

# Implementing GIS For Town Planning and Management

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**Abstract** - The geographical information system (GIS) is a tool used generally for any computer based adequacy for operating geographical data. The hardware and software functions of GIS include data input, data storage, data management (data manipulation, updating, changing, exchange) and data reporting (retrieval, presentation, analysis, combination, etc.). We all know that some GIS will fail, however, when failure does occur and a recapitulation is performed, the lessons can be published so that other user may profit from the experience. This paper determines the GIS implementation in town planning; it identifies the reason for its present failure and suggest ways for a successful implementation that could be more workable and developed countries.

**Keywords** - Geographic information standard, Urban Planners, Geographical Information System, Town Planning, GIS data management, Aerial photography.

## 1. INTRODUCTION

The concern for India's urban and town planners for efficient urban development is the major issue of continuous growth of population. These automated system allow us to collect lot of physical data very easily, with high speed and on repetitive basis, and together with the help of GIS it enable us to analyze the data spatially, offering new possibilities of generating various options, there by optimizing the whole planning and development process. New technology such as aerial as well as satellite base automated system must be used to keep an eye on the growing population.

According to the recent census study it has been found that there has been rapid growth of population around two and half times during the last fifty years. But urban India has increased nearly five times. In 2001, 306.9 million Indians (30.5%) were living in nearly 3,700 towns and cities spread across the country, and it is expected to increase to over 400 million and 533 million by 2011 and 2021 respectively. One of the main applications of GIS is urban planning. Spatial database and modeling tool are used by the urban planners with the help of GIS. GIS applications may differ according to levels, stages and sector. GIS become an important component of planning support system. Due to user-friendliness, low price hardware and function provided by GIS software made it very popular in the recent years. Integration of GIS with planning models, visualization, and the internet will make GIS more useful to urban planning. The major problems in using GIS for urban planning are not the technical issues, but the lack of data, changes in organizational and staffing.

## 3. GEOGRAPHIC INFORMATION SYSTEM

Geographic Information System enables us to access large volumes of data and information. It also allows in manipulating in order to select, update, combine, and models and display the information. Geographic Information System has obtained an ever increasing importance and it has been widely accepted as a decision-making tool in urban planning.

The need for effective urban planning continues to grows the world progress towards development, the issue of urban

planning becomes more complicated. Particularly in situations where there was little or inadequate understanding of computer based system such investment have been largely unutilized. Many countries have invested large sums of money for acquiring advanced computer for developing their cities and have faced disappointment despite the advantages of a GIS in land use planning and management.

In today's technology we focus on urban planning rather than modify the infrastructure that was built a long time ago. There can be some situation in the near future where we will need to stop urbanization which means that we will always try to fit in the previously established infrastructure. For example: Global Warming, deforestation. The use of technologies such as GIS has been handle by a lack of skilled personnel, inadequate techno-scientific structure and difficulty in transferring information to end-user and by insufficient international cooperation to boost local research and improved information flow. GIS has proved to be a very useful and powerful tool for urban planning and management.

## 2. LITERATURE REVIEW

Land is valuable resources that constantly appreciate in value. Due to the lack of technology in the past years it is impossible to achieve the data and information which we can gather today.

GIS were developed in the late 1960s but, due to its high cost of hardware and limited capabilities in the software it was rarely use in the early days.

## 4. THE USE OF GIS IN URBAN PLANNING

GIS is one powerful computerized system which integrates the data from various sources and helps in making decisions effectively for urban planning GIS serves both as a data base and as a toolbox for urban planning and development. Using the geo-relational model spatial and textual data can be stored and fetched from database. Current GIS software system support efficient data retrieval, storage, query and mapping. Geographical information can be used to make effective planning decision which can be made by combining data from database, survey. GIS act as a toolbox

which allows planner to perform spatial analysis. It also enables the planners to use geo-processing functions such as map overlay connectivity measurements, and buffering. GIS finds its use in urban planning as an analytical and modeling tool. It can be applied to a wide range of addressing problems related to data base structure, simple and complex analytical models alike. GIS can be useful for conducting a feasibility study of location for a specific purpose e.g. ascertaining the suitability of a location for the construction of a bridge or dam. GIS helps us in monitoring the spatial data. Feasibility study of even smaller structure likes schools , colleges, playground and hospitals is essential and can be easily conducted with the help of GIS. In the areas where variety of designs or alternative plans is required, the use of GIS can be combined with specialized and more sophisticated equipments to produce better outputs.

