

# Spatial Disparity Analysis of Public Amenities in Jodhpur City

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**Abstract** - The urban amenity disparity is a challenging issue towards the urban planners, policy makers, and academicians in the Jodhpur city. There is uneven distribution of the different urban amenities in the Jodhpur city, shows significant indiscretion in the provision of urban amenities. The spatial distribution and concentration of two social amenities, viz, educational institutions and health facility were studied. The analysis of the data reveals that there is disparity in the distribution of health care institutions and schools in 65 Municipal wards of the Jodhpur city. The amenities generally decrease from the core of the city to its peripheries. The reasons for the irregular distribution of urban amenities are urban growth in the last one decades and depressed urban planning. Therefore it becomes imperative to find a solution for the provision of adequate and balanced urban amenities and their optimum utilization. The paper suggests that municipal planning authority must keep pace with the urban sprawl in order to make sure the equitable distribution of urban amenities in the city.

**Key Words:** Spatial, Public Amenities, Disparity, Location Quotient, GIS.

## 1. INTRODUCTION

This Urbanization is an index of transformation from traditional rural economy to modern industrial one. It is a progressive concentration of population in urban unit. At the moment, India is one among the country of low level of urbanization. During the last fifty years the population of India has grown two-and-a-half times, but urban India has grown nearly five times. In 2001, 306.9 million Indians (30.5%) were living in nearly 3700 towns and cities spread across the country, compared to 62.4 million (17.3%) who lived in urban areas in 1951. India is at an acceleration stage of the process of urbanization and expected to increase to over 400 million and 533 million by the years 2011 and 2021 respectively. The increasing level of urbanization growth has created many environmental problems which threaten urban life in the most of developing countries. Spatial techniques are used worldwide for urban facility management. In the study of Sule, Abdullahi and Bungwon (2012), private primary school locations in Kaduna metropolis were determine by the use of handheld GPS receiver. Thematic map, Nearest neighbour and Buffer zone analysis reveals that, the schools are not evenly distributed as some areas have the schools concentrated at particular places while some areas have none, and some settlements

are deficient in private schools while others have excess. Also, in another research conducted by, Kibon and Ahmed (2013), where they made use of thematic map and nearest neighbour analysis shows that, the distributions of Health facilities in Kano Metropolis are in clustered.

## 2. STUDY AREA

Jodhpur, one of the largest district of Rajasthan states is centrally situated in western region of the state. Jodhpur city is located at 26°N 18' latitude and 73° E 04' longitude and at an average altitude of 224m above mean sea level. In general the contours are falling from North to South and from North to Southeast with maximum level of 370m and minimum of 210m. The present population is about 1.05 million and has been functioning as one of the engines powering the Indian economy. The location map of the study area is given in fig.1.

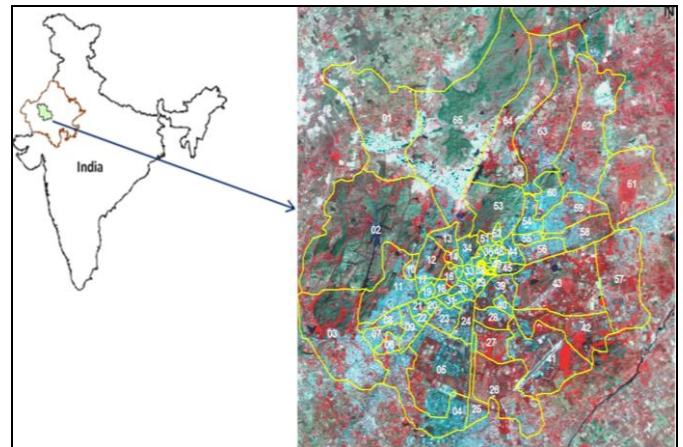


Fig.1. Jodhpur City Wards (65) on Satellite Image.

## 3. DATA AND RESEARCH METHODOLOGY

The IRS LISS-III and Landsat TM satellite data will be used for this study. The satellite image of the study area was registered and rectified with reference to geo-referenced 1:50000 scale topographic maps of the same area. The spatial data include the spatial distribution of the various urban amenity from GCP Field Survey. The attribute data on the other hand consists of specific attributes of each feature. The other data inputs used are Remote Sensing data from NRSC, Toposheets, Collateral data in the form of master plan of Jodhpur, Ward map and Ward-wise population data from Jodhpur Municipal Department.

