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**URBANISATION IN A  
FORWARD LOOKING STATE  
OF INDIA: PATTERNS,  
ISSUES AND POLICY**

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# URBANISATION IN A FORWARD LOOKING STATE OF INDIA : PATTERNS, ISSUES AND POLICY

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## *Abstract*

In the context of proposed rapid urbanization in Asia, this article attempts to analyze the pattern, issues and policy aspects of urbanization in the rapidly urbanizing state of India (Karnataka) and its capital city region (Bangalore city). Both India and Karnataka have encouraged 'top heavy character', city - region disparities and associated problems of environment and development of Indian urbanization. Economically, urbanization has greater association with the tertiary sector, and higher contribution from the primary sector has led to more of 'rurban' character of Karnataka's urbanization. In Karnataka, Southern Maidan is the highest urbanized region with highest concentration of urban population, cities and towns as well as high growth performance towns. However, ecologically fragile Malnad region is also under urban population pressure. The trickle - down process has not succeeded in diffusing the benefits of urbanization and associated infrastructure and services. This has led to more sharpened city regional disparities. Hence, to promote balanced regional development in the state, a four-tier hierarchy of urban centres has been proposed.

## **Introduction**

It has been projected that 21<sup>st</sup> century will be the urban century with almost 60 per cent of the world population living in urban areas by 2030, the highest share of population ever lived in urban areas. This is mainly because unlike previous centuries, current and future centuries are likely to experience rapid shift in the nature of human activities from primary to non - primary mainly due to changing resource base and environmental conditions, and rapid progress in human endeavors in science, technology, management and development. Such a shift obviously enhances human affordability and capabilities to achieve the improved standard of living

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through better access to infrastructure and services. However, all these achievements are possible provided rapid urbanization is managed in a sustainable way. The rapid urbanization process which set-in in the 20<sup>th</sup> century at the global level initiated the process first in Europe followed by North America, Oceania and Latin America, resulted in an almost similar levels of urbanization. The existing and proposed patterns of urbanization identified at various continental levels on the basis of their current as well as future potentialities, and on-going trends, have revealed i) North America as the highest urbanized continent followed by Latin America, ii) by future potentials, Europe and Latin America would be more prominent in the level of urbanization, and iii) the future potential candidates for rapid urbanization would be Asia and Africa (Table 1).

**Table 1: World urbanization pattern**

Region	Level of urbanization, 2000 & 2030 (per cent to total population)	
	Year	
	2000	2030
Africa	37.2	52.9
Asia	37.5	54.1
Latin America	75.4	84.0
Oceania	74.1	77.3
North America	77.4	80.5
Europe	73.4	84.5
World	47.2	60.2

Source: United Nations, 2002

The projected urbanization pattern by regional economies has indicated that urbanization in developing countries as a whole is more rapid and massive as the share of urban population by 2020 will increase by more than double the current share thus touching the share of almost 54 per cent from just 17 per cent in 1950. In particular, it has been proposed that now it is the Asia's turn to take over the rapid urbanization process from Latin America which had experienced spectacular urbanization process by reaching urban population from 44 per cent to

the level of 75 per cent during the second half of the last century (Mathur,1992 and Mohan and Dasgupta, 2005). The main reason for such a proposal is that Asia has almost fifty per cent of the global urban population and it is going to house a major share of global urban population (Asia 2.7 billion and all other regions put together 2.3 billion) in the near future. Secondly, Asian region has been dynamic as revealed by rapid and diversified levels of urbanization (high level: Singapore, Hong Kong, Japan, New Zealand, Australia; medium level: China, India, Pakistan; low level: Bhutan, Nepal, Maldives) and emergence of primate cities and regions (Bangkok city and its region; Seoul city and its region; Bombay city and its region, Bangalore and its region etc.) (Mathur, 1992). This process although has led to higher levels of urbanization, they are concentrated in certain pockets thus, promoting city - regional disparities in their levels of development. The problem of city – regional disparities would be further accentuated on account of the location pattern of cities as out of 21 cities which are expected to reach 10 million plus population by 2015, seventeen cities will be in the developing countries, and more significantly, 11 out of 17 cities will be in the Asian region (Mohan and Dasgupta, 2005).

Urbanization and economic growth are strongly associated, and hence, urban areas, in general, and cities, in particular, have been identified as the 'engines of economic growth', and 'agents of change' (Mohan and Dasgupta,2005). Hence, rapid urbanization brings significant economic growth and prosperity to the region through trickle – down hypothesis. This means massive improvement in the accessibility to basic services like primary education, health, water supply and sanitation, and other infrastructures. Another advantage of rapid and higher level of urbanization is the integration of developing economics into global economics and markets, an essential criterion for national development (Mathur, 1992). In the context of the on-going disparity based urbanization in Asia, the proposed rapid and higher level of urbanization along with efficient policy measures would most probably promote uniform urban development and prosperity in the Asian region. In addition to prosperity, rapid urbanization

also imposes innumerable problems of city management like environment and pollution, land-use, water, energy, transport, slums, demographic and social etc., which need to be addressed effectively for sustainable urbanization. Added to this, unlike developed countries, rapid urbanization in developing countries is taking place at a much lower GDP levels which would aggravate the emerging problems due to financial constraints in implementing various environment and development programmes. This obviously calls for adoption of comprehensive urbanization policy in the Asian region by incorporating the concepts of resource conservation and mobilization, environmental management, appropriate policy instruments and associated institutional structure for implementation, monitoring and people participation. Hence, Asian region as a whole has to make all out efforts to mobilize the resources to meet the challenges of proposed rapid urbanization. This paper attempts to demonstrate the problems and prospects of rapid urbanization in the Asian region based on the rapidly urbanizing state of India - Karnataka - and its capital city - Bangalore and its region - which has been identified as a globally known primate city for its information technology development and services, and draws policy directions for a balanced urban development.

### **Urbanization Pattern : India and Karnataka**

Karnataka, one of the frontline states of India, ranks 6<sup>th</sup> by per capita net state domestic product, per cent share of urban population, life expectancy, infant mortality and maternal mortality rates, 7<sup>th</sup> by literacy, and 9<sup>th</sup> by population size (Heitzman, 2001 and Govt. of India, 2001). Karnataka accounts for almost 6.3 per cent of national urban population and 5.4 per cent of the total number of towns in the country. By share of urban population, Karnataka (33.98%) stood much above the national average (27.78%) in 2001. With its conducive location characteristics for industrial and commercial development, the two engines of economic growth and urbanization, Karnataka's urbanization has been consistently progressive with gradual increase in urban population from 12.59 per cent to 33.98 per cent during 1901 and 2001. In particular, during 1901-2001, the state's

urban population had increased almost eleven times with an annual growth of 9.91 per cent. As a result, the share of Karnataka's urban population was on the much higher side as compared to the national pattern during 1901-2001. As per the projected urban population, the same higher growth trend of urban population would continue in Karnataka till 2016 by reaching an urban population share as high as 39.3 per cent while, at the national level, it will be just 33.7 per cent (Govt. of India, 1991b) (Figure 1). By per cent annual urban population growth, Karnataka is on the higher growth range along with the other prominent states, while north –eastern states, Tamil Nadu and Haryana have recorded the highest growth pattern (Table 2). All these characteristics have made Karnataka as a forward looking state in the country.