GIS were developed in the late 1960s but, due to its high cost of hardware and limited capabilities in the software it was rarely use in the early days. In the initial stage of development software system focused on computer mapping with few analytical functions The most powerful software at that time was grid based (e.g. IMGRID). In recent years the prices of hardware, computer storage, and peripherals, decreased substantially and has made GIS more affordable, less time consuming and more workable.

Land is valuable resources that constantly appreciate in value. Due to the lack of technology in the past years it is impossible to achieve the data and information which we can gather today. The world today is advancing faster than ever with big leaps and bound made in the field of technology. Urban planning and management is a complex task. One cannot complete the urban planning and management without the use of a powerful analytical tool like GIS.

Many benefits in using GIS in urban planning are as follows:

- **Improved Mapping** – GIS provides better access to maps. It helps us by providing improved map currency. It enables to show a particular theme connected with a specific geographic area which is also known as thematic mapping and it also has very less storage cost.
- **Efficient Retrieval** – Data and information can be efficiently retrieved by making use of GIS which is very useful for urban planning and management.
- **‘What if’ scenarios** – Faster and more extensive access to the type of geographical information important to planning and the ability to explore wider range of different scenarios.
- **Improved Analysis** – GIS help us to analyze the data very efficiently by making use of advanced technology.
- **User friendly** – GIS has very interactive interface and it provides us with all the tools necessary for urban planning and development. Its enables better communication to the public and staff.
- **Quality of service** – It provides improved quality of services, for example, speed access to information for planning, development.

## 5. METHODOLOGY

The following methodology was adopted in present study,

- The base map of the study area was prepared using

existing moa which made plotting the data on the map easier.

- Using GIS technique , the thematic maps have been designed and prepared to show a particular theme connected with a specific geographic area.
- Plotting, Digitizing, Editing, & labeling the various thematic maps , integration and preparation of derived maps using GIS software.

## 6. MAIN REQUIREMENTS FOR URBAN PLANNERS

Apart from using mapping techniques which includes large scale detail and quantitative representation of relief indicated by contour lines. Planners collect information on existing land utilization and their periodic updating and monitoring using GIS Remote sensing. By making the use of appropriate techniques and methodology the same data products can be used to:

- Study of urban buildings structures, population estimation and other physical aspects of urban environment.
- Study of transportation system used in current geographical area
- By making use of thematic maps it enables urban planners to separate different catchments areas
- Analyzing the vacant spaced is easier for urban planners
- It is easier for urban planner to detect slum areas as GIS keeps on monitoring and updating the system.

## 7. ANALYSIS

Data from concerned authorities and from the reports written by these authorities and organization. Different thematic maps for particulars geographical location, various master plans and reconstruction upgrading plans has been introduced, field surveys. The urban planners must make use of following parameters during analysis of geographical area which are listed below:

- Population information provided by the census for the particular geographical area.
- Depending upon the area number of storey’s can be decided.
- Public service must be nearby.
- Planning should be properly done so that sufficient public services are provided to the people.

## 8. URBAN PLANNING AND DEVELOPMENT

GIS finds a important role in the field of Urban Planning and Development. The features of GIS which makes it important in the Urban Planning and development area as follows:

- Multiple data can be entered and integrated;
  - Data can be stored and retrieved in a precise manner.
  - The system can maintain data consistency;
  - Updating of data can be done very easily and efficiently.
- Geographical Information System allows us to manipulate and display geographical knowledge by putting maps and other kinds of spatial information into digital forms. Integration of spatial and other kinds of information can be done using GIS within a single system. Analyzing geographical data can be done in a user-friendly framework which is provided by GIS.

In the past two decades the use of spatial information, GIS,

remote sensing information has been greatly improved and which plays a vital role in the field of urban planning and development. Due to the integrated technology of GIS and Remote sensing it has become very popular and is widely used in different applications. GIS and remote sensing have become inseparably linked in many applications fields. These two technologies are complementary, as they are simply variants of the digital spatial data.

Geographical Information System ( GIS ) provides vital tools which can be applied in the analysis at the district and as well as at the city level. Spatially accurate and timely information on land use and changing pattern is required for urban planning and development. Monitoring is very important as it provides the planner and decision-makers with required information about the current state of development and the further changes that can occur.

### **9. CONCLUSION**

Today, the main issues of using GIS in urban planning are not only the technical issues, but lack of data and information. The remarkable decrease in the prices of hardware component has made GIS affordable to the end-user and a comfortable tool for planning. Due to user-friendliness and number of function providing capability

has made GIS very popular. In developed and developing countries the use of GIS plays a very important role .In the past, few years many planning departments have shifted their focus from mapping systems to GIS.Recent advanced and integration of GIS with geo-spatial planningmodels,visualization, and the internet will make GIS more useful to urban planning and development.

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