International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 12 | December 2022 www.irjet.net p-ISSN: 2395-0072

GIS Application Used in Urban Planning In India

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Abstract - The Geographical Information System (GIS) is one of advanced scientific feature means which you can complete the planning in a realistic, accurate and effective way for this software. Geographical Information System (GIS) to analyze the places and zones contour lines for various services. Therefore, the finance and time savings that might be supplied to Municipal Corporation were preparing presented accuracy in the data in any Research. In This Geographical Information System that it is used to input, store, retrieve, manipulate, analyze and output geographically referenced data or Geo-spatial data in various forms which gives relationships, patterns, and trends in different forms as maps, globes, reports, and chart. Most of Planners which to support for planning and management of various land use and natural resources in urban Planning in the world. It is computer-based mapping tools to users to manipulate large sets of data as layers or themes. GIS technology is now being used widely as it can be integrated into any enterprise information system framework and Planning. Popular GIS software includes ArcGIS is developed by ESRI. ArcGIS is widely used software for town planners to form urban planning.

Key Words: Geographical Information System (GIS), Municipal Corporation, Planners, Management, ESRI.

1. INTRODUCTION

A Geographical Information System (GIS) Software in different departments in India are using for urban planning. The most important are those that are performed by engineers, urban planners and transportation planners. In this paper, it is an exploratory study to illustrate the links between organic GIS and urban planning. The rest of the aspects of the infrastructure in Urban Area are important for Planning. GIS applications have been the work of these seven arias that make up the Urbanisation. Discuss the situation of various urban planning and business sectors are random imposing themselves for reality of the situation present at earth. It may solve the problems of planning and public transport in these areas. It states that different regions/area appeared to be of a special nature of urban Planning. With respect to the research, in this paper describes specific applications of GIS functions used in the planning and analysis of urban places' distortions in the urban fabric of the city of India.

GIS technology is very important in planning and effective decision making Software in the **urban planning** and the developments of Area. In different urban applications as road network management, monitoring, health and sanitation problems, analysis of per capita, Industrial area planning, Improvements of Green Space. Drainage systems and many plans are developments are done by use of **GIS Software**. Planning of area, monitoring of maps, action plans implementation in city and assessing impacts such a tasks done with the help of GIS techniques. And it's valuable to decision makers for using in Urban Planning. For economic growth of nation, It is necessity of well-developed urban planning sector for various area. This is functioning of urban development authority, must having access to information of road network, asset and property ownership, census data etc. which increases transparency and cost effective. Rapid growth of urbanization development is most challenging factor for urban development authority, so efficient planning and management is basic need for it. GIS is using for planning purpose.

2.OVER VIEW OF GIS

A Geographical Information System (GIS) is a system for capturing photo, storing data, analyzing image and managing data and associated attributes of area, which are spatially referenced to the area. The geographical information system, which is also other name as a Geospatial information system. GIS is capable to analysing displaying data to geographically referenced information for various areas. In a GIS software tool that allows users to create interactive queries, analyze the spatial information, edit data, maps, and present the results of all these operations completed in that area. GIS technology is becoming essential technique to combine various maps. Remote sensing information is to generate various models and Design Structure in real time. Geographical information system is the study of science which is utilizing the geographic concepts, applications and systems. Geographical Information System used for is a platform for various investigations report, resource management system, asset management system, environmental impact assessment report, urban planning strategies.

Origin of GIS development:-The basic idea of identifying different layers of data of various base maps and relating Objects .Which has been found much older than present invention in any area of planning. These drawings are made

up of various geographical area Base maps. In this way it may comparison to present technologies, these are important records mimic the two-element structure of present geographic information systems, which consist of an image and attribute information for base map..

