

GIS For Land Use Patterns And Land Transformation - A Case Study Of Anand City

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ABSTRACT

Impressions of growth of any settlement are portrayed in the pattern of Landuse, structure and morphology. Thus it makes it necessary to study the evolution of the landuse pattern, structure and the layout.

Land constitutes the most important component for sustainable development in a region. Transformation takes place on the land over a period of time. The landuse pattern of any urban area is a reflection not only of the immediate and current space requirements of the community but rather of the cumulative needs over a period of year.

The detailed information about the extent and spatial information of various landuses, can be supplied to the planners so as to enable them for effective planning for future by considering the present pattern of landuse and factors responsible for its change.

The paper is an attempt to map the landuse pattern for Anand City in Gujarat, by various sources like Topomaps, Census Atlas, Geo Coded IRS-1B imagery etc for a period of three decades i.e. from 1961-1991 and to generate the land transformation map using GIS, over the same period and even to make query for the exact area of transformation from one to another category of landuse using GIS technique.

INTRODUCTION

Impressions of growth of any settlement are portrayed in the pattern of Landuse, structure and morphology. Thus it makes it necessary to study the evolution of the landuse pattern, structure and the layout.

Land constitutes the most important component for sustainable development in a region. Transformation takes place on the land over a period of time. The Landuse pattern of any urban area is a reflection not only of the immediate and current space requirements of the community but rather of the cumulative needs over a period of years. Any effective planning for future should consider the present pattern of landuse and factors responsible for its change.

The detailed information about the extent and spatial information of various Landuses, can be supplied to the planners so as to enable them for effective planning for future by considering the present pattern of landuse and factors responsible for its change.

The paper is an attempt to map the Landuse pattern for Anand City in Gujarat (Map 1) by various sources like Topomaps, Census Atlas, GeoCoded IRS-1B imagery etc for a period of three decades and to generate the Land transformation map using GIS, over the same period and even to make query for the exact area of transformation from one to another category of landuse.

ANALYSIS & INTERPRETATION

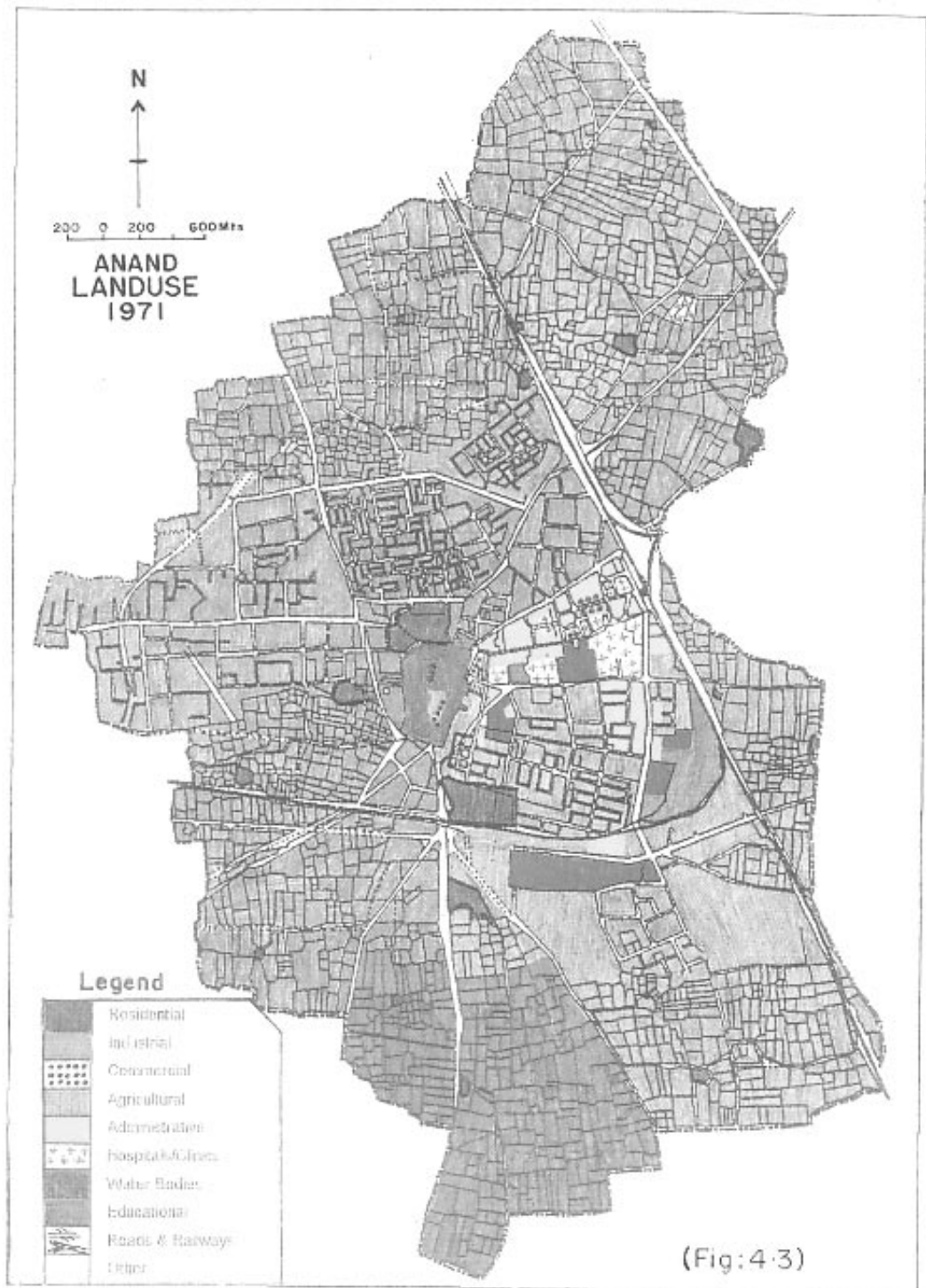
According to the municipal authorities, Anand covers an area of 21.13 Sq.k.ms. which is under different uses (Table: 1) (Map: 2,3,4).

