

An Impact of Land use and Transportation - A case study of Sanand Area

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Abstract— Land use and Transportation Systems play definitive roles in shaping the city or town. This paper explores the impact of land use and transportation system on the city population and the land price. Theory discussed is located within the Indian context, and utilizes the example of the Sanand area in Gujarat State to elucidate how land use and transportation system impact on the characteristics of the area.

I. INTRODUCTION

A. Overview of Transportation and Land Use Interactions

The connection between transportation and land use is a fundamental concept in transportation. Transportation and land use are inexorably connected. Everything that happens to land use has transportation implications and every transportation action affects land use. State departments of transportation help shape land use by providing infrastructure to improve accessibility and mobility. Accessibility can be measured by the number of travel opportunities or destinations within a particular travel radius, measured in terms of either travel time or distance. On the other hand, mobility is a measure of the ability to move efficiently between origins and these destinations. Thus, mobility is directly influenced by the layout of the transportation network and the level of service it offers. Land development generates travel, and travel generates the need for new facilities, which in turn increases accessibility and attracts further development.

B. Effects of Transportation on Land Development

Transportation influence land development through providing infrastructure and, to a lesser extent, through transportation-related regulations. These influences are seldom part of a project's goal and are usually not intentional. Transportation projects are normally planned to improve safety, decrease travel time by alleviating congestion, and achieve other mobility-related goals. Transportation's most significant impact on land development occurs when access is provided to land. Increased access to land raises its potential for development, and more development generates additional travel. Once access has been provided, land patterns begin to change over a period of time. The results of these changes are, for the most part, irreversible.

II. LAND USE AND GROWTH DYNAMICS OF SANAND

In case of Sanand, the developments in its adjoining region are the major contributing factors for population growth in Sanand. The distribution of the land use structures is a major phenomenon which controls the spread of the city as well as mobility within the city.

A. Spatial Extents of Sanand city

Sanand Municipality has completed 123 years since its establishment in 1885. After the implementation of Panchayati Raj from 1st April 1963 Sanand Municipality was converted to Nagar Panchayat under the 1961 Gujarat Adhinyam and the Revenue area of town until then not vested in the municipality came to be vested in the Nagar Panchayat, thus making the revenue and municipal limits of the town co-terminus. In the process two hamlets (namely Gibpura and Laypara) situated away from the main town were also brought under the jurisdiction of the Nagar Panchayat making the total nagar panchayat area as 40.4 sq.km. After 15th April 1994, Sanand Nagarpalika was formed for the entire area of 40.4 sqkm. Since its inception Sanand has grown with variations. It is apparent from the table below a boom in population during the 1960's.

Year	Area (sq. km)	Total Population	% Decadal Growth	Density of SNP (Per Sq.Km.)
1951	-	10623	-	-
1961	-	14315	34.75	354
1971	40.4	18985	32.64	470
1981	40.4	22465	18.33	556
1991	40.4	25674	14.28	635
2001	40.4	33687	26.26	834
2010	40.4	*50160	*48.9	*1241

Table. 1 Population growth of Sanand

Source: SNP and *Estimations

Sanand is medium size town and it is not easy to divide it into functional areas in view of its compactness and the history of its growth. The town has tended to develop radially in all directions with a commercial zone at its center. The development of town has not been by functional categories and a mixture of houses put to various uses may

be found in all the wards. A problem of haphazard and mix land use development is visible. The changes in the land use distribution are discussed below.

B. Land use Developments of Sanand in 1997

Sr. No.	Use	Area in Ha	% of Developed Area
1	Residential including Gamtal	165	46.34
2	Commercial	18	5.05
3	Industrial	84	23.59
4	Public and Semi-public spaces	51	14.32
5	Water Bodies	36	10.11
6	Transportation and communication (Railways, Roads)	2	0.59
7	Total Developed area	356	-
8	Remaining Area	3686	-
	Total	4042.00	100.00

Table. 2 Land use Pattern in 1997

C. Current Land Use Developments in Sanand (till 2009)

A survey was conducted by AUDA in 2009 to review the current land use and developments. The table below shows the details of the same. It was found that the total developed area is increased by 90 Ha. There is considerable decrease in the industrial area. In 1997, 23.6 % of the developed area was occupied by industrial use, whereas now the industries occupy only 7.12% of the total developed area.

