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## An Economic Insight into the Development Scenarios and Employment Projections in NCR Delhi

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### **Abstract:**

*National Capital Region (NCR) of Delhi includes area of Delhi, Uttar Pradesh sub-region, Haryana and Rajasthan sub-region. Thus, regional development plan for the NCR require formulation of an integrated development plan which could accommodate the growth of population in the region along with employment for the majority. One of the important objectives of the spatial development plan is to look for an alternative development pattern suitable both for regional and integrated growth. With different spatial development, alternative development scenario emerges parallel with the growth of population. Different sub-region has its own population growth rate. An integrated approach requires integration of different scenarios to make it one and suitable for each and every pocket. Here an attempted has been made to project the employment in NCR of Delhi region on the basis of population growth based development scenarios in short, medium and long –term period up to the year 2032.*

**Key words:** development scenario, work participation rate, employment scenario

JEL Classification: J21, R58

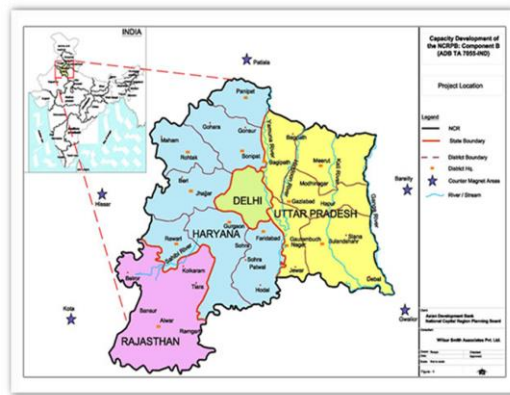
## 1.0 Introduction

Master plan for the National Capital Territory of Delhi (NCTD), prepared in late fifties and enforced as per Delhi Development Act in 1962, indicated that the problems and issues for the urban development in Delhi need to be seen beyond its territory, in the context of a broader region. Subsequently National Capital Region (NCR) Planning Board Act was enacted in the year 1985 and the Regional Plan, in the framework of this act was prepared in 1985 with perspective upto 2001. The Plan was extensively revised in the year 2001 with perspective up to 2021.

### 1.1 Background of the Study:

National Capital Region is an area of national importance and international interest. It is a region of high concentration of people and activities. It is a highly urbanized and urbanizing region. It is a high growth, large investment region. Apart from Delhi, the national capital a large number of urban centers, from a small town to a metropolitan city, are located within it, each experiencing the fruits and pangs of growth and change. The map of NCR is presented in **Map 1** in the next page. Intense movements of people, goods and services, by a variety of modes, from a humble bicycle to the glittering metro, take place within, to, from and through it. Spatial development is a critical element enabling growth and contributing to regional prosperity and social development which is related with regional transport system. Further, regional transport system is related with travel demand. With unabated growth in travel demand, inadequate capacity, internal competition and conflicts, and poor management, the regional transport system is transforming from a growth facilitator to one of growth inhibitor. There is an urgency to take early, concerted and effective measures to plan, develop, operate and manage an integrated spatial development and transport system to service

the region and promote its productivity and competitiveness in the national and international sphere. A number of planning studies, including transport system planning, have been carried out, regional development policies outlined and projects funded for the development of the region. The Regional Plan 2021 of NCR has been proposed. The detailing of the development policies and plans has been initiated. Out of these, different development scenario emerges for making the economic planning for NCR a success. The present study is an endeavor in that direction.



**Map 1: National Capital Region (NCR) of Delhi.**

*Source: NCR Planning Board (NCRPB), Delhi.*

## 1.2 Objective:

The objective of the study is to construct different development scenario models appropriate to conditions and planning needs of NCR on the basis of population projection, so as to develop alternative employment projections for short term, medium term and long term up to the year 2032

## 2.0 Literature Review

### 2.1 Study of Regional Plans

*2.1.1 Regional Plan 2001 (RP 2001):* The objective of RP 2001 is to achieve a balanced and harmonious development of the

region, leading to dispersal of economic activities and deflecting future in - migrants, thereby leading to a manageable Delhi.

NCR comprising an area of 33,578 Square kilometer; was divided into three policy zones as per RP 2001 such as:

I. *NCT Delhi*: comprising an area of 1,483 Sq. Km. to have restricted growth and decentralization of activities concentrated therein, to the entire NCR

II. *Delhi Metropolitan Area (DMA) Towns*: comprising an area of 1,696 Sq. Km. area includes contiguous towns of Ghazibad- Loni and NOIDA in Uttar Pradesh, Faridabad-Ballabhgarh complex, Gurgaon, Bahadurgarh, Kundli and the extension of Delhi ridge in Haryana for the controlled/development

III. *Rest of NCR*: comprising an area of 27,063 Sq. Km. for induced development specially of the priority towns/complexes namely Meerut, Hapur, Bulandshahr - Khurja complex, Palwal, Panipat, Rohtak, Dharuhera - Rewari - Bhiwadi complex and Alwar

**Table 1.1 : Policy Zones of NCR and Role Assigned 2001**

<i>Total Area of NCR = 33,578 Sq Km, Population in 2001 =371 lakh (1 lakh = 0.1 million)</i>		
<i>Policy Zones</i>	<i>Constituent Area</i>	<i>Role Assigned</i>
Zone I	NCT - Delhi	Strict control on creation of employment opportunities in this zone
Zone II	DMA Towns	Moderate control on creation of employment opportunities
Zone III	Area outside DMA but within NCR	Encouragement with incentives for creation of employment opportunities

*Source: NCR Planning Board Delhi*

**2.1.2 NCR Regional Plan - 2021:** The objectives of NCR Regional Plan 2021 are to

- ✓ Provide suitable economic base for future growth by identification and development of regional settlements capable of absorbing the economic development impulse of NCT Delhi

- ✓ Provide efficient and economic rail and road based transportation networks (including mass transport systems) well integrated with the land use patterns, to support balanced regional development in identified settlements.
- ✓ Minimize the adverse environmental impact that may occur in the process of development of the National Capital Region
- ✓ Develop selected urban settlements with urban infrastructural facilities such as transport, power, communication, drinking water, sewerage, drainage etc. comparable with those of NCT- Delhi
- ✓ Provide a rational land use pattern in order to protect and preserve good agricultural land and utilize unproductive land for urban uses
- ✓ Promote sustainable development in the region to improve quality of life
- ✓ Improve the efficiency of existing methods of resource mobilization and adopt innovative methods of resource mobilization and facilitate, attract and guide private investment in desired direction.

