

# REMOTE SENSING & GIS A TOOL FOR URBAN STUDIES- AMENITY PATTERNS IN HYDERABAD (A.P, INDIA).

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## Abstract

A jewel in the crown of the state, the bubbling heart of Telanganna region, a living and glowing testimony to the ancient past, studded with reminiscences from the convergent cultures as they have blended into the cultural kaleidoscopes of the present- that is Hyderabad, more than 400 years old capital of the state of Andhra Pradesh. The pearl city of India is truly a pearl in the urban mosaic of the country. The study area covers Hyderabad city situated in the heart of the Deccan Plateau at an average height of 540 mts (1760 feet's) above mean sea level. The city is located at 17° 20' North latitude and 78° 30' East longitude, covering an area of 240 Sq.Kms, at present city consists of 35 municipal wards including 12 wards of Secunderabad.

Population acts on land through a spectrum of activities, which can be broadly classified as agricultural, commercial, industrial, residential, transportation, administration etc. Needless to say that the AMENITIES and daily needs of individuals have a prominent impact on urban growth. It is here satellite remote sensing with its ability to provide data periodically on urbanization, resources and environment which is up to date, reliable, accurate and also cost effective, offers excellent possibilities to map and monitor urban land use, urban resources and urban environment to a greater extent.

This study demonstrates the use of high-resolution satellite data in generating spatial data on the image for the city. Analysis is carried out for mainly Amenity patterns and facilities available in the city. Road patterns within the city are analyzed and road network map is generated.

Proximity analysis is carried out to understand the availability of Fire Brigade and police stations for affective disaster management. City was built to meet the demand for 5 Lakhs population and now it is 50 Lakhs population. This is very clear that there is heavy pressure on Amenities & facilities (Utility services). City has grown rapidly in all directions especially in North, North West and West part living behind a big question mark on the planners for providing proper Amenities. This paper helps in correlation phenomena, identifying zones of inadequacy and inadequacies in the city system of Hyderabad. The administrators in the city can evolve an expert of a decision support system aimed at for various decision-making processes.

## Introduction:

A jewel in the crown of the state, the bubbling heart of Telanganna region, a living and glowing testimony to the ancient past, studded with reminiscences from the convergent cultures as they have blended into the cultural kaleidoscopes of the present- that is Hyderabad, more than 400 years old capital of the state of Andhra Pradesh. The pearl city of India is truly a pearl in the urban mosaic of the country. It is witness to the historic splendor monuments of glory's cultural magnificence, culinary and dialectic uniqueness, a rich admixture of the north and south India cultural traditions and now a new wave of urban renewal and modernization.

It is the eternal melting pot that has absorbed and metamorphosed people from all parts of India and even abroad. The gravitational pull of this city has stood the test of time and it is one of the most culturally diverse capitals in India. It has multi linguistic and multi religious society, which weaves into the spatial fabric of the city in multi-tonal hues & tents. Migrants of the first, second, third generation and so forth take pride in calling themselves Hyderabadis but at the same time bestow some bit of their native influencer into this growing

conglomerate that is Hyderabad. These influences enrich and nourish the body of the city, which is marching into the future with equal aplomb. It has been very quick in reaching the stature of the technological capital of the south India and is envisioned as the 'City of the future'.

The city has a star shaped layout and seems to grow along the main transportation arteries. The growth towards the Northwest, North, and Northeast is along the highway that connects the city to Mumbai, Delhi, and various districts headquarters respectively. These incidentally are also the directions in which there is major industrial development. Thus Urban- Industrial- Transportation development seems to go hand in hand in these areas and this is a significant post-independence phenomena. These directions have thus been consistently pulsating with growth dynamics for the past almost fifty years. The growth in the Southeastern periphery of the city is a case in contrast. It houses a large and growing residential area along the Vijayawada highway. Being a totally residential area it is dormitory in nature compared to the other growing suburbs menaced above that are industrial and hence economically active.

