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# ASSESSMENT OF LOSS OF AGRICULTURAL LAND DUE TO URBANIZATION: A CASE STUDY OF LIMBAYAT, SURAT

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**Abstract - Large amount of natural lands has been converted to urban due to rapid population growth and migration. Within the last 15 years, due to urbanization and migration from other provinces, the population explosion became a serious problem. The conversion of agricultural land into residential areas has increased more and more, causing the change of land-use structure. In this study, assessment of loss of agricultural land in the Limbayat area of Surat city was done. The area of 5.699 km<sup>2</sup> was taken for study. Google images of the year 2000, 2008 and 2013 were used to derive the change in land use and corresponding loss of agricultural land. The study was done using AutoCAD and vector image interpretation. The results show an increase in urban area by 152.831 ha from the 2000 to the 2013.**

## I. INTRODUCTION

Urbanization is one of the most glaring realities of the 21st century. All over the world, people are moving towards the cities. The bright lights of the cities, the perception that cities give greater opportunities and the desire to be at the heart of a 'fast life' is drawing people to cities. The process of society's transformation from a predominantly rural to a predominantly urban population is defined as urbanization. It includes two things – an increase in the number of people living in urban settlements and an increase in the percentage of the population engaged in non-agricultural activities, living in such place.

Urbanization leads to urban spatial expansion due to the demand for development and housing growth, as well as facilities areas to serve human life. Surat is the 9th largest city in India. As per 2011 Census, the population of Surat was 44,61,026. The main factors for migration are the growth of textile and diamond industries. The city has seen an unprecedented growth in the last four decades, recording one of the highest growth rates in the country and a 10-fold population rise over four decades. Coupled with this,

the spill over of population into the periphery has also been observed, especially towards the coast and Hazira in the west and the National Highway towards the east. The city area has expanded with time (major expansion being in 2006) and presently covers 326.515 sq.km. In Surat, land use and land cover patterns have undergone a fundamental change due to rapid economic development. Agricultural land has been gradually disappearing each year, converted into urban or related uses.

## II. OBJECTIVE OF STUDY

The objective is to study the change in land use pattern over a period of time and to evaluate the loss of agricultural land due to urbanization.

## III. STUDY AREA

Surat is a city located on the western part of India in the state of Gujarat. It is one of the most dynamic cities of India with one of the fastest growth rate due to immigration from various parts of Gujarat and other states of India. Prior to 1961, Surat's area was only 8.12 sq. km., while in 2009 it had expanded to 326.5 sq. km. The population has increased from 2876374 in 2001 to 4466826 in 2011. The population density as per 2011 census is 13680 persons/sq.km. There are seven zones in Surat city which are north, south, east, west, central, south west and south east zone. Limbayat is selected as the study area. Limbayat is in the south east zone of Surat city. The total area of south east zone is 19.492 sq.km. with population of 5.67 lakh and population density of 29000/sq.km. The area is also known for its haphazard development due to growth of migrants in the area. The area of 5.699 sq.km of Limbayat is taken for study for three different years. The following figure shows the Limbayat area in Surat map.

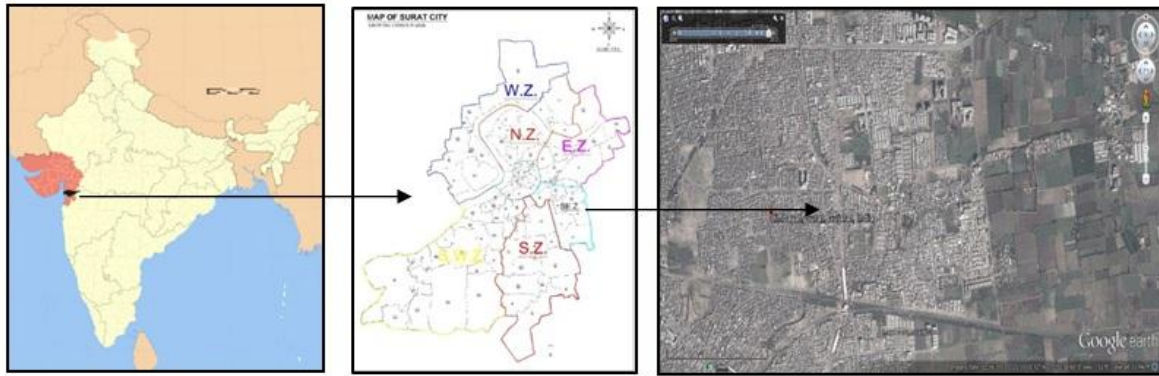


Figure: I Location of Surat in map of India and Location of Limbayat area in the map of Surat city

#### IV. DATA AND METHODOLOGY

In this study, the Google images of the year 2000, 2008 and 2013 were used for analysis. This study is based on the vector image interpretation. Land cover patterns for 2000, 2008 and 2013 are analysed using Auto CAD. Two types of land cover are identified and used in this study, including: agricultural land and other than agricultural land. The change in land use and corresponding loss of agricultural land is derived using Auto CAD.

