

An Analysis of Future City Limit Extension of Surat using Geospatial Techniques

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Abstract— Surat is world’s fourth fastest growing city so the limit of Surat Municipal Corporation is often expanding and new villages are added in to the city limit. This paper identifies the current situation of city limit and suggest the new villages which can be added in the Surat Municipal Corporation limit. Spatial direction of the city is carried out by using Remote Sensing and GIS technology. Factors for expansion are analysed by expert review form. In the results from above analysis will give the new villages which have highest potential of adding to the future city extension of Surat Municipal Corporation. This paper will help urban planners in planning future infrastructure facilities to the new villages which are going to be include in the limit.

Key words: City limit extension, GIS, Remote Sensing, Surat

Commissioner, 2011). It is situated on the banks of Tapi river. Figure 1 below shows the location of Surat city. Surat is divided in to seven administrative zones.

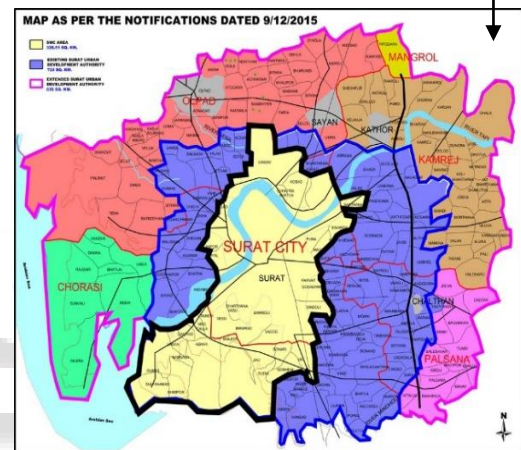
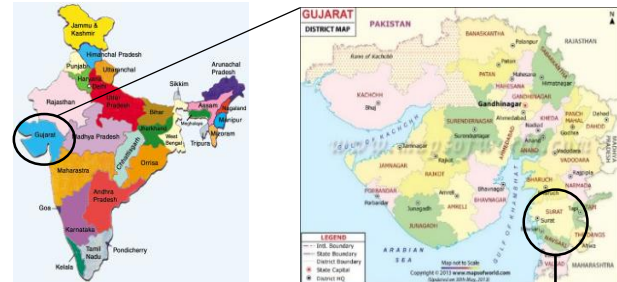


Fig. 1: Location of Surat

I. INTRODUCTION

The (relative or absolute) increase in the number of people who live in towns and cities. The pace of urban population growth depends on the natural increase of the urban population and the population gained by urban areas through both net rural-urban migration and the reclassification of rural settlements into cities and towns. (UNICEF)

The various causes of urban growth are Population growth, Independence of decision, Economic growth, Industrialisation, Speculation Expectations of land appreciation, Land hunger attitude, Legal disputes, Physical geography, Development and property tax, Living and property cost, Lack of affordable housing, Demand of more living space, Public regulation, Transportation, Road width, Single-family home, Nucleus family, Credit and capital market, Government developmental policies, Lack of proper planning policies, Failure to enforce planning policies, Country-living desire, Housing investment, and Large lot size.

Urban expansion an undesirable type of urban growth, is one of the major problem of city or town planners and administrators.

II. OBJECTIVES

- Analysis of land use land cover image of Surat
- Analysis of factors for expansion using expert review form
- Identification of villages to be added in city limit extension

III. STUDY AREA

The current research is carried out in Surat city of Gujarat, India. Surat is second largest city of Gujarat both way area and population. The population of the Surat is 44,61,002 and area of the Surat Municipal Corporation is 326.515 km² according to the census 2011 (Registrar General & Census

The above figure shows administrative boundary of the Surat Urban Development Authority (SUDA) which is controlling and regulating body for the urbanization (SUDA, Surat, 2013). SUDA established in 1978, SUDA boundary is 722 km² and it’s not change till today from its situated. SUDA administration boundary is excluded after SMC, so if directly show than SUDA control 396 km² and its population is 3,81,720 in 2011. In the above image the central yellow portion is the administrative limit of Surat Municipal Corporation.