The skyline of the city has also witnessed a marked transformation since the eighties. Vertical development has become the order of the day. Cement and concrete structures seem to be replacing the high roofed mansions of the bygone era. Demolitions of the latter are usually carried out without batting an eye bid or a thought for the environmental consequences of the effort. Real estate promoters are having a heyday, as the land and property values are escalating at an unprecedented pace. While the core areas of the city were the first to acquire the vertical structures, starting in the seventies, these are now sprinted all over the city extending up to the limits of the city and suburbs areas, though the density and heights are definitely more in central city locations- these concrete jungles have definitely raised the temperature of the city in the recent past and have been responsible for the emergence of heat islands a concept unknown to Hyderabad of , are which was known for its salubrious climate.

The study area covers Hyderabad city situated in the heart of the Deccan Plateau at an average height of 540 mts (1760 feet's) above mean sea level. On the North it has Nagpur city, South it is Bangalore city, East it has Vishakapatnam city, in the West Mumbai city beside many other cities around. The city is located at 17° 20' North latitude and 78° 30' East longitude, covering an area of 240 Sq.Kms, at present city consists if 35 municipal wards including 12 wards of Secundrabad. The twin cities of Hyderabad and Secundrabad stands on pink and gray granites, these granite hills are spread all over the city and its surrounding areas. River Musi is a tributary of river Krishna, passing through the heart of the city dividing the city into Hyderabad North and Hyderabad South. The flow of river Musi is from west to east attests to the general slope of the city which is eastward.

Population acts on land through a spectrum of activities, which can be broadly classified as agricultural, commercial, industrial, transportation, administration etc. Needless to say that the Amenities and daily needs of the individuals have a prominent impact on urban growth. Hyderabad registered a decadal growth rate of 57%. All this rapid and haphazard growth of urban sprawl and increasing population pressure is resulting in deterioration of infrastructure facilities, loss of productive agricultural lands and green open spaces, loss of surface water bodies and depletion of groundwater aquifers zones, besides causing air pollution, contamination of water, health hazards,

and micro-climatic changes. To address these issues effectively, it requires up to date and accurate data at regular intervals of time on the changing urban sprawl, urban land use, urban environment, urban infrastructure and urban resources.

The satellite remote sensing with its ability to provide reliable and accurate data offers excellent possibilities to map monitor and measure the various facets of urban planning and development. The availability of space data from IRS-1D becomes more relevant and important for urban and municipal planning and for making proper decisions for the overall development of Hyderabad city.

According to 2001 census, Hyderabad is the fifth largest metropolis of India with a population of 5,434,347. The population of Hyderabad has increased from 0.448 million in 1901 to 0.502 million in 1911 but come down to 0.406 million in 1921. It again went up to 0.447 million in 1931, 0.739 million in 1941 (an increased of 665%), 1.28 million in 1951 (52%), 1.429 million in 1961 (11% increase), 1.796 million in 1971 (44% increase). But in 1971 and 1981 the population went up to 2.759 million, and the rate of increase in the urban agglomeration was 43%. Between 1981 and 1991 the population went up to 4.34 million and the rate of growth to 67%, and population went up 5.43 million in 2001 and a growth rate of 24%.