#### V. RESULTS AND DISCUSSIONS

Total area taken as study area is 5.699 km<sup>2</sup>. Following table shows the change in land use for the year 2000, 2008 and 2013.

Table I: Change in land use

| Year                                            | 2000  | 2008  | 2013  |
|-------------------------------------------------|-------|-------|-------|
| <b>Agricultural (km<sup>2</sup>)</b>            | 3.940 | 3.206 | 2.412 |
| <b>Other than agricultural (km<sup>2</sup>)</b> | 1.758 | 2.492 | 3.286 |

From the above table, it is clear that agricultural land is decreasing and it is converted into a built up area. Results show that from the year 2000 to 2008, the loss of agricultural land is 0.734 km<sup>2</sup> and from the year 2008 to 2013, it is 0.794 km<sup>2</sup>. So, total 1.528 km<sup>2</sup> is converted into a built up area from agricultural land from the year 2000 to 2013.

The following graph shows an increase in built up area and corresponding decrease in agricultural land from year 2000 to 2013. The following figures show the change in land use for the years 2000, 2008 and 2013. In the figure, the blue color indicates built up land, i.e. other than agricultural land and green color indicates agricultural land.

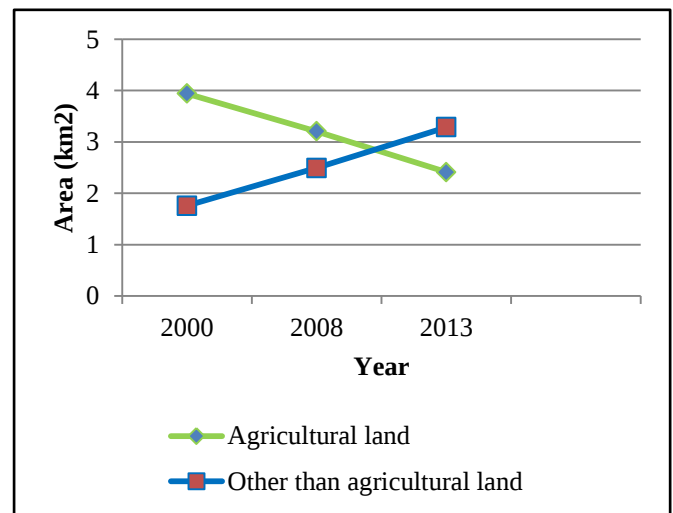


Figure II: Change in land use from 2000 to 2013

The following figure shows the land use change from the year 2000 to 2013. In the figure, blue color indicates other than agricultural land and green color indicates the agricultural land.



Figure III: Land use in 2000



Figure IV: Land use in 2008



Figure VI: Land use in 2013

## VI. CONCLUSION

This study enabled the analysis of urbanization in the Limbayat area over the period of 2000 – 2013. Some of the main findings of the present study are that there has been rapid conversion of agricultural areas to non-agricultural uses. The built-up area has also increased and the loss of agricultural land in the study area is 1.528 km<sup>2</sup> from 2000 to 2013.

