

SPATIO-TEMPORAL ANALYSIS OF GROWTH OF NATHDWARA CITY, RAJASAMAND. (RAJ.)

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ABSTRACT

Nathdwara is a religious town located on the banks of Banas River in Aravali hills, housing the world famous Srinathji temple in Rajsamand district of Rajasthan. The city has undergone phenomenal growth during the past decade with a rapid increase in population by 13.5 percent. Along with population increase significant changes in areal extent, land use and transportation network characterize the urban growth of the town. Urban sprawl is defined by haphazard patch work of development, which leads to improper development in any city. It is necessary to quantify and monitor the growth of a city in order to avoid problems related to urban congestion and haphazard growth.

This paper aims of observing, mapping tabulating, comparing and analyzing the primary as well as secondary data, to calculate a composite index, this index categories the wards of the town as developed, developing and under-developed. The present paper also endeavors to trace the pace of urban development during the decade 2001-2011.

There has been an attempt to observe the regional disparities that exists among different wards, the rationale for the disparities and the analysis there of, has also found scope viewing the futuristic needs of the town. This paper also includes the formulated suggestions to ensure the well-planned provisions for urban-amenities.

Keywords: Urban growth, composite index, morphology, working population, amenities.

INTRODUCTION

Nathdwara is one of the most famous pilgrimages and centre stage of religious faith of "PUSHTHIMARGIYA VAISHNAV SAMPRADAYA". The main temple holds the splendid statue of Lord Shrinathji. Situated amid Aravali hills and on the banks of the river Banas, this city has prospered on religious tourism. Many small scale and cottage industries have flourished due to the inland and foreign tourism. The organization of fair and festival by the management

board of the temple attracts large number of tourists and in turn helps increase the scope of transportation, trade and commerce and hotel industry.

Nathdwara had the categorical privilege of having been classified as a 'town' even in 1901 with a population of 8591 in 1901. By 1971 is increased by 36.02 % and had the populace of 18893. It was the highest growth rate. This town is spread in 18.16 km² with a population density of 2322 persons/km².

Development process incorporates the socio-economic elements and activities. It exercises a direct impact upon the populace that area by improving the life standards in terms of basic amenities like better transportation, facilities, urban infrastructural systems etc. This development process on the other hand creates certain regional disparities also.

Present paper analyses the regional socio-economic disparities that exist among the different wards at the city. This analysis is based on five variables viz. Total population, Literacy, Total workers, Total other worker and Population density.

These five variables have been used to make a composite index to display the level of the development on the different words of the town.

OBJECTIVES

1. The study analyzes the variation of variables under consideration within the wards of Nathdwara town.
2. To prepare a composite index for identifying the variation in level of development and disparities in different wards of Nathdwara town during 2001 to 2011.

THE AREA OF STUDY

Nathdwara is located amid the hills of southern Aravali hills on the bank of the river Banas. It was known as 'Sinhad' ancient times. The geographical expanse of the area is 24⁰54' to 24⁰ 57' northern latitude and 73⁰47' to 73⁰51' east longitudes in an area of 18.16 square km. The population of the town is 42016 (2011 census).

Abound by hills of three sides, Ganesh Tekri, Giriraj Parvat and Bandariya magra, Nathdwara has the river Banas of the fourth side. It is 12 km from the well known Khamnor hills and 29 kms from the Bagheri water project.

Ward Wise Analysis of Socio-Economic Variables.

1. **Population:** As per the census 2001 Nathdwara had the population of 37026 which increased up to 42016 by 2011. It had an average populace of 1481 in 25 wards of the town. Wards 2, 4, 5 8, 10,20,23,24 & 25 had the greater part where as wards 3, 14 & 16 had the lower

population. These data show a different scenario by 2011. When the average population per ward became 1680 with wards 1, 5, 8, 10, 11, 20, 21, 23 & 24 on higher side and wards 3 & 12 on the lower side of the average population.

