

IMPACT OF DEMOGRAPHIC AND AREAL CHANGES ON URBAN GROWTH: A CASE STUDY OF MYSORE CITY

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Abstract- The study aims to analyze the growth of the Mysore city from 1971 to 2001, its expansion in order to find out the pace and direction of growth. Urban sprawl leads to haphazard patchwork of development, which results improper development of any city. Hence an attempt has made in the present study to monitor the growth of Mysore city. It has presented the scenario of change in land use pattern from 1976 to 2001. The article also reviews the trend of population of the city. The extent of the urban sprawl in the city is evident from the growth rate over the last five years. The area of Mysore city has increased from 7,569 hectares in 1995 to 9,221 hectares in 2001 representing a growth of 22 per cent. This expansion is expected to continue unabated and the total land area of Mysore is expected to increase to 15,669 hectares by 2015. Based on the data it is found that the land use pattern of Mysore shows a tilt towards residential areas, which cover a greater portion of the city, and this is expected to increase in the next few years.

Keywords: Urban Agglomeration, Sprawl, Outgrowths, Conversion, Outgrowth.

I. INTRODUCTION

Urbanization is the movement of people from agricultural to industrial employment, which leads to urban way of life. Urbanization on the one hand acts as a centripetal force, attracting people to towns and cities; on the other hand it also acts as centrifugal force, radiating its influence outwards, which reinforces its centripetal role [1]. Urbanization in its most general sense refers to the complex set of processes by which the proportion of the country's population concentrated in urban areas increase over time [2]. Urban sprawl has become the catch phrase for everything that is bad about urban growth today-congestion, blight, monotony, endless development and ecological destruction [3]. All cities have an image. Infact, it would be truer to say that all cities have, and always have had, a number of images. The only consistent thing about cities is that they are always changing. Everywhere cities have grown both in size and considerable population [4]. Cities are a complex agglomeration of multi-activities: economic, social, cultural etc [5].

Bazaar, Markets or commercial centers not only play an important role in the urban expansion of a city but also social, cultural, political and religious activities also gets influenced by the city market which in turn support urbanization or urban expansion of a city [6]. Cities do not grow of themselves but it is the countryside which sets them to do task which must be performed by them [7]. Whatever the relation between countryside and the city, and whether the countryside's main function is providing food, a place to live, or a place to play, city and countryside are integral parts of same social and economic system.

The towns do not exist in vacuum, cut from the continuous area along clear cut boundary line; on the contrary they are always related to the bigger towns or cities than themselves. The towns do not grow separately; there is no clear cut boundary in between them. On the contrary they grow in relation with each other. Small towns are related with bigger towns, and bigger towns are closely linked with the city and so on [8]. Rapid urbanization has resulted due to the several factors. However, the natural growth of the population, the rural to urban migration are important in it [9].

The negative impacts of urban sprawl can be analyzed in three ways leapfrog development, low density and unlimited outgrowth expansion-are same as those that define the positive aspects of sprawl [10]. The urban encroachment on the rural land is directly proportional to the growth of urban area i.e., higher the growth of urban area greater will be the urban encroachment on rural areas [11]. Villages around the city are undergoing rapid change in demographic structure. Changes are visible in the field of vital rate of births, deaths, longevity as well as of marriage and family size, occupational and internal migration [12]. It is accessibility rather than geographical distance as a major factor responsible for spread of urban attributes. It has been argued that towns cannot grow as isolated pockets without maintaining functional linkage with rural hinterland [13]. Rapid urbanization causes disorganized and unplanned growth of the towns and cities. The pressure of an ever growing population becomes the burden on the limited civic amenities which are virtually collapsing; there is the need to balance present requirements of land against future needs.

Prevention of agriculture land in the fringe area of expanding cities is a vital for preserving and maintaining open space and therefore environmental qualities [14]. Urban growth has resulted in the conversion of land for urban uses without any systematic development plan and without a corresponding investment in infrastructure. Poor land management has resulted in urban areas with inadequate services, infrastructure and corresponding lack of accessibility, that may prove very costly to resolve in future [15]. Transportation has brought the city's influence deep into the hinterland and the interrelation between the city and countryside has gradually strengthened and ultimately the parts of countryside gets merged with the city, giving to a geographical entity to which the term 'urban sprawl' is applied [16].