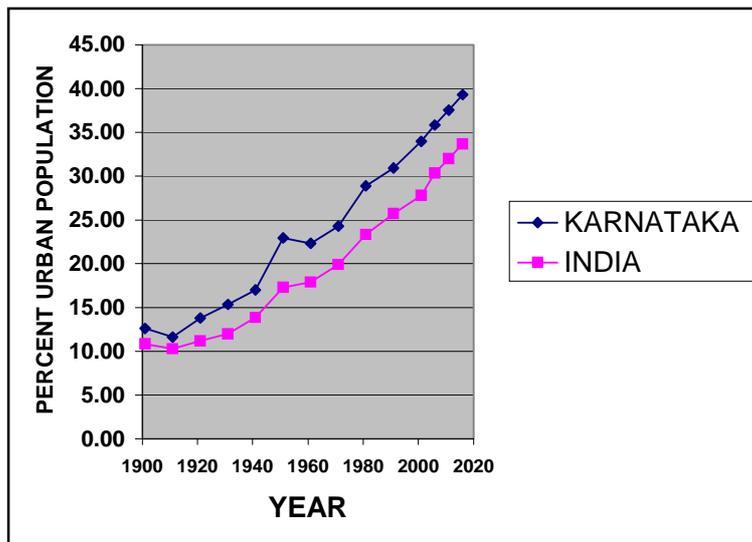


Figure 1: Per cent urban population: 1901-2016

**Table 2: Per cent annual urban population growth by states of India : 1991 - 2001**

Population growth	States
Negative	Punjab
0 - 2	Andhra Pradesh, Kerala, Manipur
2 - 4	Bihar, Karnataka, Orissa, West Bengal, Assam, Goa, Gujarat, Himachal Pradesh, Madhya Pradesh, Maharashtra, Meghalaya, Mizoram, Rajasthan, Uttar Pradesh
More than 4	Sikkim, Nagaland, Arunachal Pradesh, Tamil Nadu, Haryana

Source: Govt. of India, 1991b and 2001

The on-going urbanization pattern in Karnataka reveals that its urban population growth trend has been, by and large steady and smooth, and very close to the national trend (Figure 1). While, decennial urban population change pattern has revealed a criss-cross pattern by hovering around the national pattern. In particular, urban population change trend of Karnataka has exhibited bimodal pattern with two peaks, a much steeper one at 1951 and a moderate one at 1981. The national trend has also exhibited almost a similar bimodal pattern, but with moderate peaks. As per the projected urban population trends, by 2016, Karnataka's growth trend would be on the lower side as compared to the national pattern (Figure 2). The main implication of projected higher urban population share and lower growth is that there will be higher concentration of population in cities and towns in Karnataka as compared to the national pattern. This has obvious implications on the city and town management in terms of infrastructure and services. The main reason for such high urban population growth peak during 1941-51 in Karnataka was the state's initiative towards industrialization. This was the period in which both the governments of India and Karnataka encouraged massive industrial development through the establishment of several large and medium scale public sector industrial units like Hindustan Machine Tools (HMT), Indian Telephone Industry (ITI), Bharath Electronics Ltd (BEL), Hindustan Aeronautics Ltd (HAL), Government Electric Factory (GEF),

Radio Manufacturing Company etc. in the state. The second boom in urban population growth during 1971-81 was also attributed to industrialization and commercialization, but with more dent on development of Information Technology (IT) sector in the formative stage. A similar spurt in the growth of population and manufacturing workers during 1941-51 and 1971-81 was also evident in Bangalore, the capital city of Karnataka (Rao and Tewari, 1979).

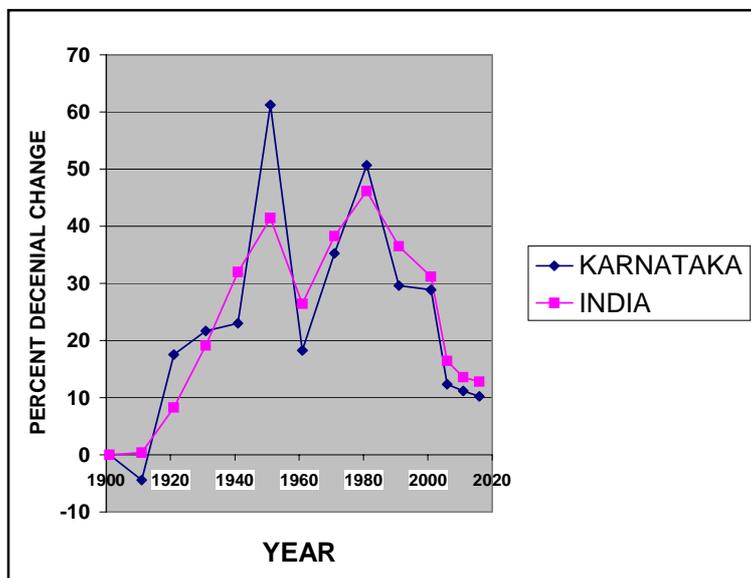


Figure 2: Per cent decennial urban population change: 1901-2016

The urbanization pattern in Karnataka may be reinterpreted in terms of different time periods such as pre-independence, post-independence but, pre-economic reform and post economic reform periods. From Figure 1 it is evident that urbanization in terms of the share of urban population to total population has shown an increasing trend in all the identified time periods thus indicating a positive influence on the urbanization trend in all the specified time period. However, in terms of decadal growth, during pre-independence and just after the

independence, high thrust on industrialisation and urbanisation has revealed an increasing growth of urban population with a crest culminating in the reorganization of the state of Karnataka in 1956. During reorganization, in addition to its own urban population, Karnataka also got urban areas from its neighbouring states of Andhra Pradesh and Tamil Nadu which added to the urban population and hence, resulted in higher decadal per cent growth of urban population (Figure 2). Again, a similar phenomenon was evident during post- independence but some part of the pre-reform period. This second high growth peak has been attributed to migration, continued phase of industrialization and initial stages of IT development. Interestingly, though urban population growth had slackened up to the reform period, it gained some momentum immediately after reform with sustained growth pattern till 2000 and such a pattern is likely to be repeated from 2004 onwards as per the projections. In fact, rapid developments in IT sector in the state has been passing through the stage of higher urban population growth, especially in the Karnataka state. Such a growth pattern is also due to the policy thrust on urbanization and industrialization by the state.