Regional plan - 2021 has proposed four policy zones:

I. *NCT Delhi (1,483 Sq. Km.):* The basic policy for NCT-Delhi is to achieve environmentally sustainable development/re-development, taking into account the limitation of developable land and water. No new major economic activities, which may result in a large scale job creation, should be located in this zone. Only activities necessary to sustain the local population of NCT Delhi should be permitted.

II. *Central National Capital Region (CNCR):* The present notified controlled areas of the towns of Ghazibad- Loni, Noida, Gurgaon-Manesar, Faridabad-Ballabhgarh, Bahadurgarh and Sonapat - Kundli are designated as Central National Capital Region (CNCR) for Regional Plan - 2021. Total area of CNCR

would be about 2,000 Sq. Km. The opportunities presented by CNCR need to be maximized to enable it to compete effectively with NCT-Delhi offering jobs, economic activities, comprehensive transport system, housing , social infrastructure and quality of environment.

III. *Highway Corridor Zone:* A Highway Corridor Zone is proposed with a minimum width of 500 meters inclusive of green buffer on either side of the right of way (ROW), along the National Highways (NHs) 1, 2, 8, 10, 24, 58 and 91 converging at Delhi, to enable the planned and regulated development along these highways outside the existing controlled / development / regulated areas. Area of the Highway Corridor Zone is about 300 Sq. Km. Utmost care will have to be taken while planning this zone to ensure that the activities being permitted in this zone are segregated from Highway traffic through proper green belts, service roads and controlled access to the highways.

IV. *Rest of NCR:* The basic policy of Regional Plan - 2001 for Rest of NCR for accelerated development in both urban and rural areas to continue. Infrastructure has to be substantially upgraded at local and regional level in order to induce the growth in these areas, specifically in the identified settlements i.e. Metro Centers and Regional Centers.

**Table 2: Policy Zones of NCR and Role Assigned 2021**

<i>Assigned Population in 2021 = 641 lakh</i>		
<i>Policy Zones</i>	<i>Constituent Area</i>	<i>Role Assigned</i>
Zone I	NCT - Delhi	Environmentally sustainable development/ redevelopment
Zone II	CNCR	All new major economic and non-polluting activities necessary to be located in NCT Delhi should be located in the urbanisable areas in this zone.
Zone III	Highway Corridor Zone	Only specified activities to be permitted with planned development
Zone IV	Rest of NCR	Accelerated development of both urban and rural areas

### 3.0 Methodology

#### Population Estimates for NCR and its Sub - Regions

*3.1 Population Growth in NCR:* The NCR comprises the entire NCT of Delhi, eight districts of Haryana, one district of Rajasthan and five districts of Uttar Pradesh with a population of over 371 lakhs in 2001. The Sub-regions of NCT-Delhi, Haryana, Rajasthan and Uttar Pradesh accommodate 37.33%, 23.42%, 8.07% and 31.19% of NCR's population respectively. Population of the NCR has increased to 371.00 lakhs in 2001 from 273.62 lakhs in 1991, 198.83 lakhs in 1981, 140.60 lakhs in 1971 and 105.80 in 1961, thus registering a growth rate of 37.88% during 1981-1991, 40.83% during 1971-81 and 32.89% during 1961-71. The NCR is a fast developing region in terms of its population growth which is 35.9% in the last decade (1991-2001) compared to all India average population growth rate which is 21.3% in the last decade.

**Table 3: Population in NCR -1961-2001**

NATIONAL CAPITAL REGION				ALL INDIA
Year	Population in lakhs	Decadal increase in population (in lakhs)	Population growth rate (decadal) (In %)	Population growth rate (decadal) (in %)
1961	105.80	-	-	-
1971	140.60	34.80	32.89%	21.64%
1981	198.83	48.23	40.83%	24.8%
1991	273.62	74.82	37.88%	24.66%
2001	371.00	97.40	35.90%	21.34%

#### *3.2 Estimate of NCR Population in Base Year (2007)*

*Base Year Population Projection for NCR:* NCR population in 2001 was 371 lakh. Its decadal growth rate was 35.90% in the decade 1991-2001. The population of NCR and the sub regions have been estimated for the year 2007 based upon the trend of 1991-2001.

*Delhi Sub Region:* Delhi has experienced a very high growth for the period of 1991-2001. Population of Delhi had increased from 9,420,644 in 1991 to 13,850,507 in 2001 and in 2011 the provisional population of Delhi was 16,753,235. The decadal growth rate of Delhi for 1991-2001 was 47%. National Commission on Population and Census of India has done population projections for India and States. The projected population of Delhi for 2007 mentioned in this document has been adopted for the purpose of this study. The population projected by the Census, for the year 2007, is 16,352,782. The growth rate, thus calculated between 2001 and 2007 population, has been applied to the all the 15 planning zones falling under NCT Delhi.

*Other Sub Regions:* There are 74 zones falling in the other 3 sub regions. The population of these sub regions, particularly those falling in Haryana, have shown a significant growth during 1991-2001. In some areas the growth is much higher than what has been experienced in NCTD. These include Sohna, Panipat, Manesar, Noida, etc.

The population of all the zones has been estimated based upon growth rate observed between 1991 and 2001 for these particular zones. The total population of NCR has been estimated at 444,49,002, for the year 2007, which gives an average annual growth rate of 3.06%.

### *3.3 Base Year Employment Projection for NCR*

On the basis of the above-mentioned population the employment for whole of NCR and the internal zones has been estimated for the year 2007. The employment differs from the worker population as it is counted at the place of work, whereas the worker population is counted at the place of residence. For NCTD the employment by zones has been estimated, whereas for rest of the zones the worker population has been considered as employment.



