

Paradigm Shift in Urban Planning with Geographical Information System in India

Jivesh Pandagre

Scholar, Dept. of Civil Engineering
School of Research and Technology, People's University
Bhopal, India

R. C. Patil

Assistant Professor, Dept. of Civil Engineering
School of Research and Technology, People's University
Bhopal, India

Abstract—Planning and development is mutually supportive and is extremely a complicated activity. Most of the urban issues lie with land related activities as land is a scarce and highly valuable commodity. Traditional methods of planning practices of data collection and record keeping became tedious for managing the urban scenario of the era. What is needed in today's scenario is a tool which captures, stores, analyses and leads to a feasible solution. Geographic Information Systems (GIS) have gained widespread acceptance worldwide. GIS is one such classy tool to handle spatial information and sequentially analyze the physical environment with that of its attribute data such as Canopy, Land use, Land cover, Environmental resources, water line, and sewer line etc and related to its topology. Rapid developments of science and technology have changed social life in various fields which is also reflected even in the field of urban planning. The objective of this paper is to undertake the possibilities of GIS application in urban planning with respect to urban plans like Master Plan or Development Plan. Using the advance features of the GIS software development plan has been prepared for the case of Obedullaganj Town, India. Apart from the conventional attributes of GIS like intensity of change, expansion of impermeable areas, growth pattern, and the applications of GIS with reference to urban planning and development have been studied with its potential role in social development, environmental conservation, inclusiveness, safety etc. as this is the need of the hour. The challenge of managing cities with respect to different aspects is a mind blogging and a challenging task to the urban planners as they have to integrate urban planning with various technological advancements. Paper submits an upgraded development plan integrating the best practices of GIS for the case of Obedullaganj town, India. It opens the door of application of new spatial analysis tools and techniques for small and medium towns in India.

Keywords—Urban; Planning; GIS; Development Plan

I. INTRODUCTION

Urbanization is the most important challenge that India faces today. There is a need to bring out in detail, the likely rates of urbanization in the future or of the infrastructural deficits, and the financing required for them [1]. The urban population in the developing world is expected to increase exponentially in the coming decades. The world's population is anticipated to grow by 9.6 billion (960 Crore) by 2050 from 2007 onwards while the urban population is projected to grow by 2.5 billion (250 Crore) [2]. As per Census of India 2011, the population of the country was 1.21 billion (121 Crore) out of which 31.1% live in urban areas [3]. The urban population has increased from 290 million (29.0 Crore) to 377 million (37.7 Crore). Now, there are 7935 towns and cities in 2011[4]. It has also been projected that the urban population will

exceed 600 million (60 Crore) within the next two decade [5]. India's urban population is expected to reach about 810 million (81 Crore) by 2050 [6]. Current restructuring of urban areas to prepare themselves for the growing global economic demands and providing better infrastructural facilities for smooth functioning of neo-liberal agenda had changed the direction and tasks of urban planning [7]. As a result, most urban settlements are characterized by shortfalls in housing and water supply, urban encroachments in fringe area, inadequate sewerage, traffic congestion, pollution, poverty and social unrest making urban governance a difficult task [8]. The rapid growth of urbanization and increase of density asks for planned urban development and thus prepare development plan for urban areas.

India is on the threshold of facing complex urban planning and development challenges in managing massive urbanization, posing greatest challenges to India's urban future. In India, at national level, urban planning and development subject is dealt by the ministry of urban development, the ministry housing and urban poverty alleviation, and the planning commission of India. These are the main agencies which lay down policies, legislations, and development programs etc. At state level Town planning departments are responsible for preparation of master plans and development plans (UDPMI 1996). Development plan drives planning of cities in India and it outlines land-use zones in which uses like residential, commercial, institutional, industrial etc., are planned. The urban planning process is more or less same throughout the country following the guidelines stipulated in Urban Development Plan Formulation and Implementation (UDPMI).