In order to accomplish the objectives taken for the study, the methodology has been divided into two branches (Fig.2). ENVI 4.2 is used for satellite data enhancement and making it suitable for interpretation. The enhanced product used in ArcGIS platform for interpretation and digitization. ArcGIS9.2 is used for image interpretation and onscreen data capture, base map and geodatabase generation.

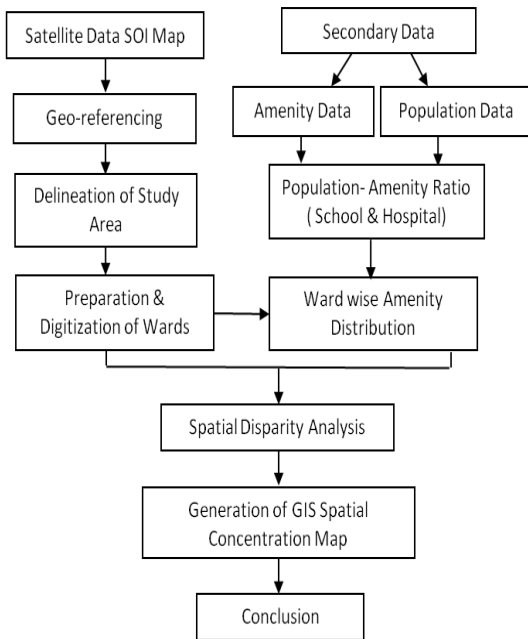


Fig.2. Methodology of Spatial Analysis of Urban Amenities.

### 3. RESULTS AND DISCUSSION

#### 3.1 Spatial Locational Analysis of Urban amenities

The spatial locational analysis of urban amenities holds an important place in the formulation of locational planning strategy and development of urban amenities in any geographical region. This type of analysis serves as a vital input for planning the establishment of these amenities. The spatial concentration of urban amenities is measured by the statistical measure known as 'Location Quotient'. The location quotient is a method for comparing a ward's percentage share of a particular facility with its percentage share of its population. The location quotient of different wards in Jodhpur with respect to a particular facility provides knowledge about the level of concentration of that facility in those wards. For calculating the location quotient (L.Q.) for a particular facility 'i' in a particular ward, the following formula has been used.

$$LQ = (n_i / p) / (N_i / P)$$

Where  $n_i$  = Number of facility "i" in a given ward,  $p$  = Population of the concerned ward,  $N_i$  = Number of facility "i" in Jodhpur city,  $P$  = Total Population of Jodhpur city.

if  $LQ > 1$ , Concentration is indicated means the per capita availability of that facility in the ward exceeds that of the city as a whole.

if  $LQ < 1$ , indicates Deficiency and  $LQ = 1$  indicates self sufficiency.

Location quotient of Hospital, School is given in Table -1.

#### 3.1.1 Spatial analysis of Higher Secondary Schools

In order to determine the spatial concentration of Higher Secondary Schools in Jodhpur city, location quotient was worked out (Table-1). It is clear from the table that twenty eight wards out of sixty five (43%) have absence of any Higher Secondary Schools; seventeen wards (26%) have deficiency. Ward no. 63 has having maximum number of higher secondary schools (6), with the location quotient value of 5.05, which is certainly very high and depicts the excessive concentration of this amenity in the concerned ward. The spatial concentration pattern is highlighted in the Fig.5. From the figure, it is evident that eight wards have high concentration of the amenity i.e. the concentration of the amenity exceeds the city average, while the remaining thirty four wards are below average which means these wards are underserved in context of this amenity. However, the degree of concentration varies between the over served wards as well so far as the amenity-population ratio is concerned. This can be explained from the fact that Ward no. 63 has six higher secondary schools having population of 14001 persons (1 higher secondary school/ 7500 persons).