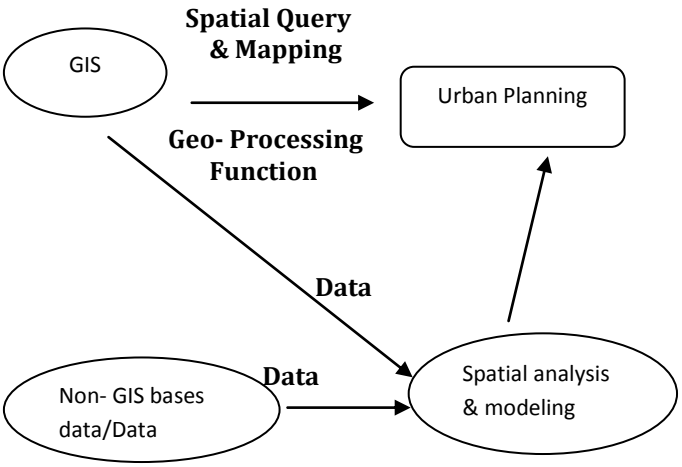

Fig-1 GIS and Urban Planning

3. METHODOLOGY

Most of software's uses digital information system to generate by using other CAD tools by the formation of digitization Map. Digitization is a process of making a digital map from image of area which is mapped by tracing the actual map through lines, objects and other tools in CAD software's. The maps which is generated by Arc GIS. These are generally used maps called as base maps. The digitized maps are also geo-referenced for better analysis and implement visualization.

GIS based systems are works by maintaining spatial and attribute data which are separately by the Attributes of table and shape file (spatial structure) with a data base table containing attribute information in order to display the spatially map.

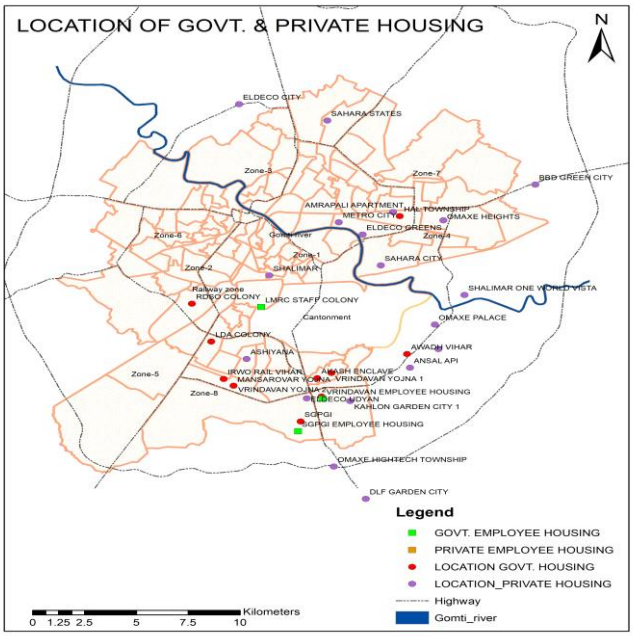

Fig.2.Preparation of GIS based MAP

Fundamentals include:

Data Management:

Analysis:

Visualization:

Functions of geographic information system:

- Capture Data
- Store Data
- Query data
- Analyze data
- Display Data
- Produce Output

Data Model: In this way for Implementation – Geographic Integration of Information system are used for various work.

Data is organized by various layers, coverage's or themes, with each layer representing a common feature of map.

Layers are integrated using for the information of various geographic location is the organizing principle.

GIS help to planners, surveyors, and engineers with the tools they need to design and map their neighborhoods and cities. Such as Visualization, spatial analysis, and spatial modeling are the most frequently used GIS functions in plan making. GIS can also help to storing, manipulate, and analyze physical and economic data of a particular city area. Planners can then

use the spatial query and mapping functions of GIS to analyze the existing situation in the city. Through map overlay analysis, GIS software can help to identify areas which are conflict of land development with the environment by overlaying and existing land development area. Using the multilayered mapping feature of GIS, a municipal planning committee can visualize a variety of things, for instance, prime agricultural land, surface water, high flood frequency, and highly erodible land. In this information System leads to informed utilized decisions and avoiding developing areas with high flood frequency as those areas that are not likely to it. GIS can significantly aid in monitoring an area or conducting a feasibility study of a location for a specific purpose, for instance ascertaining the suitability of a location for the construction of a bridge or dam. Most of Feasibility studies to schools, hospitals and various structure/Building can also be carried out effectively using GIS data. In India Planners are using to GIS for identical progress of citizen participation and community input. They may be developing a vision for the community that enhances the quality of life for all citizens in the planning area. Citizens are the life and blood of any city and first-hand inputs from them as to what can be done to make their city smarter can aid in crafting out amazingly productive methods/means for urban planning. PPGIS (public participatory GIS) is a platform in which to enables this effective engagement process for Planning area.

