

AN ASSESSMENT OF SOCIAL INFRASTRUCTURE IN WEST ZONE OF SURAT CITY

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Abstract—The citizen's comfort and satisfaction of needs shall be a prime focus to improve a quality of service delivery. For that, the social infrastructure plays a significant role. It includes health, education, recreational area, open space and distributive services. Surat is on a path to become a smart city and, for that availability of social infrastructure is an essential criterion. Henceforth, the distribution of social infrastructure according to the norms is among important goals for Surat Municipal Corporation. However, due to the population growth, the need for social infrastructure increases and overburden happen on the existing infrastructure. The current paper aims at identifying gaps in the social infrastructure of West zone of Surat by examining the current availability and need. Also, the paper discusses future requirement provisioning for the social infrastructure.

Index Terms—Educational facility, infrastructure gap, health facilities, open spaces; socio-cultural, social infrastructure

I. INTRODUCTION

Social Infrastructure shares a reference of the facilities and services provided in a community, through services and networks. It help citizens to meet the social requirements, maximize their possibilities for development and enhance community well-being [1].

Economic, physical and social infrastructure are inter-related for a sustainable community development. Adequate social infrastructure is the key to gain progressive society. Social infrastructure can be defined as a system that makes a society safe through the provision of health, education, public services, and recreation. Social Infrastructure is also take part in the economic development of a country [1].

The social infrastructure deals with the aspects of health-care facilities, education facilities, socio-cultural facilities, recreational facilities and open spaces, distributive services and, safety management.

Current work is aimed at performing an analysis of demographic and in relation to that, exploration of gaps in the existing social infrastructure referring to Urban and Regional Development Plan Formulation Guidelines (URDPFI) of Government of India [2]. The work is focusing at the West Zone of Surat city in terms of gap identification and discusses about proposals for a ward in the zonal administrative area.

II. STUDY AREA PROFILE

Surat city is situated at latitude 21°12'N and longitude 72°52'E on bank of river Tapi having coastline of Arabian Sea on its West. General terrain of the city is 13 Mt above the MSL. It is situated in a well-developed region of the Southern Gujarat. It is located 306 km south to the state capital, Gandhinagar. Surat Municipal Corporation (SMC) has practiced Zonal systems for public administration, following a functional decentralization approach of services management [3]. The whole Surat city has been divided into 7 zones [4]. Here, the assessment of social infrastructure is discussed.

Demography

The Surat urban area has witnessed a huge rise in the population over past decades. The overwhelming population increase is a result of in migration caused due to enormous economic opportunities and the extent of industrialization in the Surat city. The demographic information past few decades and estimated population of Surat city (based on SUDA development plan) are shown thus below. A development plan has a horizon of a decade, whereas in the case of Surat city, the population increase in past decades completely overtook the planning perspectives and its implementation. It resulted in certain deficiencies and gaps when compared to ideal standards and guidelines.

Table 1 Demographics of Surat city

Year	1981	1991	2001	2011	2021	2031	2041
	Trending population				Projected population		
Population	7,76,583	14,98,817	24,33,835	44,66,826	59,50,831	74,34,835	89,18,840

(Source: Surat Urban Development Authority [3])

Area and population distribution of various zone are given below. It is recorded that the population residing in different part of the city is not consistent with the geographical area distribution of various zones. Table below show the population residing in different parts along with zonal densities. The latest records of Census of India, 2011 revealed that the densities range from low as 31.05 ppha to a highest of 499.71 ppha. The city-wide average population density during the last Census year was 136.80 ppha.

Table 2 Zonal distribution of area and population

№	Zone	Area (in Sq. km)	Population	Density (ppha)	Population	Density (ppha)
			2001		2011	
1	Central	8.18	4,13,641	505.67	4,08,760	499.71
2	South-West	111.912	2,42,466	21.67	3,47,447	31.05
3	South	61.764	4,07,980	66.05	6,95,028	112.53

4	South-East	19,492	3,97,257	203.81	7,48,304	383.90
5	East	37,525	7,11,516	189.61	11,37,138	303.03
6	North	36,363	4,16,370	114.50	7,05,163	193.92
7	West	51,279	2,87,144	56.00	4,24,986	82.88

(Source: Surat Municipal Corporation)

Below is the information about the population in constituent administrative wards of the West zone of Surat.