*Delhi Sub Region:* The employment at the places of work has been estimated for zones falling in NCT Delhi. The total employment of Delhi for the Year 2001 was 45.45 Lakhs as mentioned in the Economic Survey of Delhi, 2007-2008. This employment has been projected for the year 2007 adopting the same work force participation ratio as observed in 2001. The total employment for NCT Delhi in 2007 thus, works out to be 53, 66,400.

*Other Sub Regions:* In case of other zones falling in the other 3 sub regions, the Work Force Participation Ratio (WFPR) has been calculated based on the WFPR for the zones in 2001. The same rate has been applied to 2007 zonal population in order to work out the zonal employment for the year 2007.

**Table 4: Estimated Population and Employment Distribution in the Base Year (2007)**

<i>ESTIMATED POPULATION &amp; EMPLOYMENT (2007)</i>			
<i>Sl. No.</i>	<i>Zones</i>	<i>Population</i>	<i>Employment</i>
1	Old City (A)	684363	433145
2	City Extension (Karol Bagh) (B)	749652	302728
3	Civil Lines (C)	811672	654637
4	New Delhi (D)	702462	645488
5	Trans Yamuna (E)	3354989	771379
6	South Delhi - I (F)	2081799	704347
7	West Delhi – I (G)	1997224	756847
8	North West Delhi – I (H)	1515339	545304
9	South Delhi – II (J)	916509	88813
10	K-I WestDelhi K- II Dwarka (K)	745117	264827
11	West Delhi – III (L)	262029	54069
12	North West Delhi – II (M)	468062	75517
13	North West Delhi – III (N)	1571216	18040
14	River Yamuna/River Front (O)	236382	2811
15	P-I Narela & P-II North Delhi (P)	255968	48447
17	Southern part of Faridabad (between Palwal & Hodal)	492558	181036
18	Northern Part of Faridabad	211630	99437
19	Eastern Part of Gurgaon	129192	50251

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<b>ESTIMATED POPULATION &amp; EMPLOYMENT (2007)</b>			
<b>Sl. No.</b>	<b>Zones</b>	<b>Population</b>	<b>Employment</b>
20	Western Part of Gurgaon	548540	211819
21	Rohtak (SW side of Rohtak)	187509	88682
22	Rohtak (EW & NW side of Rohtak)	504351	215527
23	Rewari ( Rest of the District	706819	311242
24	Eastern Part of Jhajjar (between NH 10 and Jhajjar)	258634	135333
25	Remaining part of Jhajjar	517497	180934
26	Mewat (Between Sohna & Nuh)	269232	107668
27	Rest of the Mewat	1156059	442936
28	East of Panipat	334274	137678
29	West of Panipat	515029	211252
30	North East of Sonipat	185415	84448
31	North West of Sonipat	1163645	496451
32	North side (Between State Boundary & NH 8)	425342	230338
33	Rest of Alwar District	2711193	1372327
34	Meerut (Western Side)	460648	152013
35	Meerut (Southern Side)	1281023	471709
36	Meerut (South East Side)	189340	66080
37	North side of Ghaziabad	474125	137925
38	Eastern side Ghaziabad	528231	148970
39	Western Side of Ghaziabad	830263	253666
40	Gautam Budh Nagar (Noida & NH - 24, G. Noida till Rabpura)	465172	99985
41	Remaining Part of Gautam Budh Nagar District	423993	120062
42	Southern Part of Bulandshahr	552852	240641
43	Northern Part of Bulandshahr	1825327	694401
44	<i>Baghpat</i>	1233294	415762
45	Panipat	329939	121450
46	Rohtak	354756	104695
47	Palwal	138595	38253
48	Rewari	110526	31617
49	Sonipat	294337	87506
50	Bahadurgarh	204220	65128
51	Faridabad	1456625	453580
52	Gurgaon	254874	83293
53	Alwar	306781	87692
54	Meerut	1226384	316564

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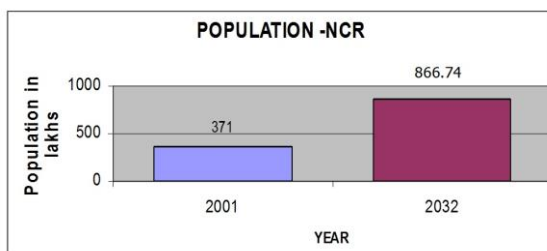
<b>ESTIMATED POPULATION &amp; EMPLOYMENT (2007)</b>			
<b>Sl. No.</b>	<b>Zones</b>	<b>Population</b>	<b>Employment</b>
55	Ghaziabad	1419531	391133
56	Hapur	264852	67167
57	Loni	247930	59250
58	Modinagar	120774	32017
59	NOIDA	473679	165356
60	Bulandshahr	214685	56067
61	Mawana	82410	21826
62	Barut	98733	24967
63	Behta Hajippur	122802	33015
64	Muradnagar	100876	25531
65	Pilkhuwa	79530	21221
66	Dadri	80218	21004
67	Khurja	111539	31875
68	Sikandrabad	75800	24613
69	Jahangirabad	61620	19415
70	Samalkha	39959	12273
71	Gohana	61737	17543
72	Sohna	37724	11808
73	Hodal	48751	17079
74	Jhajjar	47898	16385
75	Bhiwadi	54612	25629
76	Behror	28060	9928
77	Sardhana	51827	12265
78	Khekada	43776	12682
79	Baghpat	45638	11678
80	Guloathi	49344	13294
81	Siana	45750	13702
82	Kundli	12155	4213
83	Manesar	28109	11027
84	Daruhera	26353	8660
85	Ballabgarh	208146	86235
86	Greater Noida	384308	134508
87	Shahjahanpur	10131	4491
88	Neemrana	4928	1576
89	Khairthal	39288	13662
90	Bawal	14526	5746
<b>TOTAL</b>		<b>444,49,002</b>	<b>155,53,589</b>

### 3.4 Population Estimates for NCR - 2032

NCR population in 2001 was 371 lakh and population projection for 2021 carried out by the NCRPB is 641.38 lakhs. This average annual growth rate between 2001 and 2021 is extended up to 2032. In 2031 and 2032 NCR population has been estimated as 843.34 lakh and 866.74 lakh respectively with average annual growth rate of 2.78%.