## VII. REFERENCES

- [1]. Abiodun, A, Thando, G, and Reuben, S. (2014), 'A spatio-temporal analysis of peri-urbanisation in sub-Saharan Africa: a case study from Lobatse, Botswana', *African Geographical Review*, vol. 33, No. 2, (pp. 174 – 201).
- [2]. Andersona, R. and Hardy, E. (2001), 'land use and land cover classification system for use with remote sensor data', U.S. Geological Survey Professional Paper 964.
- [3]. Anyas, H, Bijaber, N, and Bannari, A. (2002), 'GIS and High-Resolution SPOT Imagery for Evaluating the Impact of Urbanization on Agricultural Lands', *Geocarto International*, vol. 17, No.3, (pp. 37 – 46).
- [4]. Bassam, S. and Rawashdeh, S. (2006), 'Satellite monitoring of urban spatial growth in the Amman area, Jordan', *Journal of urban planning and development*, vol. 132, (pp. 211 – 216).
- [5]. Bhagawat, R. (2013), 'Urbanization and the Decline of Agricultural Land in Pokhara Sub - metropolitan City, Nepal', *Journal of Agricultural Science*, Vol. 5, No. 1, (pp. 80 – 86).
- [6]. Chauhan, H. and Nayak, S. (2005), 'Land use / land cover changes near Hazira region, Gujarat using Remote Sensing satellite data', *Journal of the Indian Society of Remote Sensing*, Vol. 33, No. 3, (pp. 413 – 420).
- [7]. Duram, L, Bathgate, J, and Christina, R. (2004), 'A Local Example of Land-Use Change: Southern Illinois—1807, 1938, and 1993', *The Professional Geographer*, vol. 56, no. 1, (pp. 127 – 140).
- [8]. Govindu, V. and Kiros, M. (2012), 'Land use/land cover changes through the applications of GIS and Remote Sensing and the implications on sustainable land management', *International Journal of Geology, Earth and Environmental Sciences*, Vol. 2, No. 2, (pp. 136-147).
- [9]. Fang, H. and Xu, J. (2000), 'Land Cover and Vegetation Change in the Yellow River Delta Nature Reserve Analyzed with Landsat Thematic Mapper Data', *Geocarto International*, vol. 15, no. 4, (pp. 43 – 50).
- [10]. Francis, N, Romanus, D, and Raphael, K. (2013), 'Urbanization and its impact on agricultural lands in growing cities in developing countries: a case study of tamale in Ghana', *Modern Social Science Journal*, vol. 2, No. 2, (pp. 256 – 287).
- [11]. Jusoff, K. and Mohd. Hassan, H. (1998), 'An overview of satellite remote sensing for landuse planning with special emphasis in Malaysia', *Remote Sensing Reviews*, vol. 16, no. 3, (pp. 209 – 231).
- [12]. Kanagalakshmi, A. and Nagan, S. (2012), 'Impact of land use on environmental quality due to urbanization: A case study of Tirumangalamtaluk, Madurai', *Asian journal of civil engineering (BHRC)*, vol. 14, no. 2, pp. (339 – 348).
- [13]. Krishna Mohan, B, BabuMadhavan, B, and Das Gupta, U. (2000), 'Integration of IRS-1A L2 data by fuzzy logic approaches for landuse classification', *International Journal of Remote Sensing*, vol. 21, no. 8, (pp. 1709 – 1723).
- [14]. Lakshminarayana, B. and GopalRao, K. (2010), 'Artificial neural networks in spectral spatial landuse classification', *ISH Journal of Hydraulic Engineering*, vol. 16:sup1, (pp. 64 – 73).
- [15]. Lichen, L, Xiaofeng, D, Xiaoying, I. (2011), 'Quantative analysis of urban expansion using RS and GIS: A case study in Lanzhou', *Journal of urban planning and development*, vol. 137, (pp. 459 – 469).
- [16]. Rai, P. and Kumra, V. (2011), 'Role of geoinformatics in urban planning', *Journal of Scientific Research*, Vol. 55, (pp. 11-24).
- [17]. Saehoon, K. and Peter, G. (2012), 'Does large sized cities' urbanization predominantly degrade environmental resources in China? Relationship between urbanization and resources in the changjiang delta region', *International journal of sustainable development and world ecology*, vol. 19, no. 4, (pp. 321 – 329).
- [18]. Saha, A, Arora, M, Csaplovics, E, and Gupta, R. (2005), 'Land Cover Classification Using IRS LISS III Image and DEM in a Rugged Terrain: A Case Study in Himalayas', *Geocarto International*, vol. 20, no. 2, (pp. 33 – 40).
- [19]. Shahab, F. (2000), 'Urban expansion and loss of agricultural land – A GIS based study of



- Saharapur city, India', *Environmental and urbanization*, vol. 12, no. 2, (pp. 133 – 149).
- [20]. Sharma, R, Ghosh, A, and Joshi, P. (2013), 'Analysing spatio-temporal footprints of urbanization on environment of Surat city using satellite-derived bio-physical parameters', *Geocarto International*, vol. 28, no. 5, (pp. 420 – 438).
- [21]. Xiaogang, C. and Tailai, Y. (2007), 'Applying a GIS based model to collect information on agricultural land use in Beijing', *New Zealand journal of agricultural research*, vol. 50, (pp. 1073 – 1081).
- [22]. Xu, H, Wang, X, and Xiao, G. (2000), 'A remote sensing and GIS integrated study on urbanization with impact on arable lands: Fuqing city, Fujian province, China', *Land degradation and development*, vol. 11, (pp. 301 – 314).
- [23]. Zaki, H. and Khalil, K. (1999), 'Identification of urban expansion onto agricultural lands using satellite remote sensing: two case studies in Egypt', *Geocarto international*, vol. 14, no. 1, (pp. 45 – 48).

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