

Infrastructure Planning in Developing Urban Area by Remote Sensing and GIS: A Case Study of Zone 16 of Jaipur

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Abstract-Studies have shown that there remain only few landscapes on the earth which are still in their natural state. Due to human activities, the earth surface is being significantly altered due to man's presence on the earth and his use of land. So, most of the times, it becomes virtually impossible to find a huge chunk of vacant land off a metropolitan city like Jaipur for planning and development related purposes. In this research we have focused on zone 16 of Jaipur city which is established along NH-8Ajmer road.

Keywords: Remote Sensing, GIS, Urban Planning

I. INTRODUCTION

Urban planning play an essential role for development of our country in terms of infrastructure. The urban planning contains best of infrastructure and services that describes the level of aspiration to provide the needs of citizens. The element of planning contains physical, institutional, social infrastructure. Urban areas of today are more precisely described as sprawling regions that become interrelated in a dendritic manner[1].

The planning is a widely accepted way to handle complex troubles of resources allocation and assessment making. It involves the use of collective intelligence and foresight to plan direction, order unity and make growth in public action relating to human environment and common welfare. Infrastructure is defined as "the basic physical and organizational structures needed for the operation of a society or enterprise, or the services and facilities necessary for an economy to function". Green Infrastructure is strategically planned and delivered network comprising the broadest range of high quality green spaces and other environmental features. A sustainable infrastructure is considered to be one in which maintaining, repairing and upgrading the infrastructure sustains our quality of life. In order to provide more valuable and meaningful direction for better planning and development necessary support of the society is very essential.. Urbanization is inevitable, when stress on land is high, agriculture incomes are low and population increases are excessive, as is the case in most of the developing countries of the world.

Urbanization has become not only of the principal motive but also an engine of change, and the 21th century which has become the centre of urban transition for human society. Urban Planning defines land distribution and regulates land use in cities, with the aim to advance financial development and high quality of life.

Nearly 31% of India's current population lives in urban areas and contributes 63% of India's GDP (Census 2011).With increasing urbanization, urban areas are expected to house 40% of India's population and contribute 75% of India's GDP by 2030. This requires comprehensive development of physical institutional, social and economic infrastructure. All are important in improving the quality of life and attracting people and investments to the City, setting in motion a virtuous cycle of growth and development. Development of Smart Cities is a step in that direction.

A smart city is one in which effective integration of physical, digital and human systems in the built environment to deliver a sustainable, prosperous and inclusive future for its citizens.. A smart city is one wherein investment in human, social capital, traditional transport and modern communication infrastructure sustainable financial system development gives a high quality of life by engaging management of natural resources through participatory action. Smart city provides for the well-being of the people through integration of

- Urban planning system
- Efficient services delivery
- Smart governance
- Energy management
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A. Study Area:

Jaipur is popularly known as the Pink City. It is the capital city of Rajasthan state in India..Jaipur is located at 26° 54'N 75° 36'E in the northern direction, 26° 43'N 75° 41'E in the eastern direction, 26° 43'N 75° 31E in the southern direction & 26° 47'N 75° 22'E in the western direction. It is one of the first planned cities of India. . Based on the population size of Jaipur, the city is divided into 16 zones (Study area zone no.16).Ajmer road (NH-8) is passed over this area in west direction & Diggi malpura road (NH-12) passed in southern direction. It is well connected by roads, railways and airways to the rest of the country. NH-8 and NH-11 intersect at Jaipur and NH-12 leading to Jabalpur starts from here. The city lies on Delhi-Ahmedabad rail route of Western railways. It lies at a distance of about 260 kms from Delhi, 135 kms from Ajmer, 225 kms from Agra. The city's airport at Sanganer is located towards the south of the city. It is one of the fastest growing mega cities of the country with an annual average growth rate of 4.5% whereas the national urban growth rate is only 2%. The population of the city is about 3.46million at present

which making it the tenth most populous city in the country. The area of zone 16 is 442 sq km.

B. Objective:

1. Evaluation of existing master plan of zone 16.
2. Critical analysis of existing infrastructure in this zone.
3. Estimation of infrastructure requirement as per the population, shape & size of area and government Policy requirements of smart city
4. 4.Preparation of plan for infrastructure as per smart city guidelines.