IV. HISTORY OF CITY LIMIT EXTENSION

Year	Name of Newly added Area	Area (km ²)
Up to 1963	Nanpura	8.18
1963	Umarwad&Navagam	21.95
1975	Ved, Katargam, Singarpur, Tunki, Fulpada&Kapadra	55.56
1986	Karanj, Magob, Dumbhal, Limbayat, Bhestan, Udhna, Pandesara, Bhedvad, Bhatar, Umra, Piplod&Althan	111.16
1994	Pishad	112.28
2006	Bamroli, Un, Puna, Godadhra, Kosd,	146.456

March	Chaprabhatha&Amroli	
2006 July	Dumas, Magdalla, Gavier, Bhimpor, Abhva, Khajod, Sarsana, Bhimrad, Vesu, Bharthana, Gabheni, Budia, Jiav, Vadod, Sonari, Dindoli, Sarthana, Simada, Mota-Varachha, Utran, Variav, Pal &Palanpor	326.515

Table 1: Surat City Limit Expansion within SMC boundary
Table above shows the year wise extension of Surat Municipal Corporation and the villages added. Often limit has extended major and expansion occurred in July 2006 in which 23 (twenty-three) villages were added in the city limit.

V. DATA ANALYSIS

To detect the spatial direction of the city, land use land cover image of year 2011 from the Remote Sensing satellite Landsat is collected and image classification is carried out in four class (vegetation, waterbody, vacant land and built up) using GIS tools. Classified image is divided in to eight directions.

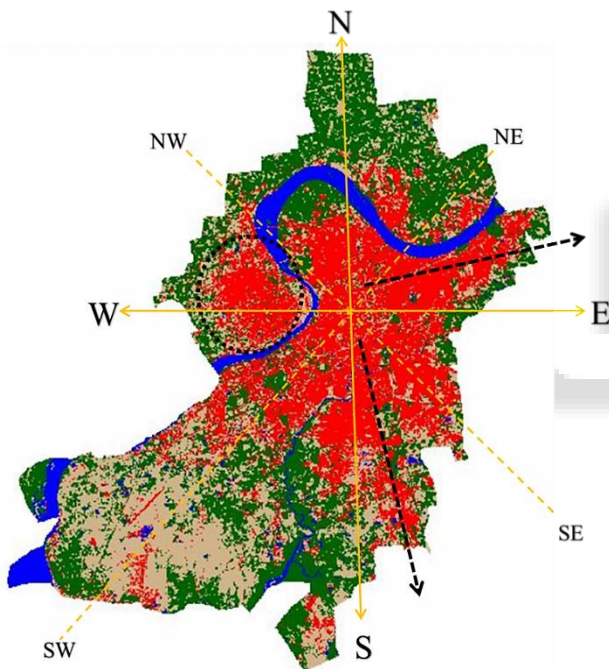


Fig. 2: Spatial direction of Surat

In above figure marked area (circle and arrow) are showing the spatial direction of city. By thoroughly inspecting the image it is clear that city limit needs to expand in the direction from North-East to South.

VI. RESULTS AND DISCUSSION

Factors for expansion and villages to be added in the city limit are carried out using expert review form. The total 26 (twenty-six) expert review forms filled up from the experts of Town Planning and Town Development department of Surat Municipal Corporation. Collected data were analysed using SPSS (Statistical Package for Social Science) software. Result of the analysis gives 18 (eighteen) villages which have highest potential to be added in the Surat City limit extension. The list of villages is shown below.