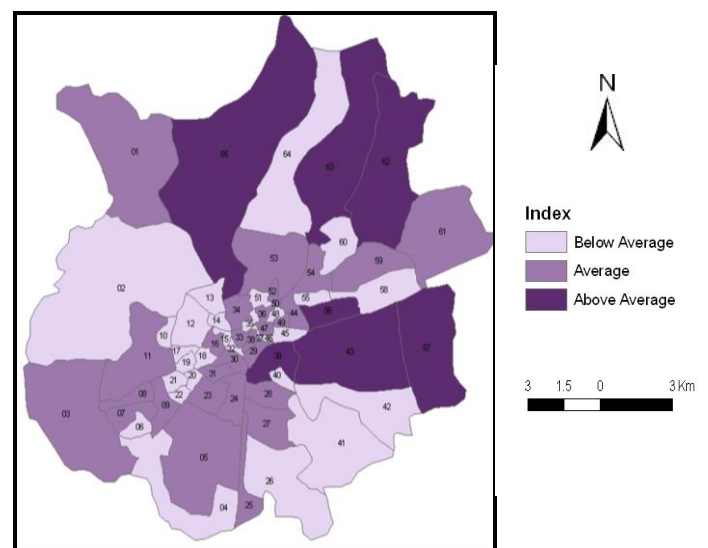


Fig.3 The Spatial concentration of Schools.

### 3.1.2 Spatial analysis of Healthcare Facilities

In order to determine the spatial concentration of Health Institutions in Jodhpur city, location quotient was worked out in Table-1. It is clear from the table that twenty nine wards out of sixty five (45 percent) have absence of any Health Institutions, while as sixteen wards (24%) have deficiency in the availability of Health Institutions, twelve wards (18%) have self sufficiency and the rest eight wards (12%) posses above normal concentration i.e; the per capita availability of the facility exceeds that of the city as a whole. Among the wards, ward no 7 has maximum number of healthcare facility with a location quotient value of 4.95. The spatial concentration pattern of health institutions is presented in the Fig.4. This shows that the concentration of these institutions varies between different wards.

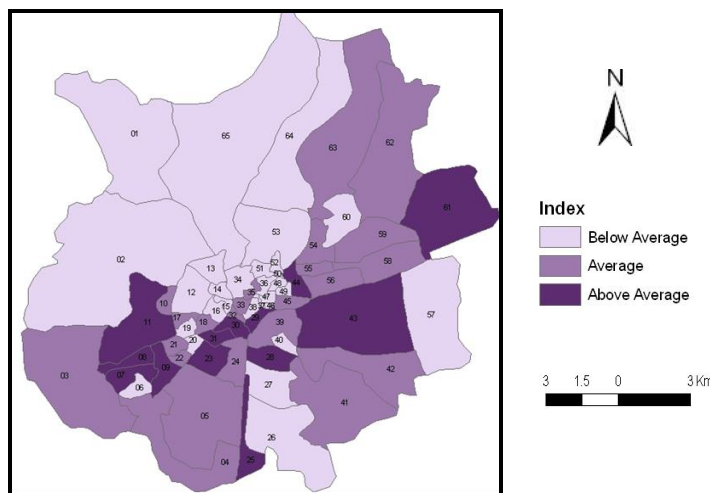


Fig.4. Spatial concentration of Hospital.

### 4. CONCLUSION

The study indicate that urban amenities (Schools and Hospitals) of the study area are not evenly distributed among different wards, which leads to various problems like alienation of people towards local government, interpersonal disparities in standards of life and deterioration of city environment. The analysis of the distribution of two public amenities indicates that there is a lead-lag relationship among different wards in terms of the provision of urban amenities. Some wards are more developed in terms of a particular facility while others lag far behind the mean level of development of the city in terms of that facility. The reasons for the disparity are the lack of urban policy for Jodhpur city resulted in the unplanned urban structures which also led to an uneven distribution of these amenities.