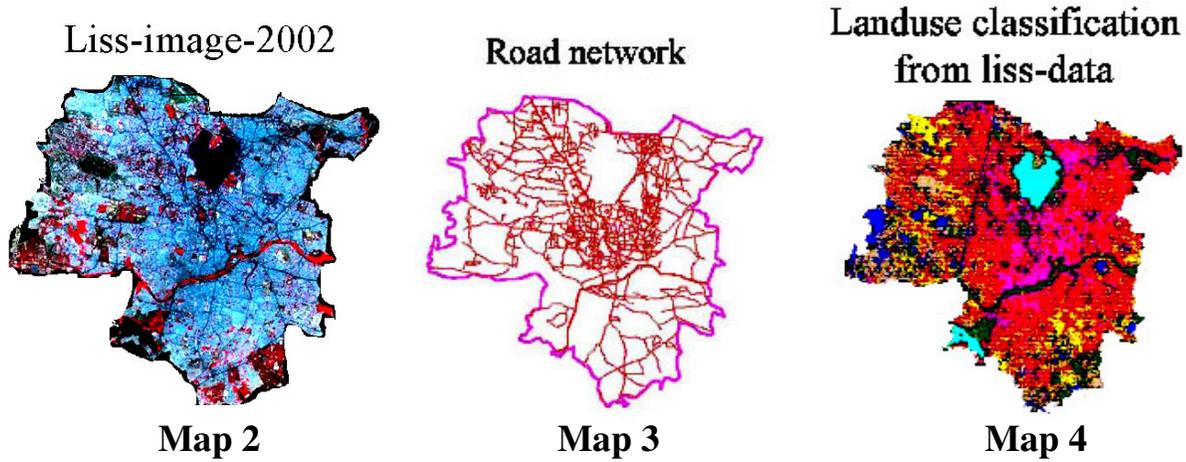
### **Data Sources:**

Hyderabad Urban Development Authority (HUDA), Municipal Corporation of Hyderabad (MCH), National Remote Sensing Agency (NRSA), Census of India, Commissionarate of Schools, Board of Intermediate education, Higher education department, Medical and Health department, Fire brigade and Police department, Survey of India Toposheets (SOI), etc.

### **Methodology:**

Base map is prepared with the help of Survey of India (SOI) Toposheets Map1.

Liss-III image of 2002 (Map 2) is used for Road network (Map 3) and Land use classifications (Map4 & Table 1).



**Landuse Classification Table 1**

Row	Value	Histogram	Color	Red	Green	Blue	Opacity
0	0	967931	Black	0	0	0	0 Unclassified
1	1	43548	Cyan	0	1	1	1 water-body
2	2	145930	Black	0	0.332757	0	1 vegetation
3	3	269400	Yellow	0.623529	0.701961	0.54902	1 open-scrub
4	4	218623	Magenta	1	0	1	1 built-up
5	5	318842	Red	1	0	0	1 built-up
6	6	137420	Yellow	1	1	0	1 built-up
7	7	99736	Blue	0	0	1	1 vacant land

With the help of Municipal corporation of Hyderabad (MCH), city was divided into 35 Municipal Wards, and on it Police and Fire Brigade information was overlaid in GIS framework to know the gaps.

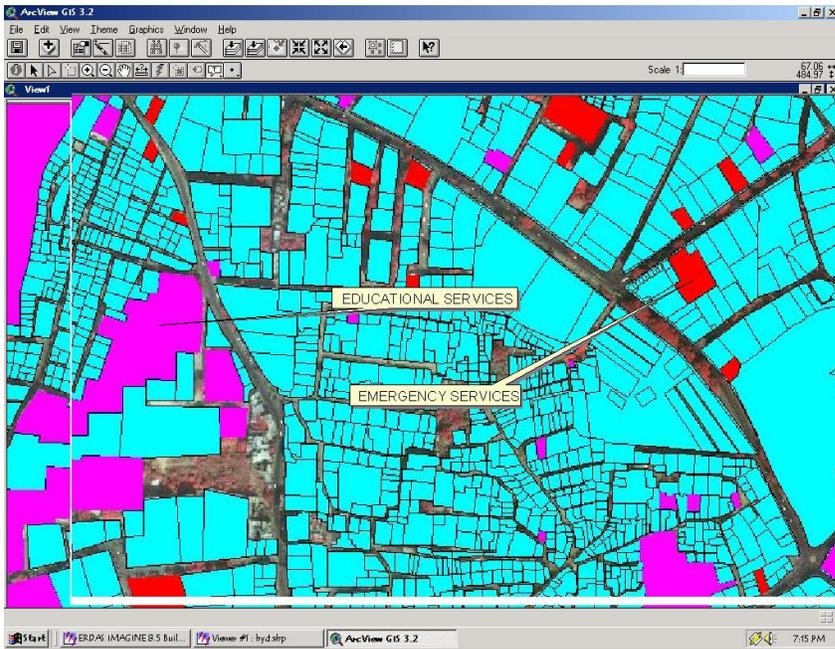
IKONOS data with ground survey was made use for locating various services in the city.

