Demographic and Urban Expansion impact on Landscape Change of Mysore City

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ABSTRACT
A house is a basic and fundamental human need. In a literal sense, a house provides warmth, shelter and security. Beyond its physical nature, the concept of ‘house’ is deeply ingrained in human civilization as the space where the institution of family is nurtured. It is a place that reflects a person’s identity, living condition, human values, aspirations, future expectations and one’s social and cultural identity. However, despite the global recognition of its importance, many millions of people in the world live either without safe habitable housing or without any housing at all. This situation is common in developing countries, especially in urban areas. Interestingly the Mysore is one of the historical and compact city of India. It has been noticed that population in this area increasing rapidly since 1901. Moreover the city boundary or urban area is also expanding which increased almost 5 times after 1970’s. Therefore increasing population and their demands requires place of settlement. This increasing pressure on land for residential purpose ultimately encroaches the open and vegetation areas that disturbs the environment. In this sense there is need of sustainable planning to build the houses in outskirts of city and also need to adopt some policies for the better life in old Mysore city.

Key Words: Urban housing, Land use Land cover, Sustainable development, RS/GIS and Mysore City

1. Introduction
Increasing human pressure on land disturbs the whole environment. Urbanization, desertification, and agriculture are some human driven land use change examples that significantly altered the surface of the earth and in this sense land use is an important element of global change (Vitousek, 1992; IPCC, 2000). The global, regional and local scale studies are obtaining a great deal of attention for the characterization of the carbocycle (Melillo et al., 1993; Myneni et al., 1997). An understanding of land use/land cover change at different scales is important in an increasingly human-dominated biosphere. The correct identification and interpretation in land cover and/or land use change is of great interest in environmental change studies (Dale, 1997; Lambin et al., 2001; Vitousek et al., 1997). It has been identified that land-cover change has the most pervasive human impact on natural systems (Vitousek, 1994) and urbanization is perhaps the most severe agent which is highly responsible for land cover change because of its dissimilarity to native habitats and its permanence (Marzluff and Ewing, 2001). 14% of the world’s population was residing in urban areas only by 1900 and this figure had increased to 47% by 2000 (Brockerhoff, 2000). At the end of 2030, the percentage would be 60% of the urban population. The human modification on the earth’s terrestrial surface is responsible for the change in land use. Even though, natural processes may also contribute to changes in land cover, themajor driving force is human induced land uses (Allen and Barnes, 1985). Although humans have been modifying land to obtain food and other essentials for thousands of years, yet current rates, extents and intensities of land use/land cover change are far greater than ever in human history, leading tounprecedented changes in ecosystems and environmental processes at local, regional and global scales. Today, land use/land cover changes encompass the greatest environmental concerns of the human population including climate change, biodiversity depletion and pollution of water, soil and air. The history of urban growth indicates that urban areas are the most dynamic places on the earth’s surface. Despite their regional economic importance, urban growth has a considerable impact on the surrounding ecosystem (Yuan et al., 2005). Most often the trend of urban growth is toward the urban–rural-fringe where there are less built-up areas, irrigation and other water management systems. In the last few decades, a tremendous urban growth has occurred in the world, and demographic growth is one of the major factors responsible for the changes. This urban growth is a common phenomenon almost all countries over the world though the rate of growth varies. Currently, these are the major environmental concerns that have to be analyzed and monitored carefully for effective land use management.
updating and obtaining of information about the current condition and the continuous dynamic changes of our earth’s surface in remote high-mountain regions is a task where remote sensing technologies can best display their advantages. Land use cover (LUC) assessment is one of the most important parameters to meaningfully plan for land resource management. LUC inventories are assuming increasing importance of invaluable resource sectors like agricultural planning, settlement surveys, environmental studies and operational planning based on agro-climatic zones. The knowledge of spatial land cover information is essential for proper management, planning and monitoring of natural resources (Zhu, 1997). The multi-temporal data is frequently used to generate landscape-based metrics and to assess landscape condition and monitor status and trends over a specified time interval (Jones et al., 1997). Monitoring and mediating the adverse consequences of landuse/land cover change while sustaining the production of essential resources has become a priority of researcher’s and policy makers around the world (Erleand Pontius, 2007).