Data :-The most important component of a GIS is the data. Geographic data or spatial data and related tabular data can be collected in-house or bought from a commercial data provider. Spatial data can be in the form of a map/remotely-sensed data such as satellite imagery and aerial photography. These data forms must be properly dereferenced (latitude/longitude). Tabular data may be identical in the form to attribute database used is in some way related to spatial data system. Most of GIS software may come with inbuilt Database Management Systems (DBMS) for create and maintain to help organize and requiring manages data.

Users:-GIS technology is of identical and required value without the users who managing data in the system and to be develop plans for applying it .GIS based application may be users range from technical specialists who design and maintain the system to use it. It may be help them to do their everyday work. These users are largely interested in the results of the analyses and may have no interest or knowledge of the methods of analysis.

Methods:- A successful GIS operates according to a well-designed plan and business rules, which are the models and operating practices unique to each organization.

Functions of GIS :-General-purpose GIS software performs six major tasks such as input, manipulation, management, query and analysis, Visualization.

Input :-The most identical and valuable important input data for GIS is also be a digitized maps, images, spatial data and tabular data. The required data may be generally typed on a computer using relational database management system. Before geographic data can be used in a GIS it must be converted into a suitable digital format. The DBMS system, It may be generate various objects related to such as index generation on data items, to speed up the information regarding retrieval by a query. Maps may be digitized which is using a vector format in which the identical and required actual map shows as points, lines, and polygons are stored as coordinates System.

Manipulation:- GIS can store, maintain, distribute and update spatial data associated text data. The spatial data must be referenced to geographic coordinate systems (latitude/longitude). The required data associated with spatial data can be identify and manipulated with help of data base management software. It is likely that data types required for a particular GIS project will need to be transformed or manipulated in some way to make them compatible with the system. For example, geographic information is available at different scales (scale of 1:100,000; 1:10,000; and 1:50,000).

Management:- For small GIS projects it may be sufficient to store geographic information as computer files. However, when data volumes become large and the number of users of the data becomes more than a few, it is advised to use a database management system (DBMS) to help store, organize, and manage data.

Query:- The stored information either spatial data or associated tabular data can be retrieved with the help of Structured Query Language (SQL). Depending on the type of user interface, data can be queried using the SQL or a menu driven system can be used to retrieve map data.

Analysis:-GIS systems really come into their own when they are used to analyze geographic data. The processes of geographic analysis often called spatial analysis or geo-processing uses the geographic properties of features to look for patterns and trends, and to undertake Modern GIS have many powerful analytical tools to analyses the data. The following are some of the analysis which are generally performed on geographic data.

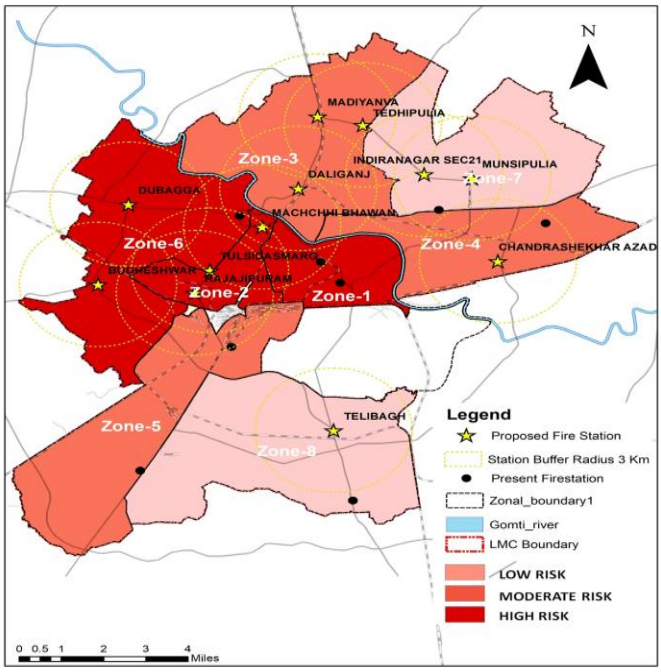

Fig.3.Raster of Data

A. Overlay Analysis :-

The integration of different data layers involves a process called overlay. This overlay, or spatial join, can integrate data on soils, slope, and vegetation, or land ownership. For example, data layers for soil and land use can be combined resulting in a new map which contains both soil and land use information. This will be helpful to understand the different behavior of the situation on different parameters.