Urban development and planning involves the deliberate use of today's resources to achieve tomorrow's desirable objectives. It is the art of organizing space, science integrating research and knowledge of various disciplines, and the politics using available means to achieve specific [9]. It is the art and science of ordering the use of land to secure maximum economic, aesthetic and values [10]. Thus innovation in urban planning is required after change in urban behaviour to access its strength, weakness, opportunities and threats. These characteristics are analyzed with qualitative and quantitative data collected from urban area. Geographical Information System (GIS) is one of the software based tool which help to work and assess qualitative and quantitative data with their spatial attributes. Feature of GIS enabled professional planner, academician and practiser for planning and execution of innovative solution [11]. This study is geared towards use of GIS in urban planning. Planning can be made better more

efficient, user friendly and cost effective by inculcation of GIS in to the conventional physical planning methods. There are varieties of application of the technology in planning; GIS enables access to large volumes of data and is a tool for effective decision-making in urban and regional planning. This requires understanding paradigm shift in urban development and planning. It would be more helpful if the shift is traced after introduction of GIS in urban planning. Review of worldwide best practices of GIS in urban planning has been made. After learning different application of GIS not only in planning, suggestions have been made to bring changes in the preparation of development or master plan with preparedness of upcoming urban pressures.

II. RESEARCH OBJECTIVE AND METHODOLOGY

Land, the most valuable commodity, is the gift from God. This natural resource is required for all personal human needs and development. But it is a fixed and limited commodity too. Owing to the increased urbanization and also due to the impact of globalization, cities and towns face tremendous urban pressure; infrastructure is at stake in these metros, which have become high dense concrete jungles. Therefore, study explores paradigm shift in urban planning after introduction of GIS. It gives a background of urban planning and development in general, explores the benefit and constraints of using GIS in urban planning and describes in detail the urban planning and development for the sample cases to prepare 'Development Plan'. To work on identified urban issues, the research objective is **'to propose the innovate role of geographical information system in contemporary urban planning practice'**.

The literature review has been conducted for three aspects interacting each other. These aspects cover firstly understanding urban planning practices in India; secondly the increasing role of GIS in urban planning; and finally learning form best practices on GIS based urban planning and development works. Research after review of literature and empirical study proposes the innovative techniques which could be used at different level of development or master plan preparation. The research outcome would be useful to improve the conventional planning approach for the preparation of development plan. It would also strengthen the development with its accuracy, accountability, viability, equitable aspects.

III. LITERATURE REVIEW

GIS evolved from computer based models, which had a wide application in urban planning from the 1950s in the United State; it is necessary to have an overview of the development model of such tools in the field of urban planning. Models are commonly used in two distinct ways, as representation of an aspect of the real world or an ideal type [10]. Before computer-based urban models origination, there were some quantitative models of the urban structure developed by quantitative geographers and social scientists. Up to the late 1970's the use of computers in planning was fairly small because of the cost of procuring a system but in the 1980's miniaturization made it possible for dissemination and affordability of the computer technology. From that time till now there has been a steady growth in both software and hardware development with special applications to urban planning and management have the capabilities of spatial

analysis, query, modelling, mapping integration and other planning applications. All these types of application are now developed into a spatial database and mapping system known as GIS.

A. Paradigm of Urban and Regional Planning

In the context of western capitalist economies, the dominant urban planning paradigm, called the 'Rational Planning' or popularly know Master Plan, has been challenged and literature is available on the six other paradigms of Urban Planning. There is very little discussion available on the paradigm of urban planning in the developing countries and governments and the planners continue to pursue 'Rational Planning' and the city developments continue through subversion [12].

In the West, the urban planning paradigm has moved away from the technological approach of the 1960s and 1970s to a more participatory approach and greater role of civil society [13]. In Design with Nature, McHarg (1969) used blacked-out transparent overlays to identify sites that are in harmony with nature. The concept of map overlay analysis was computerized by Carl Steinitz of Harvard University into GRIDS in 1967 and later further developed by David Sinton (1977) into IMGID in the 1970's. These grid-based packages played a key role in the development of GIS in its inception stage in the 1970s [14]. They laid the foundations of many spatial processing, statistical and analytical functions of modern GIS.

The urbanisation in India is more of a statistical and demographic phenomenon than a real improvement in the quality of life. With limited resources and means, it is extremely difficult to fulfil the housing, infrastructure, community facilities and services, and employment which can provide a minimum standard of living in urban areas. After 1950 urban and regional planning was introduced to Indian national planning exercises in a systematic and regular manner [15]. It has assumed importance in recent decades for various reasons: the large size of the population of the country; the high rate of population growth, rapid urbanisation, large scale rural-urban migration, the reflection of rural-urban, regional and intra-rural disparities and the existence of a large population below the poverty line are some of the important and pressing issues which have created strong awareness for strengthening the urban and regional planning activities in the country. The urban development paradigm in India in the last two decades has been accused of being rooted in the neo-liberal development paradigm [16]. At the centre of these arguments are the observed processes of exclusions, marginalization, reduced rates of absolute poverty reduction and slow progress towards meeting the Millennium Development Goals (MDGs) [17]. Now the urban planning paradigm has moved from conventional approach to technological approach in India.

