# NATIONAL CAPITAL REGION
## Growth and Development

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*National Capital Region Planning Board*

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# Keys to Abbreviations

| | |
|---|---|
| NCR | National Capital Region |
| NCRPB | National Capital Region Planning Board |
| DUT | Delhi Union Territory |
| DUA | Delhi Urban Area |
| DMA | Delhi Metropolitan Area |
| UP | Uttar Pradesh |
| CCA | City Compensatory Allowance |
| HRA | House Rent Allowance |
| UD | Urban Development |
| NH | National Highways |
| GAL | Goods Avoiding Line |
| DAL | Delhi Avoiding Line |
| MRTS | Mass Rapid Transit System |
| NOIDA | New Okhla Industrial Development Area |
| MW | Mega Watts |
| MU | Million Units |
| DESU | Delhi Electricity Supply Undertaking |
| HSEB | Haryana State Electricity Board |
| NTPC | National Thermal Power Corporation |
| I.P. Station | Indra Prastha (Power) Station |
| BBMB | Bhakra Beas Management Board |
| lpcd | liters per capita a day |
| mgd | million gallons a day |
| LIG | Low Income Group |
| MIG | Middle Income Group |
| HIG | High Income Group |
| HUDCO | Housing and Urban Development Corporation |
| HDFC | Housing Development Finance Corporation |
| ESI | Environmental Sensitivity Index |
| ESP | Electro Static Precipitators |
| HUDA | Haryana Urban Development Authority |
| LIC | Life Insurance Corporation of India |
| BOD | Bio-Chemical Oxygen Demand |
| EWS | Economically Weaker Section |

# Foreword

Delhi, the National Capital Territory (NCT), has been emerging as a gigantic magnet, attracting people not only from the proximate states of Haryana, Rajasthan and U.P. but also from the far-flung regions of the country. Besides being the centre of nations' political activities, Delhi has been attracting people, by offering diverse scope for employment and opportunities.

The need for addressing the problems of Delhi by adopting regional approach had drawn the attention of the planners in 1959 itself, when in the context of influx of huge refugee population and increasing commercial and industrial activities, it was felt that Delhi should be developed on the basis of a Master Plan. The Master Plan of 1962 had recommended a statutory body for the NCR and finally the National Capital Region Planning Board (NCRPB) was set up as a statutory body in 1985 and the first statutory Regional Plan—2001 was given a formal shape. The Regional Plan—2001, first printed in 1988, was a bilingual publication, based basically on 7th plan data analysis. This is being reprinted as part of the endeavour of the NCRPB, to focus on the problems of the National Capital and the regional approach adopted to cope with these. For understandable reasons, the present publication has depended on 7th Plan data analysis. The subsequent development are being given separately.

Population growth in Delhi over the last four decades has been phenomenal. In 1911, Urban Delhi had a population of only 2.5 lacs. Following partition of India,

influx of refugees had pushed up the population figure to 14.5 lacs in 1951. Since than, Delhi has been witnessing boom in economic growth, rapid industrialisation, giant stocking and distribution centres for almost all kinds of consumable goods. Job opportunities also attracted people from the proximate as well as from other states. In 1991 population of Delhi reached the staggering figure of 94.2 lacs. It is estimated that by the end of 1996 population of NCT of Delhi is likely to cross 1.20 crore mark.

Such huge population is also not well dispersed over the entire NCT, which comprise of 1483 sq.km. In an area of about 30 sq. km. around the Raisina Hill, most of the human habitats and activities are concentrated. However, during last one decades settlement of new colonies, business centres and other commercial activities have started expanding to the rural areas of the NCT and adjoining areas of the NCR, particularly in the new urban pockets of Gurgaon, Faridabad, Ghaziabad etc. With the present trend of growth, it is estimated that the population of Delhi is likely to touch 142 lacs by the year 2001. This mind boggling figure places Delhi almost at par with other megapolises including Tokyo, Seoul, New York, Mexico city, London and in our own backyard, Calcutta and Bombay.

Population explosion in and around Delhi has not mainly been due to natural growth, in fact natural growth has shown downward tendency. In addition to the influx of huge refugee population immediately after partition, during 1961 to 71, 5.3 lacs people had migrated to Delhi; but in the next decade 1971-81 this figure went up to 12.3 lacs; while decadal migration figure between 1981-91 is estimated at 20 lacs.

These figures do not always give a correct picture. More than 3 lacs people commute to Delhi everyday from the NCR, adding to the day time floating population and other connected problems. Besides this, it is suspected that



there are atleast 5 lacs of unaccounted for and hidden population in Delhi, consisting of migrants from Bangladesh and migratory labour population. They live on the fringe areas of the established habitats and seek out their living in various undefined service sectors. The migrants generally take shelter in slums. In 1990 number of squatters was about 2,40,000 of Delhi's housing stock, over 2/3rd are attributed to squatters/unauthorised settlements/slums. No reliable survey is available for homeless destitutes and footpath dewellers.

The neighbouring states of Utter Pradesh, Haryana and Rajasthan account for over 70 per cent of the migration to Delhi, Uttar Pradesh heading the list. This large scale migration is basically in search of employment opportunities and consequent family movement. The large scale movement to Delhi in recent times can be attributed to the substantial growth of industries, specially small and medium scale and expansion of trade and commerce, buffeted by growth imbalance in the National Capital Region, mostly due to absence of co-ordinated growth concept. The distributive character of trade in Delhi has also resulted in increased movement of trucks in and out of the city. Location of an Inland Container Depot is an added attraction. To these factors have been added the facilities available in the NCT, like lower tax structure, subsidised infrastructure and higher per capita investment.

Growth of Delhi has spilled over the boundaries of the Union Territory and now inculde the surrounding areas of U.P. and Haryana. This area of special extension constitute the Delhi Metropolitan Area (DMA). The DMA, excluding Delhi, has exhibited phenomenal growth characteristics. Infact, while Delhi had grown by 53 per cent during 1971-81, Faridabad-Bahadurgarh, Ghaziabad-Gurgaon have grown at the astronomical rate of 169.40 per cent, 141.65 per cent and 76.50 per cent respectively.

This huge sea of humanity has thrown up several social, civic, economic and environmental problems and have put all the basic services under considerable strain.

Delhi's water supply requirement is estimated at 2950 million litres per day (mld), against which only 2120 mld. is now available and this quantum is further reduced during peak summer season and often aggravated by erratic flow of water supply from Haryana and U.P. By 2001 requirement of water is expected to be more than 4000 mld. Given the present configuration of availability of surface and ground water resources in and around Delhi, it may become an impossible task to fulfil the target requirements; unless new sources are explored and added to the supply system of the DMA. Rapid and un-scientific tapping of sub-soil water is another factor which require appropriate studies to ensure that sub-soil water level does not go down below danger level, which may lead to disasterous ecological and enviromental consequences enhancing the chances of the Western desert marching towards the NCR.

Sewage and solid waste disposal are two vulnerable sections plaguing the DMA. It has been projected that by 2001 sewage disposal requirement of Delhi will go upto 3170 mld. The present required capacity is more than 1700 mld, against which the civic authorities can take care only of 1270 mld. However, this does not include the sewage problems of the newly established habitats and the huge colonies mushrooming in the DMA, including Delhi.

Related to the sewage disposal is the problem of disposal of solid wastes. Delhi generates about 5000 tonnes of solid wastes everyday and the civic authorities can manage to lift and dispose of about 2700 tonnes. By 2001 Delhi is likely to generate 7000 tonnes solid waste per day. Besides the reqirement for immediate improvement in the capability of the civic authorities in lifting and disposing of solid wastes, immediate steps are required to



be taken for introducing latest scientific methodologies for disposal of hazardous and noxious solid wastes. Some of these wastes are recycled by unscrupulous elements, causing serious health hazard. Scientific exploitation of solid wastes have the potential of generating power.

There is no doubt that the demand for power has increased manifold. In 1981 the demand was 542 mw and by 1991 it went upto 1435 mw. It is expected to increase to 4000 mw by 2001. Shortage of power has led to cronic crises in the medium and small scale industries, affecting productivity, economic utilisation of man-hour and upgradation of technology. This has also led to energy theft and energy waste, particularly in the unauthorised colonies and the slum clusters. Loss of revenue has been colosal.

Environmental pollution, according to recent studies has exceeded more than two and half times the permissible limits. The main sources of pollution are motor vehicle, industries, power houses, effluent discharge for hazardous and noxious industries.

The pattern of population and activity growth over the last four decades has led to serious environment decay. Both air and water in Delhi are highly polluted and causative factors are traced to urban uses, such as industry, transportation, commerce, housing etc. For example, the BOD load discharged into the Yamuna amount to 132 MT per day. As a result water quality degrades from B at Wazirabad to E at Okhla, unsuitable even for use by animals.

The pattern of distribution of ambient air pollution caused by noxious gases like carbon monoxide, sulpher dioxide, oxides of nitrogen indicate that pollution level has far exceeded the maximum permissible limits as per the Air Act.

The number of registered motor vehicles is now more than 25 lacs, far exceeding the combined vehicle population

of Bombay, Madras and Calcutta. With the expansion of auto-industry and introduction of more attractive models in the market, by 2001 vehicle population in Delhi is likely to exceed 40 lacs, which if uncheked may grow to 60 lacs by 2011 AD. Pollution discharges from motor vehicles alone in Delhi is more than 1300 metric tons per day. Delhi is likely to reach a saturation point by 2001 unless progressive measures are adopted on priority basis.

Over and above, the other burning problems, immediate attention to bring about include changes in the transport system in and around Delhi. The National Capital is the only megapolis in the world which is more than 95 per cent dependent on motorised vehicles. The existence of an elaborate rationalise on the basis of mass transport system non-pollutant mode of transport is an urgent necessity.

The World Health Organisation has classified Delhi among the ten most polluted cities. It is estimated that 2500 MT of pollutants are emitted everyday in the atmosphere of Delhi. Vehicular sources contribute 64 per cent, thermal power plants 16 per cent, industries 13 per cent and domestic sources 7 per cent to the total pollution.

Among the metropolises in India, Delhi suffers maximum *noise pollution*, and studies show that noise level has gone up over the years. At the present growth trend of vehicular ownership, air pollution levels are expected to go up to unexpected levels, making Delhi one of the unhealthiest metropolises. These diagnosis call for immediate and pragmatic implementation of the multi-modal MRTS, HSTS and other innovative Rail-cum-Road transport diversification plans within the NCT and the interlinked NCR. This single composit task is of utmost importance and priority.

Looking at the emerging scenario, Delhi may not remain manageable in the near future unless corrective measures are taken immediately.

The overall plan for the National Capital Region, linked



with the survival of Delhi, is required to be based on a holistic human approach. Movement of population from Delhi to the NCR, decentralisation of industry, renovation of transport system, structuring of the habitat clusters are to be carried out without causing human misery. The aim of the National Capital Region Planning Board is not to shift population from one place to another, nor yet to arbitrarily shift economic activities in an arbitracy manner. The changes will be carried out with democratic popular participation, within the ambits of synchronised policy structures and keeping in view the natural growth in the National Capital Region and drawing upon the experiences in other parts of the world, particularly in highly developed urban centres with similar human problems.

It is said that as a nation we are excellent in planning but very weak in implementation. The idea of bringing out the Regional Plan in its present from is not just to highlight the grim fate that await the National Capital; nor even to emphasise the massive efforts needed in this direction: our aim is to present to the public a plan of action which gives us some hope for the future. What is needed is the building up of a strong public opinion of force planners and administrators to carry out harmonised and coordinated policies which will produce a more liveable and environmentally healthier National Capital living at peace and in harmony with a region which sustain it, while benefiting from its proximity.

**OMESH SAIGAL**
*Member Secretary*
*National Capital Region*
*Planning Board*

# Contents

# The Scenario

Delhi, the National Capital has been facing unprecedented growth which has been a cause of serious concern to the Central Government. It has been recognised that the planned growth of Delhi is possible only in a regional context. In fact, the need for regional approach was felt as early as 1959 when the draft Master Plan for Delhi was prepared. Thereafter, the Master Plan of 1962 recommended that a statutory National Capital Region Planning Board should be set up for ensuring balanced and harmonised development of the Region. The setting up of the statutory Board in 1985 and coming into operation of the first statutory Regional Plan—2001, would be important achievements in the balanced development of the National Capital Region.

Delhi is besieged by a number of serious problems today. The gap in availability of essential services like water supply, power, transport, and management of solid waste is continuously increasing. The problem is being further aggravated due to increasing migration. In our democratic system, migrants do not feel bound by physical boundaries of the State while our adminstrative, development planning and resource allocation systems operate within the limits of territorial boundaries. The operation of this system, therefore, on the one hand has manifested in increasing congestion in Delhi and, on the other, acted as an obstacle in the integrated and balanced development of the Region without any regard to the

physical boundaries. The enactment of the National Captial Region Planning Board Act, 1985 with the consent of the participating States and the adoption of the Regional Plan by them is the culmination of this realisation. Consequently, the Plan has suggested policies and measures which would help in achieving the objective of the planned development of Delhi in its regional context.

The genesis of Delhi's growth lies in its rapid urbanisation and its ability to offer wide opportunities for large scale employment through specialisation and increased productivity in manufacturing and supporting services. Till 1951, Delhi was essentially an administrative centre with a population of 14.5 lacs but, the expansion of industry, trade and commerce providing opportunities for economic development, in turn, began to transform its character from an administrative city to a multifunctional city and, exhibited a significant functional shift to industrial character in 1981 when its population size became 57.3 lacs, recording a growth of about 300 per cent since 1951.

This phenomenal growth of population is due to increasing migration with about 1.50 lacs migrants annually coming to Delhi in search of employment during 1971-81. Today, Delhi acts as a powerful job magnet at the national level. This has drawn job aspirants from far and wide but, more particularly from the neighbouring States. As Delhi grows, its problems of land, housing, transporation and management of essential infrastructure like water supply and sewerage become more acute. The city lacks reliable and adequate sources of water, and thus has to depend upon the adjoining States to meet its water supply requirements. Delhi is a Union Territory occupying barely 1483 sq km of land. The physical expansion of Delhi, due to spread of urbanisation in the last decade claimed about 40 per cent of the total territorial area in 1981, compared to about 30 per cent in 1971 and it is growing at a rapid pace.



The Master Plan for Delhi had initially assigned urban Delhi's population as 46 lacs in 1981 against the trend based projections of 53 lacs through a policy of diverting 7 lacs to the 'Ring' towns. Subsequently, this figure was revised to 53 lacs. The 1981 Census, however, revealed a population of 57.3 lacs. In other words, Delhi's growth has taken place at a much faster rate than anticipated. Worse still, the population of Ring towns grew 567 per cent during this period. In 1981, the city had 11.3 lacs more population than what was envisaged at the start of the Plan and, 4.3 lacs more than the revised capacity of 53 lacs in 1976.

Whether economic and demographic concentration in Delhi has already reached a point at which the social cost of agglomeration exceeds the benefits, cannot be proved conclusively, but, it is clear that if this threshold has not yet been reached it is likely to be reached in near future. It is also clear that alternatives to further growth of Delhi should be identified on a basis which is consistent with the objectives of national economic growth and social development.

The solution may lie in making investments in selected settlements outside the metropolis at appropriate distances and also, in impulse sectors to relieve the National Capital of its suffering from the pressures within a reasonable future. Inspite of the awareness of the pressures being exerted on the Capital, for over two decades, we have failed to remodel the pattern of development from a mono-nodal towards a poly-nodal pattern. Today, the Government has an obligation to create a pattern of development on as big a scale as possible, and as soon as possible. Policies must define dynamic action and, be dynamic in content. We need, therefore, development policies, progremmes and plans aiming to:

- relieve the Captial city from additional pressures;
- avoid adding new pressures on the Capital; and,

– remodel the pattern of settlements in the National Capital Region to enable them to play their assigned role.

The Regional Plan-2001 incorporates inter-related policy framework for the achievement of these objectives.

Provision of transport and communications infrastructure is crucial to increasing the growth potential of every part of the Region. By improving comparative advantages of the Sub-regions, direct spatial policies can contribute substantially to the process of deflection of migrants-flow away from the Capital city. Great attention must, therefore, be paid to the development of priority towns located in the transport corridors, to channelise the growth in the National Capital Region.

The Regional Plan was preceded by the Draft Plan as provided in Section 10 of the NCR Planning Board Act, 1985. The Draft Regional Plan was prepared on the basis of expert studies and, with the help of extensive deliberations with the concerned Central agencies and the State Governments. It was approved by the Board in its meeting held on July 21, 1987. As per the provisions of the NCR Planning Board Act, the Draft Regional Plan was then published for inviting objections and suggestions from the public, Central and State Governments, local bodies and individuals on August 14, 1987. In all 37 objections and suggestions on various aspects of the Plan were received. After thorough scrutiny and consideration of the objections and suggestions, the Planning Committee, in two meetings held on November 19, 1987 and December 16, 1987, offered its comments and observations for the consideration of the Board. The Regional Plan 2001 has been approved by the Board on November 3, 1988 after consideration of these objections and suggestions received as a reaction the Draft Plan.

The National Capital Region Planning Board Act envisages formulation of cascading Plans for the purpose of enforcement of the statutory regional plans for the



NCR. These plans include Functional Plan to elaborate one or more elements by the Board and sub-regional plans for the respective sub-regions by the participating States within the framework of the Regional Plan. The Board would also cause preparation of project plans by the participating States, and also the Central Ministries within the framework of long term investment plan, broken up into five years, coinciding with the national Five Year Plan periods and annual investment plans. The projects would include comprehensive programmes aimed at induced growth, provision of infrastructure, both social and physical, employment generating activities etc. in the development of priority areas. The functional plans, sub-regional plans and project plans together shall culminate in a set of precise and time bound programmes to ensure a balanced and harmonious development of the National Capital Region.

The financing of the NCR Development Plan has attracted considerable attention in the Parliament, press and several non-official fora. Serious concern has been expressed at the availability of meagre resources during the Seventh Five Year Plan. The concern gets aggravated due to the fact that time shall be of great essence if any dent has to be made on the problems being created in Delhi and, investments made now, may start yielding results only after a few years. At the same time, allocation of major chunk of resources during the pendency of a plan, particularly in a situation of all round shortage of resources, was a very difficult proposition. It is, however, quite clear that unless the Central Government takes the lead in the provision of finances, as it has done in the setting up of the Board and making it functional, there is little hope for the implementation of the Plan. The Central Government also should assume responsibility of providing adequate power to the priority towns of the NCR, as in the case of Delhi, so that they could become alternative sources of substantial employment generating activities.

# 1

# National Capital Region

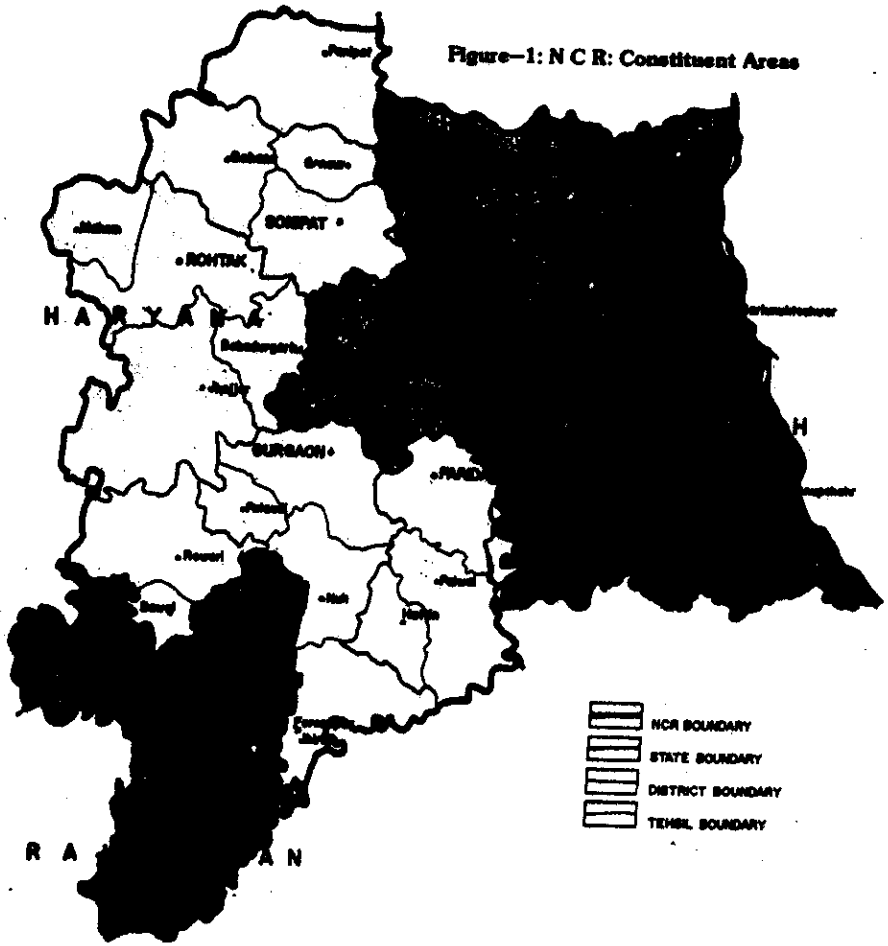
## Physical setting

The National Capital Region covers an area of 30,242 sq km. The Region includes the Union Territory of Delhi and, parts of the States of Haryana, Rajasthan and Uttar Pradesh. The physiography of the region is characterised by the presence of the Ganga skirting its eastern boundary, the Yamuna traversing it north-south forming the boundary between Uttar Pradesh and Haryana, and the sand dunes and barren low hills of the Aravalli chain and its outcrops in the west, flat topped prominent and precipitous hills of the Aravalli range enclosing fertile valleys and high table lands in the south-west, and the rolling plains dominated by rain-fed torrents in the south. The rest of the Region is plain with a general slope of north-east to south and south-west.

## Constituents of the NCR

The administrative units and their areal extents are (Fig. 1):

a) Union Territory of Delhi (1,483 sq km).
b) Haryana Sub-region comprising Faridabad, Gurgaon, Rohtak and Sonepat districrts; Rewari and Bawal tehsils of Mahendragarh district, and Panipat tehsil of Karnal district. This account for 30.33 per cent (13,413 sq km) of the area of the State.
c) Rajasthan Sub-region comprising six tehsils of Alwar




Figure—1: N C R: Constituent Areas



district, namely, Alwar, Ramgarh, Behror, Mandawar, Kishangarh and Tijara. The area is 1.31 per cent (4.493 sq km) of the total area of the State.

d) Uttar Pradesh Sub-region comprises three districts namely, Meerut, Ghaziabad and Bulandshahar. About 3.68 per cent (10,853sq km) of the area of Uttar Pradesh is under the Region.

## Morphology

Morphologically, the National Capital Region can be divided into the following: (a) The Ganga—Yamuna Doab, and (b) Area west of Yamuna—the alluvial plains and extension of the Aravallis and the sandy region.

a) **The Ganga-Yamuna Doab:** The seemingly featureless plain lacks topographic prominences and the monotony of the physical landscape is broken at places by the river channels. The Region is covered by new alluvium (Khader) and, older alluvium (Bhangar). 'Bhanger' is found all over the 'Doab' while there are finger like extensions of 'Khader' along the main streams. Due to the presence of fertile soil, level land and canal irrigation, the area is intensively cultivated and, supports a high density population.

b) **Area west of Yamuna:** The slope of the alluvial plains from the Siwaliks is towards the south and south west upto the Najafgarh drain, and then towards the north. North of Delhi, the old high bank of the Yamuna forms the summit level of the plain. In the extreme south of these plains are the outliers of the Aravallis which are intensely folded and eroded. One arm of the Aravallis forms a continuous range terminating in Delhi and, in between, there are only low hills to the west of Bawal and Rewari towns. The Aravallis are quartzite rocks, with numerous ravines on the western slope, densely forested in some areas and bare in the other. North of the Aravalli extensions, the whole tract is traversed by a number of

sand ridges which mostly run north-south and form higher prominences in the physical landscape.

## Hydrology

The Region in general is a part of the well integrated drainage system of the Ganga. Almost, all streams generally follow north, south and east course concomitant with the slope of the land. The extremely gentle gradient almost all over the Region restricts the degradational activities of the streams. Wide floodplains and high banks alongwith silt and clay deposits are common features in the course of the Ganga and the Yumuna. The canal system primarily to irrigate the doab tract, has been aligned between the four rivers of the area.

The main river of the alluvial plain is the Yamuna. The only major river in the extension of Aravallis and the sandy region is the Sahibi, which flows in a south-west north-east direction. It is ephemeral and ends up in the sandy region of Haryana, but sometimes during heavy monsoons, it drains into the Najafgarh depression and joins the Yamuna. The outliers of the Aravallis also have numerous seasonal streams which erode the bare rocks giving rise to ravines, more on the western side. In the depressions of the rocky area, water stagnates resulting in the formation of lakes.

## Resources

**i) Population:** As of 1981, the Region accommodated a total population of 191.92 lacs in 94 urban settlements and 6,677 villages. Of the total pupulation, as much as 36 per cent was in the Uttar Pradesh Sub-region followed by 32 per cent in the Delhi UT, 26 per cent in the Haryana Sub-region and 6 per cent in the Rejasthan Sub-region.

The urban component of the population was 91 lacs accounting for 47.4 per cent of the total population and, the rest nearly 101 lacs lived in rural areas. The density of



population in the Region was as in 1981, 634 persons per sq km against the all India average of 221. Of the constituents, Delhi UT has the highest concentration of 4,192 persons per sq km. In regard to male-female ratio, Delhi UT is the least balanced with 808 females for 1000 males against the Region's average of 840 and India's 943. The work force participation ratio in the Region was 28.69 per cent with a maximum of 31.93 in Delhi UT in 1981.

**ii) Water:** The Region is endowed with adequate water resources. The main sources of surface water supply in the Region are the rivers, canals and lakes. The rivers Yamuna and Ganga meet bulk of the water requirements. The other important rivers are the Hindon, the Kali and the Sahibi. Various canals which irrigate lands are: the Eastern and Western Yamuna canals, the Upper Ganga canal, the Agra canal and the Jawahar Lal Nehru canal. The prominent lakes in the Region are the Siliserh, Kaduki, Badkal and Surajkund.

Ground water resource is mainly controlled by geology and precipitation in the area. Eightyfive per cent of the annual precipitation occurs during monsoon months. The rainfall ranges between less then 50 cm is south west to more than 75 cm in the north and north east, and about 180 cm around Delhi UT.

Geologically, the quarternary alluvium is the most favourable lithology for the aquifer systems. The southern portion of the NCR has *Precambrian* Dehli-group of rocks and the other *alluvium* increases in general from east to west. The general water table ranges between 6 to 15 metres below the ground level. Most of the borewell water comes from aquifers. However, there are two to five confined aquifer systems with great water potential. These systems go up to a depth of 230 metres and, most of the tubewells are dug into these systems. The recharge of these systems is mainly through rivers and precipitation. The ground water quality varies from the place to place depending on the local geological setting.

**iii) Soil:** The Region basically has alluvial soils ranging between hard clay-clayey, loam-sandy loam and sandy soils. Based on the morphological setting such as nearness to the riverine track, fertility etc, there are certain local names given to these soils, viz. khadar, dadar, bhur, reh, etc. There are alkaline and saline soils which occur as patches particularly near the canals.

In Alwar district of the Rajasthan Sub-region, there are three different types of soils. The Uttar Pradesh Sub-region has rich loamy soils which are very fertile. The soils very close to the rivers Yamuna and Ganga are sandy in nature. In the Haryana Sub-region, there are alluvial soils which range between totally sandy to loamy and, clayey soils. Hard clays and sandy soils are not very fertile. In Delhi UT, the soils are described as (a) 'Khader' (low lying strip along the Yamuna—a fertile silty loam) (b) 'Bangar' (old alluvium) in north western portion of Delhi-fertile soils wtih high moisture holding capacity (c) 'Dadar' tract (of low lying areas) mainly saline and alkaline with low fertility (west of Yamuna), and (d) 'Kohi' tract (hilly)—sandy loams which are less fertile.

**iv) Forests:** On account of pressure of population and extensive cultivation, very little has been left of the natural vegetation. The study based on satellite imageries reveals that only 1.2 per cent of the area of the Region is under forest cover. The forest cover is of 'tropical thorn type' ranging from open shunted forestes to xerophytic bushes occurring both on plains and hills. The common tree types are *acacias, khair, dhak, kikar and babul.* The forest in NCR is important more as a source of fuel and fodder than as timber.

In the Rajasthan Sub-region, the forest cover is about 4.3 per cent mostly accounted by hill forests of Alwar and Behror tehsils. The forests are mainly 'dry deciduous type' with dominant tree types being *Kikar and Dhak.*

In the Uttar Preadesh Sub-region, forests account for



only 1 per cent of the area. This again is due to extensive use of land for cultivation. This area has dry deciduous forests. The dominant tress are *Sal, Shisam,* and *Teak.* In the drier parts, the forests are of thorny type.

The Haryana Sub-region accounts for the least amount of forest cover. Most of this forest cover is concentrated in Gurgaon district. *Khair* and *dhak* form the important tree species in the Aravali hills. The other forest cover is mainly in the form of orchards in the plains. Sultanpur Bird Sanctuary over an area of about 117 hectares is located near Gurgaon

In the Delhi UT, owing to low rainfall and the gravelly substratum, the upper strata of the soil do not support any dense perennial vegetation. The forest cover of 1.8 per cent is mainly due to the forest on the ridge and other recreational areas in Delhi urban area.

**v) Minerals:** The mineral wealth in the Region is very limited, and is restricted to construction material. The major mineral deposits of the Region are the China clay with a reserve of 7.54 million tonnes occuring mainly in Delhi and Gurgaon, and the Quartz with a reserve of 15.32 million tonnes occuring mainly in Faridabad and Gurgoan, copper occuring in Alwar with a reserve of 0.31 million tonnes. The major mineral deposits in Alwar are Barytes, Quartz, Calcite, Soap stone, Copper, China clay and Silica sand.

The annual production of all the minerals and mines in the Region in 1986 was of the order of 4.7 lac tonnes. The other minor mineral deposits are Asbestos, China caly, Felspar, Fire clay, Soap stone and Quartz. In Uttar Pradesh, there are no notable mineral deposits. China clay (kaolin), Silica sand and Fire clay deposits occur in Faridabad district. Gurgaon contributes Silica and Kaolin. Occurrence of Slate deposits is reported from Rewari tehsil. Rohtak, Sonipat and Panipat areas do not have any mineral deposits of economic importance. In Delhi UT, China clay, Silica and Quartzite are available.

# 2

# Policy Zones

Delhi has been experiencing enormous growth of population since Independence. The partition of the Country in 1947 brought overnight nearly 5 lac people to Delhi, swelling its population to almost double its earlier size. Though, the services were inadequate and strained beyond their capacity, the Government and the local adminstration sought a large number of options in the form of industries, trade activities and other economic opportunities in order to absorb the additonal population to find means of livelihood. This trend emerged into an encouragement in large scale proliferation of economic activities, retail and wholesale trades, industries of all categories and informal sector activities. These activities over the years out of sheer necessity or otherwise started mushrooming all over the city, and assumed large proportions. Gradually, these economic opportunities became recognised for which all infrastructural facilities were created and encouraged by the Government/Local Bodies to serve not only the Delhi population but also the regional needs. Since there was no discernible restriction on their expansion, the enterpreneurs made use of the opportunities to boost them into big trade and industrial establishments, which took stable and strong rooting in Delhi attracting more labour from the adjoining States and also from far off places. It took years for the Government and Local Bodies to recognise the mounting pressure on the essential services of Delhi leading to a realisation that



it would lead to explosive and unmanageable situation in the foreseeable future.

With this recognition as back as 1962, the Master Plan for Delhi recommended to divert the potential migrants from Delhi to Ring towns around the Delhi UT, such as Faridabad, Ballabhagarh, Gurgaon, Bahadurgarh and Ghaziabad, and also Narela in Delhi UT; creating adequate employment opportunities with appropriate infrastructural facilities, particularly for establishment of industries and related activities. Backed with the support of the concerned State Governments, these "Ring towns" grew by leaps and bounds registering much faster growth rate than the National Capital itself. Between 1951-81, Faridabad registered a growth of 774 per cent, Gurgaon 380 per cent, and Ghaziabad 567 per cent against Delhi's 300 per cent. The "Ring towns" subsequently became to be known as Delhi Metropolitan Area (DMA) with Delhi as the core. They have bcome more and more attractive for development of industries mainly due to nearness of Delhi with marketting and other supportive facilites, and the policies of the State Governments. The development has become intensive, particularly among the major transport corridors which led to the form of ribbon development all along transport routes, lacking in adequate infrastructural facilites and also shelter.

Delhi being limited in its territorial extent and, as opposed to it, the ring towns having relatively extensive areas for expansion, the unabated pouring of migrants into Delhi brought in manifold problems in the form of congestion and inadequacy of basic services. This was accentuated as the "Ring towns" were developed for industries and allied activities but not with adequate residential development. During 1961-81, the influx of migrants into Delhi was about 53,000 a year, which jumped to 1.23 lacs a year during 1971-81. In addition, daily 3.06 lacs people commuted between Delhi and the

DMA towns of which nearly 1.5 lacs commuted to Delhi daily from DMA towns during 1987. The green belt around Delhi of the 1962 Master Plan has slowly vanished leading to a continuous sprawl of the metropolis engulfing the then "Ring towns" which form the present Delhi Metropolitan Area.

The inter-action between Delhi and the adjoining towns within the Delhi Metropolitan Area has become more and more intensive, increasing inter-dependence with each other. The services, both economic and social, and also job opportunities to a great extent, serve the floating population from the DMA towns and the migrants. A study of population, density, growth and the problems of services of Delhi and the towns around shows marked characteristic leading to clear identification of Delhi UT and the other towns within Delhi Metropolitan Area as two distinct zones. The areas beyond the DMA upto the NCR boundary which is pre-dominantly rural and relatively industrially backward recording slower growth, and depending for higher level facilities on the DMA towns, specifically Delhi, stands out as the third zone distinctly different from the other two.

The prime objective of the Regional Plan is to contain Delhi's population size within manageable limits at least by the turn of the Century. As a strategy, after evaluating various alternative scenarios for development, it has been realised and recognised that, in order to save Delhi from population explosion, it is necessary to moderate the growth in the areas around it. At the same time, it is also recognised that any additional population in the DMA towns, excluding Delhi, will not to any extent moderate or reduce the problems of Delhi as their inter-dependence is intensive and necessarily mutual. The preliminary studies clearly concluded that economic activities with potential for large scale employment should necessarily be located outside the DMA, preferably at a distance which discourages daily interaction with Delhi. Thus, on the



basis of these criteria, the zones which came out distinctly are Delhi UT, the DMA excluding Delhi UT and, the area beyond DMA withing NCR, for effective application of the policies and implementation of proposals with a view to achieve a manageable Delhi and an harmoniously developed Region.

These Policy Zones are described briefly as follows (Fig. 2):

**i) Delhi U.T.:**

Delhi UT covers a total area of 1,483 sq km of which 40 per cent had been urbanised and, the remaining 60 per cent area was spread over 231 (habitated 214) rural settlements. The urban area is spread over in 6 settlements containing 57.68 lac population of which Delhi urban agglomeration is the dominant as indicated below:

| *Towns* | *Area (sq km)* | *Population (1981)* |
|---|---|---|
| Delhi U.A. | 540.74 | 57,29,283 |
| Bawana | 17.00 | 12,637 |
| Alipur | 8.56 | 6,735 |
| Pooth Khurd | 10.00 | 7,145 |
| Pehladpur Bangar | 4.68 | 5,011 |
| Bijwasan | 10.90 | 7,389 |
| Total | 591.88 | 57,68,200 |

**Sources:** District Census Handbook - Delhi 1981.

**ii) Delhi Metropolitan Area (excluding Delhi UT):**

The Delhi Metropolitan Area, as envisaged comprises the controlled areas of the contiguous towns of Ghaziabad including Loni and NOIDA in Uttar Pradesh, Faridabad-Ballabgarh Complex, Gurgaon, Bahadurgarh, Kundli and the extension of Delhi ridge in Haryana. The total area of DMA excluding Delhi is about 1696[1] sq km (Table 2.1) and

[1]This is based on the report of the Sub-Group on DMA constituted by the Ministry of Urban Development in 1982 for the co-ordinated development of Delhi and its peripheral areas.

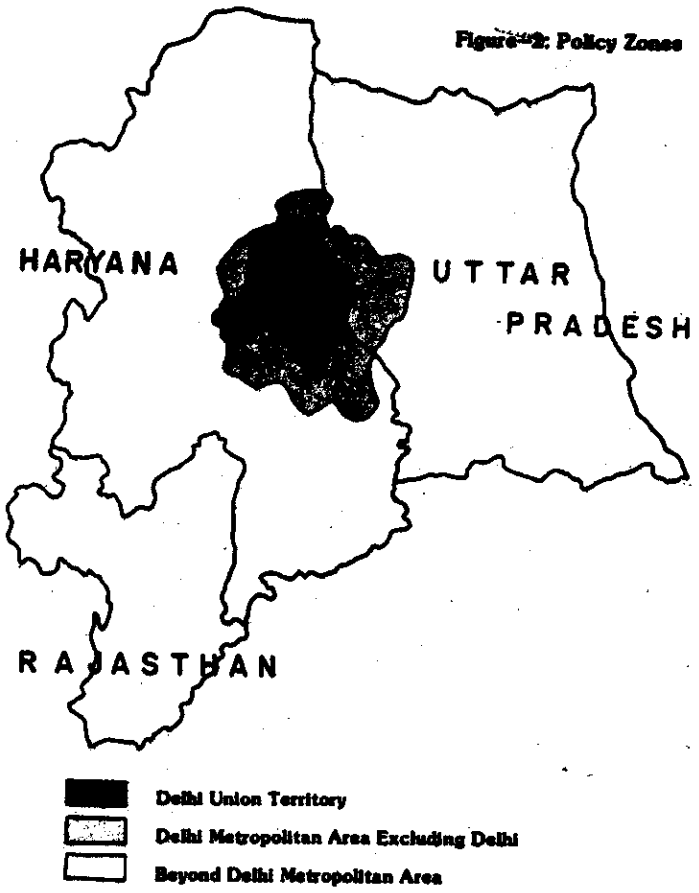



Figure 2: Policy Zones



population of 8.08 lacs in 1981 with a density of 476 persons per sq km.

### iii) Rest of NCR

Rest of the NCR comprising an area of 27,063 sq km, is predominantly rural in character and contains 83 urban centres and about 6,046 villages. The population growth rate of towns in the NCR area beyond DMA has been generally lower than the national urban average during the last decade (1971-81).

# 3

# Demographic Profile 1981-2001

A significant facet of Indian urbanisation has been greater concentration of population in metropolitan cities, specially in the recent years. The 12 metropolitan cities as of 1981, alone accounted for more than one-fourth of the total urban population. Even among metropolitan cities, the growth of Delhi has been unique in that, it has been constantly growing at a decadal growth rate of more than 50 per cent since 1951. During 1971-81, Delhi registered 57 per cent growth while Bombay (38.2 per cent), Madras (35.3 per cent) and Calcutta (30.8 per cent) grew comparatively at a much slower rate.

**i) Population distribution:**

The National Capital Region had a total population of 191.92 lacs in 1981. The Sub-regions of Delhi UT, Haryana, Rajasthan and Uttar Predesh accommodated 32.41 per cent, 25.74 per cent, 5.54 per cent, and 36.31 per cent of the total population respectively. Of the total population, 100.94 lacs (53.60 per cent) was rural, the sub-region-wise rural component being 49.73 per cent in Uttar Pradesh 36.97 per cent in Haryana, 8.82 per cent in Rajasthan and 4.48 per cent in Delhi UT sub-region. The rural population proportion of the NCR has registered a fall from 65.31 per cent in 1961 to 60.72 per cent, in 1971 and 52.60 per cent, in 1981. Of the 91 lacs urban population of the Region, Delhi UT had 63.40 per cent, Uttar Pradesh 21.42 per cent, Haryana 13.27 per cent, and the Rajasthan Sub-regions 1.91 per cent in 1981.



With its metropolitan core, the Region had population density of 634 persons per sq km against the all India average of 221 in 1981. Of the constituents of the Region, Delhi had the highest density with 4192. Excluding the Delhi UT, the density of the Region was 451 in 1981.

**ii) Growth trend of population:**

**a) Total Population:** Population of the NCR has swelled to 191.92 lacs in 1981 from 140.60 lacs in 1971 and 105.80 lacs in 1961, registering a growth rate of 36.48 per cent during 1971-81 against 32.89 per cent during 1961-71, and the national decadal growth rate of 25 per cent during in 1971-81. Substantial addition of population to Delhi has been the main reason for the rapid growth of the Region. In fact, the proportion of Delhi's population in the Region was only 25.11 per cent in 1961 which rose to 32.4 per cent in 1981. The net addition of population during 1971-81 was 51.33 lacs. Of this, Delhi UT accounted for 42.11 per cent followed by Uttar Pradesh (29.82 per cent), Haryana (22.3 per cent) and Rajasthan (6.04 per cent) sub-regions.

**b) Sub-regional growth trends:** The constituent areas present varied growth trends. Delhi UT exhibited a growth rate of 53.2 per cent during 1971-81. The Uttar Pradesh and Rajasthan Sub-regions have been growing faster in their population counts while the Haryana Sub-region had a reduction of 1.75 per cent during 1971-81 compared to the 1961-71 rate. Growth of population in Delhi is significantly higher since Independence. During the four decades preceding 1941, while it gained a modest total of 7 lacs only, during the succeeding four decades it had an addition of 52 lac population. The decadal growth rates since 1941 were 90.18 per cent, 52.46 per cent, 52.91 per cent and 52.98 per cent respectively.

**c) Components of growth in Delhi UT:** Of the two main components of population growth, namely, the natural growth and in-migration, the share of natural growth has been declining over the years. The partition of the country in 1947 resulted in a large influx of population into Delhi. In addition, the attainment of Independence and the resultant need to develop Delhi as the National Capital created a huge demand for manpower resulting in a tremendous influx of population into the capital.

According to the 1981 Census, there were 22,99,252 migrants in Delhi constituting about 37 per cent of the total population. In-migration into Delhi has been on rapid increase especially during the last two decades and the average annual in-migration has gone up by about three times during the period. Among the 22,99,252 migrants in Delhi upto 1981, 12,29,745 persons, which constitute 53.48 per cent came during 1971-81 alone. Of the net addition of population during 1961-71 proportion of in-migrants was only 37.33 per cent and it registered a sharp increase constituting as much as 57.07 per cent of the additional population during 1971-81 (Table 3.1). Thus, in-migration has emerged as the main factor for the rapid growth of Delhi.

### iii) Trend of in-migration:

**a) Origin of migrants:** The in-migration into Delhi has been mainly from the surrounding States. The NCR States together accounted for about 71 per cent of the total in-migrants into Delhi: Uttar Pradesh alone accounted for 48.2 per cent followed by Haryana, Punjab, and Rajasthan (Table 3.2). Migration to Delhi from Punjab and Haryana has declined during 1961-71 and 1971-81, whereas that from Uttar Pradesh and Madhya Pradesh has increased. Rajasthan maintained almost the same share of contribution of in-migrants of Delhi since 1961. In absolute terms, it is Uttar Pradesh from where maximum number of people



came to Delhi. All these States have been sending increasing number of people to Delhi over the last two decades as reflected by rations of migrants to the respective State's population and about 40 per cent of them are from urban areas. The proportion of flow of in-migrants to Delhi from other areas has also gone up from 10.7 per cent in 1961 to about 20 per cent in 1981. (Fig. 3).

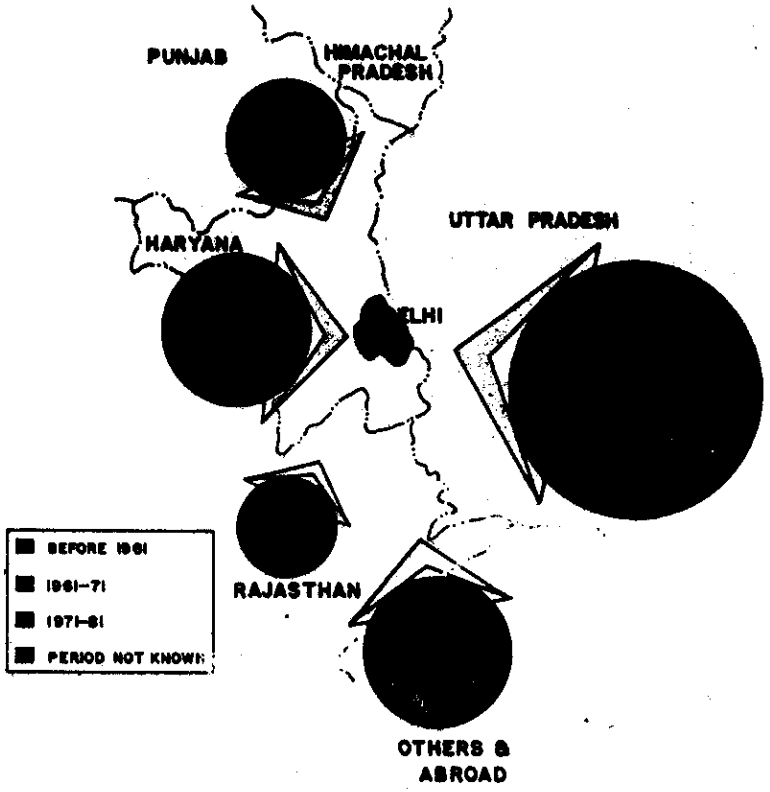
**b) Reasons for migration:** The major reasons for in-migration into Delhi have been the 'employment' and consequent 'family movement'. The large inflow into Delhi in recent times can be attributed to the substantial growth of industries, especially, small scale and, expansion of trade and commerce activities. 'Employment' and 'family movement' accounted for 73 per cent of all the in-migrants in 1981 from the five adjoining States.

**c) Occupational characteristics of migrants:** Employment structure of migrant workers (1971) shows that tertiary sector engaged the hightest proportion (69.17 per cent) of all migrant workers followed by secondary (28.87 per cent) and primary sectors (1.96 per cent). Majority of the in-migrants are absorbed in petty trades, low grade production or processing activities, and in the informal sector activities serving local population. Incidentally, proportions of total workers in Delhi in different sectors too reflect roughly the same situation as for migrant workers.

### iv) Delhi Metropolitan Area:

Delhi's growth is not confined to the boundaries of the Union Territory. This urban spatial expansion has spread into the surrounding areas of Uttar Pradesh and Haryana around Delhi, which along with Delhi UT constitute the Delhi Metropolitan Area (DMA). Owing to its location, the DMA excluding Delhi has exhibited growth characteristics similar to that of Delhi in recent years. In fact, Delhi had grown only 53 per cent durng 1971-81, Faridabad,

**Figure–3: Immigration Pattern: Delhi-1981**






Ballabhgarh, Ghaziabad and Gurgaoan have grown 169.40 per cent, 141.65 per cent and 76.50 per cent respectively.

**v) Population projection:**

Recognising the urban growth dynamics in the Region, projections have been made by the Office of the Registrar General of India, Census Operations, for the constituent units of the Region with urban-rural components. The growth differentials of the areas falling in the NCR and other areas of the NCR States were examined, and these differentials were then projected by which the total population and rural-urban composition of the Sub-regions were arrived at. (Table 3.3)

The Regional population is expected to grow at a decadal rate of 34.73 per cent during 1981-2001 to reach a figure of 325 lacs. In case of Delhi UT, an addtion of 70 lacs population during this period is foreseen, totalling to about 132 lacs by 2001.

**Issues:**

i) At the present trend of phenomenal growth rate, Delhi will have 132 lacs population by 2001 A.D. Will Delhi remain manageable with this population growth trend in terms of provision of essential services? In addition, the concentration of economic activities has resulted in soaring prices of developed land, proliferation of slums and squatter settlements, adversely affecting the quality of life.

ii) As most migrants emanate mainly from the neighbouring states, what regional development strategy would mitigate the trend of migration to Delhi?

iii) Delhi Metropolitan Area towns around Delhi have been growing faster and, would sooner become a huge unmanageable urban agglomeration woefully short of essential services. Could this growth be regulated to relieve the pressure on Delhi's services?

iv) To achieve a manageable Dehli and an harmoniously developed region, what is the judicious distribution of population both in urban and rural areas?

**Strategies:**

A pragmatic approach and strategy to meet the issues appropriately to achieve the plan objectives would be to formulate a conscious policy of:

i) decelerated and restricted growth in Delhi UT;
ii) controlled moderate growth of the DMA towns, excluding Delhi, so that the volume and directions of growth are well coordinated; and
iii) giving impetus to the regional centres through provision of adequate infrastructure and services so that they are able not only to dissuade the potential outmigrating population but also attract and absorb the Delhi bound migrants. In fact, the Delhi Master Plan now under revision for 2001 as perspective has specified selected industrial units that are found incompatible in residential, commercial and non-industrial use zones, to be shifted from such areas within a period of five to ten years. By suitably developing industrial areas and wholesale markets in the towns beyond Delhi UT, it should be possible to generate additional employment opportunities in the Regional towns.

**Demographic policy and population assignments**

**i) population projection for Delhi UT:** Under the assumptions that:

a) the natural growth rate of population with its declining trend may reach 2.0 per cent per annum during 1981-91 and 1.2 per cent per annum during 1991-2001, and
b) the rate of in-migration to Delhi would continue at the same rate as it would have otherwise registerd during 1981-91, and in view of the contemplated



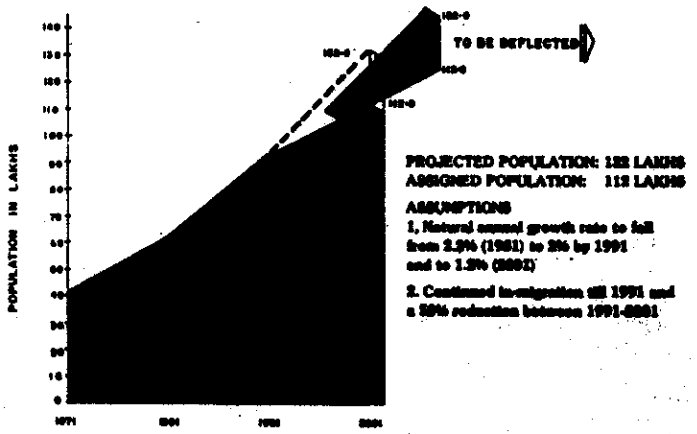
employment opportunities in the Region, a 50 per cent fall in the rate of in-migration to Delhi during 1991-2001 from that of the previous decade, the population of Delhi UT would be 112 lacs by 2001 AD of which 2 lacs would be rural (Table 3.4, Fig. 4).