B. Proximity Analysis:-

GIS software can also support buffer generation that involves the creation of new polygons from points, lines, and polygon features stored in the database. For example, to know answer to questions like; How much area covered within 1 km of water canal? What is area covered under different crops? And, for watershed projects, where is the boundary or delineation of watershed, slope, water channels, different types water harvesting structures are required, etc.

C. Visualization:-GIS can provide hardcopy maps, statistical summaries, modeling solutions and graphical display of maps for both spatial and tabular data. For many types of geographic operation the end result is best visualized as a map or graph. Maps are very efficient at storing and communicating geographic information. GIS provides new and exciting tools to extend the art of visualization of output information to the users.

4. TECHNOLOGY USED IN GIS SOFTWARE

Data creation:-Modern GIS technologies use to store digital information, for which various digitized data creation methods are used. The method of data creation in GIS software is digitization, after that a hard copy map or survey plan is transferred into a digital medium to a computer-aided design program with geo-referencing capabilities. Heads-up digitizing maps may be involves in the tracing of geographical data. It may to utilize directly on top of the aerial image to instead of the traditional method of tracing the geographical form on a separate digitizing tablet and other Forms.

Relating information from Others sources:-

Information about the rainfall of a state to aerial photographs of county. It might be able to tell which wetlands dry up at certain times of the year and others are not . A GIS based software in which may be used to information collection and different sources from different forms. It can also help with such type of analyses data. The primary data may be requirement for the source data which may consists of identical data for the locations for the variables. The identification of Location may be annotated by x, y, and z coordinates, Such as longitude, latitude, and elevation. Any variable data may that can be located spatially to fed into a GIS based Software. Different kinds of required data in which it may be map form to enter into a GIS.

A GIS can also be converted existing digital information data to which may not yet be in map form to other forms. it always can recognize and use. For example, digital spatial satellite images and other required data which may be generated. It may also be process through remote sensing can be analyzed to produce a map-like many layer of digital information identification. Other ways census data or hydrologic tabular data can be converted to map-like form, Different layers for thematic data information in a GIS.

Data representation:-GIS data represents real world objects and identical data such as roads, land use, elevation with digital data. Real world objects may be divided into two abstractions which may be discrete objects (a house) and continuous fields (rain fall amount or elevation). Two broad methods used to store data in a GIS is Raster and Vector.

Raster:- A raster data type is used in essence for any type of digital image. The digital photography will be recognizing for the pixel such as the smallest individual unit of an image form. The work in which may be combination of these pixels will create an image, distinct from. The commonly used scalable vector graphics data, which are the basis of the vector model for identification. Raster data images (raster images) which may be each pixel containing a color value. The resolution of the raster data may be set for its various cell width in ground units. Raster data is stored in various formats; from a standard file-based structure of TIF, JPEG formats to binary large object (BLOB) data. Which may be

stored directly in a relational database management system (RDBMS)? The storage data is when properly indexed, typically allows for quicker retrieval of the raster data but can require storage of millions of significantly sized records.

Vector:- The vector elements: points for wells, lines for rivers, and a polygon for the lake by used a simple vector map, using each of it . In a GIS, geographical features are often expressed as vectors forms, by considering those features as geometrical shapes to use it. ESRI Arc series of software programs are used to these for explicitly called shape files.

Points:- Geographical features that can best be expressed by a single grid reference which may be used as**:-** Zero-dimensional points; in other words, simple location. For example, the identification of locations of wells, peak elevations, other features of interest or trailheads. Points may also convey the required data information of these file types to make it.

Lines or polylines:- The linear features such as rivers, roads, railroads, trails, and topographic lines which may be help by One-dimensional lines or polylines are used for it.

Polygons:- For Geographical features that covert to a particular area of the earth's surface by the help of Two-dimensional polygons are used. Such features may identify for include lakes area, park boundaries, buildings structure, city boundaries, or land uses. Polygons may convert to the most identical data information of the file types for editing. Each of these geometries is linked to their attributes. For most frequently data based system it may describes lakes may contain a lake's depth, water quality, pollution level. The information may be used to make perfect map to describe with a particular attribute of the datasheet.