**Results & Conclusion:**

Road network map was generated, this helped in understanding the flow of traffic, vehicles pollution etc. it also helped in understanding various facilities and Amenities available in the city, Map 3

Education and Emergency facilities: with the shifting of the seat of the Government from the old city to the new city in the beginning of the 20<sup>th</sup> century, most of the Educational institutes are being located in the new city area. All the five universities in the city could find place either in the new city or on the outskirts of the city. Likewise, a large number of research and

training institutions of national importance are located mostly outside the old city. Though the Osmania general hospital is located in the old city, at the local, there is gross inadequacy of health facilities. The location of educational institutions and hospitals outside the old city has resulted in increased in traffic due to movement of people between old and new city to avail of these facilities. During the peak hours, whether it is in the morning or in the evening (9AM-11AM and 4PM-8PM), the traffic movement is witnessed unidirectional. Thus, the old city has undergone functional and spatial change. It is not the matter of traffic alone but the inhabitants of the old city face difficulties because of non-availability of required number of medical and health and educational institutions in the old city. Hence education and emergency services are mapped on IKONOS data, Map 5

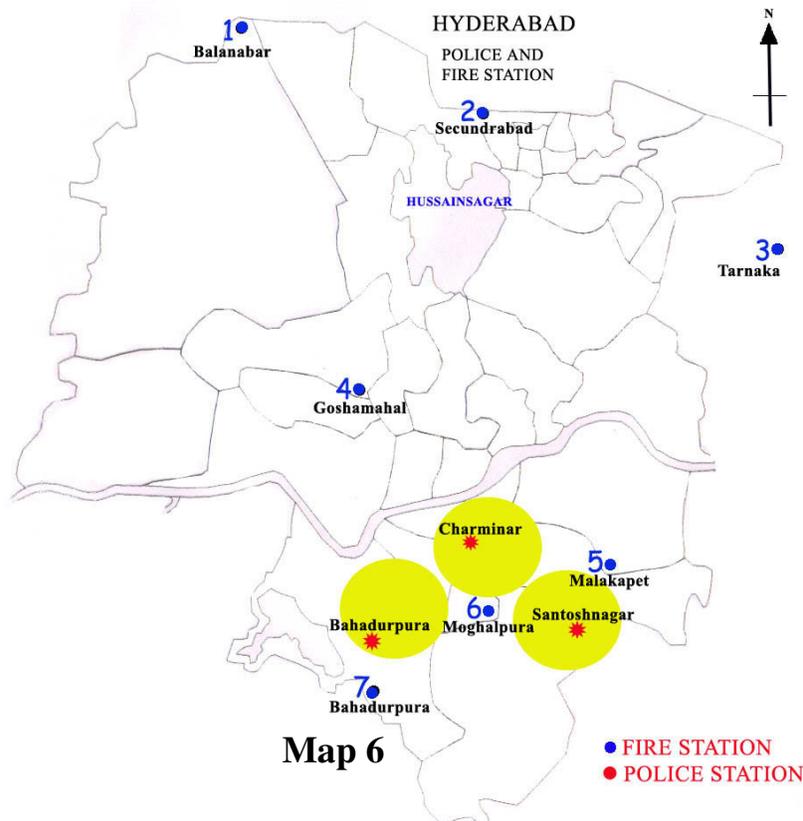


Part of new city or north of Hyderabad where most of the educational and emergency services are seen. **Map5**