In Karnataka, number of towns increased marginally by 8.2 per cent while the population increased by 990.7 per cent during 1901 - 2001. The marginal increase in the number of towns as compared to a big leap in the population growth, clearly implies that additional urban population that had accrued in the state through migration and natural growth during 1901- 2001 had by and large, followed the process of infilling into the existing urban areas. This process has obviously led to rapid increase in city and town sizes in the state. While the country has experienced both diffusion as well as infilling process of additional urban population accrued in the country during 1901-2001 (1003.7 %) into existing as well as new towns and the cities which recorded 172.3 per cent growth during the said period. Similarly, to begin with, the distribution of towns in Karnataka by size class reveals a well balanced typical pyramidal shape with strong base, with highest concentration of class VI (less than 5,000 population) and least share of class I towns

(more than 100,000 population) at the top. Subsequent urban development policies which encouraged higher size towns have led to redistribution in concentration of towns by eroding the pyramidal base. A similar growth pattern is evident at the national level as well. While the concentration of urban population by size class is concerned, the issue has been more serious as the population distribution has assumed a perfect inverted pyramid with highest and least concentration of population in class I and VI towns respectively in Karnataka as well at the national level during 1901-2001. This implies that both state and national urban development policies have consistently reinforced each other to encourage highest concentration of population in class I cities (Karnataka: 67%; India: 70%).thus highlighting the 'top heavy' character of Indian urbanization. This urbanization pattern in turn has encouraged primate cities and primate city regions in the country which has resulted in urban – regional disparities.

The pattern of urbanization emerging in an economy which is dominated by the industry or tertiary sector has unique characteristics. The industry led urbanization may be characterized as a) high concentration of workforce engaged in the manufacturing sector, b) higher share of workforce with technical specialization, c) growth of small scale sector as ancillaries to feed the production requirements of large scale industrial units, d) more organized labour with less disparity in income, and e) demand for better landuse planning for organized location of labour and associated economic and service activities. On the other hand, if urbanization is based on tertiarisation, the broad implications are: a) higher concentration of unorganized labour, b) heterogeneous educational attainment of the population, c) higher income disparity among the workforce, d) more chances of development of slums to meet the demands of the unorganized sector, e) landuse planning will be a complex for the reasons of location of various tertiary based urban activities. Similarly, in the primacy based urbanization pattern, Obviously, higher primacy would lead to more of city - region disparities. In Karnataka, Bangalore has maintained its primacy and, it has increased significantly from 2.4 to 7.2.

By economic characterization of urbanization through its associated sectors of the economy (secondary, tertiary), tertiary sector's contribution at both national and state levels is prominent. During 1950 –2001, the increase in the share of tertiary sector in the GDP/NSDP has been much faster at the state level as compared to the national pattern. In Karnataka, the development of the IT sector has been very prominent and more so during the last decade which promoted the state, in general, and Bangalore, in particular, to a global scale. This, in turn, multiplied the tertiary sector related activities on a massive scale which contributed significantly to the state's economy. Interestingly, secondary sector's contribution ranks third, next to the primary sector at both state and national levels. This is in spite of well designed industrial development policies since independence at both national and state levels for its overall development in the country. The share of secondary sector in the GDP/NSDP has increased at a much faster rate at the national level than at the Karnataka. The main implication of this is that at the national level, industrialization has still remained as the prominent sector for its contribution to the national economy. This is because industrial activities, by and large, makes sustained contribution to the economy than the IT sector which is most unpredictable in terms of growth and development. This has been experienced globally in the recent days. On the other hand, the primary sector's share has reduced at a much faster rate at the national level than at the Karnataka level (Table 3). In this context, Karnataka's urbanization may be characterized with more of rural attributes than at the national level. As a result, urban – regional disparity in Karnataka has been much sharper than at the national level. For instance, the rapid urbanization of the globally known primate city - Bangalore, has led to more pronounced city – region disparity as revealed by various socio-economic and environmental characteristics like education level, income, type of occupation, piped water supply, toilet facility and solid waste disposal (Table 4 ). As a result, instead of the city – region symbiosis, the region has been experiencing acute problems of environment and under development.

**Table 3: GDP/SNDP, share by sectors and per cent urban population, India and Karnataka : 1950-51/1960-61 to 2000 – 01**

Sector	1950-51	1960-61	1970-71	1980-81	1990-91	2000-01
<b>INDIA</b>						
GDP (in crores)	9,547	16,220	42,222	130,176	510,954	1,902,999
% Primary	59.20	54.75	48.12	41.82	34.93	26.25
% Secondary	13.29	16.61	19.91	21.59	24.49	24.90
% Tertiary	27.51	28.63	31.96	36.59	40.58	48.85
% Urban pop	17.29	17.90	19.91	23.34	25.71	27.78
Per capita GDP (Rs)	264	369	770	1,906	6,061	18,530
<b>KARNATAKA</b>						
SNDP (in crores)		692	1,763	5,587	20,550	93,333
% Primary		61.27	57.86	46.05	37.11	30.61
% Secondary		15.17	18.38	20.76	24.04	20.92
% Tertiary		23.55	23.77	33.18	39.85	48.47
% Urban pop		23.33	24.31	28.89	30.92	33.98
Per capita SNDPP(Rs)		296	622	1,527	4,608	17,808

Source: 1. Govt. of India, ( 2005) Economic Survey, 2004-05, New Delhi: Ministry of Finance  
2. Government of Karnataka(1995 &2004); Economic Survey, 1994-95 & 2003-04, Bangalore: Ministry of Finance

Table 4: Percentage distribution of households by various socio-economic and environmental characteristics in angalore city and its region

Variable	City	Conurbation	Greenbelt
<b>Education</b>			
Illiterates	13	21	30
Primary	4	5	9
Higher primary	23	25	34
Secondary	32	33	19
Intermediate	7	6	2
Graduation and post graduation	15	9	6
Professionals	7	1	0
<b>Workers</b>			
Unskilled	12	23	50
Skilled	32	40	12
<b>Monthly Household Income(Rs)</b>			
Less than 2000	10	13	19
2000 - 6000	56	70	68
More than 6000	29	8	7
Piped water supply	73	8	6
Toilet facility	66	47	26
Open defecation	1	35	70
<b>Solid waste disposal</b>			
House collection	34	0	0
Dustbin	53	29	2
Open space	7	64	72

Source: Sastry (2004a) and AusIndia(2002)

Note: Conurbation: city fringe area; greenbelt: beyond the city fringe

## Regional Pattern of Urbanisation

Physiographically Karnataka has been divided into coastal, Malnad, southern Maidan and northern Maidan regions. As a result, the development policies have been encouraged according to the location characteristics and hence, the pattern of urbanization. In Karnataka, southern Maidan region is the highest urbanized region (50.6%) while, coastal region (7.4%) is least urbanized. Both Malnad (21.4%) and northern Maidan (20.6%), for obvious constraints, have revealed medium levels of urbanisation. Southern Maidan (34.7%), for its location advantages and infrastructure facility, has also recorded the highest urban population growth in the state. Southern Maidan being the hard core region of the erstwhile princely state of Mysore has cornered all special privileges since the beginning for its well planned development in terms of the location of industrial and commercial activities and development of infrastructure and services. Although Malnad (22.8%) has recorded the least increase, it is significant in terms of its magnitude which is of very great concern as it is an ecologically fragile forest resource region and hence, the region has been identified as one of the twelve biodiversity hot spots of the world (Sengupta, 2001). Malnad region has emerged as having very strong urban characteristics (Sastry, 2005 and Sastry and Rao, 2002).