2. **Literacy** – In 2001 the literacy rate was 72% which increased by 5% and became 77% in 2011. The highest literacy rate in 2001 was 85.88% in ward 19 and the lowest rate of literacy was 43.32% in ward 8. This data shows a distinct difference in the literacy rate of different wards. For this conclusion the literate populace was divided into 5 group viz. 0-800, 801-1000, 1001-1200, 1201-1500, and 1501 to 1853 which was the highest. The study of 2001 data base shows that only two wards 20 & 22 had the higher numbers of literate groups above 1500, and the lower number of literate group below 800 was found in wards 3, 8, 11, 14, 15, 16 & 21.

The highest literacy rate in 2011 was 88.47% in ward 19 and the lowest rate of literacy was 59.48% in ward 8. The study of 2011 data base show that only the wards 1, 5, 10, 20, 21 & 24 had the higher number of literate groups above 1500 and the lower number of literate groups below 800 was found in ward 12.

The study of the literacy statistics show that during 2001 and 2011 the highest rate of literacy was achieved in ward 21 whereas ward 22 observed the greatest shortfall in the same aspect. This was during to the migration & evacuation of masses.

Total Workers

Nathdwara had the total workers of 30.79% in 2001, which reduced down to 27.13 in 2011. For this study 5 groups were formed 0-400, 401-500, 501-600, 601-800, 801-1100 and it was observed that in 2001 wards 1, 3, 6, 7, 11,12, 13, 14, 15, 16, 18 & 21 had the worker below 400 and ward 22 had the workers above 801.

The study of 2011 statistics showed that wards 3, 12, 16, 19 & 22 had the number of worker below 400 and wards 8, 10, 20, 21 & 24 had the number of workers above 800.

This study has observed in increase in the overall number of total worker in certain wards through the percentage of total workers has decreased. This shows a script within the wards. Whereas the town overall has witnessed a digression in the growth of total workers.

Other Workers

The percent of total other workers in Nathdwara was 27.05% in 2001, which increased up to 31.34% in 2011. In 2001 the highest no. of total other workers was in ward 16 which was 32.91%. The lowest number of total other worker was in ward 12, which was 30.51%. The total other workers were divided in to 5 groups. 0-250, 251-350, 351-500, 501-600, 601-1000. The

number higher than 601 was in wards. 2, 10, 22 and the number lower than 250 were in wards 12, 14, & 21.

In 2011 the highest no. of total other workers was in wards 1, 8, 10, 11, 20, 21 & 24 with the number higher than 601 and the number lower than 250 was in ward 19.

The above analysis shows that the no. of total other workers has increased in 2011. The ward with higher no. of other workers has also increased and ward no. 19 has the lowest no. of total other workers in 2011.

Density

The average population density of Nathdwara was 130 person/ hec, which increases up to 136 persons / hec in 2011. In 2001 the highest density (822 per/hect) was in ward 13 and the lowest density (5 persons/hect.) was in ward 10.

The total wards were divided into 5 groups 0-25, 26-50, 51-150, 151-300, and 301- above in 2001. The density lower than 25 was found in wards 1, 3, 7, 8, 10, 21, 24 & 25 and density above 301 was found in wards 13, 17 & 22.

In 2011 the density lower than 25 was found in wards 2, 3, 7, 10, 24 & 25 and density higher than 301 was found in wards 13, 15 & 17.

The study shows that ward 13 & 17 have observed the highest density from 2001 to 2011. This may be credited to the factor like business activities in that area.

Composite Index

The different aspect of study and analysis shows distinct disparities in wards. This necessitates the formation of a composite index to analyse all the data comprehensively. This index is based on the socio-economic data of census 2001 & 2011.

The methodology followed to study the data and to calculate the mean, standard deviation and variance. Finally the composite index was attained by standardized value. This indexing shows all data on the same standard values as standards.

This composite index exhibits the level of the development in all the wards in form of the socio-economic index. In order to formulate the existing disparities among wards five categories were framed.