The inner city dominates popular imagination of haphazard urban growth as these areas are generative of urban problems in various shades of grey. But the peripheries face somewhat a unique dilemma that revolves around the dual question of uncertainties. The first is of isolation by cost if not by time and distance, from the city centre and all the facilities and services which it does still provide. The second is the issue related to the impact of city extension upon its countryside: it is perhaps the biggest challenge as far as the city-planning is concerned. The city planner’s today, no longer view planning for the city and that of its suburbs separately as they together make an ‘urban area’, livable. The approach of the planners and architects to the urban fringe problems differ from those of social scientists, in so far as they focus on urban land policy, plan outlays and relevant acts. During the industrial growths however cities expanded into their rural hinterlands and such walls of distinctions were abolished physically and conceptually. Suburbanization, or the emergence of suburbs has along tradition that began in Europe in the 17th-18th Century in England and later went into the North American countries and Asia. The loss of former typical CBD functions of the core city and the growing importance of the former suburban areas can be observed everywhere with its clearest expression in these called Edge Cities (Garreau, 1991). The city of Mysore has a rich cultural heritage and now happens to be a fast growing city of Karnataka, after Bengaluru. Typically has grown outward while accommodating its growing population and this has led to the changes in landscape pattern as well as its fringe areas which has slowly been included in the urban area of Mysore CityConurbation. The growing autonomy of suburbia, the weakening linkage between the city and its suburban hinterland and as a result, the replacement of the traditional radial transportation pattern of the early sub urbanization by a non-directional more tangential an even a random or chaotic one with its highest density within and between the former suburban areas, and the side by side existence of rural areas with agricultural land use, highly concentrated notions like ‘city-land’ (Holzner, 1996), ‘between-city’ (Sieverts, 1997) or simply ‘Metropolitan Areas’ may be applied to any and everywhere of the developing Nation and its suburbs. Hence, ‘city as a specific unit beyond the randomness of administrative territorial organization’ does not exist anymore (Hausermann and Siebel, 1987). These metropolitan areas are neither urban nor rural and ‘unlike all cities of the past, this new ones has no defined centre or periphery, no core, no manufacturing or growth corridors in low density settlements that combine urban, suburban and rural elements in a seemingly random and endless collage’ (Fishman, 1994). One can observe a spatial form of societal order whose characteristic feature is the rapid weakening of the spatial centre-periphery gradient, the plume disappearance of a territorial border. Today the cities everywhere and nowhere. The city is observed as apatial form, if at all only in the case of small and medium sized towns (Gerhard, 1971). The expansion of the city by way of what is termed by McKay the ‘Metropolitan Invasion’ has proceeded unimpeded with the increasing tempo and has engulfed the land in the suburban transforming the face of the country (Shaw and McKay, 1942). The metropolitan invasion would take its start from the central community and move towards more Urbanization.

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 acentripetal force, attracting people to towns and cities; on the other hand it also acts as centrifugal force, radiating influences outward, which reinforces its centripetal role (N. Anderson, 1959). 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 increases over time (H. Tisdale, 1942). Urban sprawl has become the catch phrase for everything that is bad about urban growth today: congestion, blight, monotony, endless development and ecological destruction (R. Pieser, 2001). All cities have an image. Infect, it would be true 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 insize and considerable population (T. Hall, 1998). Cities are a complex aggregation of multi-activities: economic, social, cultural etc (L.N. Verma, 2008).