By regional concentration of towns, northern Maidan has the highest concentration followed by Malnad region. For obvious constraints, coastal region has the least concentration of towns. Surprisingly, Malnad, the ecologically fragile region, due to high concentration of various development activities (industrial, infrastructure, and irrigation projects) had the highest concentration of towns and particularly smaller size towns (town sizes IV, V and VI) in 1991 and have been reduced drastically due to declassification of towns in 2001 (Table 5). By size class while southern Maidan has the highest concentration of the most significant size class, the class I town and class three III towns, the northern Maidan has the highest concentration of class II towns (Table 5). Malnad has the second highest concentration of class I towns next to the southern Maidan.

This is because the major towns like Hubli - Dharwad, Mysore, Shimoga, Hassan are located in this region. Malnad is a resource rich region (forest, agriculture, industry and services). Hence, in addition to major cities, various town sizes are also concentrated (I,III, IV, V) to provide both higher and lower level urban functions and services to the large rural hinterlands of the region. In another study by the author on the western ghats region of Karnataka, Malnad region has been identified as urban and industrially dominant region with higher level of development (Sastry and Rao, 2002). Interestingly, the number of towns under size class 20,00 - 50,000 have increased significantly during 1991-01 and this increase is again concentrated in southern Maidan region. It appears that both southern Maidan and Malnad regions have been experiencing greater urban population pressure on account of higher concentration of class I towns thus, demanding efficient urban development policy interventions for balanced urban development.

**Table 5: Percentage Distribution of Towns by size class and region: 1991 & 2001**

Town population size	Coastal		Malnad		Southern Maidan		Northern Maidan		Karnataka	
	1991	2001	1991	2001	1991	2001	1991	2001	1991	2001
100,000 and more	6.7	6.7	7.4	10.1	11.4	13.4	6.8	8.4	8.3	10.1
99,999 - 50,000	10.0	10.0	2.5	7.3	8.6	11.9	8.2	15.5	6.7	11.4
49,999 - 20,000	20.0	30.0	28.4	39.2	32.9	50.8	41.1	43.7	32.3	42.6
19,999 - 10,000	33.3	26.7	27.2	24.6	27.1	13.5	27.4	26.8	28.0	22.4
9,999 - 5,000	16.7	20.0	22.2	17.4	15.7	8.9	6.8	4.2	15.4	11.4
Less than 5,000	13.3	6.6	12.3	1.4	4.3	1.5	9.6	1.4	9.4	2.1
Total	100.0 (30)	100.0 (30)	100.0 (81)	100.0 (69)	100.0 (70)	100.0 (67)	100.0 (73)	100.0 (71)	100.0 (254)	100.0 (237)

Source: Govt. India, 1991a and 2001

Note: Figures in parenthesis represent number of towns

As explained before, Karnataka's cities and towns have been experiencing rapid population growth on account of infilling of additional urban population accrued in the state. As a result, almost 28.8 per cent of the towns experienced more than 3 per cent annual growth followed by 55.7 per cent of the towns with 1- 3 per cent growth thus, contributing significantly to rapid urbanization process in Karnataka. By regional concentration of growth performance of towns, again southern Maidan had the highest concentration of towns with annual growth of 1-3 per cent and more than 3 per cent followed by northern Maidan (Table 6). Historically, southern Maidan being the hard core of erstwhile princely state of Mysore, has the concentration of almost all development activities like location of industries and commerce, infrastructure and services etc. In addition, Bangalore, the capital city of the state is located in this region. Hence, by and large, individual growth performance of towns was much faster and prominent in southern Maidan. Malnad region in spite of its location constraints also recorded comparatively higher growth performance of towns (Table 6). Malnad being resource rich, innumerable towns of various sizes have emerged as growth centres to provide urban functions and services to the large rural hinterlands. Obviously, with the intensification of the urban related activities, these towns attracted more population to record higher growth. Interestingly, majority of towns recorded 1 -3 per cent annual growth during 1981-91 and 1991-01 and such high growth performance was concentrated in Malnad, northern Maidan and southern Maidan regions. In particular, coastal zone had more than doubled the share of towns which had recorded more than 3 per cent annual growth during 1981-91 and 1991-01. The rapid growth performance of towns and cities, in addition to location advantages, depended on their functional specialization.

**Table 6: Percentage Distribution of Towns by Annual Per cent Population Growth by Regions, Karnataka**

Population Growth	Coastal		Malnad		Southern Maidan		Northern Maidan		Karnataka	
	1991	2001	1991	2001	1991	2001	1991	2001	1991	2001
Negative	13.0	4.8	10.4	3.0	0	1.7	4.9	7.7	5.8	4.2
Less than or equal to 1	26.1	33.3	18.2	15.1	3.1	8.3	14.7	3.1	13.4	11.3
1 – 3	47.8	33.3	55.8	66.7	62.5	53.3	52.4	53.8	56.2	55.7
More than 3	13.0	28.6	15.6	15.1	34.4	36.7	27.9	35.4	24.5	28.8
Total	100 (23)	100 (21)	100 (77)	100 (66)	100 (65)	100 (60)	100 (65)	100 (65)	100 (226)	100 (212)

Source: Govt. India, 1991a and 2001

Note: Figures in parenthesis represent number of towns

The functional specialization of towns and cities have been derived on the basis of the number of workers employed in various sectors of urban activities. Accordingly, the quality of urbanization in Karnataka is oriented towards primary sector as highest share of towns (31.1%) are specialized in primary activities followed by tertiary sector (27.2%). The main reason for the emerged pattern of urbanization might be due to more prominent share of the primary sector to the state economy. Surprisingly, in spite of rapid industrialization process introduced in the state for a very long time, only 14.2 per cent of the towns are specialized in manufacturing sector. On the other hand, this may be a deliberate policy of the state not to encourage industries in towns for the need of rigorous planning and environmental management on which the town may go out of control in its management which is happening in other towns and cities. Interestingly, due to dominance of more number of functions in a single town for its sustained growth, quite a significant share of towns (26.4%) have been identified as multi-function towns (Table 7). The emergence of functional specialization of towns would also depend on the development policy interventions by the state on

the various sectors of the economy. As of now greater policy boost is being given to the IT sector in the state for its overall development and for obvious infrastructural constrains such growth boot is restricted to higher size class of cities only.