To prevent urban sprawl and leads to an improper development in any city on future, it is necessary to monitor the growth of city for sustainable urban development [17]. It is important to study the and understand these trend of urban sprawl as it is one of the potential threats to sustainable development where urban planning with effective resource utilization and allocation of infrastructure initiatives are the key concerns and would help in effective land use planning in urban areas (Sarvanan and Illangovan, 2010).

II. STUDY AREA

Mysore city, one of the famous historical and tourist places of South India, is situated at a distance of about 140 Kilometers from Bangalore city. It is one of the largest cities in the state of Karnataka and was the former capital of the kingdom of Mysore. The city lies at an altitude of 1085 meters above the sea level. The city is drained by river Cauvery and Kabini Rivers. It is popularly known as the cultural capital of Karnataka. The city is situated in a Saucer shape basin with Chmundi Hills as a majestic backdrop. The city is spread over an area of 128.48 Km² with the total population of 787179 persons (2001 census). The city's latitudinal and longitudinal co-ordinates are 12°18'26" North latitude and 76°38'59" East longitude. The equable climate of the Mysore city is due to its elevation on the plateau surface and its situation in the rain shadow region of the Western Ghats and has neither extremes of temperature nor high rainfall. Mysore is one of the fast growing cities in Karnataka.

Process of urbanization in India is not different from that no other countries in Asia and Africa. The city has well developed industrial base, which has resulted high degree of urbanization in the surrounding areas and these surrounding areas have started losing its agrarian characteristics and more and more population of the surrounding area now shedding agrarian sector and switching to secondary and territory sector. The development of secondary and territory occupation is luring the population not only from the city's hinterland but also from far off places.

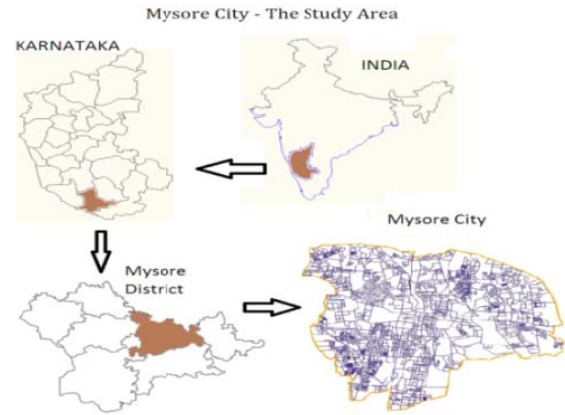


Figure 1. Location Map of Mysore city (Source: Mysore Urban Development Authority)

III. METHODOLOGY

Multi-temporal data are required to study the growth of the city over a period of time, both in terms of area and population. Hence the data pertaining to the study includes trends in population growth, areal growth, changes in land use pattern of different periods. The study is mainly based on secondary data, collected from various publication of census of India, Mysore city Corporation, Mysore Urban Development Authority (MUDA). The data has been analyzed to identify the number of villages merged in to the city at different periods of time. On the basis of its trend and direction of growth, future indications have analyzed. AutoCAD Software has been used to make different thematic maps.

IV. DEMOGRAPHIC PROFILE

Mysore is one of the fast growing cities in Karnataka. The city's population is increasing at a fast rate since 1901; it was just 68111 in 1901 while in 2001 it increased to 787179. The areal extension of the Mysore city has increased from 19.20 Km² in 1901 to 106.27 Km² in 2001 (area under Municipal Corporation). The number of households has increased from 63221 in 1971 to 158472 in 2001. The availability of data is in two forms, one is Mohalla wise and other is ward wise, 2001 data is available in ward wise.

Table 1. Mysore city: Mohalla wise population and sex ratio (1971, 1981 and 1991)

1971						
S. No.	Name of Mohalla	No. of Households	Persons	Male	Female	Sex ratio
01	Lashkar Mohalla	14123	81735	42856	38879	907
02	Mandi Mohalla	1914	56656	29200	27456	940
03	Devaraj Mohalla	10069	53095	28146	24679	868
04	Chamaraj Mohalla	9625	53670	28270	25400	898
05	Krishanaraj Mohalla	7291	41601	21777	19824	910
06	Najarabad Mohalla	6059	33774	17447	16327	936
07	Fort Mohalla	6640	35154	18398	16756	911
Total	Mysore city (M)	63221	355685	186364	169321	910