Any paradigm shift is a complex resultant of a dialogue between the theory, its practices and its due socio-political implications. One hand the planning pedagogy has always been balancing these two approaches and on the other hand, the changing paradigm of urban development in India also contributes the way in which planning is taught and practiced. The activity of planning should be seen as a process [18] and not be carried out just once and for all. Thus, the plan making

procedures may have to move in a direction that would substantially improve its ability to use information systems. This philosophy is based on the concept of feedback of information to evaluate plans and the plan making process. In the plan making process, Calkins suggested that, 'better planning will be achieved through better information, and better information will necessarily flow from an information system' [19]. GIS is one of the emerging tools which could integrate information system data into spatial planning.

B. GIS and Urban Planning

GIS is an effective tool for urban and regional Planning that enables data to be stored, used, compared, analyzed and integrated to make crucial planning decisions. It deals with the object of which their locations or positions are represented geographically on a map and the characteristics are recorded in a database as attributes. GIS offers various advantages including rapid and easy access to large volume of readily up datable data; selection of information by area or theme and merging of data sets; ability to search for particular features simulation and modelling.

The use of GIS has emerged in urban planning in the developing countries in the 1990s [20]. The integration of spatial data and their combined analysis is performed through GIS technique. It is a computer assisted system for capture, storage, retrieval, analysis and display of spatial data and non-spatial attribute data [8]. GIS techniques are playing an increasing role in facilitating integration of multi-layer spatial information with statistical attribute data to arrive at alternate developmental scenarios for effective decision-making in urban planning [21]. As a toolbox, GIS allows planners to perform spatial analysis using geo-processing functions such as map overlay, connectivity measurement, and buffering [22]. The unique feature of GIS is its ability to provide answers to the queries through rational and systematic analysis of the situation and aid planners to take quick decision [10].

In India, the complexity of urban development is so dramatic that it demands immediate attention and perspective physical planning of the cities and towns. The dynamic nature of urban environmental necessitates both macro and micro level analysis [8]. GIS tool helps to assess micro and macro level analysis. Database management, visualization, spatial analysis, and spatial modelling are the main uses of GIS in urban planning. GIS is used for the storage of land use maps and plans, socio-economic data, environmental data, and planning applications. Planners can extract useful information from the database through spatial query. Mapping and 3D views and virtual realities are the most powerful visualization tools in GIS. Maps can be used to explore the distribution of socio-economic and environmental data, and display the results of spatial analysis and modelling exercises. 3D views and virtual realities can give a community a more realistic view of the problems that it is facing and the likely development that will result from the plans. Spatial analysis and modelling are used for spatial statistical analysis, site selection, identification of planning action areas, land suitability analysis, land use transport modelling and impact assessment. Interpolation, map overlay, buffer and connectivity are the most frequently used GIS functions in spatial analysis and modelling [14]. The use of the above

functions varies according to different functions and stages of urban planning.

C. Best practices of GIS in Urban Planning

GIS is a technological tool for comprehending geography and making intelligent decisions. GIS organizes geographic data so that a person reading a map can select data necessary for a specific project or task. GIS is a useful tool for nearly every field of knowledge [23]. A good GIS program is able to process geographic data from a variety of sources and integrate it into a map project. Many countries have an abundance of geographic data for analysis, and governments often make GIS datasets publicly available. From routinely performing work-related tasks to scientifically exploring the complexities of our world, GIS gives people the geographic advantage to become more productive, more aware, and more responsive citizens of planet Earth. GIS tools can provide the necessary planning platform for visualization, modelling, analysis, and collaboration. The section reviews the best practices for the application of GIS in urban planning.

