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Peer Experience and Reflective Learning

# Managing Peri-Urban Expansion

## Research Paper

# Managing Peri-Urban Expansion

A Study of Planning Approaches adopted in
Delhi, Beijing and New York to Manage Regional Growth

**Research Paper**

# FOREWORD

The peri-urban is a distinct phenomenon within the larger process of urbanization. Whichever way one defines it, whether as a place, a concept or a process, the peri-urban continues to battle the efforts of planners and administrators to establish spatial order and justice. It represents the spontaneous and seemingly organic transformation of rural to urban and the limits of both, as it becomes an unplanned, unaccommodated type of development, leaving a trail of overburdened resources and uncontrolled growth. Similar to the other nefarious outcomes of poor planning and governance, such as socio-economic disparity and environmental degradation, the peri-urban expansion of the Indian metropolis delivers a heavy burden on the public realm. The only foil to this debilitating and unsustainable expansion of cities seems to be an improved framework for planning and management of metropolitan areas.

With three mega-cities that are sprawling into mega-urban regions, and another five cities expected to become mega-cities during the coming decade. India has already become the host to an urbanization story that will continue to interest and confound experts and administrators alike. Peri-urban expansion of Indian cities has assumed a peculiar form, with farm lands being converted into urban areas faster than can be planned, and governments are unable to contain this form of haphazard territorial expansions. Preparation, notification, monitoring and revision of spatial and physical plans is unable to keep pace with growth, and the resulting chaos is inflicting huge hidden costs to economic and social transformation, which is the stated need of the hour.

As a precursor to a more in-depth study, NIUA has attempted to explore the phenomenon of peri-urban expansion and efforts to manage it through planning and governance frameworks in three different locations and countries - Delhi, Beijing and New York. While the Chinese and American examples do not present clear analogies, they serve as cases that illustrate alternative frameworks with relevance to India. Whereas New York is located in a highly urbanized country, both Delhi and Beijing are in countries that are attempting large scale ‘induced’ urbanization by state-led and artificial means. Whether this form of induced growth is indeed the way to achieve a higher urbanization level and concomitant economic outcomes is a question that will probably find some answers in the Government of India’s new urban impetus to strengthen existing urban centres, through the Smart City and AMRUT (Atal Mission for Rejuvenation and Urban Transformation) missions.

There are clear lessons to be learnt from the Chinese and American examples, which can inform our own. The distribution of socio-economic, spatial and functional planning respectively between national, provincial and local government in China and the American approach of tracking

socio-economic and employment data by designating Combined Statistical Areas for economic planning within metropolitan agglomerations are two such lessons that can yield better results from India's urban interventions.

In the context where both the Regional Plan proposals (2001 and 2021) for the National Capital Region have only partially succeeded in driving planned outcomes, leading to sub-regional disparities and unplanned growth of the urban fringes, the paper aims to map the planning systems employed by the collaborative setup for the four states. The cases of Greater Beijing with a 'unified metropolitan government' and the Tri-state region of New York, which is also a case of collaboration between states to help in understanding the key challenges and strategies, and, additionally, the institutional structures and planning methodologies formulated for effective management of growth in other global settings.

What is clearly brought into question is whether 'induced' growth can produce any other outcomes than the somewhat unfair choice between China's 'ghost towns' and India's uncontrolled sprawls. While the 'green field' city is an option that can distribute urban population, the fact that such new towns in a democratic polity cannot be protected from speculative forces is a serious consideration, not to mention the fact that their horizons for development span over three decades and it is difficult to predict what outcomes they will actually present except in the limited forms of industrial townships which do not have the occupational diversity and economic vitality of the metropolis. There are many such issues that need further examination. This study is an attempt to tease out some such issues and open new lines of inquiry into one of urban India's key challenges.

This study is supported by the Cities Alliance, whose knowledge partnership for the PEARL (Peer Experience and Reflective Learning) has been crucial at a time when NIUA is called upon to support the Government of India's new agenda for urbanization. We thank the PEARL Team comprising of Yogita Lokhande and Sridipta Ghatak for steering this research under the guidance of Dr. Debjani Ghosh, and Deep Pahwa, for providing graphic design support. We thank the experts and scholars who have given valuable inputs and assisted in framing this research.

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DIRECTOR

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| | |
|---|---|
| APA | American Planning Association |
| BER | Bohai Economic Rim |
| CBD | Central Business District |
| CNCR | Central National Capital Region |
| COG | Council of Governments |
| CT | Census Town |
| DDPA | Delhi Development (Provisional) Authority |
| DMIC | Delhi Mumbai Industrial Corridor |
| FDI | Foreign Direct Investment |
| GBER | Greater Beijing Economic Region |
| GDP | Gross Domestic Product |
| HPEC | High Power Executive Committee |
| ISTEA | Intermodal Surface Transportation Efficiency Act |
| IT | Information Technology |
| ITES | Information Technology Enabled Service |
| MAP | Metropolitan Area Planning |
| MoR | Ministry of Roads |
| MoUD | Ministry of Urban Development |
| MPO | Metropolitan Planning Organisation |
| NCR | National Capital Region |
| NCRPB | National Capital Region Planning Board |
| NCRTC | National Capital Region Transport Corporation |
| NCT | National Capital Territory |
| NCT-D | National Capital Territory of Delhi |
| NDRC | National Development and Reform Commission |
| NY | New York |
| NYC | New York City |
| NYCHA | New York City Housing Authority |
| NYMTC | New York Metropolitan Transport Council |
| PRC | People's Republic of China |
| PSU | Public Sector Undertaking |
| RPA | Regional Planning Association |
| RRTS | Regional Rapid Transit System |
| SEZ | Special Economic Zone |
| SPV | Special Purpose Vehicle |
| TCPO | Town and Country Planning Organisation |
| UA | Urban Agglomeration |
| UGB | Urban Growth Boundary |
| UMTA | Unified Metropolitan Transport Authority |
| UN | United Nations |
| UP | Uttar Pradesh |
| USA | United States of America |
| USD | United States Dollar |

# Urban Sprawl

While there have been metropolises since ancient times, these remained confined to little more than the scope of ''walking cities'' until the emergence of modern transportation technologies, beginning with horse trolleys. And though the gentry has had its villas beyond the outskirts of the city since at least Roman times, it was only over the last two centuries that technological developments made suburban dwellings available to progressively broader segments of society. Railroads made possible the first remoter suburbs for the wealthy, electric trolleys the denser closer-in ones for the ''common man,'' and, finally, the unconfined automobile, with its steadily increasing affordability, allowed cities and suburbs to grow in all directions. Automobiles enabled the huge residential expansion of suburbs and, importantly, these were followed by trucks, which overwhelmingly enabled the commercial and industrial ''sprawl,'' which gave us the complex metro areas of today.[1]

## URBANISATION IN INDIA

India has experienced several noteworthy demographic changes over the last decade. Although by 2011 only around 31% of its population was living in urban areas, for the first time in its history during the past decade (2001-11), the growth in urban population in absolute numbers (91 million) had exceeded that of the rural population (90 million). The 2011 Census also indicated that a large part of the urban population continued to be concentrated in Class I (1 lakh and above) Urban Agglomerations (UA[*])/Towns (70%), of which around 43% was in million-plus UAs/cities alone. Interestingly, while the growth rates of some of its mega cities (10 million plus population) especially Delhi, Mumbai and Kolkata, reduced drastically in the last decade, the number of million plus cities increased from 35 as per the 2001 Census to 53, with 18 new UAs crossing the million mark, implying the rapid growth of other large urban centres.[2] Another important characteristic of urban growth in the last decade was the significant increase in the number of new Census Towns (CT[†]), contributing to as much as 30% of the total urban population growth.[3] It is important to note that almost 1/3rd of these have emerged in close proximity (within 50 km radius) of the million plus cities.[4]

**Expanding Cities:** While the large cities have experienced a spurt of demographic growth, most of the core areas of the million plus cities have recorded a significant decline in their population growth, for instance in the case of Delhi and Mumbai. In Delhi, the present growth rate is less than that of any decade and half that of the 1990s. Similarly, the Mumbai suburban district recorded a decline in its growth rate from 2.5% to 0.8%. Both the cities have also shown a decline in population in absolute numbers. The New Delhi and Central Delhi districts have lost one quarter and one-tenth of their population respectively, while the Mumbai district, comprising of the island city, has reported a decline of 0.6% per year during 2001-11.[5] Clearly the growth has not remained confined merely to the urban cores but has been distributed significantly to the peripheries. The demographic significance of the peripheries in the UAs varies, around 33% in the case of Mumbai UA and as much as 69% in the case of Kolkata UA. Expansion of the urban into the hinterland has resulted in expanding municipal boundaries, creation of larger UAs and rapid conversion of rural lands.

**Future Estimates:** The HPEC 2011 estimates that the present urban population of 377 million (Census 2011) in India, would surge to 600 million by 2030, adding another 223 million. The United Nations *World Urbanisation Prospects: The 2014 Revision, Highlights*, also estimates that by 2050, India will add 404 million urban dwellers and would account for 37% of the world's urban population along with China and Nigeria. Considering the present trends of urbanisation, a large proportion of this growth may be expected to occur in and around existing UAs. For instance, according to the same report, by 2030 the population of Delhi UA itself is estimated to rise to 36 million as against 16 million in 2011.

## CONCERNS REGARDING REGIONAL GROWTH AND THE 'PERI-URBAN' : A CASE OF DELHI

To understand what such demographic trends mean spatially, we consider the existing scenario of the National Capital Territory (NCT) - Delhi and its defined region the National Capital region (NCR). Two-thirds of the total urbanisable land for the city has already been built upon as per the latest Master Plan (MPD-2021). However, only about 30% of the total population lives in planned areas with varying densities. In the case of the New Delhi district this density is as low as 4000 persons per sq. km. The rest of the urbanised areas consist of unauthorised colonies, slum settlements and urban villages that exhibit densities as high as 36,000 persons per sq. km. as seen in the North-east district. The Master

[*] Urban Agglomerations (UA): Census defines UA as a continuous urban spread constituting a town and its adjoining urban outgrowths or two or more physically contiguous towns together and any adjoining outgrowth of such towns.

[†] Census Towns (CT): Places that satisfy the following criteria have been termed as Census Towns. (a) Minimum population of 5000 (b) At least 75% of the male main working population employed in non-agricultural pursuits (c) Density of more than 400 persons per sq. km.

Plan further states that the total population carrying capacity for Delhi UA would be a maximum of 22 million at the optimal density of 22,500 persons per sq. km. It is evident that the Master Plan envisages a large proportion of the future population growth to be absorbed by the peripheral areas of NCT.

**Spatial Structure of Delhi:** The urban agglomeration area has increased from a mere 43.25 sq km in 1901 to 888.74 sq km in 2001 while the density increased from 5501 persons per sq km to 14521 persons per sq km during the same period. Delhi over time has grown as a borderless city.[6] While some of these outward expansions (without densifying the existing areas) have been planned, for instance pockets such as Narela and Rohini on the North and North-West and Dwarka on the South-West, a substantial proportion of the sprawl remains unplanned. Two large trajectories seem to have emerged. The first is the growth of high density, mixed use areas and lower income housing with the innermost old city area, as a nucleus of sorts. The old city is characterized by high population density, dense residential areas mixed with trade and commerce, wholesale markets, packaging industries, important transport nodes (gateways from the hinterland into the city), universities and so on, besides being the primary cultural and heritage attraction. Some of these areas of Old Delhi have been declared as slums due to old, dilapidated and obsolete structures and experience a very poor quality of life with low access to basic services.

The outskirts, especially towards the west and north west are dotted with slum resettlement colonies, built by the government. Most of the industries are located in the north-east of Delhi, which again has dense housing (formal and unauthorised), and slum settlements. The west, north west, north east, east and the central core have extreme high densities with the highest density over 36,000 persons per sq km in the north-eastern district. The *figure 01* overlays district densities (census 2011) with the spatial extent of urban sprawl (derived from Google satellite imagery). The eastern extension sprawls along a 25 km stretch to Ghaziabad (Uttar Pradesh). Similarly on the west to Bahadurgarh (Haryana). The second of the 2 trajectories is manifested in the form of planned and unplanned (Sainik farms for instance) areas in the centre, south and east, where the elite class or higher income groups are concentrated. This pattern continues into Gurgaon on the south west and Faridabad and Greater Noida on the south east,

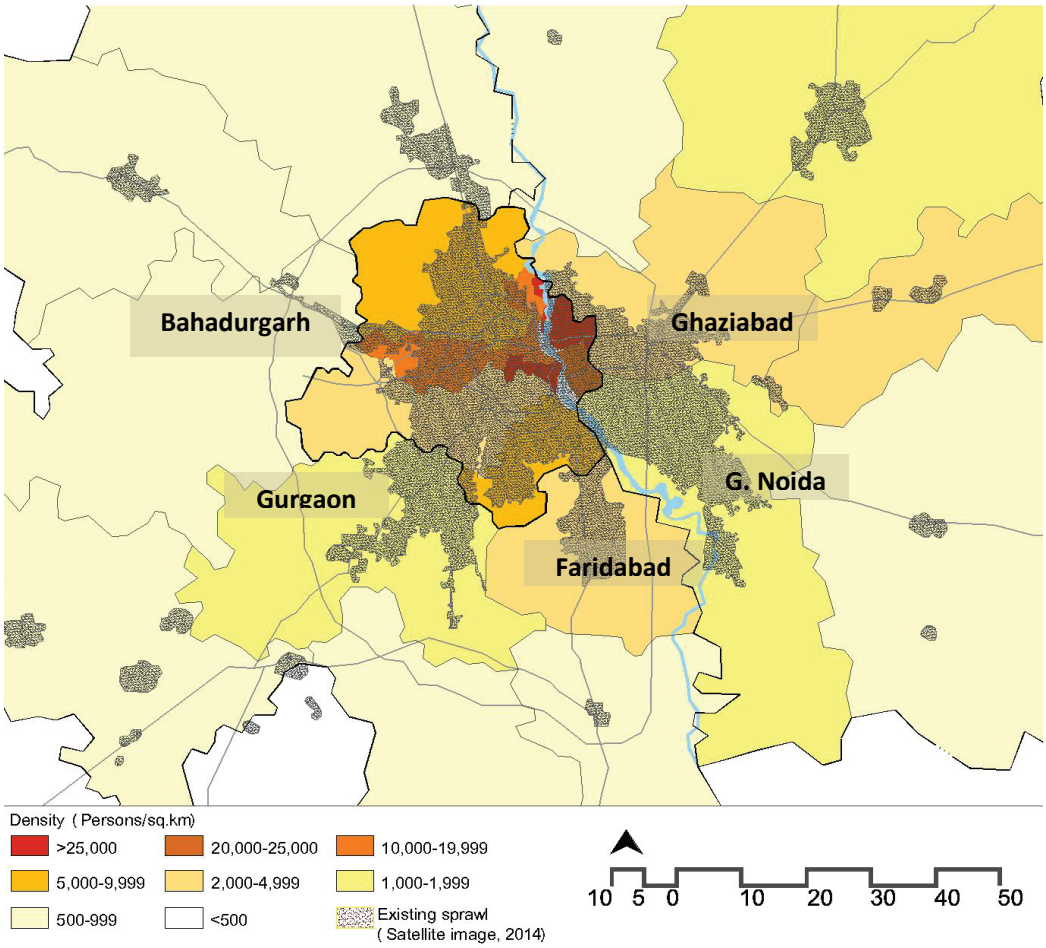



**Figure 01: NCT Delhi, District Densities and its Sprawl**

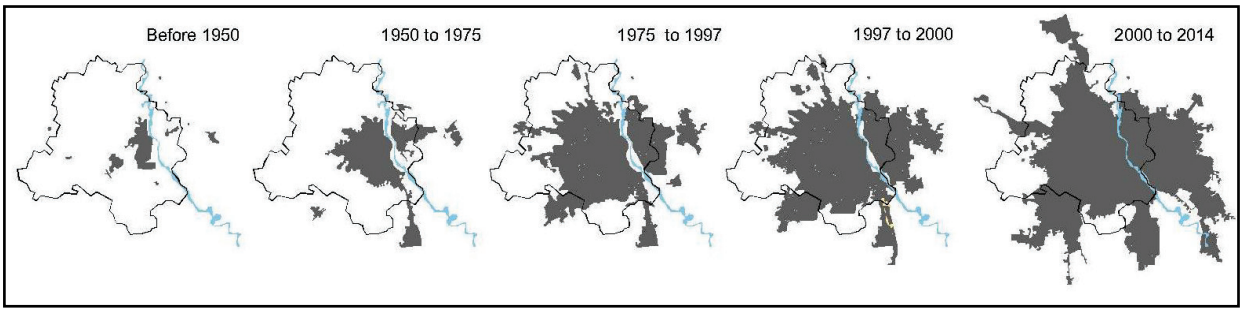



**Figure 02: Spatial Growth of Delhi (1950 to 2014)**
Source: Dupont. V, IRD (2008), Google satellite imagery (2014)

reflected mainly by the emerging high end luxury housing, corporate real estate etc.