*Comparative Analysis of Population at Global Level:* Population of NCR is increasing at a fast rate due to presence of major economic activities i.e. industries, wholesale trade and commerce, which results in large scale employment and also presence of opportunities like a multimodal transport system, housing, social infrastructure and quality of environment compared to other areas. In NCR goods and passenger movement is increasing at a fast rate, resulting in its accelerated development.

Population of NCR is estimated to increase from 371.00 lakh during 2001 to 866.74 lakh in 2032. It is presented in Figure 1.



**Figure 1: Comparative Analysis of NCR Population**

Estimated NCR population in 2032 i.e. 866.74 lakh is higher than the present day population of Germany, France, UK, Australia. The global comparison is presented Figure 2.

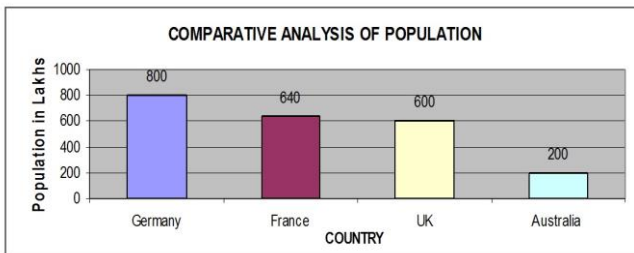


Figure 2: Comparative Analysis of Population at Global Level

3.4.1 *Population Estimation for NCR Sub-Regions 2032*: The population estimates by NCR Sub-Regions is presented in Table 5.

Table 5: Population Estimation for NCR Sub-Region 2032 (In lakh)

Year	Total Population	NCTD Population	Haryana SR population	Rajasthan SR Population	Uttar Pradesh SR Population
1961	111.02	26.59	28.93	11.00	44.50
1971	147.08	40.66	37.98	14.04	54.40
1981	198.83	62.2	49.38	17.55	69.68
1991	273.62	94.2	66.43	22.96	90.01
2001	371	138.50	86.87	29.92	115.70
2007	444.49	163.53	108.50	35.80	136.66
2011	486.19	176.03	118.84	38.33	152.99
2021	641.38	225.00	163.50	49.38	203.50
2031	843.34*	286.40	224.02	63.35	269.57
2032	866.74*	293.38	231.17	64.94	277.24

\*Percentage proportion as estimated in Regional Plan- 2021, is extended to 2031 & 2032

3.5 *Population Distribution in NCR Policy Zones*: The estimated population size of NCR by sub-regions has further been distributed amongst the policy zones keeping their proportionate share, with minor moderation, as in 2021, as per RP 2021.

NCTD, combined with CNCR towns, would emerge as a large contiguous urban mass, with population size of 469.11 lakhs (46.9 millions) size, radiating its impact along transport corridors.

The population distribution by policy zones estimated is presented in Table 6.

**Table 6: Population distribution in NCR Policy Zones 2032**

Population distribution in NCR Policy Zones 2032									
Year	Total population (in lakh)	NCTD population (in lakh)	NCTD (%)	CNCR population (in lakh)	CNCR (%)	NCTD & CNCR combined population (in lakh)	NCTD & CNCR combined (%)	Rest of NCR population (in lakh)	Rest of NCR (%)
2001	371.0	138.51	37.34	33.22	8.95	171.72	46.29	199.25	53.71
2007	444.49	163.53	36.79	47.00	10.57	210.53	47.36	233.96	52.64
2011	486.19	176.03	36.21	52.24	10.74	228.27	46.95	257.92	53.05
2021	641.38	225.00	35.08	98.76	15.40	323.76	50.48	317.62	49.52
2031	843.34	286.40	33.96	166.97	19.80	453.38	53.76	389.96	46.24
2032	866.74	293.38	33.85	175.73	20.27	469.11	54.12	397.63	45.88

## 4.0 Analysis and Conclusion

### Development Scenarios

#### 4.1 Development Scenario: An Introduction

Of the many facets of integration, the important one is land use and transport integration. NCR is a region of high growth and high concentration of people and activities. Land use is a cause and reflection of distribution of people (residential use) and activities (commercial, industrial, P&SP and other uses). Alternate Land Use Development Scenarios have been conceptualized based on Alternate Policies and Patterns of Development and are quantified in terms of spatial distribution of population, workers / employment by traffic zones.

The Conceptual Development Scenarios are briefly presented.

## 4.2 Population Estimates

### 4.2.1: D- 1: Growth Trend Based Development

This scenario assumes the pattern of development of population will be in line with past trends i.e. growth rate as in the decade 1991-2001. It does not assume any policy interventions. This scenario

will present the high growth rate with higher total population in the NCR. D-1 scenario is presented in Figure 3.

Tables 7 and 8 present the estimated population by policy zones and sub-regions in D-1 scenario. The projections for the cardinal years were estimated using individual growth rates between 2007 and 2032.