The need to make land-use decisions on a national and regional scale in Canada was the impetus for the development of GIS. Roger Tomlinson, the acknowledged father of GIS, led the Agricultural Rehabilitation and Development team that developed what became known as the Canada Geographic Information System. Land use analysis has remained an important GIS application. GIS allows for multiple criteria evaluation (MCE). This analysis is mainly characterized by allocating weights to assessment criteria for suggesting and ranking alternatives. The exercise identified desirable locations for anticipated low-density residential projects in the Champaign-Urbana region, Illinois. The analysis was based on two almost contradictory approaches and compared the resulting maps. The results were mapped and provided a comparison of the results obtained from both scenarios. Suitable areas for the low-density residential development in the developer's scenario cover a significantly larger portion of the region than the environmentalist's conservative scenario. Conversely, environmentalists' efforts to preserve the natural resources of the region greatly limited the amount of land perceived as suitable for future development. It was an example of how GIS could be used to support planning tasks and help make better decisions regarding real-world planning issues and develop communities more effectively.

Singapore faces immense challenges in its land-use planning that stem from the fact that almost five million people live and work within a land area of 710 square kilometers. The master plan is a land-use plan that guides Singapore's development 10 to 15 years into the future. The 2008 master plan is unique in that it took suggestions from Singapore's citizens into consideration before it was finalized. It also ensures that future development will balance economic growth with environmental stewardship and social progress. There is great value in the ability for citizens to quickly access the maps to determine planned land use surrounding their properties. By planning ahead and balancing land-use needs, land-scarce Singapore believes it can continue to meet development and economic objectives without sacrificing a good quality of life.

UN-HABITAT is building a worldwide urban knowledge base via its Global Urban Observatory that will make it

possible to monitor and evaluate urban conditions and trends. This global endeavour is supported by a network of local urban observatories, which are designated workshops that develop monitoring tools used for urban policy making. GIS is proving to be a useful technology for monitoring economic, social, and environmental development. The primary goal of building a GIS-based urban observatory is to use current data and Information and Communication Technology (ICT) to effectively and efficiently disseminate among concerned decision makers and stakeholders information, knowledge, and expertise about a city's most current urban indicators, statistics, conditions, and profiles. GIS outputs help staff target need, monitor urban inequalities, assess the distribution of services, identify trends, and target resources for more effective allocation.

GIS have emerged as a prime framework for the management of a range of spatial real world data. GIS integrates spatial and other kinds of information within a single system. It offers a consistent framework for analyzing geographical data. By putting maps and other kinds of spatial information into digital forms, GIS allows us to manipulate and display geographical knowledge in new and more objective ways. Planning is a field greatly associated with the spatial information's and hence GIS has an important role to play in the field of urban planning.

IV. ANALYSIS AND RESULTS

The purpose of the research is to explore the innovate role of GIS in contemporary urban planning practices. Starting with literature review, research understands urban planning practices in India and the increasing role of GIS in urban planning. It reviewed GIS based best practices in India also. After learning from literature research proceed for empirical study. In this section, GIS has been used for the case of Obedullaganj town which could be useful for the preparation of development plan or master plan.

A database was created by an extensive survey of land use and population statistics from Census for Obedullaganj town. Analogue maps and plans were scanned, and blocks and buildings digitised. Numerical data were converted into tables, graphs and maps. Base map with planning boundary, roads, water bodies and other natural features were prepared. GIS layers were created as thematic maps in a topological data structure. Topologically coded geo-data enables spatial query and analysis whilst large and complex sets of diverse data types can be efficiently managed. Issues such as insufficiency of public services and infrastructure and accessibility of public services can in this way be addressed more easily than by traditional methods. All the themes such as districts, public facilities, blocks and houses were stored as separate layers, which can be easily represented graphically. Many layers were created using the basic image as source. Data created with the GIS software package, were converted to data compatible with ArcGIS.

Analysis and overview are based on relevant literature, amnesty laws, statistics from the different government departments, maps, development plans of neighbour towns and reconstruction improvement plans (upgrading), field surveys, data from concerned authorities and from the reports

written by these authorities and organisations. The parameters used during analysis included:

- Demographic variables
- Socio-economic variables
- Status of public services and facilities
- Spatial variation covers land use and land utilities

From the descriptive information such as infrastructure, population data and area of the different land use zone, suitable land use plan was prepared.

A GIS based city base map has been prepared. To prepare GIS map shape files of major roads, railway line, water bodies, planning area boundary, Bhopal municipal boundary, zone boundary and important landmarks was collected. Spatial analysis has been made in GIS software ArcMap 10.1. Initially satellite images of Bhopal have been collected from Google Earth at 500m elevation. These images have been geo-referenced with attributes mentioned in Table 1.