1981						
S. No.	Name of Mohalla	No. of Households	Persons	Male	Female	Sex ratio
01	Lashkar Mohalla	16462	105833	54222	51611	952
02	Mandi Mohalla	9970	65250	33307	31943	959
03	Devaraj Mohalla	13161	72635	37773	34862	923
04	Chamaraj Mohalla	11426	66107	34363	31744	924
05	Krishanaraj Mohalla	8091	48726	25445	23281	915
06	Najarabad Mohalla	7443	43872	22709	21163	932
07	Fort Mohalla	7121	39331	20529	18802	916
Total	Mysore city (M)	73674	441755	228348	213406	932

1991						
S. No.	Name of Mohalla	No. of Households	Persons	Male	Female	sex ratio
01	Lashkar Mohalla	16861	98909	50639	48270	953
02	Mandi Mohalla	11568	68943	35063	33880	966
03	Devaraj Mohalla	17532	88316	45730	42586	931
04	Chamaraj Mohalla	14710	77000	39852	37148	932
05	Krishanaraj Mohalla	7567	42058	21930	20128	918
06	Najarabad Mohalla	10624	57385	29701	27684	932
07	Fort Mohalla	9544	48081	25021	23060	921
Total	Mysore city (M)	88406	480692	247936	232756	937

(Source: Census of India, Mysore District Handbook, 1971, 1981, and 1991, Note: M - Municipal Corporation)

In 1981, the city had 13 outgrowths namely Belavatha, Bhogadi, Chamundibetta, Devanoor, Irangere, Kukarhalli, Kurubalahalli, Kythamaranahalli, Malalavadi, Maragowdanahalli, Metagalli, Mysore and Nachanahalli. Census Department has collected the data regarding the outgrowths of the city from 1981. These outgrowths cover an area of 42.22 Km² and have the population of 37327 persons of which 18975 males and 18352 females.

In 1991, 10 more villages were brought under Mysore urban agglomeration and the number of outgrowths had increased from 13 to 23 and 41.87 Km² area were added to Outgrowths of the city which was 42.22 in 1981. The area under Mysore urban agglomeration had increased from 82.27 Km² in 1981 to 124.14 Km² in 1991. These outgrowths are: Alanahalli, Belavatha, Bhogadi, Chikkaharadanahalli, Datagalli, Devanoor, Hebbalu, Hinkal, Hutagalli, Iranagere, Kukarhalli, Kurubarahalli, Malavadi, Maragowdanahalli, Metagali, Srirampura, Vijayashreepura, Yaranahalli, Chamundibett, Kythamarhanahalli, Satagalli, Nachanahalli and Mysore.

In the year 2001, Mysore Urban Development Authority (MUDA) has converted Mohallas into wards for administrative purpose. It has 65 wards and 9 outgrowths. The population has increased from 479081 in 1981 to 123730 persons in 2001.

The wards of the city are: D. Agrahara, Agrahara (S. Mutha), Snunnddakeri, Lakshpuram, Chamundipuram(mader block), Hosabandikeri, Fort Mohalla, Gundurao nagar, Vidyaranyapuram, Vidyaranyapuram, Vishweshwaranagara, J.P.Nagar(N.Palya), Ashokapuram, Ashokapuram(K.R. Vana), Jayanagara, Kuvempunagar(K.G.Koppa), Kuvempunagar, Srirampura(Maduvana), Dattagalli, Tonachikoppal, Manasagangothri, Saraswathipuram, Chamarajapuram, Subbarayanakere, Devaraj Mohalla, Devaraj Mohalla(jaladarshini), Kumbaragere, Lashkar Mohalla, Kammatagere, Bamboobazar, Yadavagiri, Yadavagir(M.N.Pura), Metagalli, M.G.Koppal(Hebbula), Kumbarkoppal, Jayalakshampuram, V.V.Puram, Ontikoppal, Paduvarahalli, Kylasapuram, Mandi Mohalla, Mohammadsait block, Thilaknagar, Bannimantap extension, Bannimantap, Rajanderanagara, Kesare, Rajanderanagara, N.R. Mohalla, Veerannageri, Gandhinagar (jalapuri), Gandhinagar, AJ/AG block, Ganeshnagara, Udayagiri, Shanthinagar, Kythamaranahalli, K.N. Pura, Ghousianagara, Gayathripuram, Naazarabad, Ittigegudu, Kurubarahalli, Siddarthanagar and Kalyanagiri. Hinkal, Hutagalli, Metagalli, Sathagalli, Alanahalli, Chamundibetta, Srirampura, Dattagalli and Lingambudi are the outgrowths of the city.