COMPOSITE INDEX VALUE OF WARDS, NATHDWARA-2001

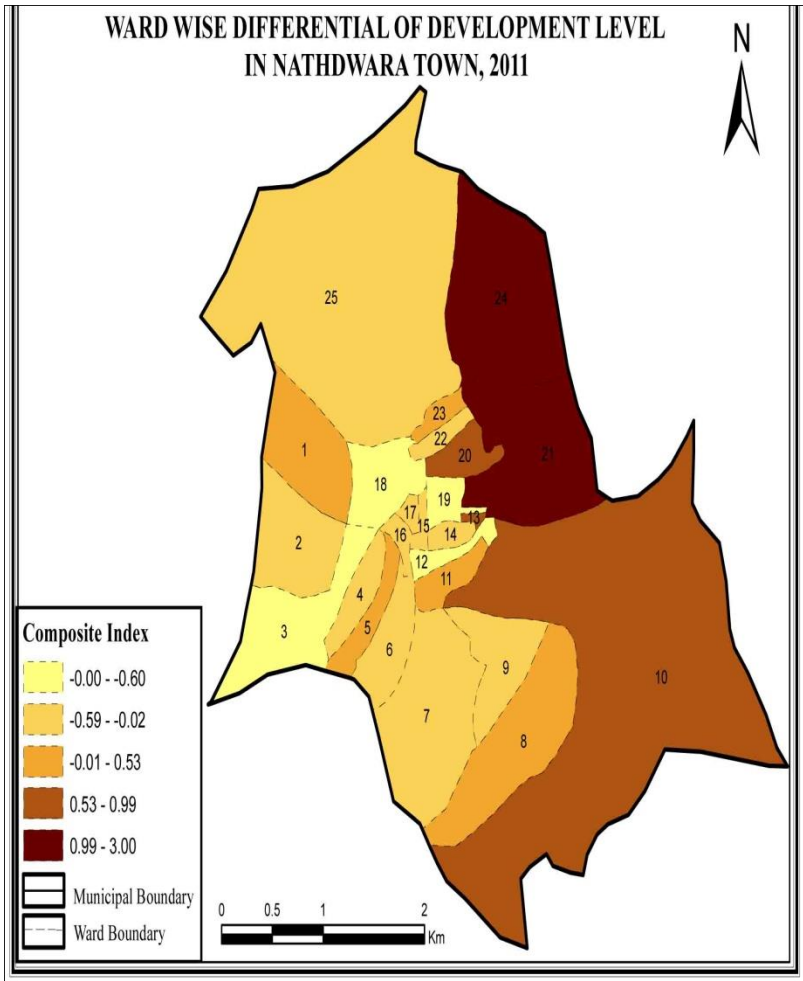
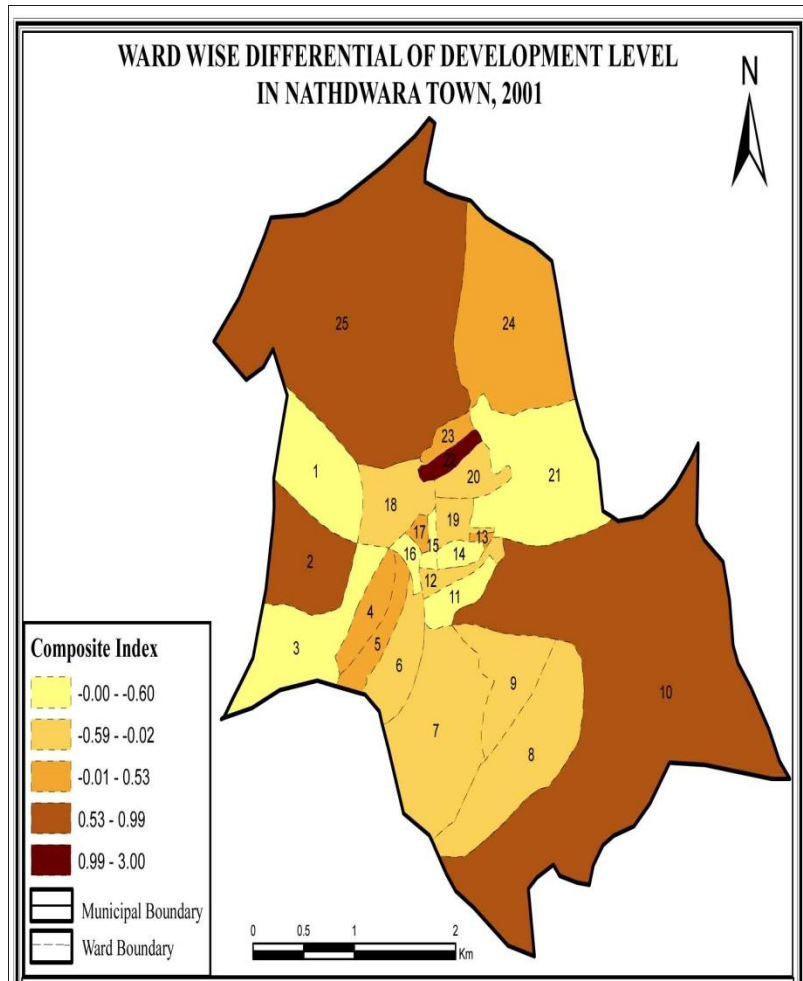
Ward	TOT_P	P_LIT	TOT_WORK_P	T_OT_WORK	DENSITY	X1	X2	X3	X4	X5	Sum	COMPOSITE INDEX
Ward 1	1150	816	359	342	23	-0.6	-0.9	-0.5	-0.4	-0.6	-3.0	-0.60
Ward 2	2371	1315	668	620	48	1.7	0.9	1.2	1.4	-0.5	4.7	0.93
Ward 3	967	769	284	270	16	-1.0	-1.0	-1.0	-0.8	-0.6	-4.4	-0.88
Ward 4	1722	1428	487	424	97	0.5	1.3	0.2	0.1	-0.2	1.9	0.37
Ward 5	1520	1238	474	462	91	0.1	0.6	0.1	0.4	-0.2	0.9	0.19
Ward 6	1226	1009	360	342	44	-0.5	-0.2	-0.5	-0.4	-0.5	-2.0	-0.41
Ward 7	1263	1035	388	351	14	-0.4	-0.1	-0.4	-0.3	-0.6	-1.8	-0.37
Ward 8	1699	736	481	471	21	0.4	-1.1	0.1	0.4	-0.6	-0.7	-0.15
Ward 9	1455	1036	430	415	38	0.0	-0.1	-0.1	0.1	-0.5	-0.7	-0.14
Ward 10	2162	1511	715	616	5	1.3	1.6	1.4	1.3	-0.7	4.9	0.99