TABLE I. BASE MAP FEATURES IN GIS

S.N.	Map Features	Description
1	Projected Coordinate System	WGS_1984_UTM_Zone_43N
2	Projection	Transverse_Mercator
3	Geographic Coordinate System	GCS_WGS_1984
4	Datum	D_WGS_1984
5	Prime Meridian	Greenwich
6	Angular Unit	Degree

After preparation of village boundary map and key landmarks satellite imagery was removed. Shape file of planning boundary, municipal boundary of Obedullaganj, village boundaries of planning area and other adjacent village area map was developed. Cadastral Map with complete khasra details was very useful for the preparation of land parcel from plot level to village level. The final village boundary within planning boundary of Obedullaganj was filtered. Ten villages were identified within planning limit of Obedullaganj. Three villages namely Tigaria, Harrai and Prem Talab was excluded where spatial analysis was performed as these villages doesn't have settlement and the total area is covered by agriculture uses. Other relevant spatial information was also added in Base Map like transport network, water supply status etc.

With the reference of this base map of Obedullaganj Planning Area (OPA) boundary and other spatial data, preliminary thematic maps were prepared. Geomorphology, Contour, Slope, Surface water and Ground water etc (Figure 1 to 4). natural and physical feature maps were prepared based on secondary source data. These maps were useful to assess the natural resource condition and find their opportunity for development.

FIGURE I. GEOMORPHOLOGY MAP OF OPA

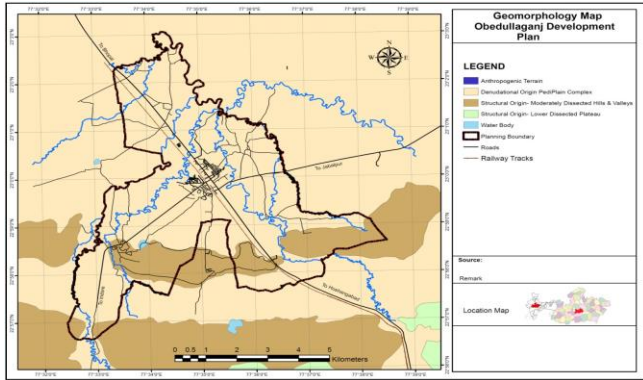


FIGURE II. CONTOUR MAP OF OPA

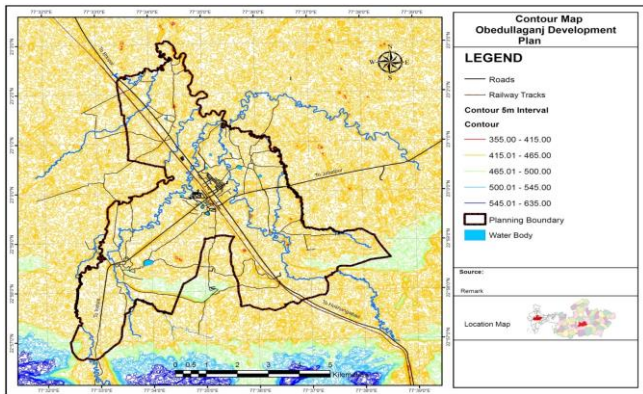


FIGURE III. SLOPE MAP OF OPA

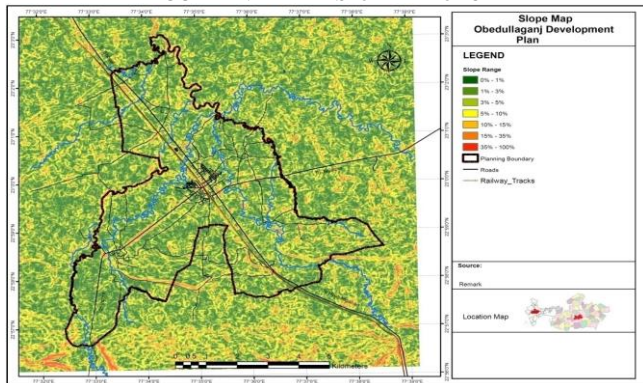
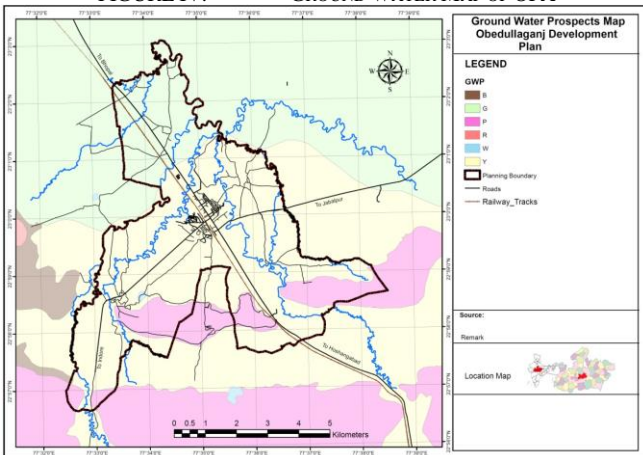