**Emerging Patterns:** Beginning in 1962, the three master plans for the Delhi UA and two regional plans proposed for the NCR, have included strategies for planned dispersal of growth to the surrounding region. However, despite such efforts to control urbanisation, the spatial growth of Delhi has largely deviated from such plans. A large proportion of the population growth has not remained contained within the boundaries of the NCT Delhi, but has overflowed (unplanned) into the surrounding region showing distinct patterns of density and economic activities. Such dispersal of growth has manifested itself in peri-urban conditions involving conflicting use of land, extreme spatial fragmentation, emergence of new and complex forms and urban conditions and varying infrastructural demands and conditions of access. The interstices between the Delhi UA and the other large urban centres in the NCR, driven by real estate development and speculation, have experienced rapid transformation. These peripheral areas, consisting of green belts and agricultural lands are now characterized by fragmented development, the emergence of gated communities, sudden densification of existing settlements to provide for residential and commercial needs and the growth of a complex ecology of industries (both formal and informal). Inadequate physical infrastructure, absence of public transport or road connectivity, and a general lack of physical and social infrastructure are also characteristics of this growth.

**Governance Complexities:** Peri-urban transformations around Delhi have also thrown up complex issues of administration. At the macro level, the broad structure for planning and management is split between the central government, the state government and the local body (urban or rural), supported by various regional bodies and other technical institutions. At the local level, although such urban and rural governance systems are distinct, the maximising of the urban-rural interactions within the space of the peripheries, especially in expanding urban areas, results in transformations that are at times urban in nature but are governed by rural bodies. These are often ill-equipped to deal with the attendant complexities of urban densities and land uses and provide the required urban infrastructure and amenities in these areas.

**THE STUDY**

Various studies investigating the Indian peri-urbanisation conditions have defined 'peri-urban' as 'a place, concept or process'.[7] 'Peri-urban' refers to the urban fringe and the geographic edge of cities as a place. It refers to the movement of goods and services between physical spaces and to the transition from rural to urban contexts as a process. And finally, as a concept, it refers to an interface between rural and urban activities, institutions and perspectives.[8] Such transformations are often highly dependent on state actions and plans, including land management policies, particularly land use and land acquisition determining land for agriculture, residential, industry, transport, and so on. In the case of Delhi and the other large cities in India, the emerging transformations in the urban peripheries can be seen, at least in part, as an outcome of the processes employed by the state for effecting urbanisation and its planned dispersal.

The Regional Plan proposals (2001 and 2021) for the NCR have only partially succeeded in substantially driving planned outcomes, leading to sub-regional disparities and unplanned growth of the urban fringe. It is in this context that the paper aims to study the state-led policies, planning instruments and institutional arrangements deployed to manage regional growth and urbanisation through the unique framework setup for the NCR. The paper emphasises the need to study different contexts, planning approaches and impacts, in

addition to alternate and successful models in regional planning is probably an important tool required for assessing the present planning approaches with the potential of leading to exploration of newer strategies.

The paper will map the systems of planning and managing urbanisation employed for NCR, a collaborative effort by four states and the central government, Greater Beijing with a 'unified metropolitan government', and the Tri-state region of New York which is a collaborative /cooperative approach between the three states. The New York region with a planning area of 33,500 sq km, 20 million population and spread across three states is similar to the spatial extent of NCR and parallels the planning complexities arising out of collaboration between three states. The Tristate region has adopted a sectoral approach towards development. Greater Beijing also covers two municipalities and a part of the neighbouring province and is almost double the size of NCR and NY Region. It has been studied for the complexities arising from the developing nations' perspective. Like most of our cities, Beijing too lays a significant thrust on the manufacturing sector, a heavy dependence on agricultural activities and the newly emerging IT and logistics sector. However, Greater Beijing unlike NCR and the Tri-state of NY, is governed by a unified metropolitan government, directly controlled by the central government.[9] By mapping the two cases, the paper hopes to highlight the key urbanisation challenges faced in these regions, along with the institutional structures and planning methodologies deployed for effective management of urban growth in these regions, and broadly understand the planning strategies adopted for the NCR and identify potential areas for improvement from the two cases.

Although the paper acknowledges the wide discourse on peri-urbanisation and the emerging conflicts between the imagined/planned and actual conditions and processes, this is not an attempt to map the 'peri-urban' condition or its dynamics. The scope of this paper is restricted to understanding the various strategies adopted by the state for shaping growth in metropolitan regions as a basis for future investigations into the forms, networks and processes that characterize the peri-urban conditions emerging within regions such as the NCR. The paper thus hopes to be a basis for future studies as well as act as a first level investigation into the policy and planning environments that shape the imagination of metro regions. The paper relies exclusively on data available through secondary sources and is not supported by primary surveys for documenting present condition.

| | National Capital Region of Delhi | The Greater Beijing Economic Region | The Tristate Metropolitan Region of New York |
|---|---|---|---|
| **Area(sq.km.)** | 34,000 | 70,000 | 35,000 |
| **Population** | 46 million | 106.15 million | 20 million |
| **% Urban 2011** | 21.75 | 62 | 65 (approx.) |
| **GDP (in Trillion USD)** | For NCT Delhi 0.0633 (2014) | For Beijing 0.0314 (2013) | For New York 1.33 (2012) |
| **Governance** | Centrally coordinated inter-state collaboration | Centrally coordinated municipality-province collaboration | Inter-state collaboration |
| **Planning Strategy** | Multi nodal growth approach | 'Two Axis two belts' | Polycentric growth approach with focus on Redensification of core city and environment degradation |
| **Economy** | • Model Industrial Estates<br>• Special Economic Zones | • Create an economic powerhouse for the North East China<br>• Develop a mix of Services, industry and logistics | • Emerging global economy<br>• New global markets<br>• Information technology<br>• Finance business and personal services |
| **Housing** | • State Housing Boards/Authorities<br>• Private developers | • Municipality and provincial Government<br>• Private developers | • New York City Housing Authority (NYCHA) for low and moderate income<br>• Private developers |
| **Transport** | • State Governments<br>• Central Highway and Railway | • Municipality and provincial Government | • The New York Metropolitan Transportation Council (NYMTC)<br>• Metropolitan Area Planning (MAP) |

**Table 01: Brief Profile for the three regions**

# Managing Growth in the NCR

Time and again the need was felt to plan Delhi in the regional context under a suitable legislation which would control and regulate development in the region and finally Parliament enacted the National Capital Region Planning Board Act in 1985 with the concurrence of the constituent States 'to provide for the constitution of a Planning Board for the preparation of a plan for the development of the National Capital Region and for coordinating and monitoring the implementation of such plan and for evolving harmonised policies for the control of land uses and development of infrastructure in the National Capital Region so as to avoid any haphazard development of that Region and for matters connected therewith or incidental thereto'.[10]

**INTRODUCTION**

Delineated in the 1970s, presently the NCR is the largest defined planning region in the country, around 34,000 sq. km. in area with an urban population of 21.75 million (total population of 46 million).** With the exception of the NCT Delhi, which is 97.5% urbanised, only 42.5% of the remaining region is urbanised. This indicates that a significant population resides in rural settlements with employment in agriculture related sectors. The NCR includes six districts of Uttar Pradesh (UP), nine districts of Haryana and one district of Rajasthan which form the three sub-regions. *Figure 03* shows the percentage area distributed between the four states, the percentage population share and the percentage urban in each sub-region, with NCT Delhi with the highest urban population and the least area covered. The UP sub-region shows a total population almost as much as NCT Delhi but with just about 50% urban.

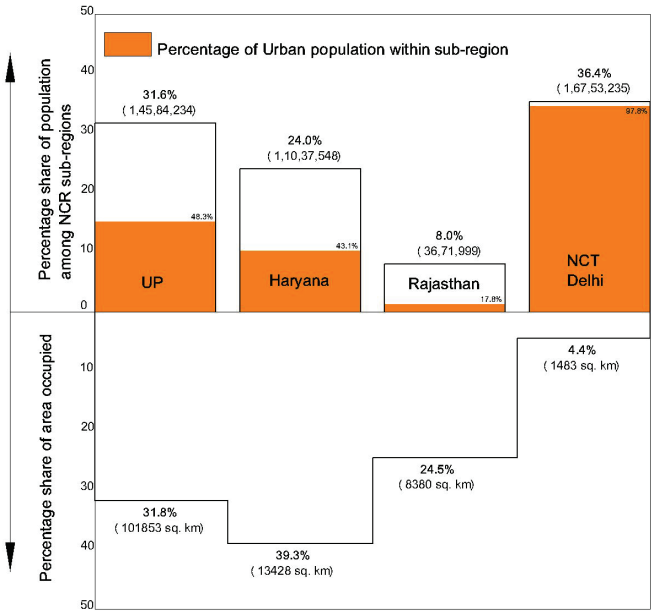



**Figure 03: Statewise percentage - population share, urban population and area share**

The 'urban' component of NCR functions as a multi-nucleated organism comprising of three million-plus cities of Ghaziabad (1.6 million), Meerut (1.3 million) and Faridabad (1.4 million) along with the mega city of Delhi (16.3 million). Additionally, six large urban centres of Gurgaon (0.8 million), Noida and Greater Noida (0.7 million), Alwar (0.31 million), Sonepat (0.27 million), Panipat (0.2 million) and Bahadurgarh (0.17 million) dot the region. The 2011 Census identifies 163 urban areas within NCR with an average decadal growth rate of around 35% till 2001 which dropped to 24.1% for 2001-2011. NCT Delhi till 2001 continued to experience an average decadal growth rate of about 50% since 1951, higher than any other urban centre in India despite the reduced growth rate of the core city of Delhi which dropped to about 21% in the decade 2001-2011.[11] In comparison, Mumbai Metropolitan Region (MMR) with a total population of 18.4 million experienced an average decadal growth rate of around 30%, while Kolkata Metropolitan Area (KMA) with a total population of 14.1 million, experienced a growth rate of around 20% (for the past three decades) which dropped to just 12% for MMR and 7% for KMA in 2001-2011. For the NCR, the UP sub-region has displayed an increased growth rate from 22.20% in 1961 to 29.2% in 1981-1991 and a sharp increase to 52.7% during 2001-2011, while the growth of Haryana marginally declined and for Rajasthan it has remained constant.

Major National Highways and Expressways link the NCR with other metropolitan cities of Jaipur, Agra, Lucknow and Amritsar. A total of 16 districts from the states of Haryana, UP and Rajasthan form the region. Additionally, Haryana has applied for the inclusion of Jind and Karnal in NCR, while UP is pushing for Mathura-Vrindavan.[12] Such expansions are intended to facilitate the further dispersal of economic activities and reduce pressure on Delhi's health, educational and economic infrastructure leading to "balanced growth of the NCR". With no clear roles defined, such expansions need to be viewed critically.

**The National Capital Region has undergone another expansion in 2013 to add three more districts - Mahendragarh and Bhiwani (both in Haryana) and Bharatpur (Rajasthan) bringing the number of districts in the NCR to 19, with the total area increasing by 34% to 45,887sq km. However, since both the Regional Plans do not include the 2013 additions, the paper too has not included them in the discussions.

**ECONOMIC PROFILE OF THE REGION**

NCR is a major economic hub for the whole of North India and is rapidly transforming into an industrial base due to changes in policy, privatisation of public sector undertakings (PSUs), downsizing of government shares and elimination of subsidies and tax incentives for industries.[13] A number of existing and proposed industrial areas (especially as part of the proposed investment regions of the Delhi Mumbai Industrial Corridor) are expected to have a significant impact on the economy of NCR, trends indicate that the tertiary sector, particularly value-added services, is fast emerging as an important source of employment in the NCR. The tertiary sector contribution to GDP (67%) ranks the highest followed by secondary (25%) and primary (8%) sectors for the year. While Delhi is the largest contributor to GDP in the NCR, the growth rate of GDP is the fastest in the Haryana sub-region amongst the states. Delhi has become the main centre for various services, Haryana sub-region a mix of industries and service sector (with a fast growth of IT / ITES in Gurgaon), while Uttar Pradesh and Rajasthan sub-regions are dominated by agriculture. In terms of districts, Bulandshahr has the highest portion of its total working population engaged in agricultural, livestock and forestry activities of Gurgaon has the largest part of its total working population in the tertiary sector; Faridabad in manufacturing; and Alwar in the cultivation sector.

Rural infrastructure in the NCR, in terms of market yards, and cold storage has fallen significantly short of demand. In 2001, the Haryana and UP sub-regions had around 43% of their total workforce involved in the primary sector. Yet, strikingly, Haryana has a very high share of regulated markets and yards as compared to UP. Since this is extensively funded by state governments, it has resulted in an uneven distribution of agricultural infrastructure such as regulated markets, yards and cold storages.

In addition, the lack of regulation and the presence of powerful market forces in the Small Scale Industry (SSI) and micro industrial sector has led to the rise of a laissez-faire situation thereby leading to mushrooming of small industries especially in the unorganised sector with a high concentration in NCT Delhi itself. The approximate number of people employed in this sector is around 10 lakhs.

Two aspects are evident from studies, one, the region has a significant agricultural economy with over half the population being rural. And, two, while the existing industrial clusters employ approximately 15 lakh persons, while, the small, medium, micro and household

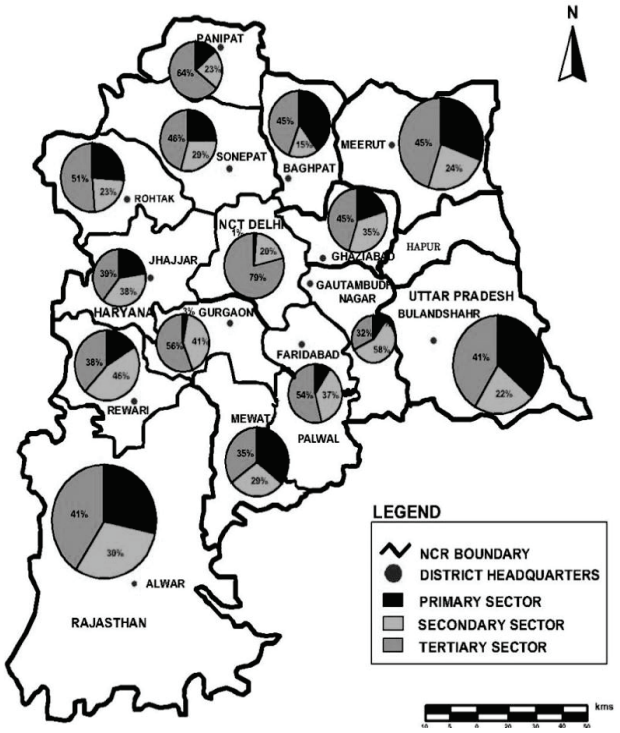



**Figure 04: District-wise and Sector-wise GDP**
Source: Apex Cluster Development Service ( 2015)

industries employ around 5 lakh persons. The diverse economic environment has made NCR a potent region for investments and growth. Three investment regions for the Delhi Mumbai Industrial Corridor are in the initial stages of investment. All three are located to the south of NCT Delhi. Also, around 80 SEZ have been approved for the NCR mostly focusing on IT/ITES.