Ward 11	1207	793	312	310	85	-0.5	-0.9	-0.8	-0.6	-0.2	-3.1	-0.61
Ward 12	1199	998	334	162	125	-0.5	-0.2	-0.7	-1.5	0.0	-3.0	-0.59
Ward 13	1246	1027	379	369	822	-0.4	-0.1	-0.4	-0.2	3.8	2.6	0.53
Ward 14	804	669	277	249	119	-1.3	-1.4	-1.0	-0.9	-0.1	-4.7	-0.93
Ward 15	971	782	300	268	245	-1.0	-1.0	-0.9	-0.8	0.6	-3.0	-0.60
Ward 16	951	778	323	313	178	-1.0	-1.0	-0.7	-0.5	0.3	-3.0	-0.60
Ward 17	1369	1127	417	384	387	-0.2	0.2	-0.2	-0.1	1.4	1.1	0.22
Ward 18	1211	917	376	340	38	-0.5	-0.5	-0.4	-0.4	-0.5	-2.4	-0.47
Ward 19	1204	1034	406	340	109	-0.5	-0.1	-0.3	-0.4	-0.1	-1.4	-0.28
Ward 20	1508	1119	426	400	96	0.1	0.2	-0.2	0.0	-0.2	-0.1	-0.02
Ward 21	1008	743	298	225	11	-0.9	-1.1	-0.9	-1.1	-0.7	-4.6	-0.93
Ward 22	3028	1853	1053	973	393	3.0	2.7	3.3	3.6	1.5	14.0	2.81