V. DENSITY OF POPULATION

The man land ratio in the Mysore city has increased from 3504 persons per square kilometer in 1901 to 9535 in 1971, after that density of population has rapidly declined in 1981, because of Mysore city are incorporated to the urban agglomeration. At present Mysore city has 6130 density of population.

Table 2. Density of population in Mysore city during 1901-2001 (Source: Mysore Urban Development Authority)

Year	Density
1901	3505
1911	2897
1921	3411
1931	4136
1941	4471
1951	6738
1961	6806
1971	9535
1981	5835
1991	5823
2001	6859

VI. LAND USE PATTERN OF MYSORE CITY

The uncontrolled, haphazard, low density human population will lead to urban sprawl, which is characterized by haphazard patchwork of development leads to an improper development in any city usually happens due to land use / land cover conversion in which the growth rate of urbanized land significantly exceeds the role of population growth over a specific period of time, with impervious surfaces. In the present day world people are more and more attracted towards comforts and luxuries. Consequently population flows rural to the urban in search of some economically gainful activities.

It helps in the growth and areas expansion of the cities. The total area of the Mysore city as per Mysore Urban Development Authority (MUDA) has shown an increase from 1976-2001. The Mysore city has covered nearly 3880.7 hectares in 1976, 7569 in 1995, 9221 in 2001.

Table 3. Land use pattern in Mysore city, 1976, 1995 and 2001 (Source: MUDA, City Development plan for Mysore)

Land use	1976		1995		2001		2011	
	Area in ha	% age	Area in ha	% age	Area in ha	% age	Area in ha	% age
Residential	1284.3	33.09	3057.30	40.39	2849.91	39.90	6097.87	43.45
Commercial	95.5	2.46	182.23	2.41	215.95	3.02	344.07	2.45
Industrial	244.5	6.30	1021.01	13.49	962.61	13.48	1855.05	13.22
Park & open spaces	578.0	14.89	415.77	5.49	918.70	13.74	1055.05	7.52
Public and semi-public	799.8	20.61	856.45	11.32	639.69	8.96	1180.78	8.41
Traffic and transportation	714.1	18.40	1530.73	20.22	1150.27	16.10	2380.56	16.96
Public utility	13.3	0.34	37.26	0.49	36.48	0.51	43.35	0.31
Water sheet	98.6	2.54	182.68	2.41	143.99	2.02	178.95	1.28
Agricultural	52.2	1.36	285.34	3.77	162.33	2.27	898.99	6.41
Total	3880.7	100	7568.77	100	7142.93	100	14034.67	100
Nehru loka	-	-	-	-	2078.14	-	1634.82	-
Total	3880.7	-	7568.77	-	9221.07	-	15669.49	-

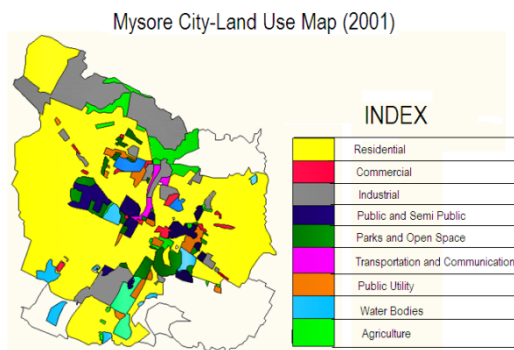


Figure 2. Land use map of Mysore city 2011 (Source: Mysore Urban Development Authority)

VII. SPATIAL EXPANSION OF MYSORE CITY: A GEOGRAPHICAL ANALYSIS

It is observed that the rate at which a particular area grows is not uniform both in time and space. There are several factor, which govern the growth rate and also responsible for the growth to be continue in a particular direction. The traffic nodes are assumed to be the most important factor for the beginning of settlement, which continues to grow with the passage of time. Hence transportation in general is the most important factors in governing the type and rate of growth of the urban areas. The impetus, generated due to the installation of any industry is the next important factor in the growth of the city.

Tertiary activities like services, commercial and other activities follow it. The physical factors of the region like rivers, plains, hills etc which also influence the growth of the city. These factors determine the value of the land, which intern also determines the direction of the growth of the city. In the modern world, the urban development and spatial expansion of urban centers is continuous. The physical growth of the city has taken place along with the population growth. There was considerable spatial

expansion as a result of rise in its population. With the rise in population, the economic base of the city was also diversified generating more employment. The spatial expansion is a consequence of the process of urbanization and urban growth; it is extension of the urban tentacles into the non-urban areas, through the expansion and through the process of agricultural land uses and occupations change from the area of primary activity to secondary and tertiary.