By physiographic regions, coastal zone had the highest concentration of towns, which were specialized in tertiary sector (40%) followed by secondary sector (26.7%). The coastal region for its rich resource base and location advantages had attracted large number of industries and associated service sector. Similarly, Malnad region for its obvious location specificity and rich natural resource endowment, also encouraged larger share of towns (40.7%) which were specialized in tertiary activities followed by the towns specialized in primary activities (32.1%). Surprisingly, Malnad, the well-known forest region encouraged large-scale agriculture (Sastry and Rao, 2002), which, in turn, contributed significantly to functional specialization of towns in the primary sector. Southern Maidan with its locational advantages for industrial, commercial and service activities along with better infrastructure facilities encouraged the highest concentration of multi-functional towns (towns which were specialized in more than one function) (32.9%). In addition, its location specificity also encouraged the towns which were specialized in secondary (24.3%) and primary sector (24.3%) as well. While northern Maidan, for its obvious high agriculture and irrigation potentials and associated infrastructure, had the highest concentration of towns with specialization in primary sector (43.8%) followed by tertiary sector (19.2%). In addition, northern Maidan had the second highest concentration of multi-functional towns (27.4%) (Table 7).

**Table 7: Percentage Distribution of Towns by functions and Region**

Functional Category	Coast	Malnad	Southern Maidan	Northern Maidan	Karnataka
Primary	13.3	32.1	24.3	43.8	31.1
Secondary	26.7	4.9	24.3	9.6	14.2
Tertiary	40.0	40.7	18.6	19.2	28.3
Multi-functions	20.0	22.2	32.9	27.4	26.4
All Towns	11.8	31.9	27.5	28.7	100.0

Source: Source: Govt. of India,1991a

An integrated analysis of towns by size, growth and functional specialization by region enabled one to identify a few typologies of towns and their potential growth performances. In coastal region, cities and large towns like Mangalore, Udupi, Sirsi and Puttur, which are multifunctional are growing rapidly as compared to other functional towns. While Mangalore and Udupi are coastal towns, Puttur and Sirsi are in the midst of forest resource base and all of them are located in an ecologically sensitive coastal zone. Hence, their growth process and pattern need to be regulated to maintain both forest and coastal ecology. In particular, Udupi has recorded very high growth (97.1%) during 1981-91, thus attracting administrators and policy makers to take special care in the growth process of Udupi town. Incidentally, in recognition of the high growth performance and historical importance of Udupi, which was a part of Dakshina Kannada district till 1995 has been recently carved out as a separate district along with a set of villages and towns. In fact, both Mangalore and Udupi with their rapid growth and associated urban environmental problems of industrial pollution, solid waste and sewerage disposal have been posing serious threat to the coastal ecology. In addition, the other coastal zone towns Karwar, Bantval, Dandeli, Putter, Bhatkal, Yellapur, Honnavar and Karkala with multifunctional specialization and higher population growth have emerged as potential growth centers for future investments and development. Hence, these potential growth centres

need adequate growth regulations under the coastal zone management for their sustainable development. Similarly, several new towns were added, and several project towns recorded significant population decline mostly due to decline in the project activities.

In Malnad region, which has higher concentration of towns specialized in primary and tertiary sector activities due to difficult terrain needs, adequate care in the promotion of urbanisation in the region. As a result, towns like Arakalagud, Heggaddadevanakote, Mundargi, Hangal and Navalgund which are specialized in primary sector, and C R Patna, Haveri, Kushalnagar and Hubli-Dharwad, which have multifunctional specialization, have recorded high population growth, thus emerging as potential growth centers. While, Hubli-Dharwad, the second largest city in the state and Mysore, the most prominent city of the state, require greater infrastructure facilities to manage their growth performance. The remaining towns need to be encouraged by making use of the available regional or local resource base. Like coastal region, Malnad with its strong forest resource base is also an ecologically sensitive region. Hence, adequate care is required while development of these towns.

Southern Maidan with its multifunctional infrastructure facilities encouraged the towns which were specialised in all the three sectors viz; primary, secondary and tertiary. In particular, southern Maidan accommodated Bangalore, the capital city of Karnataka which accounts for almost 31 per cent of state's urban population and the entire state depends on it for various functions and services. The main concern of the southern Maidan is increasing concentration of population in Bangalore, which needs to be discouraged in order to encourage balanced regional development in the state. In this context, several towns of this region like K R Pet, Holalkere, Siriguppa, Hadagali specialized in primary sector; Maddur, Mulbagal, Anekal, Harihar, Kanakapura and Vijayapura specialized in secondary sector; Hosadurga, Tumkur, Kolar, Bagepalli, Bangarpet, Challakere, Chintamani, Chitradurga, Davangere, Hiriya, Koratagere, Kunigal, Malur, Pavagada and Srinivaspura. have emerged as potential growth centres with higher population growth performance.

Hence, these potential centres need adequate encouragement in accordance with the regional growth perspective as well as the available local resource base.

Similarly, Northern Maidan due to high irrigation potentials accounts for major share of towns with specialisation in primary sector and in particular agriculture based activities followed by multi-functions. In particular, the region has concentration of major cities like Belgaum, Gulbarga, Bidar, Bijapur. and Raichur which are specialised in multi-functions. In addition, several towns like Indi, Mudhol, Gangavathi, Manvi, Sindhanur, Hatti, Mudebihal, Badami, Bhalki, Mahalingapur, Sadem, with higher population growth have emerged as potential growth centres which need to be encouraged with appropriate regional perspective along with the available regional resource base. Hence, by proper choice of potential growth centres across, the state would induce balanced urbanization process in Karnataka.

As mentioned before, rapid urbanization has been sharpening the regional disparities. This has been demonstrated in the case of Bangalore city region. A similar disparity is evident at the regional levels as well. In the Southern Maidan, Bangalore urban district, for its obvious rapid urbanization, has cornered all the infrastructure facilities along with very high per capita SNDP. While other districts in the region are still lagging behind in terms of urban population, literacy and specially toilet facilities. A similar pattern has emerged in the Malnad region where Dharwad district has gained prominence followed by the Mysore district, whereas the other districts of the region have remained low due to lower level of urbanization and associated services and per capita income. In particular, the higher levels of urbanization has reconfirmed its close association predominantly with the higher share of the tertiary sector's contribution to the district GDP followed by the secondary sector as clearly revealed by Bangalore Urban, Dharwad, Mysore and Uttara Kannada districts which have recorded higher level of urbanization with least trickle-down effect (Table 8). Surprisingly, irrespective of the level of urbanization

there has been a higher share of households with access to safe drinking water and very low access to toilet facility. This is mainly because, to begin with, greater attention was given to water supply alone by various development programmes. However, with the recently emerged holistic concept of 'water supply and environmental sanitation, it has begun to improve the sanitation facility as well. The government of Karnataka, in particular, has taken up several rural sanitation programmes to improve the sanitation facility at the rural level. With the emergence of several potential growth centres and functionally specialized cities and towns, unless proper urban development policy is implemented, the revealed disparities would be further sharpened to promote lopsided urbanization in the state. These disparities have already resulted in innumerable urban environmental problems like high population density, air and water pollution, and solid waste disposal problems. The high vehicular concentration in cities have led to higher emission load of pollutants to the atmosphere. Similarly, inefficient solid waste management has also contributed significantly to urban environmental problems of major cities in the state (Table 9). These environmental problems have further accentuated with improper disposal of untreated urban sewage water in most of the cities of the state. As on date, only 37 out of 208 cities and towns have been provided with underground sewerage and of them, only 14 towns and cities have waste water treatment facility (Website: kuwsdb). Hence, a thorough mismanagement of urban sewerage by letting into water bodies has resulted in serious water pollution problems both in upstream and downstream stretches of almost all the prominent rivers in the state (Table 10).