Sr. No.	Use	Area in Ha	% of Developed Area
1	Residential including Gamtal	194.53	39.8
2	Commercial	19.58	4
3	Industrial	31.43	6.4
4	Public and Semi-public spaces	49.79	10.2
5	Water Bodies	63.28	12.9
6	Transportation and communication (Railways, Roads)	130	26.6
7	Total Developed area	488.6	-
8	Remaining Area	3553.4	-
	Total	4042.00	100.00

Table. 3 Existing Land Use Plan

D. Recent Developments in the Region and Its Impacts

The advantageous location of Sanand as far as industrial developments are concerned has motivated setting up of Special Investment Regions (SIR) in its surroundings. About, 12 km from the Sanand city, is the Tata's Nano small car manufacturing plant. The other developments such as Changodar SIR and Sanand SIR are under planning stage by GIDC and can be seen as the major developments catering

to increased employment opportunities. About 4.28 km of the Dedicated Freight Corridor passes through Sanand Taluka. All these developments will be the major factors contributing towards high population growth.

E. Impact on Land Prices

Sanand Taluka is covered under the AUDA village area jantry. The jantry rates are prepared in 2006. It was found during the field surveys that the sudden escalation in market rates was observed only after the declaration of setting up of Tata Small Car Manufacturing (Nano) plant in Sanand i.e. since 2009. The official rates of properties as per jantry of the area are given in the table below:

Area	Rates in Rs Per Square Yard				
	Developed Open Land	Residential Building	Offices	Shops	Agricultural Plots
Along SH 17	1792.5	5975	9560	17925	418
Area between Sanand-Bavla Road and Gibpura Gam	1434	5975	8365	14340	286
Area along both side of Nalsarovar Road	1195	5975	8365	14340	239
Sanand Gamtal	1792.5	5975	10755	21510	-
Gibpura Gamtal	5975	4780	5975	11950	-

Table. 4 Jantry rates in Sanand

Source: AUDA Jantry, (Draft) 2006

III. CONCLUSION

It can be concluded from the above Table 2.2 and 2.3 that the city expanding along the major transport corridors:

1. Sanand-Viramgam SH No. 17
2. Sanand-Nalsarovar Road and
3. Sanand-Bavla Road SH No. 135

The city is experiencing haphazard development mainly in the form on mixed residential and institutional as well as commercial activities spread along the Viramgam state highway. The area covered under the water bodies (21.97 Ha) is decreasing compared to its use in 1997 (36 Ha) as a result of encroachments along the bank of the lakes especially. Removing these encroachments situated in the catchment area should be done on priority basis for their conservation.

Also concluded from Table 2.4 Major impact is observed in the form of escalating land rates in the city especially along the Sanand-Viramgam State Highway (No. 17). Since the city has been declared as a 'Satellite town' of Ahmadabad city, the land rates are increased by almost 500-1000 Rs. per Sq. Yard. The land parcels along the state highway cost about Rs. 7000-8000 per Sq. yard now.

REFERENCES

- [1] Daniel A. Badoe and Eric J. Miller Transportation - Land-Use Interaction: Empirical Findings and Implications for Modeling. July, 2009.
- [2] Anas, A. and L. N. Moses, Transportation and Land Use, in the Mature Metropolis, chapter 8, edited by C. L. Leven, Lexington, Massachusetts, D. C. Heath, Lexington Books, 1978.
- [3] Deakin, E., Jobs, Housing, and Transportation: Theory and Evidence on Interactions between Land Use and Transportation, in Transportation, Urban Form, and the Environment, Transportation Research Board Special Report 231, 1990. [4] Feeney, B.P. (1989) 'A review of impact of parking policy measures on travel demand'.
- [4] Heenan, G.W., The Influence of Rapid Transit on Real Estate Values in Toronto, Presented to Workshop-Conference on Transit and Development sponsored by Institute for Rapid Transit in cooperation with Boston College, June 15, 1966, in Toronto, Canada. Mimeographed.
- [5] Guan, H. et al. (2005) 'Modeling Parking Behavior for Better Control and Pricing: A Case Study From One of the Busiest Retail Shopping Areas in Beijing, China', Paper presented at the 84th Annual Meeting of the Transportation Research Board, Washington D.C., January 2005.
- [6] Libicki, M.C., Land Use Impacts of Major Transit Improvements, Washington, D.C.: Urban Analysis Program, Office of Transportation Planning Analysis.