There are only 9 fire brigade stations in the city, out of which only three are located in the south of Hyderabad (Old city). This is alarming situation and immediately atleast five more fire brigade stations should be setup in old city to meet the sudden natural calamity. The old city being the oldest and unplanned and haphazard growth, resulting in narrow roads and much of encroachments on the road side, makes traffic to move very slow and in this situation if any disasters (say if fire is caught), it is very difficult for the fire brigade to move fast at

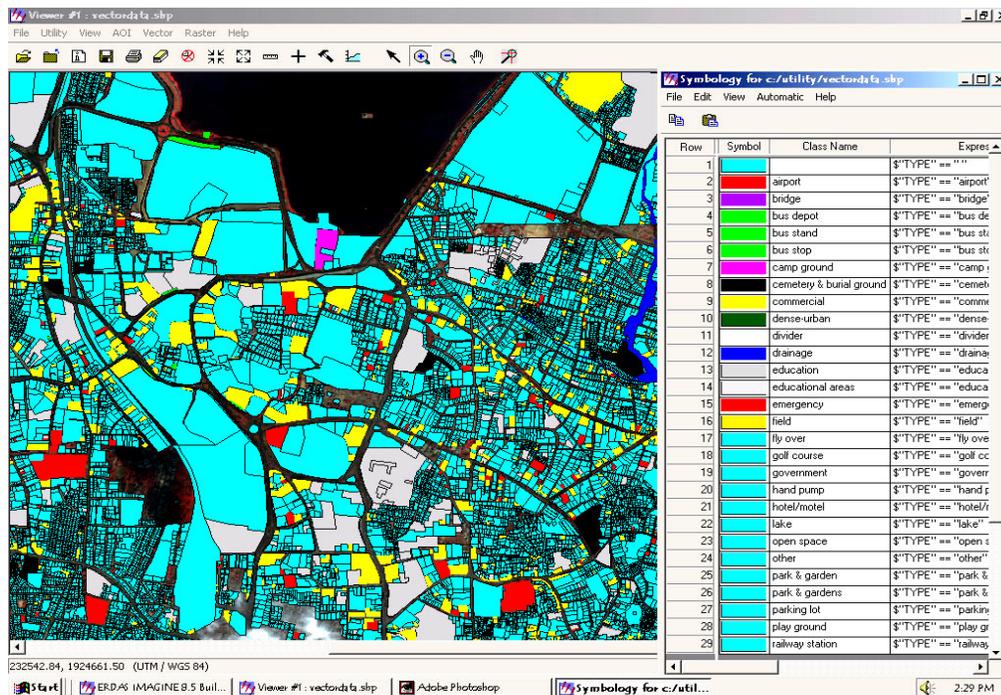
the place hence some more fire brigade stations need to be setup, .Map 6.

Some of the Police stations were mapped and the gap is clearly seen between Police stations in south of Hyderabad. Proper allocation or relocations of Police stations should be taken up immediately, Map 6



**Map 6**

Various utility services are mapped on OKONOS data and are classified, Map 7 Part of Hyderabad and environ.



Map 7

The historical and geographical pattern of the city of Hyderabad which was founded by Mohammed Quli Qutub Shah in 1591 AD, witnessed disparities in the development of its areas. The historical aspects and the geography of the urban development of the Hyderabad city has been such that rapid development has taken place in a few areas on one hand, and on the other, a few areas have declined since decades, especially the old city area.

Hyderabad city was built to meet the demand for the 5 lakhs population and now it is 50 plus population. It is clear that there is pressure on Amenities & Facilities (Utility services), which is not able to meet the demand of the present population. City has rapidly grown in all directions especially in North west and West part, living behind a big question mark on the planners for providing proper facilities.

Amenities, Facilities or services other than Municipal corporation needs immediate attention and in this sector, private entrepreneurs, builders need to take up major projects.

Government and planners need to take note of the gaps prevailing in the city of Amenities and Facilities and plan immediately to cover the gaps.

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