Accordingly, the rate of in-migration into Delhi will be about 84,000 per annum during 1991-2001 as against the likely, 1.79 lacs during 1981-91. This would contribute a fall of the in-migrants' share in the total decadal addition i.e. 46.32 per cent by 2001 as against 57.07 per cent observed during 1971-81 and the likely 59.01 per cent during 1981-91.

**ii) population assignment-DMA:** Recognising the potential of the DMA in relieving the population pressure of Dehli, and also the problems Delhi would face in case of over-growth of the DMA, a moderate growth for the DMA towns around Delhi is prescirbed. The population forecast on the present trend of growth places the population size of DMA excluding Delhi at 38 lacs including 1 lacs rural population by 2001 A.D.

**iii) population assignment beyond DMA:** Any strategy to control population growth in Delhi should be prepared in consultation with the surrounding States as majority of the in-migrants to Delhi come from there. The additional population of 19 lacs which otherwise would have moved into Delhi from these States during 1981-2001 should be deflected towards or contained in the urban areas beyond the DMA within the National Capital Region. It is proposed to contain and accommodate this additional population in the Sub-regional areas of Haryana, Rajasthan and Uttar Pradesh. Based on the urban growth trends and the projected urban population in the constituent Sub-regions by the year 2001, it is proposed to contain and accommodate respectively about 5.5 lacs, 1.5 lacs and 12 lacs in the urban areas beyond the DMA of Haryana, Rajasthan and Uttar Pradesh, Sub-regions and, 1 lacs in the rural area. The projected and assigned population for the Sub-regions and DMA towns are given in Table 3.5.

**Figure–4: Delhi: Population Projection 1981-2001**




# 4

# Settlement System 1981-2001

The Metropolitan core of the NCR, that is Delhi, is growing fast by attracting activities and consequently population from the surrounding areas, and the sprawling development due to overspill of Delhi's population into the areas adjoining it, has also gained tremendous momentum. The policy of restricting the growth of Delhi and allowing only a moderate growth of the DMA beyond Delhi, requires an evaluation of the development centres of the Region.

i) **Settlement distribution:** The 191.92 lac population of the Region (1981) is distributed over 6,771 Settlements—94 urban and 6,677 villages. Of the total, 220 are in Delhi UT, 2,413 in Haryana, 1,091 in Rajasthan and 3,047 in Uttar Pradesh Sub-regions. The Region has an urban-rural settlement ratio of 1:71.

ii) **Urban Settlement:** There are 94 urban centres with 6 in the UT of Delhi, 58 in Uttar Pradesh, 27 in Haryana and 3 in Rajasthan Sub-regions. There has been a spectacular increase form 48 to 94 in the number of urban centres during 1971-81 compared to an addition of only 4 during 1961-71 (Map 1).

There are 11 Class-I urban centres including Delhi metropolis accommodating about 70 per cent of the urban population of which Delhi Urban Area alone contains 57 lacs persons accountig for 63.45 per cent of the entire urban population of the Region. Greater concentration of activities and resultant population lead to higher density in urban area. The Region had an urban density of about

6,300 persons per sq km in 1981. An analysis of the density pattern indicates that the process of activity and population concentration followed size and class of the towns. While the Class I cities had an average density of about 7,488, the other Class towns from II to VI had 6725, 6016, 2764, 1835 and 1260 respectively in 1981.

Urban growth has been extraordinary in the Uttar Pradesh Sub-region. The urban population increased from 10.68 lacs in 1971 to 19.49 lacs in 1981, thus registering a growth rate of 82.5 per cent during 1971-81. The Haryana Sub-region also experienced a fast growth of 57.79 during 1971-81 with a population increase of 4.41 lacs. A growth rate of 56.63 per cent was experienced in urban population by the Rajasthan Sub-region during 1971-81. Thus, the already highly urbanised NCR will experience faster urbanisation trend in future reaching an urbanisation level of 72 per cent by 2001.

The trend of population growth of a town provides an insight into its latent potentials to absorb economic activites and consequent population. A sutdy of the growth trends of the regional urban centres indicates that most of the urban centres in the Region lack dynamism in growth as they lie in the shadow of a large metropoils. Despite being larger in population size, the economic base of many of them such as Meerut, Hapur, Khurja, Rohtak, Rewari, Alwar etc, is week to sustain their natural superfluous growth. The fact is borne by the Census figures of 1981 which had shown that the growth rates of these towns are less than the national average.

**iii) Functional characteristics:** An analysis of functional specialisation of urban areas of the Region shows the close relationship between population concentration and functional diversification. Diversification in functions has been the phenomenon in the higher order towns. All the towns upto Class-III have shown greater diversification in terms of activity concentration. Industries, trade and



commerce and primary activities to a lesser extent in many cases, are equally pronounced in these towns. The Class IV to VI towns had primary activities as either dominant function or equally dominant function amongst other functions in 1981 (Table 4.1).

**Issues :**

With this background, the issues that emerge are:

i) The extraordinary growth of Delhi is to be controlled at 112 lac population and that of the DMA excluding Delhi UT to be moderated to a population size of 38 lacs by 2001. The excess 19 lacs of urban population of Delhi by 2001 would have to be diverted to and contained in the urban areas beyond the DMA.

ii) Most of the towns beyond the DMA are showing lack of dynamism and diversification in their functional character. A spatially and functionally articulated settlement system has to be evolved with purposive development of urban areas of the Region beyond DMA to meet the objective of controlling the growth of Delhi and achieving balanced development of the Region. This assumes additional importance as the study on 'migration pattern in the NCR' by the Natioanl Institute of Urban Affairs, New Delhi, clearly indicates that there is a large intra-regional migration taking place at present and, about 80 per cent of the potential migrants within the Region would ultimately move into Delhi.

iii) The rural zones of the constituent States contribute greater number of migrants of Delhi mainly for employment and services. This rural out-migration to Delhi should be checked. This requires integration of the settlement system with functional dependence and independence with appropriate services to improve their economy which will dissuade the population to move to other places.

**Strategies:**

i) The first strategy should be to revitalise the economy of the stagnating regional urban centres and to integrate them in a well-knit system of settlements with specific functions to encourage an orderly development of economic activites and increase their complementarity.

ii) Secondly, the development of small urban centres and villages should be integraged in relation to priority towns to achieve the objective of balanced development of the Region. These could be achieved by developing a four tier hierarchical system of settlements consisting of regional centres, sub-regional centres, service centres and basic villages with functionally specialised organised structure. Desirable population size and probable functions of each tier settlements will be as follows:

| | *Level of Settlement* | *Population size* |
|---|---|---|
| 1) | Regional Centres | 3.0 lacs and above |
| 2) | Sub-Regional Centres | 0.5 to 3.0 lacs |
| 3) | Service Centres | 10000 to 500000 |
| 4) | Basic Villages | Less than 10000 |

The main centres of utmost activity concentration in this hierarchical system are the regional centres and sub-regional centres. The service centres and basic village are mutually dependent upon each other. The regional centre being self contained, should be capable enough to form an inter-dependent system independent to a great extent of the Delhi metropolis.

iii) Thirdly, to attract and contain the Delhi bound potential migrants to the extent of 19 lacs, the selected regional centres would be developed on an intensified scale with conscious intervention to organise and stimulate economic activities to offer a variety in occupational structure and job opportunities. The regional centres are identified in the Regional Plan while Sub-regional plans will identify Sub-regional centre, Service centres and Basic villages.



**i) Regional centres:**

To identify such settlements which may function as regional centres, a development hierarchy has been followed. Every settlement, depending on its size in terms of population and area spread, location with reference to transport network, availability of social facilities and concentration of economic activities, places itself, among others in a development hierarchy within the Region. In consonance with size and rank, these centres provide higher order services to the scattered population around them.

A study on 'Settlement System in the NCR' by the Physical Research Laboratory, Ahmedabad, based on computer model employed various parameters in selecting the regional centres such as revenue and development adminstration, population size, sex ratio, literacy level, growth trends during 1951-81, participation ratio and industrial work-force, rate of migration, location of various facilities such as educational, health, road and railway, water supply, power, marketing facilities, financial institutions and recreational facilities, in relation to population size. A total number of 38 indicators were employed for the computer modelling. The basic model that has been used to identify relative weightages of each settlement in reference to the 38 indicators is based on composite index. By taking 10 per cent of the higher composite value obtained by any centre, regional centres have been identified. Due to the proposed moderate growth of the DMA towns, Regional Centres have been identified from among the centres that rank in the development hierarchy, and are located beyond the DMA. The identified regional centres by the study are: Meerut, Hapur, Bulandshahar, Khurja, Panipat, Rohtak, Rewari, Palwal, Alwar.

The regional centres would be developed primarily to accommodate the Delhi-bound potential migrants by creating employment opportunities in secondary and tertiary sectors and, they would act as magnet-centres to attract economic activities. In order that various regional centres are planned to accommodate the excess population of Delhi, a rational distribution has to be attempted. To decide the extent to which these centres should be equipped to attract and contain potential migrants, the Central Building Reserach Institute, Roorkee, in a study on 'Alternative Development models for urban development in the NCR' evaluted the various scenarios of differential population assignments against development costs for residential, commercial, industrial, public and semi-public and community facilities, city infra-structure and provision of telecommunication facilites and, benefits assessed in terms of employment absorption potentiality of each scenario, acceptable rate of growth, standard of living and an acceptable level of linkages between Delhi and the scenario settlements. Cost-efficiency ratios indicate desirability of developing all the eight Regional centres/ complexes with appropriate additional population mix. Growth trend and regional potentials of each of the selected regional centres have been assessed.

The regional centres—Bulandshahar and Khurja—would be developed as a complex while Rewari would be planned in relation to Dharuhera and Bhiwadi industrial townships in the form of another complex. The Regional Centres (priority towns) thus identified and their assigned populaiton for 2001 AD are as under:



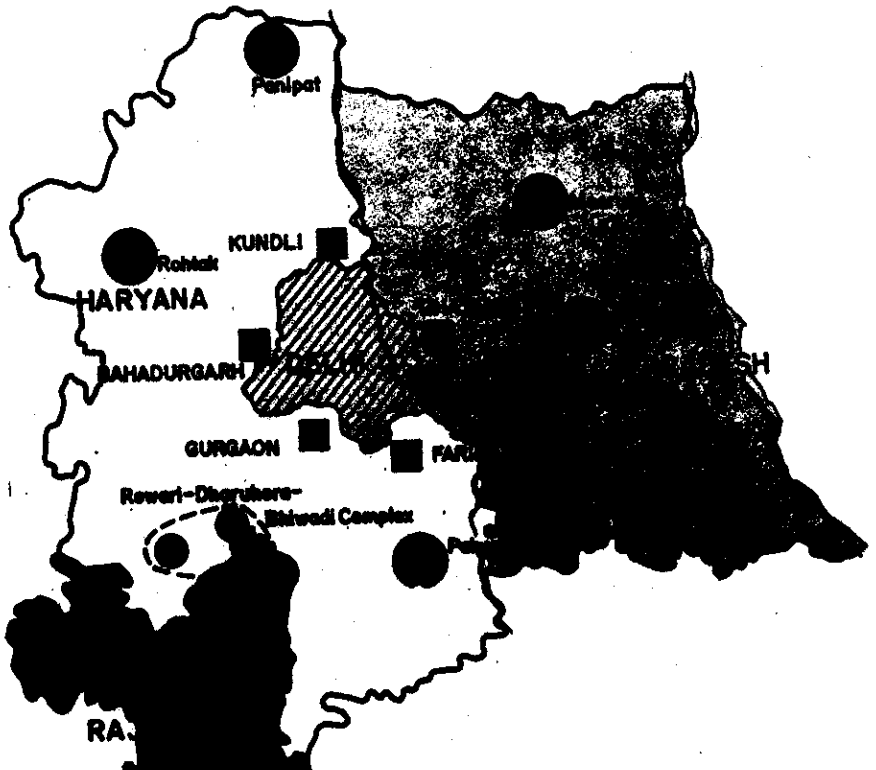
| *Sub-region* | | *Regional Centre* | *Population (in lacs)* 1981 | 2001 |
|---|---|---|---|---|
| Uttar Pradesh | 1. | Meerut | 5.36 | 15.50 |
| | 2. | Hapur | 1.02 | 4.50 |
| | 3. | Bulandshahar | 1.03 | 5.00 |
| | | Khurja Complex | 0.67 | 3.00 |
| Haryana | 4. | Palwal | 0.47 | 3.00 |
| | 5. | Panipat | 1.38 | 5.00 |
| | 6. | Rohtak | 1.68 | 5.00 |
| | 7. | Rewari- | 0.52 | 1.10 |
| | | Dharuhera- | — | 0.75 |
| Rajasthan | | Bhiwadi Complex | — | 1.15 |
| | 8. | Alwar | 1.47 | 5.00 |

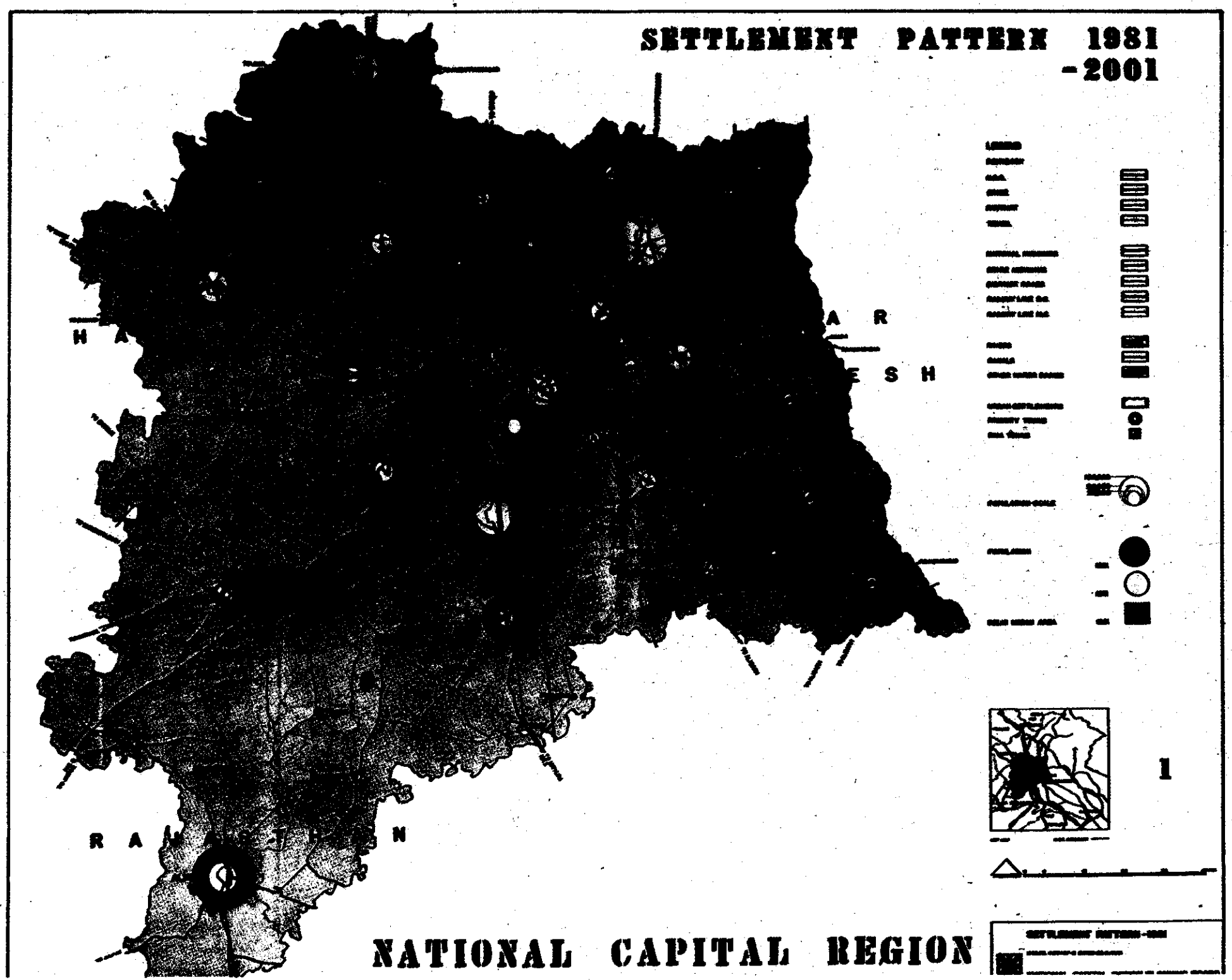
Fig 5. shows the priority towns which are the regional centres and the DMA towns.

The functional composition of the remaining hierarchical centres is being dealt with very briefly in this plan since their identification and role would be spelt out in the Sub-regional plans.

The Sub-regional centres would serve as focal points with development and resume functions as that of Sub-divisional headquarters with corresponding facilities. In addition, they also will serve as first stage industrial centres with agricultural and marketing facilities. While the service centres would cater to the rural hinter-land as agro-service centres in the collection and distribution of agricultural goods and services with marketing, warehouses and cold storages, the basic villages would be developed to cater to the day-to-day needs of a cluster of villages with cooperatives for distribution of fertiliser, agricultural implements and also for collection of agricultural products for marketing in higher order centres.

**Figure–5: Delhi Metropolitan and Priority Towns**

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# 5

# Rural Development

The NCR has a vast rural expanse and majority of the population live in rural areas. As much as 95 per cent of the geographical area of the Region is represented by the rural segment accommodating about 53 per cent of the Region's population. The Region has agriculture as its main occupation. It is, however, at the same time, is one of the highly urbanised zones in the Country which has become a job-magnet for the rural population. The 1981 Census shows about 64 per cent of the migration of Delhi originated from the rural areas and most of them were from the adjoining States.

It is thus evident that development of rural areas will also partly help in achieving the Plan objectives. Development activities that would raise the incomes and diversify the economy of the rural areas would to some extent check the out-migration to urban centres in the Region and perhaps finally to Delhi Metropolis.

### i) Rural settlement system

The rural settlement scene (6,677 settlements) is characterised by the predominance of medium size villages with 500 to 1,999 persons with a stable economic base mostly of primary sector. Nearly, one-fifth of the villages have more than 2000 population of which the 5000 and above population sized villages account for one-sixth. Small villages with upto 500 population are in the form of clusters and hamlets scattered all over and, account for

around one-fifth of the total number of villages. The Rajasthan Sub-region is typically characterised by smaller settlements, while the Uttar Pradesh and Delhi Sub-regions do have dominance of medium sized settlements (Table 5.1). It may also be noted here that the out-migration from the villages of the Haryana Sub-region is minimum as compared to other Sub-regions. Thus, development of rural areas will be in a way complementary to development of urban areas in the Region.

**ii) Literacy**

Though the Region consists of the best developed parts of the constituent States, the rural literate proportion is only marginally higher (31.05 per cent) than that of the national average of 29.65 per cent. The Uttar Pradesh and Rajasthan Sub-regions are lower in the literacy rate compared to the all India average. Among the rural population, the literacy level of the women tends to be lower than that of the males.

**iii) Agriculture and allied activities**

The NCR forms one of the most productive areas of the Country. The Region is endowed with extensive fertile land and good irrigation facilities. Agriculture suffers from the constraints of low operational holdings and poor operational capacity of farmer in Uttar Pradesh. Majority of land-holdings are less than one hectare per unit of holding. Animal husbandry plays an important role in supplementing income of the rural population in the Region. The nearness of the metropolitan city of Delhi has given a great fillip to the establishment of dairies in the rural areas.

**iv) Availability of services**

a) *Educational facilities:* Of the total 6,677 inhabited rural



settlements in the Region, about 80 per cent are provided with some kind of educational facilites. Villages of Delhi UT and the Haryana Sub-region are better served as 88 per cent of them are having this facility. In terms of population coverage too, Delhi UT and the Haryana Sub-region are better served. The Uttar Pradesh and Rajasthan Sub-regions have 10 per cent of their population unserved by even basic educational facilities. (Table 5.2 & 5.3).

b) *Health facilities*

Availability of health facilities in the rural areas is poor as only 36 per cent of the villages of the Region are served by some kind of health facility. Only 53 per cent of the regional rural population is provided with health facilities. In this respect too, the Haryana and Delhi UT Sub-regions are better served as 59 per cent and 58 per cent of villages and about 78 per cent and 75 per cent of their population are covered (Tables 5.2 & 5.3).

c) *Drinking water supply*

All the villages of the Region draw their domestic water needs from one source or the other, though, the supply is not organised and protected. Moreover, the supply level is also poor in villages tapping ground water sources as community resource pool.

d) *Accessibility*

One of the pre-requisites for the speedy development of the rural areas, is the availability of physical linkages. As regards availablility of asphalted roads, the Delhi Sub-region has 97 per cent of its villages and 99.8 per cent of its population covered, followed by the Haryana Sub-region with 92 per cent and 96 per cent of villages and population covered respectively. In the Region, about 35 per cent of the villages have bus stands. The Rajasthan and UP Sub-

regions lag far behind with only 16 per cent and 26 per cent of their villages and only 29 per cent and 36 per cent of their population having direct access to this facility.

*e) Post and telegraph facility*

Only 27 per cent of the villages and 51 per cent of the rural population of the Region have either post or post and telegraph facility. Again, Delhi UT and the Haryana Sub-region are better served to an extent of 54 per cent and 32 per cent of their villages and, 73 per cent and 56 per cent of their population respectively.

*f) Markets/Hats*

The rural markets encourage interaction and act as centres for innovation and diffusion. But in the Region, the number of markets and 'hats' held in the rural areas, is practically negligible and, only 4 per cent of the villages and about 9 per cent of the population have immediate access to such markets/hats.

*g) Power supply*

Availability of power has emerged as one of the most important pre-requisites for agriculture, industrial and in turn, overall economic development. All the villages of the Delhi UT and the Haryana Sub-region have power connections, while about 83 per cent of villages and 90 per cent of population of the UP Sub-region, and 55 per cent of villages and 71 per cent of population of the Rajasthan Sub-region are provided with power connections.

*h) Housing*

Estimates indicate that there were 18.23 lac liveable houses as of 1981 (excluding Delhi UT) both in urban and rural areas and, the occupancy rate in 1981 was 7.34



persons. The shortage of dwelling units in the rural areas as of 1981 was 6.18 lacs and such huge backlog calls for a special programme of rural housing in the Region.

**Problems and proposals**

i) Most of the rural areas of the Region lack in many of the basic services like protected water supply, education, health, accessiblity, power and communication. Marketing facilities are inadequate for agricultural products and distribution of agricultural inputs like fertilizer and implements. Both in terms of number of villages and population covered by basic services, the Rajasthan and UP Sub-regions lag far behind. The declining contributioin of migrants to Delhi from Haryana State may be due to availability of better level facilities, while the increasing contribution of Uttar Pradesh can be attributed to the lower level of facilities. As compared to Uttar Pradesh and Rajasthan, the villages in Haryana are all electrified and are connected with asphalted roads and, also have better educational facilities. Thus, there is an urgent need to provide power, roads and educational facilities in the remaining villages.

ii) As the rural settlements are spread over a wide area, often quite distant from one another, while the lower order basic facilities couid be provided in each village, higher order facilities would need to be provided in service centres and basic villages. This strategy would serve the following objectives of:

- providing more specialised infrastructure and services such as bank, markets etc. to the isolated villages which individually may not have viable population size to support them;
- acting as a node in the transport system linking the smaller villages with higher order settlements;
- providing an environment for marketing to which nearby rural residents may commute to sell their

goods and services and also to find non-agricultural employment; and

— providing an immediate alternative for the potential out-migrants from the surrounding areas.

iii) The upgradation of skills of workers engaged in non-agricultural pursuits and employment opportunities may decisively influence the rate of outmigration from the rural areas. Therefore, there is a need to undertake a programme for training rural artisans and also creating commensurate employment opportunities for them.

iv) There is a huge backlog in rural housing. Government, through intermediate and base level housing finance institutions can provide loans and subsidies for construction and improvement of shelter with special emphasis on EWS and LIG households.

v) It is necessary to impart vocational education to the rural mass to train and equip them to participate in community development, management of rural institutions and formal credit institutions. Adult eduction that concentrates on functional literacy and on practical training on subjects like health, nutrition and agriculture should be organised in appropriate places to ensure maximum coverage.

vi) To encourage participation of rural population in the regional development, it would be necessary to encourage rural based community voluntary organisations. Several types of community organisations in rural areas enable the people to mobilise resources for different community purpose. Such organisations help to disseminate programmes. It should be necessary to identify such organisations and by aiding them to improve public participation.



vii) In the provision of water supply and sanitation facilities in the rural areas, suitable low cost technology options need to be adopted.

viii) It may be necessary to identify a group/cluster of villages at the Block level for which integrated plans may be prepared on a pilot basis. The plan should be prepared keeping in view participation of people, voluntary organisations and public sector on a wider scale.

# 6

# Economic Profile 1981-2001

## Region's Economic Base

### i) Background

The vast hinterland of the Region lying in the area beyond DMA in the three Sub-regions is characterised by a fairly well developed rural as well as urban economy and represents comparatively some of the best areas of the respective States. The Region's economy is based on agriculture and other primary activities, although sigificant developments in industrial and commercial sectors have also taken place. Industrial centres in Uttar Pradesh, Rajasthan and Haryana have been playing an important role in the overall economy of the respective Sub-regions. Among the various types of industries, textile products, wood and wood products, leather and fur products, rubber, plastic, pertroleum and coal products, electric and electronic equipments are some of the industries which have grown faster in the Uttar Pradesh Sub-region; whereas in the Haryana Sub-region, non-metallic mineral products, wood and wood products, machinery and machine tools, basic metals and alloys and, food product industries have grown faster than other industries. In the Rajasthan Sub-region, maximum number of industries are related to manufacture of food items, printing, publishing, iron and steel industries and manufacture of wood products.

Trade and commerce forms another important component of the economic base of the Region. Commercial



activities are fairly developed in Uttar Pradesh, Rajasthan and, Haryana Sub-regions. There are several wholesale mandis in the Sub-regions dealing in commodities like food-grains, pulses, vegetables, fruits, machinery, cloth, timber and wool.

The employment in Government and semi-Government services is mainly centralised in the District towns viz. Meerut, Bulandshahar and Ghaziabad in the Uttar Pradesh Sub-region, Faridabad, Gurgaon, Rohtak and Sonepat in the Haryana Sub-region and, Alwar in the Rajasthan Sub-region. Panipat, Rewari and Bawal towns in the Haryana Sub-region, due to their population size and concentration of other economic activities, besides being tehsil and sub-divisinal headquarters, also have other local and professional activities. Rewari is an important Railway junction too.

The Region acts as a vast hinterland and feeder zone for Delhi's population. The concentration of resources and investments in Delhi has been apparently instrumental in dominating the economic scene of the Region attracting majority of rural-urban migrants, after by-passing intervening smaller towns. The total journey time from Delhi to the farthest point in the Region is so short that no big centre of transportation and trading activity has developed in the Region. Thus, the Region rather than aiding or accelerating its own growth has supported the growth and prosperity of the Delhi metropolis. In this process, a great deal of mutual dependency has also developed between Delhi and the National Capital Region, which is now sought to be harnessed to the advantage of each other.

The Delhi Metropolitan Area or more precisely, the towns falling in DMA, due to the advantage of their close proximity to Delhi, where diseconomies and other problems of metropolitan city exist, have been attracting large number of economic activities in the recent years. The economy of these towns, which was mainly agricultural has swiftly become manufacturing and industrial.

### ii) Economic structure

The economic structure of the last two census clearly shows the diversification from the activities of primary to secondary and tertiary sectors in the Region. Agricultural labourers and cultivators together formed about 43 per cent of the workforce in 1971 which declined to about 37 per cent in 1981. The primary sector, leaving aside Delhi Union Territory, in the three Sub-regions, however, still dominates the scene. The diversification and intensification of secondary and tertiary sectors has also occurred in the urban economic structure of the Region though it has not made any perceptible change in the overall structure. The workforce in activities relating to construction, trade and commerce, manufacturing other than household industries, transport, storage and communication, forestry, fishing and other activities showed a little variance from 93.4 per cent in 1971 to 92.6 per cent in 1981.

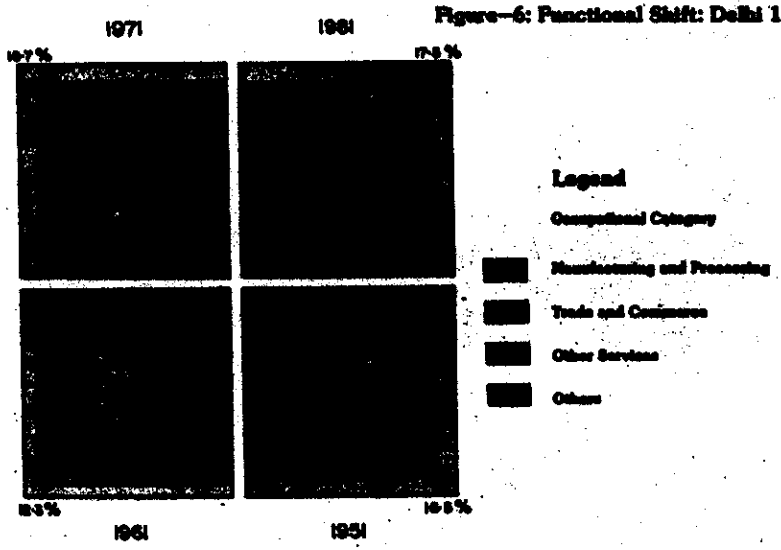
In the last three decades preceding 1981, Delhi has experienced a significant functional shift in its economic structure in favour of manufacturing and processing activities. In 1951, only 17 per cent of the workforce was employed in this sector which increased to more than 29 per cent in 1981. This happened mainly at the expense of service sector which declined from 43.7 per cent in 1951 to 31.4 per cent in 1981. There has been no change in the trade and commerce sector, which has uniformly remained around 20-22 per cent (Fig. 6).

### Future occupational structure

*i) Region*

The basic character of the regional economy of the National Capital Region would become more diversified in future. The fact that more than 70 per cent of the population would be living in urban areas by 2001, would entail the creation of more jobs in non-agricultural






Figure–6: Functional Shift: Delhi 1951-81

occupations than at present. For this purpose, there should not only be creation of additional activities in the existing and new centres outside urban Delhi, but also development of agro-based industries in the rural areas in order to support urbanisation and to stabilise the rural economy.

### ii) Delhi UT

The trend in the functional shift in favour of manufacturing and processing activities over 1951-81 shows that Delhi is likely to have much higher workforce in the industrial sector by 2001. With a view to achieve a more balanced base by moderating the tendency of growth of employment in industrial activities, employment in manufacturing activities in Delhi is likely to remain around the present share of 29 per cent. In order to revert to a balance in its functional characteristic, the workforce in trade and commerce and other services is estimated to remain at 22 per cent and 31.5 per cent respectively. The participation rate in Delhi is likely to increase to 35 per cent by 2001 as against 32.20 per cent in 1981 (Table 6.1).

### iii) Delhi Metropolitan Area

Forecast of employment is difficult in case of DMA towns since spurt in activities and rapid population growth have been only a recent phenomenon in this area. However, taking clue from the trends exhibited by these towns in terms of nature and concentration of activities in the recent years, the likely employment structure by 2001 has been worked out (Table 6.2). Emphasis has been to derive location specific economic structure. The assumptions made in the forecast are:

a) Owing to the location of the DMA towns adjacent to Delhi, the DMA towns would attract economic activities at a greater scale and hence, the participation rate would be much higher in 2001 than in 1981.



b) These towns initially having specially been planned for industrial development, would continue to generate employment opportunities in industries. However, with a view to restricting the population increase to a moderate scale, controlled growth of industries would be permitted in the DMA towns.

c) All these towns having crossed the initial stage and entered the take-off stage of physical development, would have the potential for employment opportunities in construction, trade and commerce and transport activities.

### iv) Priority towns

In the context of the policy of deflecting urban population from Delhi to the priority towns beyond the DMA, it is proposed to develop such activities that are appropriate to the location of priority towns, having due regard to their potential and the growth process that has already set in. It is expected that with positive incentives, such activities shall continue to thrive to provide greater employment opportunities. In view of the fact that the manufacturing activities have greater multiplier effect on the expansion of employment opportunities than employment in other sectors, base-oriented projections such as 'highly industrialised', 'moderately industrialised' and 'less industrialised' have been made. In addition to the past trend, the assigned population sizes of the towns, their participation rates and likely occupation structure have been taken into account to arrive at the workforce in each occupation. For each town, all India average proportions of workers in towns of similar size and character have been taken into consideration for the purposes of assignment of workforce in different occupations (Table 6.3).

### Delhi in Region's economy

An examination of the economic structure of the

various segments of the Region based on the estimates of the per capita State Domestic Products, reveals that during 1984-85, Delhi with a per capita income of Rs. 4191 at current prices tops among all the States and Union Territories of the Country let alone the NCR States.

Delhi, with its well developed linkages with the rest of India, serves as the main intrepot of Northern India. The Region, thus, depends on Delhi for the movement of goods. There exist strong linkages and interdependency of Delhi with the Region. Delhi, besides being a distributive centre, is also a big consumption centre which is drawing in commodities from the surrounding rural and urban areas and distributing commodities and industrial goods among them. The quantum and the range of goods produced in the Region are largely determined by the requirements of the markets in Delhi.

The three main important economic generators which have shown strong tendency of growth in Delhi are as follows:

**A. Government and Public Sector offices**

*i) Growth trends*

In Delhi, the employment in the Government offices and Public Sector Undertakings has been increasing fast. The setting up of a large number of foreign embassies, foreign missions, research and cultural organisations has also had its distinct impact on the growth of the city. Employment in the various types of the Government and Quasi-Government offices has been constantly increasing ever since 1921. Employment in Public Sector undertakings can be divided under four major categories, viz employment in central Government offices Quasi-Government undertakings, Delhi Administration and Local Bodies.

a) Employment in Central Government offices which



was only 8,000 in 1921 grew to 2.30 lacs in 1985. During 1941 to 1985, more than two lac new jobs have been added in this sector (Table 6.4, Fig. 7.) The planned attempts to shift certain offices outside Delhi, have not made any dent in the situation.

b) Employment in Government undertakings was only 6,000 in 1961 which leaped to 1.41 lacs in 1981, adding nearly 1.35 lac persons in just two decades. In the decade 1971-81, about one lac people were provided jobs in these Undertakings, which means, a total addition of roughly 5 lac population during the decade 1971-81 through employment in Public Sector undertakings alone. During the period 1981-85, there has been an addition of 42,000 jobs in this sector, meaning that the trend continues to remain as before.

These offices, inspite of desincentives, such as insufficient space, costlier land and inconvenience and costlier supervision of their regional units from Delhi, prefer to cling on to Delhi and as of today, there is no valid reason in sight for them to decide to move out.

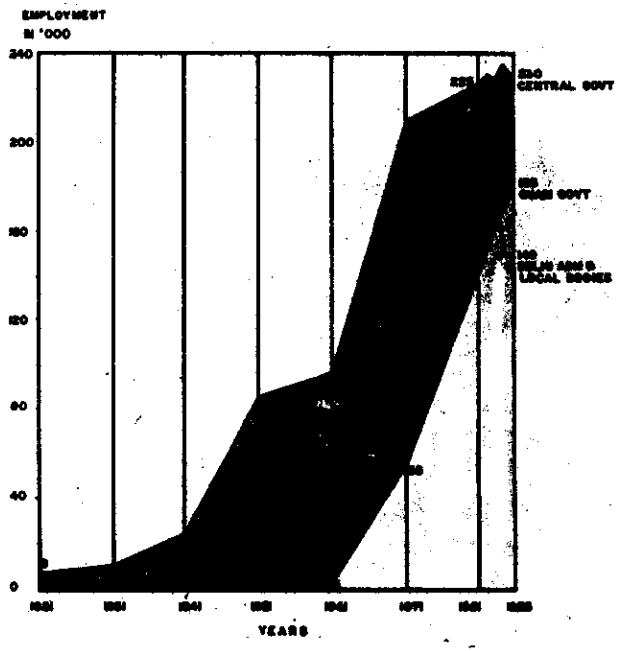
c) Employment in Delhi Administration and local bodies largely grew with the size and enhanced responsibilities of the Administration and local bodies with increasing overheads of servicing of metropolitan city. In 1921, it had a meagre 3,000 employment which grew to 1.82 lacs 1983, but, the employment index declined to 1.49 lacs by 1985.

**B. Wholesale Trade and Commerce**

*i) Growth trends*

a) According to a study conducted by the National Institute of Public Finance and Policy, it has been established that the growth of wholesale trade and commerce in Delhi has been facilitated due to following determining factors which have been favourable to Delhi

**Figure–7: Employment in Public Sector 1981-85**






and given it dominance over the Region:

i) Delhi as the Capital city is the centre of political as well as administrative power.

ii) The availability of requisite infrastructure such as banking, warehousing, transport, communication facilities, marshalling yard etc.

iii) The low tax rates in Delhi as compared to the neighbouring States and the low transportation costs.

iv) Lower wholesale prices (exclusive of tax) as compared to the neighbouring States.

v) Lower Central Sales Tax on re-export of goods in Delhi as compared to the neighbouring States.

b) In 1951, Delhi had 22.8 per cent of its work force in trade and commerce which was second to the services sector. Though, by 1981, it maintained more or less the same proportion of workforce (22.25 per cent), it occupied the third position next to services and manufacturing, other than household goods. In absolute numbers, however, the work force increased from 1.17 lacs to 4.13 lacs during 1951 to 1981. During 1971-81 alone, it nearly doubled from 2.4 to 4.13 lacs (Table 6.5).

Most of the wholesale trades in Delhi were established during 19th and 20th centuries and are located in Old Delhi area, in close proximity to one another, and nearer the railway station. The wholesale activity in the central city has concentrated in an unplanned manner resulting in congestion, encroachment on public land, traffic bottlenecks and parking problems, besides causing excessive noise in the area.

The conventional approach to solve these problems has been the shifting and relocation of wholesale trade activities from the central area, mainly to the peripheral areas of Delhi and in some cases, even to some regional towns within the National Capital Region. The Delhi Master Plan-1981 had recommended shifting and relocation of some of the wholesale markets viz. vegetable market,

grain market, steel market etc. Some of these programmes have been successfully implemented (vegetable market, iron and steel market); some have been partially successful (cycle market); and some have failed. The revised Master Plan Delhi-2001 has now again proposed the need for decentralisation of these wholesale markets in the peripheral areas of Urban Delhi along with shifting of warehousing and hazardous activities to the areas specifically assigned to them at the periphery within Delhi. Some of these activities which are hazardous in nature and require extensive space have also been recommended to be located in the DMA towns. Keeping in view the fact that the relocation of these activities in Delhi Union Territory would further generate more employment opportunities and create congestion in the peripheral areas, thereby creating a contiguous expansion; it would be appropriate that alternative/additional wholesale markets are developed in the DMA and priority towns of the Region. Studies to carry out surveys and to identify such locations have now been initiated.

The major part of the commodities which are brought to Delhi are distributed outside Delhi. The percentages of exports outside Delhi, in some of the commodities like textiles and textile products radio, T.V. parts, fruits and spices, sugrical and scientific instruments are as high as 80. Due to the concentration of trade and commerce activities in Delhi, a regional imbalance has been created. The other towns of the Region are lacking in economic activities with weak economic base.

## C. Industry

### *i) Growth trends*

Industrial progress in Delhi in the last two decades has been phenomenal. The growth of industries in Delhi followed a typical trend, with slow progress upto 1970-71 and rapid one from 1976 onwards. There was a sharp



increase in the number of units from 26,000 in 1970-71 to 62,000 in 1984-85, i.e. an increase of 9.90 per cent per annum. The industrial employment increased from 2.15 lacs in 1970-71 to 5.58 lacs in 1984-85 registering a growth rate of 11.37 per cent per annum (Table 6.6).

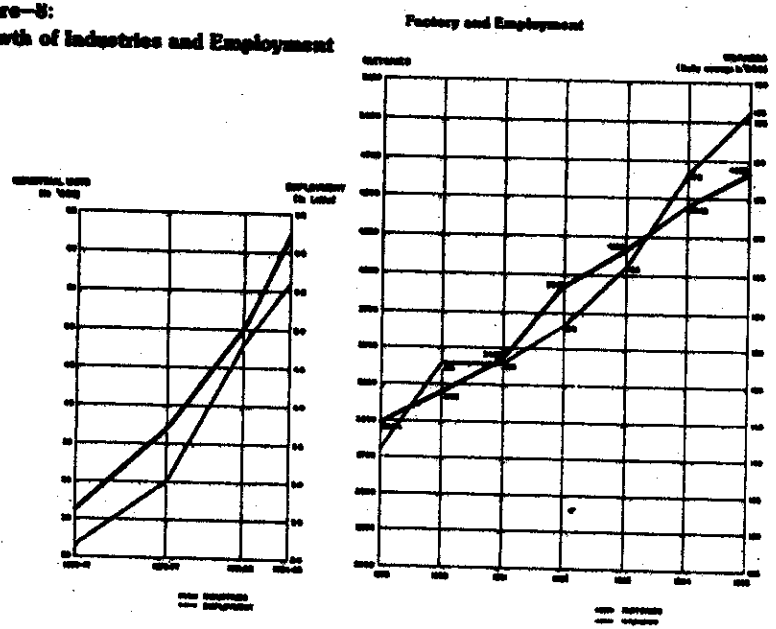
The number of registered industries, which constitute the organised sector has increased from 2,984 in 1979 to 4,652 in 1985 in Delhi. The number of daily workers in these factories increased from 1.41 lacs in 1979 to 1.85 lacs in 1984-85 (Table 6.7 Fig. 8).

Delhi which in 1951 and 1961 had administrative character is now very fast becoming a city of industrial character. The first Master Plan of Delhi recognised the need to put a curb on the industrial activities in Delhi and prohibited certain types of industries, mainly large scale and obnoxious industries, from being set up in Delhi. The increase in the industrial employment in the intervening period shows that the curbs prescribed by the Master Plan were not sufficient.

The revised Master Plan of Delhi 2001 has also recognised the need for restricting the industrial growth of Delhi for achieving balanced regional development and, has recommended location of only small scale industries in Delhi with stress on units which require more skill, but less of manpower and energy, are not nuisance creating and largely sub-serve Delhi's economy. Recommendations for shifting certain hazardous units and units located in non-conforming areas, have also been made in the existing as well as the proposed Master Plan for Delhi. Shifting of industries from Delhi requires decisions on various related issues along with a consensus about such shifting among the various interests which are involved in the process. It is feared that unless all these issues are tied up, it will not be possibe to implement these recommendations.

With the current aggressive entrepreneurship and local administration's promotional support, the share of

**Figure–8:**
**Growth of Industries and Employment**





industrial sector employment could well increase even beyond 30 per cent by the turn of the century. For a city of national importance, the fact that industrial sector is growing faster of all the economic sectors, needs serious consideration.

## DMA in Region's economy

In pursuance to the policies of the Master Plan for Delhi 1962-81 to disperse economic activities in the adjoining towns falling in the Delhi Metropolitan Area, the concerned State Governments developed large scale industrial activities in these towns. This resulted in a phenomenal growth of these towns during the last two decades. While undertaking industrial development in these towns, matching level of residential, commercial, telecommunication and other facilities have not been developed resulting in sizeable number of workers employed in the industries living in Delhi. This necessitates control on development of industries in the Delhi Metropolitan Area. Besides, some of the offices of the Government and Public Sector undertakings and the wholesale trades which are essential for Delhi can be suitably located in these towns.

## Role of informal sector in Region's economy

There are certain economic activities which are generally overlooked in the planning exercise as these do not fall in the cateogry of organised or well defined sectors of economy. Consequently, the needs of such activities and also of those people carrying out such activities, generally fall outside the purview of the normal planning and investment exercises. This unanticipated demand results in additional pressure on the existing infrastructure and services, thereby deteriorating them.

These activities collectively known as 'informal sector' are present in all the towns and cities in some form or the other. They range from production of engineering goods,

electronic and electrical goods, transport and various other industrial activities to retail and wholesale trading activities, servicing of varous equipment, domestic services etc. These activities are further characterised by some salient features viz small scale of operations, reliance on indigenous resources, low level skill requirements, low level of income, labour intensive technology, non-availability of adequate infrastuctural facilities etc.

A study on informal sector in the National Capital Region conducted through the Society for Development Studies, New Delhi for the NCR Planning Board had taken into consideration the informal sector activities in the towns of Alwar, Ghaziabad, Khurja, Faridabad and Sonepat. Similar studies are in progress for Meerut and Panipat towns. The study, while emphasising the dynamic role of the informal sector in the development process, has recommended that a phased programme for the development of informal sector activities should be prepared. The study has also emphasised the need for accessibility to institutional finance, skill upgradation programmes for the workers engaged in such activities and, better organisation of the informal sector entrepreneurship.

In the towns of the National Capital Region where induced development has been envisaged by developing economic activies intensively, alongwith the development of organised sector of economy, the growth of informal sector would be carefully nurtured. This would then play the role of a vibrant component of the urban economy and provide gainful employment to the potential migrants to urban areas.

In the priority towns which have been selected for induced development, there are certain economic activities traditionally being carried out since long and, also well recognised from the point of view of specialisation and their export potentials. Since in the past, no eforts have



been made with regard to provision of adequate infrastructure facilities for these activities in an organised way, the economic activities are being carried out in substandard conditions, in congested areas of the towns, in lanes and bylanes. An improvement in the working conditions by suitably locating them with provision of appropriate infrastructure and improvement in the technology will enhance the prospects of these activies and generate more employment.

**Policies and proposals**

Major employment generators in Delhi which need be dispersed within the National Capital Region fall under the following three categories: Government and Public Sector officies, Wholesale Trade and Commerce and, Industry. For the dispersal and development of economic activities in the Region, a three tier policy approach has been envisaged in the Plan: A policy of strict control for creation of employment opportunities within the Union Territory of Delhi, moderate control outside Delhi within the Delhi Metropolitan Area and encouragement with incentives, in the areas outside Delhi Metropolitan Area within the NCR.

**A. Government and Public Sector Offices**

*a) Strict control within the Union Territory of Delhi*

With regard to Government offices, the present policy and mechanism for screening the location of new Government offices and expansion of existing Government offices should be continued. The main criterion for location of offices in the Capital should be that they perform ministerial functions, protocol functions or liaison functions which, by their nature, cannot be performed anywhere else except in the National Capital. The existing offices which do not perform any of the above functions should

be identified and shifted from Delhi. In the case of Public Sector offices, there is an urgent need to scrutinise the list of existing offices and allow them to retain only very small establishments to cater for ministerial and liaison functions. The rest of the estbalishments should be shifted out of Delhi. The accommodation which may thus become available could be used to cater to the needs of the essential growth of the Central Government offices.

A study of the decisions taken by the Committee set up to scrutinise requests for fresh locations in Delhi shows that in 17 out of 27 cases, the offices have been located in Delhi itself.

*b) Control outside Delhi but within the DMA*

A similar control on the opening of new Central Government and Public Sector offices in the DMA towns should be exercised. Relocation or expansion of Government offices which have ministerial, protocol or liaison functions which make it incumbent upon them to be located in Delhi alone should be allowed to be located in the DMA towns. In so far as Public Sector undertakings are concerned, the restrictions on their opening new offices or expanding the existing ones should apply equally to the DMA also. Rest of them have to go out to the priority towns to be developed in the NCR or in the Counter-magnet areas identified by the Board.

*c) Incentives outside DMA but within NCR*

The Central Government offices which are considered for being shifted from Delhi and the DMA towns should be located in other towns of the NCR and, incentives in the form of CCA, HRA etc, as given to employees working in Delhi, should be given to employees who may be affected by this shifting for a limited period. Other incentives like providing Government accommodation,



allowances for study of their children also be given to act as an incentive. For locating the new Central Government and Public Sector offices in the DMA and/or the priority towns, alternative sites should be identified and developed by the development agencies in consultation with the Board's secretariat.

**B. Wholesale Trade and Commerce**

*a) Decentralisation of wholesale trade and commerce in Delhi*

There should not be any special advantage in terms of preferential treatment or lower taxes by way of incentives to wholesale trade in Dehi vis-a-vis the adjoining States. Those wholesale trade which are hazardous in nature such as plastic and PVC goods, chemical, timber, food grains, iron and steel and building material and require extensive space may be decentralised by developing suitable additional locations outside Delhi.

*b) Development outside Delhi within DMA*

There are certain wholesale trade and storages in Delhi which are hazardous because of their location in congested areas and also due to bulk handling activities relating to plastic and PVC goods, chemical, timber, food grains, iron and steel and building material. These wholesale trades in addition to new trades and related activities should be encouraged to be developed in the DMA towns.

The possibility of developing modern Super Markets should be explored in the Delhi Metropolitan Area towns.

*c) Development outside DMA within NCR*

Incentives, concessions and infrastructure should be made available in the regional towns to encourage and accelerate the growth of trade.

## C. Industries

*a) Control within the Union Territory of Delhi*

The present policy of not promoting location of medium and large scale industries within Delhi should be continued.