Table 4. Geographical area of Mysore city, 1901-2001 (Source: Census of India, 1971, 1981, 1991 and 2001)

Year	Municipal Corporation (MC)	Urban Agglomeration (UA)
1901	19.2	-
1911	24.32	-
1921	24.32	-
1931	31.74	-
1941	33.68	-
1951	35.84	-
1961	36.84	-
1971	37.3	-
1981	40.05	82.27
1991	97.73	102.68
2001	106.37	128.42

Table 4 indicates the total geographical area of Mysore city from 1901-2001. Mysore city had 19.20 Km² of area in 1901; it had rapidly increased to 106.27 Km² in 2001. The MUDA was established in the year 1981 it may be classified into two groups, i.e., Mysore city Corporation Area and Mysore urban development authority area. At present Mysore city has 106.27 Km² area under Municipal Corporation and 128.42 Km² of area Urban Agglomeration (MC+OG). Mysore city's urban area has marginally increased from 1901 to 2001 due to natural increase of population as well as migration towards the city.

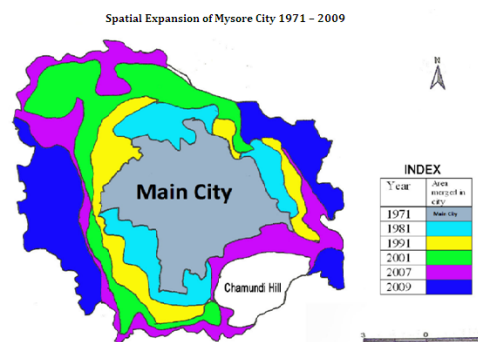


Figure 3. Spatial Expansion of Mysore city 1971-2009 (Source: Mysore Urban Development Authority)

During 1971-1981, due to increasing demand for housing, the trust board further formed three new extensions in various parts of the city. They were Gangothi layout in the west, Kuvempunagar in the south west and the Kumbarakoppal in the northwestern part of the city. The city's expansion during the period took place mainly towards the northeast and southwest.

During this period Municipal Corporation area was increased from 37.30 Km² to 40.05 Km² in the 1981, 82.27 Km² of area has considered urban agglomeration

area, it includes municipal corporation area and outgrowths. In 1971, the Census has classified municipal corporation area into 7 Mohallas, 9 standard urban areas and 19 rural components were considered. In 1981, city Improvement Trust Board was converted into Mysore Urban Development Authority. Mysore Urban Development Authority has 82.27 Km² of area, it was considered as urban agglomeration, it includes both municipal area (40.05) and out growths (42.22). In this decade MUDA has 13 out growths selected from Mysore standard urban area and rural components in 1971.

During 1981 to 1991, the trust board has got the approval of the government to form new layouts in the eastern and northern side comprising of 374 hectares of land. The new layouts are Yaranahalli, Jyothinagar-III stage in the eastern side, Vijayanagara in the western side were incorporated to Mysore city.

In the decade 1991 to 2001, the process of development and expansion of the Mysore city was determined and planned by Mysore Urban Development Authority and Mysore city Corporation. In 1997, the Government of Karnataka revised the comprehensive master plan for the development of the city. It covers an area of 495.32 Km². this project includes city corporation area, 14 villages of Srirangapatna taluk, 79 villages of Mysore taluk and 18 villages of Nanjangud taluk.

In the census 2001, MUDA has converted 7 mohallas into 65 wards for the administrative purpose. In 1991 census, the number of out growths had decreased from 23 to 9 in 2001 census. In this decade 13 out growths from 1991 census were incorporated to the Mysore city Corporation from various parts of the city. These out growth were located in west, southwest, northeast and southeastern directions of the city.

According to the City Development Plan (CDP), which is a 20-year vision document for Mysore, the expansion is significant and there is a 70 per cent increase in the total area of the city since 2001. The extent of urban sprawl in the city is evident from the growth rate over the last five years. The area of Mysore city according to the MUDA has increased from 7,569 hectares in 1995 to 9,221 hectares in 2001 representing a growth of 22 per cent. Of the land use pattern of Mysore shows a tilt towards residential areas, which cover a greater portion of the city, and this is expected to increase in the next few years. The city's development is highly slanted towards Mysore south, including the industrial areas located in Nanjangud, because at present most of the industrial development has come along the Mysore Nanjangud Corridor.