Table 3 Wards of West zone with population

No	Ward	1991	2001	2011
1	Rander	59,549	86,047	1,14,632
2	Adajan	62,620	1,52,274	1,96,970
3	Jahangirabad	3,329	9,288	27,813
4	Jahngirpura	1,027	1,120	2,165
5	Pal	4,459	11,165	36,107
6	Palanpor	1,712	11,496	23,514
7	Variav	8,495	14,003	19,728
8	Pisad	244	1,751	4,057
Total	West zone	1,41,435	2,87,144	4,24,986

(Source: Surat Municipal Corporation)

Town planning

The government of Gujarat uses T.P. Schemes tool for land management. The Gujarat Town Planning and Urban Development Act, 1976 includes two type of planning, (1) Development Plan which included broad land-use of an area and (2) T.P. Scheme which deals with detail planning. Public use is included in T.P. Schemes as reservation. Public use included social infrastructures like school, Health center, and Community Hall under section 40.

There are total 127 T.P.Schemes included under the boundary of Surat city, as per status of February 2015. Out of total 40 final, 27 preliminary and 58 drafts T.P.Schemes and remaining T.P.Schemes are draft submitted to the government as per [4]. Besides, The Town Planning Department at SMC is also involved in other task related to planning. According to the needs of the city/corporation the proposals of D.P. and T.P. Schemes are made. List of T.P. Schemes of West zone is shown below.

Rander ward encompasses T. P. Schemes of 26 (Rander), 23 (Rander), 14 (Rander-Adajan), 30 (Rander); the Adajan ward has T. P. Schemes of 10 (Adajan), 11 (Adajan), 12 (Adajan), 13 (Adajan), 31 (Adajan), 32 (Adajan); In pal ward, the T. P. Schemes are 10 (Pal), 14 (Pal), 15 (Pal), 16 (Pal), 74 (Pal); In the Palanpor ward, the T. P. Schemes are 8 (Palanpor), 9 (Palanpor-bhesan); In the ward of Jahangirabad, there are three T. P. Schemes of 42 (Jahangirabad), 43 (Jahangirabad), 44 (Jahangirabad) where as in Jahangirpura, there are only two T. P. Schemes, namely, 45 (Jahngirpura-Pisad), 46(Jahngirpura), Variav has T. P. Schemes of 36 (Variav), 37 (Variav), 38 (Variav), 39 (Variav) and the Pisad ward has only one T. P. Shcheme namely, 45 (Jahngirpura-Pisad). Henceforth, the Zone under the study has in total 26 T. P. Schemes.

III. DATA COLLECTION

The authors collected data of available Social Infrastructure in West zone of Surat city. All the data was collected from Surat municipal corporation office, west zone. Location of data is taken from Google earth and also shown in qGIS. Social infrastructure includes following facilities as per Urban and Regional Development Plans Formulation and Implementation (URDPFI) guidelines:

- Educational facilities;
- Healthcare facilities;
- Socio Cultural facilities;
- Open spaces;
- Sports facilities;
- Distribution services;
- Police safety; and
- Safety Management.

Table below enlists various social infrastructure available in the West zone.

Table 4 Available social infrastructure

Available Social infrastructure in, West zone, Surat.			
No.	Social infrastructure		Existing
1	Education facilities	Preprimary school	111
		Primary school	56
		Senior secondary school	35
		Colleges	5
2	Health facilities	Maternity centers	10
		Specialty hospital	42
		Multi-Specialty hospital	1
		General hospital	38
3	Socio cultural facilities	Community hall	21
		Library	10

4	Open spaces	Hosing area park	25
		Neighborhood park	10
		Community park	1
5	Distribution facility	Petrol filling centers	9
		CNG pump	3
		Milk distribution	21
6	Police softy	Police post	6
		Police station	3
7	Safety management	Fire station	3

Educational facilities like school and alike is obtained from the records made available from the office of Surat Municipal Corporation. West zone has three health centers, located at Rander, Adajan, and Palanpor. In addition, SMC also extended the records of detail related to available Health facilities, Socio cultural facilities like garden, playgrounds, community hall and library /reading room, fire stations, distribution services like Petrol filling center, CNG pump. Details pertaining to the Milk distribution centers were availed from Sumul diary which plays major role in the milk distribution service across the region. Information of police stations and police posts were extended from the office of the police commissioner. Location of data is obtained through Google Earth, ground verification and, plotted using qGIS. Here, below figures show example of location of three CNG pumps filling center resulted from the exercise of qGIS.