Table 8: Urban, service and economic indicators by regions of Karnataka:1991&amp; 2001

Region	%Urban Population		Literacy		%Households with Safe Drinking Water*		%Households with Toilet		% Primary		% Secondary		% Tertiary		Per capita SNDP	
	1991	2001	1991	2001	1991	2001	1991	2001	1991	2001	1991	2001	1991	2001	1991	2001
<b>Southern Maidan</b>																
Bangalore. U	86.2	88.1	76.3	83.9	82.1	96.2	72.9	85.3	3.1	4.8	48.9	38.8	48.0	56.4	14,127	32,083
Bangalore. R	18.1	21.7	50.2	65.0	86.5	97.4	16.8	33.8	37.2	32.3	25.0	24.6	37.7	43.0	8,639	17,270
Bellary	32.0	34.9	45.9	58.0	84.2	93.7	12.9	27.2	47.1	33.2	16.2	26.4	36.6	40.4	7,232	17,822
Chitradurga	16.6	18.1	52.3	64.9	88.1	97.1	17.0	27.7	45.4	42.1	19.1	16.9	35.5	40.9	7,734	12,841
Kolar	23.3	24.7	50.5	63.1	89.8	97.2	19.8	33.3	49.3	47.5	14.6	13.8	36.0	38.6	6,739	13,802
Mandya	16.2	16.0	48.1	61.2	71.2	93.2	14.3	25.4	48.1	47.0	18.9	15.1	33.0	37.9	7,840	15,258
Tumkur	16.6	19.6	54.5	67.2	80.8	96.9	14.0	26.0	46.5	37.6	18.8	23.6	34.7	38.7	7,013	13,881
<b>Northern Maidan</b>																
Belgaum	23.5	24.1	53.0	64.4	64.2	75.0	14.4	26.7	43.3	40.4	24.2	22.3	32.4	37.4	8,953	16,439
Bidar	19.6	64.4	45.1	62.0	60.5	79.6	10.3	19.5	44.6	38.0	16.2	16.3	39.1	45.7	5,944	10,892
Bijapur	19.5	62.0	56.5	57.5	73.3	83.0	6.9	12.7	48.8	43.2	17.8	14.6	33.3	42.1	7,207	14,885
Gulbarga	2.6	57.5	38.5	50.6	63.0	80.5	12.2	18.6	40.5	37.9	23.3	20.4	36.2	41.6	7,115	13,446
Raichur	24.6	50.6	34.3	49.5	65.4	83.2	7.3	14.8	48.6	48.2	13.7	12.4	37.6	39.4	6,275	11,344
<b>Malnad</b>																
Chikmagalur	16.9	19.5	61	72.6	69.5	81.8	23.1	42.0	58.5	54.9	8.6	8.4	32.9	36.7	11,918	21,387
Dharwad	52.5	55	62.7	71.9	81.5	90.6	21.6	31.5	37.7	25.4	22.1	22.3	40.1	52.3	7,512	17,915
Hassan	17.4	17.7	56.9	68.7	79.5	93.0	16.1	27.8	50.5	47.0	13.9	12.9	35.6	40.1	7,519	14,697
Kodagu	16.0	13.8	68.3	78.2	44.8	53.1	32.1	52.1	63.5	58.4	6.3	7.2	30.2	34.4	14,826	29,608
Mysore	35.8	36.9	50.9	63.7	82.7	94.6	24.9	37.0	35.3	27.2	28.2	26.3	36.4	46.5	8,886	19,560
Shimoga	32.4	34.8	63.9	74.9	66.5	72.6	25.5	48.2	47.1	39.4	19.6	19.3	33.3	41.4	9,204	19,349
<b>Coast</b>																
U. Kannada	24.1	28.7	66.7	76.6	20.0	33.5	34.1	34.6	36.4	29.3	23.8	25.7	39.8	45.0	8,137	17,689
D. Kannada	31.7	38.47	76.7	83.5	30.2	31.5	22.8	60.2	29.4	12.9	27.4	43.5	43.2	43.5	10,252	39,817

Source: State Domestic Product, Karnataka, 1980-81, 1990-91 to 1997-98;1993-94 to 2000-Directorate of Economics and Statistics, Govt. of Karnataka; 2001, Govt. of India 2001;

**Table 9: Some Indicators of Environmental problems**

City density	Population	Pollution load (tonnes/day)	Solid waste generated (tonnes/day)	Solid waste cleared (tonnes/day)	No. of Vehicles
Bangalore	14,943	2,856.7	2,500	1,400	1,934,761
Mysore	5,087	243.0	230	183	306,418
Dharwad	3,395	159.9	250	200	184,896
Mangalore	2,747	153.4	250	200	171,940
Belgaum	2,597	137.9	120	100	168,392
Gulbarga	7,204	96.7	120	100	112,477
Bijapur	2,562	75.7	80	50	81,918
Bellary	3,724	65.5	70	40	78,201
Bidar	2,814	28.5	60	30	33,610

Source: Govt. of India, 1991a; Govt. of Karnataka, 2004; Sastry (2004b)

**Table 10: Highly Polluted River Stretches in Karnataka**

Sl no.	River stretch
1	<b>Bhadra River Shimoga</b> : Upstream of MPM and VISL, Bhadravathi; Downstream of MPM, Bhadravathi
2	<b>Tungabhadra River, Davangere</b> : Upstream of Harihar Polifibre; Downstream of Harihar Polifibre;
3	<b>Kali River, Uttara Kannada</b> : Upstream of West Coast Paper Mills Downstream of West Coast Paper Mills
4	<b>Hebbala River, Mandya</b> : Hebbala village, near Mandya
5	<b>Kabini River, Mysore District</b> : Intake of KIADB, Nanjanagud; Bathing Ghat, Nanjanagud
6	<b>Tungabhadra River</b> : Haralahalli bridge
7	<b>Arkavathi River</b> : Downstream of Kanakapura
8	<b>Krishna River</b> : Downstream of Devasagara bridge
9	<b>Bhima River</b> : Downstream of road bridge, Ghanagapura village

Source: KSPCB, 2002-03 Annual Report

## Growth Pattern of Bangalore

Bangalore, the globally known software city and capital of Karnataka is known for its trade and commerce, and industrial development since the beginning. As a result, it became one among the million cities of India as early as 1961 and whose growth and development was comparable with the seven 'million' and capital cities of India. As per 2001 census, Bangalore ranked fifth, next to Chennai by population size. Population size trend of Bangalore has been smooth all along and very close to the baseline unlike Greater Bombay, Calcutta and Delhi (Fig 3). All the seven 'million' cities have revealed the growth trend of bi-model pattern with growth peaks at 1951 and 1981 (Fig 4). In particular, the main reason for such high population growth of Bangalore during 1941-51 was large scale industrial development encouraged by both govt. of India and Karnataka and area expansion. While 1971-81 growth was also attributed to industrial development especially the IT sector in its formative stage and area expansion (Heitzman,2004 and Sastry,1988).