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 get influenced by the city market which in turn support urbanization or urban expansion of a city (A. Assari et al., 2011). Cities donot grow of themselves but it is the countryside which sets them to do task which must be performed by them (M. Jefferson 1931). 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 some 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. Smalltowns are related with bigger towns, and bigger towns are closely linked with the city and so on (E. Smailus, 1947). Rapid urbanization has resulted due to the several factors. However, the natural growth of the population, the rural urban migration are important in it (P.C. Bhatacharya, 2002). The negative impacts of urban sprawl can be analyzed with three ways leapfrog development, low density and unlimited outgrowth expansion - are same as those that define the positive aspects of sprawl (R.W. Burchell, 1998). 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 (R. Sinclair, 1967). 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 marriage and family size, occupational and internal migration (H. Sharma, 1983). 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 (V.S. Phadke and K. Sita 1981). 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.

The International conferences on Human and the Environment, the United Nations Conference on Environment Development (UNCED) (Rio, 1992) and the World Summit for Sustainable Development (Johannesburg, 2002), called for substantive changes of land-use and land-cover changes. This is because the effects of land-use and land-cover are directly related to the livelihoods of people. According to Pimentel (1993), for almost all food requirements, people of the world fully depend on land resources, except for only 3 per cent of the food which is coming from aquatic resources. Therefore, this important resource needs careful evaluation and management. In order to understand the various implications of land cover change, understanding of land-use change is essential. Timely and precise information about LULC change detection of earth’s surface especially built-up area is extremely important for understanding relationships and interactions between human and natural phenomena for better management of decision making (Lu and Mausel, 2004).

The ultimate goal of global change study is to assess the impacts under each possiblescenario and suggest preventative actions against the adverse environmental consequences. The focus is on the adverse impact of these regional and global changes on society and environment. Empirical studies by researchers from diverse disciplines found that land use/land cover and its change had become key to many applications such as environment, forestry, hydrology, agriculture (Li and Yeh, 1998), geology, anecology (Weng, 2001). These applications referred to urban expansion, deforestation, crop land loss, water quality change, soil degradation etc. At the same time, in the past decades, according to Lambin (1997), a major international initiative to study land use change, the land use and land cover project had gained great impetus in its efforts to understand driving forces of land use change, developed diagnostic models of land use change and produce regionally and globally integrated land use models. Historical changes in land use types such as urban expansion, agricultural land loss and forest cover change were addressed in different studies. Houghton (1994) pointed out the major reason of land use change was to increase the local capacity of lands to support the human enterprise. Nowadays, localized changes around the world added up to massive impacts. Thus, it could be argued that even modest changes in land use had some unintended consequences.

2. Role of Remote Sensing and GIS in Land Use/Land Cover Classification

Remote Sensing (RS) and Geographical Information System (GIS) have emerged as a powerful tool for mapping and analysis of land use land cover. Supervised classification of satellite imageries is a popular method for land use classification. Classification is the process of assigning classes to the pixels in images. Successful utilization of remotely sensed data for LULC studies demands careful selection of an appropriate data set and image processing techniques (Lunetta, 1998). Digital image classification is the process of assigning pixels to classes. Usually each pixel is treated as an individual unit composed of values in several spectral bands. The automated classification method relies mainly on brightness and spectral elements and not much on spatial content (King, 2002). These types of classifications generally work well for spectrally homogeneous areas like forest but for heterogeneous regions these methods are not well recommended (Yang and Lo, 2002). Image classification techniques are most generally applied to the spectral data of a single-date image or to the varying spectral data of a series of multi-date images (Sabins, 1997). The purpose of image classification is to label the pixels in the image with the real information (Jenson & Gorte, 2001). Through classification of satellite image, thematic maps such as the LULC can be obtained (Tso and Mather, 2001).

3. Classification Schemes

Based on geographical conditions and socio economic, number of classification schemes are developed and applied. The important classification schemes are developed by NRSA (1989), Anderson (1971) and Grigg (1965). There is closer relationship between the level of classification, the resolution of satellite image and the level of economic
development. There are numerous land classes but for the sake of study urban sprawl and its expansion is important. Therefore, first level of urban and built up area and its further classification discussed here with proper definitions.