**PLANNING PROCESS**

The National Capital Region Planning Board (NCRPB) acts as the nodal agency to formulate planning strategies for the NCR, while the state governments of each constituent district implement different proposals within its district development strategies keeping in line with the broader objectives set by the NCRPB. The organisation and key functions of the NCRPB have been illustrated in *figure 05*. The NCRPB also provides loan assistance up to a maximum of 75% of the project cost to the borrowing agencies (state government, development authorities, ULBs and para-statal bodies) engaged in providing basic infrastructure. The states submit respective sub-regional plans and proposals aligned to the Regional Plan. The NCRPB helps set-up NCR planning cells at the district-level state government offices. Since its inception in 1988, both the Regional Plan proposals for the NCR have advocated *"development of regional settlements capable of absorbing the economic development impulse of NCT - Delhi"* with provisions for

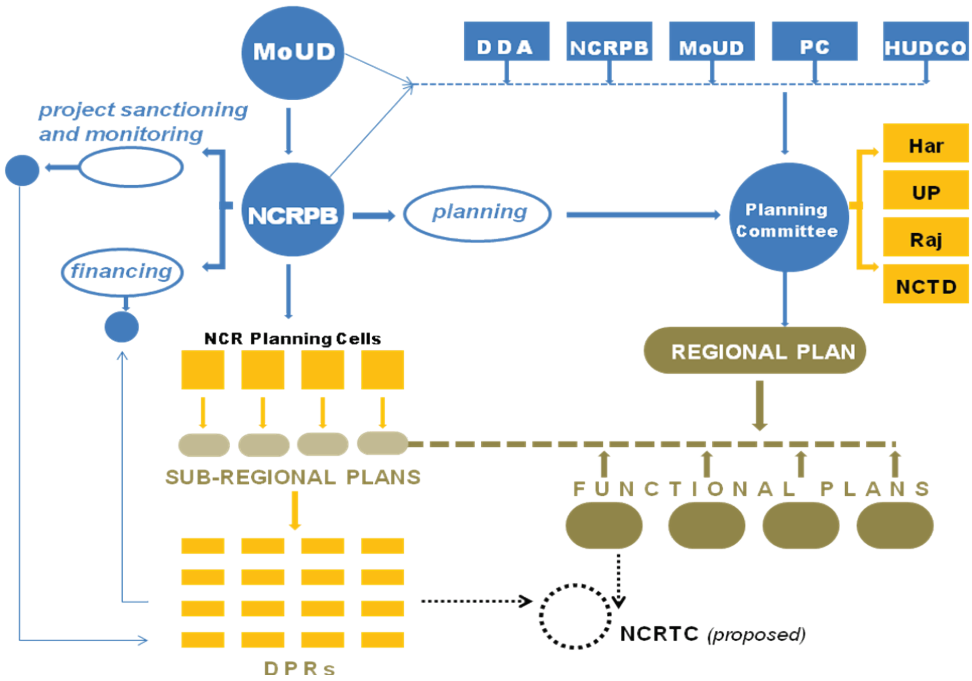



**Figure 05: Mapping the Planning Process for the NCR**

comparable urban infrastructural facilities and growth centres of varying sizes distributed across the region. A brief description of the key visions and achievements of the first plan (Regional Plan 1989) and the strategies adopted for some of the sectors for the second (Draft Revised Regional Plan 2021) have been described below.

**Historical Context:** The first exercise in planned development was done through the Town Planning Organisation (TPO), which prepared an Interim General Plan (IGP) in 1956 for Greater Delhi. The study reported the emergence of the private developers for residential developments just outside Delhi State boundaries, beyond the control of the D.D.P.A.[14] Such developments just at the outer periphery of Delhi State triggered the need for planning Delhi in a regional context and stated that *`serious consideration should be given for a planned decentralisation to outer areas and even outside the Delhi region'*.[15] In this context, the NCR was then given specific physical contours in the early 1970s when its boundaries were defined in geographic terms encompassing a contiguous area of over 30,000 sq. km. An Act of Parliament in 1985 brought into being the NCR Planning Board, an autonomous body in which the main implementing agencies are the Central Government, the three participating State Governments of Haryana, Rajasthan and Uttar Pradesh, and the Government of National Capital Territory of Delhi.

**Regional Plan 2001 (RP 2001):** The first regional plan, published in 1989 by the NCRPB, is a blueprint of various policy imperatives and programmes. The plan mandated to deflect population from Delhi following a multi-nodal regional growth structure to the identified Regional Centres or `Priority Towns' in the NCR by the year 2001. *Figure 06* locates these on the map of NCR. Also, the table in *Annexure 1* shows population growth for these towns over the last three decades, population assigned by RP 2001 and the present economic base of these settlements. The table highlights that in 2001 barring NCT Delhi, Faridabad, Ghaziabad and Rewari only about seven settlements crossed the halfway mark. Even by 2011, none of the Regional Centres had achieved the population assigned for 2001. Growth of the NCR has been absorbed by the larger towns concentrated around the NCT-Delhi. It can therefore be inferred that the planning strategy adopted for forced dispersal of growth into the region has failed to achieve its set intentions.

The various plans for the NCR --- (Interim Development Plan (1986), Regional Plan (1989) and the related plans such as Sub- regional Plans; Uttar Pradesh (1992), Rajasthan (1994) and Functional Plans for Transport (1995), Power (1996), Telecommunication (1997), and Industry (1998) --- were exercises that were considered most expedient to achieve this common objective. This would be done through a set of policy initiatives, planning for land uses and development of core regional infrastructure. However, despite this, population in Delhi continued to grow faster than anticipated. The Regional Plan projected a total population growth of 32.5 million for the region and 13.2 million for Delhi UT. To achieve this, the Plan proposed an addition of 45,291 hectares to

the urbanizable area. During this period, however the total built-up area increased more than 3 times this allocation (*refer Table 02*).

**The Regional Plan 2021**, in its analysis, states that the NCR experienced an increase of 166% in the built-up area between 1986 and 1999. More than 90% of this was due to large scale conversion of agricultural land caused by industrial and urban development in the peripheries of Delhi. Substantial urbanisable area, almost 61% of what was proposed, remained unbuilt in 1999, highlighting the comparatively low level of planned development in the NCR. On the other hand, the areas proposed to be kept as green belts, immediately outside the Delhi UA, have transformed rapidly after 1986 with 60% of the green belt demarcated as per RP 2001 having been built upon.

| Category | 1986 | | 1999 | |
|---|---|---|---|---|
| | Area | % | Area | % |
| 1 | 2 | 3 | 4 | 5 |
| **Built-up** | 98,794 | 3.26 | 2,63,500 | 8.71 |
| **Agriculture** | 26,50,585 | 87.64 | 24,04,964 | 79.52 |
| **Forest** | 77,512 | 2.56 | 1,21,435 | 4.02 |
| **Wastelands** | 1,85,886 | 6.14 | 2,00,535 | 6.63 |
| **Water bodies** | 3,235 | 0.10 | 24,217 | 0.80 |
| **Others** | 8,200 | 0.27 | 9,549 | 0.32 |
| **Total** | 30,24,200 | 100.00 | 30,24,200 | 100.00 |

**Table 02: Comparative Areas under different landuses in 1986 and 1999**
Source: RP 2021. NCRPB

**Draft Regional Plan 2021 (RP 2021):** In view of the above, the NCRPB prepared the Regional Plan 2021 which was notified in 2005 and was revised in 2013. The RP 2021 aims to promote growth and balanced development for the whole region by developing an appropriate economic base for future growth in the identified major settlements, Metro Centres and Regional Centres, *(see figure 06)* in order to absorb the economic development impulse of Delhi. Additionally, the plan makes proposals for developing an efficient transport network, developing physical infrastructure, rationalizing the land use pattern, and improving the environment and quality of life within the region.

The thrust areas for RP 2021 include:

1. Laying down of Land Uses at the Regional level in

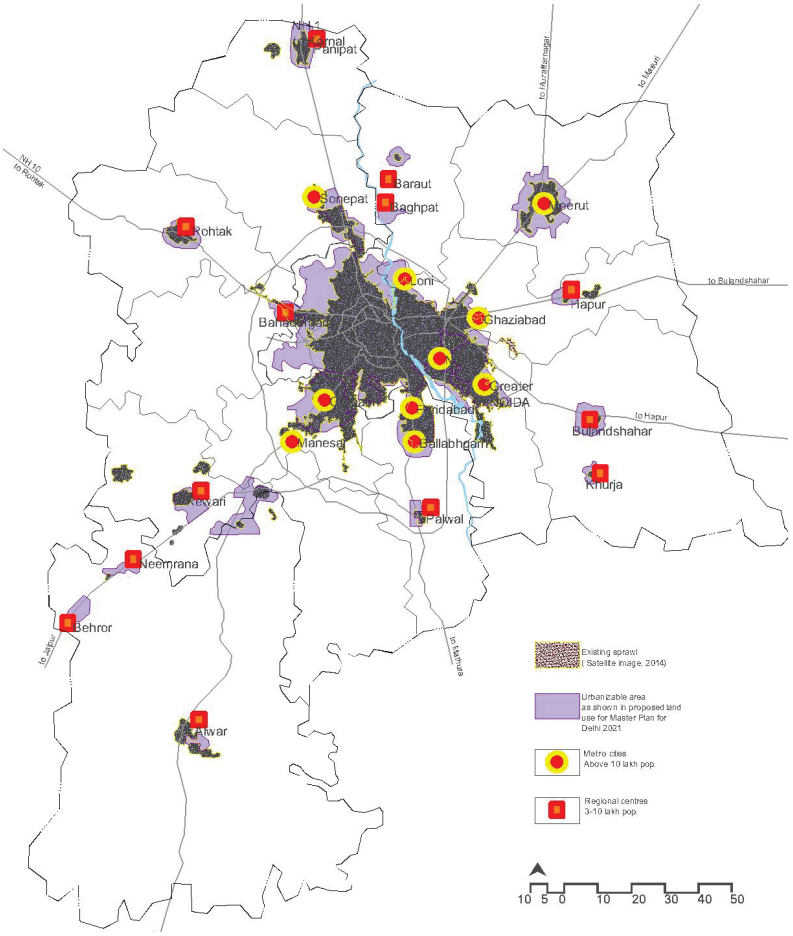



**Figure 06: Metro Centres, Regional Growth Centres and urban sprawl for the NCR**
Source: NCRPB (2013) and Google satellite imagery (2014)

terms of a harmonious pattern emerging from a careful examination of natural features including susceptibility to natural disasters and socio-economic activities
2. Development of Metro and Regional Centres as powerful growth nodes to attract major activities
3. Provision of regional transport linkages and Mass Commuter System
4. Construction of peripheral expressways and orbital rail corridor around Delhi
5. Development of core urban infrastructure (transport, power, water supply, sewerage, drainage) in NCR towns
6. Development of the region's economy through Model Industrial Estates, Special Economic Zones outside NCT-Delhi

The plan proposes four policy zones to achieve sustainable development: (1) the NCT Delhi, wherein no new activity (formal and informal) resulting in job creation can be located within the NCT, (2) the Central NCR (earlier called Delhi Metropolitan Area) proposed to develop to its fullest potential - to enable this, plans by respective states are proposed to be made by the CNCR Planning Group, (3) The Highway Corridor Zone, marking an area of 1 km along the highways with restricted activities and land uses, and (4) the rest of the NCR, which is proposed to continue providing infrastructure and amenities to the various urban and rural settlements specifically for the identified Metro Centres or Regional Centres.

**KEY STRATEGIES ADOPTED IN THE NCR REGIONAL PLANS**

To achieve the set objectives, the regional plans have strategically proposed the development of adequate transportation linkages and housing, distribution of economic growth opportunities through growth centres in the region.

**Growth Centres:** Within a proposed 6 tier settlement system, a number of strategically located million plus centres termed as Metro Centres are located in the CNCR region of the NCR, namely, Ghaziabad-Loni complex, Faridabad-Ballabgarh complex and Meerut. The RP 2001 as well as the RP 2021 have both proposed the development of Regional Centres in the rest of the NCR, as potential alternatives. While most of the population is concentrated within the CNCR, the expected population growth in these proposed Regional Centres has been lower than expected. The Regional Centres have been envisaged to host highly specialized secondary and tertiary sector activities for providing job opportunities, but presently, most of these towns are involved only in the manufacturing sectors (traditional and new). These centres are proposed to have a concentration of administrative and higher order service functions and are expected to attract investments along with favourable living and working environments for residents. Various cases of rapid growth induced by industrial location policies are evident in the NCR. Cases such as Dharuhera and Bhiwadi are distinct as within a span of 3 decades these rural settlements have been transformed into the most coveted destinations for industry and housing.

The study "Economic Profile of NCR" (2015) focuses on the existing economic scenario in the region especially for the Metro Cities and Regional Centres.[16] It highlights the need to strengthen rural infrastructure to promote agro based industries, provide better infrastructure in industrial areas, address pollution and congestion in industrial towns, facilitate industrial revival of Meerut, develop appropriate infrastructure to boost traditional crafts in Ghaziabad, Khurja, etc., and, encourage enterprises in districts showing slow growth rates like Jhajjar, Alwar, Bulandshar and Sonepat. The Delhi Mumbai Industrial Corridor (DMIC) has identified three investment regions to boost the manufacturing sector in terms of industrial output and employment, namely, Noida-Ghaziabad and a continuous 100 km stretch adjoining Gurgaon consisting of Manesar-Bawal and Bhiwadi-Neemrana. All of these regions lie to the south of the NCR. With large investments planned for this region, it is crucial to take a critical look at the role of other Regional Centres to truly achieve decentralisation. However an examination of the population for each of the growth centres over the last three decades shows discrepancies. While some of the Regional Centres have experienced very rapid growth within a single decade, some have remained stagnated. This highlights the influence of factors not included in the regional planning strategies.

**Housing in NCR:** In the context of the Regional Plan policy of 'induced growth' of selected settlements in the NCR, large-scale housing activities are essential elements for the overall development programme to absorb population and economic activities, thus achieving the decentralisation agenda of Delhi and balanced development for the entire region. It was estimated that the Regional Centres in the NCR would need a supply of about 6.25 lakh dwelling units by 2001 (0.5 lakhs for removing the current shortage, 1.75 lakhs to cater to the normal population increase and 4 lakhs for absorbing the additional population proposed to be deflected to these towns).