*b) Control outside Delhi but within the DMA*

While in the long term perspective, the growth of large and medium scale industries in DMA towns may have to be restricted, these industries may be permitted in the DMA towns for a period of 10 years, whereafter the policy shall be reviewed. The emphasis will be on promoting growth of large and medium scale industries in priority towns in preference to DMA towns.

**c) Incentives for industries outside the DMA but within the NCR**

The towns selected for priority development should have a strong industrial content, and incentives comparable to those given to industries in centrally declared backward areas should be given for location of large, medium and small scale industries. Industrial estates should be developed in these towns. Specific areas should be earmarked in the Region outside the DMA, for relocation of non-conforming, polluting and obnoxious industries proposed for shifting in the Delhi Master Plan-2001.

# 7

# Transport

The NCR Plan is based on the concept of developing the Region in a balanced manner with optimum growth. It would be multi-sectoral in its nature and scope, ensuring inter and intra sectoral integration. An integrated transportation system in this strategy would rather 'lead' than 'follow' development.

**Existing characteristics:**

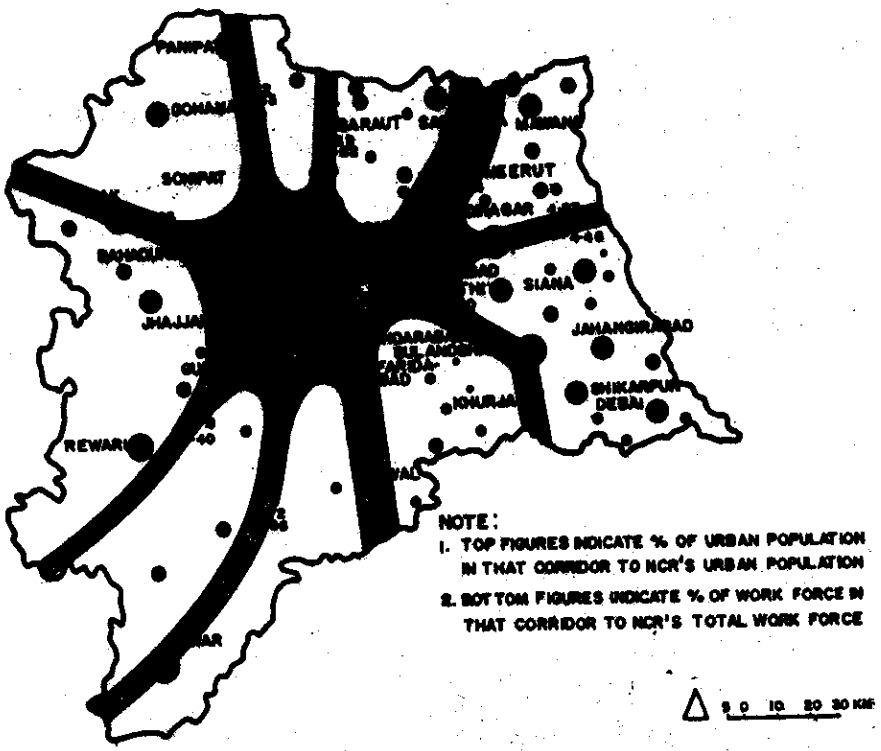
**i) Network of Transport**

The existing primary transport network in the NCR exhibits a pattern of "radial corridor" development. There are nine major corridors in the network of transport system. (Fig. 9) In addition, there are seven orbitals which provide the linkage among important urban centres of the Region. There has been a substantial increase in the volume of activities, workforce and population along these corridors over the period, and as such, it is only logical that these activities and population attracting corridors are utilised to gain the prime objective of the NCR Plan of controlling the growth of Delhi through induced development of the regional towns and by deflection of economic activities towards them.

*a) Road Network*

The existing road network in the Region shows a convergence towards Delhi, with the five National

**Figure–9: Transport Corridors**






Highways (NH) 1, 2, 8, 10 and 24 terminating at Delhi. The National Highways are four lane divided upto Sonepat on NH-1, Ghaziabad on NH-24, Ballabgarh on NH-2, Gurgaon on NH-8 and Bahadurgarh on NH-10, and the rest of the portions beyond are two laned. The twelve State Highways also serve in strengthening the regional road network. Most of the State Highways are single or intermediate laned except for very busy stretches like Ghaziabad-Meerut and Ghaziabad-Bulandshahar which are two to four laned.

*b) Rail Network*

The NCR rail network covers three zonal railways (Northern, Western and Central) and five divisions. The rail network in the Region consists of both Broad and Metre gauges. Five railway lines converge at Delhi. The rail network has two specially identified lines known as the Goods Avoiding Line (GAL) and, the Delhi Avoiding Line (DAL). The GAL provides a direct entry from Ghaziabad into New Delhi, bypassing the congested Delhi Railway Station complex. The DAL provides a direct passage from the major yards-Tughlakabad and Ghaziabad directly into the Delhi-Ambala-Kalka section, and the sections through Lajpatnagar, Patel Nagar, Dayabasti and Azadpur link.

**ii) Volume of Traffic: 1987**

Transport system development would be highly capital intensive and of long gestation period. It is, therefore, necessary to base the planning of regional transport system appropriate to different policy scenarios on a set of sound and reliable data. For this purpose, various traffic and transportation studies were got conducted through Operations Research Group, Baroda. These studies threw up the following present and future characteristics of traffic flow in the Region:

*a) Road*

Traffic volume-count surveys to estimate the traffic intensity on different road links connecting all important centres in NCR show that the heaviest interactions take place on Ghaziabad-Delhi section (Table 7.1) followed by Delhi-Faridabad and Delhi-NOIDA sections. The composition of vehicular traffic on Delhi corridors of five National Highways is of 67.3 per cent of passenger vehicles, 7.7 per cent of buses and 25 per cent of goods vehicles. Delhi emerges as a major point of attraction and traffic generation in the Region, with relatively less interaction among the other towns.

*b) Rail*

The line capacity in and around Delhi is heavily strained. The area around Delhi, within Delhi Division of the Northern Railway distinguishes itself from the rest of the Region, and is commonly known as the "Delhi Area". 75 per cent of the goods traffic and 65 per cent of the passenger traffic are handled in this intensively worked Delhi Area through 65 goods trains and 230 passenger trains. Presently, the inflow and outflow of commuter traffic which has a peaking character is not catered to effectively by rail transport. the 79 suburban trains on the eight rail corridors are insufficient to cater to this load and, the commuters have to often utilise the 29 long distance trains available to them during the peak periods. This usage has in turn affected the punctuality and departures of the long distance trains.

A peculiarity of Delhi Area is that it also works as distributive centre for the areas in the Region due to convergence of major regional trains at Delhi and, lack of loading and unloading facilities at other railway stations in the Region. Train loads of freight traffic are also received into the Delhi Area, but no back bulk loading takes place.



**iii) Passenger Movement — Road and Rail**

The generation of total daily passenger movement by all modes in the Region is estimated at 8,84,000 (Table 7.2). Share of rail to the total traffic generated is 23.7 per cent and of public transport, about 32 per cent.

Share of Delhi UT in the total passenger movement generated in the Region by all modes is the highest. There are quite a few urban areas such as Ghaziabad, Meerut, Faridabad, Rohtak, NOIDA and Bulandshahar which contribute to the regional traffic generation but their share is comparatively smaller than that of Delhi.

*a) Per capita trip rate*

The per capita inter-urban trip rate for bus passengers varies from 0.021 for Delhi to 0.142 for NOIDA, that of vehicle passengers, from 0.007 for Delhi to 0.65 for Rohtak, and that of rail passengers from 0.011 to 0.085 (Table 7.2). These variations are found to be a result of both size and characteristics of an urban area. The general trend observed is that increase in population size and diversification of economic base result in decline in the per capita trip rate, whereas, increase in per-capita trip is an indicator of lesser degree of self containment of a town.

*b) Movement pattern*

Of the total passenger traffic by buses and that by private vehicles, the share of intra-regional passenger traffic by buses is 65 per cent and by private vehicles 85 per cent and the share of through traffic (both ends of the trips outside the Region) is very small. This shows that the by-passable traffic in the Region is insignificant (Table 7.3).

In the case of urban nodes, the component of through traffic by bus via Delhi UT is only 8 per cent whereas through traffic via Ghaziabad, Hapur, Panipat, Sonepat d Modinagar is as large as 60 per cent. The by-passable

passenger traffic by other vehicles varies between 20 and 80 per cent. As such, it is apparent that smaller the urban node for attraction and generation of the traffic, higher is the proportion of by-passable traffic, if the urban node lies on the main trunk route. Location of the towns vis-a-vis the routes being followed is also a factor which contributes significantly to the by-passable traffic. To quote an example, Ghaziabad, which is located at the confluence of three main corridors of movement is having the highest by-passable traffic.

### iv) Goods Movement — Road and Rail

The total volume of goods moved on the regional road network of the NCR is about 1.92 lac tonnes (1.84 lac tonnes excluding through traffic) of which the share of Delhi bound traffic is about one-third while that of the other urban centres in relation to the DUT is very small.

In the case of railway goods traffic, the importance of Delhi is more overwhelming (60 per cent) as compared to that of road. However, there are quite a few urban centres of significance namely Ghaziabad, Panipat and Meerut. Share of railways in total goods traffic attracted by the NCR (excluding through traffic) is only about 14 per cent.

#### *a) Movement pattern*

About 63.4 per cent of the goods movement by road is inter-regional and 33 per cent is intra-regional in nature while railways goods movement is inter-regional. The through traffic of goods movement by road is a mere 4 per cent.

In intra-regional traffic movement by road, DUT followed by the other DMA towns are the important centres and, in the inter-regional movement, vicinity States of the NCR account for a sizeable share. For railway movement, the largest contributor to inward movement is the Eastern Railway followed by the Northern Railway.



#### b) Commodity Movement

Commodity composition of inward traffic in the shape of industrial raw material is more through rail traffic and less through road. In case of building material, the share of both the modes are equal. Foodgrains account for a sizeable portion of road and rail traffic whereas vegetables and fruits are catered to mainly through road transport. There are, however, large variations in the type of flow from one group to another.

| *Commodity* | *Road (%)* | *Rail (%)* |
|---|---|---|
| Food grains | 12.0 | 13.6 |
| Vegetables & fruits | 8.7 | 0.2 |
| Manufactured food items | 9.7 | 1.8 |
| Industrial inputs | 19.1 | 46.8 |
| Manufactured household products | 15.7 | 5.0 |
| Building material | 20.4 | 18.6 |
| Other industrial products | 6.7 | 0.4 |
| Petroleum products | 1.0 | 4.0 |
| Miscellaneous items | 6.7 | 9.6 |
| Total | 100.0 | 100.0 |

### Traffic projection-2001

The projection of traffic volumes, both of goods and passengers is to be necessarily based on the likely population size and economic base of the towns in the Region in order to accomplish the core objectives of achieving a manageable Delhi subserved by a harmoniously developed Region by 2001.

### i) Passenger trip projections

Besides behavioural and operational aspects of future travel demand pattern, the forecast of future passenger traffic assumes that:

i) trip rate (inter-urban) by each mode is a function of the population size of an urban area, its socio-economic base and also locational factors, particularly the relation between the resident workers and jobs. These factors are, in a sense, reflected in what may be called the degree of self-containment of an urban area. The higher the degree of self-containment, lesser is the per capital trip rate (inter-urban) as in the case of DUT. Other factors like per capita income and behavioural parameters, though important in some cases, have not been explicitly taken into account and,

ii) the trip rate for railway is both a function of the variables noted above and also the availability of the facility itself.

Accordingly, the volume of trip generations through the total vehicle passenger and public transport for the Region as a whole are forecast at 7.84 lacs an 19 lacs respectively (Table 7.4) On the basis of assigned population, economic base and trip rate, the lowest growth rate of passenger trip will be for DUA and Ghaziabad, (though the projected absolute volume of increase for DUA is much larger compared to other areas), whereas a higher growth rate is forecast for towns with expected high degree of industrialisation and trading activity such as Alwar, Panipat and Gurgaon.

**a) Projected traffic flows: Road**

The total traffic projected to move by bus and passenger vehicles are 13.99 lac trips and 4.77 lac trips respectively. The distinct concentration in Delhi of about one-third of the trips currently being generated and attracted by it is, however, projected to decline to about 19 per cent. But in absolute terms, there would be an increase in the generated and attracted traffic of Delhi due to increase in



population size by 2001.

| Mode | 1987 Generated % | 1987 Attracted % | 2001 Generated % | 2001 Attracted % |
|---|---|---|---|---|
| Bus | 32.2 | 32.6 | 19.5 | 19.3 |
| Passenger | 23.7 | 26.1 | 19.4 | 19.9 |
| Truck | 22.0 | 32.6 | 13.8 | 19.1 |

*b) O-D flows-2001*

**Vehicle passenger** : An important change is predicted in the gain in movement to and from DMA towns exception being NOIDA which will continue to have a limited interaction (only with Delhi). Among the priority towns, interaction with Meerut, Gurgaon, Panipat and Alwar gains significantly so also rest of the NCR in Uttar Pradesh with Hapur as a centroid. The other important change in the redistribution of flows is the likely reduced importance of Delhi based flows.

**Bus**: Currently, the bus passenger flow originating from or terminating at Delhi shows that about one-third of the total trips made within or through the NCR have one end of their trip at Delhi. This is estimated to be about 19 per cent by 2001. However, in absolute number of Delhi based trips, the increase will be about 1 lac after taking into account the impact of improvements in rail system. The intra-regional share of public transport is projected at 54 per cent which is less as compared to the present share due to large railway share in intra-regional public transport. Major movements follow similar pattern as that of vehicle passenger but the proportion of larger distance trips will be more. A significant forecast is of larger number of flows between the priority towns and the DMA towns.

**ii) Goods traffic projections**

The goods traffic generation is explained more by

economic activity base than population size. Accordingly, projections of goods traffic are based on employment in large, basic and small scale industry and indices of volumes of wholesale and retail trades. (Table 7.5).

The share of intra-regional traffic will remain less (36 per cent) compared to the bulk of inter-regional traffic. The share of Delhi will fall from 25 per cent to about 15 per cent by 2001. The goods traffic flows between the priority towns and DMA towns will go up in future. Major traffic flows are expected with outside the Region. However, Ghaziabad, Faridabad and Panipat show an increasing trend.

**Objectives, Policies and Strategies**

The objective of the transport plan is to promote and support the economic development of the Region and, relieve the Capital of traffic congestion. It is to provide accessibility to all the parts of the Region and discourage the transit of passengers and goods through the core area Delhi by providing by-passes and thereby opening areas for economic development of the rest of the Region.

Transport is essentially looked upon as a service, though it has all its economic by-products. A sound transport policy will be a catalyst for the growth and economic development of the Region and also influence the directon of the growth. The development strategy includes:

i) interconnection of regional centres among each other, and with the Capital by efficient and effective network system for free movement;
ii) provision of shortest and free movement network to inter-connect the maximum traffic attracting and generating urban nodes in the Region to diminish the centrality of Delhi;
iii) decongestion of Delhi roads and terminals by diverting the by-passable long distance through traffic;



iv) provision of suitable fast suburban operating system for efficient and effective movement of commuters and for boosting up of the development of economic acitivies in the urban nodes of the Region; and
v) integration of road and rail network system in Delhi, DMA and rest of the Region with appropriate inter-facing facilities.

Fig. 10 dipicts conceptually the proposals.

**Programmes and proposals**

The transport plan study concludes that the existing transport system will be highly inadequate and ineffective to cope with the projected flow of traffic in the Region by 2001. To supplement the present transport network, the Plan proposes the following:

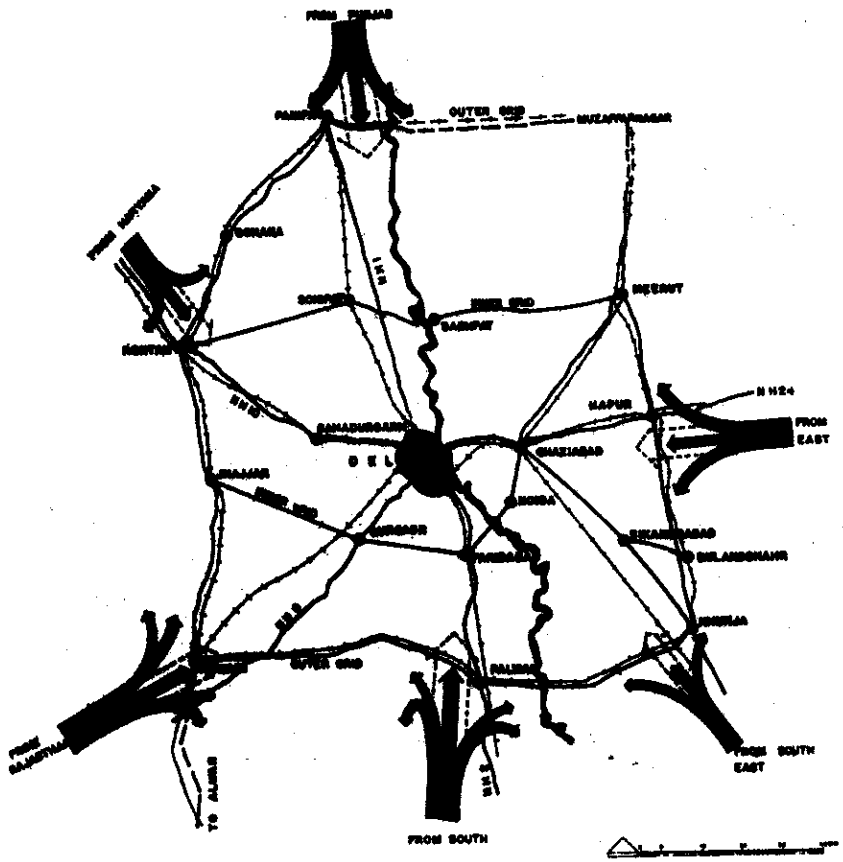
*i) Proposals for the Road Network*

i) On the basis of evaluation of alternative road networks and also, expected role that railway system would play in carrying additional passenger traffic, the road network will include (Map 2):

a) Express ways on new/parallel alignments,
b) Upgradation of existing National Highways,
c) Development of inner and outer grids, and
d) Sub-regional road network.

a) Since the conversion of existing National and State Highways to Expressways will face several constraints in terms of clearing the large built-up areas within the right of way and, also provision of a very large number of junctions/crossings, particularly on the Delhi—Meerut and Delhi—Panipat corridors, development of Expressways (4-lane divided initially with full access control and all intersections grade separated) with 100 metre right of way on entirely new/parallel alignments have been proposed. The Expressway on a new alignment shall lead to sizeable savings in travel time, fuel cost and increased convenience

**Figure–10: Concept Plan for Transport Network**






of free and faster travel leading to an overall monetary savings of about 100 per cent over and above the savings by improvement of existing road network. The three expressways have been proposed as follows:

**Upto 2001:**

On parallel alignment: i) between Delhi-Ghaziabad-Modinagar-Meerut, and ii) between Sonepat-Panipat, and on new alignment iii) between Faridabad-NOIDA-Ghaziabad.

**Beyond 2001:**

a) On parallel alignments: i) connecting Delhi-Gurgaon-Rewari-Behror, ii) between Delhi-Sonepat connecting the Sonepat-Panipat Expressway, and iii) connecting Delhi-Faridabad-Palwal-Hodal, with a link to Faridabad-Ghaziabad Expressway and creation of additional capacity for traffic between Delhi and Faridabad.

b) Upgradation/widening of existing National Higways by 2001:

i) Development of Delhi-Gurgaon stretch to six lanes on NH-8,
ii) Development of Gurgaon-Behror stretch to four lanes on NH-8,
iii) Development of Ghaziabad-Hapur stretch to four lanes on NH-24,
iv) Development of Bahadurgarh-Rohtak -NCR Boundary to four lanes on NH-10, and
v) Development of Faridabad-Hodal stretch to four lanes on NH-2,

c) Development of an inner grid and an outer grid (two lane initially with ultimate capacity of four lane divided highway) with 60 metre right of way.

**Inner Grid:**

i) On new alignments to connect Murthal to Baghpat, and

ii) Strengthening and widening of existing alignments on Rohtak-Sonepat-Murthal, Baghpat-Meerut and Jhajjar-Gurgaon-Faridabad stretches.

**Outer Grid:**

i) Strengthening and widening of existing alignment on Palwal-Sohna-Rewari-Jhajjar, Rohtak-Gohana-Panipat, Meerut-Hapur-Bulandshahar-Khurja-Palwal, Khurja-NCR boundary (south), Meerut-NCR boundary (north) and Bhiwadi-Tijara Kishangarh-Alwar stretches.

*d) Sub-regional road network*

Smaller towns of the National Capital Region have been stagnating mainly because of their location in the shadow of bigger urban centres. However, their economy could be revitalised by providing suitable infrastructure facilities so that they act as link between the rural areas and the bigger urban centres besides acting as service centres for the rural population. Efforts would be to inter-connect the same order centres directly and the lower order centres with their nearest higher order centres. A system of feeder roads of higher standard would be evolved to connect the work centres and industrial estates with the nearest regional or sub-regional centres. This will be dealt in Sub-regional Plans in detail.

**ii) Proposals for the Railway network**

The projected total passenger traffic suggests a need to improve railway system. Accordingly, a regional rail by-pass and several improvements (Map 2) are envisaged:

*a) Regional rail by-pass*

Studies on transportation network for the Delhi Urban Area have established the need for creating new railway



lines to by-pass through traffic from Delhi Area. This has also been found necessary in those studies in order to release the existing capacity for the needs of sub-urban and daily commuters' traffic in the Delhi Urban Area. Such a Regional by-pass would further give a tremendous boost to the economy of the Region by opening up of new areas and help in fulfilling the national objectives of movement of bulk goods. The study conducted by Operations Research Group was required to approach this issue from the narrow-angle of the regional needs only and they found justification for the proposed bypass only beyond 2001. The Planning Committee and the Board have considered regional bypass traversing through Meerut-Hapur-Bulandshahar-Khurja-Palwal-Rewari-Rohtak and Panipat to be essential to further the objectives of an integrated and balanced development of the Region, including the Delhi Urban Area. Part of this link already exists between Meerut-Hapur-Bulandshahar-Khurja and Rohtak-Panipat. and, new lines are to be laid between Khurja-Palwal-Rewari-Jhajjar and Rohtak for about 205 km. The propsed rail link should also connect the newly emerging industrial towns of Bhiwadi and Dharuhera. It is understood that the Railway Board is already preparing a Techno-Economic Feasibility Study for the new lines which would further help in establishing its need.

*b) Suggested improvements*

The existing network has a number of bottlenecks which can be removed to create quite a large capacity in the rail network. The most important of them are:

i) The carrying capacity of existing passenger trains could be substantially increased by adding to the number of coaches,
ii) Creation of additional capacity in Delhi area by re-routing certain through trains,
iii) Rationalisation of movement of freight traffic to

Punjab/Haryana to avoid their concentration in Delhi at present,

iv) Elimination of existing bottlenecks on short stretches by providing additional facilities such as:

— provision of an additional pair of lines on Palwal-Faridabad-Delhi section,

— laying of a single Broad Gauge line between Delhi-Rewari-Alwar,

— addition of a line to the single line between Muradnagar and Meerut Cantonment and electrifying the entire section, and

— an additional pair of lines between Delhi-Ghaziabad and Khurja

v) Development of terminal facilities at four locations in accordance with the Master Plan for Delhi 2001.

v) After the implementation of the above proposals for augmentation of the rail network, the following Priority Towns and towns in the DMA would not have a rail link. Studies should be carried out to ascertain justification of such rail links: 1) NOIDA 2) Kundli

**iii) Proposal for Air Ways**

Regional Centres are to be developed on a priority basis by inducing their growth through economic activities. It is necessary to study the possibilities of extending air services to these towns through short distance carriers.

**iv) Inter-facing**

The foregoing proposals are primarily based on the inter-urban movement requirements in the Region. Another important component of transport flows is intra-urban movement. The synthesis which would be required between the two can only be achieved through a proper planning of inter-facing facilities. The two major points for consideration are:



a) the effects of the inter-urban movements on intra-urban circulation pattern, and

b) the consequent need for new terminals, if any.

The problem of circulation is mainly expected to be felt in Delhi rather than in other centres of the Region, because most of the other towns would be served through a bypass road (as proposed) which would mitigate the problem of through traffic. The projected daily traffic by 2001 which would use Delhi's network will be 144 per cent more than the existing traffic:

| *Year* | *Paasenger vehicals* | *Buses* | *Goods vehicles* | *Total* |
|---|---|---|---|---|
| 1987 | 53890 | 25370 | 77320 | 156580 (100%) |
| 2001 | 92270 | 42400 | 149500 | 284170 (100%) |

The existing outer ring and ring road in Delhi which are the main arteries for dispersal of regional traffic will not be able to effectively cope with collection and dispersal of inter-urban traffic in the future. Similar will be the problem in rail network in catering to the needs of the future passenger and goods movement. This suggests the need for another concentric ring of a limited access type and preferably not having any major points of origin/destination for the regional traffic along it.

The integration of the regional network with that of urban area network specially for Delhi should be examined from the point of view of accessability to the four integrated metropolitan passenger terminals and freight complexes proposed in Delhi Master Plan 2001, which will also serve DMA.

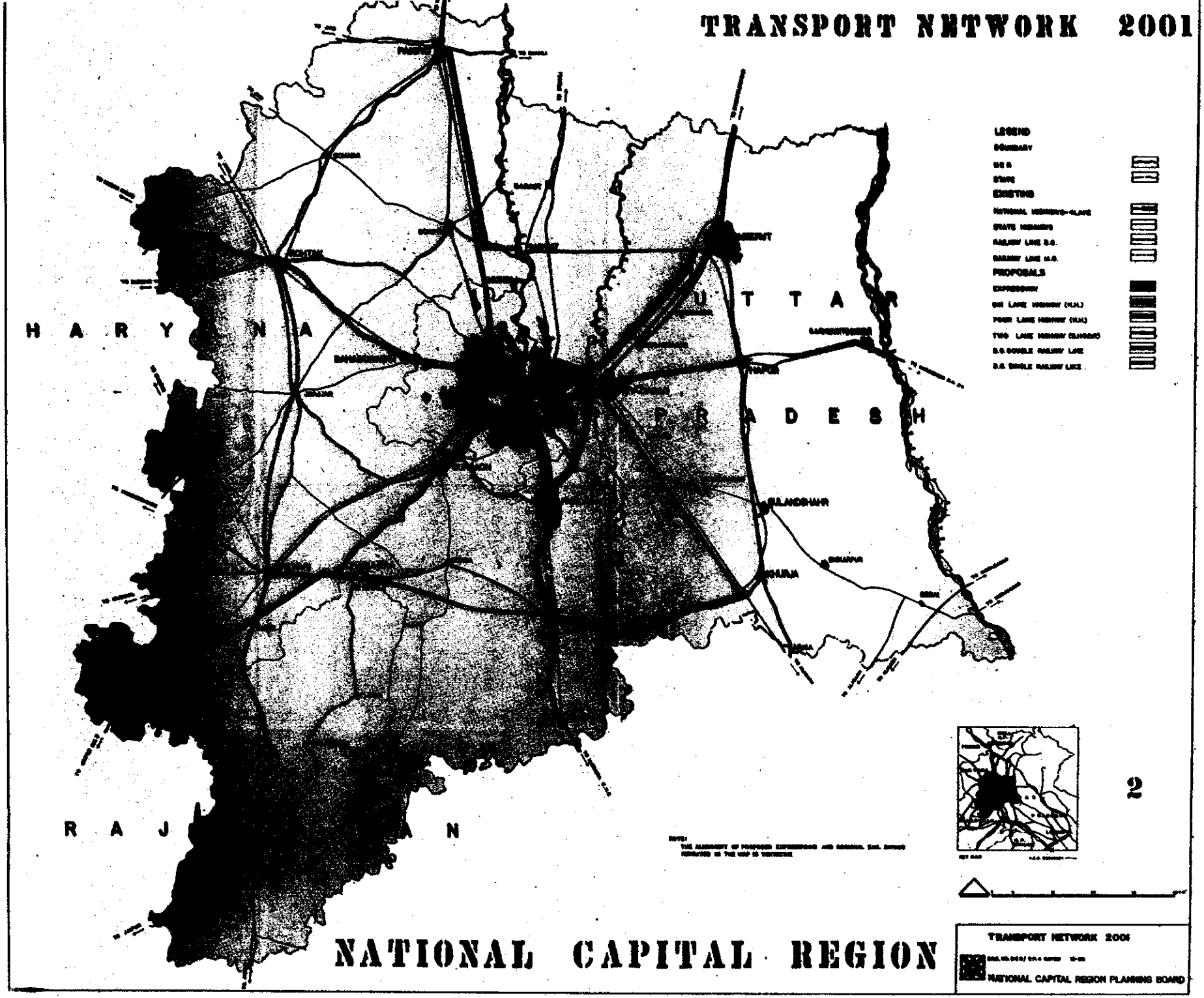
These terminals and complexes should be along the proposed concentric ring and, also connect the existing outer ring road so that the inter urban traffic would flow either through these regional roads or proposed

expressways and, follow the proposed ring upto its metropolitan passenger terminals/freight complexes. It would branch off using the existing connections nearest to the proposed terminals/complexes and to the proposed ring. Similarly, in other important urban nodes of the Region, the terminal facilities would need to either drastically expand their existing facilities or go in for suitably located new terminals.

**v) Integration of transport services**

The problems of Regional transport in the NCR are of a varied nature. At present, various transport authorities/ agencies are responsible for planning, development and managing transportation facilities and services. They operate, in large parts of this Region independent of each other. This results in avoidable long journey time, and more expenditure. The responsibilities for providing transport facilities and enforcement of rules and regulations are often fragmented and vague. The agencies charged with such responsibilities need to be strengthened and a coordinating agency needs to be constituted with representation of various transport authorities, which would coordinate and take an overall and integrated view of the total transportation system in the Region. This agency will be for the entire Region, having a long term goal of planning and development of a co-ordinated network of transport services.

The recommendations contained in the Draft Regional Plan-2001 and the Interim Development Plan for setting up of a unified Regional Transport Authority for the NCR was referred to, by the Ministry of Urban Development, to the Task Force which went into the question of Mass Rapid Transit System (MRTS) and similar Authority for Delhi. However, no recommendation in this regard has been made in the report of the Task Force. An earlier attempt by the Ministry of Surface Transport to achieve


TRANSPORT NETWORK 2001
H A R Y A N A
U T T A R
P R A D E S H
R A J A S T H A N
BULANDSHAHR
LEGEND
EXISTING
PROPOSALS
2
NATIONAL CAPITAL REGION
TRANSPORT NETWORK 2001
NATIONAL CAPITAL REGION PLANNING BOARD

effective co-ordination through inter-State Transport Commission under Section 63-A of the Motor Vehicles Act, 1939 on a much bigger scale has also not met with much success. There is no other provision in the Motor Vehicles Act which could enable the setting up of such Authority. Nor does the National Capital Region Planning Board Act has any such provision. An Authority for the Region could, therefore, be set up either through fresh Legislation under Clause (i) of Article 252 of the Constitution with the consent of the participating States or, through a Resolution of the Board itself which obviously would be of a non-statutory nature. It is felt that in the present situation, only this course of action of setting up of an Authority or any other co-ordinating Body through a Resolution of the Board would be achievable.

# 8

# Telecommunications

Telecommunication is a vital and essential infrastructure for socio-economic development. It can replace to a large extent the personal travel and as such, can become very cost effective. Telecommunication services could be complementary to other investments in the development process which enhances the productivity and efficiency in other sectors.

Provision of telecommunication facilities assumes a special importance in the context of the NCR, where not only decentralisation of economic activities is envisaged from the metropolis to areas outside but also induced development of the priority towns. These towns are proposed to be developed with a diversified economic base where secondary and tertiary sectors will form the dominant economic activities. These sectors are much more dependent on telecommunication services. Moreover, Delhi, the mother city will continue to remain in the centre of decision making and a window to the outside world, and telecommunication links shall provide the means of information necessary for business decisions.

In the eight priority towns/complexes indentified for priority development, the existing Telecommunication facilities are inadequate in terms of their capacity and sophistication of technology. Some of the existing facilities have out-lived their design life and, are unreliable and inadequate. An overview of the existing telecom facilities in the DMA and priority towns shows that the existing



capacity varies form 100 to 7600 lines whereas the wait-listed demand ranges from 3 to 7585, the maximum being in Faridabad as of 1987 (Table 8.1).

The telex facilities are available only in a very limited number of towns such as Faridabad, Gurgaon, Panipat, Alwar, Meerut, Ghaziabad and NOIDA and their capacities are expected to be augmented by the end of the Seventh Plan when a few more DMA and priority towns of the Region like Rohtak, Rewari, Bhiwadi, Palwal, Hapur and Bulandshahar are likely to be covered (Table 8.2).

The priority towns are to be developed faster to as to absorb more economic activities and thus to attract the Delhi bound potential migrants to the extent of 19 lacs by 2001 A.D. For an effective realisation of this goal, and development of economic activities especially relating to industries, trades and commerce, telecommunication facilities would be essential. Moreover, in order to make the priority and DMA towns as attractive as Delhi in respect of provision of employment opportunities and standard of living, the facilities in these towns should be made comparable to that of Delhi.

In order to achieve the objectives, the long term proposals for 2001 AD are:

i) full automation of telephone services,
ii) replacement of all life expired exchanges and related accessories,
iii) provision to telephone and telex facilities practically on demand,
iv) extension of subscribers dialling facilities to DMA and priority towns.
v) connection of priority and DMA towns with Delhi by reliable cable or radio media,
vi) provision of reliable trunk services either by direct dialling or through demand services among the priority towns and DMA towns,

vii) extension of telegraph office facilities to all the towns as may be justified; and
viii) replacement of all the manual and mechanical exchanges in Delhi as well as other towns of the Region by electronic exchanges.

As the telecommunication facilities are as important as other community facilities, the planning and development agencies should take note of the proposals so as to provide adequate land in appropriate locations for provision of these facilities right at the planning stage.

It would be desirable that for smooth services, a separate electricity feeder to the telephone exchanges and underground ducts in Delhi and other big towns of the Region for telophone cables for their safety and better maintenance are provided.

During the Seventh Plan (1985-90), the Department of Telecommunications have the following national objectives to meet the demand and addition and alllocation of direct exchange lines (DEL) for the corresponding switching capacity:

i) To meet the average demand upto September 30, 1986 in all the metro and major telephone districts and the demand upto April 1, 87 in MAX-I, upto April 1, 88 or MAX-II, and upto April 1, 90 for MAX-III or manual exchanges in all the minor districts to telephones circles.
ii) To provide telex connections practically on demand by April 1, 90.
iii) Connecting all the district headquarters to main trunk network through atleast one reliable media.
iv) To connect all exchanges having capacity larger than 1000 lines through a reliable media to the Natioanl network.

According to the information collected from Department of Telecom (DOT) (Table-8.1), 11 station namely Faridabad-Bahadurgarh-Gurgaon-Dharuhera-Palwal-Alwar-Bhiwadi-



Ghaziabad-Loni-NOIDA and Khurja would be provided with exchanges equipped with latest technology by the end to the Seventh Five Year Plan.

The Department of Telecom is in the process of formulating their broad objectives for the Eighth Five Year Plan (1990-95). These objectives are mainly for further boosting up of telecom services both in quality and quantity. This will benifit the NCR towns also in a big way. The broad objectives are as follows:

i) All worn out equipment in the telephone exchanges having 25 years service upto April 1, 90 to be replaced.
ii) All manual exchanges to be replaced by automatic exchanges.
iii) All Sub-divisional and Tehsil headquarter to be provided with STD facilities and to be connected to the national network by reliable transmission media.
iv) All exchanges of capacity of 500 lines or more as on April 1, 90 are to be provided with STD facility. An effort will be made to cover all NCR priority towns even with lesser capacity than 500 lines, specially industrial urban areas such as Bhiwadi-Dharuhera and MIA-Alwar for STD facility.
v) All industrial growth centres, tourist and pilgrimage places to be provided with STD Pay-Phone Facility.
vi) Providing telex connections practically on demand.
vii) All district headquraters to be provided with Telex, Public Call Offices (PCO), and
viii) All Telex exchanges to be of electronic types.

In addition to these, following new service have also been envisaged by the DOT during the Eighth Plan:

i) Penetration of data services under the project VIKRAM (opening of more nodes) tele-tax, video-tax, telefax and electronic mail to be increased.
ii) The delivery to telegrams within 12 hours from 500 Central Telegraphic Offices (CTO)/Departmental

Telegraphic Offices (DTO) to be expanded to cover more number of CTO and DTO.

On the basis of likely level of economic activities in the priority towns and the DMA towns, the telecom demand has been projected by the Ministry of Communications and targetted to be achieved in three successive phases namely by 1990, 1995 and 2000 AD coinciding with Seventh, Eighth and Ninth Five Year Plans (Table 8.3). However, necessary adjustments should be made in the plan provisions wherever possible, to accelerate the achievement of these objectives. The Board shall be separately identifying the sub-regional centres in the Sub-regional plans to be prepared by the participating States. The Telecommunications needs of these centres would be than taken up with the Department of the telecommunications for adequate provisions in their plans.

# 9

# Power Development

Electricity, one of the most important forms of energy, is the life-blood of modern society. It is indispensable for any development whether industry or agriculture, and for improving the living standards of the people.

**i) Power generation**

a) **Existing :** The National Capital Region falls in the Northern Power Zone and has in operation six power generating stations - five thermal and one gas fired. Three stations are in Delhi UT run by the Delhi Electricity Supply Undertaking (DESU) and the rest three in the Haryana portion of the NCR, two run by the Haryana State Electricity Board (HSEB) and one by the National Thermal Power Corporation (NTPC). The aggregate installed capacity of these generating stations is 1834.1 MW (1987).

b) **Under construction:** Of the five power plans with the total installed capacity of 1665.3 MW under construction, three are thermal, one micro hydel and, one nuclear type (Table 9.1). 815 MW of power would become available from four plants within the Eighth Plan. Thus, the total installed generating capacity by the end of 1995 in the NCR would be around 2644 MW.

**ii) Power supply position: 1986-87**

a) **Delhi UT:** The maximum demand for power in

Delhi has already reached 968 MW (August, 1986). The present availability of power to the DESU from its own sources is limited to about 200-250 MW from I.P. station. A gas turbine generator with an installed capacity of 180 MW has already been commissioned in November, 1986, which will take care of the peak load requirement of Delhi. The Badarpur Thermal Power Station (BTPS) supplies 400-450 MW to Delhi. The DESU has also a share in the Centrally sponsored schemes like Singarauli Super Thermal Power Station, Bairasiul. Hydro Power Station and Salal Hydro Power Station. During 1986-87, Delhi UT required 5676MU against which the supply was 5674 MU—a shortage of only 2 MU or 0.04 per cent.

b) **Haryana:** Haryana, in addition to receiving power from its own generating stations, receives power from Bhakra Nangal complex, Dehar and Pong power houses under Bhakra Beas Management Board (BBMB), Bairasiul Hydel station and I.P.Station (Delhi) to meet its demand. In Haryana, during 1986-87, against the requirement of 5945 MU of energy, only 5147 MU was available and thus there was a shortage of 13.4 per cent which reflects the power position of the Sub-region also.

c) **Rajasthan:** Rajasthan's power demand is met by the generating stations owned by the Rajasthan State Electricity Board, the BBMB system, Singarauli Super Thermal system and the neighbouring states. In Rajasthan, against the requirement of 8090 MU of energy, 7448 MU was available during 1986-87, and thus, there was a shortage of 7.9 per cent . However, due to some preferential treatment to the industrial areas of Alwar and Bhiwadi, shortage of electricity has been a minor constraints.

d) **Uttar Pradesh:** Uttar Pradesh receives power from the integrated grid of the Uttar Pradesh Power System and the Northern Regional Grid. The Uttar Pradesh Power System being operated in synchronisation with the Northern Region Grid comprising Jammu and Kasmir, Punjab, Himachal Pradesh, Haryana, Delhi, Rajasthan and



Part of the Madhya Pradesh. Against the requirement of 20204 MU, the supply was only 17198 MU during 1986-87; thus, there was a shortage of 14.9 per cent in the States. Once again, the towns and industrial areas at Ghaziabad and NOIDA have been getting a preferential treatment in respect of power supply.

Month-wise energy shortage during the period April, 1986 to March, 1987 shows that except Delhi, the States of Haryana, Rajasthan and Uttar Pradesh faced energy shortages throughout the year. However, the position of Rajasthan was comparatively better than that of Haryana and Uttar Pradesh.

### iii) Pattern of energy consumption

During 1985-86, the total energy consumption was of the order of 7530 MU of which more than one-third was by the industrial sector, nearly one-fourth by domestic use and one-seventh by agricultural use.

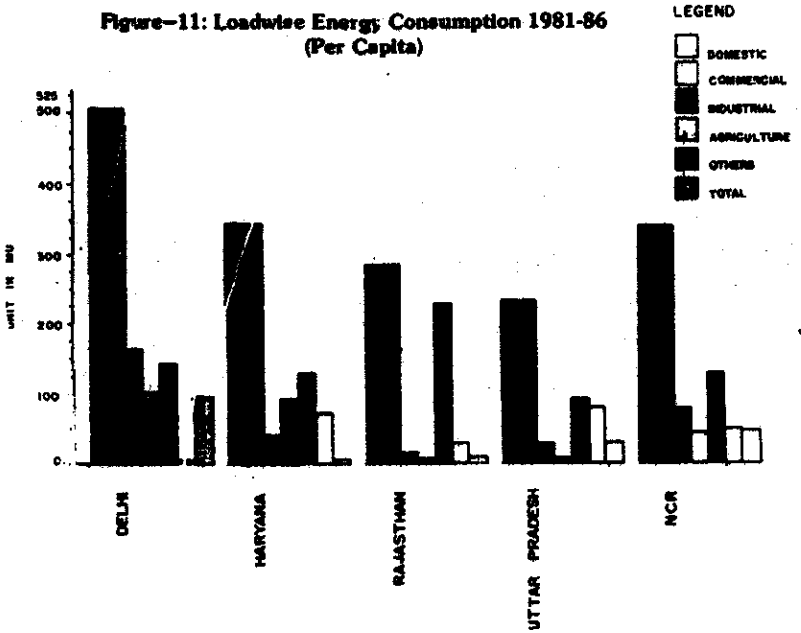
In all the participant States, the energy figures refer to restricted supply only. The Rajasthan Sub-region relatively tops in industrial sector, nearly one-fourth by domestic use and one-seventh by agricultural use.

In all the participant States, the energy figures refer to restricted supply only. The Rajasthan Sub-region relatively tops in industrial use accounting for 80 per cent of the energy consumed in the Sub-region, followed by the Haryana Sub-region with 51 per cent and the Uttar Pradesh Sub-region with 40 per cent. Agriculture ranks second in energy consumption in the Haryana, Rajasthan and Uttar Pradesh Sub-regions. In the Delhi UT, domestic use leads in energy consumption with one-third, followed by industrial and commercial sectors (Table 9.2 and Fig. 11).

### iv) Per capita consumption

Per capita energy consumption is a barometer of the

**Figure–11: Loadwise Energy Consumption 1981-86 (Per Capita)**






status of economic development. As of 1985-86, the per capita consumption for the Region as a whole was about 340 units against Delhi's 580. All the NCR States consumed less than the region's per capita consumption and the Uttar Pradesh Sub-region is the least with 236 units. Among the various loads, the industrial load leads with a per capita consumption of 127 units compared to 78 by domestic use, 48 by agricultural sector, and 42 by commercial sector.

### v) Rural electrification

Electrification of villages and energisation of pump sets is indispensable for improving the living standards of rural population. In the Region as a whole, about 80 per cent of the villages are electrified. All the villages in the Union Territory of Delhi and in the Haryana Sub-region are electrified. In the UP and Rajasthan Sub-regions, only about 60 per cent and 90 per cent of the villages had been provided with electricity respectively till the end of March, 1987. About 2.12 lac pumpsets have been energised in the Region. The figure is expected to reach a minimum of 2.37 lacs by the end of the Seventh Plan (Table 9.3).

### Load Forecast - 2001 AD

The demand for power has been generally rising at a rapid rate in the constituents of the Region. The demand has invariably outstripped the availability of power causing wide spread shortages of power all over the Region except Delhi. To manage the situation, the State Electricity Boards have imposed varied restrictions from time to time during the last decade, both on the demand and energy requirements. The increase in electricity consumption reflects the increase in availability rather than the demand for it. Adjustment have, therefore, to be made in the forecast to take care of the suppressed demand on account of restrictions imposed on consumption.

In forecasting the load for the NCR, the intended economic structure in terms of dispersal and informal occupation based composition of the industrial and other economic activities, including the tertiary occupations, need specific attention.

At present, the broad indications are that the rural-urban population ration will undergo a substantial change by 2001, the induced development in the selected towns for development on priority basis will be mostly in the form of industrial and commercial activities and also as per the policy directives, the norms and standards of civic services including power supply in the DMA and priority towns will be comparable to that of the Delhi UT. The categorywise per capita consumption as of Delhi can be taken as the targets to be achieved in stages. In certain sectors, however, like commerce, the participating States cannot match with Delhi as is evident form the energy consumption pattern of the States: it is less than 5 per cent in the participating States against the 21 per cent consumption in Delhi.

The State Electricity Boards and the DESU have forecasted the unrestricted load/energy demands upto 2001 and the Central Electricity Authority has, in view of the development proposals, adjusted the forecast upwards.

### i) Upto the Seventh Plan and 2001

The regional demand for power will be 3077 MW by the end of the Seventh Plan which will shoot upto 12032 MW by 2001 with the corresponding energy forecast of 15871 MU and 61624 MU (Table 9.4).

a) Delhi UT: The maximum demand of power in Delhi has already reached a figure of 968 MW (August, 1986). As per projections made by the 13th Electric Power Survey Committee of the Central Electricity Authority, the demand is expected to go upto 1432 MW by the end of the Seventh Five Year Plan and 5871 MW by 1999-2000, against the



expected peak availability of 839 MW form 1989-90 to 1999-2000 excluding shares from other Central sector projects. In terms of energy, the corresponding requirement would is forecast at 7586 MU and 28233 MU which gives a growth rate of 9.50 per cent per annum.

### Policies

The following policies regarding power are:

i) To help develop the regional and sub-regional centres in particular and the Region in general, uninterrupted power supply in adequate quantity should be made available in the entire NCR.

ii) Preference and priority in making available the additional power to the NCR should be given utmost attention.

### Issues and Proposals

iii) The constituents of the Region have been continuously experiencing shortage of power for quite some time and their actual demands have thus always been the suppressed ones. The tentative assessment of power position by the 13th Electric Power Survery of India shows that the energy shortages would be to an extent of 16.6 per cent in Delhi UT and 28.1 per cent in the State of Rajasthan by the end of the 7th Plan, though, both in case of Haryana and Uttar Pradesh, it has forecast marginal surpluses of 7.1 per cent and 5.1 per cent respectively. It may be noted that in the Sub-regions of the NCR, as of 1986-87, the deficit varied from 25 per cent to 35 per cent except in Delhi UT.

iv) The envisaged induced development of the selected urban areas at the Regional and Sub-regional levels would require more power. The rural areas where accelerated development programmes are to be taken up would also require more power than at present.

Thus, the portions of the States under the NCR would demand substantial additonal power as against the other parts of States. State Governments with their own preferences and priorities will not be in a position to treat areas of the NCR under their States in a special and preferential manner for the purpose of supply of additional power. The Department of Power, Ministry of Energy is of the view that the allocation of additional power particularly, from the Central power stations is to meet competing claims from different sectors including central core industries and services and thus, it would be difficult for allocation of additional power for the NCR. But in order to meet the objectives of the NCR which is time bound, it is an imperative necessity to provide, by any means, additional power to the Region. The Central Government, on the recognition of the fact that it was its responsibility to save the National Capital, created the National Capital Region Planning Board to prepare a Plan to achieve the objective of a manageable Delhi in the foreseeable future, and as per the Plan strategy, if adequate power is not made available to the NCR, it would never be possible to realise the objectives. It is, therefore, incumbent on the Government of India to provide additional power to the Region through appropriate arrangements.

iii) There are proposals to generate power through gas fired turbines at Dadri and Delhi. The HBJ Gas Pipe Line is expected to be extended from Dadri to Delhi to generate an aggregate capacity of 180 MW in replacement of existing gas turbines. The proposed Dadri Gas Plant has an aggregate generating capacity of 400 MW. Keeping in view the successful performance of the gas turbines in operation, the ready availability of its technology indigenously, the minimum gestation period for its installation and also



its relatively non-polluting nature, the possibility of more gas connections for generation of electricity in the Region should be explored.

iv) The additional power,once made available, should be reached to all points of consumption through optimum transmission and distribution network. The State Electricity Boards and the Central Electricity Authority have indicated that the present system of distribution network would not suffice to cope with any addtional power distribution. The constituent electricity authorities have, therefore, worked out the distribution network requirements in the respective portions comprising sub-stations, tie-lines, transmission and distribution network etc.

v) Under the provisions of the Central Electricity (Supply) Act, 1948 and also in view of the problems and difficulties envisaged in organising generation and distribution of additional power for the NCR in isolation, it is proposed to set up a Coordinating body which will mainly arrange and coordinate distribution of power, if additional power is made available from the Central/State sources for the NCR. Such a Committee would be set up under a resolution of the NCR Planning Board. The Committee will be headed by the Member Secretary of the NCR Planning Board and will include representatives of the States Power Departments, State Electricity Boards and representatives of the Department of Power and Central Electricity Authority.

# 10

# Water Supply, Sewerage, Drainage and Solid Waste Management

## Background

### i) Water Supply

The Region is endowed with three perennial rivers namely the Yamuna, the Hindon, both traversing through and the Ganga skirting its eastern boundary. A good network of water canals benefit the districts of Karnal, Rohtak, Faridabad, Bulandshahar and Ghaziabad providing water for irrigation and domestic consumption. Other districts draw water from sub-surface sources through handpumps, wells, tubewells and in Delhi, Ranney wells as well. The sub-surface water resources to the west of the Yamuna are, however, insufficient, and often brackish in quality rendering it unfit for domestic consumption. Scanty rainfall in this area leaves the groundwater resources limited and, the tubewells go dry as the water table sinks deep in the summer months. There is generally shortage of water supply in the areas west of the Yamuna and, the problems assume acute proportions in dry months.