4. Significant parameters responsible for urban expansion:

There are various factors which are responsible for Mysore city expansion. In this study the demographic analysis and land cover changes have been discussed as main contributors of Mysore City expansion.

4.1. Demographic Analysis:

Mysore is one of the fast growing cities in Karnataka. The city’s population in increasing at a fast rate since 1901; it was just 68111 in 1901 while in 2001 it increases to 785800. The Ariel 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 also 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. Here 2001 data is mentioned as per the information of wards.

In 1981, the city had 13 outgrowths namely Belavatha, Bhogadi, Chamundibetta, Devanoor, Irangere, Kukarhalli, Karubalahalli, Kethamaranahalli, Malalavadi, Maragowdanahalli, Metagalli, Mysore and Nachanahalli. Census Department has collected the data regarding the outgrowths of the city from 1981. These out growths 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 out growths had increased from 13 to 23 and 41.87 Km² were added to Outgrowth 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 outgrowth are: Alanahalli, Belavatha, Bhogadi, Chikkaradananahalli, Datagalli, Devanoor, Hebbalu, Hinkal, Hutagalli, Iranganere, Kukarhalli, Kurubarahalli, Malavadi, Maragowdanahalli, Metagalli, Srirampora, Vijayashreepura, Yaraganahalli, Chamundibett, Kethamaranahalli, 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. Now the population status in Mysore city is 893062, as per the census, 2011 (Figure-1).

4.2. 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 exceed 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 grows 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-1: Shows the area and percentage distribution of different land use between 1976 to 2011 (Source: MUDA, City Development plan for Mysore).

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<td>Residential</td>
<td>1284.3</td>
<td>33.09</td>
<td>3057.30</td>
<td>40.39</td>
<td>2849.91</td>
<td>39.90</td>
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<td>2.46</td>
<td>182.23</td>
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<td>215.95</td>
<td>3.02</td>
<td>344.07</td>
<td>2.45</td>
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<td>6.30</td>
<td>1021.01</td>
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<td>962.61</td>
<td>13.48</td>
<td>1855.05</td>
<td>13.22</td>
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<td>Park &amp; open spaces</td>
<td>578.0</td>
<td>14.89</td>
<td>415.77</td>
<td>5.49</td>
<td>918.70</td>
<td>13.74</td>
<td>1055.05</td>
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<td>Public and semi-public</td>
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<td>20.61</td>
<td>856.45</td>
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<td>639.69</td>
<td>8.96</td>
<td>1180.78</td>
<td>8.41</td>
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<td>Traffic and transportation</td>
<td>714.1</td>
<td>18.40</td>
<td>1530.73</td>
<td>20.22</td>
<td>1150.27</td>
<td>16.10</td>
<td>2380.56</td>
<td>16.96</td>
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<td>Public utility</td>
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<td>0.34</td>
<td>37.26</td>
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<td>36.48</td>
<td>0.51</td>
<td>43.35</td>
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<td>Water sheet</td>
<td>98.6</td>
<td>2.54</td>
<td>182.68</td>
<td>2.41</td>
<td>143.99</td>
<td>2.02</td>
<td>178.95</td>
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<td>285.34</td>
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<td>162.33</td>
<td>2.27</td>
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<td>7568.77</td>
<td>100</td>
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<td>14034.67</td>
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<td>7568.77</td>
<td>-</td>
<td>9221.07</td>
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<td>15669.49</td>
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Figure-2: Graphical representation of area under land covers from 1976 to 2011.

4.2.1. Residential area:

The built up area for residential purpose increased largely showing a gradual urban expansion of the Mysore City. This is the result of increase in population during the study period (Statistical analysis from table-1 and figure-4). As a result about 4813 hectares of area has been expanded and used for residential purpose between the study periods i.e., 1976 to 2011 showing a 10.36% increase in residential area of the Mysore city (Figure-2). To meet the growing demand of the open space, the rural areas are merged with urban area of Mysore.
4.2.2. Commercial and Industrial areas:

Commercial and industrial areas recorded an increase of 248.57 hectares and 1610.55 hectares respectively. This signifies that there has been a large amount of Commercial and Industrial expansion in Mysore during the study period. There has been a large amount of industrialization in Mysore leading to the expansion of the city.