Housing is generally provided by state development authorities or housing boards involved in the delivery of both developed plots and built-up dwelling units. The *table 04* indicates the share of the various agencies in providing housing till 2001.[17] The NCRPB has provided financial assistance to these public agencies for projects facilitating over 1 lakh residential plots/flats, besides a variety of other infrastructure facilities in different towns in the region till 2001. Despite this, the public sector has not been able to deliver the requisite housing units in terms of numbers or costs, leading to a higher dependence on private developers. The real estate market responsible for a large quantity of housing provided by both big and small private developers is thus an important source. The core city of New Delhi has added only marginally to the housing scenario as compared to the rest of the NCR. Investments in housing are much higher in Gurgaon and Noida.[18] Noida has been the largest contributor in supplying residential development with good infrastructure, metro connectivity and road network, and real estate development. The Noida Extension area is emerging as a prime residential corridor with housing stock of varying prices making it a preferred destination for many. This has acted as a pull factor. Upcoming major projects like the Export Promotion Zones and Taj Economic Zone along the Yamuna Expressway are likely to push the economic development of this region, consequently giving a further boost to real estate development.[19] The presence of this unregulated real estate market has further led to lack of affordable housing for different sections of the population, resulting in the growth of slums and squatters even in the smaller towns of the NCR (refer *Table 03*).

| Slum Population in NCR (2001) | | | |
|---|---|---|---|
| **Sub-region/Cities** | **Population** | | **% of Slum population** |
| | **Total** | **Slum** | |
| **NCT-Delhi (MC-Urban)** | **98,17,439** | **18,54,685** | **18.89** |
| **Haryana (Urban)** | **61,14,139** | **14,21,839** | **23.25** |
| 1. Panipat | 2,68,823 | 1,02,813 | 38.25 |
| 2. Sonepat | 2,25,151 | 75,454 | 33.51 |
| 3. Rohtak | 2,94,537 | 90,645 | 30.78 |
| 4. Bahadurgarh | 1,26,746 | 39,478 | 30.90 |
| 5. Rewari | 1,00,946 | 51,754 | 51.27 |
| 6. Gurgaon | 2,01,759 | 33,570 | 16.64 |
| 7. Faridabad | 10,54,981 | 4,91,131 | 46.55 |
| 8. Palwal | 1,00,528 | 15,589 | 15.50 |
| **Rajasthan (Urban)** | **1,32,05,444** | **12,06,123** | **9.13** |
| 1. Alwar | 2,60,245 | 15,923 | 6.11 |
| **Uttar Pradesh (Urban)** | **3,45,12,629** | **43,99,005** | **12.75** |
| 1. Meerut | 10,74,229 | 4,71,316 | 43.87 |
| 2. Ghaziabad | 9,68,521 | 2,58,834 | 26.72 |
| 3. Hapur | 2,11,987 | 90,964 | 42.91 |
| 4. Bulandshahr | 1,76,256 | 50,292 | 28.53 |
| 5. NOIDA | 2,93,908 | 26,824 | 9.12 |

**Table 03: Slum Population in NCR (2001)**
Source: RP 2021, NCRPB

With the focus on affordable housing, the NH-24 stretch in Ghaziabad, which already has a sizeable population in the developed residential corridors of Vaishali and Indirapuram, is being looked at as another destination. The Faridabad residential market has Greater Faridabad (also known as Neharpaar) as a growth corridor. As per the report by a real estate advisory firm, upcoming locations include Neemrana, Sohna etc. On the other hand low land prices and development potential continue to keep Yamuna Expressway an attractive destination for investors. As a further push to the real estate market, the Government of India has issued guidelines permitting FDI upto 100% for development of

| No. | City/Town | Dev. Authority GDA/ NOIDA | State Housing Board | Co. Op Group Housing Society | Pvt. developers/ builders | Friends/ relatives | Others/State Housing Dev. Authority HUDA | Total |
|---|---|---|---|---|---|---|---|---|
| 1. | Ghaziabad | 18.0 | 66.0 | 4.0 | 12.0 | - | - | 100.0 |
| 2. | NOIDA | 74.0 | - | 16.0 | 10.0 | - | - | 100.0 |
| 3. | Faridabad | - | - | - | 18.0 | - | 82.0 | 100.0 |
| 4. | Gurgaon | - | - | 4.0 | 22.0 | - | 74.0 | 100.0 |
| 5. | Bahadrurgarh | - | - | - | 86.0 | 2.0 | 12.0 | 100.0 |

**Table 04: Agencies providing Housing in NCR**
Source: TCPO (2007)

integrated townships, including housing, commercial premises, hotels, resorts, city and regional level urban infrastructure facilities. The Board has recommended in the draft RP 2021 that the participating states of NCR could consider such integrated development with the help of FDI. The draft Plan also recommends the tenets of the new National Housing and Habitat Policy 1998, wherein public agencies have been given the role of facilitator rather than provider of these facilities. While this would boost availability of housing in the region, it would also be crucial for the state governments to draft policies for affordable housing.

**Infrastructure:** The NCRPB has prepared functional plans for Transport-(2032) and the Functional Plan for Ground Water recharge while the Functional plan for Water is under preparation to determine the infrastructure needs for transport and water respectively. As part of the urbanisation pattern, it is essential to assess the existing infrastructure for the region. As seen in the case of transportation, there is a very high dependence on private vehicles for daily commutation in the Metro-centres of CNCR due to the inadequacy or near absence of a dependable public transport system. The existing urban sprawl highlights the concentrated growth (industrial and residential) along the national highways and road corridors only. Also, for the Regional Centres in the NCR, the primary mode for commuting is private vehicles (*refer table 05*). As per *figure 07*, a very high share of the passenger movement within the NCT Delhi originates from other areas in the NCR region.[20]

Multiple agencies are responsible for planning, implementing and maintaining transport networks within the region. This includes the National Highway Authority of India for the national highways and expressways, the state PWDs, the development authorities, NCR Transport Corporation (NCRTC) set up for the implementation of the Rapid Rail Transit System (RRTS), and the Unified Metropolitan Transport Authority (UMTA) proposed to be set-up as a single planning, co-ordination, management and monitoring entity for the NCR under the Ministry of Urban Development (MoUD).

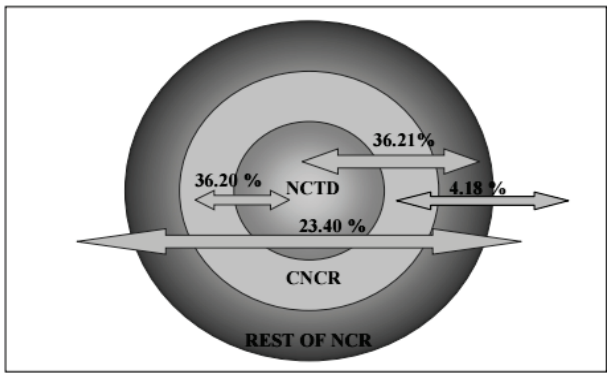



**Figure 07: Movement of Passenger Modes in NCR**
Source: NCRPB (2013)

A mass rapid transit system has been proposed as a decentralisation and decongestion strategy in both the regional plans. While it did not take off in the earlier plan, proposals for implementation of the RRTS have now been given an impetus with the setting up of the NCRTC for coordinating its implementation in the four different states. This will be implemented through a holding company with equal shareholding of the Government of India (MoUD, MoR & NCRPB) and the four states of the NCR (Delhi, Haryana, UP and Rajasthan) to facilitate high speed connectivity for Delhi with the Regional Centres within CNCR and the rest of NCR. The lack of a high speed connectivity between the Regional Centres has been termed as the primary reason for the inadequate success of the multi-nodal regional development strategy. The transport plan for the region identifies the lack of mass rapid and public transport systems as the key reason for the failure of the planned growth centres to take off. A closer look at the functional plan for transport and the proposals for expressways and integrated rail including rapid rail and metro rail reinstates the sprawl structure for the region with NCT Delhi as its core. Also, the transport plans and growth centres have been prepared to induce growth in the region assuming the regional centres to grow as per the demographic projections without considering the existing or past trends of growth (*refer Annexure 01*). This has been the most critical drawback of inducing

| Sl. No. | Name of the city/town | Communication to work place | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Owned | Pvt. | Public | Office | Other | Rail | Total |
| 1. | Ghaziabad | 66.0 | 6.0 | 26.0 | 2.0 | - | - | 100.0 |
| 2. | NOIDA | 76.0 | 14.0 | 10.0 | - | - | - | 100.0 |
| 3. | Faridabad | 72.0 | 2.0 | 20.0 | - | 2.0 | 4.0 | 100.0 |
| 4. | Gurgaon | 60.0 | 16.0 | 24.0 | - | - | - | 100.0 |
| 5. | Bahadurgarh | 32.0 | 4.0 | 52.0 | - | 6.0 | 6.0 | 100.0 |

**Table 05: Modes of Transport used to commute to work in the NCR**
Source: TCPO (2007)

urban growth through the tools of regional planning.

In terms of water supply, major storage reservoirs, dams and barrages that provide water to NCR are located outside the region in the upper reaches of the Himalayas. The NCRPB study has indicated that excepting Delhi, which has an average water availability of 225 lpcd, per capita rate of water supply in the urban centres of Haryana sub-region ranges from 45 lpcd in Ganaur to 145 lpcd in Panipat, and 35 lpcd in Shahjahanpur; 98 lpcd in Alwar in Rajasthan sub-region; and 28 lpcd in Phalauda and 142 lpcd in Meerut in the Uttar Pradesh Sub-region. The status in rural areas presents an even worse situation as many villages do not have local sources of water. Inadequate water supply for industrial, residential and agricultural uses has led to a heavy dependence on ground water and over exploitation of ground water resources. While the U.P. sub-region has abundant ground water, the areas west of River Yamuna comprising the districts of Gurgaon, Rohtak, Sonepat, Jhajjar and most of Faridabad district in Haryana, Alwar in Rajasthan and a large part of NCT Delhi have insufficient ground water. As observed, the concentration of residential and industrial development as well as the identification of new investment regions along the Delhi Mumbai Industrial Corridor (DMIC), is all in southern Haryana along the Delhi-Jaipur corridor which has experienced high rates of urbanisation (specifically, Dharuhera and Rewari). This has multiplied the scarcity of water and proves to be a case of the failure of the functional plans to inform regional planning strategies.

| Sub-region | Total Water Available MCM | Total Water Demand MCM | Total Water Deficit MCM |
|---|---|---|---|
| **Haryana** | 5224 | 9775 | - 4551 |
| **Rajasthan** | 1877 | 4523 | - 2646 |
| **Uttar Pradesh** | 4396 | 6730 | - 2334 |
| **NCT-Delhi** | 2283 | 2438 | - 155 |
| **NCR** | 13780 | 23466 | - 9686 |

**Table 06 State-wise Demand Supply gap in the NCR**
Source: NCRPB (2013)

**OBSERVATIONS:**

Most of the metropolitan regions of Mumbai , Kolkata, Bangalore and Chennai were set up in the 1970s with the objective of management of urban expansions and dispersal of activities to the region. While KMA covers an area of 1886 sq km and MMR 4384 sq km, the NCR with its 34,000 sq km area is a peculiarly different case. However, despite the regional strategies focusing on dispersal of population, most of the urban growth in the metropolitan cities has resulted in a sprawl and an expanding UA. The NCR defined an even larger area to disperse the population growth from the core to its multi nodes. However, the ever expanding footprint and the complete urbanisation of the CNCR (*refer figure 06*) raises crucial questions regarding the ability to abandon the strong core-periphery relationships for even larger regional boundaries and thus the adequacy of our regional planning strategies adopted.

While the urban and rural governance systems are distinct, the maximum urban - rural interactions occur at the peripheries, especially for the expanding urban areas, resulting in transformations that are at times urban in nature but are governed by rural bodies. These metropolitan region thus depend on a technical institution to strategise and manage expansions in the region by setting forth a larger vision. In addition to drafting regional level plans, these authorities as Special Purpose Vehicles (SPVs) also direct the local governments to implement projects in accordance with

the regional proposals. The Development Authority for Delhi was set up in 1957 for managing growth for the NCT Delhi, which experienced a very high growth (90%) in the previous decade following the Partition. One of the urgent needs felt then was the dispersal of growth into a larger region to decongest the city further.

So the mandate of the NCRPB when it was set up was not focused on achieving regional balance and management, but aimed at decongesting Delhi by ensuring dispersal of urbanisation into the region. Both the regional plans employed a multinodal approach (well suited to regional balanced growth) considering Delhi as the core for future expansions. However, while the development of growth nodes were met with partial success, the further sprawl of the core continued into the region. It has been observed that the CNCR, adjoining the NCT Delhi, has grown at a much faster rate than the Regional Growth Centres proposed in the other parts of NCR due to a number of reasons. Lack of sufficient transport connectivity and a unified authority for implementation of transport plans is considered to be a prime reason for this lopsided development. Instead, urbanisation has followed the continuous stretches along the highways providing adequate connectivity than the proposed growth centres. The case of the continuous urban stretch from Gurgaon to Bhiwadi along the Delhi-Jaipur Highway is an example. The population growth for two of the urban areas Dharuhera and Bhiwadi have increased from a mere 5000 and 1000 to 2 lakhs and 1 lakh in the past three decades. The forces of the real estate market also tend to append housing and commercial supply to the

core in the region. (*refer Annexure 1*). Unfortunately, the Regional Plans take no stock of the existing conditions and the impacts of such sprawls.

Further, external policy interventions such as the three proposed investment regions of the DMIC have been identified to boost the manufacturing sector in terms of industrial output and employment in the NCR. These are, Manesar-Bawal and Bhiwadi-Neemrana that form a continuous 100 km stretch adjoining Gurgaon and the third, Noida-Ghaziabad. While all three areas are already highly industrialised, further induction of growth into these regions and their proximity to the existing core city, challenges the core intent of the multinodal regional growth strategy.

Inadequate water availability in the southern part of the NCR is another factor that impacts the tendency to sprawl. Whereas regions with adequate water and therefore predominant agricultural economy result in reluctance on the part of the farmers to sell their lands for urban expansions. The spatial strategies adopted for urban growth dispersal have weakly considered these context specific core-periphery relationships and the factors influencing them.

The stress on functional plans rather than strategy plans, lack of unified authorities responsible for planning and implementing sector specific projects, inadequate interconnection developed between the different sectoral plans, a focus on developing and implementing projects rather than comprehensive visions, and, the inability to follow evidence based planning methods for propagating induced growth have proven to be the crucial reasons for the failure of the regional plans.

# Greater Beijing Economic Region

The rapidly increasing urban footprint in China, has led to a number of rural settlements to gradually transform into urban, albeit without the ownership of their land being transferred to the municipality. A patchwork of non-agricultural uses (was) apparent in these villages: industrial and commercial centres; new roads and bus lines; and local factories and small-scale industry established by outsiders and locals. Also evident (was) an increase in the importance of rental housing as a significant source of income for villagers and an influx of outsiders, including factory workers, construction workers, and college students.[21]

**INTRODUCTION**

China has experienced one of the highest rates of urbanisation in the past three decades. In 2010, the People's Republic of China (PRC) was home to 1/5 of the world's population with 1.3 billion people of which almost 49% were urban.[22] China's urban population (in about 600 urban areas with a population above 100,000) grew from 346 million (27% of its total population) to 477 million people (36%) between 2000 and 2010.[23] China has five cities with population above 10 million, around 73 million plus cities and around 519 cities with a population of above 1 lakh. While the average population density in Chinese cities has dropped by more than 25% in the last decade, its urban land which was about 99,000 sq. km in 2000, increased to 127,000 sq. km in 2010, an average growth of 2.5 % a year.[24] This territorial expansion has included rapid conversion of agricultural land located in the peripheries of large cities.

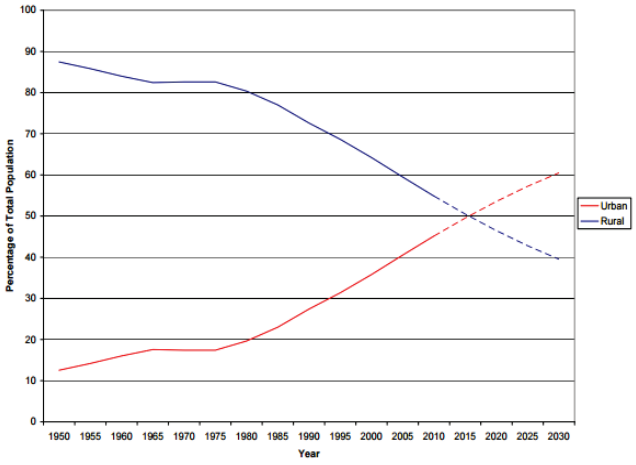



**Figure 08: Urbanisation in China**

Source: Karen Seto (2007) 'Urbanisation Growth in China: Challenges and Prospects', Standford *University*

Beijing and Tianjin are directly controlled municipalities of the Central Government. Beijing is spread over a total of 16,250 sq. km with a mere 1368 sq. km area urbanised and an urban population of 18.6 million surrounded by rural districts. Tianjin is around 11,760 sq. km with a 200 sq.km. urban area and an urban population of 11.5 million. The Greater Beijing Economic Region (GBER) has been demarcated for integrated development as a metropolitan area with Tianjin and autonomous 'satellite' areas in the surrounding province of Hebei .

