GIS IS A TOOL FOR MICRO LEVEL PLANNING FOR SQUATTER SETTLEMENTS

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Abstract – slums and squatter settlements are the physical manifestation of urban poverty, the root cause of the origin and growth being urban-rural migration, economic inequality and over all development of the country. Over crowding, no housing or dilapidated/sub standard houses, lack of proper light and drainage etc, are the common problems in slum areas.

The urban community development (UCD) cell was established in 1967 in the Hyderabad and has been implementing urban poverty alleviating programs. The Draft National Housing Policy in 1998, adopted by the government for the betterment of living condition instead of "slum clearance" approach to that of "slum improvement".

In this scenario, two clear-cut approaches emerge for tackling the physical and social problems of the slums and squatter settlements. So the main aim is to improve the environmental conditions of the poor, promoting health, safety and better living with the help of Geographical Information Systems as a tool.

Key words: squatter settlements, slum improvement, physical infrastructure and GIS

1. INTRODUCTION

Slums are an integral part of urban areas and contribute significantly to their economy both through their labour market contributions and informal production activities.

The poor represent an extremely important element of the urban labour force and contribute substantially to total productivity and labour market competitiveness. It is vital that all Urban Local Bodies (ULBs) recognize the contribution of the urban poor in helping to build urban prosperity and make sufficient provision for them to have access to affordable land, house sites and services. The present planning and development framework is exclusive of slums and informal settlements. It views slums as "problem areas" requiring corrective action.

A compact area of at least 250 population or about 60-70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities. This definition appears to be satisfactory at all India level. In general, all underserviced settlements, be they unauthorized occupation of land, congested inner-city built up areas, fringe area unauthorized developments, villages within urban areas and in the periphery, irrespective of tenure or ownership or land use shall be covered under the definition of a slum/informal settlement.

1.1 Problems

The urban centres, particularly the metropolitan centers of India have become enclaves of economic power, thanks to the dualistic process of development, which attracts and depends upon the migrated rural labor for its own day-to-day economic survival. Thus the urban units, in economic terms, contribute a significant quantity of labour force to the urban labour market and generate adequate income not only to sustain the urban economy but also to attract more and more migrants towards these urban economic enclaves. It is not only the rural-urban income differentials, as perceived by physical and demographic planners that activate the 'push' and 'pull' factors, but other factors such as access to basic facilities and amenities, access to institutional and political power, etc., also trigger off the rural-urban as well as the urban-urban migration.

In most cities of the developing world, up to one half of urban population lives in informal slums or squatter settlements, which are neither legally recognized nor serviced by city authorities. The informal sector in the urban area, however, occupies an important position in a city's economy.

1.2 Reasons for growth of slums

The reasons and causes of unauthorized growth and constructions of slums can be grouped into two categories as below:

Demand factors

- 1) Rapid population growth rates due to natural increase in population and rural-urban migration.
- 2) Persistent urban poverty and unemploymentunequal distribution of income.
- 3) Lack of access to credit facilities.
- 4) Price level of housing unit and other commodities.

Supply factors

- Shortage of appropriate urban land due to:

 (a) zoning practices which favour private holding of land by the rich minority;
 (b) speculation which results in the private holding of land;
 (c) bureaucratic delays and procedures in acquisition proceedings.
- 2) Government imposed minimum building standards, which have the effect of retarding the rate of construction of private dwellings.
- Lack of Government involvement reflected in low investment in housing and indifference to the needs of low-income urban groups.
- 4) Ceiling on urban property and taxation.

1.3 Slum clearance

The process of improving the existing conditions of slums is known as the slum clearance and the main four objects of taking up slum clearance programmes can be enumerated as follows:

(1) To bring down the disparity in the living standards of the people of various classes.

(2) To prevent the occurrence of epidemics in the town or city.

(3) To provide the absolute basic minimum standards of essential amenities for a healthy living.

(4) To remove the ugly spots or slums from the map of town or city.

Following are the two methods by which slum clearance programmes can be affected: -

(1) Complete removal method

(2) Improvement method.

It should, however, be remembered that the slum clearance, if not properly carried out, does not abolish slums, but on the contrary, it shifts and spreads them.

1.4 Government approach

The government of India, rather than evolving a policy of its own towards the slum, was heavily dependent upon the experiences of other countries in dealing with the slum problem. Unfortunately, the land of millions never had a housing policy till recently. The first ever **Draft National Housing Policy** announces in **1988** has already seen through three revisions clearly indicating the ad hocism in policy planning towards housing in general and slums in particular. This is party due to the low priority given to housing and urban development in the Five-year plans of India. As regards housing, hardly one percent or little more than one percent is allocated, which got reflected in the growing housing shortage and increasing slums in the urban areas of India.

In the existing administrative set-up, housing comes under the state list, i.e., to be looked after by the state governments and not by the center. This division of responsibility enshrined in the constitution protects the center in not allocating much to housing and the resource crunch faced by the state government's all the more neglects housing in this set-up.

2. GIS- TOOL FOR SLUM IMPROVEMENT

The urban planning is a complex phenomenon, which require enormous amount of data to support the decision. The local authority requires an information system, which will be able to monitor, surveillance, the planning regulations and will work as early warning system. The application of GIS in the planning and management is very common in the local authorities in developed countries but in developing countries very few local authorities have invested in GIS. It is mainly due to the high cost and lack of support from the higher management level.