The 1991 report of the municipality shows that the maximum area presently is under residential use as is normal with all settlements (11.1 Sq.k.ms) followed by educational establishments (2.64 Sq.k.ms). While a 2.0 Sq.k.ms area is devoted to agricultural purposes. It is worth mentioning here that in 1961, about 13.64 Sq.k.ms of land was under agricultural purposes and only 0.4535 Sq.k.ms. area was residential.

This land transformation over a period of three decades 1961 - 1991 from agriculture to residential and to some extent also to industrial and commercial suggesting the process of urbanization and urban character (Map 5).

The institutional uses cover a large area. The Institute of Agriculture and horticulture occupies about 2.44 Sq.k.ms. of the area in the southeastern part of the city while other educational units which comprises schools and colleges occupy about 0.13 Sq.km (3.73%) of the total area used for educational purpose.

The undeveloped area excluding that of Institute of agriculture occupies 0.48 Sq.k.ms. of the total municipal area. While roads and railways together occupy 1.7680 Sq.km. i.e. 8.36% of the total area of Anand.



MAP 2

MAP 3

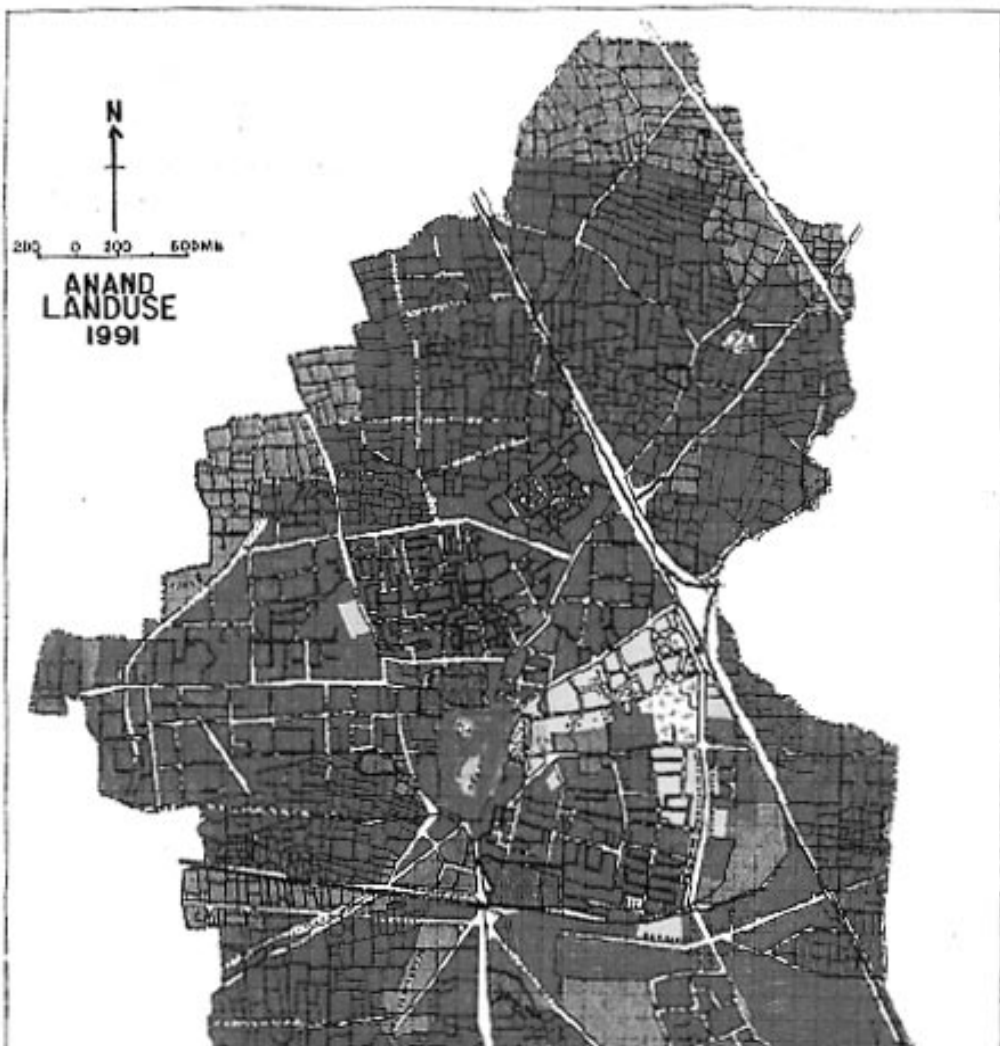


TABLE : 1

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The commercial activities which occupied only 0.1538 Sq.km. (0.72 %) in 1961 has grown to occupy 0.2476 Sq.km. (1.71%) in 1991. Public buildings and other administrative units occupy 0.550 Sq.km of the total area of Anand. Industrially occupied area has grown from 0.1741 Sq.km. in 1961 to 1.71 Sq.km in 1991.

Thus, a major change in land use has taken place by transforming rich agricultural land to residential, industrial and commercial uses from 1971 to 1991 (Map 5) The invasion of agricultural land by buildings or concrete structure, is a proof to the rapidly growing population and the expansion of the settlement.

METHODOLOGY

The source material used for the urban sprawl map generation comprises of two types :

- (i) Remote sensing data and
- (ii) Collateral information data.

Data products used

- Survey of India Topo map, Scale 1:63,360 - 1952, 46 B/4.
- Census atlas, Government of India, Scale 1:50,000 - 1971.
- Survey of India Topo map, Scale 1 : 50,000 - 1974, 46 B/4.
- Census atlas, Government of India, Scale 1:50,000 - 1981.
- Geocoded IRS - 1 B imagery on 1 : 50,000 Scale, 1992.

Image Processing and GIS Technique

Visual image interpretation techniques have been used for this study. Various maps of different time period were brought to the same scale and layers were created using GIS Software and image analyst. The super imposition of these layers gave the final map of Land transformation. Using the same map a query was built in order to understand the exact area of various land use transformation over the period of three decades so as to understand and compare the rate at which land is transformed from one land use category to another.

