Urban	-0.46	3.97
Vadodara	-0.45	0.38
Surat	-0.95	-0.14
MADHYA PRADESH	-1.96	-0.99
Indore	1.05	1.29
Bhopal	-1.40	0.86
RAJASTHAN	-1.17	-1.32

Jaipur	-1.47	-1.91
BIHAR	-1.69	-2.02
Patna	-0.84	1.69
PUNJAB	-0.62	-1.56
Ludhiana	-0.36	-4.22
Amritsar	-0.54	-2.13
Andhra Pradesh	-1.04	-1.07
Hyderabad	-0.39	-1.75
Vishakapatnam	-1.52	-0.99

SOURCE: Census 1991-2011

Table 22: Other workers in %

Districts	%MAIN_OT_P	%MAIN_OT_P	%MAIN_OT_P
Maharashtra	44.81	9.75	11.80
Mumbai_Peri_Urban	77.99	17.61	20.20
Pune	63.47	57.79	9.25
Nagpur	36.54	58.88	13.83
Nashik	65.26	35.42	6.41
Harayana	52.10	9.92	9.09
Uttar Pradesh	34.82	6.00	5.44
Haryana+Uttar Pradesh	36.88	6.53	5.81
Delhi_Peri_Urban	68.87	13.39	14.46
Agra	55.81	52.70	17.00
Lucknow	68.99	63.47	4.46
Kanpur Nagar	66.54	65.80	29.65
Allahabad	43.12	33.10	6.99
Varanasi	55.04	45.81	8.25
Meerut	62.11	58.49	8.76
West Bengal	48.87	10.59	12.47
Kolkata_Peri_Urban	62.64	19.98	21.87
Tamil Nadu	53.72	11.02	15.11
Chennai_Peri_Urban	74.49	13.05	14.55
Bangalore ru	49.70	7.46	9.05
Karnataka	47.44	8.14	8.24
GUJARAT	49.00	46.40	6.24
Ahmedabad_Peri-Urban	77.36	74.57	10.57
Vadodara	46.84	45.45	6.51
Surat	81.31	64.04	6.95
MADHYA PRADESH	27.17	24.51	4.55
Indore	70.03	75.13	12.71
Bhopal	76.57	65.14	13.82
RAJASTHAN	35.49	31.24	4.52
Jaipur	60.77	54.64	6.13

BIHAR	22.38	18.81	3.56
Patna	46.08	41.19	9.95
PUNJAB	60.51	57.40	4.54
Ludhiana	75.79	74.86	55.56
Amritsar	68.64	57.44	70.75
Andhra Pradesh	36.84	5.63	5.61
Hyderabad	68.43	11.05	13.94
Vishakapatnam	49.43	43.11	6.99

SOURCE: Census 1991-2011

Table 23: Change in Other workers in %

Districts	%MAIN_OT_P_2001-11	%MAIN_OT_P_1991-01
Maharashtra	35.06	2.05
Mumbai_Peri_Urban	60.38	2.59
Pune	5.68	-48.54
Nagpur	-22.34	-45.04
Nashik	29.84	-29.01
Harayana	42.18	-0.82
Uttar Pradesh	28.82	-0.56
Haryana+Uttar Pradesh	30.36	-0.71
Delhi_Peri_Urban	55.47	1.07
Agra	3.12	-35.70
Lucknow	5.51	-59.01
Kanpur Nagar	0.74	-36.15
Allahabad	10.02	-26.11
Varanasi	9.23	-37.56
Meerut	3.62	-49.73
West Bengal	38.29	1.88
Kolkata_Peri_Urban	42.66	1.89
Tamil Nadu	42.70	4.09
Chennai_Peri_Urban	61.44	1.49
Bangalore ru	42.24	1.59
Karnataka	39.30	0.11
GUJARAT	2.61	-40.16
Ahmedabad_Peri-Urban	2.79	-64.00
Vadodara	1.39	-38.95
Surat	17.27	-57.09
MADHYA PRADESH	2.66	-19.95
Indore	-5.10	-62.43
Bhopal	11.43	-51.31
RAJASTHAN	4.25	-26.72
Jaipur	6.14	-48.50
BIHAR	3.57	-15.25