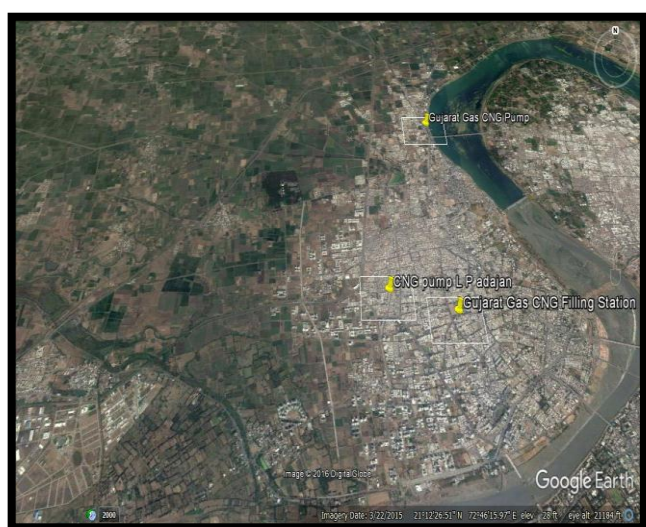


Figure 1 Google Earth image of location of CNG filling center

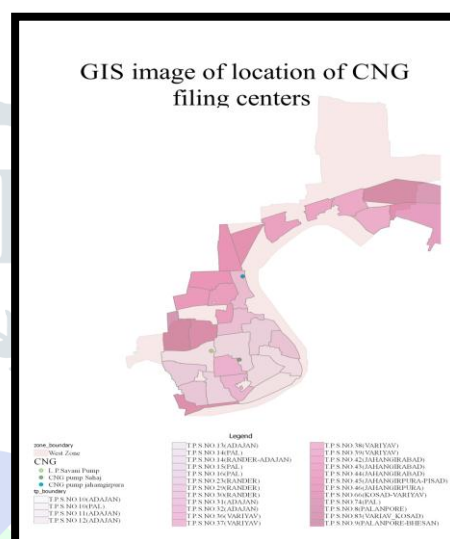


Figure 2 GIS image of location of CNG filling center

IV. GAP IDENTIFICATION

Prior to carry out an exercise for identification of infrastructural gaps, it is essential to project the population. Here, based on the previous Census data available for the ward level population, the population forecast for decades up to 2041 considering the base year as 2011 is performed. As the geographical area are comparatively smaller, an approach of two methods was adopted. The average of Arithmetical Increase Method and Incremental Increase Method was used for considering the population in the projected decades for identification of the gaps in the category of social infrastructure.

Table 5 Population projection

No	Ward	2011	Projected Population		
			2021	2031	2041
1	Rander	1,14,632	1,43,218	1,72,846	2,03,518
2	Adajan	1,96,970	2,41,666	3,63,883	2,63,621
3	Jahangirabad	27,813	46,338	71,146	1,02,237
4	Jahangirpura	2,165	3,210	4,731	6,728
5	Pal	36,107	61,049	95,109	1,37,787
6	Palanpor	23,514	35,532	48,667	62,919
7	Vriyav	19,728	25,453	31,287	20,779
8	Pisad	4,057	4,863	9,068.5	12,174
	West zone	4,24,986	5,61,329	7,96,738	8,09,763

Then second step is the study of the URDPFI, 2014 guidelines and obtain identical requirement of facility as per guiding norms. Set parameters were as for the social infrastructure, like 1 Preprimary school for 2,500 population, 1 primary school for 5,000 population and 1 senior secondary school for 7,500 population and so on.

Then the gap identification by comparing existing provision with norms based recommended requirements were obtained. For the development of any area, check on availability of social infrastructure is sufficient so that by doing gap analysis we can find scarcity of social infrastructure of West zone of Surat. Here, below images represents the gap analysis through different wards of the West zone.