*a) Urban*: All the 94 urban centres except 20 have organised water supply systems of drawing water from tubewells, wells and canals. The per capita supply ranges from 17 to 240 Lpcd (litres per capita a day). Only in 20 per cent of the urban centres, the water treatment is complete and in others, it is partial (Table 10.1).



*b) Rural*: Rural water supply position in the Region presents a very dismal picture. Many villages do not have adequate sources of water supply. Only one in every eight villages has some form of protected or organised water supply. The main sources of water supply are canals and wells in the Haryana Sub-region, whereas, handpumps are invariably restricted to the Uttar Pradesh Sub-region (Table 10.2).

### ii) Sanitation

*a) Sewerage*: Poor sanitation gives rise to high incidence of water-borne and water and sanitation related diseases. The percentage of high infant mortalities in the NCR is indicative of the poor state of sanitation measures available in the Region. Sewerage system, that too partly, exists only in one-fifth of a number of towns. The system is mostly water-borne often supplemented by septic tanks and sanitary latrines. A number of urban centres have only sanitary latrines. The sewage is treated partly in four towns. In all the others, the raw sewage is let off into the drains, rivers and in many cases, the sewage stagnates in the depressions or in drains that create an unhygienic environment (Table 10.1).

*b) Storm water drainage*: In nearly 60 per cent towns, the strom water drainage system exists; but in all, only in two towns the coverage is full. Almost in all cases, the drains are open. In many towns, the system is combined where storm water and the sewage flow together. The disposal of the storm water is invariably unplanned and is allowed to flow its natural way on land, into depressions, ponds and drains (Table 10.1).

*c) Solid waste disposal*: A system exists to dispose of the solid waste in nearly 60 per cent of the towns. Unscientific land refill and open dumping are the methods prevalent in the towns in disposing the wastes. (Table 10.1).

*d) Rural sanitation*: In none of the villages, a system to take care of its sanitation is reported to exist.

**Issues**

i) To improve the quality of life in the regional towns, one of the strategies is to upgrade the essential services such as water supply, sewage and sanitation in them at norms and standards comparable to that of Delhi. Presently, the supply standards are far below the desired norms in the towns ands in the rural areas organised or protected water supply is rarely provided for want of institutional and financial arrangements.

ii) Sanitation in the Region is poor, resulting in high incidence of water borne diseases. The environmental degradation and insanitary conditions need proper and immediate attention with the conscious efforts of the local bodies and the State Governments concerned.

iii) Storm waters are invariably allowed to flow their natural way on land into depressions, ponds and drains. More often, it is combined with sewage. Unregulated flow of storm water erodes as well as silts agricultural fields and stagnates creating environmental problems. This needs a planned and integrated approach alongwith sewage disposal.

iv) Disposal of garbage in general is given the least attention. Scientific management of solid wastes would help in recycling it partly and through snaitary refilling, that would render the environement hygienic and clean. This requires proper education and training of the people in general and institutional arrangement in particular.

v) Rural zone which greatly lacks sanitation measures needs adequate attention to be given so that healthy living environment is ensured which will help the rural population lead healthier lives and also avoid possible out-migration to urban areas.

**Policies and proposals**

i) **Urban water supply:** The water supply norms and



standards of the urban areas, particularly of the DMA towns (excluding Delhi UT) and priority towns should be comparable to that of Delhi and should also be uniform in the entire region for rural and urban areas. Accordingly, keeping in view the minimum level of water supply expected to be achieved, the following norms are proposed:

| Urban Centres with population | Lpcd |
|---|---|
| 5 lacs and above | 275 |
| 2 to 5 lacs | 225 |
| 1 to 2 lacs | 100 minimum |

- For the DMA towns and priority towns, the starting point should be 225 Lpcd with the target of achieving 360 Lpcd by 2001. The requirements should be graded according to the size of the projected population of the concerned urban centre. In four towns viz Rewari, Palwal, Dharuhera and Bhiwadi, where water scarity is experienced as a chronic problem, minimum of 225 Lpcd may be taken as the target to be achieved.
- In no urban centre, the supply should be lower than 100 Lpcd which is the minimum technical requirement.

ii) **Rural water supply:** The sources of water supply to the rural areas should be identified and, the water supply should be organised to supply water at the levels commensurate with the functional character of the rural areas.

A minimum of 70 Lpcd including a supply of 30 Lpcd for cattle is proposed for rural areas. If independent connections are given, a minimum of 100 Lpcd is advised. Spot sources may supply a minimum of 40 Lpcd which can supplement the piped supply.

iii) **Targets for water supply:** In view of the low levels of coverage in water supply, the targets which have been agreed to by the Government of India under the International Drinking Water Supply and Sanitation Decade 1981-1990 programmes to be achieved by March, 1991 may be adopted for the NCR:

| Coverage | Level of service |
|---|---|
| Urban water supply 100 per cent | Piped water supplies in all communities, where feasible; Demand range 70-250 Lpcd; average 140 Lpcd . Stand posts in fringe areas, if necessary at strategic localities; average 40 Lpcd. |
| Rural water supply 100 per cent | Piped water supplies to 30 per cent of the population; demand range 25-70 Lpcd ; spot source water supplies for 70 per cent of the population in the form of dug or tubewells with handpumps and/ or power pumps; average demand 40 Lpcd . |

It is proposed that in all towns other than DMA and priority towns, and all rural areas, the foregoing targets be achieved by 1991.

Delhi and the other Delhi Metropolitan Area towns - Ghaziabad, NOIDA, Faridabad and Gurgaon have been experiencing inadequacy of water supply recently. The recent drought has also shown that this severity could become quite acute in the absence of normal rainfall. Perennial sources of water supply such as the Ganga, the Yamuna and the Sutlej with their systems are subject to a number of agreements between the various Governments. The NCR occupies a special position and its water supply need should be given special consideration. It is, therefore, necessary that comprehensive proposals identifying the



sources of water supply are prepared for the Region. Likewise, the Delhi Metropolitan Area towns would also need an integrated drainage system. The NCR Planning Board has recently constituted a Study Group to look into the various aspects of physical infrastructure particularly, water supply, sanitation and drainage in the Delhi Metropolitan Area towns and, its findings could be the basis for further indepth studies in assessing the needs and identifying the sources of water etc.

iv) **Urban sanitation**: The DMA and priority towns, should treat their sewage before it is let-off into water courses or on land or for irrigation. The other towns where it is not possible to provide a proper system due to topography and for want of resources, low cost sanitation measures may have to be adopted but only to be replaced by regular sewage system subsequently as the conditions improve.

Open drains, which are by and large the sources of nuisance and pollution, should be discouraged and discontinued. Sewage should be treated to bring the pollution level to permissible limits as stipulated by the Indian Standards Institution, and Pollution Control Boards irrespective of the type of disposal of the sewage. As far as possible, areas where the annual rainfall exceeds 75cm, separate systems for sewage and storm water are recommended.

v) **Rural sanitation:** The rural areas, where piped water supply system exists should be provided with sewerage system with treatment facilties. Low cost sanitation measures such as sanitary latrines, septic tanks and pit privies should be resorted to in villages with hand-pumps for water supply. Where possible, the sewage should be recycled after treatment for watering gardens, parks and lawns, fire-fighting, street washing, cooling etc. Publicity and demonstration on the necessity for hygienic sanitation should be frequently arranged to make the rural population aware of the imperative need of the clean and healthy environment.

vi) **Targets for sanitation:** The proposed targets of the International Drinking Water Supply and Sanitation Decade 1981-1990, could be taken as targets of the NCR Plan. The targets are:

| Coverage | | Level of service |
|---|---|---|
| Urban sanitation | 80 per cent | 100 per cent coverage for Class-I cities with sewage and sewage treatment facilities, low cost sanitation methods in other towns. Overall coverage of 80 per cent in all cities and towns. |
| Rural sanitation | 25 per cent | Low Cost sanitary methods of disposal. |

vii) Water supply and sanitation should be taken together as an integarted project. A combined sewerage system including drainage may be economical if the average annual rainfall does not exceed 75 cm. All the drains should be covered as far as possible. The sewage treatment process should include units to obtain best by-products like cooking gas and sludge manure. The solid waste should be properly managed and recycled for a healthy and hygienic living environment.

viii) **Solid waste management**: Solid waste disposal and management should be planned for a minimum of 20 years and at least controlled tipping should be adopted in the disposal of the solid wastes. Compost is a solid stabiliser. Incineration of the garbage is not adviseable. Areas should be identified in all the towns for sanitary refill and, all the towns above one lac population should have arrangements to properly manage the waste disposal.

The areas for dumping of solid waste/garbage have to be identified while preparing the development plans for each urban centre in advance, so that, the Municipal Authorities responsible for solid waste management could utilise such pre-identified locations for disposal of garbage. The derelict lands on account of brick kilns and quarrying may be suitable locations for such operations.

# 11

# Education and Health

## Background

The equitable distribution of educational and medical facilities at convenient locations in the Region, especially those which serve the primary needs, is far more important than the location of any other facility. Education shall provide the vital input for provision of a trained manpower for running the soical and economic fabric of the Region.

### i) Sub-regional disparities

**a) Education facilities:** According to the 1981 Census, the literacy rate in the Region (43.94 per cent ) is higher than that of all India (36.23 per cent). When compared among the Sub-regions, Delhi UT (61.54 per cent) has the highest literacy rate followed by the Haryana (33.58 per cent), Uttar Pradesh (33.31 per cent) and Rajasthan (30.24 per cent) Sub-regions. The literacy rates in all the three Sub-regions are also higher than the literacy rates of the States of which they form the parts. The literacy rates in the urban areas also follow the same trend except in the case of Uttar Pradesh Sub-region. Though the rural literacy rate in the Region as a whole (32.35 per cent) is higher than that of all India (29.65 per cent), it is less than the country's figure in Uttar Pradesh (29.02 per cent), and Rajasthan (25.22 per cent) Sub-regions. On the basis of the availability of educational facilities in the rural areas in terms of proportion of villages having one or more of the educational facilities and proportion of rural population

served by educational facilities. Haryana's rural population is better served with educational facilities, as 90.38 per cent villages have one or more of the educational facilities and 97.26 per cent of the rural population served by education facilities. The corresponding proportions in the Uttar Pradesh and Rajasthan Sub-regions are 73 per cent, 91.3 per cent and 70 per cent, 90 per cent.

In the National Capital Region, Delhi, the mother city, has almost all types of higher educational and research facilities, perhaps the best available in the Country. Meerut in Uttar Pradesh Sub-region is the second city after Delhi with a University which has jurisdiction over a large portion of the UP Sub-regions. At present, Meerut has facilities for higher education including a Medical College. There are large number of post-graduate colleges at Meerut and Ghaziabad which are also patronised by student population from Delhi and Haryana. In the Haryana Sub-region, Rohtak town has a University of its own. It has large number of State level institutions such as a Medical College and two Ayurvedic Colleges, two Polytechnics, and an Industrial Training Institute. As regards the Rajasthan Sub-region, Alwar town is the main centre of educational activities. It has a number of colleges which mainly cater to the local students and to some extent those from nearby areas.

**b) Medical Facilities**: The availability of medical facilities in terms of number of beds per thousand population in the urban areas of the districts of the three Sub-regions, is substantially better in Rohtak district (5), Meerut district (1.50) and Alwar district (2.59), compared to other areas of the Region. In Delhi, the number of beds per thousand population is 2.50.

As regards availability of medical facilities in the rural areas, the Haryana Sub-region in terms of proportions of population and villages served being respectively 77.62 per cent and 61 per cent, ranks higher than the other Sub-regions.



Delhi being the National Capital and the third largest city of India, has the advantage of possessing large number of medical institutions with best specialisation in almost all the fields available in the Country. The medical facilities in the three Sub-regions of Haryana, Rajasthan and Uttar Pradesh lack in specialisation and also, looking at the vast hinterland served by them, they lack in availability of general medical facilities. Meerut, Rohtak and Alwar are the main centres of medical facilities which attract people from large part of their hinterland.

**Proposals**

i) An assessment of the availability of the education and health facilities in the three Sub-regions indicates that the level of these facilities in terms of accessibility and equitable distribution is far from satisfactory. Some of the regional centres namely, Meerut, Rohtak and Alwar being fairly large sized urban centres in the respective Sub-regions are having some higher order of educational and medical facilities which at present cater to the needs of both the local population as well as the neighbouring areas. The priority towns and complexes identified for faster development and also the DMA towns excluding Delhi will contain more population in addition to their natural increase through the deflection of the Delhi bound potential migrants to them, and they will need, over the perspective plan period, more education and health facilities. In addition, some of them may have to cater to the regional requirements with institutions of specialisation both for education and health care.

ii) Provision of these facilities in adequate measures in the regional centres away from Delhi would not only improve the quality of life but may attract population seeking migration to Delhi. This will thus meet ultimately the objectives of provision of infrastructural facilities at desirable norms and standards to improve the standard of living in the areas of the Region.

iii) The distribution of social infrastructure, not only on the basis of population size but also on the catchment areas for each level institution in the Sub-regional centres, Service centres, and Basic villages will help to remove the imbalances in the provision of social infrastructure of the Sub-regions.

iv) The norms for education and health facilities suggested are as follows:

| *Type of facility* | *Norms* | |
|---|---|---|
| | *Rural* | *Urban* |
| **A. Education** | | |
| 1) Nursery School | One in each village | One for 2.500 population |
| 2) Primary School (including classes upto VIII standard) | One in each village | One for 5,000 population |
| 3) Higher Secondary | One in each village with population 10000-15000 | One in each town with 10000-15000 population. |
| 4) College | | One in each town with 80,000-1,00,000 population |
| **B. Medical** | **Rural/Urban** | |
| 1) Sub-Centre | One for 5,000 population | |
| 2) Primary Health Centre | One for 30,000 population | |
| 3) Community Health Centre with four basic specialisations. | One for 1,00,000 population | |

# 12

# Shelter

## Background

Housing is a basic human need and ranks next only to food and clothing in importance. One of the primary aims of any policy plan of a welfare state like India, has, therefore, to be to improve the quality of living of its people. The Seventh Five Year Plan document holds that a certian minimum standard of housing is essenial for healthy and civilised existence. The development of housing, therefore, deserves an overwhelming priority in the NCR, where housing amenities are below the minimum standards. The NCR Plan inter-alia aims to provide healthy living conditions in priority and DMA towns, at standards comparable to that obtaining in Delhi. Most of the migrants seeking employment in informal sector activities need priority attention in providing shelter for them. The objectives of Draft National Housing Policy are in fact in consonance with the objectives of the National Capital Region Plan which seeks to encourage people to build and improve their own houses; to promote repair, renovation, expansion and up-gradation of the existing housing stocks, and to preserve India's rich and ancient heritage in the field of human settlement planning and architecture and, conserve buildings of historic, cultural and aesthetic significance.

Demand for shelter increases with the population. Provision of housing does not keep pace with the population increase. At present, about 30 per cent to 40

per cent of the urban population in the NCR live in unhygienic and insanitary conditions.

Occupied residential houses in the Region excluding Delhi UT, with an allowance of 10 per cent either as non-liveable or vacant or non-residential, totalled to 13.83 lacs for a population of 101.14 lacs in 1971 with an occupancy rate of 7.31 persons per unit. In 1981, there were 18.23 lac liveable houses (except in Delhi UT) for a population of 129.72 lacs with an occupancy rate of 7.12 persons per unit (Table 12.1). The marginal fall in the occupancy rate during 1971-81 indicates a slight improvement in the living conditions.

The 2.576 lac liveable residential units in the urban areas of the NCR housed a population of 18.88 lacs of 1971 with an occupancy rate of 7.33 persons per unit and, the housing stock doubled to 5.099 lacs in 1981 to house 33.29 lac people at an occupancy rate of 6.53 persons per unit. Though the decline in the occupancy rate in urban areas is a happy development, it is offset by the increase in occupancy rate from 7.30 to 7.34 during 1971-81 in the rural zones of the Region. If quality of houses is also taken into consideration, the number of houses fit for living might be much less.

### Demand by 2001

On the assumptions that the occupancy rate shall be five persons a residential unit, the 1971-81 trend of growth shall continue and a 10 per cent allowance is given to compensate non-liveable or vacant or non-residential housing units, the total demand for housing by 2001 AD, except for Delhi UT, is estimated at 42.6 lacs residential units in the NCR; of these 24.8 lacs units (58.22 per cent) will be in the urban area and 17.8 lac units (41.78 per cent) in the rural area; the UP Sub-region will have a demand of 24.2 lac units (56.81 per cent), followed by the Haryana Sub-region with 15.6 lac units (36.62 per cent) and



Rajasthan Sub-region with 2.8 lac units (6.57 per cent). In 1987, the net liveable residential houses have been estimated at 20.868 lac units; of these the UP Sub-region had 11.417 lacs, Haryana Sub-region had 7.766 lacs and the Rajasthan Sub-region 1.685 lac units.

Thus, the additional demand (including the existing backlog) between 1988-2001, will be (42.6-20.868) 21.732 lac units in the Region excluding Delhi UT, and of these, 18.188 lac units, (83.69 per cent) will be in the urban sector and 3.544 lac units (16.31 per cent) in the rural sector. Of the total demand, 12.783 lac units (58.82 per cent) will be in the UP Sub-region, 7.834 lac units (36.05 per cent) in the Haryana Sub-region and 1.115 lac units (5.13 per cent) in Rajasthan Sub-region (Table 12.2). The towns/complexes identified for priority development will have an additonal demand of 7.19 lacs units (39.56 per cent while the DMA towns will have 5.70 lac units (31.34 per cent) and other towns 5.29 lac units (29.10 per cent) (Table 12.3).

### Informal sector housing

About one-third of the urban population lives in slums. Most of them are engaged in informal sector economic activities. Informal sector, therefore has to be viewed as an integral part in the process of spatial planning. In the context of Delhi, the migrants constituting more than one-third of the city's population, are primarily occupied in informal sector activities and, the potential Delhi-bound migrants to be deflected away form Delhi to other NCR towns would also be engaged mainly in the informal sector activities. During 1988-2001, the economically weaker sections of the society constituting mainly the informal sector workers, would require about 8 lac dwelling units (44 per cent) in the urban centres of the Region excluding Delhi Urban Area.

The informal sector housing faces more stresses and strains in mobilishing resources as it has no easy access to

the housing finance market. The informal sector housing would have to exclusively depend on institutional support for loans. Thus, in planning informal sector housing, the points for consideration would be:

i) making available developed land at affordable prices;
ii) introduction of minimum needs programme to ensure an environment of minimum urban normative levels; and
iii) provision of an easy access to institutional finance.

**Issues**

i) There is a need for adequate planning and identification of sources to raise the required funds to meet the housing demand arising out of additional population due to natural increase, as well as through in-migration into the NCR generally, and also the component of the population that would be deflected from coming into Delhi to the NCR towns.
ii) A special treatment is required to the informal sector housing, as most of the deflected Delhi-bound migrants with their semi and unskilled levels will get occupied in informal sector activities in the NCR towns away from Delhi. In addition to making available adequate incentives, a major component will be that of shelter to suit their needs and affordability. The problem of informal sector housing may have to be met through making available developed land, and finding ways and means for easy access to finance institutions.
iii) The standards and norms of the civic services should conform to the desirable norms almost comparable to that of Delhi as a part of the strategy in developing the Region harmoniously.

**Strategy**

The strategy to meet the housing in the NCR would be:



i) To fix priorities in dealing with different segments of the population:
(a) the 19 lac Dehli-bound migrants should be given top most priority in providing shelter; they would be requiring about 4 lacs units, most of them in informal sector;
(b) the potential migrants from the urban centres of the NCR to Delhi should be provided with gainful employment - most of whom will join the pool of the weaker sections of the urban population and may be provided with reasonable hygienic and sanitary conditions; under the slum upgradation scheme, 100 per cent of the beneficiaries of 1.99 lac units may be provided with financial assistance for improving their homes (Table 12.4);
(c) under Sites and Service schemes, all the beneficiaries of 5.99 lac units may be provided with institutional finance to provide incremental shelter on self help basis. (Table 12.4);
(d) there will be demand of 5.57 lac LIG dwelling units during the Plan period, 50 per cent beneficiaries of which may be provided with institutional finance;
(e) 25 per cent of the beneficiaries of MIG dwelling units may also be provided with institutional finance, and
(f) HIG dwelling units may be provided with only devleoped land at market price.

ii) To identify areas of development in order of priority:

The Regional Plan envisages to develop a four tier hierarchical system of settlements consisting of Regional centres, Sub-regional centres, Service centres and Basic villages. Shelter programmes would also follow the same priorities and pattern of development. Accordingly, the identified eight towns/complexes to be developed as Regional centres should be accorded the first priority followed by the Sub-regional centres the second priority, Service centres the third priority followed by Basic villages.

**Housing Finance Institutions**

At present, there are a number of agencies engaged in arranging housing finance and related activities such as Housing and Urban Development Corportion (HUDCO) and Housing Development Finance Corporation (HDFC) at the National level, and Housing Development Boards of the three constituent State Governments at the State level, Ghaziabad Development Authority, Khurja-Bulandshahar Development Authroity, Meerut Development Authority, Urban Improvement Trust Alwar and Haryana Urban Development Authority at the local levels. Most of these agencies are engaged partially or wholly in solving housing and/or housing finance problems either at National or State or local levels. But, these agencies cannot treat the National Capital Region as a special area for development.

The Government of India has approved creation of the National Housing Bank with a seed Capital of Rs. 100 crores. One of the primary functions of the National Housing Bank is to develop the base level and intermediate level housing finance institutions to extend financial assistance to the Economically Weaker Sections, mostly occupied in informal sector activities, for construction and imporvement of their shelter.

The NCR Planning Board Act, 1985 under section 22(1)(c) empowers the Board to receive funds from various sources as may be decided upon by the Central Government in consultaion with the participating States and, such funds would be credited to the NCR Planning Board Fund. This provision makes the NCR Planning Board an ideal institution to act as an intermediate Finance Institution to facilitate in ensuring availability of requisite finances to the target groups for construction of shelter and improvement of houses under the NCR schemes through the implementing agencies which would act as the base level institutions for implementing the NCR projects.

# 13

# Regional Landuse

**Background**

The Landuse Plan for the National Capital Region depicts the exposition of various broad landuses designed for a balanced and harmonious development of the Region by 2001. The Plan will serve as a guide and provide direction for the use of land in the NCR in both - short and long terms towards accomplishment of the goals of the Plan. The broad landuse plan will be supplemented by Sub-regional plans dealing with respective Sub-regions in greater depth to provide more specific policy guidance.

Land is a vital but limited and non-renewable resource. With the tremendous increase in population, the pressure on land has gone up rapidly. Particularly, there is an increasing concern over the loss of primary agricultrual land and, the consequent environmental degradation. This is indicative of the utmost need for optimising the use of land resources in the Region through rational uses of urban land, conservation of areas sensitive to development activities and evolving policies for the effective control of landuses.

**Existing regional land uses pattern**

Agriculture is the predominant user of land in the Region. The cultivated area consititutes about 80 per cent of the total reporting area. Of the Region's total cultivated area, about 46 per cent is concentrated in the Haryana

Sub-region followed by the UP Sub-region (37.3 per cent), and Rajasthan Sub-region (13.1 per cent) while Delhi UT has the least of 3.7 per cent. The land put to non-agricultural uses which comprise area under settlements, transport network, rivers and canals covers 9.9 per cent of the total area. The Haryana Sub-region has the highest area of 1,28,431 hectares under non-agricultural uses which form 43.3 per cent of the Region followed by the UP Sub-region (38.7 per cent), and the Delhi UT (24.2 per cent) and the Rajasthan Sub-region (5.9 per cent). The occupation of maximum area under this category in the Haryana and UP Sub-regions is mainly due to the large area occupied by the Ganga and Yamuna rivers and their tributaries and, concentration of non-agricultural uses whereas, in Delhi, it is owing to large-scale urbanisation and industrial expansion (Table 13.1).

The third important category is the barren land which includes rocky area, saline patches, gullied land, dereclict land covering an area of 1,41,677 hectares or 4.7 per cent of the total reporting area of the Region. According to land records, forest covers a total area of 65,222 hectares which forms 2.1 per cent of the total area of the Region, with the highest concentration in the Haryana Sub-region (52.2 per cent), followed by the UP Sub-region (30.5 per cent) and the Rajasthan Sub-region (15.2 per cent). The Forest Departments of the NCR participating States place the total area under forest at 1,53,474 hectares, with a break up of 55,544 hectares under reserve forests, 32,640 hectares under protected forests, 56,202 hectares under unclassified forests and 10,088 hectares under social forests (Table 13.2). The satellite imageries, however, show only 35,557 hectares i.e. 1.2 per cent of the reported area under forests. The satellite imageries include only the compact forests under tree cover while records give the area under protectd category also.

Culturable waste land constitutes 57,484 hectares of land which is 1.8 per cent of the total Regional area. Delhi has the least area of 1.5 per cent of the total culturable waste land in the NCR. The area under 'permanent pastures and other grazing land' forms 1.2 per cent of the total area of the Region which is mainly concentrated in the Haryana and the Rajasthan Sub-regions. The area under water bodies include lakes, reservoirs, tanks and forms 0.28 per cent of the total area. Map 3 shows the landuse of the Region as of 1987.



**Status of landuse-categorywise: 1987**

**a) Agriculture:** Agriculture occupies 23.92 lac hectares or 79.9 per cent of the area of the Region. In Delhi, only 59.9 per cent of the area is under cultivation.

**b) Forest:** A comparative analysis of forest area through Landsat satellite imageries and land records reveals that 45 per cent of the total forest area is devoid of tree-cover. This vast area has been denuded by encroachment or by other uses and indiscriminate deforestation. In the Haryana Sub-region, 31,925 hectares (Table 13.3) of the forest area is reported as tree-less area. There is a loss of huge forest area of 59,558 hectares in the Rajasthan Sub-region due to encroachment and indiscriminate felling of tress. In the UP Sub-region, an area of 29,455 hectares (Table 13.3) should be under forests which includes reserved, protected, unclassified and social forests against 11,601 hectares of land under actual tree cover, and thus, there is loss of 17,854 hectares of forests. Bulandshahar district, has the highest shares of such denuded area.

**c) Barren land:** This category of land includes quartzite rocks, sandy and saline patches, gullied land and derelict lands. According to the satellite imageries, 6.5 per cent of the total area is under barren lands against 4.7 per cent the land records. Most of the gullied lands are concertrated in the Rajasthan, Haryana and Delhi Sub-regions around the Aravalli ranges. In other parts, it occurs along the river

and stream courses, whereas saline patches are concentrated in the Haryana and Uttar Pradesh Sub-regions especially in the excessively irrigated areas. Sandy patches exist in extinct river courses in the Uttar pradesh and Rajasthan Sub-regions.

The land actually under the category of 'Barren land' as interpreted from the satellite imageries shows that more area has become barren for one reason or the other in addition to the area designated under this particular category.

The analysis revels that as much as 53,044 hectares (Table 13.4) of land has become barren over and above the barren land as per the land records in the Haryana Sub-region, whereas it is to an extent of 6,672 hectares in the UP Sub-region, and 2,144 in the case of the Rajasthan Sub-region. Interestingly, an area of 7,269 hectares in Delhi UT is found reduced compared to the land records which may be mainly due to the reasons of urban expansion and proliferation of secondary and tertiary activities.

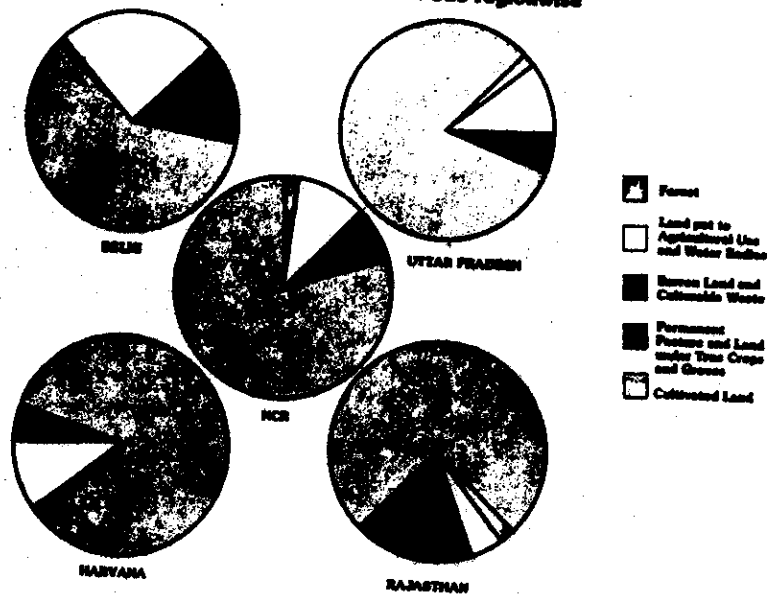
**d) Culturable waste:** Rohtak (13,000 hectares) and Bulandshahar districts (12975 hectares) have extensive areas under culturable waste lands. Other districts, having concentration of culturable waste lands are Sonepat, Ghaziabad, Meerut and Alwar.

**e) Land put to non-agricultural uses:** In Delhi Sub-region, this category forms maximum of 24.2 per cent of the total reporting area compared to nearly 10 per cent in the Haryana Sub-region as well as UP Sub-region. The concentration of this use is significant, apart from Delhi, in Gurgaon, Faridabad and Mahendragarh districts of the Haryana Sub-region Figure 12 presents Sub-regionwise land utilisattion.

**f) Others:** Land under permanent pasture and other grazing lands which meet the fodder requirements of the cattle occupy 1.2 per cent of the total area of the NCR. The Rajasthan and Haryana Sub-regions have the highest concentration (2.7 per cent) of the reporting area. Land



**Figure–12: Land Utilisation 1986-87: Sub-regionwise**



under miscellaneous tree crops and groves constitutes a meagre proportion of 0.2 per cent of the NCR.

**Changing characteristics of land uses**

The landuse characteristics in the NCR are influenced mainly by two factors: The first has been the continuous and rapid increase of the economic activities, particularly in the Delhi Urban Area (DUA) and the consequential rise in population within the DUA mostly due to inflow of migrants to seek employment opportunities created by the economic activities. In 1981, about two-thirds of the total urbanites of the NCR were concentrated only in Delhi. The second factor has been the rapid increase in the development of industrial activities on the traffic arteries radiating from Delhi and, the consequent pre-mature and speculative sub-division of land for residential and industrial uses along the corridors outside Delhi. The development activities in the secondary and tertiary sectors in the DMA towns have leap-frogged leaving widening gap in the development of physical and social infrastructure. The other towns in the Region beyond the Delhi Metropolitan Area (DMA) have been growing slowly with normal activities and natural increase. The landuse demands in the three distinct areas, namely, the Delhi UT, the DMA excluding Delhi UT and the area beyond the DMA, are influenced by the aforesaid development activities.

The convergence of road and rail routes in Delhi has favoured flourishing of wholesale trade activities, and Delhi has become one of the biggest distributive centres in the Country. The present disposition of landuses within main urban centres and also the mushrooming industrial agglomeration along the transport corridors have amply been reflected in varied economic activites. The change in landuse characteristics particularly the conversion of agricultural land for non-agricultural uses has been at a



big scale during the last two decades. This has brought in the attendant degradation and deterioration in the environment and eco-system. Vast tracts of fertile agricultural land have been converted for industrial and economic uses. However, the primary sector and agricultural economy will continue to dominate as the mainstay of the Region though the urban structure might play a significant role in shaping the future landuses of the Region.

Moreover, the proposed transport and communication system based on the radial corridor pattern would warrant a rationalisation of landuse in the Region. In the urban centres along the traffic corridors also, creation of more employment opportunities in the secondary and tertiary sectors would bring about a shift in the land requirement from non-urban to urban uses. The anticipated urban population of 234 lacs by 2001 as against a mere 91 lacs in 1981 in the Region would also warrant adequate economic opportunities mostly in the non-agricultural occupations to be created by the turn of the century. However, as a major aspect of the regional development opportunities are to be development in the selected urban centres for development on priority basis.

**Issues**

i) The process of urbanisation in the Region is comparatively faster than other areas. With the policy of inducing development in the regional and sub-regional centres, the urbanisation will be much faster which implies additional land for urban expansion. Delhi will require large chunk of land to accommodate the envisaged population. All this will necessitate conversion of agricultural land into urban or non-agricultural uses. A rational landuse pattern would have to be worked out to protect and preserve good agricultural land and utilising productive land for urban uses.

ii) The Region, for all pratical purposes is devoid of forest cover worth its name. Against the National Forest Policy stipulation of an average coverage of 33 per cent (20 per cent in plains and 60 per cent in hills) the Region has only 1.2 per cent of forest cover. Thus, the entire Region has become enviromentally sensitive and, the eco-system is already disturbed. Measures encompassing a wide area would have to be taken up to improve the situation.

iii) More and more land patches become barren either due to increase in salinity or indiscriminate abuse through destruction of vegetative cover. This land, in fact, is potential for productive use either for afforestation or agriculture use after proper reclamation and replenishment of its lost fertility.

**Proposals**

**i) Land for urban development**

Out of the projected population of 325 lacs by 2001 AD for the NCR, about 234 lacs would be accommodated in the urban areas which accounts for 72 per cent. Out of the total population, assignments for Delhi Urban area is 110 lacs, for the DMA towns, excluding Delhi, 37 lacs, for the eight priority towns/complexes it would be 49 lacs and for the rest of the towns, 40 lacs by 2001.

To accommodate this population, additional urban land would be necessary. The additional land, by and large will be met by conversion of agriculture land. A study of the distribution of urban settlements and their spread reveals indiscriminate use of land for urban uses. It is, therefore, only reasonable that both urban and rural settlements should be developed in future in as compact manner as possible and on lands unfit for agricultural use. With this in view, especially for the urban settlements, the following density norms are suggested: (a) For urban centres upto 1.0 lac pupulation, a density of 80 persons per hectare, (b) For urban centres of 1.0 lac of 5.0 lac population, a density of 110 persons per hectare, and (c) For urban centres of more than 5.0 lac population, a density of 125 persons per hectare.



Whenever these norms are not readily obtained in the existing urban centres, an appropriate redensification is suggested to be taken up to attain the density norms. Accordingly, the total area under urban use for the DMA (excluding DUT), priority towns and other towns in the NCR will be of the order of 1,23,561 hectares (Table 13.2) by 2001. This would mean an additional area of 45291 hectares would be required for urban expansion between 1981-2001.

**ii) Land for forest**

Development of forest resources is of vital importance in preserving the environment and eco-system which greatly influences the climate pattern for better. Their presence is also essential as a safegurad against flood and erosion.

Forests occupy a meagre proportion of 1.2 per cent of the NCR area and, are under constant danger of encroachment and denudation.

Viewing the situation of the forests in the Region with reference to the National Forest Policy, the Region's forest cover should be increased in any form such as protected, reserved, community and social forestry in all those areas which are not fit mainly for agricultural use. The main targets of operation will be:

a) to afforest and vegetate barren lands, rocky areas, culturable waste land etc, so that the forest or vegetative cover is raised atleast to 10 per cent of the land area;

b) to intensify the forest cover by planting suitable species in the sparsely forested zones and denuded areas, and

c) to identify alternate sources of energy for fuel and also to find methods of increasing the efficiency from the social community forests. These should be taken up in a phased and planned manner so that afforestation and vegetation sustain and stablise over time.

**iii) Land for agriculture**

For meeting the growing demand for food and food products, the existing cultivated land of 23.92 lacs hectares should be kept reserved for agricultural use. Efforts should be made to increase the production through intensive cultivation by providing irrigation facilities and other necessary infrastructure.

In view of the anticipated changes in landuse, there would be a major impact on land requirement in agricultural sector. To the extent that new employment opportunities are proposed in non-agricultural sector consequent land availability would have to be largely met from the agricultural and other non-urban uses. It is, however, necessary to institute measures for the protection of prime agricultural land and to ensure against its neddless conversion. This necessitates a rational policy as to the utilisation of less and least valuable land for urban expansion/new urban centres.

**iv) Conservation area**

The un-planned urbanisation and industrialisation and intensive exploitation of resources with little regard to environment, affect the environment and ecological balance adversely. An intimate and inseparable relationship exists between the environment and development and sustained development may not be achieved by ignoring the environmental causes.



To achieve the overall development of the NCR without destruction of its natural environment, all economic activities need to be rationally planned. Special attention should be given to check the damage to natural features and environment by man's interference for development purposes.

In the NCR, the major natural features are the Ridge, an extended part of the Aravalli range, the forest areas, the rivers Yamuna and Ganga. Apart from these, the NCR has two sanctuaries namely, Sariska Wild Life Sanctuary in the Rajasthan Sub-region and Sultanpur Bird Sanctuary in the Haryana Sub-region harbouring a large number of wild animals and birds. The ridge areas and these sancturies should be conserved with utmost care and, should be afforested with suitable species.

The rivers Yamuna and Ganga have a high level of water pollution, mainly from the un-treated sewage and waste from industrial and residential areas. While measures have been taken to make the river Ganga pollution free under 'Ganga Action Plan', similar action is needed to check pollution of the river Yamuna too.

**v) Landuse control: Zoning regulations**

In order to avoid haphazrad development and ensure orderly development of the rapidly developing urban sector in the National Capital Region, a legislative tool in the form of Zoning Regulation is a necessity. Keeping in view the anticipated rapid urban expansion of the NCR towns and also the rate of environmental degradation in the Region, the following four distinct zones have been identified for application of strict landuse control and development. An attempt has been made to identify the likely major economic activities in the following use zones/areas: (a) Urbanisable area, (b) Green belt/green wedge, (c) Areas along the major transport routes, (d) Remaining rural land.

*a) Urbanisable area-2001*

With the urbanisable area-2001, which is proposed in the Master Plans of the respective towns, the functions and uses designated as under could be continued: 1) Residential; 2) Commercial; 3) Industrial; 4)Government offices; 5) Recreational; 6) Public and semi-public; 7) Circulation; 8) Open spaces, parks and playgrounds; and 9) Grave yards/cemeteries.

The detailed uses within the urbanisable area will be governed by the local authority according to the prescribed uses in the Master Plans. The master plans for Delhi Metropolitan Area and priority towns should be prepared under the existing rules and acts of the participating States/UT. In order to avoid the landuse conflicts especially in the Delhi Metropolitan Area towns, the master plans of all the towns within the National Capital Region should be prepared in consultation with the National Capital Region Planning Board.

*b) Green belt/green wedge*

The peripheral agricultural zone in the immediate vicinity of the urbanisable area is very vulnerable to encroachment by development. To arrest undersiable growth in the zone and, to ensure orderly and compact urban development, a control belt is proposed all around the expected developable area. The development will be restricted or strictly controlled in this green belt. The activities compatible with open character of land will be permitted. The major landuses that could be permitted in these zones are as under: 1) Agriculture, particularly high value cash crops; 2) Gardening; 3) Dairying; 4) Social forestry/plantation; 5) Quarrying, 6) Cemeteries; 7) Social institutions such as school, hospital; and, 8) Recreation or leisure.

The detailed boundaries of the green belt/green wedge



will be defined in the Sub-regional plans and Master plans.

In the cases of settlements particularly those which are in close vicinity to each other either along the roads or interior, the intervening space between the settlements should be kept green which can be designated as green wedge. This will prevent not only any development other than permitted taking place around the settlement but also prevent them from merging with each other. The green wedge should be forested and, wherever it is not possible for pressing reasons, it could be in the other forms of greens.

*c) Green buffer along the major transport corridors*

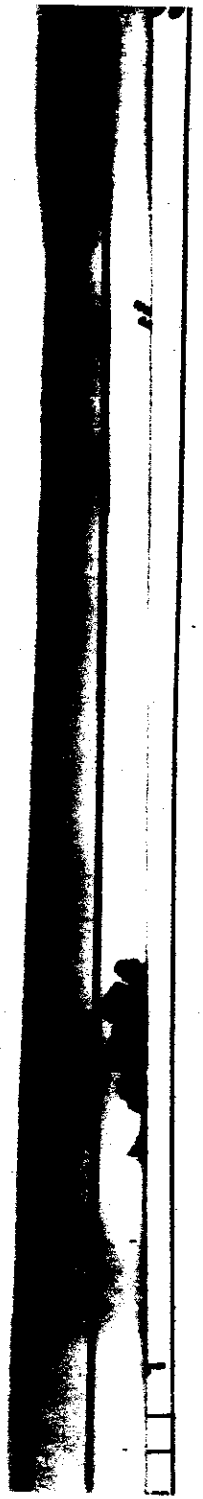
The un-desirable industrial development in the areas beyond the urbanisable area limits of the towns along the Highways would become a serious problem in the near future. There will be a continuous ribbon development along the major transportation routes. The large scale development beyond urbanisable limits of any town should be strictly controlled. A width of 100 metres on either sides along the National Highways and the proposed Expressways and, 60 metres on either sides along the State Highways should be kept as green buffer. Those should be afforested under the control of the Forest Development. Only activities permitted in the green belt as indicated earlier would be allowed.

*d) Remaining rural land*

The remaining rural zone include mainly the vast agricultural land, forest, ridge areas and rural settlements. This zone of virgin agricultural land at present, is being threatened by the spotted industrial/urban encroachments especially along the five National Highways and, State-Highways. The lower cost of land in the rural areas, excellent transportaion system and marketing for the

products have accelerated the development of industries along the roadsides. The following major landuses can be designated in the rural lands. Strict prohibition and control on the large scale and hazardous industries, has to be exercised in the rural zone: 1) Intensive agriculture and allied activitites; 2) Afforestation especially on the hills, rocky lands, 3) Regional recreational facilities such as regional parks, wild life sanctuary, 4) Cemeteries, schools, insititutions, like hospitals may be permitted. However, the proposed development, should neither involve the use of high yielding agricultural land nor should it adversely affect ecological interest, 5) Quarrying, 6) Brick kilns, 7) Existing village mandis, and 8) Rural industries etc.

These landuse proposals are shown in Map 4.



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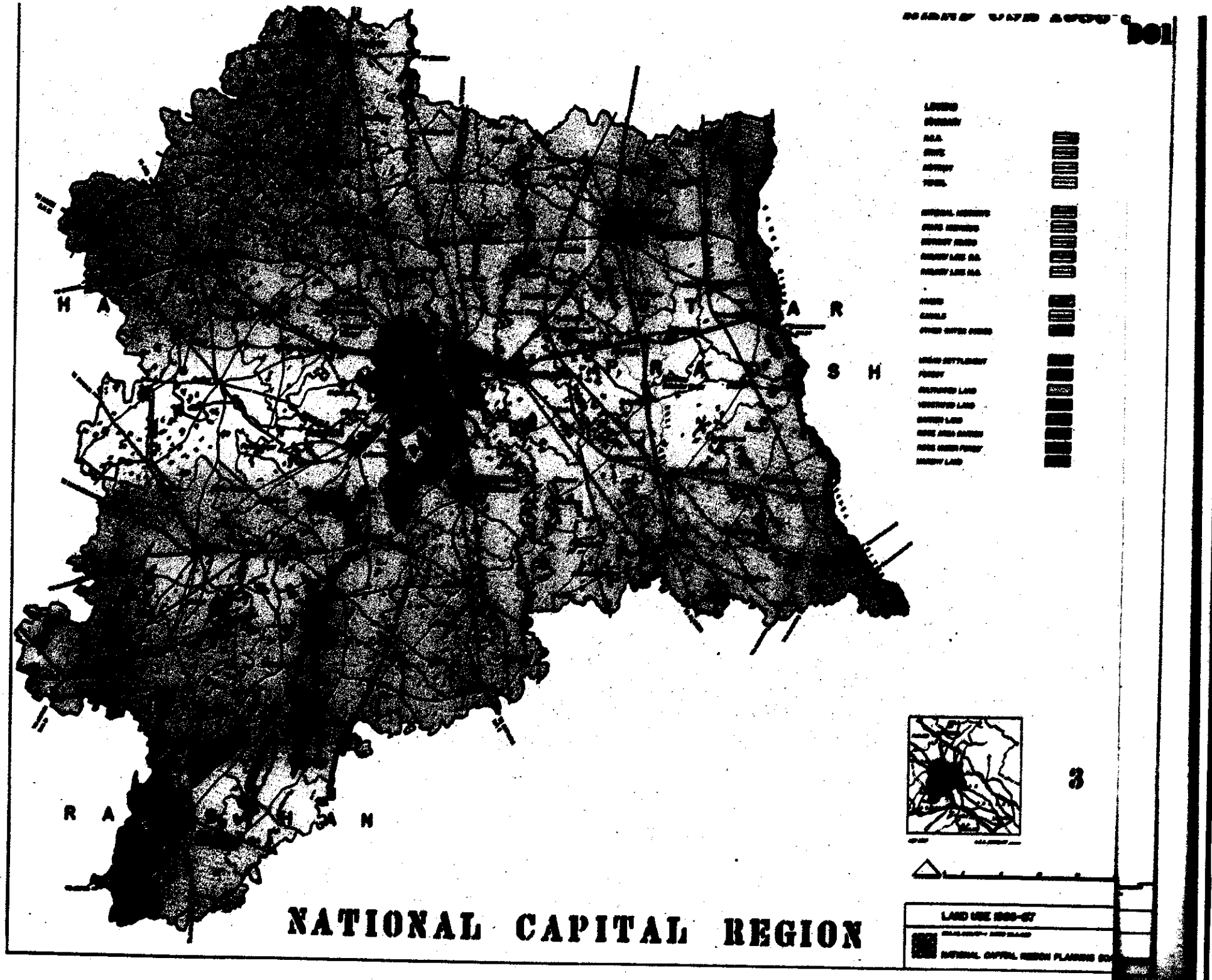

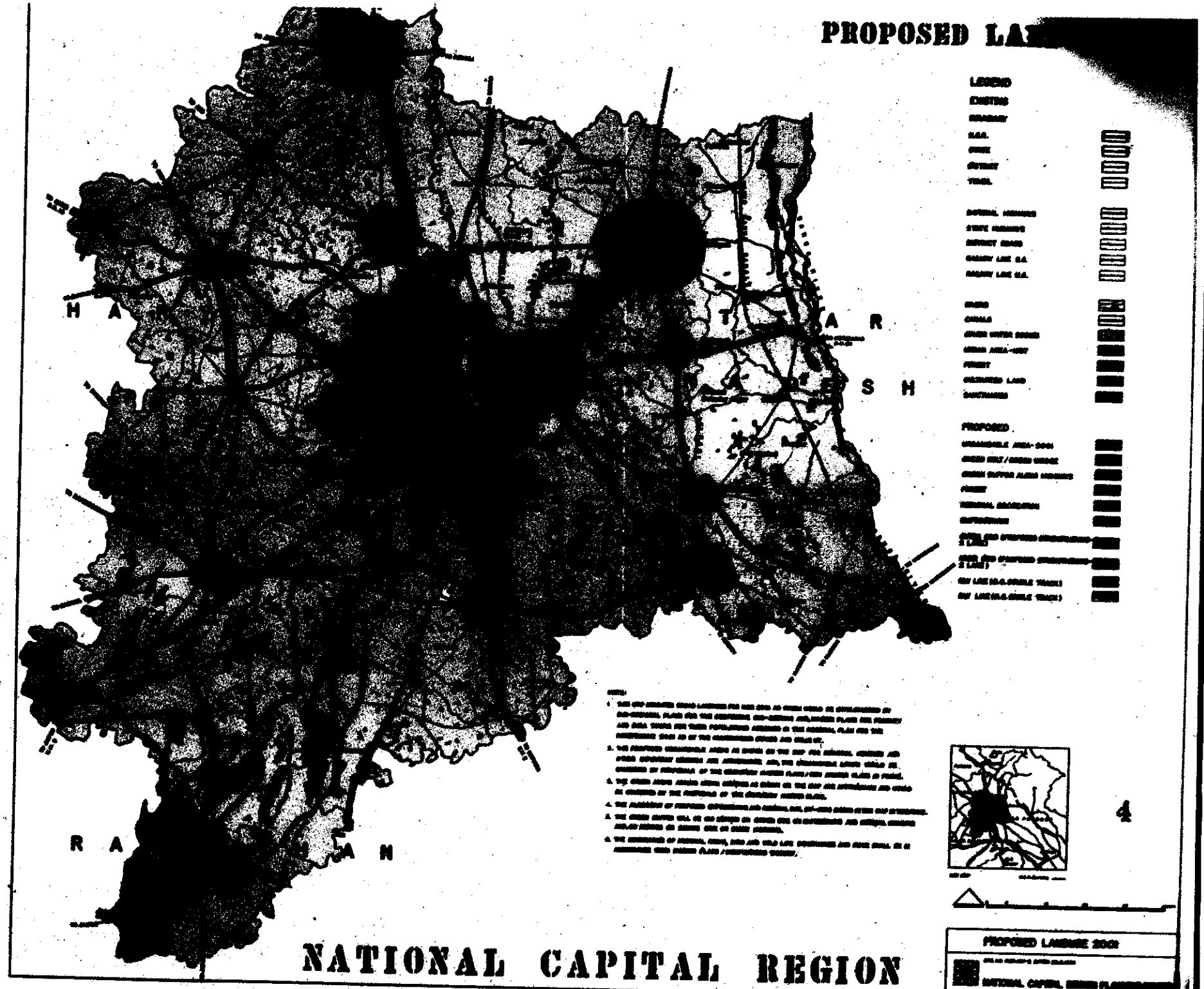
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NATIONAL CAPITAL REGION

# 14

# Environment and Eco-Development

## Background

Environmental changes are inevitable consequence of developmental process. In NCR, damage to the environment by human interference for development purposes or otherwise has taken place mainly in the form of denudation of its scanty forests. Unless necessary steps are simultaneously taken to preserve it, the environmental health of the National Capital Region may start deteriorating.