4.2.3. Park and Open space:

The data about area used for park and open space from Table-1 in Mysore shows a very small increase during the study period i.e., 477.05 hectares. The cumulative percentage area for Park and Open space shows a sharp descent of 14.89% to 7.20% from the total area of Mysore compared to other land cover areas as there is increase in percentage.

4.2.4. Traffic and Transportation:

The area used for traffic and transportation was 714.1 hectares in 1976 and 2380.56 hectares in 2011 showing an increase of 1666.46 hectares in 35 years. This is the result of urban expansion and increase in population which results in increase in number of roads connecting different parts of the Mysore city.

4.2.5. Public utility and Water sheet:

The area used for Public utility and Water sheet shows a gradual increase during the study period as observed from the table-1 and figure-4. A 30.05 hectares and 80.35 hectares increase in area has been observed during the study period for Public utility and Water sheet respectively.

4.2.6. Agricultural Land:

As a result of urban expansion of Mysore during the study period there has been increase in area used for Agriculture. This is because of merging of the neighboring rural areas into the city during the expansion. A total of 846.69 hectares increase has been observed in the area of land used for agriculture during the study period of 35 Years.
5. 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 factors which govern the growth rate and also responsible for the growth to 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 factor 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 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 process of agricultural land uses and occupations change from the area of primary activity to secondary and tertiary.

Table indicates the total geographical area of Mysore city from 1901-2001. Mysore city had 19.20 Km² of areas 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 surban area has marginally increased from 1901 to 2001 due to natural increase of population as well as migrant towards the city.

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 Gangothri layout in the west, Kuvempunagar in the southwest 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 (Figure-5), 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 outgrowths (42.22). In this decade MUDA has 13 outgrowths 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 Yaraganahalli, Jyothish Nagar Illistage in the eastern side, Vijaynagar 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 Srirangapatnanaulk, 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 outgrowths had decreased from 23 to 9 in 2001 census. In this decade 13 outgrowths from 1991 census were incorporated to the Mysore city Corporation from various parts of the city. These outgrowths were located in west, southwest, northeast and southeaster 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 to 9,221 hectares in 2001 representing an agroth 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 highlylsanted towards Mysore south, including the industrial areas located in Nanjangud, because at present most of the industrial development has come along the Mysore-Nanjagud 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 (21Km) takes off from Bangalore – Mysore Road (SH-17) and circumferences Mysore city on the western side crossing KRS Road, Hunsur, Road, Bogadi Road, HDKote Road and joins the Ooty Road near the Regulated Market; and in the eastern side crossing Mahadevapura 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 into consideration the current urban sprawl and proposed projects some of the growth corridors are identified around the Mysore city.

6. CONCLUSIONS

Poverty, population growth, rapid urbanization, unplanned city development and many other variables have greatly influenced the development of Mysore city. In this paper it has been found that the increasing population and limited space is a major problem that leads to the high density housing; especially in old city of Mysore. There has been a large expansion in area of Mysore city during the study period of 35 years. Expansion is noticed mainly in residential and industrial areas i.e., 4813 and 1610.55 hectares respectively. The expansion rate has been observed declining in Public and semi public areas and also in water sheet. A large amount of urban expansion is observed during the years 2001 and 2009 in Mysore. Interestingly it has been noticed that the density of houses also depends on the income of people. Area under the poverty have found more house density rather than the low density houses of posh colonies where the income is high. Due to the compactness, pollution is increasing and high class people wants to stay in open environment on the outskirts of city which leads the urban expansion. Therefore there should be a restriction of urban expansion especially in natural land covers so that we can protect the local environment. Professionals and policy makers who work with urban planning and city development of Mysore could open a way of thinking about issue.

Bibliography