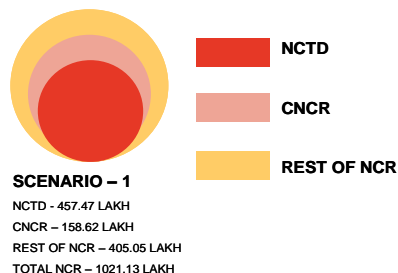


Figure 3: Population Estimate in Growth Trend Based Development Scenario

Table 7: Population Distribution in Policy Zones in D-1 Scenario

Policy Zones	Population Distribution (In Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	138.51	163.53	200.88	246.77	303.15	457.47
CNCR	33.22	47.00	58.88	74.35	94.72	158.62
Rest of NCR	199.25	233.96	254.86	280.60	312.70	405.05
Total NCR	370.97	444.49	514.63	601.73	710.56	1021.13

Table 8: Population Distribution in Sub – Regions in D-1 Scenario

Sub-Region	Population Distribution (In Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	138.51	163.53	200.88	246.77	303.15	457.47
Haryana	86.87	108.50	125.10	145.92	172.17	247.93
U.P.	115.67	136.66	147.43	161.49	180.26	241.55
Rajasthan	29.93	35.80	41.21	47.54	54.98	74.19
Total NCR	370.97	444.49	514.63	601.73	710.56	1021.13

#### 4.2.2 D- 2: NCR – RP 2021 Policy Based Development

In this scenario, population estimates worked out by NCR Planning Board for NCR and other sub-regions for the year 2011 and 2021 have been extended to 2032 based on the same growth rate for total NCR

estimates and maintaining the same proportion in the sub-region. This scenario recognizes that the policies and programmes of NCR-RP 2021 would be effectively realized. The spatial distribution, in the horizon year, is extended in accordance with the pattern proposed in RP-2021.

The population estimates, by 2021, by Sub Regions, metro centers and regional centers, as given in RP-2021-NCR have been taken as base. For other urban zones, the growth rates in between 1991-2001 have been adopted to estimate population size by 2021. For the rest of rural zones, the growth rate of zones (excluding urban zones) in between 1991-2001 has been adopted for estimating population size by 2021. The population size, by traffic zones, has been balanced against the population size of sub-regions as given in RP-2021. The population, by 2032, by sub regions, has been estimated based on the proposed growth rate between 2001 and 2021. Population distribution has been estimated based on the derived growth rate between 2001 and 2021 and balanced against sub-region totals. The population distribution by policy zones has been estimated by summing the population size included in the Policy Zones. D-2 scenario is presented in Figure 4. Tables 9 and 10 present the estimated population by policy zones and sub-regions in D-2 scenario.

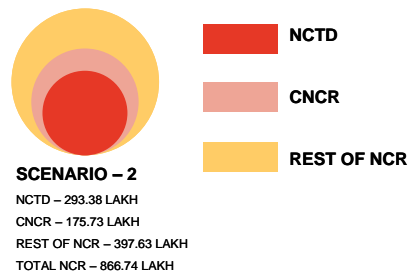


Figure 4: Population Estimate in NCR – RP 2021 Policy Based Development Scenario



**Table 9: Population Distribution in Policy Zones in D-2 Scenario**

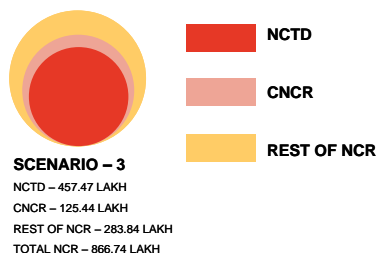
Policy Zones	Population Distribution (In Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	138.51	163.53	183.81	206.60	232.22	293.38
CNCR	33.22	47.00	59.25	75.72	98.34	175.73
Rest of NCR	199.25	233.96	255.00	280.04	310.51	397.63
Total NCR	370.97	444.49	498.06	562.36	641.07	866.74

**Table10: Population Distribution in Sub – Regions in D-2 Scenario**

Sub-Region	Population Distribution (In Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	138.51	163.53	183.81	206.60	232.22	293.38
Haryana	86.87	108.50	121.32	137.75	159.47	231.17
U.P.	115.67	136.66	154.15	175.51	201.93	277.24
Rajasthan	29.93	35.80	38.78	42.51	47.45	64.94
Total NCR	370.97	444.49	498.06	562.36	641.07	866.74

### 4.2.3 D- 3: Dominant Delhi

In this scenario, it is assumed that NCTD will continue to experience unabated increase in population size. The high decadal growth rate of 47.02%, during 1991-2001, is assumed to continue unabated during the coming decades. In this scenario, the population for different policy zones is estimated as: NCTD 457.47 lakh, CNCR 125.44 lakh and rest of NCR 283.84 lakh.



**Figure 5: Population Estimate in Dominant Delhi Scenario**

The overall population size of NCR as estimated in D-2 is held constant in all the subsequent Development Scenarios. After estimating the population size of NCTD policy zone, the balance population is distributed amongst the other policy zones in proportion to their population size in D-2 (NCRPB scenario). The rate of change of growth rate of policy zones

between D-2 and D-3, has been applied to the growth rate in the policy zone and the estimated population size balanced against the policy zone estimate.

The population distribution by sub-regions has been calculated by sum of the population size of traffic zones, in the sub-region. Tables 11 and 12 present the distribution of population by population by policy zones and sub regions in D-3 scenario. Further it is presented in figure 5.

**Table 11: Population Distribution in Policy Zones in D-3 Scenario**

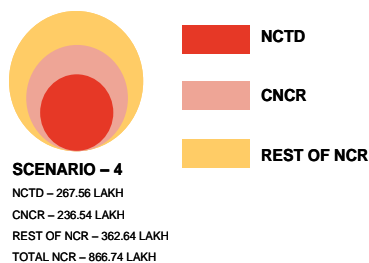
Policy Zones	Population Distribution (In Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	138.51	163.53	200.88	246.77	303.15	457.47
CNCR	33.22	47.00	55.38	66.17	80.33	125.44
Rest of NCR	199.25	233.96	238.38	244.71	253.65	283.84
Total NCR	370.97	444.49	494.64	557.65	637.13	866.74

**Table 12: Population distribution in Sub – Regions in D-3 Scenario**

Sub-Region	Population Distribution (In Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	138.51	163.53	200.88	246.77	303.15	457.47
Haryana	86.87	108.50	113.41	120.37	130.27	165.02
U.P.	115.67	136.66	144.10	153.37	164.95	197.90
Rajasthan	29.93	35.80	36.25	37.14	38.76	46.36
Total NCR	370.97	444.49	494.64	557.65	637.13	866.74

#### 4.2.4 D – 4: STRONG CNCR

RP-2021 has identified the Central NCR (CNCR) as a policy zone for development. It includes high growth areas comprising Ghaziabad-Loni, NOIDA – Greater NOIDA, Faridabad - Ballabgarh, Gurgaon - Manesar Bahadurgarh and Kundli-Sonipat. CNCR is a major concentration of high growth urban centres.