There is also a gradual decline in the quality of environment in the industrial pocket of the Delhi Urban Area in particular, and other industrial towns of the Region in general. The undersirable environmental effects of industries are noise, smoke, dust and dirt, odour, emission of toxic gases, glare, vibrations, effluents, and aesthetic and psychological factors and many other such factors.

### i) Present environmental status of the Region

*a) Delhi UT*

**Air:** Utter disregard to environment has placed Delhi in the unenviable position of being the world's third grubbiest and unhealthy city. Delhi records 12 times the national average for respiratory ailments mainly due to the unchecked pollution or the thick clouds of smoke that hang over the city. An estimated 2.5 million motor vehicles, thousands of industrial units in conforming and

non-conforming use zones, some of them hazardous and hundreds of stone crushers located in different parts of the Union Territory, are responsible for this situation.

The power plants in Delhi account for as much as 82 per cent of the total industrial pollution in Delhi. Though, the Electro Static Precipitators (ESP) to trap the flyash have been fitted, the Kalpavriksh Environmental Action Group has found that these ESPs are working at less efficiencies than intended. The mushrooming industrial units not only pollute the environs but also pose safety hazards as a large number of them are located in the thickly populated areas of the Walled City and in the residential complexes in North and West Delhi. Of the 15,000 polluting industries, nearly 5,000 industrial units including hazardous units such as chemicals, electro and nickel plating and plastics are in the non-conforming areas. Each 500 tonnes crusher throws 3 tonnes of suspended particle daily and, the dust concentration around them varies form 3,000 to 8,000 micro grains per cubicmetre of air. This is 15 to 40 times above the limit prescribed by the Central Pollution Control Board.

Sixtyfour per cent of the total atmospheric pollution in the Capital, however, comes from the emission of nearly 2.5 million vehicles. A study by the Indian Institute of Technology, Delhi, at the behest of the Delhi Adminsitration found that only 18 per cent of the Delhi Transport Corporation buses and 10 per cent of the trucks that ply on the Delhi roads have the standard smoke intensity of 65 per cent on the Hartridge scale. Nearly, 41 per cent of the DTC buses and 50 per cent of the trucks and, all tempos monitored by the IIT had a smoke intensity over 90 per cent on the Hartridge scale. The railways are also contributing to the air and noise pollution in the city.

**Water:** The major share of Delhi's water is from the Yamuna. Nearly, 1200 million litres of domestic and



industrial wastes, containing about 100 tonnes of BOD (Bio-chemical Oxygen Demand) load are let into the Yamuna every day. In fact, the entire stretch from Delhi to Agra is unfit for bathing and drinking. Ninteen major storm water drains meet the river in Delhi. A survey by the Central Pollution Control Board in 1984 revealed that five drains namely, Najafgarh, Civil Mill, Power House, Sen Nursing Home and one from Okhla Sewage Plant contribute more than 95 per cent of the Yamuna's total BOD load. The thermal plants discharge waste oils and chemicals into the drains that threaten subsoil waters that seep into the river. Some of the industries discharge dangerous pollutants like cadmium, zinc, chromium, cyanide, oil, grease and colour into the river. Major part of the solid wastes of the city are dumped at many places in the open areas in the city which pollute the air, subsoil water and land too.

According to a study on Environmental Impact Assessment and Guidelines for Industries Development in NCR by the School of Planning and Architecture, New Delhi, the status of environment of the industrial towns of NCR is in brief as under:

*b) Harayana Sub-region*

*Sonepat*

Large scale pollution of land and water from the effluents of large industries is prevalent in Sonepat. Road adjacent to Atlas Industries are polluted with solid wastes and sullage water casuing insanitation and health hazards. The Shanti Paper Mills, Enginnering industries, Seafarm Roller Tanner, Gedore Tools and Hindustan Everest Foods and units of the Kundli Industrial Estate casue both air and water pollution.

*Panipat*

This textile town has a number of handloom and powerloom industries dealing with woollen fabrics. The effluents from these industries are allowed into an open drain. A large and highly polluted drain through the middle of the city outfalls into the Yamuna polluting it to dangerous proportions.

*Bahadrugarh*

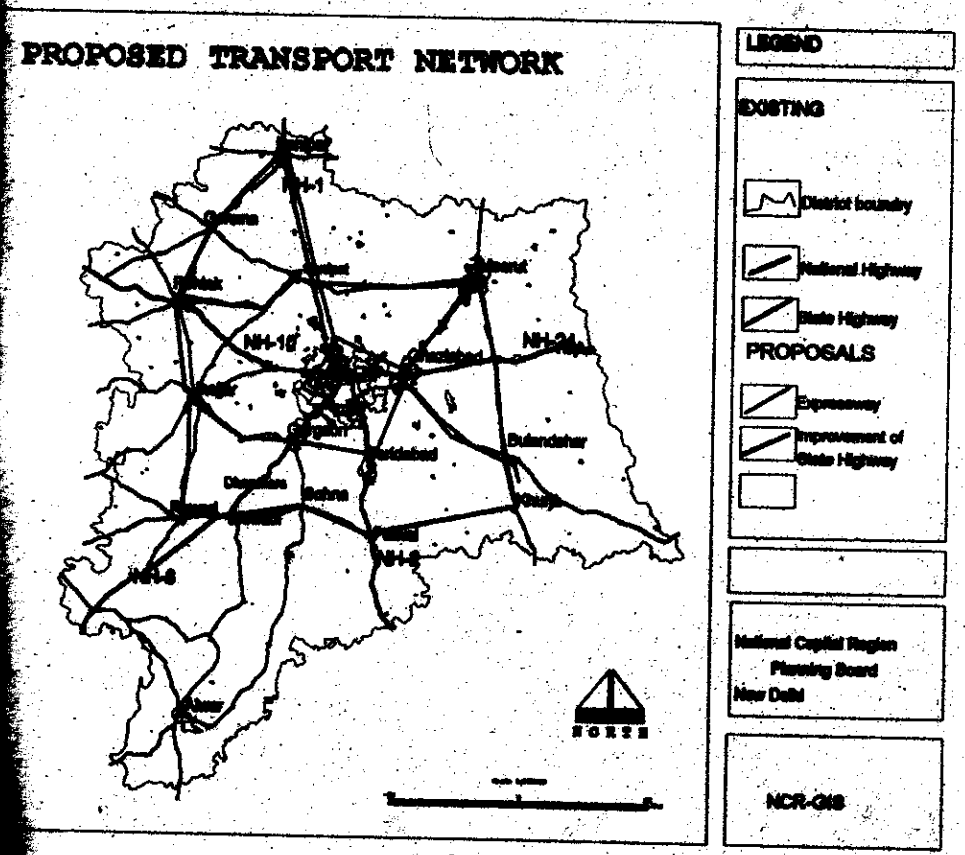
Bahadrugarh has extensive areas under industries. The industrial area near railway station with about 100 small and large industries, private industries north of the road cause air and water pollution. Though HUDA has constructed sewage treatment plant, major part of the sullage is disposed off on land as the plant is not yet completed.

*Faridabad—Ballabgarh Complex*

There are around 1800 polluting industries and amongst them, 337 industries including electroplating processors are more polluting. There are a number of privately owned electroplating units in the residential areas seriously endangering the health of the residents. Traces of zinc have been found in the water drawn from the borewells and, this poses an alarming health hazard to many in the city. Moreover, in the absence of the sewage treatment, the raw sewage is let into the drains damaging the environment.

*Dharuhera*

The solid and liquid wastes of the industrial estate are dumped on the Jaipur road side causing water stagnation and insanitation. There is pollution of air, water and land in an extensive way in the Estate. The paper mills throw out liquid wastes on to the road and also the gaseous



wastes (sulphuric acid) which damage the agricultural crops as well as trees in the area. The solid wastes from the paper and chemical industries being dumped in the open will spoil the land as well as the water resources. The Oriental Carbons and Chemicals Ltd. and the Multi Technical Chemicals industries cause heavy pollution of land, water and air.

*Gurgaon*

Among the many industries in the city, polluting industries are of the ceramics, rubber and iron works etc. For want of adequate power supply even the large industries are using diesel generators which aggravate the smoke pollution hazards.

**c) Rajasthan Sub-region:**

*Bhiwadi*

Bhiwadi Industrial Estate located on the Rajasthan-Haryana border accommodates number of large industrial units besides a number of small scale industries. There is no arrangement to deal with the solid and liquid wastes. The sullage water is carried untreated through the natural drainage channels towards Haryana causing a great hazard of water pollution. The Cardboard Factory and the two paper mills are the most polluting units and, their solid and liquid wastes are dumped on land. The coal ash is not properly disposed off.

*Alwar*

Alwar has two industrial areas, one in the town is of medicine and chemical industries which create pollution hazard; the other one is outside the town consisting of chemical gases and glass industries which give rise to large scale pollution. There are chances of gas leakages

which had occurred at minor levels causing eye irritation to the residents nearby.

**d) Uttar Pradesh Sub-region:**

*Khurja*

This is a unique case where a large number of ceramic industries have been developed close to each other with a kiln and a chimney for each. The kilns are mostly coal-fed. The smoke from many chimneys heavily pollutes the atmosphere and sometime, choking sensation has been reported by the people around. The proposed expansion of creamic industries may add more to the pollution level and suitable measures to minimise the pollution shoule be taken.

*Meerut*

Meerut city has three industrial areas—Partapur, Modipuram and Daurala. In Partapur, presently only water pollution by the distillery is reported. Modipuram industrial complex is reported to have no significant pollution problem so far. The small industrial units within the city are causing air, water and land pollution.

*Modi Nagar*

A large number of industries which have been located on road side as well as inside the city have no provision for any treatment of the liquid waste and, it is discharged into the Kalinadi.This endangers the inhabitants of the area as well as the ground water sources. The chimneys of various plants are causing air pollution.

*Ghaziabad*

There are a number of industrial complexes comprising forging units, rolling mills, paper plants, metallurgy



plants, pharmaceuticals, rubber industries and eletro-plating. All these cause serious water and air pollution. The wastes pollute the Hindon River. The calendering and dyeing plants at Pilakhuwa, though small in size, cause water pollution in a big way.

*Mohan Nagar*

The food processing plant, engineering shops located on the border of Delhi cause air and water pollution.

*Sahibabad*

There are a number of industries manufacturing textiles, paper, chemicals and rubber products. Besides, there are a number of printing and electroplating industries. These are causing air and waste pollution. The water pollution caused by these industries may also affect the waters of the Yamuna.

**ii) Environmental sensitivity**

*a) Industrial*

This is a tool to assess the overall impact of various types of pollutants generated by different kinds of industries on various landuse zones, infrustructure, flora and fauna, and man-made structures.

The Environmental Sensititvity Index (ESI)* for industrial complexes in the NCR are as under:

| | Sub-region/Complex | ESI | Environmental condition |
|---|---|---|---|
| a) | **Haryana Sub-region** | | |
| | 1) Sonepat | 778 | Adverse |
| | 2) Panipat | 798 | Adverse |
| | 3) Gurgaon | 757 | Adverse |
| | 4) Rohtak | 758 | Adverse |
| | 5) Bahadurgarh | 679 | Bad |
| | 6) Faridabad | 675 | Bad |
| | 7) Rewari | 715 | Adverse |
| | 8) Dharuhera | | 730 Adverse |

| | | | |
|---|---|---|---|
| **b)** | **Rajasthan Sub-region** | | |
| 1) | Alwar | 757 | Adverse |
| 2) | Bhiwadi | 789 | Adverse |
| **c)** | **Uttarpradesh Sub-Region** | | |
| 1) | NOIDA | 614 | Tolerable |
| 2) | Khurja | 650 | Bad |
| 3) | Bulandshahar | 615 | Tolerable |
| 4) | Hapur | 650 | Bad |
| 5) | Meerut | 632 | Bad |
| 6) | Modinagar | 633 | Bad |
| 7) | Sikandrabad | 635 | Bad |
| 8) | Ghaziabad | 662 | Bad |

*Source: 'Environmental Impact Assessment and Guidelines for Industrial Development in NCR' by School of Planning and Architecture. New Delhi sponsored by the Ministry of Environment and Forests.

*b) Human settlements*

So far the sanitation facilities are concerned, the Region presents an equally unsatisfactory picture. Of the urban centres, as many as 65 do not have sewerage system at all. The raw sewage is disposed off on lands, into open drains and is allowed to flow its natural slopes where it stagnates and results in formation of foul smell, germs and virus, rodents and water pollution. Solid wastes are managed only to 29 towns and, they are dumped in depressions in an unorganised and unscientific manner polluting the air and underground water by its gaseous products. The rural sanitation scene is still worse. Sewerage system does not exist in villages and, solidwaste collection and disposal is fully unscientific and irrational.

**iii) Imbalance of eco-system**

One of the important elements in keeping the eco-system in balance is the vegetative cover. The National Forest Policy in this regard stipulates a minimum of 33 per cent of the land area to be under forest cover made up



by 20 per cent in plains and 60 per cent in mountainous zones. The NCR, by and large, is plain and should have, therefore, a minimum 20 per cent of its area under forest/ tree cover. But, the Region has only 1.2 per cent of its area under forest cover. In fact, even this is being fast eaten away by encroachment for other uses. Even in the left over forest area, forests are getting denuded leaving only a fraction of the forest area under tree cover. The satellite imageries of the Region reveal that out of the forest designated area of 65,222 hectares, only 35,557 hectares of land is covered by trees, meaning thereby denudation/ encorachment of nearly 29,665 hectares of land. This is a significant loss of forest wealth which will have damaging effects on microclimatic conditions causing reduced rainfall, dust storms, deepened water table conditions and finally in economy and livelihood of people. The damage is to an extent of 31,925 hectares in the Haryana Sub-region and 8,317 hectares in the Uttar Pradesh Sub-region.

**Policies and Proposals**

*i) Air pollution*

The main sources which contribute to air pollution are emission from automobiles, industries, thermal power plants, fertilizer plants, coal burning and indirectly putrefying odour from slaughter houses, raw sewage disposal, solid waste dumping and stagnating water. There is a direct relationship between air pollution levels and urbanisation and industrial activities. The level of air pollution in the NCR is severe in several pockets such as in the metropolitan and urban industrial areas, and major transport corridors. The pollution impacts have to be identified through appropriate field research studies so that, the levels and types of industrialisation can be established for the different Sub-regions.

*ii) Water pollution*

a) No industry be permitted to discharge its effluents over land or into other water bodies without treating it to requisite pollution control standards.

b) As far as possible, new industries be developed in identified and classified industrial areas/estates which should have proper effluent treatment facilites in-situ before effluents are discharged into natural areas.

c) Urban wastes should be treated to requisite levels of pollution control standards before being discharged into rivers or other water bodies.

*iii) Sewage disposal*

Detailed schemes should be prepared at local level for sewage treatment for all DMA, priority and other towns so that the sewage may be recycled for irrigation and other purposes. The settlements where regular sewerage schemes are not available, low cost sanitation system for individual family or community may be adopted as a short-term measure.

*iv) Solid waste*

Solid waste from urban and agricultural areas, if properly recycled, can be a valuable source of nutrient and energy. This approach will also lessen the pollution loads of the solid wastes on the environment or the eco-system. A scientific approach should be adopted for the solid waste management and its re-use in all urban and agricultural areas.

**v) Coordination Committee**

A Coordination Committee for preventation and control of pollution of water, land and air should be established for the NCR with the following main functions:



a) to coordinate the activities of the State Pollution Control Boards for the prevention of pollution, and the Environmental Committees constituted at local levels and to provide them the technical assistance and guidance to carry out and sponsor investigations and research relating to problems of water and air pollution and prevention, control and abatement of such pollution,

b) to advise enforcing law for treatment of liquid effluents from domestic areas, industrial and commercial areas for making them fit for recycling, and

c) to promote solid waste management for extracting its nutrient value.

**vi)** Location of industries in the NCR should be regulated with respect to pollution propensities. Before issuing new licence or renewing the old one, licensing authorities should ensure that industries are located in such a way that smoke emitted by industries is carried away from the main human settlement, and the liquid wastes are released so that the water sources are not polluted and no liquid effluents are released without proper treatment.

vii)Afforestation programmes should be undertaken on all barren and uncultivable land by the concerned agencies.

**viii)** Care should be taken by the local planning and plan implementing authorities at the time of preparing and implementing the development plans of the urban areas in their Sub-regions to contain the spread of corridor developments all along the major transport arteries of the Region. All urban developments should be regulated within identified geographical areas. As far as possible, each of the settlements may be surronded by a green belt comprising social forestry, urban forestry or agro-horticulture with adequate vegetal and biomass cover. These would inter-alia, act as climate balancers.

ix) Technical help and traning should be given to the people in rural areas throgh voluntary organisations and, through the concerned agenices of the Central and State Governments to put the animal dung and human waste to productive use of bio-gas generation.

x) Municipalities and other local authorities should provide for sewage and solid waste disposal in towns and, low cost sanitation in towns and villages where conventional sewerage system is not available.

# 15

# Management Structure for Plan Implementation

With the establishment of NCR Planning Board, an apex body has been constituted at the Central level with the requisite statutory powers to prepare a Regional Plan for the balanced, harmonised and coordinated development of the NCR and to enforce, oversee and monitor the implementation of the Plan. For successful implementation of the Plan in the Region, suitable institutional arrangements are necessary at all levels. The NCR Plan is required to be implemented by the participating States/ Delhi UT, while, schemes falling in the Central sector will be implemented by the concerned Central Ministries.

A review of the existing planning and implemention arrangements shows a varied pattern in the three participating States and the Union Territory of Delhi. However, none of the existing arrangements has been found to be fully compatible to fulfil the needs of taking up the balanced and integrated development of the concerned Sub-regions at the field level, which could encompass both the rural and urban areas. In Haryana, the Haryana Urban Development Authority (HUDA) fully meets the needs as far as the urban areas, including controlled areas, are concerned. Planning in their case is the responsibility of the State Town and Country Planning Department. The Director of the Town and Country Planning Department who is also the Chief Administrator of HUDA, is in a position to achieve a fair degree of

integration in planning and developmental activities. However, their jurisdiction does not extend to rural areas at all.

In Uttar Pradesh, planning in urban areas is the responsibility of the Development Authorities and Controlling Authorities under the UP Urban Planning and Development Act and the UP Regulation of Building Operations Act respectively. The State Town and Country Planning Depatment acts as an agency for planning on behalf of the Development Authorities. But once again, they have no responsibility for the rural areas. The suggestion made to the UP Government for declaring the Sub-region as a Special Area under their UP Special Area Development Authorities Act, 1986, has not yet found favour with the State Government and, they have been considering various other proposals. Uttar Pradesh, of course, has the added advantage of having Development Authorities covering their towns included in the DMA and the other towns identified for priority development. However, as pointed out above, the body which could exercise uniform authority for planning and implementation in the urban and rural area would be the suitable Authority for each Sub-region. In the Rajasthan Sub-region, the NCR area lies in one district alone, viz Alwar. The State Government has presently extended the scope of the Urban Improvement Trust, Alwar, to include development of Bhiwadi, one of the identified priority towns, but they have themselves accepted the limitations of this arrangement. They have agreed that they intend to constitute a Sub-Regional Development Authority with wider jurisdiction to undertake planning and to implement the NCR Plan for the entire Sub-region when their proposed Town and Country Planning Act is enacted. The situation in the Delhi Union Territory is still more complicated and, a Commission appointed by the Union Government is presently going into the question of



suggesting a revised administrative structure and we shall have to await their findings.

The main issue to be resolved is about dovetailing the planning and development in the rural areas along with urban areas. The concept of the development of the NCR goes beyond the limited applicability on the urban areas and has to integrate and harmonize the development of the rural areas also. It is a fact that a number of agencies, such as Zila Parishads, Panchayat Samitis, Panchayats, cooperative bodies, in addition to the official agencies of the Government, are operating in the rural areas. Since an integrated approach is crucial for the development of the Region, it is of utmost necessity that a suitable organisation be set up at the Sub-regional level which would have jurisdiction for planning in the entire Sub-region, and an overseeing role in the implementation of the NCR objectives and policies. It would be necessary at the Sub-regional level to have one plan for the entire Sub-region consisting of resources from the NCR Planning Board and the regular schemes of the State Plan. Suitable proposals in this regard should be worked out by the Board in consultation with the States.

The need for having a Planning Cell in each of the constituents of NCR to carry out the preparation of the Sub-regional Plans, Functional Plans, Project Plans etc. and provide the necessary information to the NCR Planning Board for the preparation of its plans, has been accepted. Planning Cells with different compositions are already in operation and, it is expected that they would be shortly re-organised on the pattern recommended and accepted by the Board. Presently, the three participating States have also set up Steering Committees under the chairmenship of the Chief Secretaries concerned, to establish the required coordination at the State level.

One of the functions of NCR Planning Board is to arrange for, and oversee, the financing of selected

development projects in the NCR through Centre and State Plan funds and other sources of revenue. For both these functions, suitable monitoring systems would be developed as under:

A. In case of projects with financial assistance of the NCR Planning Board, it is proposed that each implementing agency/organisation would have the following institutional arrangement:

i) Within the Implementing Agencies in participating States: Creation of a Programme Monitoring Unit (PMU) which would be responsible for monitoring of the programmes of the agency/organization including projects funded by the NCR Planning Board. This Unit will monitor the achievement of the overall goals of the sectoral programmes and also physical and financial progress of individual projects funded by all sources, including NCR Planning Board. This Unit will submit a quarterly progress report to be evaluated by the Planning Cells (in the Town and Country Planning Department) of the State Government and finally to the NCR Planning Board for review by the Project Sanctioning and Monitoring Group of the Board.

ii) In Central Ministries: In case of NCR projects to be implemented by the Central Ministries, progress reports on quarterly basis will be made available to the NCR Planning Board Secretariat for review by the Project Sanctioning and Monitoring Group of the Board.

iii) For monitoring of projects both of State and Central Schemes, a Project Appraisal Monitoring and evaluation system will be developed in the NCR Planning Board.

B. As regards monitoring of the following aspects, suitable scientific systems will be developed within the



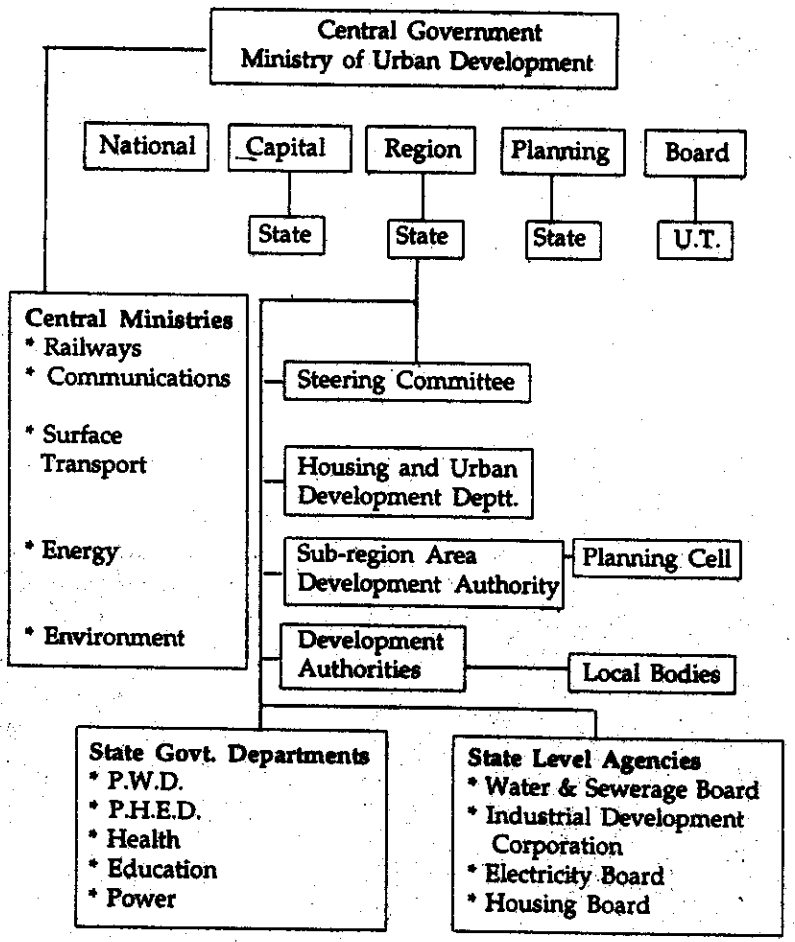
Serectariat of the NCR Planning Board for monitoring of major developmental activities as follows:

i) **Landuse aspect**
Through sequential/periodical aerial photographs/ satellite imageries to evaluate persistent trend of landuse over a period of time and monitor unauthorised developments and to detect growth trend of urban areas for review by the Planning Committee and the NCR Planning Board.

ii **Environmental aspect**
Through constitution of a Joint Committee represented by the respective constituent State Pollution Control Boards, Central Pollution Control Board and the NCR Planning Board to be reviewed by the Planning Committee and the NCR Planning Board.

An Organisational Structure for the purposes of planning and co-ordination of enforcement and implementation of the Regional Plan, Functional Plans, Sub-regional Plans and Project Plans is as given next page.

**Proposed Organisational Structure For Implementation**




# 16

# Counter Magnet Areas

## Background

The NCR Planning Board Act, 1985 empowers the Board to select, in consultation with the State Governments concerned, any urban area outside the NCR having regard to its location, population and potential for growth, which may be developed in order to achieve the objectives of the Regional Plan. As per 1981 Census, the major share of migrants to Delhi was from Uttar Pradesh, Haryana, Rajasthan, Punjab and Madhya Pradesh. It may be appropriate to identify the Counter-magnets in these States to help in meeting the objectives of the Regionl Plan. A study to identify appropriate Counter-magnet areas has accordingly been entrusted to a Professional Institution—the School of Planning and Architecture, New Delhi, by the Board.

## i) Concept of Counter-magnet

Counter-magnet Areas to Delhi should be located sufficiently away from the NCR and, should have its known established roots and inherent potentials to function as viable independent growth foci. Such identified Counter-magnets would have the attributes of physical, social and economic viability, nodality with respect to transportation network and will have the quality of physical linkages in the form of facilities for transportation and communications.

**ii) Role of Counter-magnet areas**

The proposed Counter-magnets are envisaged to play two distinctive and mutually complementary roles in the context of the NCR:

a) firstly, as the future intercepters of migratory flows which may escalate as the accelerated development of the NCR would provide a pull to migrants from the less developed adjoining areas,
b) secondly, as regional growth centres in the regions of their setting which would help, over time, to achieve a balanced pattern of urbanisation.

**Identification of Counter-magnets**

i) The criteria employed by the Consultants in identifying the Counter-magnet areas are:

**a) Nodality consideration:** The Counter-magnet areas are expected to maintain certain amount of complementarity in respect of metropolitan functions with Delhi and the NCR and as such, a range of 250-300 km from the NCR boundary or 350-400 km from Delhi representing 6 hours journey time at the prevailing transport conditions should enable interaction between chosen Counter-magnet and the metropolitan core, without impairing its developmental autonomy and functional identity as a regional growth centre. However, these distances for search zones would be extended to the entire constituent States with the likely technology improvement in the transport sector specially along the major transport corridors. To avoid overlapping of influence zones, such identified centres would be spaced at least about 60 km apart.

**b) Spatial consideration:** To infuse complementarity to spatial pattern, size and functional specification of priority towns and their linkages outside the NCR, particularly in the search zones to identify for linking possible Counter-magnets, spatial considerations are imperative.



**c) Size and viability consideration:** Counter-magnets will generally have a population size of about 3,00,000 and upwards as the cities of that size would have established service area and basic level social and economic infrastructure, with a diversified economic base. While this would be only a general guideline, emphasis would be location specific.

**d) Migration consideration:** By and large, the location of Counter-magnets may be guided from the consideration of higher rate of migration flow in a district or a group of districts of a State.

**ii) Search zone**

For selection of possible counter-magnets, area falling between 100 and 400 kilmometre radius from Delhi and, including Haryana and parts of Punjab, Rajasthan, Madhya Pradesh and Uttar Pradesh was considered and, on the whole, 36 Class I urban centres were listed for multi stage scanning (Table 16.1)

**Selection of Counter-magnets**

The 36 listed centres were subjected to considerations such as metropolitan or sub-metropolitan size, major administrative status, viz capital cities, religious or ecological significance, or any special locational attributes; and also to quantitative analysis using five variables viz population size (1981), population growth (1971-81), workforce participation ratio (1981), growth in workforce participation ratio (1971-81) and population density (1981); and to a spatial analysis using three parameters, viz accessibility, congruence with in-migration corridors, and proximity to other contenders in the Region, in addition to an evaluation of them in terms of viable economic base, availability of infrastructure, input requirements particularly in secondary and tertiary sectors. These analyses have led

to the selection of certain urban centres as possible potential counter magnet areas. After discussions and consultations with the State Governments, the following urban centres emerged as possible contenders for further scrutiny to decide the counter-magnet areas:

*Hayrana*
1) Hissar
2) Yamuna Nagar/Ambala/Karnal

*Madhya Pradesh*
1) Gwalior

*Punjab*
1) Patiala
2) Bhatinda/ Ludhiana

*Rajasthan*
1) Kota
2) Sikar/Ajmer

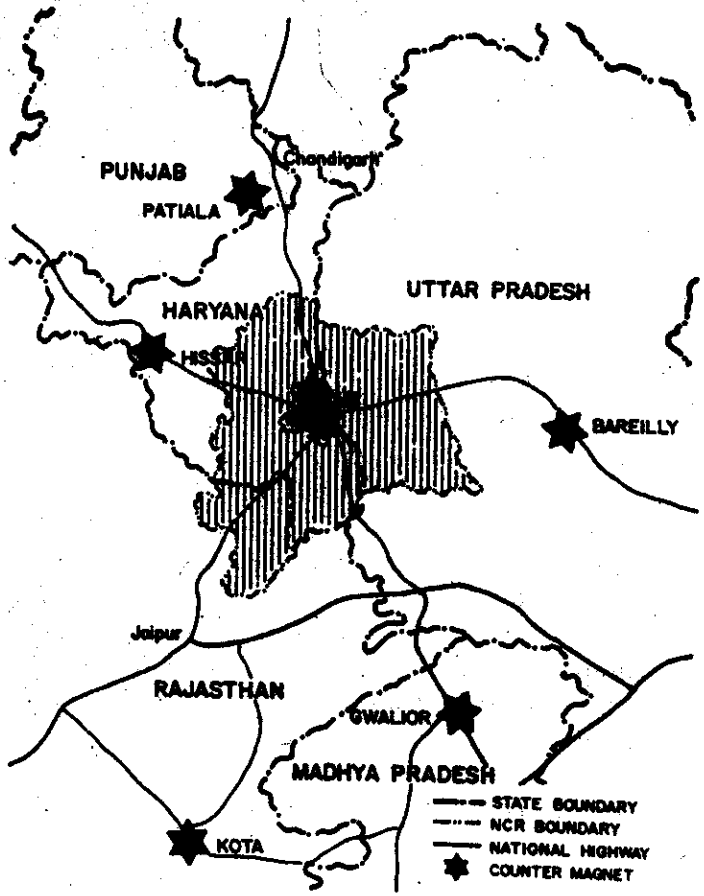
*Uttar Pradesh*
1) Bareilly
2) Moradabad/Saharanpur/Allahabad

The Consultants have recommended that from amongst the five counter-magnets, one from each State be selected for investment initially. This has been suggested not only in view of general financial constraints, but also to enable proper synchronisation of development programmes in the priority towns of the NCR vis-a-vis that which may need to be undertaken in the counter-magnet cities by the State Governments, and further to provide them time to acquire the necessary institutional strengthening. Further addition to the number of centres to be designated as counter-magnets in each State could be considered at subsequent stages of NCR Plan implementation.

In the interest of a balanced directional split, the Consultants have recommended the following centres (Fig. 13) as the counter-magnets to the NCR for first stage intervention: 1) Hissar in Haryana (in the westerly direction), 2) Patiala in Punjab (in the northerly direction),



Figure–13: Counter Magnets



3) Gwalior in Madhya Pradesh (in the south easterly direction), 4) Kota in Rajasthan (in the south westerly direction), and 5) Bareilly in Uttar Pradesh (in the easterly direction).

**Policy guidelines**

Development of Counter-magnet areas would require co-ordinated efforts of the State and Central Governments and the National Capital Region Planning Board. The broad policy guidelines for development of Counter-magnet areas in terms of the role by the Governments and the Board may be as under:

**A. State Government**

i) The Counter-magnets would be finally identified by the NCR Planning Board in consultation with the State Governments. The State Governments/its implementing Agencies will prepare an integrated long term development programme under which detailed projects would be prepared to coincide with Five Year Plans for their accelerated development.

ii) Specific action programmes for each Counter-magnet area for the first five years, would then have to be prepared by the State Government/implementing agencies indicating the investment implications relating to development of physical and social infrastructure, economic activities such as industries, commerce and services, housing, environmental improvement etc. in the State Sector and development of transport (National Highways and Railways) and telecommunications in the Central Sector.

iii) The concerned State Governments should take steps to formulate a special programme in the State sector for the integrated development of the concerned Counter-magnet areas and set apart a special fund (in the form of revolving fund) for this purpose in the State Plan providing easy access to the funds by local bodies/authorities.

iv) The State Government should immediately take steps to establish statutor development authorities if not existing and, these authorities and local bodies should be equipped adequately with both manpower and finance, to be able to take up urban development programmes.

v) The State Governments' promotional role would include extending packages for industrial and commercial entrepreneurs favouring location in Counter-magnet areas. This calls for a reorientation of the State level industrial development policy directed at encouraging not only public sector but also corporate sector investments in the Counter-magnet areas.

vi) A Coordination Committee may be set up at the State level to coordinate various development programmes of the Counter-magnet areas with other development programmes relating to agriculture, marketing infrastructure, rural roads and electrification etc. in the district.

vii) The State Government may provide additional thrust to Counter-magnet areas taking advantage of Central sector urban development programmes and ensure additional allocation for such schemes.

viii) The Counter Magnets should be given a priority status for the purpose of institutional funding of various development programmes like development of industrial land, infrastructure and housing.

**B. Central Government/NCR Planning Board**

i) The NCR Planning Board in its budgetary demands should incorporate a separate head for supporting the development of Counter Magnet areas, based on an

assessment of investments required under Central Sector for transport and communication schemes, subject to the availability of resources.

ii) The NCR Planning Board would extend technical assistane to the State Governments/implementing agencies for the preparation of integrated projects for the development of Counter Magnet areas. Besides, the NCR Planning Board would also be responsible to monitor the implementation of various development programmes for which a suitable mechanism will be worked out by the Board in consultation with the State Governments.

iii) The Central Government, in addition to providing the financial support would also have a substantial promotional role to play. For this purpose, the Board would formulate policy guidelines relating to development of various sectors.

### C. State and Central Governments and NCR Planning Board

To mobilise public support and participation and, to attract private entrepreneurs to invest in the Counter Magnet areas at the development authority level, a publicity campaign should be organised with the support of such institutions as Chamber of Commerce, Market Associations, Mandi Committees, etc. using mass media like newspapers, radio and television network.

# 17

# Strategies and Priority Areas for Development 2001

The Regional Plan for the NCR-2001 stipulates an inter-related policy frame-work for achieving the objectives of the Plan. The policies require several strategies to be followed each of which has significant impact on programmes to be undertaken in the NCR. Various strategies and priority areas for development as discussed below are related to the goals of the NCR Plan viz (i) a manageable Delhi, and (ii) harmonised and balanced development of the NCR.

### Policies and strategies

Although the year 2001 AD has been taken as the perspective for the Regional Plan, the Plan is not finite, but is a part of continuous process. Nevertheless, it is essential to structure this continuous process into distinct phases, that can be organised within the limits of the resources and implementing capability of the organisations involved. It is equally essential to place the tasks into an order of priority. The tasks can be divided into the following:

i) Continuation of the work of Regional Plan through the preparation of Functional Plans by the National Capital Region Planning Board (NCRPB) and, Sub-regional Plans by the participating States and Delhi UT.

ii) Action plan, programmes and project plans by each

of the participating States and Delhi UT and the Central Ministries.

iii) Institutional improvements
iv) Resource mobilisation
v) Approval and monitoring of implementation of projects, and
vi) Implementation of the Regional Plan.

**i) Continuation of the work of Regional Plan**

The Regional Plan contains broadly policy frame-work, strategies and guidelines for development of the Region together with broad landuse for the NCR-2001.

The Secretariat of the NCR Planning Board will prepare Functional Plans for various sectors of development in close collaboration with the Central/State Government agencies. These Functional Plans will identify areas of action for proper guidance of the participating States and of the Union Territory to achieve the objectives of the NCR Plan.

The action plan will suggest measures:

a) To contain the population of Delhi UT through decelerated growth;
b) To achieve moderate growth of DMA excluding Delhi UT;
c) To induce growth in the towns/complexes identified for priority development by enhancing the momentum of economic expansion and technological development and, also adopting effective promotional measures to create employment opportunities to attract the Delhi bound potential migrants and, creating a physically efficient pattern and socially desirable environment with effective participation of the States, that will sustain dynamic growth in keeping with objectives and goals of the NCR Plan;
d) For action to expand and to effect qualitative and quantitative improvement in physical and social infrastructure in towns identified for priority development.



The Sub-regional Plans will be prepared by each of the participating States for the respective Sub-regions. The Sub-regional plan will indicate the following elements to elaborate the Sub-regional plan at the Sub-regional level namely:

a) reservation of areas for specific landuses which are of regional or sub-regional importance;
b) future urban and major rural settlements indicating their areas, projected population, predominant economic functions, approximate site and location;
c) road network connecting Sub-regional centres, Service centres and Basic villages;
d) proposals for the coordination of traffic and transportation, including terminal facilities;
e) priority areas at Sub-regional level for which immediate plans are necessary;
f) proposals for the supply of drinking water and sanitation and drainage;
g) and other matter which is necessary for the development of the Sub-regions.

**ii) Action plan, programmes and project plans by each of the participating States/Dehi UT and Central Ministries:**

a) The Regional Plan for the NCR envisages development of economic activities over a wider area in the towns/complexes that are identified for this purpose. These priority towns need to be planned as self-contained units and action taken for their coordinated and synchronised development, both physical and economic, to maximise their growth for induced development. This can only be done through an interrelated programme for which projects would be required to be identified over a time-scale. The programme for Central Ministries would be in transport, both road and railways, and telecommunications sectors,

while that for State sector in urban development schemes and regional roads.

b) The development strategies approved in the Regional Plan need to be translated into a set of programmes and phased suitable to achieve the major objectives of the Plan. The three phases would be as follows:

i) Phase I (1987-90) corresponding to the remaining part of the 7th Five Year Plan period.
ii) Phase II (1990-1995) corresponding to the 8th Plan period.
iii) Phase III (1995-2001) corresponding to the 9th Plan period and part of 10th Plan period.

c) Bringing down the growth rate by attracting the Delhi bound migrants to priority towns through creation of job opportunities will have a strong impact on priority towns which cannot absorb a large number of migrants who are presently moving to the National Capital without inducing growth rate in them three to four times higher than their present rate. In view of the greater concentration of population in the Capital, the need for flow of migrants to be re-directed to priority towns will be greater. This will require well identified projects to gradually increase the migration share to the priority towns by improving their economic base. The dominant force in triggering in-migration is the growth of secondary and tertiary sectors. The secondary sector has a greater multiplier impact upon the expansion of local and regional economy than a similar employment expansion in the service sector. For implementation of such programme, the institutional framework both at the State and local levels will need to be strengthened and action taken to improve the resource mobilisation at the local level. This will also call for inter-linakges of investments and programmes of the agencies responsible for economic activities, State level functional agencies and local authorities incharge of the infrastructural services and maintenance.



**Need for multisectoral projects:**

In the context of the above, coordinated urban development projects for various sectors of the Region/selected towns will need to be prepared. The regional level components will be: a) surface transport: the Expressways, NH and regional roads, b) railways, c) telecommunications.

And the priority towns' components will be: a) development of economic activities, industry, distributive trade and commerce and, Government and Public Sector offices to promote employment and improve the economy, b) urban infrastructure and services like water supply, sanitation, storm water drainage, solid waste management, traffic and transportation etc., c) provision of social infrastructural facilities such as education and health, d) development of shelter for the urban poor, and, e) development of small scale enterprises in the informal sector for expansion of employment opportunities and upgrading skills.

**Determining priorities:**

In this regard, more appropriate action should be to designate the areas where urgent planning action is needed and, to treat them as 'priority areas' for which integrated plans and programmes would be prepared. These would be called 'action areas' and the plans would be called 'action plans'. To preapre the plan, it is suggested that the Planning Cells of the State Governments should be responsible to complete programmes including the tasks of coordinating investments of public and private agencies. A programme would be devised in relation to the priorities finally culminating into projects for implementation. The role of the Secretariat of the NCR Planning Board in the project cycle will be in the areas of:

a) Identification of suitable projects that support the NCR Plan objectives.

b) Assisting the agencies in preparation of projects comprising technical, economic and financial aspects and institutional aspects of the proposed project by providing guidance and/or financial assistance for preparation.
c) Appraisal comprising review of all aspects of the projects; the appraisal report will serve the basis for sanction of the projects by the NCR Planning Board.
d) Implementation and supervision will be the responsibility of the participating States/Delhi UT. Quarterly progress reports on the implementation will be reviewed and field visits undertaken by the Secretariat of the NCR Planning Board for the same.
e) Evaluation to provide lessons of experience which will be built into subsequent identification, preparation of appraisal work.

**iii) Institutional improvements**

For efficient implementation and management of the projects, it is necessary to tone up institutions incharge of urban development, services and management at all levels. This will involve review of the working of the development authorities, taxation and tax recovery system of the local authorities and monitoring methods of the projects, at the local level.

**iv) Resource mobilisation**

Under Section 22 of the NCR Planning Board Act, it is provided that the National Capital Region Planning Board fund may be constituted. The sources for such fund shall be:

a) all grants and loans from the Central Governments,
b) all sums paid to the Board by the participating States, Delhi UT, and
c) all sums received by the Board in consultation with



the Central Government, participating State Governments and Delhi UT.

**v) Approval and monitoring of projects**

The project plans will be mainly prepared by the implementing agencies at local level within the framework of the Regional/Sub-regional/Functional Plans in collaboration with the Planning Cells. The NCR Planning Board will assist the implementing agencies in preparation of identified projects. Each implementing agency will have a Monitoring Cell for the projects under that agency and, they will submit timely progress of the performance in implementation as a feed back to the NCRPB. The NCRPB will develop a Monitoring and Evaluation system and also extend assistance in the preparation of objective, effective and financially viable projects.

**vi) Implementation of the Regional Plan**

The Regional Plan, although containing socio-economic policies, has alternative strategies with investment implications. The Regional Plan represents an end product, the implementation of which would be pursued on the desired strategies and goals through a number of projects. However, in the light of the impact, the development would be reviewed every five years and, after such review, it may be substituted by a fresh regional plan or such modifications or alterations made, as may be found necessary.

**Resources for implementation**

*i) NCRPB's resources*

In addition to the 'NCR Fund', it is proposed to mobilise resources under Section 22(1) (c) for financing implementation of the NCR projects through: a) Life

Insurance Corporation of India, b) Debentures/Bonds, c) Nationalised Commerical Banks, d) Proposed Urban Development and Urban Water Supply Finance Corporation, e) National Housing Bank, f) National Bank for Agriculture and Rural Development.

*ii) State Governments resources*

At the State level, the general provision of pattern of matching share will continue. However, the State Governments will make efforts to raise additional resources through: a) HUDCO, b) LIC, c) Nationalised commercial Banks, d) Market borrowings, e) National Bank for Agriculture and Rural, Development

**iii) Local Government resources:** a) Locally raised taxes, b) User charges, c) Market borrowings, d) Other non-tax revenues for performance of statutory and regulatory functions, e) Transfers from higher level of Government including shared taxes and grants-in-aid.

*iv) Role of privater sector*

Recognising the critical importance of the private sector and the dominant role of private investments in the total investment, its resources and expertise should be incorporated in the regional planning process. the regional planning involves the integration of a much larger number of sectors such as economic development, social services and environmental management where the private sector can play a significant role in improving the regional economy.

**Special Component Plan**

The allocation of financial resources is primarily made by the concerned Ministries with the approval of the Planning Commission. Allocation of resources for State



sector urban development schemes sponsored by the Centre is made by the Ministry of Urban Development. The Ministry of Urban Development and the NCRPB would also be responsible to ensure that sectoral allocations concerning other Ministries such as Surface Transport, Telecommunications and Railways for the NCR Schemes are consistent with, and supportive of NCR priorities and objectives. In practice, this task is extremely difficult because of the competing demands on the available resources and, is thus, a serious drawback for implementation of the regional development programmes. It is, therefore, proposed that a financial mechanism of Special Component Plan for NCR be established in the Central and State Plans to permit the simultaneous channelling of funds through Central Ministries and State Governments for inter-related activities ensuring the efficient implementation of comprehensive urban and regional development programmes in the NCR.

# 18

# The Emerging Scenario

## Population Explosion

The NCRPB constituted under an Act of Parliament in 1985, was tasked to devise ways and means for containing the population of the National Capital Territory of Delhi (NCT-Delhi), within manageable limits by 2001; through balanced and harmonions development of the National Capital Region (NCR), which comprise of an area of 30,242 sq. mt. of the adjoining states of Haryana, Uttar Pradesh and Rajasthan. A comprehensive plan for the NCR, with the target year 2001 was prepared by the NCRPB, which came into effect from 23rd January, 1989. The present publication, therefore, drawn up on the basis of analysis of data pertaining to 1981 census and Seventh Plan do not reflect the current positions and trends. In the chapter, the Emerging Scenario an effort has been made to update the organic decadal evolution of NCT-Delhi and the NCR, encompassing population growth, environmental challenges, traffic and industrial problems and other intricately related aspects.

Correct demographic estimate is the controlling neuron of development planning. The Regional Plan-2001, notified in 1989 had made projections and assignments for 2001, based on 1981 census and had assigned a population deflection of 20 lacs from NCT-Delhi to the NCR. This estimate did not work out as expected, because of comparatively slow development processes in the NCR. The 1991 census data gives a realistic picture of the



demographic characteristics in the NCR which need indepth examination in the backdrop of proposed deflection of population from Delhi; shifting the target from 2001 to 2005 A.D.

Total population of the region in 1991 was 264.66 lacs as against the Regional Plan-2001 projections of 254.1 lacs in 1991. Against the projected urban population of 206.68 lacs for the NCR in 1991, as per RP-2001, actual growth was 137.05 lacs. On the otherhand, against projection of 105.2 rural population, actual growth was 127.57 lacs. Higher growth in the rural sector of the NCR is a matter of further demographic research. Trend based projections for the NCR indicate that the region's population is likely to be 371.48 lacs by 2001 as against the Regional Plan projection of 325.00 lacs. This shows a marked difference of 40 lacs. However, the DRG census of India, in his report, has estimated a population of 356.6 for the Region by 2001 By 2005 the NCR Region's projected population is likely to be 423.37 lacs. Total population of NCT Delhi is expected to be 164.00 lacs by 2005, against 135.57 (U.P.), 102.79 (Haryana) and 21.01 (Rajasthan).

To underscore the importance of demographic factor in development challenges a clear understanding of the trends in NCT Delhi and the NCR is necessary.

## NCT-Delhi

According to 1991 census total population of NCT Delhi is 94.21 lacs as against the Regional Plan estimate/census expert committee projections of 92.5 lacs.

In urban -Delhi NCT actual growth was 84.72 lacs against projection of 88.1 lacs. In rural area the 1991 census figure stood at 9.49 lacs, while projection was for the 4.4 lacs. The Regional Plan 2001 has assigned a population of 112 lacs for NCT Delhi by 2001 A.D. However, trend based estimates indicate a population of 160 lakhs in Delhi in 1995, far exceeding the assigned

target population, estimated by the NCRPB. In the light of these emerging realities new assignments for NCT Delhi are being worked out.

The trend based projections for Delhi come to 144.30 lacs by 2001, on the basis of 1981-91 Rural Urban growth rate. As against this DRG census of India has projected an undeflected population ranging between 132-139 lacs by 2001. In fact, taking the growth rate of 1981-91 as a constant, trend based population for Delhi would be 164.00 lacs by 2005 A.D. All these projections are subject to actual growth rate. Delhi has shown a tendency of decadal lowering of growth rate by over 1 per cent. If this trend continues, growth rate for 1991-2001 should be pegged at 50 per cent and during 2001-2011 at 47.5 per cent.

According to projected undeflected population by 2001 and 2005 should be 141.3 and 156.0 lacs respectively; at the expected lower growth rate and 144.30 lacs and 164.0 lacs respectively at the continuing rural urban growth rate.

If the target of deflection of 20 lacs population from Delhi can be shifted from 2001 to 2005, the assigned population of Delhi under both scenario should be 129 lacs and 144 lacs respectively at the continuing growth rate and 127.9 and 136.8 at the assumed declined growth rate.

Another dimension to the hypothetical scenario emerge out of the use of the ADG census figure of range i.e. 132-139 for Delhi's undeflected population and if the deflection factor is applied to the quantum of 13.94 lacs by 2001, the range is expected to be 118.6 to 125.6 lacs.

## Population Trend in NCR Sub-Regions

To understand the real implication of population growth in NCT-Delhi a clear perception of the growth pattern in NCR sub-regions is necessary.

### *Uttar Pradesh*

Against the NCR plan projection of 87.6 lacs, the actual



population for 1991 in UP sub-region was 90.02 lacs. The projected population for 2001 comes to 118.80 lac, on the basis 1981-91 rural urban growth rate. If same yardstick is accepted, the projected population by 2005 should be 135.57 lacs. In case the deflection factor is taken into account, the trend based population of UP sub-region should stand at 127.20 lacs (118.80 + 8.4) and 147.75 lacs (126.69 + 12) for 2001 and 2005 respectively.

