Evaluation of Urbanization Level of Districts in Gujarat

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Abstract

Urbanization is the process by which there is an increase in the proportion of people living in urban areas. Urbanization is defined by the United Nations as movement of people from rural to urban areas with population growth equating to urban migration. There is a widespread opinion the urbanization is a direct measure of demographical characteristics of a location. However, new forms of urbanization that are emerging wherein urbanization is a function of different parameters. The aim of the paper is to evaluate the urbanization level of some districts lying in Gujarat using different aspects of Urbanization apart from the demographic criteria alone. In this paper, urbanization index of three districts, Anand, Dahod and Panchmahal are evaluated using the urbanization index methodology incorporating different characteristics of urbanization.The results show that the district Anand is more urban compared to Panchmahals followed by Dahod.

Keywords: Urbanization, Urbanization Index, Demographics

Introduction

According to Census definition of India (2011), an urban area must have a minimum population of 5,000; 75 per cent of the male working population must be engaged in non-agricultural employment; and the population density must be at least 400 sq. Km. Many researchers have associated various parameters to urbanicity. Yach, et al. (1990), Montgomery et al. (2003), Vlahov and Galea (2002) , McDade and Adair (2001), Wheaton and Shishido, (1981), Rosen and Resnick, (1980) have used characteristics such as population, population density , availability of infrastructure and services (telephone, mail, transportation, electricity, water, and health care facilities etc. to define urbanization levels. Here, the aim of the paper is to examine urbanization level of various districts in Gujarat based on multi dimensional aspect.

Aim of the Study

The aim of the paper is to examine urbanization level of various districts in Gujarat based on multi dimensional aspect.

Methodology

Selection of Characteristics for Urbanization

To develop the Urbanization Index four multi-dimensional aspects have been considered for selecting the indicator parameters for urbanization:

1. Demographic aspect
2. Economic development aspect
3. Spatial Aspect and
4. Infrastructural development aspect

This aspect includes physical and social infrastructures. Under the four aspects identified, nine indicator parameters of urbanization are selected namely, population size, population density, number of Industries, percentage of built- up area, roofing types, electricity facilities, educational facilities, availability of health services and assets (i .e. T V, computer/ laptop, telephone/mobile phone and scooter/car) for developing the Urbanization Index model.

Development of Urbanization Scale for Each of the Urbanization Parameter

For each of the above urbanization parameters the scale is formed to assign the points from 1 to 10. Table 1 to 9 shows the scale formed for the various parameters and the corresponding assigned points for district.

Table 1
Points for population size in a district

Population size (Number)	Points
< 300000	1
> 300000 - 500000	2
> 500000 - 1500000	3
> 1500000 - 2500000	4
> 2500000 - 4000000	5
> 4000000 - 5000000	6
> 5000000 - 6000000	7
> 6000000 - 7000000	8
> 7000000 - 8000000	9
> 8000000	10

Table 2
Points for population density in a district

Population density (Persons/sq.km)	Points
< 200	1
> 200 - 400	2
> 400 - 600	3
> 600 - 800	4
> 800 - 900	5
> 900 - 1000	6
> 1000 - 1300	7
> 1300 - 1400	8
> 1400 - 1500	9
> 1500	10

Table 3
Points for number of industries in a district

Number of Industries	Points
< 100	1
> 100 - 500	2
> 500 - 3000	3
> 3000 - 6000	4
> 6000 - 9000	5
> 9000 - 11000	6
> 11000 - 12000	7
> 12000 - 13000	8
> 13000 - 14000	9
> 14000	10

Table 4
Points for % of built-up area in a district

% of Built-up area to total area	Points
< 0.3	1
> 0.3 - 0.6	2
> 0.6 - 0.9	3
> 0.9 - 1.2	4
> 1.2 - 1.5	5
> 1.5 - 1.8	6
> 1.8 - 2.1	7
> 2.1 - 2.4	8
> 2.4 - 2.7	9
> 2.7	10

Table 5
Points for Roofing Types in a district

Households ** (%)	Points
< 4	1
> 4 - 8	2
> 8 - 10	3
> 10 - 12	4
> 12 - 14	5
> 14 - 16	6
> 16 - 18	7
> 18 - 20	8
> 20 - 22	9
> 22	10

**Households having concrete as predominant roof material (% of total population)

Table 6
Points for Electricity Facilities in a district

Households * (%)	Points
< 5	1
> 5-10	2
> 10-15	3
> 15-20	4
> 20-25	5
> 20-22	6
> 22-24	7
> 24-26	8
> 26-28	9
> 28	10

*Households having main source of lighting as electricity (% of total population)

Table 7
Points for available educational facilities in a district

Educational facilities	Points
Primary school	1
Secondary school	1
Senior secondary School	1
Vocational training facility	1
Colleges (if > 40)(otherwise 0 pts)	6

Table 8
Points for available health services in a district

Health Services	Points
Hospitals (if >15)	4
Health centre	2
Dispensary	1
Family welfare centre	1
Nursing home	1
Primary health sub centre	1

Table 9
Points for assets in a district

Households *** (%)	Points
< 0.2	1
> 0.2-0.4	2
> 0.4-0.6	3
> 0.6-0.8	4
> 0.8-1.0	5
> 1.0-1.2	6
> 1.2-1.4	7
> 1.4-1.6	8
> 1.6-1.8	9
> 1.8	10

***Households with TV,computer/ laptop, telephone/ mobile phone and scooter/car (% of total population)

Urbanization score of a district

Urbanization score for each of the district have to be obtained by aggregating the points obtained as above for each urbanization parameter. As there are 9 urbanization parameters considered in this study, the urbanization score for each district varies from 0 (i.e, minimum) to 90 (i.e, maximum).