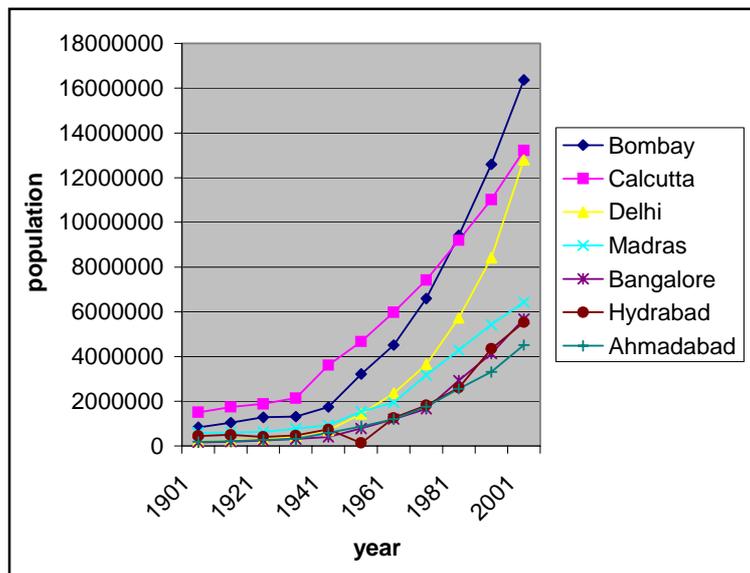


Figure 3: Population size of million cities of India: 1901-2001

The area of the city recorded a significant increase by 92.1 per cent and the population by 37.8 per cent during 1991-2001. As per the projected estimate, the population of Bangalore would reach 9.8 million by 2016. While IT development has been in progress, the corresponding infrastructure and services required for the smooth functioning of IT sector was not geared up. The main victim of such expansion is the peripheral areas of the city as it has experienced uneven development and severe environmental problems with unique 'rurban' characteristics which was quite different from the city. Some of the characteristics were higher concentration of households with large household size, higher illiteracy rate, higher share of unskilled and primary sector workers, higher share of medical expenses as compare to city, larger share of kuccha or semi-pucca house structure, least water and sanitation facility, and almost no solid waste disposal provision and high concentration of slums and uneven city- peripheral transport facility (AusIndia, 2002; Sastry, 2004a).

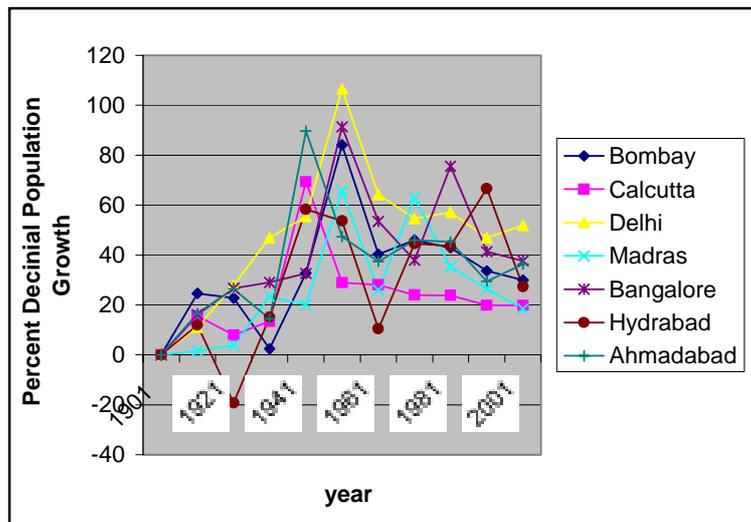


Figure 4: Population growth of million cities of India: 1901-2001

## **Functional Specialization, Causes and Consequences of Growth**

By functional specialization, Bangalore has consistently emerged as a bi-functional city with specialization in manufacturing and service sectors. In addition, trade and commerce for obvious location specificity has acquired greater significance. As a result, almost 97.5 per cent of the total work force were employed in non-primary sector with a major share in the tertiary sector (63.6%) (Govt. of India, 1991a). Since 1984 the main instrument for Bangalore's rapid growth is IT sector with the establishment of a multinational company, the Texas Instruments followed by STPI first earth station and a group of 13 company. Especially, during 1991-99, the number of IT units had increased by 361.5 per cent while, sales in terms of export recorded an unparalleled increase by 22,566.7 per cent. More significantly, growth in export of software in a single year (2000-01) was as high as 73 per cent. For the smooth functioning of IT sector, it has attracted highly skilled IT professionals whose number is estimated at 1.5 lakhs. Hence, by 2000, the Bangalore city had 2020 individual software related companies with 765 companies specialized exclusively in software development and service. This obviously resulted in the multiplier effect to attract resources and population to the city. As a result, the city had started expanding its boundaries on all sides to accommodate IT units and its professionals. Such expansion has been more prominent in the south-east sector of the city (Hosur Road, Koramangala, HAL, Whitefield) which has been proposed as IT corridor running from old Madras Road to New Madras Road (Govt. of Karnataka, n.d).

## **Conclusion and State Urban Development Policy**

Karnataka's urbanization has been promoting both functionally and spatially lopsided urban development mainly due to higher concentration of population in the Class I cities and higher levels of urbanisation in the southern Maidan region, and in particular, the regions adjoining the state capital, Bangalore, which is located almost in the southern tip of the state boundary. By 2016, the share of urban population would reach

almost 40 per cent which may, in all possibilities would extend the existing uneven urbanization pattern further, thus, leading to more serious problems. In addition, the population of Bangalore would reach 9.8 million by 2016, adding to the problem of high concentration of urban population. Such uneven urbanization pattern in the state has sharpened the city –region disparities as well as inter region disparities in terms of the availability of infrastructure and services and would be sharpened further with the projected population concentration in cities and towns. In particular regional disparities and high growth and high density performance of various cities have not only imposed high pressure on land but, demand more resources and services. In the absence of planned growth and infrastructure development, cities and towns would experience unplanned development and hence, environmental degradation. Regional disparities in urban development has also been identified in the recently commissioned study by the government of Karnataka (Govt. of Karnataka, 2002).

There is a need for policy direction to encourage balanced urban development in the state through diverting population concentration especially from the mega city region to the emerging potential growth centres or regions. This uneven urban development has been well recognized by the state planners and policy makers and corrective measures have been proposed as early as in the state's eight five year plan document. Accordingly, the state level urban development strategy, 1994 focused on the dispersal of urbanization and equitable distribution of urban benefits; development of counter magnets to slow down the growth of mega cities; development of areas of special potentials like west coast, growth areas and administrative towns; establishment of proper hierarchy of small, medium and large towns; and development of urban - rural linkages (Govt. of Karnataka, 2002: 544).