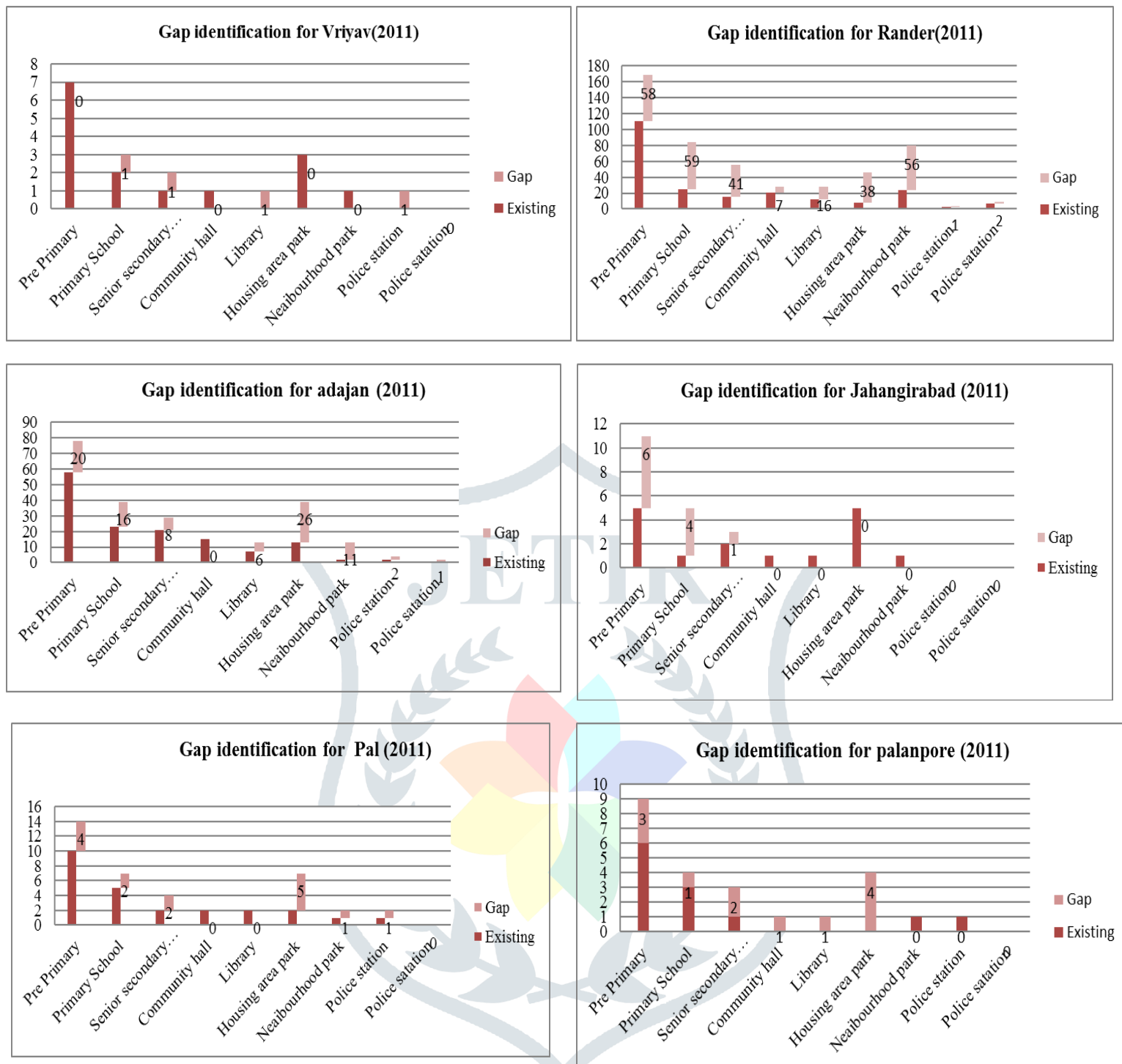


Figure 3 Gap identification for wards in the study area

Some of the important findings are listed below.