FIGURE IV. GROUND WATER MAP OF OPA



GIS connects a database of non spatial information to a map (spatial information). It combines layer of information about where things are located with descriptive data on these things and the surrounding. This helps in:

- Using analytical tools on the spatial data.
- Prioritization of issues.
- Better understanding of spatial phenomenon.
- Help in making viable conclusions.

Therefore to compare spatial location, Google image was superimposed on cadastral map. In order to identify the sites suitable for the urban growth, certain factors have to consider which is: land should have proper accessibility, land should be more or less flat, land should be vacant or having low usage value presently and it should have good supply of water. For the purpose of project objective to prepare landuse map with innovative steps, digitization was done to an extend that is enough to display the functionalities of GIS that adds value to preparation of a Development Plan. The map below shows a digitized part of Obedullaganj town with the various land uses. The land uses shown are both the existing and proposed. To determine what land use goes in to what section, a number of considerations are done. Land uses can be determined by the size of the land available. Land size in this case is used to refer to the level of subdivision and ownership not the size of undeveloped land available. Preliminary landuse map was prepared as per existing use activities of building and land which were further crosschecked with the development proposal of developers and authorities.

After preparation of base map a grid map was prepared in GIS platform. The thematic spatial maps were improved with non-spatial data. Toposheet index map was overlapped and other non-spatial data collected from census were also filled. This process improved thematic maps into vector format. Many tools like near tool under proximity toolbox distance of each grid for its nearest point of facility could be calculated for each attributes. Distance calculated were classes into equal class size of referred proximity. The spatial sprawl and chronological growth of the town could be assessed from the satellite imagery of different time period. The present population is concentrated into few central wards which need to spread throughout the planning area. Density map was classified into three density classes of 1 – 50, 50 – 200 and more than 200. More than 200 persons per hectare is considered as high density class. Other vector maps covering demographic variables, socio-economic variables etc. were also prepared. Based on these thematic maps final spatial analysis was performed.

As a result of legislation of squatters by amnesty laws and weakened fear of demolition of houses, the number of the squatters has increased year after year. After the last GoI initiatives, municipalities were suggested to upgrade development plans. Compared to standards, URDPFI and law, public services are inadequate; the ratio of services to the number of people is low and walking distances are too high. Even the ratio of proposed public services to the existing population is too low according to the standards defined in developmental regulations and URDPFI. Civil services and amenities were spatially identified and compared with the access parameters of URDPFI. To improve the accessibility of public services and buildings existing road network were

improved. Most of the public institutions like government buildings, schools, hospitals are located in town centre along the national highway and could be accessed conveniently and economically. Other facilities like graveyard, water bodies, and recreational area are away from the town centre. Thus access to these points is improved by improving the road network. Other small scale units like commercial area, industries, health and education faculties number need to increase to avail public services in justified manner.

The point level spatial proposals have been made to fill the gap of facilities and amenities. Area level proposal need to make after assessment of suitable land for a particular use. Thus suitability analysis has been performed to identify and allocate best possible location for residential, commercial, public and semi public space, industry, recreational facilities, agriculture and others. Suitability factors, factor scores, factor weights and permitted land use conversions can be specified for all land use by using GIS. Automated mapping allows the efficient handling and dissemination of thematic information enabling quick map making for planning and decision making. Suitability factor for allocation of each landuse were identified. Access to the land parcel, availability of portable water, access to basic services, access to facilities, land ownership were the factors for suitable residential land identification. Scores were given to these factors based on stakeholder consultation and public opinion of their priority for the selection of residential location. Since Obedullaganj town is dependent on agriculture economy thus most of the suitable land is fit for either agriculture or residential use. The map below presents the suitable residential, commercial, agriculture and others.

rather than through bare text. GIS is a perfect visualisation aid. So, GIS makes model creation and interpretation easier and provides understanding that may otherwise not be achieved.