*Figure 6 – Population Estimate in Strong CNCR Scenario*

The RP-2021 has also recognized the high growth potential of CNCR and has accorded importance and priority of development of the policy zone. If opportunities in CNCR are maximized, it can compete effectively with NCTD offering jobs, economic activities, comprehensive transport system, housing, social infrastructure and quality of environment. In this scenario, it is assumed that CNCR will grow at a higher rate than that experienced in the decade 1991-2001. A 10 percentage point increase over the decadal (1991-2001) growth rate in CNCR has been adopted and would contain 236.54 lakh population in the year 2032. The balance population has been distributed amongst other sub-regions. In such a situation NCTD will have a population of 267.56 lakh and Rest of NCR 362.64 lakh respectively in the year 2032.

The rate of change in GR of the policy zones, between D-2 distribution and the present distribution has been estimated and applied to the observed growth rate of each traffic zone within the policy zones and their population size estimated and balanced against the total of policy zone estimate. Tables 13 and 14 present the distribution of population by population by policy zones and sub regions in D-3 scenario. Further it is presented in figure 6.

**Table 13: Population Distribution in Policy Zones in D-4 Scenario**

<i>Policy Zones</i>	<i>Population Distribution (In Lakh)</i>					
	<i>2001</i>	<i>2007</i>	<i>2012</i>	<i>2017</i>	<i>2022</i>	<i>2032</i>
NCTD	138.51	163.53	180.45	199.13	219.73	267.56
CNCR	33.22	47.00	64.86	89.55	123.71	236.54
Rest of NCR	199.25	233.96	250.35	269.91	293.81	362.64
Total NCR	370.97	444.49	495.66	558.58	637.26	866.74

**Table 14: Population Distribution in Sub – Regions in D-4 Scenario**

<i>Sub-Region</i>	<i>Population Distribution (In Lakh)</i>					
	<i>2001</i>	<i>2007</i>	<i>2012</i>	<i>2017</i>	<i>2022</i>	<i>2032</i>
NCTD	138.51	163.53	180.45	199.13	219.73	267.56
Haryana	86.87	108.50	123.26	142.78	168.86	251.61
U.P.	115.67	136.66	153.87	175.71	203.77	288.34

Rajasthan	29.93	35.80	38.07	40.97	44.90	59.23
Total NCR	370.97	444.49	495.66	558.58	637.26	866.74

#### 4.2.5 D – 5: STRONG ‘REST OF NCR’

‘Rest of NCR’ zone (as per RP 2021) is a large area comprising a mix of urban and rural areas. Some of the urban centres in this zone like Panipat, Meerut, Hapur, Bulandshahr, Rewari-Bhiwadi

and Rohtak are important and fast growing towns. This policy zone is also experiencing growth impulses. This scenario envisages financial and urban development policies highly restricted in NCTD and CNCR; and location of new projects are in Rest of NCR i. e. accelerated development of both infrastructure and economic activities in urban and rural areas of the ‘Rest of NCR’ are substantially upgraded at local and regional level in order to induce the growth in identified settlements in the ‘Rest of NCR’.

In this scenario, it is assumed that this zone in future will experience a higher growth rate than experienced in the past decades. A 10 percentage point increase over the decadal growth (1991-2001) growth rate has been adopted. In this scenario the population estimates for year 2032 shows NCTD at 211.21 lakh; CNCR at 126.51 lakh and Rest of NCR at 529.03 lakh. Tables 15 and 16 present the distribution of population by population by policy zones and sub regions in D-5 scenario. Further it is presented in figure 7 above.

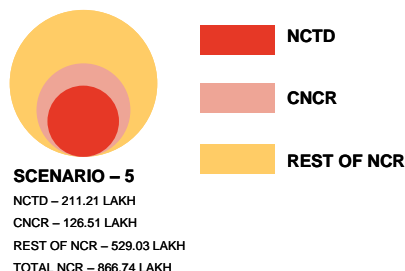


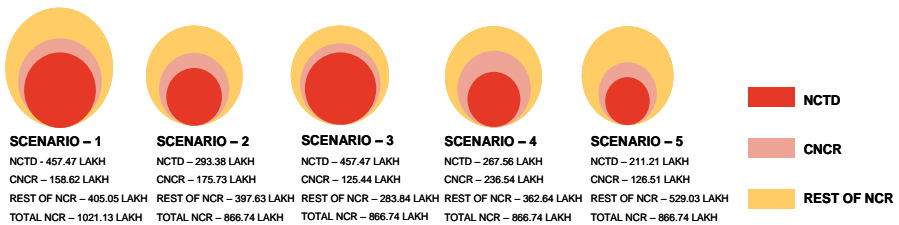
Figure 7 – Population Estimate in Strong Rest of NCR Scenario

**Table 15: Population Distribution in Policy Zones in D-5 Scenario**

Policy Zones	Population Distribution (In Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	138.51	163.53	172.11	181.15	190.66	211.21
CNCR	33.22	47.00	55.48	66.39	80.74	126.51
Rest of NCR	199.25	233.96	275.10	323.67	381.05	529.03
Total NCR	370.97	444.49	502.69	571.22	652.46	866.74

**Table 16: Population Distribution in Sub-Regions in D-5 Scenario**

Sub-Region	Population Distribution (In Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	138.51	163.53	172.11	181.15	190.66	211.21
Haryana	86.87	108.50	126.61	148.66	175.86	253.43
U.P.	115.67	136.66	161.98	192.17	228.20	322.65
Rajasthan	29.93	35.80	41.98	49.23	57.74	79.46
Total NCR	370.97	444.49	502.69	571.22	652.46	866.74

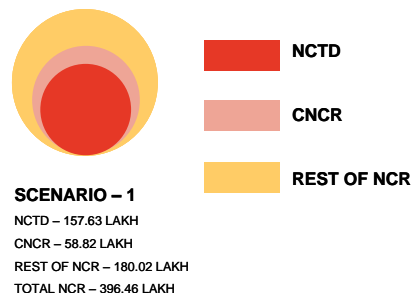


*Figure 8 - D - Comparative Patterns of Population Estimates*

### 4.3 Employment Estimates

#### 4.3.1 D - 1: Growth Trend Based Development

This scenario assumes the pattern of growth of Work Participation Rate (WPR) in the sub-regions will be in line with past trends i.e. growth rate as



in the decades 1981-1991-2001.