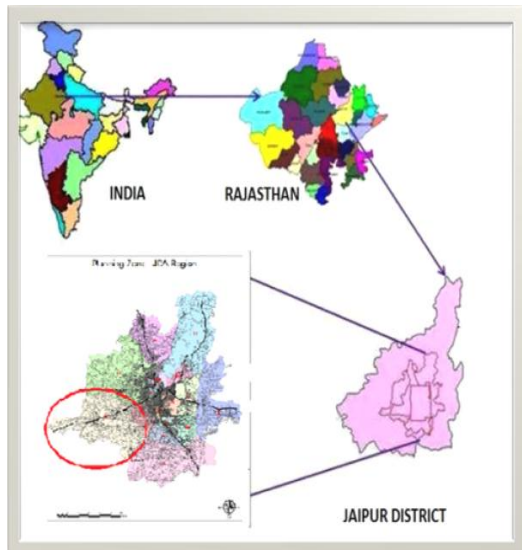


Fig 1 Study Area

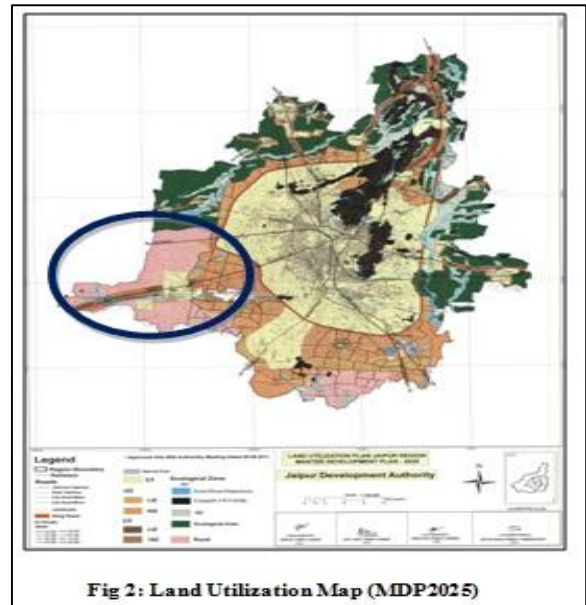
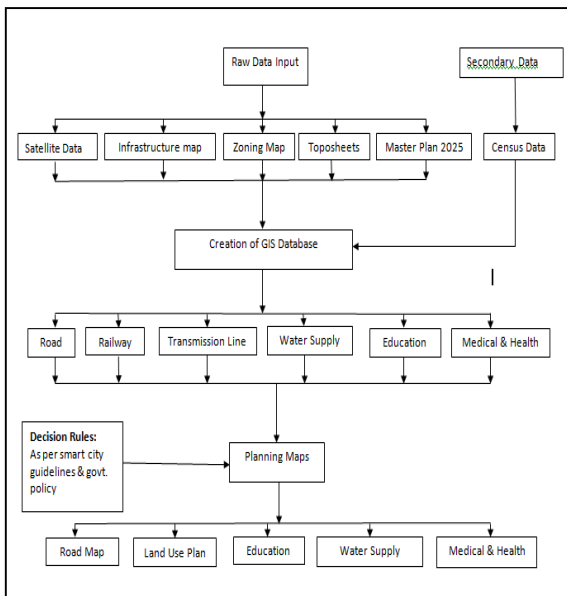


Fig 2: Land Utilization Map (MDP2025)

II. METHODOLOGY

Methodology includes the following steps:

- a. Selection of latest high resolution satellite images(Cartosat,Quickbird) for the study area zone-16 of Jaipur city.
- b. Georeferencing of satellite image by ground control points(image to image georeferencing)
- c. Creation of sub-set of study area zone-16 of Jaipur city.
- d. Creation of existing land use map and different thematic maps or layers.
- e. Transformation of secondary data(planning Jaipur ,zoning map of Jaipur, Topo sheets, Infrastructure data of Power, Water supply, Education, Medical and health, Road, Communication, etc) form various form into GIS form.
- f. Preparation of strategy for planning of road and power line.
- g. Planning of road and power line & Accuracy assessment of planned road and construction.

III RESULTS AND DISCUSSION:

The results include various thematic maps such as transmission line, road map, and settlement.

Transmission line includes transmission line of buffer 20m and 30 m showing how much of the settlement area is included within these buffer zones.All these results have been mentioned in table1.

Second road map showing existing and proposed road network have been created. Which have been shown in figure 4 and 5.