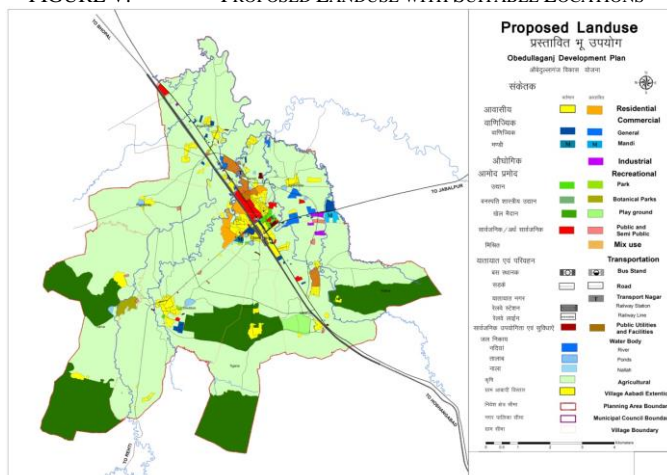
The specific research finding suggests that suitability analysis very useful during the preparation of master plan. It helps to prepare proposed landuse plan to allocate location for different land use. Preparation of base map is the key for reference. Thematic maps need to prepare for the discussion of different sectors separately. Overlapping process of GIS is very useful to compare different activities within planning area through their thematic maps.

V. CONCLUSION AND SUGGESTIONS

Planning and managing cities in the new era of globalisation and economic liberalisation would be a demanding task calling for new skills and approach. Indian cities will have to compete with others to attract investments and, therefore, issues like quality of infrastructure, energy efficient services provision and environmental conditions in a city besides economic stability would play a significant part in such competition. Urban planning profession in general will have to address these issues and respond rapidly. Urban planning authorities and agencies in every parts of the country should adopt new technologies like remote sensing and GIS. These have capability to provide necessary physical input and intelligence for preparation of base maps, for planning proposals and act as monitoring tool during implementation phase(s) [8]. Interfacing of urban planning models with GIS should now receive due attention. Incorporation of land-use transportation models, water distribution network analysis, simulation of urban activities to evaluate different urban development alternatives in the GIS framework needs to be explored for added advantage. Despite the diminishing importance and role of planning models and computers in urban planning, geographic information system (GIS) is increasingly being used in urban planning [24]. This is mainly because even in the paradigm of participatory planning, spatial information and analysis is important for facilitating informed discussion and decision making. As a computerized system for the storage, retrieval, visualization, analysis and modeling of spatial information, GIS can provide the textual and visual spatial information as well as the results of spatial analysis to aid public discussions and deliberations in the planning process and the making of plans that are in harmony with development, the environment and society [14]. Recent advances in the integration of GIS with planning models, visualisation, and the Internet will make GIS more useful to urban planning. The main constraints in the use of GIS in urban planning today are not technical issues, but the availability of data, organisational change, and staffing. Hence, planning strategies play an important role in defining the success of a GIS development. To attain maximum benefits of the GIS in planning, the following are recommended:

- Inculcate GIS as part of Urban and Regional planning educational curriculum.
- Add value to the planning process by hosting digital development plans online and make them accessible to the public more easier and also be able to include public participation in that forum.

FIGURE V. PROPOSED LANDUSE WITH SUITABLE LOCATIONS



Statistics, reports, articles, aerial and close-range photos, satellite images, maps and drawings all aid in understanding the planning area and its problems. Alternative solutions may be developed by importing this data into computer models. These models may predict, for example, demographic changes and land use modifications or simulate traffic flow. Often these computer models are implemented as stand-alone software. GIS facilitates by providing digital geo-data and display of intermediate and final results. Arriving at the most appropriate solution requires communication and collaboration among many stakeholders. Communication is best done through visualisations such as images and maps

- Speed up digitization of the existing maps and development plans so as to enable tap the strengths of GIS in planning of these areas during planning or re-planning of the areas.

Research findings support the innovation in preparation of development plan, zonal plan and local area plan. These physical plans also consider urban development policy vision. To strengthen urban development scenario, present research contributes the innovative approach for land use map preparation in different physical plans. It supports to urban research, physical plans and analytical approach.

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