### *Haryana*

The Haryana sub-region registered a population strength of 66.43 lacs; 48.08 lacs rural and 18.35 lacs urban as per 1991 census. The NCR plan had projected a figure of 62.7 lacs by 2001 for Haryana sub-region. In the light of 1991 census figures, applying 1981-91 growth rate of 34.52 per cent, projected population for the year 2001 comes to 89.3 lacs. Applying the same principle the projected figure for 2005 comes to 102.79 lacs. In case the process of deflection of 20 lacs of population is assumed to be completed by 2005, the population of Haryana sub-region should come to 93.5 (89.3+4.2) lacs and 108.79 (102.79 + 6.00) lacs in 2001 and 2005 respectively.

### *Rajasthan*

The actual population in Rajasthan sub-region was 13.96 lacs as per 1991 census, against the estimate of 11.3 lacs projected in the NCR plan.

For 2001, the NCR plan had projected a population figure of 11.9 lacs for Rajasthan sub-region. Applying the growth rate of 31.12 per cent, as witnessed during 1981-91, new population projection for 2001 comes to 18.49 lacs. Applying the same yardstick we can reach a projection of 24.4 lacs for Rajasthan subregion by 2005. Supposed deflection of the deflection process of 20 lacs population takes us to projected population of Rajasthan sub-

region to 19.83 (18.49+1.34) lacs and 23.50 (21.01 + 2) lacs for 2001 and 2005 respectively.

**Population of NCR & its sub-regions, 1971 to 2005**

Reproduce table

It would, therefore, seem that the population assignment made by the NCRPB for each DMA and Priority Town by 2001 has remained unfulfilled. There have been enormous gaps between targeted population and actual present population, particularly in DMA and Priority Towns which are located in the NCR.

Serious concern arises out of high population growth in NCT Delhi. It has already crossed the target figure of 112.00 lacs by 2001.

If this trend continues, in remaining 5 years population of Delhi may increase up to 144.30 lacs by 2001. This mind boggling growth is likely to lead to an explosive situation, leading to system clogging of civic support mechanism and the impacts of over-growth are likely to generate insurmountable and catastrophic consequences. To combat this alarming scenario the Central and the concerned State governments are required to re-examine the Regional Plan in right earnest and empower the NCRPB, as a Statutory Authority, to implement the Plan at the earliest.

Generation of finance for this purpose under the 9th Five Year Plan have been projected.

**The Transport Sector–Need for Immediate Plan implementation**

Transport bottleneck and lack of modern forward planning and high density of vehicular population have led to a black hole situation in NCT-Delhi, through discharge of gasseous pollutants by emission of poisonous gasses like Co, N0x, V0C, Pb and noise pollution. The archaic transport system in NCT Delhi and the NCR have brought about environmental and ecological degradation.



The NCR is perhaps the only Mega-Capital region in the world primarily dependent on fossil-fuelled vehicles and partially rail-based transport system. The World Health Organisation (WHO) has classified Delhi as one of the 10 most polluted cities in the world along with Mexico city, Seoul and Beijing. Major sources of air pollution in Delhi are vehicles, thermal power plants, industries and domestic coal burning. It has been estimated that out of the 2000 MT of pollutants emitted in the atmosphere ever day within Delhi, vehicular sources contributed 64 per cent as per the 1993 data. The growth in mobility and traffic due to population growth, economic affluence and inadequate public transport infrastructure have resulted in environmental and ecological degradation. Therefore, proper forward planning for non-polluting transport system for NCT Delhi and the NCR has been a major concern for the NCRPB.

In the context of the developments proposed in the Regional Plan, intense traffic movement is envisaged between NCR town and Delhi, and also among each other. As such, the NCRPB has treated the total transportation system of the region as a single multi mode system, and have developed strategies for transportation planning, treating the region as a single zone for planning.

For the purpose of understanding the main thrusts of the Functional Plan for transport sector, there is need for examining the ground spread of the NCR, which extends over an area of 30,242 sq. mt., comprising NCT Delhi; Faridabad, Gurgaon, Rohtak and Sonepat Districts; Rewari and Bawal Tehsils of Mahendragarh district and Panipat Tehsil of Karnal district; six tehsils of Alwar district namely, Alwar, Ramgarh, Behror, Mandawar, Kishangarh and Tijara, and Uttarpradesh sub-region including districts of Meerut, Ghaziabad and Bulandsahar.

8. For the purpose of Functional Plan of transport sector, distinct zones have been identified: Delhi, Delhi Metropolitan Area, Priority Towns and rest of the region.

Delhi U.T. is planned for restricted growths DMA outside Delhi U.T. for moderate growth and the rest of the NCR for induced growth.

Regional Plan 2001 has identified transport as one of the key sectors of development in the regional context. Before suggesting specific measures in the Functional Plan detailed studies of the existing transport network has been made. These are delienated below.

The existing primary road transport network in National Capital Region exhibits a pattern of "radial corridor" development. There are at present five national highways and twelve state highways in the region forming the backbone for the traffic movement in the region. In addition, there are seven orbital corridors which provide the linkages among important urban centres of the region.

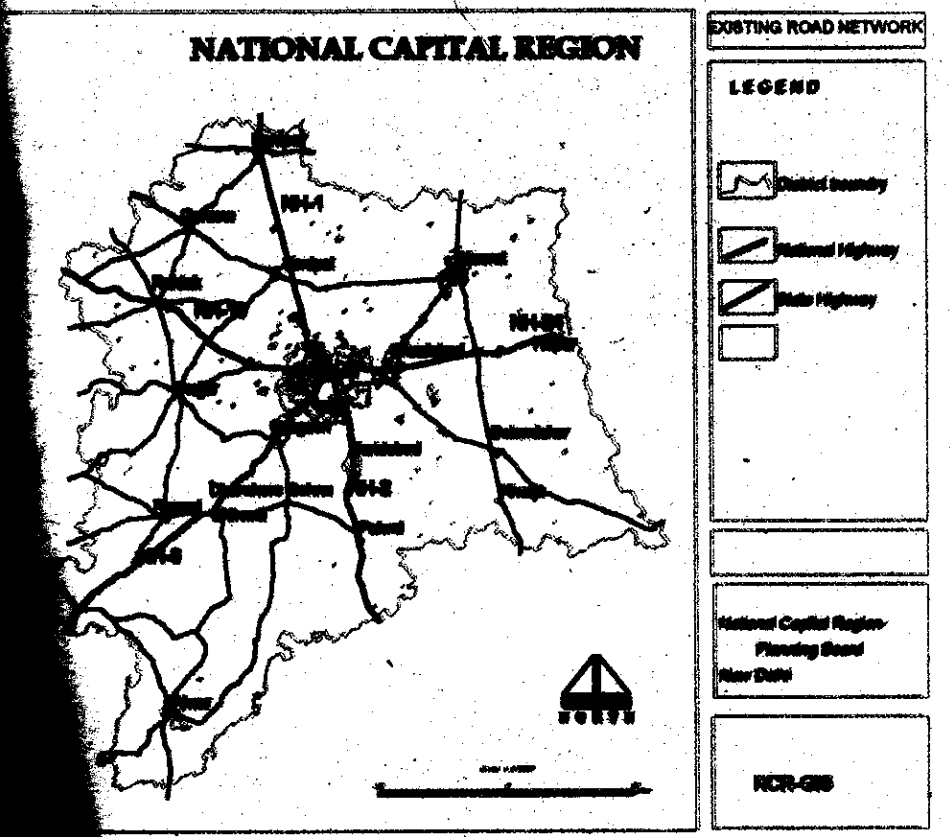
The rail network in the region comprises both of Broad Gauge (BG) and Metre Gauge (MG) lines covering three zonal railways and five divisions.

**Traffic & Transport characteristics-Road and Rail**

* The generation of total daily passenger movement by all modes in the Region was 0.88 million trips in 1987. This figure was estimated as 2.35 million trips in 1994. These trips are projected to increase to 3.07 million and 4.25 million by 2001 and 2011 respectively.
* The component of public transport (Bus & Rail) out of the total trips was estimated as 62 per cent in 1994. This is projected to rise to 65 per cent in 2001 and 70 per cent in 2011.
* The component of the freight traffic out of the total traffic was estimated as 5 per cent during 1994, and is expected to rise to 10 per cent during 2001 and 12 per cent during 2011.

*Road Network*

The existing road network in the region is radial in



nature. There are nine major corridors which forms the backbone for the traffic movement in the region. In addition there are seven orbital corridors which provides the linkage between the urban centres. Delhi has been the nucleus with major corridors converging into it.

These roads are:

1. Delhi-Ghaziabad-Hapur-Garhmukteswar (NH 24)
2. Delhi-Faridabad-Palwal-Hodal (NH 2)
3. Delhi-Gurgaon-Behror (NH 8)
4. Delhi-Bahadurgarh-Rohtak-Meham (NH 10)
5. Delhi-Sonepat-Panipat (NH 1)
6. Delhi-Ghaziabad-Meerut (NH 45)
7. Delhi-Ghaziabad-Bulandshahar-Khurja (SH 22)
8. Delhi-Gurgaon-Sohna-Alwar (SH 20)
9. Delhi-Loni-Baghpat-Baraut (SH 57)

The seven orbital links are:

1. Panipat-Gohana-Rohtak (SH 16)
2. Rohtak-Jhajjar-Rewari (SH 15)
3. Rewari-Sohna-Palwal (SH 12 - 18 - 28)
4. Palwal-Khurja
5. Bulandshahr-Hapur-Meerut (SH 18)
6. Meerut-Baghpat
7. Baraut-Panipat

Transportation Network (Road) Map of NCR.

**Table**
**Traffic levels on the sections of the Regional roads**

| S.No. | Name of the Section | Traffic Level (PCUs/Day) 1991 | 2001 | 2011 | Optimum Traffic level (Planned) (PCUs/Day) |
|---|---|---|---|---|---|
| 1. | Panipat - Gohana | 12479 | 23788 | 43415 | 15000 |
| 2. | Meerut - Baghpat | 9323 | 19429 | 31984 | 15000 |
| 3. | Khurja - Bulandshahr | 14450 | 33171 | 53279 | 15000 |
| 4. | Hapur - Meerut | 9083 | 18533 | 27906 | 15000 |
| 5. | Rohtak - Jhajjar | 11915 | 21521 | 38719 | 15000 |
| 6. | Sonepat - Kharkhoda | 12115 | 21258 | 22705 | 15000 |
| 7. | Bulandshahr - Hapur | 10435 | 18337 | 31993 | 15000 |
| 8. | Gohana - Rohtak | 9365 | 17785 | 32632 | 15000 |
| 9. | Rewari - Sohna | 8848 | 18129 | 31207 | 15000 |
| 10. | Jewar - Khurja | 7186 | 8568 | 13215 | 15000 |
| 11. | Kharkhoda - Rohtak | 6534 | 11735 | 19869 | 15000 |
| 12. | Baghpat - Sonepat | 4675 | 8186 | 15938 | 15000 |
| 13. | Jhajjar - Rewari | 6087 | 11463 | 21199 | 15000 |
| 14. | Sohna - Palwal | 5568 | 11348 | 20787 | 15000 |
| 15. | Palwal - Jewar | 2443 | 3861 | 6839 | 15000 |
| 16. | Jhajjar - Farruknagar | 3626 | 8002 | 12824 | 15000 |
| 17. | Gurgaon - Faridabad | 3626 | 6124 | | 15000 |
| 18. | Farruknagar - Gurgaon | 3626 | 5829 | | 15000 |

Source: DPR on Regional Roads



*Rail Network*

The rail network in the region consists of the following radial lines converging in Delhi:

1. Delhi Area (Broadgauge)
2. Delhi-Shakur Basti-Rohtak (70 Km-Broadgauge Double line unelectrified)
3. Delhi-Shahdra-Shamli (94 km-Broadgauge Single line unelectrified)
4. Delhi-Ghaziabad-Meerut (68 km-Broadgauge Double/ Single line unelectrified)
5. Delhi-Ghaziabad-Hapur (57 km-Broadgauge Single line electrified)
6. Delhi-Ghaziabad-Khurja (Broadgauge Double line electrified)
7. Delhi-Tuglakabad-Palwal (61 km - Broadgauge Tripple line electrified)
8. Delhi-Sonepat-Panipat (89 km-Broadgauge Double line electrifieJ)
9. Delhi-Gurgaon-Rewari-Alwar (83 km-Broadgauge/ Metergauge Single Line unelectrified)

The following feeder routes converge in Delhi Area

| | |
|---|---|
| 1. Mughal Sarai-Delhi | at Ghaziabad |
| 2. Moradabad-Delhi | at Ghaziabad |
| 3. Saharanpur-Delhi | at Ghaziabad |
| 4. Saharanpur-Shamli-Delhi | at Delhi Shahdara |
| 5. Ambala Cantt-Delhi (DUK) | at Delhi/New Delhi |
| 6. Bathinda-Delhi (SPR) | at Delhi/New Delhi |
| 7. Mathura-Delhi (C.Rly) | at Tughlaqabad |
| 8. Rewari-Delhi (BG Line) | at Delhi Cantonment |
| 9. Rewari-Delhi,(MG Line) | at Delhi Queen's Road |

**1. Delhi Area - Sub Sections:**

| S.No. | SUB-SECTIONS | EXISTING STATUS |
|---|---|---|
| 1. | Delhi-Delhi-Shahdara | Double Line |
| 2. | Delhi-Shahdara-Sahibabad | Double Line |
| 3. | Sahibabad-Ghaziabad | Quadruple Line |
| 4. | Sahibabad-Tilak Bridge (26 km) | Double Line (GAL) |
| 5. | New Delhi-Tilak Bridge (2.8 km) | (Main line and GAL) (Quadruple line) |
| 6. | Tilak Bridge-Nizamuddin (3.5 km) (GAL) | Double line |
| 7. | Nizamuddin-Okhla (3.66 km) (GAL) | Double line |
| 8. | Okhla-Tughlakabad (6.85 km) (GAL) | Double line |
| 9. | Nizamuddin-Lajpat Nagar (2 km) (DAL) | Double line |
| 10. | Okhla-Lajpat Nagar (3 km) (DAL) | Double line |
| 11. | Lajpat Nagar-Patel Ngr.(17.39 km)(DAL) | Double line |
| 12. | Patel Ngr.-Rampur Cabin (2.51 km)(DAL) | Double line |
| 13. | Rampur Cabin-Naya Azadpur (3.2 km) | Single Line |
| 14. | Rampura Cabin-Shakurbasti | Double line |
| 15. | Delhi-Kishanganj-Dayabasti | Double line |
| 16. | Subzimandi-Naya Azadpur | Double line |
| 17. | Tilak Bridge-Nizamuddin | (Main line) Double |
| 18. | Nizamuddin-Tughlakabad | (Main line) Double |
| 19. | Delhi-New Delhi | Double line |
| 20. | Delhi-Subzimandi | Double line |
| 21. | New Delhi-Subzimandi | Double line |
| 22. | New Delhi-Kishanganj | Tripple |
| 23. | Delhi-Delhi-Kishanganj | Double line |

However, the status of sub-urban passenger service in Delhi area is not satisfactory. The rail and bus systems are independent of each other. Lack of terminality and radial connectivity between the two often leave huge gaps and render the system less popular.

The following passenger services are running in Delhi area:

i) EMU services ii) Suburban shuttle trains iii) Long distance passenger trains.

The EMU services are running on the following corridors: i) Delhi/New Delhi-Ghaziabad; ii) Delhi/New Delhi-Palwal; iii) Delhi/New Delhi-Shakurbasti; and iv) On ring railway between Nizamuddin-New Delhi-Patel Nagar/ Shakurbasti-Safdarjung-Nizamuddin in clockwise and anit-clockwise directions.



The sub-urban shuttle trains are, running on the following corridors:

i) Delhi/New Delhi-Palwal/Mathura ii) Delhi/New Delhi-Rohtak/Bhiwani iii) Delhi/New Delhi-Panipat/ Kurukshetra iv) Delhi/New Delhi-Shamli/Saharanpur v) Delhi/New Delhi-Meerut Cantt. vi) Delhi/New Delhi-Hapur vii) DeIhi-New Delhi-Aligarh

**Table**
**Current status of passenger carrying trains on each- radial (1994)**

| *Name of the raidal* | *Sub Urban* | *EMU* | *Total* |
|---|---|---|---|
| 1. Ghaziabad-Aligarh | 4 | – | 4 |
| 2. Delhi-Palwal | 2 | 11 | 13 |
| 3. Delhi-Panipat | 5 | – | 5 |
| 4. Delhi-Rohtak | 8 | – | 8 |
| 5. Ghaziabad-Meerut | | | |
| 6. Ghaziabad-Hapur | 1 | – | 1 |
| 7. Delhi-Rewari (BG) | | | |
| 8. Delhi-Ghaziabad | 2 | 15 | 17 |
| 9. Ring railway | 1 | 5 | 6 |
| Total eachway | 25 | 31 | 56 |
| Total bothways | 50 | 62 | 112 |

**Table**
**Projection of Freight and Passenger trains to be handled in Delhi area-Daily**

| *S.No.* | *Design Year* | *Projected Freight Trains* | *Projected long Distance Passenger* |
|---|---|---|---|
| 1. | 199-93 (base year) | 29.1 | 354 |
| 2. | 2000-01 | 37.4 | 392 |
| 3. | 2010-11 | 48.8 | 460 |
| 4. | 2020-21 | 57.9 | 520 |
| 5. | 2030-31 | 66.0 | 564 |

ix) With a view to improving the transport network in NCT Delhi and the NCR following proposals have been mooted:

**Development Proposals – Road**

(i) Upgradation (4-laning) of the following national Highways

| | |
|---|---|
| National Highway No.1 | Delhi to Panipat; |
| National Highway No.24 | Delhi to Hapur; |
| National Highway No.2 | Delhi to Palwal; |
| National Highway No.8 | Delhi to Behror and |
| National Highway No.10 | Delhi to Rohtak & Hansi |

(ii) Construction of the following Expressways:

a) Faridabad-Noida-Ghaziabad Expressway

A detailed feasibility study was conducted with the technical assistance of Asian Development Bank. The salient features of the study are:

| | | |
|---|---|---|
| Length | : | 65 km |
| Construction Cost | : | Rs. 623 cr. |
| Land Acquisition Cost | : | Rs. 129 cr. |
| TotaI Cost | : | Rs. 751 cr. |
| EIRR (Include Time benefits) | : | 36.26 per cent |

b) Ghaziabad-Meerut (with a spur to Delhi) Expressway (60 km)

c) Delhi-Panipat Expressway (parallel to NH 1)

At the border of Delhi, it is proposed to branch off into two segments, one will connect to the orbital Expressway in Delhi at Kundli/Narela with a spur to Outer Ring Road and the other will take off to Ghaziabad (on a new alignment) to meet FNG and Ghaziabad-Meerut Expressway (120 km approx.).

In addition to the above Expressways, we suggest following Expressway new alignment beyond 200. Delhi-Loni-Noida-Surajpur-Bulandshahar-Khurja.



We suggest that since Expressways are interconnecting the National Highways and diverting their through traffic from converging to Delhi, the Ministry of Surface Transport should consider declaring them as National Expressways and take up the responsibility of developing them. If necessary amendments of the existing law may be made.

Also the Ministry of Surface Transport may provide requisite funds in their budget for contributing to atleast 12.5 per cent of their cost to match the contribution of the concerned States. This would go to pay for the cost of the land acquisition. The rest of the funds could come from private sector.

(iii) Widening (4 laning) of Grid Roads

a) Inner Grid:

i) on new alignments to connect Murthal to Baghpat, and

ii) Strengthening and widening of existing alignments on Rohtak-Sonepat-Murthal, Baghapat-Meerut and Jhajjar-Gurgaon-Faridabad stretches.

b) Outer Grid:

i) Strengthening and widening of existing alignment of Palwal-Sohna-Rewari-Jhajjar-Rohtak-Gohana-Panipat-Meerut-Hapur-Bulandshahar-Khurja-Palwal, Khurja-NCR boundary (south) Meert-NCR boundary (North) and Bhiwadi-Tijara-Kishangarh-Alwar stretches.

(iv) Perimeter Expressway

There is a need to develop an orbital road corridor of Expressway circumscribing Delhi (85 km) to siphon off the inter-city (regional) traffic. Though the Government of Delhi is contemplating such a proposal, the location and also connectivity to the Directional Terminals needs to be examined in detail keeping in

view the overall perspective of the regional plan objectives and also to link it with a Perimeter Rail Corridor.

v) Elevated Expressway on the Existing Ring Road in Delhi

The present proposal of the MOST for an elevated HSTS on the Ring Road will be inadequate to cope with the projected demand, so an Expressway is proposed.



**Development Proposals – Rail**

*Regional Rapid Transit System (RRTS)*

About 4 lac commuters come into Delhi every day from NCR. This will increase to 7.5 lac by 2001. This figure will be even higher with the implementation of NCR plan, which aims at deflecting 2 million population out of Delhi. Out of the total number of commuters about 40 per cent come by rail. The commuters from NCR uses main rail corridors viz. Palwal, Rewari, Rohtak Panipat and Ghaziabad/Meerut/Khurja. Railways are running only token services on these lines. In the absence of any integration with the ring rail system, the commuters are literally on the roads, straining road transport system of Delhi.

It is felt that a larger and broader complementary system, which would connect the central portions of Delhi with the NCR towns can provide relief to the over crowded core of Delhi and help in the dispersal of various activities to the NCR Towns. The strategy is based on the utilization of the following elements:

i) Ring Rail
ii) Underground Rail line from Viswavidyalaya to Central Secretariat
iii) Radials (Rail) from Delhi to Regional towns
iv) High Speed Tramway System (HSTS) in Delhi to feed the above ring and radials
v) High Speed Tramway System in the Regional towns
vi) Directional Terminals
vii) Perimeter Rail Corridor

In order to satisfy the future commuter traffic requirements the following are required to be done:

) Construction of two additional (dedicated) lines g the existing ring rail (34 km.)
) Construction of two additional (dedicated) electrified along the radials upto priority towns

Electrification:

1. Delhi-Rewari-Alwar (120 km)
2. Delhi-Rohtak (9 km)
3. Ghaziabad-Meerut (47 km)
4. Ghaziabad-Hapur (37 km)

Total - 263 km

Additional Lines:

| | Projected Trips (2011) Total | Assigned (Rail) |
|---|---|---|
| 1. Delhi-Ghaziabad (20 km) | 4,60,000 | 3,22,000 |
| 2. Ghaziabad-Khurja (83 km) | 4,00,000 | 2,80,000 |
| 3. Delhi-Palwal (61 km) | 3,00,000 | 2,10,000 |
| 4. Delhi-Panipat (89 km) | 3,00,000 | 2,10,000 |
| 5. Delhi-Rohtak (70 km) | 3,00,000 | 2,10,000 |
| 6. Ghaziabad-Meerut (47 km) | 2,00,000 | 1,40,000 |
| 7. Ghaziabad-Hapur (37 km) | 1,40,000 | 9,80,000 |
| 8. Delhi-Rewari-Alwar(120 km) | 3,00,000 | 2,10,000 |

Total 527 km

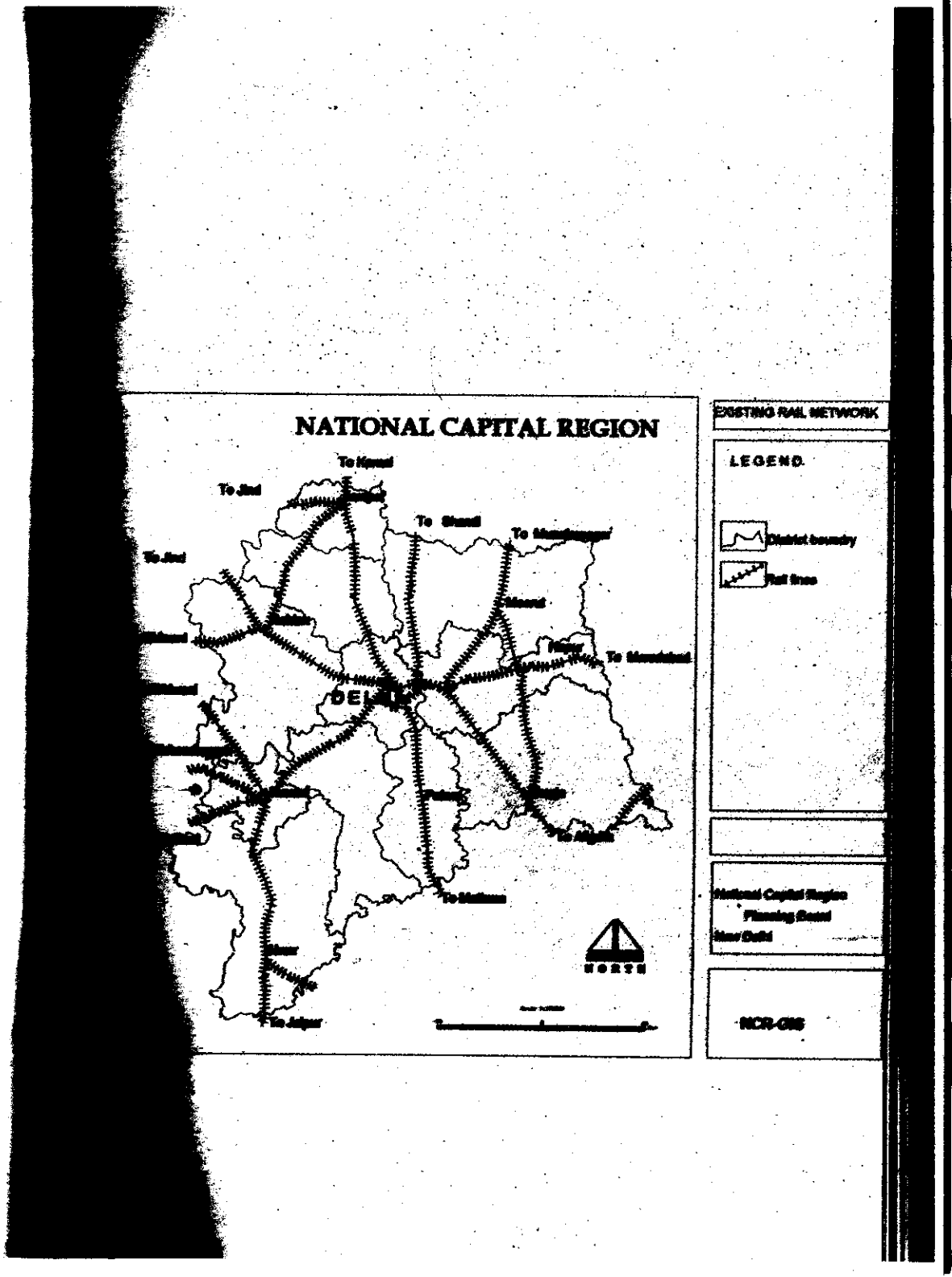
c) Provision of appropriate HSTS in Delhi to act as a feeder system to the ring and radial rail transport system.

d) Construction of Under Ground Rail Corridor from Viswavidyalaya to Central Secretariat via ISBT.

e) Provision of HSTS network in regional towns to satisfy intra-urban transport needs.

f) Construction of Rail Directional Terminals in Delhi.

Presently, the long distance passengers are being served at New Delhi, Old Delhi, Hazrat Nizamuddin and Sarai Rohilla Railway Stations and ISBTs at Kashmiri Gate and Sarai Kale Khan. In order to accommodate the future traffic the Delhi Master Plan suggested four Rail Directional Terminals in Delhi. They are located at four directional locations in Delhi viz. Anand Vihar, Tuglakabad, Bhartal and Holambikalan. Out of these Anand Vihar is being developed as a passenger terminal to cater to the long



distance passengers from the East, as well as for the trans-Yamuna population in Delhi. Land for this terminal has already been acquired. The proposal to develop the rest of the terminals is being considered in the Ministry of Railways.

g) Perimeter Rail Corridor:

In order to segregate Inter-city and Intra-city passenger/ freight traffic, it is proposed to have an orbital rail corridor (approx. 150 km) circumscribing Delhi inter-connecting Directional and Integrated Freight Complexes evisaged in the Delhi Master Plan. As per the traffic assignments done by the NCRPB, the demand on this corridor is 130.000 passenger trips day.

To accommodate both the road and rail corridors, it is suggested to have 300 Meter Right of Way.

Immediate requirements:

a) Dual Track along Northern portion of the ring rail from Dayabasti to Nizamuddin via New Delhi.
b) Dedicated rail tracks from Delhi to DMA towns (Ghaziabad, NOIDA, Faridabad, Bahadurgarh, Gurgaon and Sonepat).
c) Additional rail tracks along Ghaziabad-Meerut, Ghaziabad-Khurja & Delhi-Palwal line.
d) North-south underground corridor in Delhi.
e) Feeder Transit System in Delhi (HSTS).

The entire rail component, including underground railway, of the RRTS will be under the control of Ministry of Railways.

Upgradation of the raod-rail operations on the basis of a single planning zone, call for integrated operational policies, which is lacking at the present point of time.

At present in the region, the bus services are provided by Delhi Transport Corporation (DTC), Haryana Roadways, Uttar Pradesh State Road Transport Corporation and Rajasthan State Road Transport Corporation under a bilateral agreement. For uniformity of the services in the region, the entire region should be treated as a single zone for planning, routing and scheduling of services for avoiding duplication of services and competitions among each other. For this purpose all State Road Transport Undertakings can either enter into an agreement in lines of NOIDA with DTC or the number of services should be under increased the existing bilateral arrangements among Delhi, U.P., Haryana and Rajasthan.

As the supply of Bus services under Public Sector would not be able to meet the growing travel demands in the region, introduction of private bus services under fixed schedules and routes similar to private bus operation system under DTC should be identified and a proper framework may be evolved.

**Proposal for Airports**

With the growing air traffic within the region, development of an International Airport at a location within the region to act as an alternative to the existing International Airport in Delhi is suggested. In addition, it is also suggested to develop domestic air terminals within the region.

*Urban Transport System within NCR Towns:*

Beyond the year 2001 the intra-city traffic within the major Regional Towns as well as Counter Magnet Towns would increase tremendously, which requires an integrated



transport system within these towns. The following towns will be the candidates to have a intra-city mass transport system beyond 2001.

1. Meerut
2. Ghaziabad
3. Faridabad
4. Noida
5. Panipat
6. Rohtak
7. Rewari-Dharuhera-Bhiwadi
8. Gurgaon
9. Alwar
10. Bulandshahar-Khurja

Counter Magnet Towns:

1. Bareilly
2. Kota
3. Gwalior

The NCR Planning Board suggests development of a High Speed Tramway System (HSTS) in the towns, where the population be in the range of 5 to 8 lac by 2011. In Meerut, already there is a proposal to develop LRT system costing Rs.1300 cr.

Such integrated plan for upgradation of the transport system need an integrated investment approach for the period 1995-2010. The total investment requirement for various transport sector proposals has been calculated as under:

*ROADS*

| 1 NATIONAL HIGHWAYS | Length(km) | Cost(cr,) |
|---|---|---|
| a) 4-laning of Faridabad -Hodal section (NH 2) | 70 | 140 |
| b) 4-laning of Gurgaon-Behror (NH-8) | 102 | 04 |
| c) 4-laning of Bahadurgarh-Rohtak-NCR Boundary (NH-10) | 78 | 156 |
| d) 4-laning of Ghaziabad-Haour (NH-24) | 20 | 40 |
| e) 4-laning of Delhi-Panipat (NH-l) | Progressing under World Bank | |
| | | 540 |

| | | Length(km) | Cost (cr.) |
|---|---|---|---|
| 2 | EXPRESSWAYS : | | |
| a) | Faridabad-NOIDA-Ghaziabad Expressway | 56 | 750 |
| b) | Ghaziabad-Meerut Expressway | 60 | 900 |
| c) | Panipat-Kundli-Ghaziabad Expressway | 120 | 1800 |
| d) | Loni-Noida-Surajpur-Bulandshahar-Khurja Expressway | 150 | 2250 |
| | | | 5700 |
| .3. | REGIONAL ROADS | | |
| | | - Length(km) | Cost(cr ) |
| a) | Inner Grid Road (4 lane) | 189 | 590 |
| b) | Outer Grid Road (4 lane) | 391 | 1200 |
| | | | 1790 |

| | | |
|---|---|---|
| 4. | PERIMETER MULTIMODE TRANSPORT CORRIDOR (Perimeter Road & Rail) | |
| a) | Land Acquisition of 300 Mt wide corridor | 800 |
| b) | Perimeter Expressway road | 1000 |
| c) | Perimeter Rail | 1000 |
| d) | Directional Terminals | 600 |
| | Sub Total | 3400 |
| 5. | REGIONAL RAPID TRANSIT SYSTEM | |
| a) | Dedicated dual tracks upto NCR Towns and along the ring rail | 3920 |
| b) | North-south underground corridor between Vishwavidyalaya-Central Secretariat | 2200 |
| c) | Elevated Expressway over ring road | 750 |
| d) | Feeder Transit System (HSTS) | 3400 |
| | Total | 10270 |
| 6. | URBAN TRANSPORT SYSTEMS | |
| a) | High Speed Tramway System in NCR towns (350 cr. per town) | 4550 |
| | Grand Total | 26250 |



| | | |
|---|---|---|
| 7. | FIRST PHASE (1995-2004) | |
| 1. | National Highways | 540 |
| 2. | Expressways. | 3450 |
| 3. | Inner & Outer Grid | 630 |
| 4. | Perimeter Multi Mode Transport Corridor (Feasibility, Land Acquisition and 2 lane Expressway) | 1000 |
| 8. | RRTS | |
| a) | Dedicated tracks upto DMA towns | 960 |
| b) | Dual track along Northern ring | 370 |
| c) | Additional Tracks along Ghaziabad -Meerut, Ghaziabad-Khurja & Delhi-Palwal tracks | 500 |
| d) | North-south underground corridor | 2200 |
| e) | Elevated Expressway over ring road | 750 |
| f) | Feeder Transit System | 100 |
| | | 13900 |

The projects listed for being taken up in the first phase of the Investment Plan are in fact required to be implemented under the aegis of either the Central Ministries (i.e. MOST, Railways, etc.) or the State Government or both. However, in view of the new development strategy, it is proposed to intimately involve the private sector for Transpprt Projects, which are likely to cost around 13,900 crores. Accordingly these projects are being divided into two categories:

*(A) Development Projects*

These projects are absolutely essential for the basic development of transport activities in the NCR, but may not be commercially viable. As such, in view of their necessity and importance, they are required to be taken up through the Central and State budgetary sources. Of course, in certain cases where budgetary sources are not immediately available for their immediate financing, help may be taken from the international agencies like World

Bank, ADG, OECF etc., and repayment of these loans may be made in due course out of the future plans.

*(B) Other projects*

It is felt that in implementation of all other projects, private sector can be beneficially involved. As such, various options of public and private particpation for funding these projects have been considered and based on that the following modes have been suggested:

i) Rail Projects:
Vide their general letter dated 22nd February, 1995, the Railways have recommended to the State Governments to accept the pattern of investment as adopted by CIDCO in New Bombay. By this formula total project cost would be shared as under:
— Railways - 1/3 rds - State Agencies - 2/3 rds

Part of the cost of the State agencies could be loaned by NCRPB. State agencies would recover their investment through property development either locally or on overall basis.

ii) Road Projects:
Most of the Expressway projects and Feeder Transit Systems (tramways) are proposed to be taken up on BOT basis by involving private capital. There would broadly be two type of projects:

a) which are commercially viable yielding an FIRR more than Bank rates and can be fully funded by the private sector.

b) the projects which may be viable in the long run but the FIRR worked out for them is much below the bank rates and as such require some elements of subsidy. This subsidy can be either in the form of direct financial inputs from the sponsoring agency or in the form of land development rights being provided



by the authorities to the operators whose profits can subsidise improvement of the FIRR. A rational mix of the two systems could be worked out depending on the bid offers received from BOT operators.

**National Highways**

Regarding up gradation of National Highways, the Ministry of Surface Transport has taken the full responsibility of completing the 4-laning of all the National Highways traversing in NCR by the year 2001. The VIII Plan programme of Ministry of Surface Transport for up gradation of these National Highways from 2-lane to 4-lane envisages:

— National Highway No.1 - Delhi to Panipat:
(An on-going Seventh Plan Programme). Widening and up gradation of this stretch was expected to be completed by 1994-95.

— National Highway No.24 - Delhi to Hapur:

— Provision for land acquisition made in 1991-92 budget. Work to be taken up immediately and completed by 1996-97.

— National Highway No.2 - Delhi to Palwal:
Widening of this stretch is in progress since 1990 (under the Asian Development Bank Assistance) and was expected to be completed in 1995-96.

— National Highway No.8 - Delhi to Behror:
Work on the Delhi-Gurgaon section (which is the only stretch to be widened to 6-lane) commenced in 1995-96 and on the Gurgaon-Behror stretch 1993-94. Both these projects will be completed by 1998-99 (IX Plan).

— National Highway No,10-Delhi to Rohtak and Hansi:
Work on the stretch extending from Bahadurgarh to Rohtak was to commence in 1993-94 and now expexted to be completed by 1998-99 (IX Plan), while the stretch beyond Rohtak upto NCR boundary at

Hansi is proposed to be taken up and completed during the IX Plan.

The total cost of Rs.540 cr. for the upgradation of these National Highway projects is proposed to be met out of the budget of the Ministry of Surface Transport since these are essential developmental projects.

Regarding Expressways, since they have not been declared as National Expressways, the MOST has declined to take these up. However, NCRPB is of the view that the Expressways in NCR should be declared as National Expressways immediately. These Expressways can be taken up on Build, Operate and Transfer (BOT) basis.

The feasibility study for one of the Expressways (F.N.G. Expressway) has shown-that, though ultimately the Expressway starts to pay for itself, but initially some inputs in the form of equity are required from the Government side. In this case it has been suggested that of the total estimated cost of Rs.751 cr. an amount of Rs.200 cr. covering land acquisition cost of Rs.130 cr. and upfront contribution Rs.70 cr. be provided as equity. This contribution is expected to improve the project FIRR from about 8 per cent to 16 per cent. Another method of improving the FIRR by offering land development rights some area in the vicinity of this is also being considered so that financial burden on the Government can be minimised.

However, for the other proposed Expressway an amount of Rs.700 cr. have been assigned for investment by the sponsoring authorities as under:

| | | |
|---|---|---|
| M.O.S.T/N.H.A.I. | : | Rs.350 Cr. |
| N.C.R.P.B. & States (as per-the approved NCR financing pattern) | : | Rs.350 Cr. |

**Regional Grid Roads**

The investment plan for the 8th five year plan prepared



by NCRPB has stipulated that the development of regional roads (outer grid and inner grid) would be the responsibility of the NCR participating State Governments namely, Government of Haryana and Government of Uttar Pradesh. The NCR Planning Board, keeping in view the meager resources available with these Governments has requested the MOST to finance these roads through World Bank assistance. Further, the NCR Planning Board is willing to finance the cost of the land acquisition for these roads as per the following pattern:

a) Share of NCR Planning Board 75 per cent b) Share of Concerned State Government 25 per cent.

**Perimeter Multi Mode Transport Corridor and Directional Terminals**

The 300 mt. wide perimeter corridor encircling, Delhi provides for PERIMETER EXPRESSWAY, RAILWAY AND THE DIRECTIONAL TERMINALS. In the 1st Phase it is proposed to acquire the land for the entire 300 metre wide along with the Directional Terminals at a cost of around Rs.800 cr. and construct a 2-lane Expressway.

The cost of land acquisition (approx. Rs.800 cr.) would have to be borne by the G.N.C.T. Delhi, whereas the construction of the Expressway in the first phase; expansion in the II phase and ultimately construction of the perimeter rail and development of terminals are proposed to be taken up through the private sector on BOT/BOLT basis. However, this would, involve a policy decision to allow the Private BOT/BOLT operators to develop commercial centres above/within the Directional Terminals, whose profits can help recover the investments required to be made by them.

**Regional Rapid Transit System**

The RRTS has a number of components which are to be executed by different agencies. Each of these projects falls

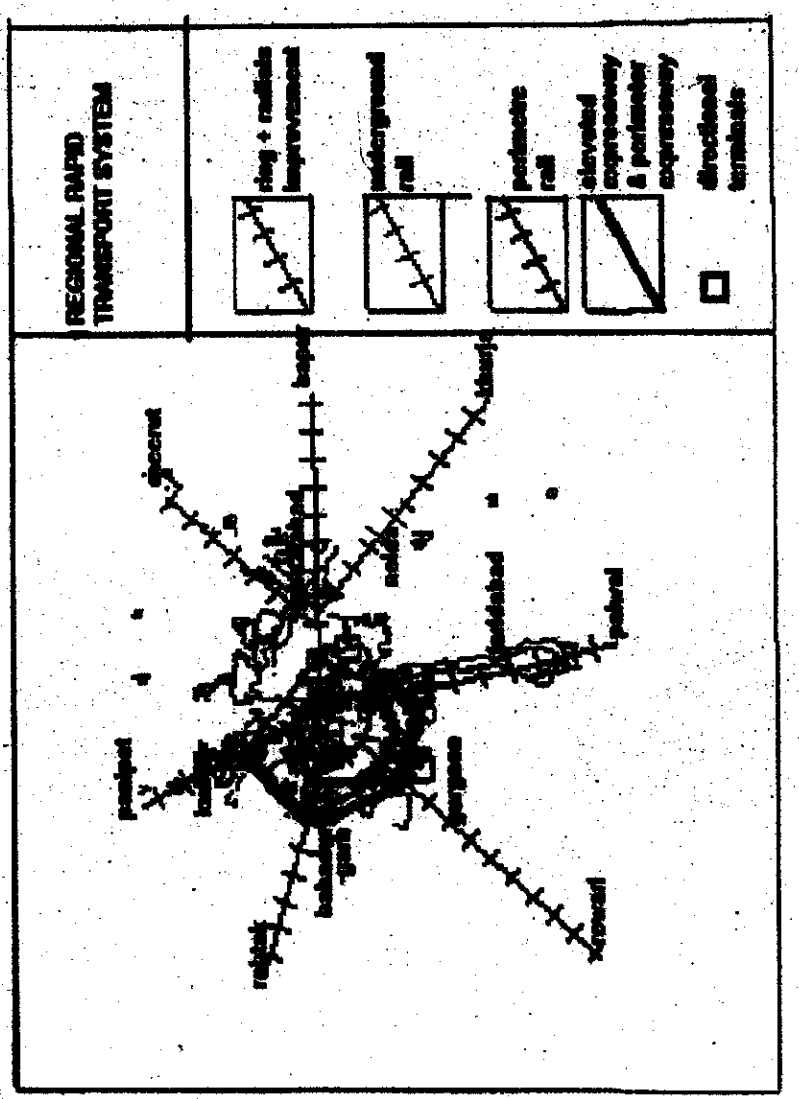
in different financing pattern according to its requirements as given below:

i) Laying of dedicated tracks upto DMA , dual tracks along the Northern Ring and additional tracks along Ghaziabad-Meerut, Ghaziabad-Khurja and Delhi-Palwal tracks, are the projects that are essentially required to be executed by the Railways and are proposed to be taken up on sharing basis (CIDCO Pattern). Accordingly, the Railways would share one-third of the cost (Rs.610 cr.) and the rest of the two-third of the cost (Rs.1220 cr.) would be shared by the participating States, while the NCR provide loan assistance for the same to them. The State can recover the same through overall property development.

ii) The north-south Underground Metro Corridor is also proposed to be taken up by the Railways on sharing basis. The Railways would bear 1/3 cost of the project while 2/3 cost be borne by the NCT for which a loan assistance can be provided by the NCRPB as per financing pattern of 22 per cent State share and 78 per cent NCRPB share. A major part of the cost is proposed to be recovered through property development.

iii) The anticipated traffic volumes on the Ring Road are 1,73,000 PCU's per day during 2001 and 3,35,000 PCU's during 2011. As such this transport link will soon get choked. For meeting the requirements of 2011 traffic, 4 to 6 additional lanes are required. Since no land is physically available for this major expansion, it is proposed that a 6-lane elevated expressway be constructed on the top of inner Ring Road. The FIRR in this case is expected to be much higher than the bank rate and, therefore, the elevated expressway can profitably be taken up on BOT basis.

iv) The Feeder Transit System (HSTS) can be directly taken up on BOT basis by the Private Sector on the basis of which offers have been invited by the Ministry of Surface Transport.



## TRAMWAY SYSTEM IN NCR TOWNS

This would be taken up on BOT mostly in the private sector.

First phase proposals are summarised below:

| *Sr No.* | *Project* | *Mode of Financing* | *Sources/Extent of Funds (Rs. Cr.)* | | | | | | *Remarks* |
|---|---|---|---|---|---|---|---|---|---|
| | | | *Central Budget* | *State Budget* | *NCT Budget* | *NCRPB Funds* | *Private Sector* | *Total* | |
| 1. | National Highways | C.B.F. | 540 | | | | | 540 | |
| 2. | Express Ways | B.O.T. | 350 | | 88 | 262 | 2750 | 3450 | Recovery through toll & property development |
| 3. | Regional | S.B.F. | | 630 | | | | 630 | Loans to be taken by state Govts. from WorlBank /NCRPB and to be refunded subsequently out of State plan funds. |
| 4. | Perimeter multi mode Transport corridor including Directional Terminals | B.O.T | | | 800 | | 200 | 1000 | Initial work for rail corridor may also be taken up on B.O.L.T. basis. |
| 5. | Regional Rail transit System | | | | | | | | |
| a) | Dedicated tracks upto DMA Towns | | | | | | | | |
| b) | Dual Track along Northern ring | Sharing Basis | 610 | 215 | 360 | 645 | | 1830 | Recovery through property development |

| Sr No. | Project | Mode of Financing | Sources/Extent of Funds (Rs. Cr.) Central Budget | State Budget | NCT Budget | NCRPB Funds | Private Sector | Total | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| c) | Additional Tracks along Ghaziabad- - Meerut, Ghaziabad- Khurja & Delhi -Palwal tracks | | | | | | | | |
| d) | North-south underground corridor | Sharing Basis | | | | | | | |
| e) | Elevated Expressway over ring road | | | | | | 750 | 750 | Recovery through all |
| f) | Feeder Transit System | | | | | | 3400 | 3400 | Financing through property development |
| 6. | Project Development | | | | | | 100 | 100 | |
| | | 890 | 1360 | 933 | 2610 | 1007 | 7100 | 13900 | |

Say Rs. 14000 Cr.

**Note:**

C.B.F. Central Budgetary Funds
S.B.F. State Budgetary Funds
B.O.T. Build, Operate, and Transfer
B.O.L.T. Build, Own, Lease and Transfer
* Represent cost of dual track on Northern ring already agreed to by NCT.

Accordingly the following amounts of funds would tentatively have to be arranged by different organizations upto 2004 so that these projects can be implemented.

| | | | |
|---|---|---|---|
| * | Central Government | | |
| | M.O.S.T. | - | Rs. 890 Crores |
| | Railways | - | Rs. 1360 Crores |
| * | State Governments | - | Rs. 933 Crores |
| * | NCT Delhi | - | Rs. 2610 Crores |
| * | NCRPB | - | Rs. 1007 Crores |
| * | Private Sector | - | Rs. 7100 Crores |
| * | Total | | Rs. 13900 Crores |



It is expected that with the implementation of the first phase of transport sector as Jelienated above, considerable improvement can be brought about in traffic movement and passenger clearance. While the Regional Rapid Transit System (RRTS), with a number of components is likely to ease pressure considerably, the Mass Rapid Transport System (MRTS) is expected to decongest the clogged roads of NCT-Delhi. This proposed system consisting of Elevated Express Way on Ring Road, Feeder Transit System (HSTS), Perimeter Multimode Transport corridor (Rail & Road), North South underground metro, costing about Rs.9750 cr. is to be implemented between 1995 and 2011.

However, these plans by themselves are not good enough. Their time-bound implementation will depend on political will of the elected representatives of the people, peoples participation and ready acceptance of modern financing parametres. Privatisation is the most important window through which fast changes can come in.

In addition to the above, introduction and implementation of certain regulatory measures are necessary. These include mandatory in corporation of modern pollution reducing gadgets in cars, trucks and buses, three and two wheelers; phasing out of three wheelers, with the completion of MRTS and RRTS; restriction on plying of three wheelers and two whellers in certain areas of Delhi metropolis; ban on use of cycle rickshaws, animal driven carts, hand carts in certain areas of the city etc. Strict implementation of pollution related offences should go a long way in clearing up much of air pollution in Delhi caused by vehicles. This task should be vested in a non-police organisation with adequate legal teeth, mobility and modern gadgetry. We must understand that Delhi has a vehicle population of more than 25 lacs, more than the strength of Bombay, Calcutta and Madras put together. Proliferation of vehicles do not always signify existence of a healthy society; it rather points to the absence of modern

means of transportation, which has become standard prescription in all modern megapolises. With the implementation of MRTS and RRTS some regulatory curb on per-family car/vehicle holding should be introduced. Otherwise economic affluence may continue to increase the numbers of multi-vehicle family. Perhaps introduction of stiff surcharge on purchase of more than one vehicle by individual/family, within the given parametres certain relaxations, may work as a disincentive.

## INDUSTRY

The landmark of the Hon'ble Supreme Court, July 8, 1996 directing closure of 186 noxious, hazardous polluting NCT Delhi based industries by Nov. 30, 1996 and their shifting to other areas in the NCR have appropriately highlighted the outstanding concerns about incompatibility between growth of a healthy megapolis and existance of industries in its vital breathing spaces

The NCRPB, since it came in existance in 1985, through an Act of the Parliament, have been persuing the twin goals of balanced and harmonious development of the region, leading to dispersal of economic activities and migrants from Delhi. Delhi, as studied by the WHO, is one of the 10 most polluted cities in the world. The only way to relieve the capital city from the huge burden and pressures, is to deflect the population, industries and economic activities and relocate the same in various Priority Towns in the NCR.