1991-2001 trend was used to

find the growth rate of WPR.

Multiplying these WPRs with the projected population, employment size was estimated. This scenario does not assume any policy interventions. This scenario will present higher total employment in the NCR.

Tables 17 and 18 present the estimated employment by policy zones and sub-regions. It is presented in Figure 9.

*Figure 9: Employment Estimate in Growth Trend Based development Scenario*

**Table 17: Employment Distribution in Policy Zones in D-1 Scenario**

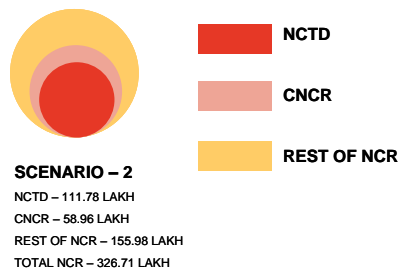
Policy Zones	Employment Distribution (In Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	45.45	53.66	74.46	95.25	116.04	157.63
CNCR	10.10	14.20	18.52	24.36	32.35	58.82
Rest of NCR	75.27	88.70	99.85	113.57	130.68	180.02
Total NCR	130.82	156.56	192.82	233.19	279.07	396.47

**Table 18: Employment distribution in Sub – Regions in D-1 Scenario**

Sub-Region	Employment Distribution (In Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	45.45	53.66	74.46	95.25	116.04	157.63
Haryana	34.41	42.37	49.74	59.36	71.98	110.94
U.P.	36.37	43.07	48.57	55.48	64.36	91.94
Rajasthan	14.59	17.46	20.06	23.10	26.68	35.96
Total NCR	130.82	156.56	192.82	233.19	279.07	396.47

#### 4.3.2 D-2: NCR RP 2021 Policy Based Development

In this scenario, WPR estimates worked out by NCR Planning Board for metro centers/regional centers for the year 2021 as well as that mentioned in the Delhi Master Plan for NCTD have been adopted for 2032. This



*Figure 10: Employment Estimate in NCR – RP 2021 Policy Based Development Scenario*

scenario recognizes that the policies and programme of NCR-RP 2021 would be effectively realized. The spatial distribution, in the HY, is extended in accordance with the pattern proposed in RP-2021.

The WPR estimates, by 2021, by metro centers and regional centers, as given in RP-2021-NCR have been taken as base. For other urban zones, average WPR of the metro center/regional centers of that particular sub-region have been adopted to estimate employment size by 2021. For the rest of rural zones, average sub-region wise WPR of 2001 and 2021 of D1 scenario have been adopted for estimating employment size by 2021. The employment size by traffic zones have been balanced against the employment size of sub-regions as calculated earlier. The employment by 2032 by sub regions has been estimated based on the same WPR as in 2021. The TAZ wise employment estimates were summed to get the sub-region totals and NCR totals. The employment distribution by policy zones has been estimated by summing the employment size of traffic zones included in the Policy Zones. Tables 19 & 20 present the estimated employment by policy zones and sub-regions. Figure 10 present this scenario.

**Table 19: Employment Distribution in Policy Zones in D-2 Scenario**

<i>Policy Zones</i>	<i>Employment Distribution (In Lakh)</i>					
	<i>2001</i>	<i>2007</i>	<i>2012</i>	<i>2017</i>	<i>2022</i>	<i>2032</i>
NCTD	45.45	53.66	65.29	76.91	88.53	111.78
CNCR	10.10	14.20	18.22	23.74	31.48	58.96
Rest of NCR	75.27	88.70	97.61	108.17	120.87	155.98
Total NCR	130.82	156.56	181.12	208.82	240.88	326.72

**Table 20: Employment Distribution in Sub – Regions in D-2 Scenario**

<i>Sub-Region</i>	<i>Employment Distribution (In Lakh)</i>					
	<i>2001</i>	<i>2007</i>	<i>2012</i>	<i>2017</i>	<i>2022</i>	<i>2032</i>
NCTD	45.45	53.66	65.29	76.91	88.53	111.78
Haryana	34.41	42.37	47.88	54.84	63.90	93.19
U.P.	36.37	43.07	49.25	56.87	66.40	93.96
Rajasthan	14.59	17.46	18.71	20.19	22.04	27.79
Total NCR	130.82	156.56	181.12	208.82	240.88	326.72

4.3.3 D- 3: Dominant Delhi

In this scenario, it is assumed that NCTD will continue to experience unabated increase in employment size. The WPR of 38.1% for NCTD as mentioned in the RP-2021 is assumed to be 5 percentage point higher in the D-3 scenario.

In this scenario, the employment

size for different policy zones in the HY is estimated as: NCTD 197.17 lakh, CNCR 35.53 lakh and rest of NCR 94.01 lakh.

The overall employment size of NCR as estimated in D-2 is held constant in all the subsequent Development Scenarios. After estimating the employment size of NCTD policy zone, the balance employment is distributed amongst the other policy zones in proportion to their employment size in D-2 (NCRPB scenario). Subsequently within each policy zone, total employment is distributed among the traffic zones in proportion to their size in D-2 scenario. After estimating employment size, final TAZ wise WPRs for 2021 were recalculated subject to a maximum of 50%. The modified WPRs for 2021 were adopted for 2032 for estimation of employment size. Tables 21 and 22 present the distribution of employment by policy zones and sub regions. This is also presented in Figure 11 above.