FINDINGS & CONCLUSION

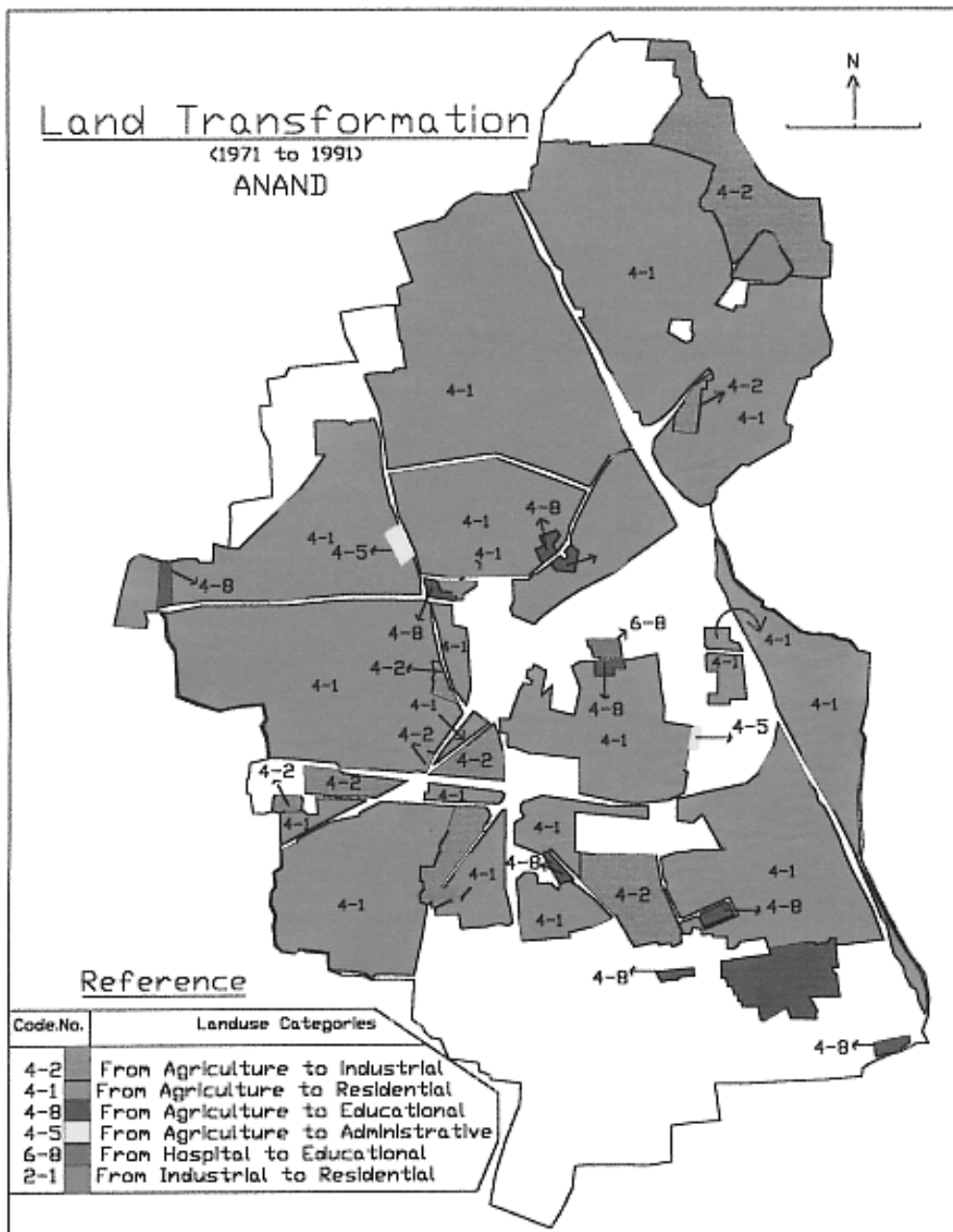
The satellite data and GIS technique helped significantly in demarcating the urban spread. The use of different imageries and maps for different time periods made it possible to monitor the urban growth and changes in land use.

The analysis has revealed that the city has been growing at a faster rate especially during the last couple of decades. Most of the growth has been along the major transport routes towards Northeast, West and Southwest directions.

By studying these current land use patterns it is easy to know the current space requirements of the community and even the cumulative needs over a period of years.

Effective planning for future can be considered as it is revealed from the study that the need of land for residential purpose is due to the influx of population from the surrounding because of better accessibility and connectivity of Anand.

Same way the influence of the Educational town of Vallabh Vidyanagar resulting into a conurbation has also generated demand of land for educational purposes.



Industries are scattered and hence they should be systematically established and small-scale manufacturing units should be shifted away from the residential and commercial areas.

Educational institutions occupy a large area of the city (2.64 Sq.km) i.e. 12.49% of the total area of the city which is much more than that occupied by commercial (0.24 Sq.km) and industrial (1.71 Sq.km).

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