Of late, rapid infrastructure development along the major corridors of the state, have encouraged rapid urbanization, along these developing corridors and in particular, along the Bangalore – Belgaum

corridor which is a part of the golden quadrilateral national road network, Bangalore-Mysore corridor, a miniature of the golden quadrilateral being exclusively developed by the state, and Mangalore-Karwar corridor as a part of the west coast corridor. While self-induced urban corridor development is a very good sign towards balanced urban development in the state, but the state has to regulate it properly for its dispersal all along these corridors to achieve the main goals of balanced development.. It has been identified that almost 84 per cent of the state urban population and 74 per cent of the total urban investment are concentrated in these rapidly urbanizing corridors (Shivaramkrishnan, n.d).

By population size and associated functions, the following more conspicuous six-tier hierarchy of urban centers has emerged in the state (Table 11). Spatially, one can find both gaps and overlaps in the existing hierarchic structure of the towns. Especially, the second order centres are only just two (Hubli-Dharwad and Mysore) which are supposed to serve the entire Karnataka with the required functions. Though each one of this centre is located ideally in northern and southern Karnataka, however, because of infrastructural constraints, they cannot take the entire load. Similarly, third and fourth order centres are not spatially well distributed to encourage balanced urban development in the state. Hence, for balanced urban development in the state, reordering in the existing hierarchic order is very much essential especially at the second and third levels. In order to achieve this objective, the proposed hierarchy of urban centres has been discussed below (Table 12).

The importance of Bangalore as the capital city and globally known software centre need to be maintained by encouraging its sustained growth in the state as the first order urban centre and also as an important national metro in southern India along with four other metros of the country. In particular, with the increasing city- region disparities, Bangalore's growth should be integrated with its region to encourage an integrated development of the city and its region with proper symbiosis. This can be achieved mainly by reducing the existing functional gaps between Bangalore and other four national metros with

appropriate development vision for the city and its region. At the second hierarchic order, only five cities: Mysore, Hubli-Dharwad, Mangalore, Belgaum and Gulbarga have emerged with spatial gaps and overlaps. Hubli-Dharwad and Belgaum are almost adjacent centres with several overlapping regions, and similarly, the central part of the state is left with huge unsaved area with out having any second order centre. Hence, to rectify the spatial gap and overlap, instead of Belgaum, it is preferable to upgrade Davangere-Harihar to the second order level to serve the central area of the state. Belgaum with its location advantages as a border city of Karnataka and Maharashtra will develop as a second order centre in spite of little planning push which should be carefully monitored for its overall development. Hence, with the readjustments in the spatial pattern of location of second order centres, the proposed six 'second order' centres with spatially well balanced locations would reduce both functional and spatial gaps in serving the urban functions in the state (Fig 5). In this context, in addition to Davangere-Harihar, the second order cities of Mangalore, Belgaum and Gulbarga have to be brought to the levels of Mysore and Hubli-Dharwad through appropriate development policies to function as second order centres. Similarly, it is preferable to have spatially interspersed fifteen "third order" urban centers which would further reduce both functional and spatial gaps. These towns and cities are Bagalkot, Bellary, Bijapur, Bhadravati-Shimoga, Bidar, Chitradurga, Chikmagalur, Gadag-Betigeri, Hassan, Hospet, Kolar Gold Fields, Marcara, Mandya, Raichur, and Tumkur. Meanwhile, the coastal zone, with its rich resource base and dynamic economy, is being served only by the second order centre Mangalore, thus, is looking for some lower order centres to facilitate the urban related activities of the region. Though potential growth centres like Udupi and Sirsi have not come up to the level of higher order centre, need to be developed as third order centres, in order to bridge the spatial gap. However, since coastal zone is ecologically fragile, extra care is needed in promoting urban development activities in the region. Hence, totally seventeen 'third order' centre need to be developed for balanced urban development (Fig 5).

By size, growth and functional typology, both large and medium towns that are specialized in tertiary, secondary and multifunction with their rapid growth process have emerged as potential growth centres in all the four regions (coastal, Malnad, southern and northern Maidan). Incidentally, many of them are located in the well-known west coast corridor between Mangalore – Karwar, all along the Bangalore-Mysore Infrastructure Corridor and Bangalore- Belgaum golden quadrilateral corridor. In addition, many of these potential towns are part of the proposed hierarchic model to be encouraged with their strong local resource base or induced functional specialization for balanced urban development in the state. While, higher order urban centres need to be encouraged as per the proposed hierarchic order, at the lower levels, the interspersed urban development need to be induced preferable by identifying several strategic potential growth centres emerged during both function and growth performances to achieve balanced urban development in the state. However, while Karnataka's urban development need to be encouraged under the regional urban system perspective, Bangalore growth according to both regional and national perspective. Hence, it is essential that Karnataka's urban development policy need to be integrated with national urban development policy to achieve the development objectives of the state. All these reoriented urbanization processes if encouraged with appropriate development perspective would undoubtedly promote balanced urban and hence, regional development for which the state development policies have been aiming at since its inception.

**Table 11: Existing Hierarchy of Urban Centers in Karnataka: City and Population**

Hierarchic Order	Town and Population
I(1)	1. Bangalore: 5,686,844
II(2)	1. Hubli-Dharwad: 786,018; 2. Mysore: 785,800
III(8)	1. Mangalore: 538,560; 2. Belgaum: 506,235; 3. Gulbarga: 435,631; 4. Davangere: 363,780; 5. Bellary: 317,000; 6. Shimoga: 274,105; 7. Bijapur: 253,307; 8. Tumkur: 248,592
IV(13)	1. Raichur: 205,634; 2. Bidar: 173,678; 3. Hospet: 163,284; 4. Bhadravathi: 160,392; 5. Robersonpet: 156,961; 6. Gadag-Betigeri: 154,849; 7. Mandya: 131,211; 8. Chitradurga: 125,060; 9. Udupi u a: 112,706; 10. Hassan: 113,331; 11. Kolar: 113,299; 12. Gangavathi: 101,397; 13. Chikmagalur: 101,022
V	Towns with populations: 50,000 - 100,000
VI	Towns with populations: Less than 50,000

**Table 12: Proposed Hierarchy of Urban Centers in Karnataka**

Hierarchic Order	Town
I (1)	1. Bangalore
II (6)	1. Mysore, 2. Hubli-Dharwad, 3. Mangalore, 4. Belgaum, 5. Gulbarga, 6. Davangere - Harihar
III (17)	1. Bellary, 2. Bijapur, 3. Shimoga – Bhadravathi, 4. Tumukur, 5. Raichur, 6. Koalr Gold Fields, 7. Hospet, 8. Gadag-Betigeri, 9. Bidar, 10. Mandya, 11. Hassan, 12. Chitradurga, 13. Gangawati, 14. Bagalkot, 15. Marcara, 16. Udupi, 17. Sirsi
IV	Other Towns



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