This aims to serve three broad purposes:

(1) It will provide an opportunity for creating the much needed economic centre to boost the economic growth of the larger north-east region;[25]

(2) It is expected to boost the local economies of the region, and ,

(3) It will share the burdens of congestion, pollution and resources of the capital city of Beijing.

Through a brief discussion on the proposed development of the GBER encompassing Beijing, Tianjin, and Hebei in the Bohai Sea Rim area, this section aims to study the key urbanisation challenges faced in this region, the opportunities and challenges arising from it along with the institutional and planning frameworks deployed for strategizing the management of urban growth in the region.

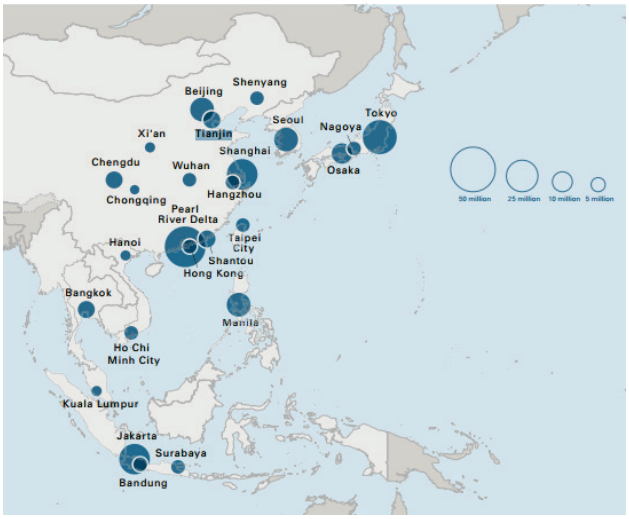



**Figure 09 China's Urban Centres**

Source: World Bank (2015) Urban Development Series

**Urbanisation Challenges:** The impetus for rapid urbanisation in China dates back to the late 1970s when the country through its early economic reforms led the decentralisation of its governance systems, shifting from a centrally dictated growth to a more localised one. Recently economic policies have reflected China's efforts to rebalance its economy, shifting emphasis from

investment for building production units towards increasing local consumption and inducing urbanisation in the rural and inland areas to achieve this. But critics are wary of such induced urbanisation as an instrument for creating sustainable economies. The frequent incidence of 'ghost towns' with less than 2% occupancy in some of these further echoes these fears.[26] Such a process of urban expansion in the absence of any market force or demand has led to peculiar patterns of suburban expansion and peri-urban conditions. The absorption of 260 million rural migrants into Chinese cities has led to conflicts with the urban hukou holders who perceive a decline in service quality.[27] Presently, land laws for urban and rural areas in China are different, with significant uncertainties for farmland tenures. This makes acquisition of rural lands easier.

Government policies in the 1990s allowed occupants of industrial housing to purchase homes at heavily discounted prices and led to 84% of the households with self-owned units. Across urban areas, prices doubled between 1999 and 2010; in some cities like Shanghai and Beijing, they increased more than five times—making the Chinese housing market unaffordable for many.[28] On the other hand, Chinese cities are low density with low FARs and large under-utilised lands. Demand for affordable housing for the low and middle income groups and the felt need for higher income groups to move away from congestion and pollution of the city and own luxury villas at affordable rates in the hinterland has led to expansion of residential developments in the peripheral lands. Formal and informal rental markets provide an important source of housing, even in 'urban villages' within the cities and 'rural villages' in the peripheries.

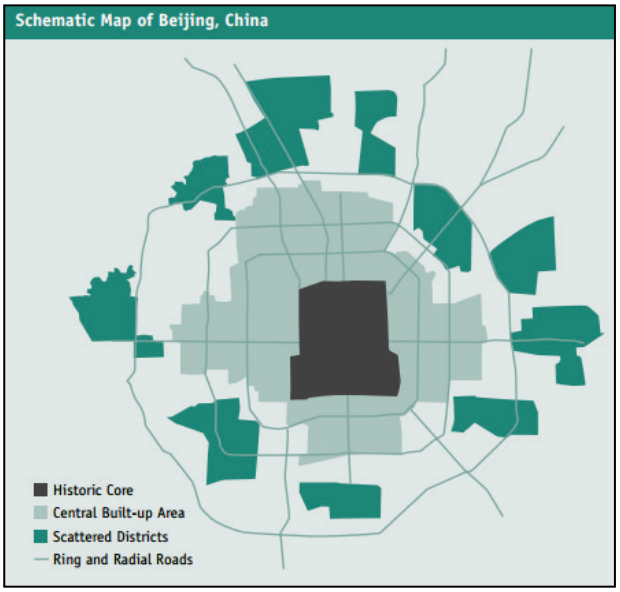



**Figure 10: Schematic Map of Beijing**
Source: Yan Huang (2004)

As more land was annexed into the cities, the growth of businesses, industries and foreign investments attracted a large number of migrants into the cities. Migrant workers made up more than one-third of the labour force in 2012. Two-thirds of China's migrant workers live in the eastern provinces and two-thirds of these originate from the same provinces. Thus urbanisation is merely concentrated in the eastern coast of China and remains distinctly separate without any of the positive impacts reaching the predominantly rural provinces. Also another cause for a further differentiation between the urban and rural. Additionally, with a number of fresh water rivers in the east, this is also the agricultural rich land. The unplanned increase in built up land, almost 87%, has resulted in loss of this arable land.

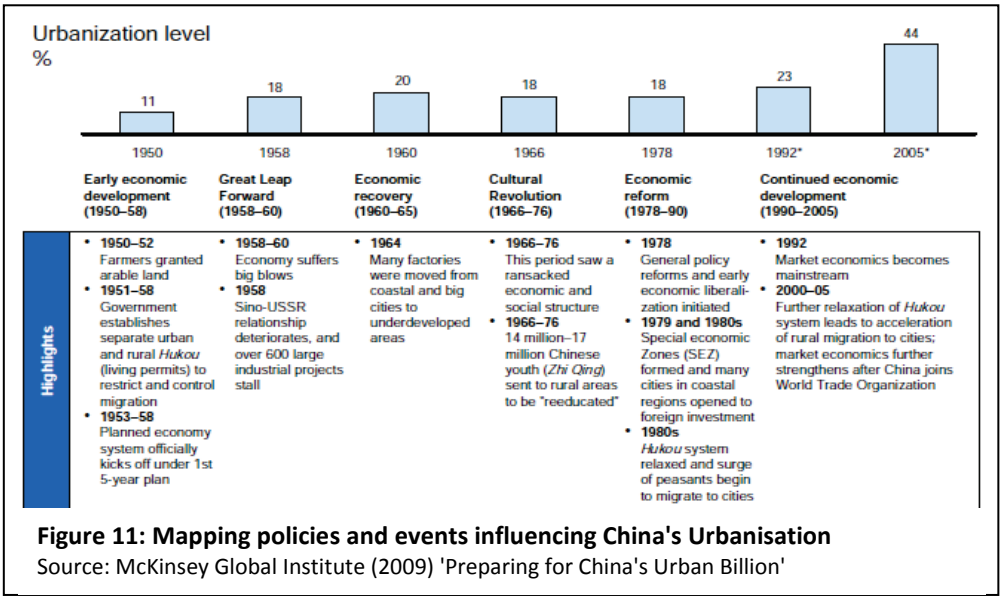



**Figure 11: Mapping policies and events influencing China's Urbanisation**
Source: McKinsey Global Institute (2009) 'Preparing for China's Urban Billion'

**Governance Reforms and Urbanisation:** *Figure 11* that charts the events and policies influencing urban growth. The substantial reduction of state budgetary commitment to local economic development since the 1980s and the reformation of the central-local taxation scheme since 1994, shifted the responsibilities of capital mobilisation and regional development from the central to the local level. With increasing inter-city competition to attract investments and jobs and the absence of any finance generating tools such as property tax, service charges, value added tax and market bonds, the empowered local governments heavily invested in infrastructure primarily through borrowings. One of the most significant aspects of this decentralisation of governance in China is the provision of acquiring land and subsequently processing it for development to the local government. In absence of land policies to methodically allow this, it has resulted in fragmented developments in the peripheries. Thus, much of the expansion of Chinese cities led to an official annexation of the rural peripheries into the cities.

**PLANNING PROCESS**

China has a centrally controlled planning system which consists of three kinds of plans: the Socio-Economic Development Plans prepared by the National Development and Reforms Commission (NDRC) and 32 departments under the national government known as the State Council; the National Spatial Plans prepared by the Ministry of Land Resources; and, the Urban and Rural Development Plans by the Ministry of Housing and Urban-Rural Development.

- The **Socio-Economic Development Plans** prepared by the NDRC provide broad political and ideological guidelines for economic development articulated through the Five Year Plans (the last was the 12th Plan 2010-2015). This plan is politically driven and follows a top down approach, drafts an outline for the physical/geographical distribution of large-scale construction projects, production centres and resource allocation, and attempts to lay out a course for the national economy.

- Accompanying the Socio-Economic Development Plans, there are four categories of spatial plans. **The Spatial Plans** (land use plan) at the National and provincial levels focus on equalising the allocation of land resources for different regions so as to have equal opportunity to promote their development.

- **Master plans at city levels** are comprehensive plans for guiding development and are usually valid over a 20-year period. Detailed plans further guide development at a township level. The plans prepared at the city level have to get central government's approval. Land use plans at the national, provincial, prefecture and township level are mandated by the Land Management Law which follows a complete top down approach and stipulates that the master plans for lower administrative bodies should follow those of higher administrative bodies starting with the national land use plan. The Master Plan, however, being static in nature, is gradually being replaced by Strategic Plans that are dynamic and flexible instead on merely focusing on a rigid spatial plan.

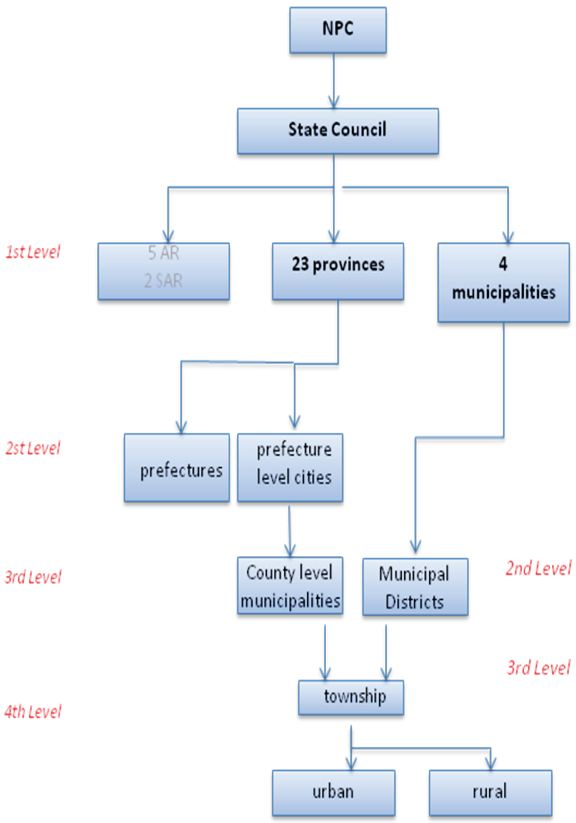



**Figure 12:** Schematic governance structure for PRC

**Metropolitan Planning or Planning for Economic Regions:** Since China's economic reform and opening up, there has been an attempt to break boundaries among different administrative regions and form a number of closely knit economic rims or belts that provide a vibrant and sustainable economy. These urban agglomerations, each with a central core megacity, have become powerhouses for the country's rapid economic development and are largely responsible for the economic growth of the surrounding region. Ten such economic regions have been proposed to be developed in the 12th Five Year Plan. The largest three of these distinct economic rims are the Pearl River Delta (urban population 42 million), the Yangtze River Delta (urban population 40 million), and the Bohai Economic Rim (urban population 62 million).[29] All of these large

metropolitan regions are spread across more than one administrative province and hence require special metropolitan plans which act as regional plans for these regions covering multiple administrative units. Metropolitan planning is directly coordinated by the national level ministries. However, the various concerned administrative units, provinces, counties, cities and municipalities are responsible for implementation, demanding higher regional cooperation. The plan for the Pearl River Delta has been approved and has been under implementation since 2005. Similarly, the Yangtze River Delta plan has been sanctioned in 2010. After decades of proposals for development the Beijing - Tianjin - Hebei region (the Bohai Economic Rim [BER]), the plan will finally be submitted to the State Council for approval this year in 2015.

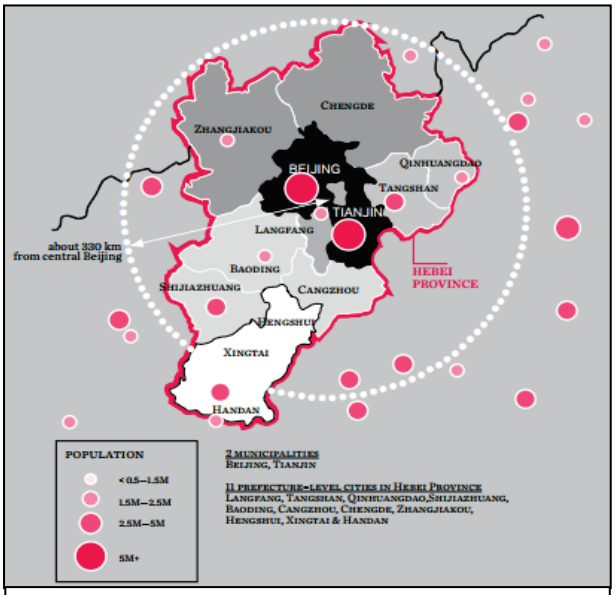
**BOHAI ECONOMIC REGION:**

The plan preparation for integrated development of the region is directly coordinated by the NDRC. The draft plan for the growth of the area is expected to take the form of "two centres, three axes and one belt", with Beijing and Tianjin as two centres and coastal areas forming an economic belt. The Hebei province, which is primarily rural, serves as a key supplier of energy, electricity, steel, agricultural products and water to the two municipalities. Hebei benefits from the two cities as Beijing and Tianjin provide ready markets for its key products, especially agricultural produce and steel. Likewise, many of the most pollution-heavy industries have moved out of the two municipalities in recent years — particularly steelmaking — and has migrated to nearby cities in Hebei, providing important sources of provincial government revenue and employment.[30]

**Key Strategies:**

China plans to merge the urban centres in the Bohai Economic Rim (with about 62 million urban of residents as on 2010) into one big Super City of 260 million population. A key strategy planned is a high speed rail connectivity to link the Beijing and Tianjin. The draft plan for the growth of the area envisions two main urban centres and an economic belt of the coastal cities. Unifying the *hukou* system for Beijing-Tianjin-Hebei has been proposed as one of the key triggers to the proposed Economic Development Plan. Another trigger is the shifting out of all government departments, state owned firms and government agencies from Beijing to the Tianjin and Hebei region.[31]

**Regional Economy:** The prospective Beijing-Tianjin-Hebei economic zone illustrates the need and potential for — as well as the constraints on — region-oriented development policy. With rich natural resources of oil and natural gas in the Bohai Sea and closely-knit core city clusters, it's the most robust region in northern China and was previously a base for manufacturing, heavy industry and chemicals. Its strengths have also been seen in its well-developed communication network, shipping, high-tech, S&T innovation and education. More than 3,000 enterprises, mostly heavy industries, have already relocated to the city's fringe districts since the 1990s, including some in the surrounding Hebei province. The adjoining figure shows the identified growth centres and the proposed settlement structure for the region.