Sr.No	Village Name	Area (km ²)	CENSUS-2011 Total population
1	Valak	3.313	2153
2	Laskana	3.883	15318
3	Pasodara	3.388	860
4	Khadsad -pilodra	2.807	1044
5	Kosmada	7.527	1650
6	Saniahemad	3.240	3964
7	Saroli	1.989	3063
8	Kumbharia	2.851	5824
9	Devadh	3.751	1168
10	Sedhav	1.294	596
11	Dakhanwada	1.396	183
12	Deladwa	6.472	1374
13	Saniakande	2.610	1555
14	karadwa	2.265	1437
15	Eklera	2.020	839
16	Bhanodara	2.850	1138
17	Talangpor	6.072	11417
18	Umber	9.089	1704

Table 2: Village list of future city limit extension
Source: Gujarat village directory 2011

Table above shows the name of villages and their population and area which can be added in the next city limit extension. These villages are existing at the periphery of the present administrative boundary of Surat Municipal Corporation and some of the villages have population more than 10,000. So these villages also required the regulation and proper management of infrastructure like road, water supply, sewareage system, streetlights and so on. Geographical location of these villages are shown in below figure.

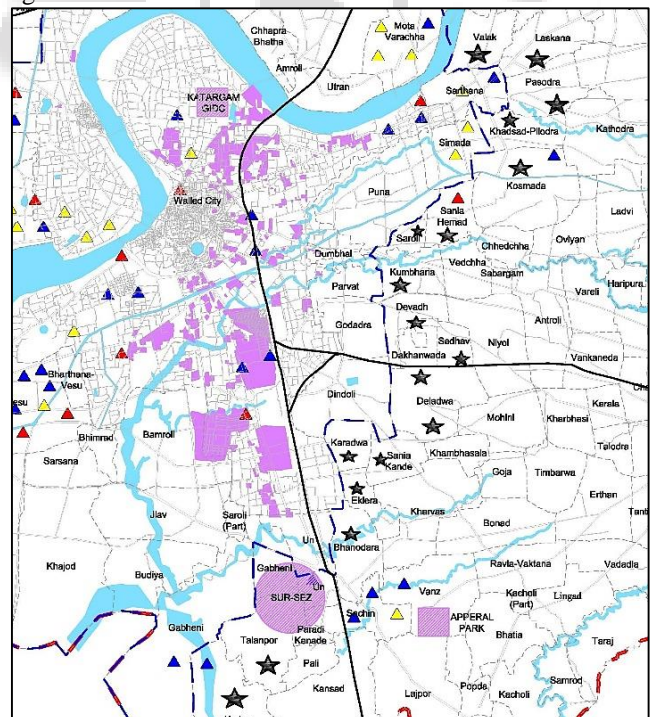


Fig. 3: Geographical location of villages

In above figure the blue colour is the boundary of Surat Municipal Corporation and the marked area (black star) are the 18 villages which have high potential of adding into the Surat city limit extension.

VII. CONCLUDING REMARKS

These study identified and analysed the spatial direction of the city, future city limit extension and the villages which can be added in to the new expansion. The villages which are going to be add can get the benefit in terms of better standard of living, land value and other infrastructure facilities. This research work will help management authority in regulating the haphazard growth of city. This work will also give the brief notion of direction of expansion of city. This study can help in identifying city limit extension in other direction of the city. Other cities can also use this mechanism for their city limit extension.

REFERENCES

- [1] Bhatt, Basudeb. Analysis of Urban Growth and Sprawl from Remote Sensing Data.
- [2] Development Plan 2004. Surat : Surat Urban Development Authority (SUDA).
- [3] Gujarat, Government of. 2011. Village directory. 2011.
- [4] Registrar General & Census Commissioner. 2011. Population Enumeration Data (Final Population). Census india 2011. [Online] Ministry of Home Affairs, Government of India, 2011. <http://censusindia.gov.in/>.
- [5] SUDA, Surat. 2013. SUDA, About US. Sudaonline. [Online] SUDA, Surat, 2013. <http://www.sudaonline.org/about-us/>.
- [6] Surat City Development Plan (2006-2012). Surat : s.n.
- [7] Surat Municipal Corporation. [Online] www.suratmunicipal.gov.in.
- [8] Survey, U.S. Department of the Interior U.S. Geological.USGS. [Online] <http://earthexplorer.usgs.gov/>.
- [9] UNICEF. unicef India. [Online] [Cited: 26 April 2016.] unicef.in.