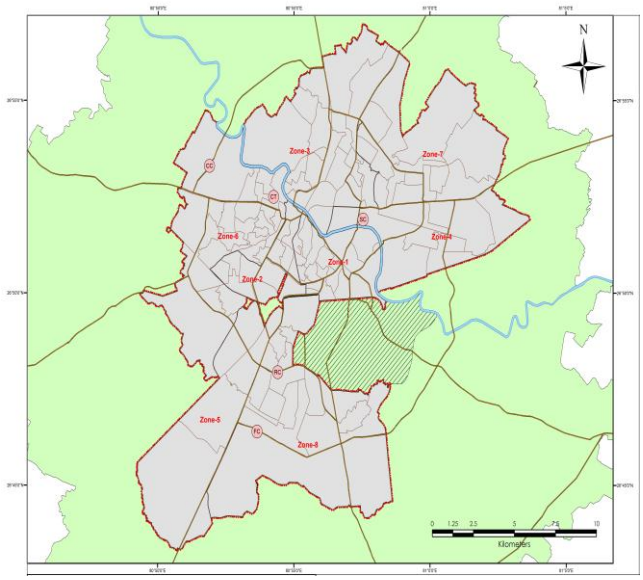

Fig.4.Implimentation of GIS

GIS applications in urban development

GIS data base creation for entire city, town by using latest satellite imagery. Collection of Data from different Dept. in Municipal Corporation & integrate it in GIS database. It is useful in creation of DP, Master Plan, CDP, TP etc. Application development base on different guidelines used by Planner (UDPFI etc.)

- GIS tools is used for spatial data analysis and modeling
- Land suitability analysis by using map overlay through GIS is important in urban planning
- Visualization and database management is used in urban planning
- GIS is beneficial for the storage of plans and land use maps, environment data, socioeconomic data and planning applications.
- Used for mapping improvement. Access to the different maps, useful in thematic mapping with less cost
- Efficiently retrieval of information through GIS
- Extensive and faster access to geographical information, and what if functionality, it is used in urban planning
- Best communication, improvement in quality of services, due to the fast access of the data
- GIS is useful for site selection, for storing and analyzing social, physical and economic data of the city
- Using GIS, environmental sensitive areas, environment conflict areas can be found out
- Tool creation is useful for Urban Planner

GIS Analysis is beneficial in Planning process:-

- For quick decision-making
- Increasing efficiency
- Improvement of the accuracy
- Management of assets efficiently
- Useful for allocating the better resources

5. CONCLUSIONS

Through look over and acknowledge this research, it shows that the belonging to success in the area of outlining depends on the practicability of providing the urgent data and basics for the users of all provender and facilities momentous for the association to provide the appropriate circumstances of workable and assembled divergence to achieve the intent of India that generality requirement to achieve in all the cities in the universe. So, we can bring about the conclusion of this research. We must assign the term planning as the experimental method to achieve the values through the means attainable to the highest capabilities from which we can wind up the means accessible in the following items:

1). GIS is a considerable objective means to provide the elementary data for the ambition area in terms of space and its topographical nature and proportions of attachment. The results of strained under the scanner ablaze good senses in royal topographical center could be in particular.

2). the assurance of these data will implement us to impel the material costs to complete the project perfectly and thus lead to the success of this project in all respects and the right chronology.

3).Know that all the documents facilitate will enable us to identify problems that require decision in each region by linking with other explication in the areas bordering to reach the urban plan executed and this is one of the main objectives followed by User.

4).Show where the shape lines and the distribution of population consistency and systematization of social planes and the urgent needs of pollution resources and anchorage serve the zone; from that we can see the strong relation between outlining and topographical area.

5). Many constituents are going to use GIS in urban planning and project management. To make notarization for many disparate sheets with images gives us a clear show in outline of planning project.

GIS helps urban planners to promote the towns and cities we live in, prepare for future knowledge, and make orientation as the population in an area variation. An important and effective tool, GIS has become serviceable for many when it comes to effective for urban planning.

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