- There are five colleges in west zone and as per URDPFI guidelines three colleges is sufficient. And 1 school for mentally challenged children which is also sufficient. No school for physically challenged children and as per guideline there should at least 9 school for physically challenged.
- There are 38 general hospitals, 10 maternity centers, 1 multi-specialty hospital and 42 Specialty hospitals. As compared with guideline there is good number of hospital. But distribution of hospital in not proper as we show in digital map of hospital, most of hospital is in the posh area of west zone.
- There is 1 community park in west zone but as per requirement of URDPFI guidelines, 4 community parks are needed.
- For Distribution services Petrol pump and CNG pump are included which is sufficient as per URDPFI guidelines.
- There are three fire stations in west zone which is sufficient as per URDPFI guidelines.

Population Projection up to 2041 helped to know future need and so that on that direction development is started on early stages.

V. PROPOSAL FOR GAP IDENTIFIED

Based on the study of development plan 2035 proposal, the land reserved for social purposes, is proposed in connection to the gap identified. Minimum area is considered as per URDPFI guidelines. Below figure shows the planning proposal based on the gap identification exercise conducted for the Rander ward, West zone.

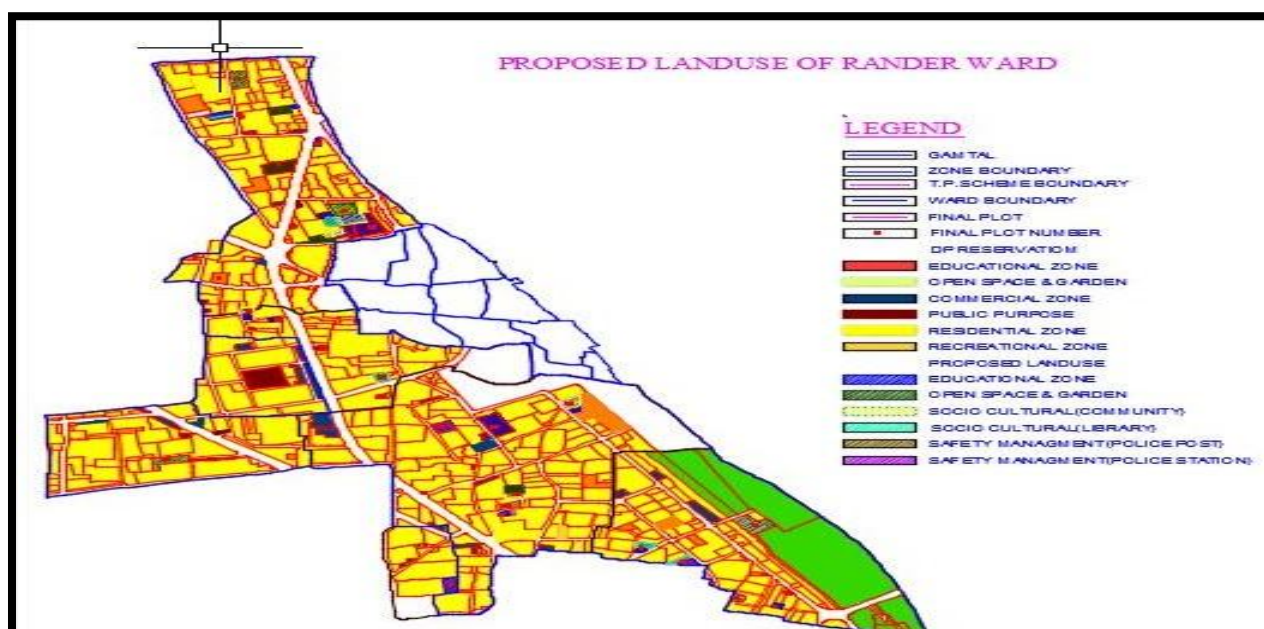


Figure 1 Proposed land use for Rander ward with inclusion of social infrastructure components

VI. CONCLUDING REMARKS

Analysis for any area in a manner similar to the current exercise is never carried out in the city of Surat. If the records of different social infrastructure components-facilities-services are maintained by means of a uniform record, future proposal for defining land allocation for specific locality can be streamlined. Such an attempt, if practiced, can avoid irregular provisioning of infrastructure in urban areas and bring in the maximum utilization of these facilities. Crucial findings include a considerable deficiency in the educational facilities, open spaces, police station coverage, and socio-cultural facilities. The approach taken up by the authors can improve the accessibility of these facilities provided for public utilization more effectively as, the distribution of these facilities will be based on prevailing guiding norms.

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