Hence, the urbanization score obtained for each district ranges from 0 to 90 points from low urbanization towards high urbanization. Urbanization score (US) of the district is expressed by the equation given below.

Urbanization score (US) of the district

$$USj = \sum_{i=1}^{n} (P_{i,j})$$

Where, P= points obtained for the parameter for the district, n = total number of urbanization parameters, j= district under consideration, i = urbanization parameter under consideration

Urbanization Index of a district

Urbanization index is formed by normalizing the urbanization score of the district over the maximum value of the urbanization score.

Urbanization Index (UI$_j$) = (US$_j$ /Max. score i.e, 90) x 100

Data base for Urbanization Index

District-wise data of households by main source of lighting, number of households having specified assets, census houses by predominant material of roof, population size and population density for districts Anand, Dahod, Panchmahals of Gujarat are collected from Census of India, 2011. District-wise data base of number of industries, educational facilities and health services are collected from Ministry of Micro Medium and Small Enterprise (MSME) 2011, Government of India.(website: dsmsme.gov.in). Land Use, land cover pattern, district-wise data is collected from National Remote Sensing Centre (NRSC) 2011, Hyderabad. The data-base for the urbanization parameters collected for districts: Anand, Dahod, Panchmahals (Gujarat) are shown in Table.10.

Table 10

Data for Parameters for Measurement of Urbanization Level of Districts

Urbanization Parameters	District		
	Anand (Guj.)	**Dahod (Guj.)**	**Panchmahals (Guj.)**
Population size	2090276	2126558	2388267
Population density (persons/sq.Km)	653	582	458
Industries	950	3637	200
% of Built up area to total area	2.34	0.29	1.10
Roofing (%)	10.54	2.65	5.66
Electricity Facility (%)	18.09	11.33	16.70
Educational facilities	25	1	12
Health services (major Hospitals)	4	2	7
Assets (%)	0.97	0.19	1.47

Results

The points for each of the urbanization parameter for the districts, Anand, Dahod, Panchmahals (Gujarat) are obtained using the urbanization scale. The points are aggregated and the normalized Urbanization Index for each district is obtained, shown in Table 11.

Table 11

Urbanization Index Computation for the Districts Under Study

Urbanization Parameters	POINTS FOR DISTRICTS		
	Anand	**Dahod**	**Panchmahals**
Population size	4	4	4
Population density	4	3	3
Industries	3	4	2
% of Built up area to total area	8	1	3
Roofing	4	1	2
Electricity Facility	4	3	4
Educational Facilities	4	4	4
Health services	5	5	5
Assets	5	1	2
Total Points	**41**	**26**	**29**
Urbanization Index	**45.6**	**28.9**	**32.2**

Conclusions

From table 11, it is observed that the district Anand is more urban compared to Panchmahals followed by Dahod although the population of Panchmahal and Dahod are more than Anand. The Census of India uses only the demographic criteria to assess the Urbanization level of a location. However, only demographics cannot distinguish clearly the urban and rural settlements.In this paper, various multi dimensional characteristics are used to determine the Urbanization index of different districts in Gujarat. The methodology presented in this paper can act as a tool to evaluate the Urbanization Index of any district by using the available database from Census and other agencies.

References

1. *Adair LS, Vanderslice J, Zohoori N.(1993) Urban-rural differences in growth and diarrhoeal morbidity of Filipino infants. In: Schell LM, Smith MT, Bilsborough A, editors. Urban ecology and health in the third world. xii. Cambridge; New York: Cambridge University Press, pp 287.*
2. *Ades, F., and E. L. Glaeser.(1995), Trade and circuses: explaining urban giants. Quarterly Journal of Economics 110 pp 195-227.*
3. *Dahly D. L and Adair L. S., (2007), Quantifying the urban environment: a scale measure of urbanicity outperforms the urban-rural dichotomy, Soc Sci Med., 64(7), pp 1407-1419.*
4. *McDade TW, Adair LS., (2001) Defining the "urban" in urbanization and health: a factor analysis approach. Soc Sci Med.,53(1), pp 55–70.*
5. *Montgomery M, Stren R,Cohen B, Reed H. Cities transformed, (2003): demographic change and its implications in the developing world. Washington, D.C.: National Academy Press.*
6. *Rosen, K., and M. Resnick. (1980), The size distribution of cities: an examination of the Pareto law and primacy, Journal of Urban Economics 8 pp 165-186.*

7. Vlahov D, Galea S. (2002), Urbanization, urbanicity, and health. J Urban Health.,79 (4 Suppl 1) : S1–S12.
8. Wheaton, W., and H. Shishido. (1981). Urban concentration, agglomeration economies, and the level of economic development. Economic Development and Cultural Change 30 pp 17-30.
9. Yach D, Mathews C, Buch E, (1990), Urbanisation and health:methodological difficulties in undertaking epidemiological research in developing countries. Soc Sci Med. ,31(4) pp 507–514