The growth of industry in Delhi, in terms of number of units, investment, production and employment has shown the tendency of Malthusian rate of growth. Against 8, 160 units in 1951 employing 69,266 persons, industries in Delhi have shown phenomenal growth of 1.12000 units in 1996, employing 9,00,000 heads; with investment Rs.2,000 cr. and production value of Rs.5,500 cr. Until 1960's Delhi used to be predominantly a sleepy seat of the government,



but gradually it has turned into a humming centre for trade and commerce.

Peculiar features of Delhi industries require elucidation. An average unit employed 9 workers, while 30 per cent of the units employed 4 or less number of workers. The major end-products of the industries were garments, electrical appliances, consumer electronics, printing and publishing and food processing. studies carried out in 1995-96 by the Department of Environment of the NCT government and the Delhi Pollution Committee, brought out that 97,411 units are located in non-conforming areas. these 1,343 units have been categorised noxious, hazardous, heavy and or/large falling in Group H(a) and (b) of Annexure III of MPD-2001 and are statutorily required to be shifted outside MCT Delhi.

**Group-Wise List of Non-Conforming Industries as Per MPD-2001**

| *Group under Anex-III of MPD-2001* | *No. of Industries units* | *No. of Industries of which Relevant Data is Available* | *No. of Employees* | *Area* |
|---|---|---|---|---|
| A | 5,986 | 4,966 | 13,507 | 7,98,250 |
| A1 | 178 | 166 | 855 | 17,395 |
| B | 23,574 | 14,542 | 67,658 | 39,65,679 |
| C | 1,250 | 996 | 5,000 | 61,799 |
| D | 796 | 640 | 2,859 | 92,573 |
| E | 16,710 | 10,401 | 62,131 | 29,06,146 |
| F | 39,836 | 20,524 | 1,46,233 | 72,43,576 |
| G | 8,636 | 5,840 | 64,076 | 14,59,319 |
| H(a)&(b) | 1,343 | 600 | 6,214 | 40,9331 |
| **Total** | 97,411 | 58,677 | 3,68,550 | 1,69,54,868 |

It would be seen that most of the small units located in non-conforming areas pose threat to the enviornment. But, in the past, several factors have contributed to such proliferation. Some of these are: availability of easy market

in Delhi due to fast population growth; existance of marketing mechanism and linkages; lesser cost of manufacturing and easy access to physical infrastructure; easy availability of raw materials due to well developed rail and road network; availability of semi-skilled and skilled labour; favourable sales-tax structure and existance of loopholes and laxities in enforcement of land use regulations and building bye-laws. In addition to the above, smoother labour relations and better law and order situation have also given impetus to fast industrial growth.

There have been prolonged struggle in the direction of dispersal of highly polluting industries from Delhi as stipulated in MPD-2001. The Supreme Court's interventions since March, 1995 have taken concrete shape in the Apex Court's judgement on July 8, 1996. Before we come to that, some elaborations of the efforts made by the NCRPB are required. An expert group constituted by the NCRPB had recommended a package of incentives for shifting of industries from Delhi and a Standing Committee for facilitating the shifting was appointed in 1994.

| *Sl.No.* | *Extent* | *Percentage of land to be surrendered & dedicated to DDA for green belt and open spaces* | *Percentage of land to be developed by the owner for his own benefit according to the use permitted under MPD* |
|---|---|---|---|
| *1* | 2 | 3 | 4 |
| 1. | Upto 2000 sq.m. and first 2000 sq.m. of larger plots | NIL | 100 % |
| 2. | Over 0.2 ha. upto 5 ha. | 57 | 43 |
| 3. | Over 5 ha. upto 10 ha. | 65 | 35 |
| 4. | Over 10 ha. | 68 | 32 |



The central issue has been the pattern of utilisation of land to be vacated by the dispersal of industrial units. Topping up the efforts and formulae worked out by the NCRPB, the land use Advisory Committee, headed by a judge of the Delhi High Court, submitted its recommendations to the Supreme Court. The Apex Court issued an order on May 10, 1996 laying down the land re-use pattern and ruled that no amendent of MPD-2001 was necessary.

However, several contentious issues are still plauging the central theme of land re-use. According to the projections made by the Environment Department of Delhi Government, out of about 1226 affected industrial units, only about 30 occupy over 2000 sq. mts. Therefore, owners of 97.8 per cent of units, required to shift out of NCT Delhi, will be able to self-utilise their entire land according to the land use, FAR and other parameters under the existing provisions of the MPD-2001. On the otherhand about 30 industrial units in the category H (a) and (b), each occupying more than 2000 sq. mt. land, may on a rough assessment, be required to "surrender and dedicate" about 115 ha. to the DDA for green belt and open spaces. However, inspite of the Supreme Court order of May 10, 1996, some questions continue to remain unresolved: kind of title to accru to DDA on the surrendered land; probable source of funding and administrative modalities for development and maintenance of surrendered land; whether granting of 50 per cent more FAR on land left with the owner meets the requirement of the Article 300 A of the Constitution of India for surrending the remaining land with the DDA and working out modalities for practical use of the surrendered land.

It is heartening to note that the Supreme Court in another land mark judgement on April, 19, 1996 has constituted an inter-organisational high-power committee to screen the cases of industries operating in residential

areas of the metropolis. According to this order, from January 1, 1997, no industrial unit in any residential area shall be permitted unless it has been cleared by the committee and has obtained necessary licence and consent from the statutory authorities. It is hoped that successful implementation of this order will substantially clean up the environment in the residental areas of the city. It is also hoped that the industrial units slated for statutory shifting, may constitute only 1.3 per cent of the persent strength of industries of Delhi, but once the process starts it may have a cascading effect, leading to realisation of NCRPB's objective of decentralisation of industries.

The Supreme Court in a judgement on July 8, 1996 held that 168 listed industries are hazardous/noxious/heavy/ large industries and fall in H(a) and H(b) categories under the Master Plan. These industries can not be permitted to operate in Delhi. The Apex Court has directed their relocation/shifting to other industrial estates in the NCR. Under the verdict these listed industries are to stop functioning/operating in the city of Delhi from November 30, 1996. The NCRPB has been directed to render all assistance to the industries in the process of relocation. In order to facilitate shifting of industries from Delhi, all the four states constituting the NCR, have been directed to set up an unified single agency to act as a nodal body, to sort out all the problems of such industires.

Shifting of hazardous/noxious industries and industries from the non-conforming areas can be facilitated by linking up with the development of industrial areas in the DMA, outside Delhi and the NCR. Industrial areas have been developed in Ghaziabad (4804 ha), Loni (2237 ha), NOIDA (688 ha), Faridabad (905 ha), Gurgaon (726 ha), Bahadurgarh (206 ha) and Kundli (43 ha). Further development of industrial estates in these locations are on the anvil. Industiral estates developed in Dharuhera (Haryana) on about 670 acres for medium scale industries



and adjoining Bhiwadi (Rajasthan) on about 1160 acres for small scale units, can accomodate industries from Delhi. Active consultations with the Rajasthan authorities are going on. Infact, in U.P. sub-region 4901.95 acres, Rajasthan sub-region 5203.61 acres (Alwar, Bhiwadi, Neemrana, Behror) have already been identified and communicated to the Supreme Court. Rajasthan Government have been taking steps to acquire additional land to the extent of 3095 acres. They have also offered acquisition of land outside their industrial areas for the industries, which can not be located in regular industrial areas. These plots can be alloted to the industry. If industries by themselves procure such land, change of land use can be granted.

Suggested location of core economic activities (Plan 5)

With the Supreme Court order, the process of decentralisation, so long strenously calibrated and emphasised upon by the NCRPB, has taken a concrete shape. Realisation of NCR plan objectives, however, largely depend upon whether adequate political consensus and will can be evolved and popular consciousness can put considerable pressure. So far, industrial growth in the NCR has been parallel and complimentary to the rising graph of industrialisation in NCT Delhi. The exact contour and scenario of decentralisation of industries from NCT Delhi and their merging with the industrial ethos of the NCR states are gradually unfolding.

Closure of industries at their present sites in Delhi and their shifting to the NCR is a daunting task, involving 19 key functions to be synchronised between 27 or more official agencies in Delhi and the NCR States. The NCRPB has examined these parameters and concluded that a "Single Window" is required for closure of industries and enabling the owners of the land vacated by such closure to re-use it in Delhi as well as for re-establishing the shifted industries in their new locations in the NCR. An apex

body in the NCRPB for review of the progress is likely to give an impetus to the effort.

One vital factor always emerge as the nagging constant. This is ummanageable population growth in NCT Delhi and other related problems. With the unchecked growth of population, numbers of industrial units in non-conforming areas have multiforied in geometric progression. The Master Plan Delhi - 2001 provides for development of new industrial estates in 1,533 ha, dedicated to several groups of industries, without any stipulation that industries shifted from non-conforming areas should only be accommodated there. If this principle is not accepted, the next better option for the government of NCT Delhi would be to develop some industrial estates outside NCT Delhi in the DMA or other parts of the NCR, dedicated to the resettling of non-conforming industries in Delhi. Unless these factors are taken care of, the new proposed industrial estate will only clutter up the capital, adding to the already alarming status of environmental hazards.

Industrial growth in Delhi can not be reversed without adverse impact on the population and overall economic efforts. But, to make the National Capital environmentally sustainable the industrial policy require major structural correction and content modification. Coupled with the concept of deflection of 20 lac people, shifting of industries, improvement of transportation system and civic facilities; Delhi needs conceptual change in industrial sector from primary level manufacturing to secondary and tartiary level activity. In fact Delhi needs shifting emphasis to High-Tech industrial activities. Such industries are non-polluting in nature, do not require much water, electricity and swearage, are not labour intensive (would not attract migrant labour) and will employ educated and skilled workers. Some such industries are: Computer Software/ Hardware, Informatics, Electronic goods; Service and



repair of TV and other electronic gadgets; Textile designing and Fabric testing; TV and Video programme production, including software for media; Garment manufacturing; Pollution control services etc. Such switch over from low-tech to high-tech can not take place overnight. Massive efforts are necessary for educating the people and young entrepreneures and encourage them to borrow know how from Singapore, Hongkong and other megapolises like Tokyo, New York and Sanfransisco. High-Tech industry is essentially compatiable with the environmental needs of a mogapolis like Delhi, whose survival depends on adopting a new industrial philosophy. In this direction the NCRPB is doing its best to implant and propagate their new industrial philosophy among the policy makers in NCT Delhi and the member states of the NCR.

*Power*

Intricately related to the growth of industry and living and working standards of the people is the availability of adequate power. Delhi, with a deficit of 787 MW is still better off than Haryana, Rajasthan and Uttar Pradesh with deficites of 1528 MW, 1909 MW and 3113 MW respectively. This imbalance acts as a deterrent for shifting of industries from Delhi to NCR towns. To remove such imblance some strategic co-ordination is necessary. The power supply system of the NCR states, viz. Haryana, Uttar Pradesh, Rajasthan and Delhi forms part of the Northern Grid. This gird is overseen by the Northern Regional Electricity Board (NREB), which get power through various Central and State generating units and in turn supply power to the constituent states. However, the basic management and control of the power supply system in the states is under the control of the respective State Electricity Boards. The Electricity Boards of NCR states do not give any special priority to the DMA/Priority Towns in the matter of supply of electricity.

The overall power supply scenario is rather grim, retarding growth factors in industrial and agricultural sectors. Based on likely VIII plan capacity addition of 20729.7 MW in the country and demands as per the 14th EPS report, the anticipated power supply position in the NCR states at the end of 8th plan (1996-97) will be as follows:

| *Power Supply Position* | *Northern Region* | *NCR States* | | | |
|---|---|---|---|---|---|
| | | *Delhi* | *Haryana* | *Rajasthan* | *U.P.* |
| Peak Demand (MW) | 24234 | 2532 | 3058 | 3851 | 8263 |
| Peak Availability (MW) | 14896 | 1745 | 1530 | 1942 | 5150 |
| Surplus/Defecit | -9388 | -787 | -1528 | -1909 | -3113 |
| per cent | -38.5 per cent | -31.1 | -50.0 | -49.6 | -37,7 |
| Energy Requirement (MU) | 129587 | 14416 | 15183 | 22232 | 43957 |
| Energy Availability (MU) | 105401 | 13153 | 10148 | 12572 | 37852 |
| Surplus/Defecit | -24186 | -1263 | -5035 | -9660 | -6105 |
| per cent | -18.7 | -8.8 | -33.2 | -43.5 | -13.9 |

In the backdrop of this scenario, to ensure steady quantitative and qualitative power supply in the priority towns of NCR at par with Delhi, the Priority Towns should have their own power generating stations, specifically for the areas which have been earmarked for shifting of industries. The existing generating stations may continue to feed power to the main grid. The proposed exclusive generating stations can also feed into the main grid, their surplus power, through grid stations earmarked for these areas. This will ensure the reliability and all other advantages of being part of the grid. The grid stations meant for these areas should have *'islanding system'*, to ensure that in the event of major grid failure, the proposed generating stations can be *islanded* and remain safe of cascade tripping and can immediately start



supplying power to the areas uninterruptedly. The Nodal Centres should remain free from load sheding. These generating stations should have the capacity of meeting atleast 50 to 60 per cent of the power requirement for these areas.

The Nodal Centres require power generation to the tune of 945 MW; Uttar Predesh (405 MW), Haryana (405 MW) and Rajasthan (135 MW). The generating stations dedicated to this goal, should be Gas based and be equipped to use alternative fuel like Naptha/Diesel; to meet unforeseen shortages. The availability of gas is likely to increase in the Northern region with the likely commissioning of gas pipeline from Iran and the Gulf. For gas based stations planning can be done for bigger stations but operations can be started with units of small capacities of 30 to 40 MW which are indigenously available.

Though there exist elaborate Transmission and Distribution (T&D) system in the Nodal Centres, it is nonetheless necessary to provide these areas with modern T&D system. The sub-transmission and distribution lines should be laid underground and sub-stations should be in-doors with equipments having proper protective devices to ensure against inclement weather, tempering, pilferage and vandalism. In order to ensure steady power supply it has been proposed that these dedicated generating stations should be provided with Supervisory Control and Data Acquisition System (SCADA) with complete automation of the operation of the power supply system.

### *Telecom*

For the smooth interation between the NCT Delhi and the designated NCR, establishment of an integrated Tele-Commuincation zone is necessary. In the NCR Telecommunication facilities are lagging far behind those in Delhi, leading to communication cluttering and losses in business and industrial ventures. Facilities like cellular telecom

services, paging services, should be extended. Most of the stations are connected only through STD, even though the distances are much less than those of the farthest localities in Delhi Telecom network. Introduction of Dynamic STD locking is another important consumer demand. To bring the Telecom services of the NCR at par with that of NCT Delhi and to ensure better control, and coordination, the NCRPB has suggested to the Telecom Commission to start a separate Telecom circle for the NCR and Priority Towns with head quarters at Delhi.

*Law and Order*

While the new thurst areas examined in the chapter will facilitate clear understanding of the magnitude of the problem, it remains the bounden task of the NCRPB to point out that unsatisfactory law and order situation often militate against shifting of industry to the NCR. Over the years there have been plenty of cases of kidnapping; ransom taking and assassination of industrialists. Orgainsed gangs extract regular protection money from the industrial houses. Often there is planned terrorist attack on important industrialists. In this regard there is hardly any coordination between NCT Delhi and the concerned law and order authorities in the NCR. To ensure smooth exchange of intelligence/information about gang movements and their operation, terrorist hide outs and concentrations, surveillance on them and containment of mafia interference in the running of industires and labour relations, it is necessary to establish an *NCR Police Coordination Authority*, drawing elements from Delhi and the NCR, with head quarter in Delhi. The NCRPB is taking up this project as corollary to other projects to ensure smooth decentralisation.



POLICY ZONES

**Table 2.1 Area, Population and Growth Characteristics of DMA**

| *Constituent Units of N.C.R.* | *Area in Hectare* | *Population 1981 in lakhs* | *Decadal Growth (%)* | | |
|---|---|---|---|---|---|
| | | | *1951-61* | *1961-71* | *1971-81* |
| Delhi, UT | 1,48,500, | 62.20 | 52.43 | 52.92 | 52.98 |
| Bahadurgarh | 17,403 | 0.37 | 34.43 | 72.28 | 45.23 |
| Faridabad-Ballabgarh | 39,398 | 3.31 | 57.88 | 103.42 | 169.39 |
| Ghaziabad including Loni | 49,691 | 2.97 | 61.01 | 68.71 | 141.65 |
| Gurgaon | 26,671 | 1.01 | 103.42 | 50.94 | 76.50 |
| Kundli | 13,722 | — | — | — | — |
| Noida | 14,915 | 0.42* | Did not exist till 1981 | | |
| Ridge falling outside the area of DUT, Gurgaon and Faridabad | 7,885 | — | — | — | — |
| Total D.M.A. | 3,18,185 | 70.28 | — | — | 56.76 |
| Total D.M.A. excluding Delhi | 1,69,685 | 8.08 | — | — | 95.84 |

*Gives rural population of fity villages in controlled area.

Sources: 1. Census of India—1981
2. Report of the Sub-Group of DMA-1982 Ministry of Urban Development, Govt. of India.

DEMOGRAPHIC PROFILE

**Table 3.1 Pattern of Inmigration to Delhi 1941-81**

| *Census Year* | *Population* | *Net decadal increase* | *Total Decadal inmigrants*** | *Propn. of inmigrants to total Pop. % in that year (4/2)* | *Propn. of inmigrants to net Increase (%) (4/3)* | *Decadal Growth of inmigration (%)* |
|---|---|---|---|---|---|---|
| 1941 | 917939 | | | | | |
| 1951 | 1744072 | 826133 | | | | |
| 1961 | 2658612 | 914540 | 544198* | 20.47 | | |
| 1971 | 4065698 | 1407086 | 525309 | 12.92 | 37.33 | |
| 1981 | 6220406 | 2154708 | 1229745 | 19.77 | 57.07 | 134.10 |

*Represents inmigrants upto 1961 and includes migrants for 'period not known category (99,143).
**In the population Census, migrants are classified on the basis of either (i) Place of birth, or (ii) Place of last residence. A person is considered a migrant by place of birth if the place of enumeration during the Census is other than the place of his/her immediate last residence. Till 1961 statistics on migration was based on 'birth place' but since 1971, it is on the basis of 'place of last residence'.



**Table 3.2 Migrants to Delhi by States of their Origin**

| *Sate* | *Before 1961* | *1961-71* | *1971-81* | *Period not known* | *Total* |
|---|---|---|---|---|---|
| Haryana | 98324 | 85945 | 159028 | 14412 | 357709 |
| | (22.1) | (16.4) | (12.9) | | (15.5) |
| Madhya Pradesh | 5585 | 8860 | 37709 | 2496 | 54650 |
| | (1.2) | (1.7) | (3.1) | | (2.4) |
| Punjab | 74944 | 59503 | 78671 | 11447 | 224565 |
| | (16.8) | (11.3) | (6.4) | | (9.8) |
| Rajasthan | 33341 | 39885 | 93836 | 7603 | 174665 |
| | (7.5) | (7.6) | (7.6) | | (7.6) |
| Uttar Pradesh | 185550 | 260748 | 616021 | 54362 | 1107681 |
| | (41.7) | (49.6) | (50.1) | | (48.2) |
| Others (including outside India) | 47311 | 70368 | 244480 | 17823 | 379982 |
| | (10.7) | (13.4) | (19.9) | | (16.5) |
| Total | 445055 | 525309 | 1229745 | 99143 | 2299252 |
| | (100.0) | (100.0) | (100.0) | | (100.0) |

Note: Figures in brackets indicate % to the respective totals.

**Table 3.3 Population Projections for the NCR Constituents**

(Population in lakhs)

| *Sub-Region* | | *Population 1981* | *Projected Population 1991* | *2001* |
|---|---|---|---|---|
| Delhi UT* | Total | 62.2 | 92.5 | 132.6 |
| | Rural | 4.5 | 4.4 | 3.6 |
| | Urban | 57.7 | 88.1 | 129.0 |
| Haryana | Total | 49.4 | 62.7 | 72.1 |
| | Rural | 37.3 | 40.3 | 34.4 |
| | Urban | 12.1 | 22.4 | 37.7 |
| Rajasthan | Total | 10.6 | 11.3 | 11.9 |
| | Rural | 8.9 | 8.7 | 8.5 |
| | Urban | 1.7 | 2.6 | 3.4 |
| Uttar Pradesh | Total | 69.7 | 87.6 | 108.6 |
| | Rural | 50.2 | 51.8 | 45.0 |
| | Urban | 19.5 | 35.8 | 63.6 |
| NCR | Total | 191.9 | 254.1 | 325.2 |
| | Rural | 100.9 | 105.2 | 91.5 |
| | Urban | 91.0 | 148.9 | 233.7 |

*Projection for Delhi UT are estimates of the Expert Committee on Population set up by the office of the Registrar General, India.



**Table 3.4 Controlled Population Projection of Delhi UT 1981-2001**

| *Year* | *Population (in lakhs)* | *Net increase (in lakhs)* | *Decadal growth rate (%)* | *Addition by natural growth(%)* | *Increase by inmigration in lakhs (%)* |
|---|---|---|---|---|---|
| Actual | | | | | |
| 1961 | 26.59 | | | | |
| 1971 | 40.66 | 14.07 | 52.91 | 8.82 | 5.25 |
| | | | | (33.17) | 19.74) |
| 1981 | 62.20 | 21.54 | 52.98 | 9.24 | 12.30 |
| | | | | (22.74) | (30.24) |
| Projected | | | | | |
| 1991 | 92.55 | 30.35 | 48.79 | 12.44 | 17.91 |
| | | | | (20.00) | (28.79) |
| 2001 | 112.00 | 19.45 | 21.01 | 11.11 | 8.34 |
| | | | | (12.00) | (9.01) |

**Note:** Figures in brackets indicate components of decadal growth rate.

**Table 3.5 Population Assignment by 2001 AD for Delhi, DMA & NCR**
**(in lakhs)**

| Sl.NO. AREA | POPULATION 2001 | | | | | |
|---|---|---|---|---|---|---|
| | PROJECTED | | | ASSIGNED | | |
| | Total | Urban | Rural | Total | Urban | Rural |
| 1. Region | 325 | 234 | 91 | 325 | 234 | 91 |
| 2. Delhi-Sub-region | 132 | 129 | 3 | 112 | 110 | 2 |
| 3. Haryana Sub-region | 72 | 38 | 34 | 78 | 43.5 | 34.5 |
| 4. Rajasthan Sub-region | 12 | 3.5 | 8.5 | 14 | 7 | 7 |
| 5. Uttar Pradesh Sub-region | 109 | 63.5 | 45.5 | 121 | 75.5 | 45.5 |
| 6. Delhi Metropolitan Area | | | | | | |
| a. Total | 170 | 166 | 4 | 150 | 147 | 3 |
| b. Delhi | | | | 112 | 110 | 2 |
| c. Haryana | | | | 21 | 20.5 | 0.5 |
| d. U.P. | | | | 17 | 16.5 | 0.5 |
| 7. DMA Towns | | | | 37 | 37 | — |
| a. Ghaziabad including Loni | | | | 11 | 11 | — |
| b. NOIDA | | | | 5.5 | 5.5 | — |
| c. Faridabad | | | | 10 | 10 | — |
| d. Gurgaon | | | | 7 | 7 | — |
| e. Bahadurgarh | | | | 2 | 2 | — |
| f. Kundli | | | | 1.5 | 1.5 | — |
| 8. Other areas outside DMA | | | | (Urban 89 and rural 86 lacs) | | |
| a. Haryana | 17 | 17 | | 57 | 23 | 34 |
| b. Rajasthan | 12 | 3.5 | | 104 | 7 | 7 |
| c. U.P. | 47 | 47 | | 104 | 59 | 45 |



**SETTLEMENT SYSTEM 1981-2001**

**Table 4.1 Functional Classification of Towns in NCR 1971-81**

| *Sl. No.* | *Name of the Town* | *Census Class Size* | *Population in 1981* | *Density (per sq.km) 1981* | *Growth rate in 1971-1981 (%)* | *Function in* | |
|---|---|---|---|---|---|---|---|
| | | | | | | *1971* | *1981* |
| *1* | | *2* | *3* | *4* | *5* | *6* | *7* |
| **Delhi UT Sub-region** | | | | | | | |
| 1. | Delhi UA | I | 5729283 | 10594 | 57.09 | Others, Industry | Others |
| 2. | Alipur | V | 6735 | 787 | ** | — | Others |
| 3. | Bwana | IV | 12637 | 745 | ** | — | Others |
| 4. | Bijwasan | V | 7389 | 678 | ** | — | Others |
| 5. | Pehladpur Banger | V | 5011 | 1073 | ** | — | Others |
| 6. | Poth Khurd | V | 7145 | 716 | ** | — | Others |
| **Uttar Pradesh Sub-region** | | | | | | | |
| 7. | Abdullapur | V | 6383 | 3940 | * | — | Primary-Others |
| 8. | Agarwal Mandi | V | 9353 | 10116 | * | — | Primary-Others |
| 9. | Aminagar Sarai | V | 6837 | 3617 | 21.97 | Industry-Trade* Commerce-Others | Others |
| 10. | Anup Sahr | IV | 15193 | 5866 | 23.99 | Others-Industry-Primary | Others |
| 11. | Aurangabad | IV | 11622 | 3874 | * | — | Others-Primary |
| 12. | Babugarh | VI | 2389 | 445 | * | — | Others |
| 13. | Baghpat | IV | 17157 | 5957 | 47.07 | Primary | Others-Primary |
| 14. | Bahusama | V | 7906 | 2635 | * | — | Primary |
| 15. | Baraut | III | 46292 | 4468 | 48.07 | Trade & Commerce Industry-Others | Others |

| 1 | | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 16. | Bhawan Bahadur Nagar | V | 6779 | 1808 | ** | — | Others-Primary |
| 17. | Bilaspur | V | 4661 | 2188 | * | — | Others |
| 18. | Bugrasi | V | 8307 | 1298 | 16.12 | Primary-Others Industry | Others |
| 19. | Bulandshahr | I | 103436 | 11016 | 73.83 | Others-Trade & Commerce Industry | Others |
| 20. | Chhaprauli | IV | 13805 | 12550 | * | — | Primary |
| 21. | Chhatari | V | 5862 | 982 | * | — | Primary |
| 22. | Dadri | IV | 19723 | 3156 | 51.01 | Others-Trade & Commerce Industry | Others |
| 23. | Dankaur | V | 7935 | 802 | 14.18 | Others-Trade & Commerce Industry | Others |
| 24. | Daurala | V | 9146 | 8710 | * | — | Primary |
| 25. | Debai | III | 22430 | 9627 | 31.62 | Industry-Trade & Commerce Primery | Others |
| 26. | Doghat | IV | 10019 | 10890 | ** | — | Primary |
| 27. | Faridnagar | V | 9116 | 20718 | 20.89 | Industry-Primary | Others |
| 28. | Garmukteshwar | VI | 17914 | 560 | 63.79 | Primary-Industry Others | Others |
| 29. | Ghaziabad (UA) | I | 287170 | 4366 | 124.88 | — | Others |
| 30. | Gulaothi | III | 24416 | 10949 | 40.52 | Trade & Commerce | Others |



| 1 | | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 31. | Hapur | I | 102837 | 17639 | 44.30 | Trade & Commerce Industry-Others | Others |
| 32. | Hastinapur | IV | 11637 | 3803 | 30.91 | Industry-Others | Others |
| 33. | Jahangirabad | III | 29301 | 10317 | 35.79 | Primary-Industry Trade & Commerce | Others |
| 34. | Jahangirpur | V | 6447 | 626 | ** | — | Primary-Others |
| 35. | Jewar | IV | 15275 | 837 | * | — | Others |
| 36. | Kakod | VI | 4299 | 3495 | * | — | Others-Primary |
| 37. | Karnawal | V | 9895 | 8315 | ** | — | Primary |
| 38. | Khanpur | V | 8311 | 5099 | * | — | Primary |
| 39. | Kharkhoda | V | 8708 | 4976 | * | — | Primary-Others |
| 40. | Khekada | III | 24984 | 20648 | * | — | Others |
| 41. | Khurja | II | 67119 | 6479 | 33.58 | Industry-Others Trade & Commerce | Others |
| 42. | Kithaur | IV | 13791 | 4522 | * | — | Primary |
| 43. | Lawar | IV | 11535 | 3178 | * | — | Primary-Others |
| 44. | Loni | IV | 10259 | 3901 | * | — | Others |
| 45. | Mawana | III | 37620 | 14525 | 51.32 | Diversified | Others |
| 46. | Meerut (UA) | I | 536615 | 6640 | 44.34 | Others-Industry | Others |
| 47. | Modinagar (UA) | II | 87665 | 6105 | 101.67 | Industry | Others |
| 48. | Murad Nagar | III | 26047 | 16279 | 86.25 | Industry-Trade & Commerce-Primary | Others |
| 49. | Narora | V | 9573 | 1760 | * | — | Others |
| 50. | Niwadi | V | 7078 | 4424 | * | — | Primary |
| 51. | Of Muradnagar | IV | 13147 | 1983 | 45.66 | Others | Others |
| 52. | Pahasu | V | 9016 | 39200 | 45.66 | Others | Others |

| 1 | | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 53. | Parikshitgarh | IV | 11328 | 3293 | * | — | Others |
| 54. | Patala | V | 7847 | 6539 | ** | — | Primary |
| 55. | Palauda | IV | 10357 | 4523 | * | — | Primary |
| 56. | Pilkhua | III | 37884 | 8363 | 58.24 | Industry | Others |
| 57. | Rabupura | V | 8999 | 868 | | — | Primary-Others |
| 58. | Sardhana | III | 30138 | 2145 | 36.48 | Industry-Primary Trade & Commerce | Others |
| 59. | Sewalkhas | IV | 10278 | 12534 | ** | — | Primary |
| 60. | Shajahanpur | V | 8867 | 1483 | 20.80 | Primary-Industry | Primary |
| 61. | Shikarpur | III | 21449 | 43876 | 29.79 | Primary-Industry Others | Others Others |
| 62. | Siana | III | 22410 | 4335 | 35.79 | Primary-Others Trade & Commerce | Others |
| 63. | Sikandrabad | III | 43135 | 4913 | 34.67 | Industry-Primary Trade & Commerce | Others |
| 64. | Tikri | IV | 11315 | 10286 | ** | — | Primary |
| **Haryana Sub-region** | | | | | | | |
| 65. | Bahadurgarh | III | 37488 | 4165 | 45.23 | Others-Industry | Others |
| 66. | Bawal | V | 7760 | 21556 | 18.85 | Primary | Others |
| 67. | Beri | IV | 13490 | 5208 | 9.35 | Primary | Others-Primary |
| 68. | Faridabad Complex Administration | I | 330864 | 1856 | NA | Industry | Others |
| 69. | Farukknagar | V | 6367 | 4760 | 16.04 | Primary-Trade & Commerce-Industry | Others |



| 1 | | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 70. | Ferozepur | V | 9400 | 1061 | 18.06 | Primary-Trade& Commerce-Industry | Others |
| 71. | Ganaur | IV | 16489 | 1820 | 96.32 | Industry-Trade & Commerce-Others | Others |
| 72. | Gohana | III | 26188 | 3686 | 56.81 | Trade & Commerce Others-Primary | Others |
| 73. | Gurgaon | II | 100877 | 4181 | 76.51 | Others | Others |
| 74. | Hailey Mandi | IV | 10140 | 3915 | 350.27 | Trade & Commerce | Others |
| 75. | Hassanpur | V | 5109 | 5494 | ** | — | Primary-Others |
| 76. | Hathin | V | 6553 | 3293 | ** | — | Primary-Others |
| 77. | Hodal | IV | 18740 | 8329 | 32.49 | Diversified | Others |
| 78. | Jhajjar | III | 24247 | 4041 | 27.97 | Primary-Others Trade & Commerce | Others |
| 79. | Jharsa | V | 8412 | 842 | ** | — | Others |
| 80. | Kalanaur | IV | 12380 | 2172 | * | — | Others |
| 81. | Maham | IV | 11722 | 3359 | 11.20 | Primary-Trade & Commerce | Others |
| 82. | Nuh | V | 5992 | 19973 | 26.68 | Trade & Commerce Others | Others |
| 83. | Palwal | III | 47323 | 8574 | 30.72 | Others-Trade & Commerce-Industry | Others |
| 84. | Panipat | I | 137927 | 6625 | 56.77 | Industry-Trade & Commerce-Industry | Others |
| 85. | Pataudi | V | 8422 | 2165 | 39.32 | Primary | Others-Primary |
| 86. | Rewari | II | 51562 | 8509 | 17.49 | Trade & Commerce Others-Industry | Others |

| 1 | | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 87. | Rohtak | I | 166767 | 7570 | 33.68 | Others-Trade & Commerce | Others |
| 88. | Samalkha | IV | 13532 | 2222 | * | — | Others |
| 89. | Sohna | IV | 12667 | 3424 | 44.35 | Trade & Commerce | Others |
| 90. | Sonipat | I | 109369 | 5118 | 75.29 | Others-Industry Industry-Others-Trade & Commerce | Others |
| 91. | Taoru | V | 6912 | 19749 | ** | Primary-Industry | Others |
| **Rajasthan Sub-region** | | | | | | | |
| 92. | Alwar | I | 145795 | 1822 | 45.25 | Others | Others |
| 93. | Khairthal | IV | 15962 | 728 | 49.36 | Primary-Trade & Commerce | Others |
| 94. | Tijara | IV | 12199 | 556 | ** | — | Others |

Note:
* Delcassified in 1971
** Newly added town in 1981
NA Not Available



## RURAL DEVELOPMENT

**Table 5.1: Number of Villages in Different Population Range—1981**

| *Sub-region* | *No. of Villages* | *Population Less than 100* | *200-449* | *500-1999* | *2000-4999* | *5000-9999* | *10000 and above* |
|---|---|---|---|---|---|---|---|
| Delhi UT | 214 | 9 | 9 | 110 | 71 | 15 | — |
| | | (4.20) | (4.20) | (51.40) | (33.20) | (7.0)) | |
| Haryana | 2386 | 158 | 335 | 1287 | 508 | 93 | 5 |
| | | (6.62) | 14.04) | (53.94) | (21.29) | (3.90) | (0.21) |
| Rajasthan | 1088 | 125 | 318 | 573 | 65 | 7 | — |
| | | (11.49) | (29.23) | (52.67) | (5.97) | (0.64) | — |
| Uttar Pradesh | 2989 | 149 | 283 | 1705 | 742 | 107 | 3 |
| | | (4.98) | (9.47) | (57.04) | (24.83) | (3.58) | (0.10) |
| N.C.R. | 6677 | 441 | 945 | 3675 | 1386 | 222 | 8 |
| | | (6.60) | (14.10) | (55.10) | (20.75) | (3.32) | (0.13) |

Note: Figures in brackets indicate proportions to respective Sub-region's total.

**Table 5.2 Distribution of Villages according to the Availability of different Amenities**

| *Sl. No* | *Sub-Region* | *No. of inhabited villages* | *Number (with Percentage) of villages having one or more of the following Amenities* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Education* | *Medical* | *Drinking Water* | *Post and Telegraph* | *Market/ Hat* | *Communi-cation* | *Approach by Pucca Road* | *Power supply* |
| 1. | Delhi UT | 214 | 189 | 125 | 214 | 115 | 7 | 183 | 207 | 214 |
| | | | (88.32) | (58.41) | (100) | (53.74) | (3.27%) | (85.51) | (96.73) | (100.00) |
| 2. | Haryana | 2386 | 2114 | 1396 | 2386 | 758 | — | 1156 | 2197 | 2386 |
| | | | (88.60) | (58.51) | (100) | (31.77) | | (48.45) | (92.08) | (100.00) |
| 3. | Rajasthan | 1088 | 767 | 194 | 1088 | 323 | 4 | 179 | 265 | 593 |
| | | | (70.50) | (17.83) | (100) | (21.32) | (0.37) | (16.49) | (24.36) | (54.50) |
| 4. | Uttar Pradesh | 2989 | 2283 | 697 | 2989 | 719 | 232 | 787 | 1512 | 2489 |
| | | | (76.38) | (23.31) | (100) | (24.05) | (7.76) | (26.33) | (50.53) | (83.27) |
| N.C.R. | | 6677 | 5353 | 2412 | 6677 | 1824 | 243 | 2305 | 4181 | 5682 |
| | | | (80.17) | (36.12) | (100) | (27.32) | (3.64) | (34.52) | (62.62) | (85.10) |

**Note:** Figures in brackets indicate percentages.



**Table 5.3 Proportion of Rural Population served by different Amenities**

| *S. No.* | *Sub-region* | *Total population of inhabited villages* | *Proportion of Rural Population severed by the amenity of* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Education* | *Medical* | *Drinking Water* | *Post and Telegraph* | *Market/ Hat* | *Communi-cation* | *Approach by Pucca Road* | *Power Supply* |
| 1. | Delhi UT | 452206 | 96.52 | 74.82 | 100 | 72.51 | 4.69 | 91.75 | 99.80 | 100.00 |
| 2. | Haryana | 3731837 | 97.05 | **77.90 | 100 | 56.12 | — | 66.48 | 95.72 | 99.64 |
| 3. | Rajasthan | 890553 | 90.25 | 40.51 | 100 | 44.83 | 1.82 | 28.84 | 36.77 | 70.57 |
| 4. | Uttar Pradesh | 5019579 | 91.34 | 34.44 | 100 | 46.12 | 17.34 | 36.34 | 59.43 | 89.81 |
| N.C.R. | | 10094175 | 93.72 | 52.96 | 100 | 50.96 | 8.99 | 49.40 | 72.79 | 92.35 |

## ECONOMIC PROFILE

**Table 6.1 Distribution of work-force in Delhi 1981-2001**

| *Categories* | *Proportion of workers (%) in year* | |
|---|---|---|
| | *1981 (Actual)* | *2001 (Proposed)* |
| Primary Sector | 1.59 | 1.50 |
| Industry | 29.18 | 29.00 |
| Construction | 6.39 | 5.00 |
| Trade & Commerce | 22.25 | 22.00 |
| Transport, Storage and Communication | 9.07 | 11.00 |
| Other services | 31.47 | 31.50 |
| Participation rate | 32.20 | 35.00 |

**Table 6.2 Employment Structure in DMA Towns-2001**

| *Town* | *Proposed Participation Rate* | *Proposed Proportion of workers (%) in* | | | | | |
|---|---|---|---|---|---|---|---|
| | | *Primary* | *Industry* | *Construction* | *Trade & Commerce* | *Transport Storage & Communication* | *Services* |
| Ghaziabad | 30 | 0.5 | 38.0 | 6.0 | 15.0 | 10.0 | 30.0 |
| NOIDA | 35 | 2.0 | 40.0 | 6.0 | 20.0 | 12.0 | 20.0 |
| Faridabad/Ballabhgarh | 35 | 6.0 | 45.0 | 6.0 | 16.0 | 7.0 | 24.0 |
| Gurgaon | 35 | 2.0 | 40.0 | 10.0 | 16.0 | 10.0 | 22.0 |
| Bahadurgarh | 35 | 6.0 | 30.0 | 4.0 | 25.0 | 10.0 | 25.0 |
| Kundli | 35 | 2.0 | 40.0 | 10.0 | 16.0 | 10.0 | 22.0 |



**Table 6.3 Occupation Structure in the Priority Towns by 2001**

**(in Percentage)**

| | *PriorityTown* | *Participation Ratio-2001 (%)* | *Proportion (%) of workers in* | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | *Primary* | *Industry* | *Construc-tion* | *Trade & Commerce* | *Transport, Storage & Communications* | *Services* |
| 1. | Meerut | 32 | 2 | 29 | 4 | 20 | 9 | 36 |
| 2. | Hapur | 30 | 6 | 28 | 4 | 22 | 13 | 27 |
| 3. | Bulandshahr | 30 | 4 | 40 | 4 | 20 | 12 | 20 |
| | —Khurja | 30 | 4 | 40 | 4 | 20 | 12 | 20 |
| 4. | Panipat | 32 | 4 | 40 | 4 | 20 | 12 | 20 |
| 5. | Rohtak | 30 | 7 | 28 | 4 | 20 | 13 | 28 |
| 6. | Palwal | 30 | 9 | 15 | 4 | 17 | 21 | 34 |
| 7. | Rewari | 30 | 9 | 15 | 4 | 21 | 15 | 36 |
| | —Dharuhera | 30 | 5 | 50 | 4 | 16 | 7 | 18 |
| | —Bhiwadi | 30 | 5 | 50 | 4 | 16 | 7 | 18 |
| 8. | Alwar | 30 | 5 | 30 | 4 | 20 | 11 | 30 |

**Table 6.4 Employment in Government and Public Sector Offices in Delhi (1921-85)**

*(Employment in lacs)*

| Sl. No. | SECTOR | 1921 | 1931 | 1941 | 1951 | 1961 | 1971 | 1981 | 1982 | 1983 | 1984 | 1985 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Central Government | 0.08 | 0.11 | 0.26 | 0.85 | 0.94 | 2.11 | 2.25 | 2.31 | 2.29 | 2.35 | 2.30 |
| 2. | Delhi Administration | 0.01 | 0.03 | 0.03 | 0.07 | 0.25 | 0.53 | 0.58 | 0.62 | 0.65 | 0.64 | 0.65 |
| 3. | Local Bodies | 0.02 | 0.01 | 0.12 | 0.14 | 0.34 | 0.90 | 1.09 | 1.13 | 1.17 | 0.83 | 0.84 |
| 4. | Quasi-Government | N.A. | N.A. | N.A. | N.A. | 0.06 | 0.56 | 1.41 | 1.51 | 1.63 | 1.72 | 1.83 |
| Total | | 0.11 | 0.15 | 0.41 | 1.06 | 1.59 | 4.10 | 5.33 | 5.57 | 5.74 | 5.54 | 5.62 |

Source: Delhi Statistical Handbook—1986

**Table 6.6 Industrial Progress in Delhi-1985**

| Item | 70-71 | 76-77 | 77-78 | 78-79 | 79-80 | 80-81 | 81-82 | 82-83 | 83-84 | 84-85 |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of Industrial units (in' 000) | 26 | 37 | 40 | 41 | 42 | 45 | 50 | 54 | 57 | 62 |
| Investment (Rs. in crores) | 190 | 550 | 600 | 650 | 700 | 867 | 965 | 1035 | 1105 | 1200 |
| Production (Rs. in crores) | 388 | 1025 | 1200 | 1430 | 1700 | 2196 | 2350 | 2352 | 2483 | 3300 |
| Employment (in' 000) | 215 | 300 | 325 | 350 | 375 | 450 | 480 | 507 | 528 | 558 |

Source: Delhi Statistical & Hand Book—1986.



**Table 6.5 Distribution of Working Force in Urban Delhi 1951-1981**

| Sl. No. | *Categories* | *1951* | | *1961* | | *1971* | | *1981* | |
|---|---|---|---|---|---|---|---|---|---|
| | | *Workers* | *%* | *Workers* | *%* | *Workers* | *%* | *Workers* | *%* |
| 1. | Cultivators | 3483 | 0.7 | 5178 | 0.7 | 5176 | 0.5 | 7227 | 0.39 |
| 2. | Agri. Labours | 584 | 0.1 | 1242 | 0.2 | 3603 | 0.3 | 4772 | 0.25 |
| 3. | Livestock Forestry etc. | — | — | — | — | — | — | 13091 | 0.70 |
| 4. | Mining & Quarrying | 1521 | 0.3 | 5446 | 0.7 | 9091 | 0.8 | 4745 | 0.25 |
| 5. | Manufacturing, Processing | | | | | | | | |
| | a) Household Industry | 6632 | 1.3 | 12684 | 1.7 | 25107 | 2.2 | 31349 | 1.69 |
| | b) Other than house-hold | 80639 | 15.7 | 155099 | 20.7 | 242733 | 21.7 | 510748 | 27.49 |
| 6. | Construction | 44948 | 8.7 | 32540 | 4.4 | 61517 | 5.5 | 118699 | 6.39 |
| 7. | Trade & Commerce | 117338 | 22.8 | 143809 | 19.3 | 239719 | 21.6 | 413430 | 22.25 |
| 8. | Transport & Comm. | 34455 | 6.7 | 47387 | 6.3 | 107324 | 9.6 | 168457 | 9.07 |
| 9. | Other Services | 224426 | 43.7 | 343430 | 46.0 | 422667 | 37.8 | 584663 | 31.47 |
| Total Workers | | 514026 | 100.0 | 746815 | 100.0 | 1116937 | 100.0 | 1857545 | 100.00 |
| Population | | 1437134 | — | 2349408 | — | 3647023 | — | 5678200 | — |
| Participation Ratio | | 27.96 | — | 31.65 | — | 30.62 | — | 32.20 | — |

**Table 6.7 Registered Factories in Delhi: Group-wise—1985**

| Sl. No. | Description | Number of Factories | | | | | | | Workers (daily average in '000) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1979 | 80 | 81 | 82 | 83 | 84 | 85 | 1979 | 80 | 81 | 82 | 83 | 84 | 85 |
| 1. | Food Products | 114 | 124 | 130 | 142 | 148 | 153 | 160 | 7 | 9 | 9 | 9 | 9 | 9.5 | 9.7 |
| 2. | Texties & Textile Products | 457 | 520 | 545 | 622 | 666 | 709 | 746 | 43 | 46 | 46 | 46 | 48 | 50 | 52 |
| 3. | Wood Products | 46 | 47 | 52 | 56 | 60 | 66 | 67 | 1 | 1 | 1 | 1 | 1 | 1 | 1.04 |
| 4. | Papper Products & Printing | 230 | 223 | 255 | 279 | 290 | 302 | 315 | 11 | 12 | 12 | 12 | 12 | 12 | 12.6 |
| 5. | Leather, Rubber & Chemicals | 396 | 429 | 434 | 495 | 534 | 578 | 581 | 12 | 14 | 14 | 14 | 15 | 17 | 17.1 |
| 6. | Non-metallic mineral Products | 55 | 57 | 51 | 107 | 114 | 119 | 146 | 4 | 3 | 3 | 3 | 3 | 3 | 3.7 |
| 7. | Metal & Engineering Products | 763 | 807 | 856 | 970 | 1032 | 1097 | 1128 | 23 | 26 | 26 | 27 | 29 | 31 | 32.2 |
| 8. | Manufacturing of Electric Machinery | 308 | 355 | 374 | 451 | 480 | 530 | 545 | 12 | 14 | 14 | 15 | 16 | 18 | 19.6 |
| 9. | Manufacture of other Misc. and Transport Equip. | 393 | 395 | 487 | 555 | 592 | 629 | 653 | 15 | 16 | 16 | 24 | 25 | 27 | 27.5 |
| 10. | Generation and Trans. of Electricity, Water Supply and Gas | 21 | 21 | 18 | 21 | 21 | 21 | 21 | 6 | 5 | 5 | 3 | 3 | 3 | 3 |
| 11. | Miscellaneous | 201 | 215 | 200 | 219 | 226 | 241 | 290 | 7 | 7 | 7 | 4 | 5 | 7 | 7.3 |
| Total | | 2984 | 3193 | 3402 | 3917 | 4163 | 4445 | 4652 | 141 | 153 | 153 | 158 | 166 | 178.5 | 185.74 |

**Source:** Delhi Statistical Hand Book—1986.





## TRANSPORT

**Table 7.1 Traffic Movement on Major Corridors**

| | Major Corridor | Total Passenger Vehicles | Total Buses | Total Goods Vehicles | Total Volume |
|---|---|---|---|---|---|
| 1. | Delhi-Faridabad | 21585 | 1936 | 6795 | 30316 |
| | | (71.2) | (6.4) | (22.4) | (100.00) |
| 2. | Delhi-Gurgaon | 9407 | 1483 | 4105 | 14995 |
| | | (62.7) | (9.9) | (27.4) | (100.0) |
| 3. | Delhi-Bahadurgarh | 3708 | 753 | 2513 | 6974 |
| | | (53.2) | (10.8) | (36.0) | (100.0) |
| 4. | Delhi-Panipat | 3383 | 1207 | 3712 | 8302 |
| | | (40.7) | (14.5) | (45.8) | (100.0) |
| 5. | Delhi-Baghpat | 5056 | 474 | 2371 | 7901 |
| | | (64.0) | (6.0) | (30.0) | (100.0) |
| 6. | Delhi-Ghaziabad | 28714 | 2605 | 11432 | 42751 |
| | | (67.2) | (6.1) | (26.7) | (100.0) |
| 7. | Delhi-NOIDA | 16677 | 623 | 2007 | 20307 |
| | | (82.1) | (8.0) | (9.9) | (100.0) |
| 8. | Ghaziabad-Meerut | 7047 | 1089 | 3109 | 11245 |
| | | (62.7) | (9.8) | (27.5) | (100.0) |
| 9. | Ghaziabad-Hapur | 4176 | 789 | 1906 | 6871 |
| | | (60.8) | (11.5) | (27.7) | (100.0) |
| 10. | Ghaziabad-Bulandshahr | 6110 | 768 | 2141 | 9019 |
| | | (67.8) | (8.5) | (23.7) | (100.0) |
| 11. | Gurgaon-Sohna-Alwar | 1146 | 157 | 884 | 2187 |
| | | (52.4) | (7.2) | (40.4) | (100.0) |
| 12. | Gurgaon-Behror (NCR Border) | 2021 | 613 | 4036 | 6670 |
| | | (30.3) | (9.2) | (60.5) | (100.0) |

Note: Figures in brackets indicate ratio of traffic in each category to toal volume of traffic.