Patna	4.88	-31.25
PUNJAB	3.11	-52.86
Ludhiana	0.93	-19.30
Amritsar	11.20	13.31
Andhra Pradesh	31.22	-0.02
Hyderabad	57.38	2.89
Vishakapatnam	6.32	-36.12

SOURCE: Census 1991-2011

Table 24: Marginal workers in %

Column1	2011	2001	1991
Districts	%MARGWORK_P	%MARGWORK_P	%MARGWORK_P
Maharashtra	11.46	15.67	9.37
Mumbai_Peri_Urban	28.58	19.98	8.90
Pune	11.44	10.46	44.23
Nagpur	8.70	16.59	55.81
Nashik	7.35	12.55	29.12
Harayana	21.32	25.66	8.15
Uttar Pradesh	32.18	27.11	8.31
Haryana+Uttar Pradesh	30.88	26.92	8.30
Delhi_Peri_Urban	18.45	22.51	8.87
Agra	24.41	17.29	64.87
Lucknow	25.31	17.14	49.90
Kanpur Nagar	21.82	16.63	7.70
Allahabad	39.07	33.79	61.14
Varanasi	24.57	21.51	66.31
Meerut	18.31	17.71	89.03
West Bengal	26.10	22.02	6.48
Kolkata_Peri_Urban	22.91	17.36	3.58
Tamil Nadu	15.03	14.77	8.69
Chennai_Peri_Urban	18.63	19.31	4.69
Bangalore ru	15.20	17.75	9.22
Karnataka	16.06	18.45	15.49
GUJARAT	17.77	19.90	64.60
Ahmedabad_Peri-Urban	11.04	11.59	86.70
Vadodara	19.65	20.82	90.14
Surat	5.81	9.22	55.20
MADHYA PRADESH	28.10	25.94	43.38
Indore	10.33	15.37	61.04
Bhopal	18.61	14.20	57.63
RAJASTHAN	29.54	26.63	57.17
Jaipur	16.43	15.00	64.09
BIHAR	38.49	24.74	45.82

Patna	27.13	18.49	50.00
PUNJAB	14.61	14.15	91.81
Ludhiana	11.38	9.40	1.39
Amritsar	14.23	15.65	16.57
Andhra Pradesh	16.20	16.73	5.34
Hyderabad	16.45	12.40	2.68
Vishakapatnam	21.63	18.54	33.17

SOURCE: Census 1991-2011

Table 25: Change in Marginal workers in %

Districts	%MARGWORK_P_2001-11	%MARGWORK_P_1991-01
Maharashtra	-4.21	-6.30
Mumbai_Peri_Urban	8.60	-11.08
Pune	0.98	33.77
Nagpur	-7.90	39.22
Nashik	-5.19	16.57
Harayana	-4.34	-17.51
Uttar Pradesh	5.07	-18.80
Haryana+Uttar Pradesh	3.97	-18.62
Delhi_Peri_Urban	-4.06	-13.64
Agra	7.12	47.58
Lucknow	8.17	32.76
Kanpur Nagar	5.19	-8.93
Allahabad	5.28	27.35
Varanasi	3.06	44.80
Meerut	0.60	71.32
West Bengal	4.08	-15.54
Kolkata_Peri_Urban	5.55	-13.78
Tamil Nadu	0.26	-6.09
Chennai_Peri_Urban	-0.69	-14.63
Bangalore ru	-2.55	-8.53
Karnataka	-2.40	-2.96
GUJARAT	-2.13	44.70
Ahmedabad_Peri-Urban	-0.55	75.11
Vadodara	-1.17	69.32
Surat	-3.41	45.98
MADHYA PRADESH	2.16	17.44
Indore	-5.05	45.67
Bhopal	4.41	43.43
RAJASTHAN	2.91	30.54
Jaipur	1.42	49.08
BIHAR	13.75	21.07
Patna	8.64	31.51

PUNJAB	0.46	77.66
Ludhiana	1.97	-8.02
Amritsar	-1.42	0.92
Andhra Pradesh	-0.54	-11.40
Hyderabad	4.05	-9.73
Vishakapatnam	3.09	14.63

SOURCE: Census 1991-2011

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