*In 2005, the NDRC released a '2 + 8' master development plan for the GBER, including Beijing and Tianjin and eight prefecture–level cities in Hebei Province. In 2007 three more cities in Hebei were added, resulting in a '2 + 11' plan.*

**Figure 13: Regional Growth Centres**
Source: Metropolis Congress (2008) Connecting Cities: China

**Growth Centres:** Two municipalities of Beijing and Tianjin and 11 prefecture level cities in the Hebei province (*refer figure 13*) have been proposed to form important growth centres. Beijing will be the focal point for high-tech and value added service industries, while Tianjin will leverage its port and manufacturing base to develop as a logistics and communications hub. Tianjin's Binhai New Area has also been earmarked as an international financial centre. The smaller Hebei province cities offer lower land prices and large reserves of land, allowing development of higher value–added industries that can be integrated with the region's research and logistics capabilities.

**Transport Infrastructure:** New and expanded transportation networks are planned to support the acceleration of connectivity between Beijing to Tianjin as well as the economic integration of the region as a whole. Expressways and a high-speed railway between Beijing and Tianjin plans to connect several major industrial zones, facilitating interaction between them. Additionally, as an extension to Beijing's ring road system, there is a seventh ring road that connects Beijing to the surrounding Hebei province, integrating the region through increased connectivity. It is in parts 175 km away from the city indicating the expanse of the future sprawl. The new networks propose to create a two-hour transportation circle encompassing some 76 million people. Enhancements to airport and port infrastructure will strengthen intra–regional and international links and with Tianjin Port as the focus, a comprehensive sea, land and air transportation network is planned for reaffirming Tianjin's status as the BER's logistics hub (*refer figure 14*).

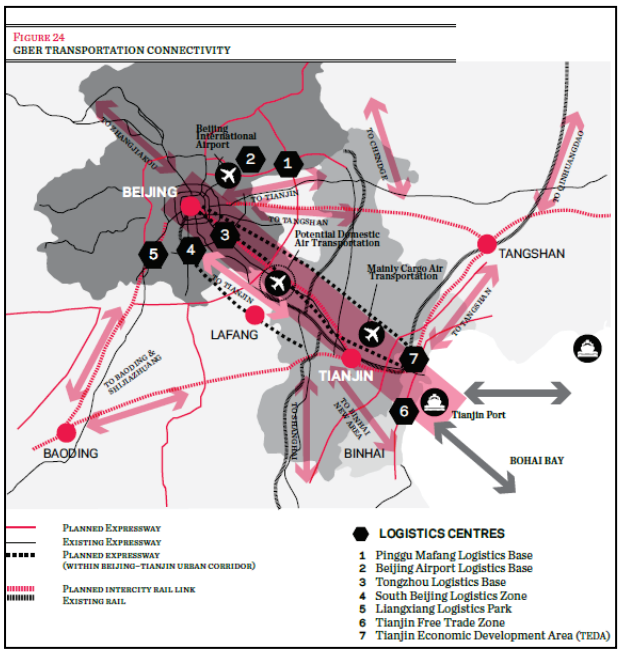



**Figure 14: Proposed Transport Strategy**
Source: Metropolis Congress (2008) Connecting Cities: China

**Land Management:** In peri-urban areas of Beijing municipality, forced re-contracting of farmland without individual consultation with land holders is common practice. Besides, the practice of readjusting village landholdings to reflect household population changes has been a feature of the rural land system in approximately 80 percent of Chinese villages. Added to this, the prevalence of informal practices and lack of a land registration system for rural lands have proved to be substantial impediments to the development of efficient rural land transfer markets.[32] This results in a general disinterest in pursuing agricultural activities and makes a strong case for the need to migrate. Land management therefore in this case is used as an instrument for steering not just urban expansions, but also forcing migrations.

The 12th Five Year Plan prioritises development of rural areas particularly along the urban rural borders. Planning controls and urban administration are to be strengthened to avoid re-emergence of border area problems. While, the priority given to key cities is expected to be maintained, the new comprehensive and supportive cities are to be created to induce growth and advantages of urbanisation into the region. The urban-function pattern is expected to rapidly shift from an over concentration of urban functions in Beijing to that of multi-functional urbanised regions.

**Housing:** The 12th Five Year Plan proposes to improve living conditions for floating populations and migrants, mostly housed in the urban villages, through the management of household rentals and security services, fire prevention and building quality of houses. Sub-standard living conditions are proposed to be prohibited. It aims to standardise leasing processes and encourage enterprises and industrial parks to provide workers with dormitories.

**Challenges:** This vision of regional growth, however relies on cooperation and coordinated planning between the two major economic hubs, Beijing and Tianjin, and though the two cities are just 120 km apart, they have long been uneasy neighbours, competing for resources and investment. Both Tianjin and Beijing have a dominant industrial economy, but their relative positioning is unclear and there is significant overlapping of industrial functions, resulting in scattered investments along the industrial supply chain. Since no central authority has been empowered to enforce the proposed development guidelines, there is no means of compelling the GBER's dominant cities to overcome their historical rivalry in order to fulfil their proposed roles.

**OBSERVATIONS:**

China follows a top-down approach in governance, administration and planning. Economic growth plans as well as spatial growth plans are drawn at a national level which are then adopted by cities and regions. The policies and agendas set at the central level, attract investments and industrial growth proposals by local level governments.

The rising competition amongst cities to attract investments, has resulted in high class infrastructure, sprawling cities along with, high dependence on automobiles, in pollution, traffic and environmental degradation.

There is a clear distinction between urban and rural with separate laws that administer them and separate identities that are associated with the place of origin (urban or rural) for every individual through the *hukou* system. The *hukou* system is also the main cause of inequitable distribution of resources and opportunities and hence the primary cause of social unrest. The urban peripheries starkly manifest these distinctions and are subjected to fragmented growth and a cause of tension between the urban and the rural. The need for induced urbanisation in the region has led to a supply driven approach, that has resulted in creation of sprawling towns with extensive housing, commercial, institutional and other areas with less than 6% occupancy.

The integration of economic and spatial planning adopted by the central governments determine the regional level approaches and plans. This has led to the possibility of a better control by the city and central governments over land use, economy, and industry, and hence, a better alternative for inducing growth. The BER is proposed as a leverage for reviving growth in the entire northern region.

A high consumerism encouraged by the central government policies, elite housing in distant suburbs, resulting sprawling cities, and a greater dependence on automobiles marks the newer expansions in China. The Chinese urban sprawl in some senses emulates the American suburbanisation, but instead of being demand driven, it appears to be highly state driven.

# Tristate Metropolitan Region of New York

Rapid industrialisation and immigration from abroad led to the growth of urban centres (in the United States). The ability of city boundaries to keep up with the explosion of urban population and the expansion of urban land development proved a difficult challenge, with the main method being annexation by the city government of surrounding towns and villages, officially incorporating them within the city's newly enlarged borders through legal authority granted to the municipal corporation by the state government. Thus for a time, city growth kept pace with metropolitan growth. For example, cities such as New York, Philadelphia, and Chicago all grew through annexation and consolidation from their original boundaries of just a few square miles and an original population of a few thousand people early in the 19th century, to cities with hundreds of square miles and millions of people by the end of the 19th century.[33]

**INTRODUCTION**

With about 83% urban population, the United States of America (USA) is one of the most urbanised nations. The last century saw urban growth in the United States rise from a mere 30 million (in 1900) to 250 million (in 2010). In 1920 there were just 5 urban areas with a population above 1 million and 9 urban areas with a population of 0.5 million to 1 million. By 2010, this increased to 42 urban areas with a population above 1 million and 38 urban areas with a population of 0.5 to 1 million. New York and Los Angeles are two of the most populated and the most sprawling cities in the United States. While Los Angeles Metropolitan Area has a population of around 13 million spread over 12,500 sq km, the metropolitan region of New York has a population of 20 million sprawled over almost 35,000 sq km.

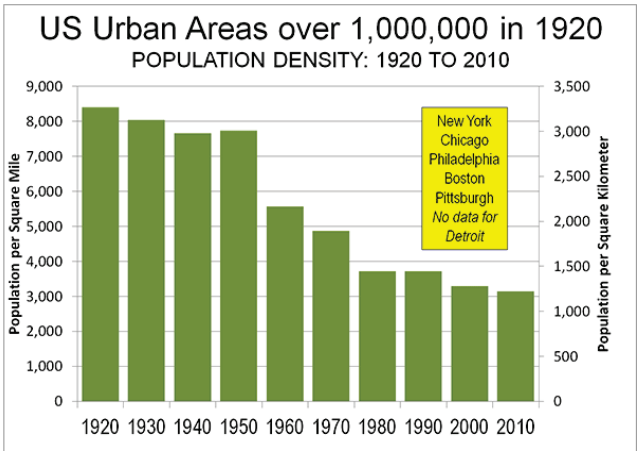



**Figure 15: Population Density in Urban Areas since 1920**
Source: New Geography (2013)

**Urbanisation Challenges:** The urbanisation processes in the USA through the entire period of the last century have been synonymous with the advance of suburbanisation. The roots of the suburban sprawl date back to the 1830s when the rise of industries in the cities brought with it issues of pollution, congestion, overcrowding, reduction in sizes of city houses, and a decreased quality of life experience. To counter these issues, the growing idea of 'suburbia' based on new regional planning concepts similar to the 'Garden Cities' in the UK, provided an opportunity to seek aspired lifestyles.[34] The introduction of assembly-line production in automobile manufacturing, the post World War-II economic boom and federal legislations in the US made it cheaper for to construct a new home in the suburbs than improve upon an existing structure in the city. The growth of suburbia, primarily in the 60s and 70s, was followed by the emergence of the 'edge city', which in addition to housing and convenient shopping areas accommodated a CBD (Central Business District). Since it lacked the compactness of the city, public transport and pedestrian facilities, these edge cities further encouraged the use of motorised vehicles.

Growth of the suburbs and the flight of the middle and higher income groups from the city, resulted not just in a physical segregation but also a racial and economic divide between those living in the city and the suburb. The city cores often decayed due to neglect and proliferated with slums and crime. Three key initiatives as listed below caught the imagination of architects, planners, environmentalists, and the government as a response to the growing concern.

(1) The ***'new urbanism'*** initiated by architects and physical planners, based on a movement that sought to bring back vibrancy into the dying city centres, led to the establishment of the New Urbanism Congress in 1993. 'New Urbanism' principles call for organising development in cities, towns, and villages that are compact, walkable, have mixed-use, and are transit-friendly, and contain a diverse range of housing. They are operated on a number of scales: buildings, lots and blocks, neighborhoods, districts and corridors, and ultimately entire cities and regions.

(2) At around the same time, initiatives towards revitalising cities and urban life were taken up across the country. The term 'smart growth' was first used in Massachusetts in the late 1980s to describe proposals to improve its state and regional planning system.[35] This led to the second most significant initiative in the mid 1990s by the American Planning Association (APA), an independent body, through the project ***'Growing Smart'*** that created a legislative guidebook. This model promoted growth, particularly in and around the existing

city and town centres and sought to curb sprawl by promoting more compact, more transit and pedestrian-friendly areas, and less resource, energy and land-consuming patterns of development.

(3) A third initiative, called the ***'Partnership for Sustainable Communities'*** setup in 2009, is a collaboration between three federal agencies, the Environment Planning Agency, the Department of Housing and Urban Development, and the Department of Transport. It aims to help improve access to affordable housing, create more transportation options and lower transportation costs while protecting the environment in communities nationwide, and provides grants to city and state governments for implementing various project.

**PLANNING PROCESS**

USA being a liberal democracy with federal systems of governance, is dominated by a history of local self-government. Institutions such as the Regional Planning Association (RPA), the American Planning Association (APA), Strategy Association, and so on), university departments along with eminent individual urbanists have been responsible for initiating relevant research and plan proposals periodically. Federal intervention is generally confined to indirect means for promoting management of urban regions. However, time and again, the federal governments have directly assisted the city governments to address sectoral gaps in the urban areas. Planning in the US is a state subject and state legislation plays a significant role in non-spatial regulatory intervention primarily through zoning and limiting of development. State level planning qualifies the local governments to prepare land use plans. State plans and regional efforts have shown a great variation across the country.

The first few decades of the 20th century witnessed a population explosion, equally in the city core and the peripheries. The main method of keeping pace with this urban expansion had been the annexation of surrounding villages and towns by the city governments, resulting in expanding boundaries. After a number of cities stopped the annexation procedures, a gap between the city and the metropolitan area was created. To cope with this, the US Census created a new category, the Metropolitan Statistical Area (MSA), consisting of a central city and a relatively contiguous urbanised population within daily commuting range. This reflected the new reality of an urban region with many different local government jurisdictions. This was followed by the initiation of regional special purpose government corporations to address the growing challenges of metropolitan regions for regulation of certain activities, eg, the port authorities, regional transport authorities, and others. (*refer figure 16*)

To create strategic plans focused on regional governance and coordination for implementation of the federal government initiatives, the **Councils of Governments** (COGs) were initiated in the 1950s. These were replaced by a new federal programme under the transport legislation in the 1980s which mandated every urban region to create a **Metropolitan Planning Organisation** (MPO) specifically for planning transportation investments and policies. In some cases, the regional COGs reconstituted themselves as MPOs. The 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) encouraged MPOs to take an integrated view of coordinating land-use, transportation, and air quality considerations, the first example of multi-sectoral planning decisions being made at the federal level.

In the absence of a clear regional planning authority for drafting comprehensive plans, numerous non-government associations, institutions and individuals have significantly helped in articulating the needs for regional planning and comprehensive planning time and again, and have also spearheaded people's movements to facilitate this. While the federal policies have promoted regional transportation planning, RPA in New York is one of the few organisations that proposes an integrated regional planning approach. The section attempts to document regional planning endeavours of the RPA in New York since 1920s.

**TRISTATE REGION OF NEW YORK**

The tri-state region of New York covers the MSAs of New York, New Jersey and Connecticut to with counties comprising Long Island and the Mid- and Lower Hudson Valley in the state of New York; the five largest cities in New Jersey (Newark, Jersey City, Paterson, Elizabeth and Edison) and their vicinities; six of the seven largest cities in Connecticut (Bridgeport, New Haven, Stamford, Waterbury, Norwalk and Danbury) and their vicinities. The New York metropolitan area with a population of more than 23 million and nearly 800 cities, towns and villages is spread across 34,000 square kilometres. Known technically as a Census Combined Statistical Area (CSA), it is a centre of many industries including finance, international trade, media and entertainment, tourism, biotechnology, and manufacturing, making it one of the most important economic regions in the world.

**Planning in the Tri-State:** Four key agencies are broadly responsible for planning in the Tristate Metropolitan region of New York. The **City Planning Department** at the local government level is responsible for planning for the city of New York. The **New York Metropolitan Transportation Council** (NYMTC), created in 1982 as the Metropolitan Planning Organisation (MPO) for New York City, Long Island and the lower Hudson Valley, provides a collaborative planning forum to address transportation-related issues from a regional perspective, plans for the future, and also makes decisions on the use of federal transportation funds. Established in 2008, the **Metropolitan Area Planning** (MAP) forum crosses the boundaries of New York, Connecticut and New Jersey and comprises of five primary MPOs in the tri-state New York City metropolitan area to address shared transportation challenges that stem from the region's unique scale and population density and focus on goals which can be realistically achieved through sharing data and models, coordinating on boundary projects, and regularly discussing current issues in a collaborative model. However, except the inter-state transport authority, the MAP that addresses shared transportation challenges for the region, there is a glaring absence of an integrated authority for addressing environment, employment, growth, housing, infrastructure and quality of life concerns for the tri-state region.