Ward 23	1671	1149	513	421	225	0.4	0.3	0.3	0.1	0.5	1.6	0.33
Ward 24	1919	1290	680	450	17	0.8	0.8	1.3	0.3	-0.6	2.6	0.51
Ward 25	2195	1394	659	499	7	1.4	1.1	1.1	0.6	-0.7	3.6	0.71
TOTAL	37026	26566	11399	10016	3254							
MEAN	1481.04	1062.64	455.96	400.64	130.16							
SD	523.4781	289.0412	179.1632	161.1691	180.6847							

COMPOSITE INDEX VALUE OF WARDS, NATHDWARA-2011

Ward	TOT_P	P_LIT	Density	T_OT_W	TOT_W	X1	X2	X3	X4	X5	Sum	COMPOSITE INDEX
Ward 1	2160	1522	43	659	770	0.65	0.45	-0.49	0.55	0.58	1.74	0.35
Ward 2	1260	826	25	467	533	-0.57	-0.90	-0.58	-0.25	-0.23	-2.53	-0.51
Ward 3	1076	868	18	323	348	-0.82	-0.82	-0.62	-0.85	-0.86	-3.97	-0.79
Ward 4	1348	1141	76	368	478	-0.45	-0.29	-0.31	-0.66	-0.42	-2.13	-0.43
Ward 5	1782	1507	106	526	562	0.14	0.42	-0.15	0.00	-0.13	0.27	0.05
Ward 6	1487	1261	53	432	459	-0.26	-0.05	-0.44	-0.39	-0.48	-1.63	-0.33
Ward 7	1306	1053	14	403	410	-0.51	-0.46	-0.64	-0.52	-0.65	-2.78	-0.56
Ward 8	2068	1230	26	608	852	0.53	-0.11	-0.58	0.34	0.86	1.03	0.21
Ward 9	1555	1188	41	462	495	-0.17	-0.20	-0.50	-0.27	-0.36	-1.50	-0.30
Ward 10	2474	1815	6	757	843	1.08	1.02	-0.69	0.96	0.83	3.20	0.64
Ward 11	1936	1465	136	652	674	0.35	0.34	0.00	0.52	0.25	1.46	0.29
Ward 12	878	727	91	274	305	-1.09	-1.09	-0.23	-1.05	-1.01	-4.47	-0.89
Ward 13	1382	1205	912	465	487	-0.41	-0.16	4.11	-0.26	-0.39	2.90	0.58
Ward 14	1242	1020	184	377	435	-0.60	-0.52	0.25	-0.62	-0.56	-2.05	-0.41
Ward 15	1326	1113	335	464	500	-0.48	-0.34	1.06	-0.26	-0.34	-0.37	-0.07

Ward 16	1083	926	203	365	371	-0.81	-0.70	0.36	-0.67	-0.78	-2.61	-0.52
Ward 17	1229	1069	347	440	453	-0.61	-0.43	1.12	-0.36	-0.50	-0.78	-0.16
Ward 18	1086	825	34	400	434	-0.81	-0.90	-0.54	-0.53	-0.57	-3.34	-0.67
Ward 19	1154	1021	105	230	367	-0.72	-0.52	-0.16	-1.24	-0.80	-3.43	-0.69
Ward 20	2483	1861	158	764	819	1.09	1.11	0.12	0.99	0.75	4.05	0.81
Ward 21	4285	3184	45	1394	1567	3.54	3.67	-0.48	3.61	3.31	13.64	2.73
Ward 22	1234	936	160	355	361	-0.61	-0.68	0.13	-0.72	-0.82	-2.69	-0.54
Ward 23	1818	1317	244	535	617	0.19	0.05	0.58	0.03	0.06	0.91	0.18
Ward 24	2770	2032	24	872	1240	1.48	1.44	-0.59	1.44	2.19	5.95	1.19
Ward 25	1594	1121	5	574	625	-0.12	-0.33	-0.69	0.20	0.08	-0.85	-0.17
TOTAL	42016	32233	3391	13166	15005							
Mean	1680.64	1289.32	136	526.64	600.2							
SD	736.38	516.82	188.91	240.04	292.39							