Infrastructure projects, from networking wastewater drainage into drainage channels in a ward, to citywide water and sewerage networks, are spatial activities. At the micro-level, re-aligning houses to broaden access ways, and deciding on equitable locations for common services, can best be planned using a combination of spatial and socio-economic information. Similarly, the impact of a number of houses flooded by the rains or broken down by road widening projects can only be analyzed spatially.

GIS is a tool, which allows us to use and analyze spatial information in conjunction with connected socio-economic information, and is therefore an ideal basis for planning. It has been claimed that GIS is an expensive tool. While the software is not cheap, local authorities in partnerships with NGOs and community-based organisations can fund the costs of this type of project. This way, consultancy and training inputs are highly subsidized. The idea behind working on a GIS stemmed from necessity rather than expertise in this field. Most of the programme is based on hand-on knowledge acquired through use of the programme with some technical input from the software Distribution Company. The data is collected by slum dwellers, which have been trained by experienced community members and consultant, and the data is checked and analyzed by consultant. The funder of the project is the Municipal Corporation, whose officials are intended to be the main end-users.

This project involves collecting data in considerable detail, including mapping and surveying every house in every slum. The rationale for this process, rather than just collecting broad settlement level data, can be explained using two maps

Its only door-door surveys that creates the census. Certain information validates their status, while other information can be used to form useable norms and standards for housing for the poor. The project needs to include everyone in the slums, which means that everyone needs to be surveyed

Example: Banjara colony, Hyderabad.



FIGURE 1: Socio-economic data is superimposed on a plane-table map of a settlement, using GIS. The dialogue box popped up by clicking on one random house, (the one in colour) gives detailed information about the selected household

Infrastructure projects are spatial activities and slum settlements are spatial entities. Hence spatial information is essential. "GIS is a tool which allows us to use and analyze spatial information in conjunction with relevant socio-economic information, and is therefore an ideal basis for planning". In addition, this information is intended to create an impact that is best achieved with a visually clear and attractive format, which again the GIS achieve effectively.

Explaining the exact process, "GIS integrates spatial information (maps) with any other data you have collected. For example, a typical slum map will show you the physical features of the area, but it does not say anything about the inhabitants and their demographics. So what we do is sending out workers to collect the relevant socio-economic information about the residents and then superimpose all this on the plane-table map that we have scanned".









FIGURE 2 & 3: The above map explains about the income levels of the slum, which clearly shows that the higher income families are together to form a group.

This analysis of socio-economic data helps in proposal for the space for dwelling unit, religious facilities, education facilities and road width, parking facilities and type of housing required for rehabilitation.

This housing data helps in analyzing type and the tenure status of the housing, rent values of the locality. And also the type of structures, floors and the built-up area of the dwelling units. It also gives the data regarding the no of units having toilet facilities and age of the structure and structural quality. Using GIS the Land use of the slum can be identified.

MAP SHOWING THE TYPOLOGY OF THE HOUSING



FIGURE 4: The above map shows that typology of housing in the slum, it shows that most of the houses are thatched roof and tile roof.

What's more, the GIS allow you to run queries and make analyses and this is its biggest advantage. Hence, what you have is not just information, but "intelligent information".

And also we can create buffer zones, so that how much distance covers the one public tap, by that it will be known that how many people are using that public tap.





FIGURE 5: Circles are drawn at a distance of 100 feet around each common water stand post. This demonstrates that water to household reach is not good.

2.1 Methodology proposed by MCH Phase 1:

- The NRSA (National Remote Sensing Agency) base map has been procured
- Capturing the boundaries of the slums, through GPS survey, and attributing the slum profiles
- Capturing the data of amenities like street lights, water supply points (Public), roads,

sewerage system (underground drains, open drains and manholes)

• Piling of all the families data to their respective blocks

Phase 2:

- Capturing the building footprints via spatial survey (approximation)
- Attributing, families previously piled in the blocks to their respective building footprints.

3. THE HYDERABAD EXPERIENCE

Hyderabad, the capital of Andhra Pradesh, is the sixth largest city in India, with a population of 3.7 millions in 2001. It is situated at 17°25' N longitude and 75°25' longitude and lies on the banks of Musi River. The municipal limits of Hyderabad and Secunderabad city cover an area of 192 Sq.Kms.



The slums covered 5 percent of the city area and contained 17 percent of the urban population, which was about 1.9 lakhs in 1957. In 1964 there were 94 slums and a study by the council for Social Development in 1976 reported 273 slums with a population of over 300,000. By 1979 there were 455 slums, spread over an area of 900 acres in the twin cities, covering a population of half a million. At present there are 792 identified slums existing with a population of 12.58 Lakhs.

The Hyderabad Slum Improvement Programme (HSIP), run by the Urban Community Development Department (UCDD), a special wing of the Municipal Corporation of Hyderabad, covers some of these. The programme has adopted a comprehensive community development approach, and its major thrust lies in providing physical infrastructures like housing, roads, electricity, drainage, drinking water, community latrines, storm water drains etc.

The UCD has been operating in these slum areas from 1967. Their approach is different from the traditional

approach to slum development. The programmes are conceived on the basis of felt needs, and executed with the participation of the community who are benefiting from them.

4. CONCLUSIONS

- Slums and squatter settlements are the physical manifestation of urban poverty.
- The present planning and development exclusive of slums and informal settlements.
- It has been observed that the view –"slums as the problem areas" need to be changed to slums as important components.
- Socio-economic information of the settlements should be collected and analyzed for identifying the slums (Household survey).
- GIS can be used as an effective tool for slum improvement.
- The quality of attaching attribute information to the spatial information is the crux of the GIS system in analyzing and isolating the target settlements to be improved.

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