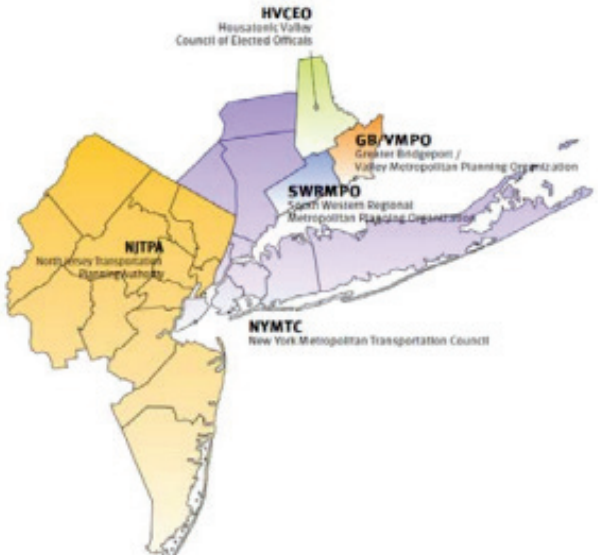



**Figure16: Metropolitan Area Planning Forum Map**
Source: Federal Highway Administration (Regional Models of Cooperation Case Study

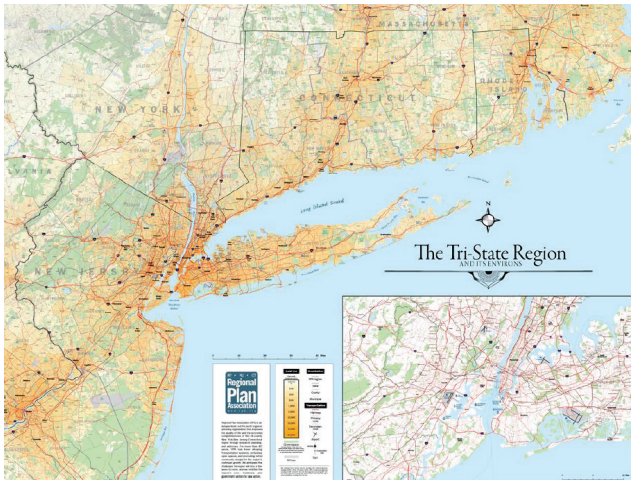



**Figure 17:The Tri-State Region**
Source: Regional Planning Association

The RPA, an association of professionals, planners, architects and other has been involved in proposing integrated plan since 1929 (First Regional Plan). For lack of any statutory planning body, most of the plans and proposals are designed such that they are easily adopted by the concerned local government departments and service district authorities. Based on rigorous surveys of ground conditions, mapping of issues and public aspirations, future projections of environment, infrastructure, economy, and social needs and support of the community, RPA has since 1929 proposed three plans for the integrated tri-state region. The fourth is in progress. This initiative was the first to recognize a New York metropolitan region — one that encompassed New Jersey and Connecticut. RPA has been enormously successful in advancing the implementation of its recommendations to the various city and regional authorities functioning in the region. This section briefly describes strategies adopted by the Third Regional Plan and follows a brief description of the unique approach for the Fourth Plan.

**Third Regional Plan (1996):** The first plan (1929) proposed a dispersal of key activities such as airport, seaport and industries to the surrounding region to ease the urban pressures of New York City. In the second regional plan, released during the 1960s, RPA identified and quantified the alarming trends caused by sprawl, including environmental degradation and decline of older urban centres. These findings led RPA to propose a polycentric structure for the region that proposed Manhattan to become a commercial, financial and cultural capital on a national scale; and for regional centres, including Jamaica, in Queens; Downtown Brooklyn; Newark, N.J..; and Stamford, to absorb most of the growth. A severe economic downturn in the early 1990s led to a loss of 770,000 jobs by 1996, eliminating virtually all the region's growth during the prosperous 1980s. Meanwhile, the trends of suburbanisation had only accelerated. From the 1960s to the 1990s, the

region's population grew by 13%, but the suburban land grew by 60%. From 1970 to 1995 the region's highway network gained 482 kms, while the transit network continued to shrink with decreased ridership in the subways. In the third plan, for achieving economy, environment and equity, RPA proposed three key strategies propagated as (1) Centers Campaign, (2) Mobility Campaign, and, (3) Governance Campaign.

**Key Strategies Adopted in the Third Regional Plan (1996)**

**Economy:** The Tri-state region, marked with diverse economies ranging from research and academia, as a centre of marketing, media, world governments, and with an unparalleled diversity of people, interests, ideas and approaches, has been recognised as the world's financial capital. Following the recession, the region experienced sluggish growth. Low-skilled workers were particularly vulnerable to this transformation, as automation, rising skill requirements and corporate downsizing have depressed wages and job opportunities. The region is now seen as an emerging global economy with new global markets and information technology, finance business and personal services. The need for new investments in infrastructure, communities, environment and the workforce for better quality of life was judged in competition with other regions in the nation and the world.

**Growth Centres:** Post-recession (in the 2000s) it was important to induce growth into the region's main CBD area of Manhattan as well as develop CBDs of Newark, Poughkeepsie, and Bridgeport to their full potential to encourage a more efficient use of resources through reduced land consumption and reduced costs for the entire regional economy. And because they are more accessible to less-advantaged communities, investing in and bringing new employment to centres brings new opportunities to the residents who need them most. The **Centers Campaign** planned to direct as much job growth as possible to CBDs (Central Business Districts) in the region's major downtowns to maintain around 50% of the region's employment. New public-private investments, creative planning and zoning, expansion of arts and cultural activities that foster the kind of desirable mixed-use communities and attract jobs and residents to centres, were sought. The goal of the Centers Campaign was to attract half of the region's expected 2 million jobs by 2020 in the Manhattan CBD and 11 regional downtowns.

**Transport:** The **Mobility Campaign** had three principal components: improved transit service, a transformed freight system, and a highway network with reduced congestion which meant reducing travel times and transfers to employment centers and airports, improved freight connections, and an efficient use of the road system with less congestion. The campaign promoted a Regional Express Rail network to support the centers of commerce and provide fuller access to major employment sites. The campaign also proposed to institute market-based transportation pricing measures that recognized the full public and private costs of transportation to add efficiency through market incentives.

**Governance:** The region is comprised of 20 million people living in 13,000 sq. miles governed by over 2,000 units of government, including counties, cities, towns, service districts, and authorities. Each of these political entities is funded almost exclusively through property tax, and the majority of them control their own budgets independently. The result is fiscal imbalance and inefficiencies, in the form of duplication of efforts, depletion and degradation of natural resources, self-serving and short-sighted decisions, cumbersome land use regulatory processes, and inadequate delivery of public services.

The **Governance Campaign** proposed to restructure existing state government and regional authorities and strategise inter-agency cooperation, to build and manage world-class infrastructure and reduce regulatory burdens and tax inefficiencies. Reforming governance was necessary for the region's economy. Governance is critical for providing greater equity in the region, in public education, land use and service delivery, as well as for protecting environment. Through reform of taxation and land use regulations, the RPA proposed to promote faster and better delivery of public services with less duplication, fewer layers of bureaucracy, and a reduction in conflicting mandates. The plan proposes strategies to reform tax systems by providing user fees for a significant share of the estimated $75 billion in new capital investments needed to implement the plan, and an equivalent amount of new investments in education and workforce.

**Housing:** Eighty percent of the 1.7 million housing units built since 1970 were constructed in the region's outer ring, as residents sought affordable housing, lower taxes, and escape from the problems of cities and inner suburbs. From 1970 to 1995, core urban counties lost more than 300,000 jobs while the outer suburban ring gained 2 million. At the same time, the region has abandoned urban areas, hollowing out cities that historically have been the focus for jobs and residences. By 1980 the majority of the region's residents did not live

in a city. Proposals for reversing this trend to develop mixed-use mixed group communities was advocated for rejuvenating the downtowns of 11 regional centres in addition to New York. The New York City Housing Authority (NYCHA) is responsible for providing low and moderate income housing for the city of New York.

**Approach to the Fourth Regional Plan (2013)**

The on-going proposed plan process begun in 2013, has undertaken a complex and far reaching participation for plan preparation and aims to address issues such as climate change, equitable distribution of resources and opportunities and most importantly a need to alleviate the debt loads of public institutions. The Fourth Regional Plan sets "a long term vision for the New York Metropolitan Area and focuses on four major challenges: expanding economic prosperity and opportunity; creating communities that are more secure and liveable; reducing our vulnerability to severe weather and climate change; and, improving our financial, institutional and regulatory structures so that smart solutions can be implemented." The approach to preparation of this plan has largely involved research and dialogues with different groups and individuals, also the use of social media to compile issues and aspiration and identify priority areas. For the preparation of this plan, RPA has worked at two levels the community or the neighbourhood level, and at the regional level, creating unique models of civic engagement and action strategies.

**OBSERVATIONS**

The role of RPA has been unique with the ability to prepare an evidence based plan for the integrated tri-state region. RPA is an example of a the advantages of a city support institute with an ability to transcends political boundaries, election-year cycles and status quo thinking to make far-reaching proposals about the policies and investments that will shape the region. As an external support institution, RPA can have a broader mandate to propose strategies that seek coordination and collaboration of the concerned agencies. However the lack of a statutory status results in delayed adoption of ideas and implementation of proposed strategies.

The ability to modulate between individual neighbourhoods and the overall region has been one of RPA's significant achievements and sets an important example for successfully identifying the issues and linking it to citizens aspirations. Citizen-engagement at all stages (mapping issues to project implementation) creates a sense of ownership for the plan. Also importantly this can develop consensus through citizen-engagement, essential for plan adoption in its entirety.

The presence of sector related authorities from special authorities at neighbourhood level, city level and regional level and state or federal level has helped in clearly demarcating needs, projects and finances, ultimately resulting in implementation of crucial projects essential for regional balance.

# Conclusions

**URBAN SPRAWL CHALLENGES**

Urbanisation in the twentieth-century is marked with expanding urban boundaries manifested through the phenomenon of the 'sprawl' resulting in an increased blurring of the 'urban' and 'rural', and resulting in varying core-periphery relationships. Sprawling cities have not just become a serious challenge for managing transportation but pose a threat to environment and efficient use of natural resources (refer *figure 18*). These large, overgrown and growing cities are distinctly characterised by their size, economy, expanse and functional linkages with the surrounding region and other larger cities outside its immediate region.

Urban sprawls are generally linked with transformations of the 'rural' into 'urban' resulting in the formation of transient urban peripheries. These peri-urban conditions have been defined as 'a place, concept or process'.[36] 'Peri-urban' thus refers to the urban fringe and the geographic edge of cities as a place, it refers to the movement of goods and services between physical spaces and to the transition from rural to urban contexts as a process and finally, as a concept, it refers to an interface between rural and urban activities, institutions and perspectives.[37] A geographical perception of the peri-urban could be limiting, necessitating a focus on underlying features and involved processes. The juxtaposition of rural and urban characteristics, an ever increasing demand of land for housing, commerce and industries, the mushrooming of cheaper housing for the middle & lower income groups and sprawling mansions for the rich, rapid transformation of rural settlements into congested 'urban villages', a persistent deficit of urban services and transportation infrastructure, dynamic demographics and social & economic diversification, result in existence of non-descript urban boundaries that characterise urbanization in the peripheries.

Also as illustrated in the *figure 18* sprawl has two primary impacts on the available resources. It not only increases the urban footprint leading to increased per capita land development, increased destination distances and higher per capita vehicle travel, but also reduces the farmlands, natural resources, increases urban heat island effects and leads to larger climate change issues.

Various concepts have emerged to describe the phenomenon of urban sprawl, its causes and impacts at different points in time in the last century. Some of these terms are crucial to understanding the functional linkages developed between the core and the periphery for urban sprawls. The phenomenon of 'Conurbation' (coined by Patrick Geddes in 1915) described is a polycentric urban agglomeration, in which transportation is developed to link areas to create a single urban labour market or travel to work area. The conceptualization of the 'megalopolis' (Jean Gottaman in 1954), describes a new scale of geography which is a result of expanding metropolitan regions leading to blurred boundaries, interlocking economic systems, shared natural resources and ecosystems and common

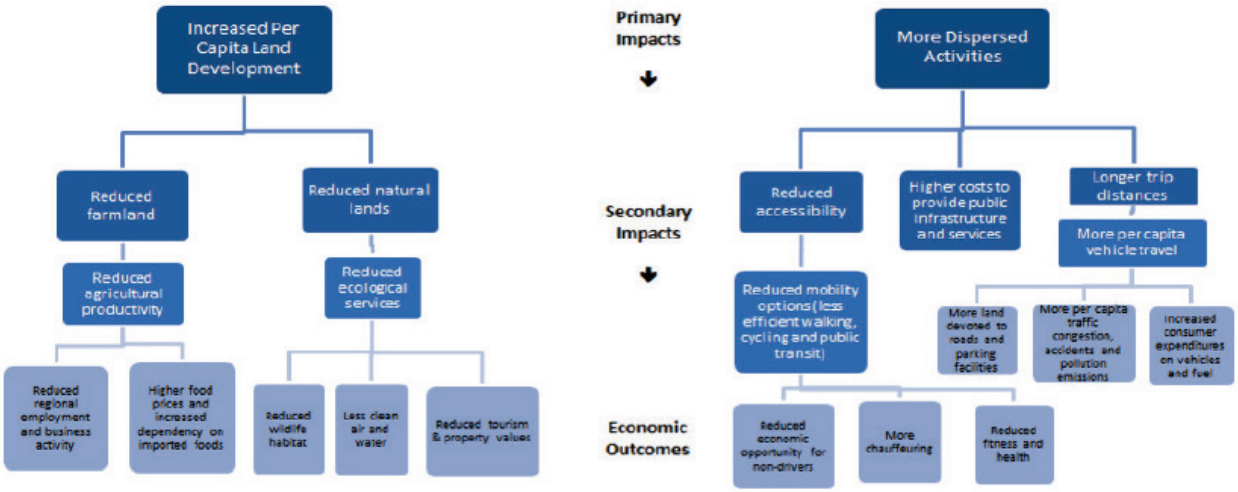



**Figure 18: Impact of sprawl on regional resources**

*Source: Littman Todd (2015)* Analysis of Public Policies that Unintentionally Encourage and Subsidize Urban Sprawl, LSE Cities

transportation systems linking these population centres together. The megalopolis concept provides cities and metropolitan regions a context within which to cooperate across jurisdictional borders. The continuous stretch from Boston to Washington (BosWash) is an example of one such defined conceptual region of megalopolis.

Moving towards a more functional concept of the sprawl is the citistate (coined by Neil Pierce and Curtis Johnson in 1993) that defines a region consisting of one or more central cities surrounded by cities and towns which have a shared identity, function as a single zone for trade, commerce and communication, and are characterized by social, economic and environmental interdependence. A citistate is organic such as a labour market, a commute-shed, a broadcast area, the circulation area of the lead newspaper, etc. and isn't defined by any political or administrative boundary.

Neil Brenner, in his concept of 'planetary urbanism', holds no distinction between rural, peri-urban and urban and terms everything as urban, such that the sprawl could be understood as a manifestation of a 'metropolitan informal urbanization', the term used to describe the dynamic rural/urban interfaces that are constituted through differentiated forms of informality, including flows of labour and types of housing.[38] The 'semi-urban' areas in the urban periphery are today characterized by high levels of economic diversity and interaction, a high percentage of non-farm employment (over about 50 per cent), and a penetration of global market forces into the local economic systems.[39] These have also resulted in marginalisation as seen in the case of the NCR as highlighted by the case of Dharuhera. 'The landless inhabitants of emerging urban centres like Dharuhera (and surrounding villages) were traditionally engaged in menial or agricultural labour. They have not greatly benefited from the urbanization process. Employment opportunities on farming land have reduced and jobs are not easily found in the industrial area, either because of lack of education or the strong reluctance of industries to employ local labour. This population group appears to be both socially and spatially trapped'.[40]

The growth of new industrial landscapes in the peri-urban partly a result of the relocation of industries from the core cities and the growth of newer types and forms of economies, impact the socio-economic profiles of the region. The growth of small, micro and household industries linked to the dynamic forward and backward linkages give rise to a constantly shifting landscape and its shifting impacts on landuse, transport and infrastructure in the region. These unforeseen developments manifest, at times, through conflicting use of land, extreme spatial fragmentation and varying infrastructural demands, resulting in a governance and planning nightmare.