Ward no.	Population	% of Population	No. of Hospital	% of Hospital	LQ of Hospital	No. of School	% of School	LQ of School
1	13699	1.613	0	0	0	2	2.78	1.72
2	14211	1.673	0	0	0	0	0	0
3	14543	1.712	2	2.41	1.41	1	1.38	0.80
4	12148	1.430	2	2.41	1.68	0	0	0
5	12402	1.460	2	2.41	1.64	2	2.78	1.90
6	13316	1.568	0	0	0	0	0	0
7	14434	1.700	7	8.43	4.95	1	1.38	0.81
8	13220	1.557	3	3.61	2.32	1	1.38	0.88
9	12905	1.519	4	4.82	3.17	1	1.38	0.90
10	14305	1.684	1	1.2	0.71	0	0	0
11	15054	1.773	4	4.81	2.71	2	2.78	1.56
12	14086	1.659	0	0	0	0	0	0
13	14547	1.713	0	0	0	0	0	0
14	14010	1.650	0	0	0	0	0	0
15	12373	1.457	0	0	0	0	0	0
16	12897	1.518	0	0	0	2	2.78	1.83
17	13282	1.564	2	2.41	1.54	0	0	0
18	14433	1.699	1	1.2	0.71	0	0	0
19	13335	1.570	0	0	0	0	0	0
20	12299	1.448	0	0	0	0	0	0
21	12071	1.421	1	1.2	0.84	0	0	0
22	11826	1.392	2	2.41	1.73	0	0	0
23	13640	1.606	6	7.23	4.50	2	2.78	1.73
24	12842	1.512	2	2.41	1.59	1	1.38	0.91
25	14363	1.691	6	7.23	4.27	2	2.78	1.64
26	14568	1.715	0	0	0	0	0	0
27	11360	1.337	0	0	0	2	2.78	2.07
28	11135	1.311	4	4.81	3.66	1	1.38	1.05
29	13543	1.595	3	3.61	2.26	2	2.78	1.74
30	12760	1.503	3	3.61	2.40	2	2.78	1.84
31	14341	1.689	3	3.61	2.14	1	1.38	0.81
32	12283	1.446	1	1.2	0.83	0	0	0
33	13828	1.628	1	1.2	0.73	1	1.38	0.84
34	11702	1.378	0	0	0	2	2.78	2.01
35	12061	1.420	1	1.2	0.84	0	0	0
36	11411	1.343	0	0	0	2	2.78	2.06
37	12495	1.471	0	0	0	0	0	0
38	13117	1.545	0	0	0	2	2.78	1.79
39	12024	1.416	1	1.2	0.84	4	5.56	3.92
40	11341	1.335	0	0	0	0	0	0
41	19040	2.242	2	2.41	1.07	1	1.38	0.61
42	13125	1.545	1	1.2	0.77	0	0	0
43	13246	1.560	3	3.61	2.31	3	4.16	2.67
44	14415	1.697	3	3.61	2.12	1	1.38	0.81
45	11520	1.356	1	1.2	0.88	0	0	0
46	10282	1.210	0	0	0	0	0	0
47	12970	1.527	0	0	0	1	1.38	0.90
48	11629	1.369	0	0	0	0	0	0
49	12066	1.421	0	0	0	1	1.38	0.971
50	10340	1.217	0	0	0	1	1.38	1.13
51	12311	1.449	0	0	0	0	0	0
52	10201	1.201	0	0	0	1	1.38	1.15
53	15181	1.787	0	0	0	3	4.16	2.33
54	13986	1.647	1	1.2	0.97	1	1.38	0.84
55	10424	1.227	1	1.2	0.97	0	0	0
56	13332	1.570	1	1.2	0.76	3	4.16	2.65
57	15706	1.849	0	0	0	4	5.56	3.01
58	11138	1.311	1	1.2	0.91	0	0	0
59	11103	1.307	1	1.2	0.92	1	1.38	1.05
60	14794	1.742	0	0	0	0	0	0
61	15350	1.807	4	4.61	2.55	1	1.38	0.76
62	11621	1.368	1	1.2	0.87	4	5.56	4.06
63	14001	1.649	1	1.2	0.73	6	8.33	5.05
64	14332	1.688	0	0	0	0	0	0
65	12729	1.499	0	0	0	4	5.56	3.71
Total	849052		83	100		72	100	

Table-1: Location Quotient (LQ) of Healthcare Facilities and Schools

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## BIOGRAPHIES



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