**Table 7.2 Generation of Passenger Traffic (Daily) in NCR and Important Urban Centres-1987**

| | *Vehicle* | *Passengers* | *Bus* | *Passengers* | *Rail* | *Passengers* | *Total* | *Rail* |
|---|---|---|---|---|---|---|---|---|
| | *Total* | *Per Capita Trip Rate* | *Total* | *Per Capita Trip Rate* | *Total* | *Per Capita Trip Rate* | | *Share (%)* |
| 1. Delhi UT | 58794 | 0.007 | 173722 | 0.021 | 107000 | 0.013 | 339516 | 32.00 |
| 2. Ghaziabad | 17465 | 0.035 | 32298 | 0.060 | 32856 | 0.016 | 82619 | 40.00 |
| 3. NOIDA | 9300 | 0.043 | 31026 | 0.146 | — | — | 40326 | — |
| 4. Faridabad | 16505 | 0.031 | 24675 | 0.046 | 6568 | 0.012 | 47748 | 14.00 |
| 5. Gurgaon | 8868 | 0.032 | 18603 | 0.066 | N.A. | N.A. | — | — |
| 6. Bahadurgarh | 1863 | 0.022 | 4123 | 0.048 | 4115 | 0.048 | 6390 | 64.30 |
| 7. Meerut | 17368 | 0.022 | 34242 | 0.045 | 9420 | 0.102 | 61030 | 15.00 |
| 8. Hapur | 6125 | 0.041 | 11456 | 0.077 | 3500 | 0.023 | 21081 | 16.60 |
| 9. Bulandshahr | 13460 | 0.054 | 23522 | 0.094 | 2644 | 0.011 | 44242 | 7.00 |
| 10. Palwal | 1215 | 0.016 | 1674 | 0.022 | 6440 | 0.085 | 9329 | 69.03 |
| 11. Panipat | 1573 | 0.006 | 7097 | 0.029 | 5775 | 0.023 | 14445 | 39.97 |
| 12. Rohtak | 18200 | 0.065 | 20845 | 0.078 | 5197 | 0.019 | 39626 | 12.00 |
| 13. Rewari | 5025 | 0.040 | 6454 | 0.051 | 6307 | 0.050 | 17786 | 35.46 |
| 14. Alwar | 1945 | 0.008 | 7392 | 0.029 | 2915 | 0.012 | 9337 | 31.20 |
| 15. Sonepat | 824 | 0.005 | 4196 | 0.027 | 15183 | 0.096 | 20203 | 75.15 |
| 16. Modinagar | 3242 | 0.016 | 909 | 0.006 | 1820 | 0.013 | 5971 | 30.48 |
| 17. Rest of NCR | 51406 | 0.004 | 39623 | 0.003 | N.A. | — | — | — |
| Total | 232000 | — | 442000 | — | 210000 | — | 884000 | 23.7 |



**Table 7.3 Road Passenger Movement Pattern (Generation)**

| | *Bus Passengers* | | *Vehicle Passengers* | |
|---|---|---|---|---|
| *Movement* | *Total NCR* | *DUT* | *Total NCR* | *DUT* |
| Internal-Internal | 346933 | 143968 | 214168 | 53739 |
| | (64.4) | (69.6) | (86.3) | (85.5) |
| Internal-External | 95036 | 61188 | 18066 | 8740 |
| | (17.6) | (29.5) | (7.2) | (13.9) |
| External-Internal | 95062 | — | 15580 | — |
| | (17.7) | | (6.499) | |
| External-External | 2055 | 1855 | 313 | 366 |
| | (0.4) | (0.9) | (0.001) | (0.06) |
| Total | 539085 | 207014 | 248127 | 62845 |
| | (100.0) | (100.0) | (100.0) | (100.0) |

**Note:** Figures in brackets indicate % to total.

**Table 7.4 Projected Trip Rate and Passenger Trips**

| Towns | Projected Trip Rate | | No. of Passenger Trips | |
|---|---|---|---|---|
| | Vehicle Passengers | Public Transport | Vehicle Passengers | Public Transport |
| Delhi UT | 0.007 | 0.030 | 93406 | 339671 |
| Ghaziabad | 0.023 | 0.075 | 25300 | 82500 |
| NOIDA | 0.057 | 0.154 | 25856 | 85224 |
| Faridabad | 0.036 | 0.064 | 25812 | 64131 |
| Gurgaon | 0.063 | 0.145 | 31650 | 101554 |
| Bahadurgarh | 0.040 | 0.119 | 8095 | 23872 |
| Meerut | 0.030 | 0.094 | 39000 | 122200 |
| Hapur | 0.050 | 0.135 | 23272 | 81000 |
| Bulandshahr | 0.011 | 0.169 | 8867 | 169289 |
| Palwal | 0.025 | 0.048 | 7643 | 14441 |
| Panipat | 0.035 | 0.128 | 28200 | 76800 |
| Rohtak | 0.030 | 0.082 | 18000 | 49200 |
| Rewari | 0.051 | 0.097 | 15446 | 29151 |
| Alwar | 0.034 | 0.112 | 27500 | 79500 |



**Table 7.5 Projected average daily goods traffic (Road) for NCR**

| Towns | Existing | | Projected | | Average Annual Simple Rate Growth |
|---|---|---|---|---|---|
| | Generation | Attraction | Generation | Attraction | |
| 1. Delhi UT | 40577 | 59980 | 82980 | 124458 | 7.5 |
| 2. Ghaziabad | 23415 | 25995 | 59357 | 72136 | 11.0 |
| 3. NOIDA | 2165 | 4604 | 10283 | 23230 | 26.8 |
| 4. Faridabad | 9676 | 4738 | 32898 | 16968 | 17.1 |
| 5. Gurgaon | 2845 | 2253 | 19459 | 15320 | 41.7 |
| 6. Bahadurgarh | 1721 | 1252 | 7465 | 5713 | 23.8 |
| 7. Meerut | 2210 | 5705 | 11558 | 28810 | 30.2 |
| 8. Hapur | 11471 | 3360 | 45061 | 25288 | 20.9 |
| 9. Bulandshahr | 1705 | 1710 | 9070 | 14405 | 30.9 |
| 10. Palwal | 824 | 691 | 5042 | 4215 | 36.6 |
| 11. Panipat | 880 | 5724 | 14673 | 22906 | 112.0 |
| 12. Rohtak | 2169 | 4004 | 9154 | 17017 | 23.0 |
| 13. Rewari | 829 | 648 | 5020 | 3467 | 36.1 |
| 14. Alwar | 1681 | 4438 | 10590 | 27072 | 37.9 |
| 15. Sonepat | 7038 | 4426 | 28997 | 16917 | 22.3 |
| 16. Modinagar | 1998 | 1834 | 8032 | 11397 | 21.6 |
| Rest of NCR | 7346 | 4258 | 19769 | 20737 | 17.8 |
| Total | 118550 | 136522 | 385266 | 449008 | 16.1 |

**Table 8.1 Telecom Facilities in D.M.A./Priority Towns—1987**

| Sl. No. | Name of Town | Existing Exchanges 30.9.1987 | | Waiting List | Expected capacity as on 1.4.90 | Remarks |
|---|---|---|---|---|---|---|
| | | Type | Capacity | | | |
| 1. | Faridabad | Max-I (Strowger) | 5100 | 7585 | 12.1 Klines (E-10B) | |
| 2. | Ballabhgarh | Max-I | 1800 | | 1800 (SXS) | |
| 3. | Bahdurgarh | Max-II | 600 | 226 | 2000 lines Electronic (RLU) | |
| 4. | Rohtak | Max-I (Strowger) | 4500 | 810 | 5400 (SXS) | |
| 5. | Gurgaon | Max-I PRX (Electronic) | 4000 | 2000 | 6000 (E-I/B) | |
| 6. | Panipat | Max-II | 2100 | 2262 | 4000 (ICP) | |
| 7. | Rewari | Max-II | 1500 | 49 | 2000 (SXS) | |
| 8. | Dharuhera | Manual CBNM | 200 | 3 | 400L NEAX Elect. | |
| 9. | Palwal | Manual CBNM | 840 | | 900L NEAX Elect. | |
| 10. | Alwar | PRX Electronic | 3000 | 681 | 4000 PRX | |
| 11. | MIA Alwar | Manual CBNM | 250 | | 400L MAX-II | |
| 12. | Bhiwadi | Manual CBNM | 300 | 37 | 400L NEAX Electronic. | |
| 13. | Ghaziabad | —ICP (X) | 5000 | | 6000 (ICP) | |
| | | —Stowger | 1700 | | 2000 (Dig) RLU | |
| | | — ICP | 2000 | | 2000 ICP | |
| | | — | — | | 4000 E 10B | |
| 14. | Loni | MAX-II | 100 | | 200 | Expanded to 200 lones w.e.t. 6.10.87. |
| 15. | NOIDA | MAX-I | 3000 | 5000* | 3000 (SXS) | |
| | | | | | 4000 E10B | Already Commissioned in1987-88 |
| 16. | Meerut | MAX-I (Stowger) | 6600 | | 6600 (SXS) | |
| | | ICP | 4000 | | 6000 ICP + 4000(Expn.) of ICP | Allotment made |
| 17. | Hapur | MAX-II | 1400 | 450* | 1600L | |
| 18. | Bulandshahr | MAX-II | 1300 | | 1400L | |
| 19. | Khurja | Manual CBM | 960 | | 1000L NEAX Electronic | |

*Figures as obtained from respective Divisonal Telephone Offices.
**Source:** D.O.T. Ministry of Telecommunication.

**Table 8.2 Telex Facilities in D.M.A./Priority Towns: Proposals**

| Sl. No. | Name of Town | Telex | | Remarks |
|---|---|---|---|---|
| | | Existing Capacity | Expected 1.4.90 | |
| 1. | Faridabad | 150L | 250L | Telex expanded to 250 lines during 87-88 and 300L electronic concentrator is proposed in 88-89 to replace the existing telex exchange. |
| 2. | Ballabhgarh | — | — | |
| 3. | Bahadurgarh | — | — | |
| 4. | Rohtak | — | 20L | |
| 5. | Gurgaon | 40L | 100L | |
| 5. | Panipat | 50L | 100L | |
| 7. | Rewari | — | 20L | National telex proposed |
| 8. | Dharuhera | — | — | |
| 9. | Palwal | — | 20L | National telex proposed |
| 10. | Alwar | — | 20L | |
| 11. | MIA Alwar | 20L | 40L | |
| 12. | Bhiwadi | — | 20L | |
| 13. | Ghaziabad | 100L | 100L | Proposal to increase capacity under consideration. |
| 14. | Loni | — | — | |
| 15. | NOIDA | 40L | 100L | |
| 16. | Meerut | 60L | 150L | |
| 17. | Hapur | — | 20L | |
| 18. | Bulandshahr | — | 20L | National telex proposed |
| 19. | Khurja | | | |

Source: D.O.T. Ministry of Telecommunication.



**Table 8.3 Augmentation of Telecom Facilities in DMA/Priority Towns-7th, 8th & 9th Five Year Plans**

| Sl. No. | Name of the Town | 1990 Demand Projections | | 1995 Demand Projections | | 2001 Demand Projections | |
|---|---|---|---|---|---|---|---|
| | | Normal Growth | Likely Staus | Normal Growth | Likely Staus | Normal Growth | Likely Staus |
| 1. | Faridabad | 17380 | 12.1K | 30869 | — | 61501 | To be capable of providing telephones Practically on demand in all DMA/Priority Towns |
| | Ballabagarh | — | 1.8K | — | — | — | |
| 2. | Gurgaon | 8509 | 6K | 20583 | 14K/1993* | 59412 | |
| 3. | Bahadurgarh | 879 | 2K | 1172 | — | 1657 | |
| 4. | Rohtak | 6454 | 5.4K | 10226 | 9.4K/1993* | 17762 | |
| 5. | Panipat | 5022 | 4K | 7943 | 6K/1993* | 13771 | |
| 6. | Rewari | 2117 | 2K | 3335 | 3k/1991 | 5755 | |
| 7. | Dharuhera | — | 0.4K | — | — | — | |
| 8. | Palwal | 925 | 0.9K | 1638 | — | 3250 | |
| 9. | Kundli | — | — | — | — | — | |
| 10. | Alwar | 4349 | 4K | 6936 | 5K/1992* | 12145 | |
| 11. | MIA Alwar | — | 0.4K | — | — | — | |
| 12. | Bhiwadi | — | 0.4K | — | — | — | |
| 13. | Ghaziabad | 13356 | 14K | 23519 | — | 46377 | |
| | Loni | — | 0.2K | — | — | — | |
| 14. | NOIDA | — | 7.0K | — | 12K/1993* | — | |
| 15. | Meerut | 18936 | 12.6K | 30212 | 17.6K/1992* | 52922 | |
| 16. | Hapur | 1973 | 1.6K | 2965 | 2K/1992* | 4833 | |
| 17. | Bulandshahr | 2837 | 1.4K | 4390 | 2K/1992* | 7410 | |
| 18. | Khurja | — | 1K | — | — | — | |

*Year of allotment of Equipment.

Source: D.O.T. Ministry of Telecommunications.

## POWER DEVELOPMENT

**Table 9.1 Power Generation Schemes in the NCR**

| *Sl.No.* | *Schemes (Agency)* | *Type* | *Units & rated capacity MW* | *Installed capacity MW* | *Expected year of commissioning* |
|---|---|---|---|---|---|
| | **Existing** | | | | |
| 1. | Rajghat (DESU) | Thermal | 1x15 | 15 | |
| 2. | IP Estates (DESU) | Thermal | 1x36.6<br>3X67.5<br>1x60 | 284.1* | |
| 3. | Badarpur (NTPC) | Thermal | 3x100<br>2x210 | 720 | |
| 4. | IP Estate(DESU) | Gas | 6x30 | 180 | |
| 5. | Panipat Stage I & II (HSEB) | Thermal | 4x110 | 440 | |
| | | | Sub Total | 1834.1 | |
| | **Under Construction** | | | | |
| 1. | Rajghat (DESU) (Replacement Units) | Thermal | 2x67.5 | 135 | Unit I May; 1988<br>Unit II Sept; 1988 |
| 2. | Panipat Stage III (HSEB) | Thermal | 1x210 | 210 | 1987-88 |
| 3. | Kokroi** | Hydel | 3x0.1 | 0.3 | Not known |
| 4. | Narora (APP) | Nuclear | 2x235 | 470 | £Unit I-87-88<br>Unit-II 89-90 |
| 5. | Dadri (NTPC) | Thermal | 4x210 | 840 | Unit-I-1991-92<br>Unit-II-1992-93<br>Units III & IV 93-94 |
| | | Sub-total | | 1655.3 | |
| | | Grand-total | | 3489.5 | |

*Includes the share of Haryana of 62.5 MW

**By Alternate Hydro Energy Centre, Roorkee University as an experimental project.

Narora Atomic Power Project under Central Sector is being set up for the benefit of constituent State of Northern Region.

Allocation of power is yet to be decided.

**Sources:** i. Ministry of Energy/Central Electricity Authority
ii. State Power Boards
iii. DESU

**Table 9.2 Pattern of Energy Consumption 1985-86**

| Sl.No. | Area | Domestic | Commercial | Industrial | Agricultural | Others | Total |
|---|---|---|---|---|---|---|---|
| 1. | DELHI UT | 1280.00 | 800.00 | 1115.00 | — | 765.00* | 3960.00 |
| | | (32.32) | (20.20) | (28.16) | — | (19.32) | (100.00) |
| 2. | HARYANA SUB-REGION | | | | | | |
| | i. Sonepat Distt. | 31.50 | 4.80 | 78.68 | 40.59 | 1.83 | 157.40 |
| | ii. Gurgaon Distt. | 24.94 | 6.36 | 51.58 | 55.79 | 5.29 | 143.96 |
| | iii Faridabad Distt. | 72.64 | 14.34 | 327.33 | 53.64 | 6.95 | 474.90 |
| | iv. Rohtak Distt. | 55.69 | 13.40 | 68.00 | 44.51 | 2.89 | 184.49 |
| | v. Panipat Tehsil | 28.78 | 9.92 | 168.27 | 151.59 | 2.31 | 360.87 |
| | vi. Rewari and Bawal Tehsil | 12.33 | 1.95 | 25.32 | 37.17 | 2.49 | 79.26 |
| | + Sub-Total | 225.88 | 50.77 | 719.18 | 383.29 | 21.76 | 1400.88 |
| | | (16.12) | (3.62) | (51.33) | (27.36) | (1.55) | (100.00) |
| 3. | RAJASTHAN SUB-REGION | | | | | | |
| | i. Six Tehsils of Alwar Distt. | 14.74 | 7.36 | 253.76 | 30.29 | 7.67 | 313.82 |
| | | (4.69) | (2.35) | (80.86) | (9.66) | (2.44) | (100.00) |
| 4. | UTTAR PRADESH | | | | | | |
| | i. Meerut Distt. | 89.34 | 31.31 | 157.53 | 208.09 | 88.79 | 575.06 |
| | ii. Ghaziabad Distt. | 82.75 | 34.06 | 498.53 | 143.65 | 125.56 | 884.55 |
| | iii. Bulandshahr Distt. | 28.21 | 3.35 | 69.81 | 291.35 | 1.78 | 394.50 |
| | Sub-total | 200.300 | 68.72 | 725.87 | 643.09 | 216.13 | 1854.11 |
| | | (10.80) | (3.71) | (39.15) | (34.68) | (11.66) | (100.00) |
| | Grand total | 1720.92 | 926.85 | 2813.81 | 1056.67 | 1010.56 | 7528.81 |
| | | (22.86) | (12.31) | (37.37) | (14.04) | (13.42) | (100.00) |

**Source:** Concerned States Electrictiry Boards and DESU

**Note:** 1. Figures in brackets are percentages to total

* DESU supplied 710 MU in bulk to liencees like NDMC and MES

\+ The unrestricted energy consumption would be Domestic: 305, Commercial: 69, Industrial 1971, Agricultural: 517 and Others: 30. Total: 1892.



**Table 9.3 Rural Electrification and Energisation of Pumpsets**

| S. No. | Area | Total No. of Inhabited villages | villages electrified | Villages proposed to be electrifed during VII Plan | Villages to be electrifed by the end of VII Plan | Pumpsets energised | Pumpsets proposed to be energised during VII Plan | Pumpsets to be energised by the end of VII Plan |
|---|---|---|---|---|---|---|---|---|
| I. | Delhi UT (31.3.85) | 214 | 214 | Nil | 214 | 15732 | 2500 | 18232 |
| | Sub-Total | (100.0) | | | (100.0) | | | |
| II. | UP Sub-Region (31.3.85) | | | | | | | |
| | 1. Meerut Distt. | 920 | 710 | 210 | 920 | 40154 | 3823 | 43977 |
| | 2. Ghaziabad Distt. | 704 | 424 | 280 | 704 | 8727 | 2180 | 10907 |
| | 3. Bulandshahr Distt. | 1365 | 651 | 714 | 1365 | 39943 | 4500 | 4443 |
| | Sub-Total | 2989 | 1785 | 1204 | 2989 | 88824 | 10503 | 99327 |
| | | | (59.7) | | (100) | | | |
| III. | Haryana Sub-Region (31.3.85) | | | | | | | |
| | 1. Sonepat Distt. | 331 | 331 | Nil | 331 | 11687 | 2000 | 13687 |
| | 2. Gurgaon Distt. | 673 | 673 | Nil | 673 | 25374 | 2000 | 27374 |
| | 3. Faridabad Distt. | 425 | 425 | Nil | 425 | 15174 | 3000 | 18174 |
| | 4. Rohtak Distt. | 438 | 438 | Nil | 438 | 10987 | 3000 | 13987 |
| | 5. Panipat Tehsil | 167 | 167 | Nil | 167 | 29295 | 3000 | 32295 |
| | 6. Rewari & Bawal Tehsils | 352 | 352 | Nil | 352 | 14838 | 2000 | 16838 |
| | Sub-Total | 2386 | 2386 | Nil | 2386 | 107355 | 15000 | 122355 |
| | | | (100.00) | | (100.00) | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| IV. Rajasthan Sub-Region (31.3.87) Alwar, Behror, Mandawar, Tijara, Kishangarh and Ramgarh Teshsils | 1063 | 960 | N.A. | 1063 | N.A. | N.A. | N.A. |
| Grand Total | 6652 | 5345 (80.35) | 1204 | 6652 (100) | 211911 | 28003 | 239914 |

*Includes uninhabited villages.
Note: Figures in brackets indicate percentages of the total number of villages in the respective Sub-region/region.
Source: State Electricity Boards and DESU



**Table 9.4 Electricity Forecast-2001**

**Energy in MU/Load in MW**

| *Area* | *1989-90* | | *1994-95* | | *1999-2000* | | *2000-2001* | |
|---|---|---|---|---|---|---|---|---|
| | *ER* | *PL* | *ER* | *PL* | *ER* | *PL* | *ER* | *PL* |
| Delhi UT | 7217 | 1373 | 11372 | 2164 | 17920 | 3409 | 28233 | 5871 |
| Haryana Sub-region | 4046 | 825 | 6401 | 1305 | 10128 | 2065 | 18024 | 3678 |
| Rajasthan Sub-region | 811 | 154 | 1347 | 256 | 2237 | 425 | 3716 | 706 |
| Uttar Pradesh Sub-region | 3428 | 675 | 5434 | 1070 | 8613 | 1696 | 13651 | 2883 |
| N.C.R. | 15502 | 3027 | 24554 | 4795 | 38898 | 7595 | 61624 | 12032 |

ER : Energy Requirement
PL : Peak Load
Sources : State Governments and Ministry of Energy.

**Table 10.1 Urban Water Supply and Sanitation**

**Water Supply, Sewerage, Drainage and Solid Waste Management**

**a) Water Supply 1986**

| *Sub-region* | *No. of Urban Centres* | *Organised W/S available* | *Per Capita consumption Lpcd* | *Population coverage % (range)* | *Supplemented by spot sources %* |
|---|---|---|---|---|---|
| Delhi UT | 6 | 1 | 240 | 94.3 | 1 |
| Haryana | 27 | 26 | 30-159 | 30.100 | 15 |
| Rajasthan | 3 | 3 | 80-106 | 100 | 18 |
| Uttar Pradesh | 58 | 37 | 17-220 | 45-90 | 12 |
| N.C.R. | 94 | 67 | 17-240 | 30-100 | — |

**b) Sewerage System-1986**

| Sub-region | Total towns 1981 | Info. available | Sys. exists | Sewerage System | | | Town with | | | | Treatment Disposal | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Comp. lete | Part | Com-bined | Water borne | Sani. lat | Septic tank | Other | Yes | No. | Dra-ins | On land | river |
| Delhi | 6 | 1 | 1 | — | 1 | — | 1 | — | — | — | 1 | — | — | — | 1 |
| Haryana | 27 | 26 | 13 | — | 13 | — | 13 | 10 | 5 | 6 | — | 13 | 6 | 6 | 1 |
| Rajasthan | 3 | 3 | 1 | — | 1 | 1 | 1 | 2 | 3 | 1 | — | 1 | — | 3 | — |
| Uttar Pradesh | 58 | 58 | 4 | — | 4 | 3 | 3 | 2 | 1 | 1 | 3 | 1 | — | 3 | 1 |
| N.C.R. | 94 | 89 | 20 | — | 20 | 11 | 16 | 14 | 9 | 8 | 4 | 16 | 4 | 9 | 9 |

**C) Storm Water Drainage-1986**

| Sub-region | No.of towns 1981 | Info. available | Drainage | | | Type | | | Disposal | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Yes | Comp. | Part | Comb. | Open | Cove-red | Drains/ sewer | On land | Irri-gate | Oth-ers |
| Delhi | 6 | 1 | 1 | 1 | — | — | 1 | 1 | — | — | 1 | — |
| Haryana | 27 | 26 | 2 | — | 2 | — | — | 2 | 2 | — | — | — |
| Rajasthan | 3 | 3 | 3 | — | 3 | 1 | 3 | 1 | 1 | 2 | — | — |
| Uttar Pradesh | 58 | 58 | 33 | 1 | 32 | 1 | 32 | — | — | 31 | — | 2 |
| N.C.R. | 94 | 89 | 52 | 2 | 50 | 11 | 49 | 4 | — | 35 | 3 | 6 |



**d) Solidwaste Management-1986**

| Sub-region/NCR | No.of towns | Info. available for | Solidwaste managed in | Type of Disposal | | | |
|---|---|---|---|---|---|---|---|
| | | | | Comp. | Sanitary refill | Land | Open |
| Delhi | 6 | 1 | 1 | 1 | 1 | — | 1 |
| Haryana | 27 | 26 | — | — | — | — | — |
| Rajasthan | 3 | 3 | 3 | — | — | — | 3 |
| Uttar Pradesh | 58 | 19 | 14 | — | — | 11 | 3 |
| N.C.R. | 94 | 49 | 31 | 2 | 1 | 19 | 11 |

**Source:** State Governments and DWS and SDU.

**Table 10.2 Rural Water Supply and Sanitation**

| Sub-region/ Tehsil | No. of villages | No. Servedby | | | | Problem Villages | | | No. of villages with sewage | Type and Cove ed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Canals | Wells | HP | PWS | Scarcity (Water) | Bad quality | No.local sources | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| **I. Delhi UT** | | | | | | | | | | |
| 1. Delhi | Not available | | | | | | | | | |
| **II. Haryana** | | | | | | | | | | |
| 1. Bahadurgarh | 92 | 90 | — | — | — | — | 5 | — | — | — |
| 2. Jhajjar | 231 | 74 | 100 | 6 | — | — | 21 | — | — | — |
| 3. Rewari | 346 | — | 346 | — | 346 | 37 | — | 309 | — | — |
| 4. Meham | 30 | 24 | — | — | 24 | — | 8 | — | — | — |
| 5. Rohtak | 103 | 45 | — | — | 45 | — | 42 | — | — | — |
| 6. Sonepat | 215 | 53 | 13 | 49 | 66 | 117 | — | — | — | — |
| 7. Panipat | 167 | 47 | 120 | — | 68 | 84 | 123 | 39 | — | — |
| Sub-total | 1184 | 333 | 581 | 55 | 549 | 238 | 199 | 348 | — | — |
| **III. Rajasthan** | | | | | | | | | | |
| 1. Ramgarh | 134 | — | 16 | 116 | 18 | 11 | 1 | 4 | — | — |
| 2. Alwar | 156 | — | 33 | 118 | 35 | 13 | 1 | 11 | — | — |
| 3. Tijara | 186 | — | 11 | 175 | 11 | 6 | — | 6 | — | — |
| 4. Mundawar | 114 | — | 16 | 100 | 14 | 6 | — | 7 | — | — |
| 5. Kishangarh | 180 | — | 20 | 155 | 25 | 11 | 2 | 18 | — | — |
| 6. Behror | 159 | — | 55 | 100 | 59 | 8 | 1 | 11 | — | — |
| Sub-Total | 929 | — | 151 | 764 | 162 | 55 | 5 | 57 | — | — |



| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| **IV. Uttar Pradesh** | | | | | | | | | | |
| 1. Meerut | 268 | — | — | 45 | — | 71 | — | — | — | — |
| 2. Mawana | 305 | — | — | 13 | — | 9 | — | — | — | — |
| 3. Baghpat | 231 | — | — | 9 | — | 29 | 4 | — | — | — |
| 4. Sardhana | 212 | — | — | 15 | — | 84 | — | — | — | — |
| 5. Ghaziabad | 167 | — | — | 107 | — | 59 | — | — | — | — |
| 6. Hapur | 232 | — | — | 128 | — | 93 | — | — | — | — |
| 7. Dadri | 155 | — | — | 25 | — | 42 | 32 | — | — | — |
| 8. Garhmukteshwar | 153 | — | — | 53 | — | 45 | — | — | — | — |
| 9. Bulandshahr | 404 | — | — | 105 | — | 359 | 3 | — | — | — |
| 10. Khurja | 370 | — | — | 100 | — | 241 | 3 | — | — | — |
| 11. Anupsagar | 420 | — | — | 74 | — | 299 | — | — | — | — |
| 12. Sikandrabad | 266 | — | — | 63 | — | 147 | — | — | — | — |
| Sub-Total | 3183 | — | — | 737 | — | 1478 | 42 | — | — | — |

**Sources** State Governments, DWS and SDU.

## SHELTER

**Table 12.1 Occupied Residential Houses-1971-91**

| *Sub-Region/Region* | *Occupied Residential Houses* | | | | | |
|---|---|---|---|---|---|---|
| | *1971* | | | *1981* | | |
| | *Urban* | *Rural* | *Total* | *Urban* | *Rural* | *Total* |
| Haryana | 1,06,157 | 4,63,113 | 5,69270 | 2,10,427 | 5,42,379 | 7,52,806 |
| Uttar Pradesh | 1,61,325 | 6,82,078 | 8,43,403 | 3,26,603 | 7,82,515 | 11,09,118 |
| Rajasthan | 18,718 | 1,05,391 | 1,24,109 | 29,494 | 1,34,082 | 1,63,576 |
| NCR (excluding Delhi UT) | 2,82,200 | 12,50,582 | 15,36,782 | 5,66,524 | 14,58,976 | 20,25,500 |
| Net ORH after deleting 10% | 2,57,580 | 11,25,524 | 13,83,104 | 5,09,872 | 13,13,078 | 18,22,950 |
| Occupancy Rate Per Unit | 7.33 | 7.309 | 7.313 | 6.53 | 7.34 | 7.116 |

Sources: Census 1971, 1981



**Table 12.2 Additional Demand for Housing Units-1988-2001**

| *Sub-regions/ Region* | | *Occupied Residential Houses* | | | *Population Assignment for 2001 (in lacs)* | *ORG requirement by 2000 @5 persons per Units (in lacs)* | *Addition H. Units between 1988-2001* |
|---|---|---|---|---|---|---|---|
| | | *1971 (Actual)* | *1981 (Actual)* | *1987 (estimated)* | | | |
| Haryana | U | 1,06,157 | 2,10,427 | 2,45,690 | 43.5 | 8.7 | 6.243 |
| | R | 4,63,113 | 5,42,379 | 5,30,945 | 34.5 | 6.9 | 1.591 |
| | T | 5,69,270 | 7,52,806 | 7,76,635 | 78.0 | 15.6 | 7.834 |
| Uttar Pradesh | U | 1,61,325 | 3,26,603 | 3,83,193 | 75.5 | 15.1 | 11.268 |
| | R | 6,82,078 | 7,82,515 | 7,58,499 | 45.5 | 9.1 | 1.515 |
| | T | 8,43,403 | 11,09,118 | 11,41,692 | 121.0 | 24.2 | 12,783 |
| Rajasthan | U | 18,718 | 29,494 | 32,364 | 5.0 | 1.0 | 0.677 |
| | R | 1,05,391 | 1,34,082 | 1,36,166 | 9.0 | 1.8 | 0.438 |
| | T | 1,24,109 | 1,63,576 | 1,68,530 | 14.0 | 2.8 | 1.115 |
| NCR (Excluding Delhi UT) | U | 2,86,200 | 5,66,524 | 6,61,247 | 124.0 | 24.8 | 18.188 |
| | R | 12,50,582 | 14,58,976 | 14,25,610 | 89.0 | 17.8 | 3.544 |
| | T | 15,36,782 | 20,25,500 | 20,86,857 | 213.0 | 42.6 | 21.732 |

*Net after allowing 10% for non-residential, vacant and non-liveable units.
Source: Census 1971, 1981 for actuals.

**Table 12.3 Additional Housing Requirements in the Priority, DMA and other Towns by -2001**

| Towns | Housing Requirement by 2001 (lakhs) | Net liveable Housing Units in 1987 (estimated) | Addition Requirements 1988-2001 |
|---|---|---|---|
| *Priority Towns* | | | |
| 1. Meerut | 3.1 | 1,17,703 | 1,92,297 |
| 2. Hapur | 0.9 | 16,988 | 73,012 |
| 3. Bulandshahr | 1.0 | 17,891 | 82,109 |
| 4. Khurja | 0.6 | 10,416 | 49,584 |
| 5. Panipat | 1.0 | 26,157 | 73,843 |
| 6. Rohtak | 1.0 | 28,926 | 71,074 |
| 7. Palwal | 0.6 | 7,545 | 52,455 |
| 8. Rewari | 0.22 | 8,222 | 13,723 |
| 9. Dharuhera | 0.15 | — | 15,000 |
| 10. Bhiwadi | 0.23 | — | 23,000 |
| 11. Alwar | 1.0 | 26,680 | 73,320 |
| Sub-Total | 9.8 | 2,60,583 | 7,19,417 |
| DMA Towns | | | |
| 1. Bahadurgarh | 0.4 | 7,017 | 32,983 |
| 2. Faridabad Complex | 2.0 | 79,001 | 1,20,999 |
| 3. Ghaziabad | 2.2 | 64,722 | 1,55,278 |
| 4. Gurgaon | 1.4 | 9,315 | 1,20,685 |
| 5. Kundli | 0.3 | — | 30,000 |
| 6. NOIDA | 1.1 | — | 1,10,000 |
| Sub-Total | 7.4 | 1,70,055 | 5,69,945 |
| Other Urban Centres NCR | 7.6 | 2,30,609 | 5,29,391 |
| Total Urban NCR excluding Delhi UT | 24.8 | 6,61,247 | 18,18,753 |



**Table 12.4 Housing Requirement in Phases-1988-2001**

| Category | 1988-90 | 1990-95 | 1995-2000 | 2000-2001 | Total |
|---|---|---|---|---|---|
| E.W.S | | | | | |
| a) Slum upgradation | 0.22 | 0.70 | 0.85 | 0.22 | 1.99 |
| b) Sites & Services | 0.70 | 2.15 | 2.70 | 0.44 | 5.99 |
| L.I.G. | 0.32 | 1.00 | 1.20 | 0.265 | 2.785 |
| M.I.G. | 0.06 | 0.20 | 0.25 | 0.07 | 0.58 |
| Total | 1.30 | 4.05 | 5.00 | 0.995 | 11.345 |

## REGIONAL LANDUSE

**Table 13.1 Landuse in the NCR-1986-87 (Sub-regionwise Distribution)**

*(Area in hectares)*

| *Category* | *Delhi* | *Haryana* | *Rajasthan* | *Uttar Pradesh* | *NCR* | *Proportion reported* |
|---|---|---|---|---|---|---|
| 1. Forest | 1434 | 34000 | 9870 | 19918 | 65222 | 2.1 |
| | (2.2) | (52.1) | (15.2) | (30.5) | (100.00) | |
| 2. Land put to non-agricultural use | 35820 | 128431 | 17398 | 114860 | 296509 | 9.9 |
| | (24.2) | (43.3) | (5.9) | (38.7) | (100.00) | |
| 3. Barren Land | 18707 | 35000 | 56425 | 31545 | 141677 | 4.7 |
| | (13.2) | (24.7) | (39.8) | (22.3) | (100.00) | |
| 4. Water Bodies | 329 | 3569 | 2407 | 2017 | 8323 | 0.28 |
| | (4.0) | (42.9) | (28.9) | (24.2) | (100.00) | |
| 5. Permanent pasture & Other grazing land | 793 | 12000 | 11262 | 2593 | 26648 | 1.2 |
| | (3.0) | (45.0) | (42.3) | (9.7) | (100.00) | |
| 6. Land under Misc tree crops and groves | 1137 | — | 94 | 3512 | 4740 | 0.2 |
| | (24.0) | — | (1.9) | (74.1) | (100.00) | |
| 7. Culturable Waste | 856 | 24000 | 7073 | 25555 | 57484 | 1.8 |
| | (1.5) | (41.8) | (12.2) | (44.5) | (100.00) | |
| 8. Cultivated Land | 88411 | 1099000 | 314419 | 890288 | 2392118 | 79.9 |
| | (3.7) | (45.9) | (13.1) | (37.3) | (100.00) | |
| Total Reporting Area | 147487 | 1336000 | 418945 | 1090288 | 2992720 | 100.0 |
| | (4.93) | (44.64) | (14.00) | (36.43) | (100.00) | |

**Note:** Figures in brackets indicate percentages to total of the NCR.
**Source:** Compiled from State Government records.



**Table 13.2 Distribution of Forest Area in NCR-1985**

(Accsares)

| *Sub-region* | *Total Reporting Area* | *Total Forest* | *Reserved Forest* | *Protected Forest* | *Unclasified Forest* | *Social Forest* |
|---|---|---|---|---|---|---|
| Delhi UT | 149788 | 1443 | NA | NA | NA | NA |
| | | (0.9) | | | | |
| Uttar Pradesh | 1075993 | 29455 | 16308 | 1995 | 1064 | 10088 |
| | | (19.4) | (29.4) | (6.3) | (1.9) | (100.0) |
| Haryana | 1334640 | 43815 | 7346 | 20850 | 15619 | NA |
| | | (28.5) | (13.2) | (65.9) | (27.8) | |
| Rajasthan | 420348 | 78761 | 30447 | 8795 | 39519 | NA |
| | | (51.3) | (54.8) | (27.8) | (70.3) | |
| NCR | 2980769 | 153474 | 55544 | 31640 | 56202 | 10088 |

**Source** State Forest Departments & Delhi Administration.
**Note:** Figures in brackets indicate percentages to total of the respective category forest.

**Table 13.3 Landuse Pattern of the NCR 1986-87** (Hectares)

| Sl. | Category | Based on Land Records | | | | | Based on Satellite Imageries | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sub-Region | | | | | Sub-Region | | | | |
| | | Delhi | Hary-ana | Raja-sthan | Utta Pradesh | NCR | Delhi | Hary-ana | Raja-sthan | Utta Pradesh | NCR |
| 1. | Forest | 1434 | 34000 | 9870 | 19918 | 65222 | 2678 | 2075 | 19203 | 11601 | 35557 |
| | | (1.0) | (2.5) | (2.4) | (1.8) | (2.1) | (1.8) | (0.15) | (4.27) | (1.0) | (1.2) |
| 2. | Land put to Non-agircultureal use | 35820 | 128431 | 17398 | 114860 | 296509 | 35820 | 128431 | 17398 | 114860 | 296509 |
| | | (24.2) | (9.6) | (4.2) | (10.5) | (9.9) | (24.2) | (9.6) | (4.2) | (10.5) | (9.9) |
| 3. | Barren Land | 18707 | 35000 | 56425 | 31545 | 141677 | 11438 | 88044 | 58539 | 38217 | 196238 |
| | | (12.7) | (2.6) | (13.5) | (2.9) | (4.7) | (7.7) | (7.4) | (13.0) | (3.5) | (6.5) |
| 4. | Water Bodies | 329 | 3569 | 2407 | 2017 | 8323 | 329 | 3569 | 2407 | 2017 | 8323 |
| | | (0.22) | (0.27) | (0.54) | (0.19) | (0.28) | (0.22) | (0.27) | (0.54) | (0.19) | (0.28) |
| 5. | Permanent pasture & Other grazing Land | 793 | 1200 | 11262 | 2593 | 26648 | 793 | 12000 | 11262 | 2593 | 26648 |
| | | (0.5) | (0.9) | (2.7) | (0.2) | (1.2) | (0.5) | (0.9) | (2.7) | (0.2) | (1.2) |
| 6. | Land under Misc tree crops & groves | 1137 | - | 91 | 3512 | 4740 | 1137 | - | 91 | 3512 | 4740 |
| | | (0.8) | | (0.02) | (0.3) | (0.2) | (0.8) | | (0.02) | (0.3) | (0.2) |
| 7. | Culturable | 856 | 24000 | 7073 | 25555 | 57484 | 856 | 24000 | 7073 | 25555 | 57484 |
| | | (0.6) | (1.8) | (1.7) | (2.4) | (1.8) | (0.6) | (1.8) | (1.7) | (2.4) | (1.8) |
| 8. | Cultivated Land | 88411 | 1099000 | 314419 | 890288 | 2392118 | 95249 | 1083182 | 333256 | 88694 | 2398631 |
| | | (59.79) | (82.3) | (73.1) | (81.7) | (79.9) | (64.2) | (80.7) | (74.1) | (81.3) | (79.3) |
| Total Reporting Area | | 147487 | 1336000 | 41945 | 1090288 | 2992720 | 148300 | 1341299 | 449300 | 108298 | 3024211 |
| | | (100.00) | (100.00) | (100.00) | (100.00) | (100.00) | (100.00) | (100.00) | (100.00) | (100.00) | (100.00) |

Note:Figures in brackets indicate percentages to total of the NCR
Source: Compiled from State Government Records and Satellite imageries.



**Table 13.4 Proposed Landuse in NCR—2001** (Hectares)

| District/ Tehsil | Landuse Category | Forest area with no tree cover | Difference in cultivated land (SG—SI) | Barren land (SG-SI) | Cultural waste | Land put to Non Agricultural | Proposed Forest Expansion |
|---|---|---|---|---|---|---|---|
| **I.** | **Delhi UT** | (—) 1244 | (—) 6838 | 7269 | 856 | 35820 | 8800 |
| **II.** | **Haryana Sub—Region** | | | | | | |
| 1. | Gurgaon | 9970 | 38358 | (—) 44294 | — | 38149 | 59200 |
| 2. | Faridabad | 4000 | (—) 6905 | (—) 7789 | — | 27703 | 28500 |
| 3. | Rohtak | 8000 | (—) 9837 | (—) 3253 | 13000 | 25167 | 19700 |
| 4. | Sonepat | 7966 | (—) 11502 | (—) 4531 | 10000 | 16811 | 13600 |
| 5. | Rewari & Bawal | 1989 | (—) 5428 | 3100 | — | 15000 | 8300 |
| 6. | Panipat | — | 10323 | 3723 | 1000 | 5601 | 4700 |
| | Sub-Total | (—) 31925 | (+) 15819 | (—) 53044 | (+) 24000 | (+) 128431 | 134000 |
| **III.** | **Rajasthan Sub-Region** | | | | | | |
| 1. | Alwar (part of NCR) | (—) 9333 | (—) 18837 | (—) 2114 | 7073 | 17398 | 89860 |
| **IV.** | **U.P. Sub-Region** | | | | | | |
| 1. | Meerut | 813 | (—) 1450 | (—) 2912 | 5182 | 46238 | 12800 |
| 2. | Ghaziabad | (—) 1050 | (—) 4730 | 1173 | 7398 | 32654 | 29100 |
| 3. | Bulandshahr | 8555 | 9524 | (—) 1033 | 12975 | 35968 | 28100 |
| | Sub-total | (+) 8317 | (+) 3344 | (—) 6672 | 2555 | 114860 | 7000 |
| NCR Total | | (—) 29665 | (+) 6512 | (—) 65561 | (+) 57484 | (+) 296509 | (+) 302660 |

SG: State Government; SI: Satellite Imagery

**Table 13.5 Land Requirement for Urban Development By 2001**

(Hectares)

| Sl. | Town/Urban Complex | 1981 | | | 2001 | | | Additional Land required by 2001 (Hectares) |
|---|---|---|---|---|---|---|---|---|
| | | Area in Hectares | Population in Lacs | Density per Hectare | Assigned Population | Density per Hectare | Total Land Required Hectares | |
| **I.** | **DMA Towns** | | | | | | | |
| 1. | Ghaziabad incl. Loni | 6840 | 3.00 | 44 | 11.00 | 125 | 8800 | 1960 |
| 2. | NOIDA | 600 | 0.75 | 125 | 5.50 | 125 | 4400 | 3800 |
| 3. | Faridabad-Ballabgarh | 17824 | 3.30 | 19 | 10.00 | 125 | 8000 | Nil |
| 4. | Gurgaon | 2413 | 1.01 | 42 | 7.00 | 125 | 5600 | 3187 |
| 5. | Bahadurgarh | 900 | 0.37 | 41 | 2.00 | 110 | 1818 | 918 |
| 6. | Kundli | 200 | 0.25 | 125 | 1.50 | 110 | 1363 | 1163 |
| | Sub-Total I. | 28777 | 8.68 | - | 37.00 | - | 29981 | 11028 |
| **II.** | **Priority Towns** | | | | | | | |
| 1. | Meerut | 8082 | 5.37 | 66 | 15.50 | 125 | 12400 | 4318 |
| 2. | Hapur | 583 | 1.03 | 177 | 4.50 | 110 | 4901 | 3508 |
| 3. | Bulandshahr | 939 | 1.03 | 109 | 5.00 | 125 | 4000 | 3061 |
| 4. | Khurja | 1036 | 0.67 | 64 | 3.00 | 110 | 2727 | 1691 |
| 5. | Panipat | 2082 | 1.37 | 66 | 5.00 | 125 | 4000 | 1918 |



| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6. | Rohtak | 2203 | 1.66 | 75 | 5.00 | 110 | 4545 | 2342 |
| 7. | Palwal | 552 | 0.47 | 85 | 3.00 | 110 | 2727 | 2175 |
| 8. | Rewari | 606 | 0.52 | 86 | 1.10 | 110 | 1000 | 394 |
| 9. | Dharuhera | - | 0.05 | - | 0.75 | 80 | 937 | 937 |
| 10. | Bhiwadi | 445 | - | - | 1.15 | 110 | 1045 | 600 |
| 11. | Alwar | 8000 | 1.47 | 18 | 5.00 | 110 | 4545 | Nil |
| | Sub-Total II. | 24528 | 14.33 | - | 49.00 | - | 42017 | 20007 |
| **III.** | **Rest of the Towns (Excluding Delhi)** | 37307 | 10.69 | - | 40.00 | - | 51563 | 14256 |
| | Grand Total | 90612 | 33.70 | - | 126.00 | - | 123561 | 45291 |

## COUNTER-MAGNET AREAS

**Table 16.1 Search Zone Delineation for Counter-magnet Study**

| *State* | *Population 1981* | | | |
|---|---|---|---|---|
| | *Class 1 (100,000 Population and above)* | | | |
| | *5 Lacs and above* | *3 to below 5 lacs* | *2 to below 3 lacs* | *1 to below 2 lacs* |
| **Uttar Pradesh** | 1. Kanpur<br>2. Agra<br>3. Allahabad | 4. Bareily<br>5. Moradabad<br>6. Aligarh | 7. Saharanpur<br>8. Dehradun<br>9. Jhansi<br>10. Shahjahanpur<br>11. Rampur<br>12. Ferozabad | 13. Mathura<br>14. Farukhabad<br>15. Haridwar<br>16. Amroha<br>17. Etawah<br>18. Sambhal |
| **Haryana** | | | 19. Ambala | 20. Yamunanagar<br>21. Hissar<br>22. Karnal<br>23. Bhiwani |
| **Rajasthan** | 24.Jaipur | 25.Ajmer<br>26.Kota | 27. Bikaner | 28. Ganganagar<br>29. Bharatpur<br>30. Sikar |
| **Punjab** | 31.Ludhiana<br>32.Jalandhar | | 33. Patiala | 34. Bhatinda |
| **Madhya Pradesh** | 35.Gwalior | | | |
| **Union Territory** | | 36.Chandigarh | | |



## NATIONAL CAPITAL REGION PLANNING BOARD

The National Capital Region Planning Board was constituted on the 28th March, 1985 under the provisions of National Capital Region Planning Board Act, 1985. The National Capital Region Planning Board, under the Chairmanship of the Union Minister of Works and Housing (now called Urban Development) has 21 members and 6 co-opted members, having its composition as under:

| | |
|---|---|
| 1. Union Minister of Urban Development | Chairman |
| 2. Chief Minister of Haryana | Member |
| 3. Chief Minister of Rajasthan | Member |
| 4. Chief Minister of Uttar Pradesh | Member |
| 5. Lt. Governor of Delhi | Member |
| 6. Chief Executive Councillor Delhi Metropolitan Council | Member |
| 7. Union Minister of Industry | Member |
| 8. Union Minister of State for Railways | Member |
| 9. Union Minister of State for Surface Transport | Member |
| 10. Member (Urban Development) Palanning Commission | Member |
| 11. Secretary, Ministry of Urban Development | Member |
| 12. Secretary, Department of Expenditure Ministry of Finance | Member |
| 13. Chief Planner, Town & Country Planning Organisation | Member |
| 14. Minister of Town & Country Planning, Government of Haryana | Member |
| 15. Minister of Urban Development Government of Rajasthan | Member |
| 16. Minister of State in charge of Urban Development, Government of Uttar Pradesh | Member |
| 17. Chief Secretary, Government of Haryana | Member |
| 18. Chief Secretary, Government of Rajasthan | Member |
| 19. Secretary, Housing & Urban Development, Government of Uttar Pradesh | Member |
| 20. Chief Secretary, Delhi Administration | Member |
| 21. Member-Secretary, National Capital Region Planning Board | Member |

**CO-OPTED MEMBERS**

1. Chief Minist of Madhya Pradesh
2. Secretary, Ministry of Industry, Government of India
3. Chairman, Railway Board, Government of India
4. Secretary, Ministry of Surface Transport, Government of India
5. Adviser (HUD), Planning Commission, Government of India
6. Vice-Chairman, Delhi Development Authority.

## COMPOSITION OF PLANNING COMMITTEE

| | | | |
|---|---|---|---|
| 1. Member Secretary NCR Planning Board | Chairman | 12. Joint Adviser Representative Planning Commission Government of India | Member |
| 2. Joint Secretary in the Ministry of Urban Development dealing with the work relating to NCR | Member | 13. Chief Engineer (Planning) Representative, Ministry of Shipping and Transport Government of India | Member |
| 3. Secretary-in-charge of NCR work in the State of Haryana | Member | 14. Director (Power) Representative, Ministry of Energy, Government of India | Member |
| 4. Secretary-in-charge of NCR work in the State of Rajasthan | Member | 15. Director (Planning) Representative, Ministry of Railways, Government of India | Member |
| 5. Secretary-in-charge of NCR work in the State of Uttar Pradesh | Member | 16. Deputy Director General (T.P.) Representative, Ministry of Communications, Government of India | Member |
| 6. Secretary-in-charge of NCR work in the State of Delhi Union Territory | Member | 17. Chairman and Managing Director Housing & Urban Development Corporation | |
| 7. Vice Chairman Delhi Development Authority | Member | 18. Director, Department of Environment, Government of India | Member |
| 8. Chief Planner Town & Country Planning Organisation | Member | 19. Chief Regional Planner NCR Planning Board | Member (Convenor) |
| 9. Director, Town Planning Department Government of Haryana | Member | | |
| 10. Chief Town Planner Government of Rajasthan | Member | | |
| 11. Chief Town Planner Government of Uttar Pradesh | Member | | |