**TRIGGERS FOR URBAN SPRAWL**

The urbanization pattern in NCR, as in other metropolitan regions in India, has shown a relatively higher growth in the urban peripheries through the emergence of new towns. Most of these, are a result of the transformations occurring in the region impacted by impulses known as 'centrifugal forces' with strong linkages to the core reinstating the core-periphery relationship. Industries and infrastructure are the main drivers that direct these transformations. Additionally, residential projects, catering to the housing demands of the rich and the middle income groups requiring larger residential spaces and affordable housing and the state-initiated forced relocations of the urban poor, contribute to spatial expansions in the region and are an outcome of the pull-push factors causing urban growth.

Some settlements in the NCR region also grow organically through internal forces, on the one hand due to natural increase in population and better agricultural or (traditional) industrial output, and on other are forced to urbanize and take on newer economies due to poor agricultural produce, inadequate quality of life, opportunities and so on. These varying causes have led to different patterns of urban growth in the Haryana sub-region to the west and the Uttar Pradesh sub-region to the east of the Yamuna river for the NCR. The resultant urban growth concentrated towards the south and the east of the Delhi UA is a continuous urban sprawl with a spatial cover larger than that of NCT Delhi.

In the case of GBER, the integration of 2 large municipalities and 1 part province has led to the creation of a large mega-region. While such an integration provides economic opportunities, coordination and management would be a challenge specially with the existing inter-city competition to attract private investments. Annexation of surrounding rural land by the municipality, setting up of economic activities such as industrial estates and Special Economic Zones and opening up of lands for residential sprawls.

In the case of New York, with maximum sprawl occurring till 1980's and resulting in moving out of population and economy from the core cities, led to extreme fragmentation of the region and a loss of the core. The subsequent efforts in planning and urban growth

**Box 01: Metropolitan Governance Systems in Asia**

*(i) Autonomous urban authorities,* where cities, towns and municipalities within a city-region are distinct from each other both functionally and territorially. Every local authority is in charge of its own planning, policymaking, regulations and programme/project execution.

*(ii) Mixed systems of regional governance,* where authority and power are vested in formal structures such as central government departments, regional authorities, metropolitan bodies, special-purpose authorities, cities, towns and villages. Each of these government bodies is responsible for functions such as policy setting, financing, planning and implementation of programmes and projects. Specific functions can be carried out by separate agencies operating at different levels. These functions can also be shared by a number of government bodies.

*(iii) Unified metropolitan government,* where city-regions come under a single governing body which plans, manages, finances, supports and maintains services in an area-wide territory. Any local authorities within the city-region are subordinated to the unified government. This approach has been used mainly in national capitals where the central government's authority is dominant (e.g., Seoul). Historical and cultural factors have influenced the evolution of each type of governance system. Each type also comes with specific benefits and shortcomings.

Source: Japan, UN-HABITAT (2010)*The State of Asian Cities 2010/2011 Part 06: Urban Governance, Management and Finance* [online] available at http://mirror.unhabitat.org/pmss/listItemDetails.aspx?publicationID=3078 [accessed on 17 July 2014].

management focused on reversing the suburbanisation trends and redensifying the inner city cores.

**GOVERNING THE SPRAWL**

In recent decades, most Asian governments have focused on planning and governing the rapidly urbanising cities and regions. These urban sprawls are usually governed by a plurality of bodies and suffer from administrative fragmentation among central and provincial/state departments and agencies. Lack of cooperation or coordination among urban authorities and central and provincial/state bodies poses major challenges to metropolitan planning and governance. In general, Asian governments currently resort to three types of approaches for the governance of metropolitan areas and city-regions as elaborated in *Box 01*.

In India, local governance involves a three tiered structure as per the 73th (for rural settlements) and 74th (for urban settlements) Constitutional Amendments of elected representatives supported by administrative services and technical authorities with two separate types of local bodies governing the 'urban' and the 'rural'. The peri-urban interface, where the urban and the rural juxtapose, is maximized at the peripheries of the expanding urban centres creating physical transformations that are urban in nature but are governed by rural bodies. This interface has not been recognised and most of the governance efforts have consistently focused on the 'urban' or the 'rural' (like the census distinctions, the separate infrastructure schemes or the decentralization efforts) except the setting up of the urban development authorities as SPVs by the state governments in 1970s - 80s. In addition to drafting regional level plans, these authorities can acquire land, develop housing/commerce/industry, develop infrastructure, finance projects and provide for future growth. The NCRPB acts as a planning body that drafts regional proposals for development of the NCR region with minimal engagement with the local neighbourhoods and people. These are implemented by various departments of the state governments, the state urban development authorities and the local governments.

The GBER, delineated as an economic mega region, comprises of two directly controlled municipalities, Beijing and Tianjin, and the surrounding region of the Hebei province. The various ministries of the national government are responsible for the economic and spatial planning of the region. The concerned administrative units, provinces, counties, cities and municipalities are responsible for implementation. Similar to the case of NCR, there is practically no involvement of the citizens. In the case of the Tristate Region, RPA is involved in preparing a comprehensive plan for the region with a high degree of participation by citizens, professionals and businesses.

Similar to India, planning in the US is a state subject and the role of the state legislation is significant in non-spatial regulatory intervention primarily through zoning and regulations for limiting development. State level planning authorizes the local governments to prepare land use plans. However, the various Federal Government interventions, through policies and federal funded schemes have contributed largely to the planning strategies and frameworks adopted at the city and regional level.

In the case of China, the integration of economic and spatial planning has led to the possibility of higher control over landuse, economy and industry. Besides, a complete central government control has made plan implementation efficient.

**Plan as a Governance Tool:** Planning is adopted as a key strategy to govern the urban sprawls. With the traditional top-down approach, city planning poses a challenge in the rapidly transforming regions, and for the urban and regional planning exercises. Globally, in addition to (physical) landuse planning, a need has been articulated for integration of strategic plans, economic visions, environmental plans and transportation plans, through evidence based planning approaches for proposing a feasible plan. This approach towards planning integrates the social, economic and physical for the city and the metropolitan region and has the potential to connect the neighbourhood, region, nation and globe.

The NCRPB proposes regional land use plans supported by functional plans (sector plans) and detailed sub-regional plans. However, the time taken for preparation of plans and their integration renders them obsolete. While in the case of the Tristate Region of NY, RPA is involved in preparing a collaborative plan for the region with a high degree of participation by citizens, professionals, and businesses. The presence of integrated sectoral authorities (like NYTMC), provides an opportunity to identify regional issues and provides coherent solutions across jurisdictions. In the case of China, the integration of economic and spatial planning has led to the possibility of higher control over landuse, economy and industry. Besides, a complete central government control has made plan implementation efficient.

While sprawl has been identified as a problem globally, theoretically, a multinodal regional approach could hold the potential to provide solutions for a contained sustainable city and region model. The mandate of the NCRPB when it was set up adopted the multinodal growth model and identified counter growth magnets outside its planning jurisdiction. However, the focus of NCR was less on achieving regional balance and management, but more towards decongestion of Delhi and dispersal of urbanisation into the region. As a result, even though both the regional plans employed multinodal growth approach, the urban expansions in the region have been lop-sided resulting in sprawl towards the south of the main city. Various issues such as the time taken to assimilate the Regional, Sub-Regional and Functional Plans; the lack of unified coordinating agencies for the individual sectors; uncontrolled sprawl, varying agendas set by multiple agencies such as the investment regions proposed by DMIC, and, an unregulated real estate market have also contributed in the inevitable sprawl.

The inability to enforce planning strategies is seen as a predominant challenge faced by the NCR. The Regional Plan states the lack of an integrated mass transit system as the cause for failure of the Regional Centres to achieve the targeted growth. However, lack of an adequate institutional setup (for implementation) like the absence of an integrated transport authority until recently, for all the four states similar to that of the MAP in the Tristate region. The multi-state region thus requires different strategies for implementation and can

**Box 02: Portland Case of Urban Growth Boundary**

The Growth Concept states the preferred form of regional growth and development and includes the Growth Concept map. The preferred form is to contain growth within a carefully managed Urban Growth Boundary (UGB). Growth occurs inside the UGB in the form of infill and redevelopment with higher density developed in areas where it is appropriate. Expansions of the UGB are done carefully to allow for the need for additional land. This concept is adopted for the long-term growth management of the region including a general approach to approximately where and how much the UGB should be ultimately expanded, what ranges of density are estimated to accommodate projected growth within the boundary, and which areas should be protected as open space.

Mixed-use urban centers inside the UGB are one key to the Growth Concept. Creating higher density centers of employment and housing and transit service with compact development, retail, cultural and recreational activities in a walkable environment is intended to provide efficient access to goods and services, enhance multi-modal transportation and create vital, attractive neighborhoods and communities. The Growth Concept uses interrelated types of centers:

- The central city is the largest market area, the region's employment and cultural hub and accessible to millions of people.
- Regional centers serve large market areas outside the central city, connected to it by high-capacity transit and highways and are accessible by hundreds of thousands of people.
- Connected to each regional center, by road and transit, are smaller town centers with local shopping and employment opportunities within a local market area and accessible to tens of thousands of people.

Source: Livable Portland, Trimet, November 2010, Climate Action Plan, City of Portland and Multnomah County, Published in 2010

take clues from the American multi-state regions.

The multi nodal regional planning strategy for the NCR uses the concept of Regional Centres to induce growth in the region. However the existing situation and the projections are incoherent resulting in some settlements with inflated populations (like Dharuhera) while some like Khurja show a steady population. Thus, such induced growth strategies seem to be appropriate only in the case of greenfield cities. This puts forth the need to examine the robustness of this approach for regional planning. As seen in the case of China, induced growth strategy is supported with economic growth strategies instrumented by the Central government which is lacking in the NCR.

Lack of any strategy to contain a city has resulted in sprawls across the three cases. The case of Portland with an Urban Growth Boundary needs to be propagated strongly.

An interesting variant of this approach is the Growth Concept adopted by the metropolitan region of Portland, Oregon, which advocates a newer approach based on efficient management of the Urban Growth Boundary (UGB). The key strategy adopted has been elaborated in *Box 02*. Experiments such as the Portland one will need to be studied closely to provide a basis for evolving future strategies for managing polycentric growth within the NCR.

## Annexure: Population Growth for Metro Cities and Regional Centres in the NCR

| Name of Town | Population (Person) in Million | | | | Average Decadal Growth (%) | | | Projected Population in 2021 (Millions) | Assigned Population in Regional Plan 2001 (Persons in Millions) | Actual Population in 2001 as % of Assigned Population | Presently acting as (in terms of activity) | Residential real estate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1991 | 2001 | 2011 | 1981-1991 | 1991-2001 | 2001-2011 | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| **NCR** | 19.018 | 26.446 | 37.100 | 46.05 | 39.05 | 40.29 | 23.85 | 48.619 | 32.5 | 114.15 | - | |
| **NCT-Delhi** | 6.220 | 9.420 | 13.850 | 16.75 | 51.45 | 47.02 | 20.93 | 19.3 | 11.2 | 123.67 | Capital city, Educational Hub, Manufacturing, Business, Commerce | |
| **NCR excluding NCT-Delhi** | 12.798 | 17.025 | 23.249 | 44.375 | 33.03 | 36.56 | 90.86 | - | 21.3 | 109.15 | - | |
| **1. Bahadurgarh** | 0.037 | 0.057 | 0.131 | 0.181 | 52.68 | 130.50 | 38.16 | 6.596 | 0.2 | 65.96 | Educational hub | |
| **CNCR (DMA) Towns** | | | | | | | | | | | | |
| **2. Faridabad** | 0.330 | 0.617 | 1.055 | 1.405 | 86.70 | 70.94 | 33.08 | 10.559 | 1.0 | 105.59 | Central Govt. Offices, Manufacturing, Chemicals, Electrical engineering equipments, Textiles | Existing |
| **3. Gurgaon** | 0.100 | 0.135 | 0.228 | 0.902 | 34.70 | 68.39 | 295.61 | 3.269 | 0.7 | 32.69 | IT, Manufacturing, Food, Services, Automobiles, Electronics and Electricals, Leather and Fur products | Existing |
| **4. Ghaziabad incl. Loni** | 0.297 | 0.548 | 1.089 | 2.148 | 84.35 | 98.64 | 97.24 | 9.902 | 1.1 | 99.02 | Major Industrial Hub, Chemicals, engineering equipments, Pilkhuwa textile printing, Plastic packaging | Existing |
| **5. NOIDA** | 0.037 | 0.146 | 0.305 | 0.642 | 295.98 | 108.21 | 143.27 | 5.547 | 0.55 | 55.47 | Media, Manufacturing, Automobile, IT, Auto and engineering item, Garmets, packaging material, Plastic products | Existing |
| **6. Kundli** | - | - | - | | - | - | | - | 0.15 | - | Proposed IT and Educational Hub | Upcoming |
| **TOTAL** | 0.803 | 1.505 | 2.810 | 5.097 | 87.35 | 86.69 | 81.38 | 7.597 | 3.7 | 75.97 | | |
| **Regional Centres/Priority Towns** | | | | | | | | | | | | |
| **1. Panipat** | 0.137 | 0.191 | 0.354 | 0.442 | 38.63 | 85.21 | 24.85 | 7.083 | 0.5 | 70.83 | Cotton Industry and Handloom, Home furnishing cluster | |
| **2. Rohtak** | 0.166 | 0.216 | 0.294 | 0.373 | 29.58 | 36.32 | 26.87 | 5.892 | 0.5 | 58.92 | Cotton Industry and Agri | |
| **3. Palwal** | 0.047 | 0.059 | 0.100 | 0.131 | 25.02 | 70.23 | 31.00 | 3.357 | 0.3 | 33.57 | Cotton Industry and Agri | |
| **4. Rewari** | 0.051 | 0.075 | 0.100 | 0.138 | 46.12 | 33.64 | 38.00 | 9.153 | 0.11 | 91.53 | Traditional Metal industry | |
| **5. Dharuhera** | 0.005 | 0.010 | 0.018 | | 106.00 | 74.15 | | 2.519 | 0.075 | 25.19 | Manufacturing and Food Industry | Upcoming |
| **6. Meerut** | 0.536 | 0.849 | 1.161 | 1.45 | 58.36 | 36.70 | 24.89 | 7.495 | 1.55 | 74.95 | Major Industrial Hub, Auto components, gas cylinders, power loom, Rubber products, Transformers and voltage regulators | |
| **7. Hapur** | 0.102 | 0.146 | 0.211 | | 42.23 | 44.93 | | 4.711 | 0.45 | 47.11 | Paper and Handloom | |
| **8. Bulandshahr** | 0.103 | 0.127 | 0.176 | 0.378 | 22.98 | 38.70 | 114.77 | 3.529 | 0.5 | 35.29 | Pottery cluster, Khurja chemicals | |
| **9. Khurja** | 0.067 | 0.080 | 0.098 | - | 19.65 | 22.79 | | 3.287 | 0.3 | 32.87 | Traditional Ceramic Industry | |
| **10. Alwar** | 0.145 | 0.210 | 0.266 | 0.341 | 44.14 | 26.68 | 28.19 | 5.324 | 0.5 | 53.24 | Auto components, Silk, Jute, Hemp products, Wood work | |
| **11. Bhiwadi** | 0.001 | 0.015 | 0.033 | | 784.04 | 121.64 | | 2.946 | 0.115 | 29.46 | Industry (DMIC) | |
| **TOTAL** | 1.366 | 1.981 | 2.817 | - | 45.03 | 42.20 | | 5.751 | 4.9 | 57.51 | - | |

Source: RP 2021, NCRPB

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