Aarhat Multidisciplinary International Education Research Journal (AMIERJ)

(Bi-Monthly) Peer-Reviewed Journal
Impact factor: 2.125

VOL - IV   Issues: III

Chief-Editor:
Ubale Amol Baban
PRELIMINARY ASSESSMENT OF MYSORE CITY EXPANSION USING REMOTE SENSING AND GIS

Mohammed Aleem Pasha
Department of Geology
Central University of Karnataka
Kalaburagi 585367 Karnataka, India

Abstract
The urban centres in India are expanding rapidly and randomly along their peripheries due to increasing population. In Karnataka also, since the capital city is growing rapidly, Government of Karnataka is looking Mysore as the next destination for IT and other industries. In this context, the authors felt it is timely to study the previous expansion and based on these results project the expansion for the next decade, and also select the suitable sites for different purpose. For this purpose, PAN image of IRS-1D and topographical map is used and the data is analysed using different GIS techniques.

The analysed results showed that, the Mysore has expanded in north-western and south-western direction respectively for the industrial and residential purpose. In the last three decades the population of Mysore city has increased two fold and the area increased is more than thrice the area existed during 1972-73. In the past Mysore has expanded rapidly but in the forthcoming decades it is assumed that, it will expand linearly trending east-west.

Key words: Mysore, GIS, Remote Sensing, Urban growth

Introduction
The increasing population in the urban areas is putting pressure on urban local bodies for housing and other basic needs. Since, these urban local bodies could not cope up with
the pressure; lots of unauthorized constructions (private/revenue layouts) are growing haphazardly around the cities [1]. In most of the cases these congregations are unplanned and lack many of the civic amenities. This leads to the transformation of the land use within the cities and the agricultural areas around the cities will be transformed into non-agricultural areas.

Mysore is located on 12°18’ North latitude and 76°39’ East longitudes and situated at 770 m above MSL. Mysore is the most important city in Karnataka next to Bangalore, the capital city of Karnataka. In the last decade Bangalore has emerged as the centre of IT industry and over crowded with them. Now, domestic and international investors are looking Mysore as the next destination and to make it happen, the government of Karnataka is providing necessary infrastructure. Hence, it is assumed that in near future Mysore will become a satellite town to Bangalore. In this context, the author felt a need of studying previous growth and project the direction of expansion of Mysore city in future. Using remote sensing and GIS techniques one can draw a suitable direction of expansion, suitable sites for domestic, industries and other type of settlements [2,3]. The aim of this paper is to study the expansion occurred in the last few decades and based on this, an attempt is made to project the expansion in the next decade. For this purpose PAN image and topographic map is used. The analysis is carried out using different GIS techniques.

**Methodology**

The data used in the present study is the Survey of India topographic map numbered 57D/11 of 1972-73 with the scale of 1:50,000, PAN image of IRS 1D of 2001 and the census of India census data of Mysore for the years 1971 and 2001.

The topographic map is georeferenced employing the standard procedure and then the limit of urban area is marked on the map through vectorization. The PAN image is
georeferenced using the already georeferenced toposheet of Mysore. Geometric correction of satellite imagery was done using the points acquired in the field using the handheld Garmin GPS instrument. The RMS error achieved is 0.16481. The urban limit obtained from the toposheet is superimposed over the PAN image. Then the extended inhabited urban area is digitized with reference to the satellite imagery. In addition, the newly planned uninhabited extension areas are also digitized separately. The boundary existed during 2001 was cross verified by oral inquiries in the field visits.

Results and Discussion

The urban population of India has rapidly in recent years. According to the 1971 census, 109.11 million people were living in urban area which is 19.91% of the total population (548.15) of India. In 2001, people living in urban areas rose to 285.00 million constituting to 27.78% of the total population (1027.01). Similarly, total population living in Mysore during 1971 was 3,35685 and rose to 7,87179 in 2001.

Figure 1, shows the spatial extent of Mysore city during 1971 and 2001. Table 1, shows the analysis of the present study related to the Mysore city. The analysis results showed that the area covered under the city corporation limit in 1972-73 is 36.847 sq.km increased to 122.154 sq.km in 2001. According to Mysore city corporation the area governed by it during 1971 is 37.3 sq.km and the area covered under the city limit during 1972-73 is 36.847 sq. Km as per the present study as shown in table 1. Since, we marked the area existed during 1972-73 using the toposheet, there exists a 0.453 sq.km of difference in area. This analysis also indicated that the villages and the agricultural/farm land existed on the fringe zone has got converted to urban area in the last three decades. Existence of inadequate services and facilities in the old villages and unauthorized colonies are the common features of the fringe areas [4]. Our field study
showed that many of the unauthorized colonies are lacking even basic facilities like sanitation and roads.

![Figure 1. Spatial expansion of Mysore city.](image)

Table 1. Analysis data of total area of Mysore city.

<table>
<thead>
<tr>
<th>Year</th>
<th>1972-73 Inhabited 2001</th>
<th>Uninhabited 2001</th>
<th>Net growth 2001</th>
<th>Total area 2001</th>
<th>Total area 2004*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Area In sq.km</td>
<td>36.847</td>
<td>58.902</td>
<td>26.405</td>
<td>85.307</td>
<td>122.154</td>
</tr>
</tbody>
</table>


In figure 1, the inner polygon indicates the area governed by the urban authority during 1972-73 and the outer polygon indicates the expanded area during the last three decades. Table 1 show that there is an increase of 85.307 sq.km of area in the last three decades. Out of this 85.307 sq.km, the inhabited area comprises 58.902 sq.km and the uninhabited area is 26.405 sq.km. According to the Mysore city corporation during 2004 the area governed by it is 128.42 sq.km, it indicates that there is an increase of about 6.266 sq.km.
of the area in last three years. Since, the boundary existed in 2001 was verified by physical inspection and then marked on the satellite imagery, there may be a marginal discrepancy in the total area calculated for the year 2001.