TABLE 1: EXISTING CONDITIONS OF HIGH TRANSMISSION LINE

BUFFER (m)	AREA (sq.km)	INTERSECTION AREA(Sq.km)
20	1.940194	0.002946
30	2.925834	0.005397

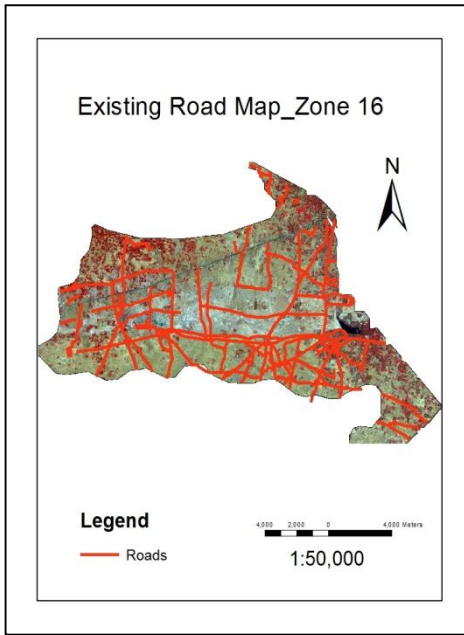


Fig4: Existing Road map of zone 16 of Jaipur city.

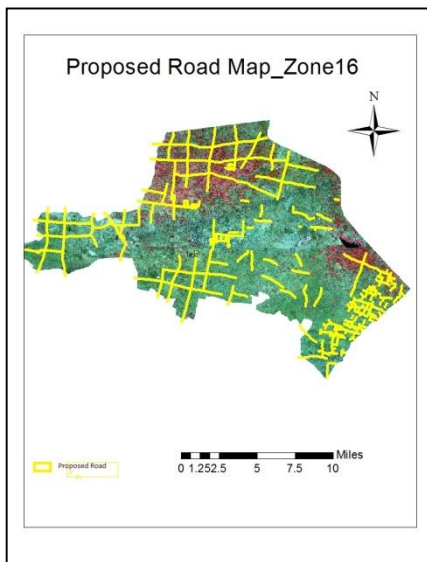


Fig5: Proposed road map of zone 16 of Jaipur city

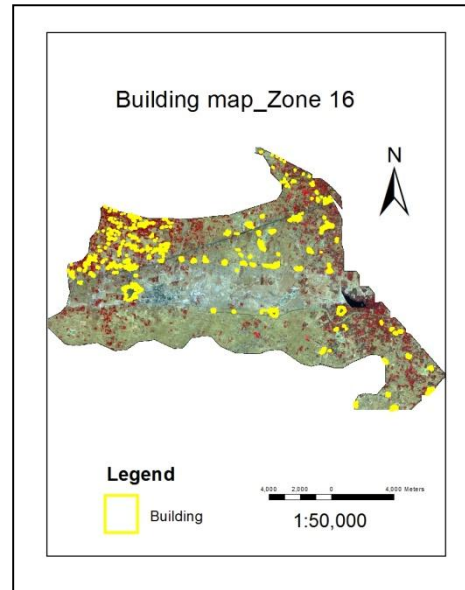


Fig 6: Settlement map of zone 16 of Jaipur City

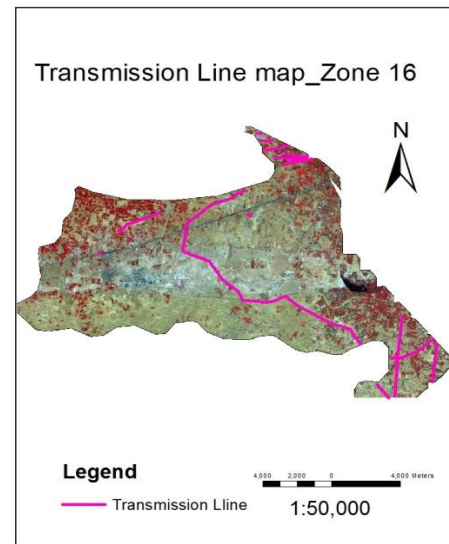


Fig 6: Transmission line Map

IV. CONCLUSION

The estimated innovation of this project is in developing a general idea for extracting road, infrastructure and all other smart city parameter and their categorization. The following are part of outcomes.

- Thematic map
- Proposed Land use Land cover map
- Proposed Infrastructure development planning map

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