Analysis of ward specific level of Development

Class	Category	Wards in 2001	Wards in 2011
i	-0.00 to -0.60 (Very Poor)	1,3,11,14,15,16,21	3,12,18,19,
ii	-0.59 to -0.02 (Poor)	6,7,8,9,12,18,19,20	2,4,6,7,9,14, 15,16,17,22,25
iii	-0.01 to 0.53 (Medium)	4,5,13,17,23, 24	1,5,8,11,23
iv	0.53 to 0.99 (High)	2,10,25	10,13,20
v	0.99 to 3.00 (Very High)	22	21,24

The study of the town in respect to socio-Economic variables shows different level of development. Five variables have been taken in to the scope of study.

1. Population
2. Literacy
3. Total workers
4. Other workers
5. Density

The maps of the town Nathdwara were prepared based on the composite index 2011. The following observations have been made on basis of the study of the data, Index and the maps.

I. Based on 2001 data the most backward wards within Composite Index Value less than -0.59 were 1, 3, 11, 12, 14, 15, 16 & 21. This is the main old walled city with narrow streets there are dilapidating, buildings transportation problems and unhygienic conditions.

Based on 2011 data the most backward with composite index value less than (-0.67) were 03, 12, 18, & 19, the wards 3, 18 & 19 were the lower development in sub-urban area which was hilly primarily.

II. In this category, Composite Index value below (-0.02) come wards no. 6, 7, 8, 18, 19. Which either is the sub-urban under development area or the hilly region.

In the year 2011 this category includes areas of Composite Index value less than -0-16 which comprises of wards 2, 4, 6, 9, 14, 16, 22 & 25. These areas are the national highway zones, college areas and newly developing colonies. Wards 14, 16, 22 are the old city with narrow streets ward 25 in the widely expanded agricultural field.

III. In the year 2001 this category includes areas with composite index value to 0.53. This includes wards 4, 5, 13, 17, 23 & 24. These are the fast developing areas with identified plans for town planning ward 13 & 17 are overcrowded.

In the year 2011 this category includes the areas with composite index value less than +0-35 wards 1, 5, 8, 11, 15, 17 & 23 are in this category. These are the residential colonies, college and schools in those wards. Ward 17 has been developed by the temple management board that has facilitated a faster rate of development.

IV. In the year 2001 this category includes areas with Composite Index value below 0.99. It includes wards 2, 10 & 25 which are located at northern or southern parts of the town and outer locations. These areas have wide open roads, educational institution and Public Parks.

In the year 2011 this category includes area with Composite Index values 1.19 wards 13 & 20 fall in this category. This area has the bus stand, hotels and restaurants. These are properly development and attractive areas.

V. This category includes the areas with Composite Index value from 0.99 to 2.81. This is ward 22 which is highly developed for socio-economic indicators. It includes the amenities like health, education, police security & transportation.

In the year 2011 this category includes areas with Composite Index value from 1.19 to 2.73. This is ward 21. Ward 22 which had the Sinhad Lake was demarcated for the safety of potable water, consequently faced the shifting of a major part into ward 21. This area has the features of modern development with multi stories building and new residential colonies.

CONCLUSION

From the study undertaken for the Spacio-Tamporal analysis of development in Nathdwara during last two decades the following observations emerge –

1. The population of the town is increasing by 22.36% per decade. It is estimated that by 2021. It would reach 55900. It is itself is an indicator of fast growth.
2. Ward 22 in the year 2001 and ward 21 in the year 2011 are the most developed wards these are the centre stage of the most of the socio-economic activities.
3. The North-western region of the town is not properly well developed since it is hilly, or it is directly impacted by the drainage area of river Banas.

4. Ward 17 the central zone of the town is over-crowded and compact. It is still the centre of all major activities due to the location of Shrinathji Mandir.
5. Hotel industry and handicraft have flourished because the town Nathdwara is on the map of religious tourism. This has affected the life style, standards income and literacy of the area positively.
6. Nathdwara being a religious place and a home to various world famous are forms viz. 'Pichhwai' the clay pottery of Molela & Meenakari, with precious stones and gems, holds a prominent position on the tourist circuits.

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