Figure 1 clearly indicates that Mysore city has expanded more in the north-western and south-western direction, and marginally on western and eastern sides. In overall, during this period the city has expanded radially, in general, expansion leads to the transformation of rural area into the urban area. Some of the physical changes occur due to expansion areas are; deduction of agriculture land holdings, loss of fertile land, increase in new buildings and density. The agricultural/plantation land that existed during 1972 in the south-western and north-western part of Mysore has respectively converted into residential and industrial area; supports the above mentioned characters are true in case of Mysore city’s expansion also. Ever growing population in urban areas coupled with the growing difference between the demand and supplies of house sites and very high cost of land in the city have increased the pressure on fringe areas tremendously [1]. This can be clearly seen in the figure 1 where the polygons marked on the outer periphery are the pockets that have already been planned as the next residential areas.

**Expected expansion**

For the author’s convenience the projection is restricted only to one decade as it was during a national seminar where the partial data was used a few years ago. Since, the presence of a hill on the southern side, there is no possibility of expansion in that direction. The author also rule out the immediate possibility of expansion in the northern and southern (beyond hill) direction because of the presence of good canal network. At present, the industries are concentrated on the north-western side and it is expected that industrial area in Mysore will grow in the same direction. The industrial establishments
encourage the villagers to change their occupation and encourage the workers to get the housing facilities nearer to the working places. This will encourage converting the agricultural land into the urban land, hence, there are more possibilities of expansion of Mysore city in the western direction because of the presence of the industries in the northwest of the city.

In the eastern and the north-eastern part of the city the absence of proper irrigation facilities has encouraged the farmers to sell their lands to the speculators. In the north, it has been observed that the urban area did not expand beyond the right bank canal of river Kaveri because of the availability of water for agriculture. Hence, the author assumes that in the eastern side also it will not expand beyond this canal in near future and it is considered as the limit of growth for a decade.

In the fringe zones, old villages, new residential extensions, industry, city service and farming are not nearly sorted out into homogenous areas but are intermingled in a random fashion which gives a distinctive quality to the land use pattern of rural urban fringe [4]. This type of mixed land use can be seen in the area between the outermost polygons and the right bank canal, which is considered as the fringe zone for the study purpose where some of the residential extensions polygons are scattered in the agricultural land. On the western side also one can see the presence of many planned extensions. Since for the author’s convenience, the major criterion adopted is the availability of irrigation facility, it is very difficult to put a limit of expansion because of the absence of proper irrigation facilities on this side. Hence, it is assumed that in this direction there are more chances of expansion than any other direction.

**Effects and suggestions**

As per the guidelines of the Central Public Health and Environmental Engineering Organisation (CPHEEO) at least 135 lt of water per person to be supplied per day and at
Present 160 MLD of water is supplied to the city. A significant share is met by groundwater. The total number of bore wells exists during 2004 are 2205, among this 630 are mechanised and the remaining 1575 are hand pumps. Since, the population is growing it may leads to shortage of water in coming years and to solve the problem the civic administration may depend on groundwater further. To utilise the bore well to its maximum potential it has to be recharged properly. Hence, in the author’s opinion during the planning of expansion, the civic administration should leave some suitable sites for the groundwater recharge (pits, trenches etc) which will definitely enhance the yield of bore wells. A geological consultation should be done before the planning of extensions, to locate suitable site for bore wells and recharging places.

The efforts made by the civic authorities to establish sewage and solid waste treatment plants to protect the environment are laudable. The citizens residing in the areas adjacent to the industrial area in the northwest of city are prone to the environmental hazards. Hence, it is advisable to grow a strip of forest adjacent to the industrial area which will protect from sound and air pollution to certain extent. A major part of the agricultural land is and will be utilised for the expansion, and is rich in nitrogen content derived from fertilizers. In many of these areas the needs of drinking water is fulfilled by groundwater partially. Hence, there is a need of adopting to water purification techniques.

This is just a preliminary assessment made to understand the expansion and its effects; one cannot draw any major significant conclusions from it. Hence, there is a need of detailed study of proper understanding of effects caused by the expansion, and for suggestions.

Conclusion
This study showed that the Mysore city has expanded in the north-easter and south-western direction for the residential purpose; north-western side for the industrial

www.aarhat.com  IJIF Impact Factor 2.125
purpose during the last three decades. The total area governed by the city corporation in 1972-73 was 36.847 sq.km increased to 122.154 sq.km in 2001. During this period the Mysore city population increased by more than two times and the area increased is more than thrice the area existed during 1972-73. The area increased in the three decades is 85.307 sq.km, which is more than twice the area existed during 1972-73.

It is assumed from the observation made in the study that the Mysore city will expand in eastern and north-eastern side up to the right bank canal in near future. The presence of industries in the north-western part coupled with the absence of proper irrigation facilities encourage expansion on western side for residential purpose.

To summarise, Mysore has witnessed a radial growth in the previous decades but in the forthcoming decades it will expand in northeast, east and western direction in general and towards west in particular. The author believes that in future it will grow linearly trending east-west. Surely, this is just a rough estimation of the area expanded and a thorough investigation should be done for more detailed and accurate estimations.

References