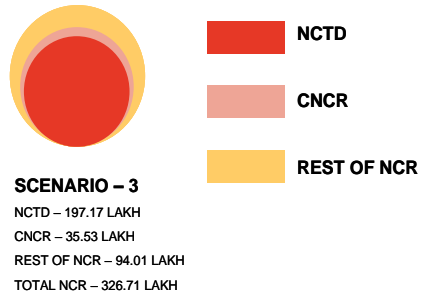


Figure 11: Employment Estimate in Dominant Delhi Scenario

Table 21: Employment Distribution in Policy Zones in D-3 Scenario

Policy Zones	Employment Distribution (In Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	45.45	53.66	82.36	111.07	139.77	197.17
CNCR	10.10	14.20	16.47	19.39	23.23	35.53
Rest of NCR	75.27	88.70	88.20	88.31	89.18	94.01
Total NCR	130.82	156.56	187.03	218.77	252.17	326.72



**Table 22: Employment Distribution in Sub – Regions in D-3 Scenario**

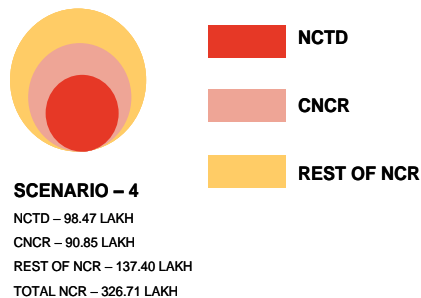
Sub-Region	Employment Distribution (In Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	45.45	53.66	82.36	111.07	139.77	197.17
Haryana	34.41	42.37	43.29	44.82	47.21	56.25
U.P.	36.37	43.07	44.46	46.36	48.89	56.47
Rajasthan	14.59	17.46	16.92	16.52	16.32	16.83
Total NCR	130.82	156.56	187.03	218.77	252.17	326.72

#### 4.3.4 D – 4: STRONG CNCR

In this scenario, it is assumed that CNCR will grow at a higher rate as compared to other policy zones. A 5 percentage point increase over the WPR in D-2 scenario has been adopted and would contain 90.85

lakh employment in the year 2032. The balance employment is distributed amongst the other policy zones in proportion to their employment size in D-2 (NCRPB scenario). Subsequently within each policy zone, total employment is distributed among the traffic zones in proportion to their size in D-2 scenario.

The employment distribution by sub-regions is estimated as the sum of employment size of traffic zones within the sub region. Tables 23 & 24 present the employment estimates by policy zones and sub-regions. It is further presented in Figure 12.



*Figure 12 – Employment Estimate in Strong Rest of CNCR Scenario*

**Table 23: Employment Distribution in Policy Zones in D-4 Scenario**

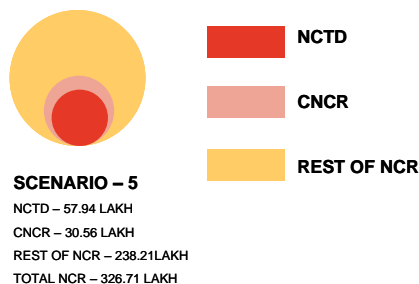
Policy Zones	Employment Distribution (in Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	45.45	53.66	62.62	71.59	80.55	98.47
CNCR	10.10	14.20	20.55	29.77	43.15	90.85
Rest of NCR	75.27	88.70	95.15	102.79	111.98	137.40
Total NCR	130.82	156.56	178.33	204.14	235.68	326.72

**Table 24: Employment Distribution in Sub – Regions in D-4 Scenario**

Sub-Region	Employment Distribution (in Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	45.45	53.66	62.62	71.59	80.55	98.47
Haryana	34.41	42.37	48.35	56.32	67.06	102.07
U.P.	36.37	43.07	49.09	57.01	67.58	101.58
Rajasthan	14.59	17.46	18.26	19.23	20.49	24.59
Total NCR	130.82	156.56	178.33	204.14	235.68	326.72

**4.3.5 D – 5: STRONG REST OF NCR**

In this scenario, it is assumed that this policy zone in future will experience a higher growth rate than experienced in the past decades. A 5 percentage point increase over the



*Figure 13 – Employment Estimate in Strong Rest of NCR Scenario*

WPR in D-2 scenario has been adopted. In this scenario the employment estimates for year 2032 shows NCTD at 57.94 lakh; CNCR at 30.56 lakh and Rest of NCR at 238.21 lakh.

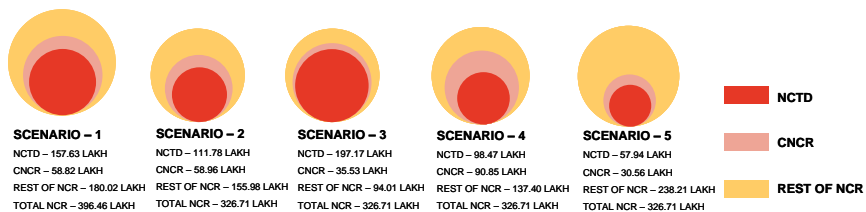
The employment distribution by traffic zones within each policy zone has been estimated on the same basis as detailed in D-4. Tables 25 & 26 present the distribution of employment by policy zone and sub-regions. This further presented in Figure 13.

**Table 25: Employment Distribution in Policy Zones in D-5 Scenario**

Policy Zones	Employment Distribution (in Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	45.45	53.66	54.52	55.37	56.23	57.94
CNCR	10.10	14.20	15.98	18.25	21.22	30.56
Rest of NCR	75.27	88.70	107.40	130.46	158.97	238.21
Total NCR	130.82	156.56	177.90	204.09	236.42	326.71

**Table 26: Employment distribution in Sub – Regions in D-5 Scenario**

Sub-Region	Employment Distribution (in Lakh)					
	2001	2007	2012	2017	2022	2032
NCTD	45.45	53.66	54.52	55.37	56.23	57.94
Haryana	34.41	42.37	49.57	58.39	69.28	99.84
U.P.	36.37	43.07	53.70	67.13	84.14	133.15
Rajasthan	14.59	17.46	20.11	23.19	26.76	35.78
Total NCR	130.82	156.56	177.90	204.09	236.42	326.71



**Figure 14 – Scenario-wise Employment Estimate**

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