While residential areas developed by MUDA have come up in areas such as Vijayanagar and J.P. Nagar. Besides the MUDA layouts, private developers have proposed an array of residential layouts for which plots have been sold, and the projects are in various stages of implementation. The North western part of the city is developing as the Industrial area mainly Hebbal Industrial Area with major industries. The development of BMIC (Bangalore Mysore Infrastructure Corridor) has enforced development on this part of the city.

No doubt, outer Ring Road (ORR) around the Mysore city was conceived to divert the traffic from the city area, which are crossing through the city, and minimize the congestion within the city. The entire length of ORR (21 Km) takes off from Bangalore – Mysore Road (SH-17) and circumferences Mysore city on the western side crossing KRS Road, Hunsur Road, Bogadi Road, HD Kote Road and joins the Ooty Road near the Regulated Market; and in the eastern side crossing Mahadevpura Road and Joins Bannur Road. This Outer Ring Road will definitely help the traffic to reach the destination without making an entry into the city. But there is also possibility of ribbon development in the near future along its sides. The present direction of growth of the city and the major development happening in the city will help to determine the future growth of the Mysore city. Taking in to consideration the current urban sprawl and proposed projects some of the growth corridors are identified around the Mysore city.

Mysore City - Directions of Future Growth

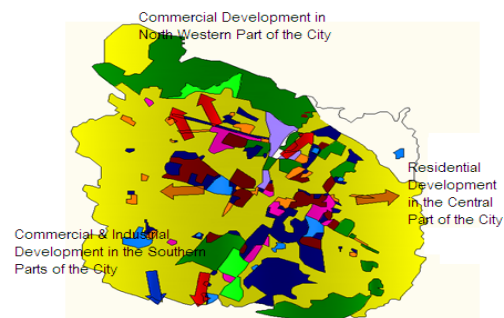


Figure 4. Future Growth of Mysore city
(Source: Mysore Urban Development Authority)

VIII. FINDINGS AND SUGGESTIONS

- ❖ There is an urgent need to look into the agricultural system in the surrounding areas of the city. The rate, at which agricultural land is being destroyed, needs serious thinking on part of planners and policy makers. The reasons for land transformation need to be taken serious. Government needs to encourage the agricultural sector and protect the interest of the farmers.
- ❖ Mysore city is expanding more towards west, northwestern direction, although it has also shown its expansion in eastern direction also.
- ❖ The rate of physical expansion of Mysore city was not same in all the decades, it was fluctuating. Maximum expansion of the city was noticed during 1991 to 2001 and minimum was during 1971 to 1981. This is very natural because when the increase of population and economic activities take place, the territorial limits of city go on increasing. Spatial expansion is closely associated and commonly dependent on population growth.
- ❖ The population of the Mysore city has increased considerably during 1901 to 2001. It was 68111 in 1901 which increased to 787179 persons in 2001. During this period both the population and the geographical area have significantly increased. The geographical area of the city has expanded form 3880.7 hectares in 1976 to 9221.07 hectares in 2001. During this decade the area under

residential, commercial, industrial and public utility were increased from 33.09, 2.46, 6.30 and 0.34 per cent to 39.90, 3.02, 13.48 and 0.51 percent respectively from 1976 to 2001.

❖ In recent decades, Mysore Urban Development Authority (MUDA) is developing various extensions around the city, which accommodates thousands of people. Further many out growths in vicinity of city are incorporated to city corporation during different decades.

IX. CONCLUSIONS

The theme of the paper is to analyze the impact of demographic and areal changes on the urban growth. The expansion of the city however creates a number of problems like reduction of space, housing, infrastructure, services and results in the conversion of agricultural land. Agricultural land is being gradually converted into built-up land like industrial, residential, commercial and other urban uses without any systematic development plan. These problems require immediate attention of the planners and administrators. Growth of infrastructure has not kept pace with the growth of the population, resulting in disequilibrium in the level of development. The sprawl of the city leaves marked impact on the land use pattern which has shown the considerable increase in residential area. The growth of Mysore city not only changes the land use pattern of the surrounding but also internal morphology of the city. "Both development and population growth are responsible for the urbanization and areal expansion of the city."

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BIOGRAPHIES



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Geography with 28 years experience. His areas of specialization are urban geography, GIS and remote sensing, settlement geography, quantitative techniques and urban planning. He is also Chairman Board of Studies in Geography, University of Mysore.