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Regularities and Irregularities in the Distribution of Population Among Urban CentersinHadauti Region

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Abstract

Rapidly growing population increases the rate of urbanization in our country. The population problem isone of the very strong issues being faced by the country; it surmounts all the problems of our country. In-migration ofworkers is one of themajor reasons of tremendous pressure on cities. Small urban centers are also important in developing countries as they act as growth and service centers for rural hinterland and thus assist in the development of rural economy and also reverse the growth of large cities which in turn mitigate the urban problems.The paper tries to measure the urban concentration and applies rank size rule for thepremier city to check its applicability in the Hadauti region-an SE part of Rajasthan.The objective of the study is to analyze the urban centers of Hadauti to test whether they satisfy the rank-size rule, possess the characteristics of real urban centers and are consistent in terms of certain criteria.

Keywords: Urbanization**,** Rank-size, Premier city, Primacy.

Introduction

Among the most significant changes now affecting mankind of developing countries is the ever increasing level of urbanization as well as the number of urban centers and thus is necessarily a factor in the study of urbanization and national development as well. Small urban centers are also important in developing countries as they act as growth and service centers for rural hinterland and thus assist in the development of rural economy and also reverse the growth of large cities which in turn mitigate the urban problems.

Aim of the Study

The objective of the study is to analyze the urban centers of Hadauti region to test whether they satisfy the rank-size rule, possess the characteristics of real urban centers and are consistent in terms of certain criteria.

Study Area

The Bundi district, the Kota district except Ramganjmandi tehsil, Khanpur tehsil of Jhalawar district, Baran district except Chabra, Kishanganj and Shahbad tehsils of S-E Rajasthan forms the Hadauti region.The area lies between $24^{0}25^{1}$N to $25^{0}51^{1}$N and$75^{0}15^{1}$E to $76^{0}45^{1}$E coverings an area of 14481.6 sq.kms.The northern and southwestern boundaries are formed by Sawai Madhopur, Tonk, Bhilwara and Chittorgarh districts of Rajasthan. The region consists of 15 administrative units that are tehsils and according to the 2011 census, it has a population of 3720433 persons out of which 40.4% is urban and 59.6% is rural.

Review of Literature

Tyagi and Bansal (1998) has done a similar study assessing the regularities and irregularities in the distribution of population among urban centres of western Uttar Pradesh using primate city rule.The course of urbanization is also marked with concentration as more and more population crowding in large cities of developing nations (Henderson, 2002). It illustrates distinctiveness (Bhattacharya, 2002) and rapid urbanization in many developing countries today (Henderson, 2002). For instance, urbanization scenario of India has always been featured with “urban primacy” that is a concentration of the urban population mainly in cities with population 100,000 and above (Kundu, 2011), coupled with considerable fall of population share in small towns (Bhagat and Mohanty,

2008).Chakraborty (2015) and others have critically analysed emerging census towns of West Bengal in 2011 census.

Methodology

Gini concentration ratio has been used to compute the urban concentration. The formula to calculate this ratio is as under

$$G_i = \left(\sum_{i=1}^{n} X_i Y_{i+1}\right) - \left(\sum_{i=1}^{n} X_{i+1} Y_i\right)$$

Where G_i refers to the Gini concentration ratio

X_i to cumulative proportion of population

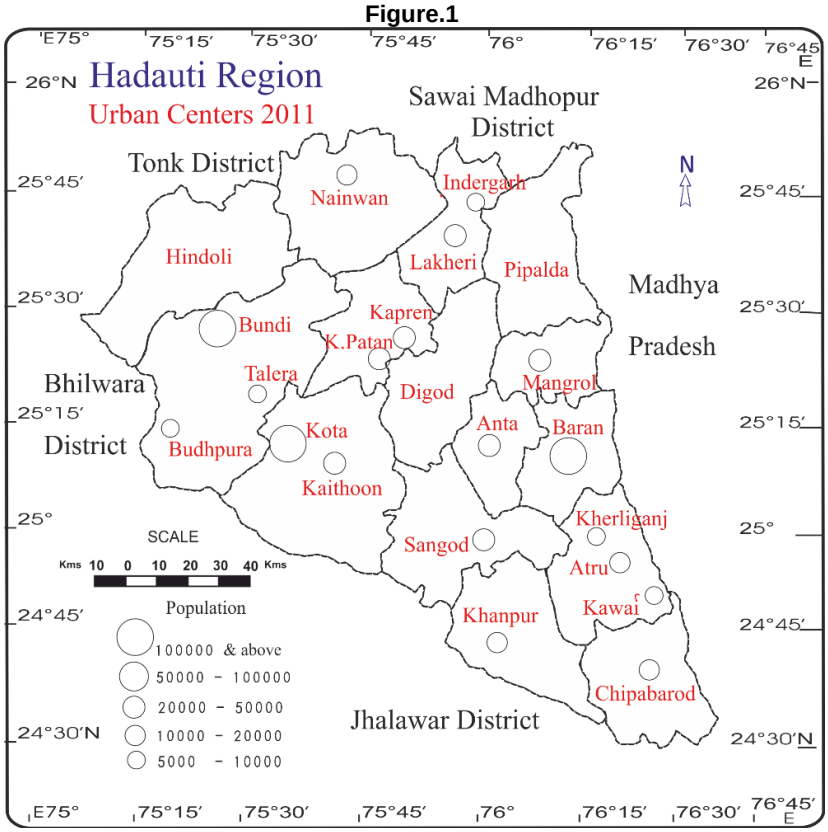
Y_i to cumulative proportion of units and

n to the number of class intervals

To make the study of the applicability of the rank-size rule, all the urban centers in the three census years have been arranged in descending order according to their population. Premier city's expected population is calculated by dividing the total population of all the urban centers with the sum of the reciprocals of their ranks. The formula will be as follows .

$$P_e = \frac{\Sigma P}{\Sigma \frac{1}{R}}$$

Figure.1



Urban centers in Hadauti region grew at a sluggish rate up to the seventies and later they flourished at a faster rate. Table1 provides a vivid picture of the urban centers in Hadauti region with their size classes corresponding to the various census years from 1901 to 2001.According to Census of India, Class I towns are synonymous to Cities.Urban places in India have been categorized into six classes according to population size ranging from less than 5000 to 100,000 and above. Among these, only places with 100,000 and above population are designated as 'City'. Apart from this, the Census of India does not offer any precise definition of small or medium sized towns. The rapid growth of the number of urban centers of size IV, V, VI took place after the seventies; the reason behind this growth may be attributed to the development of growth centers and providing services for them by the government.

Table1

Size\Year	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991	2001	2011
I	…	…	…	…	…	…	1	1	1	1	1	3
II	…	…	…	…	…	1	…	…	…	2	2	…
III	1	1	1	1	2	2	2	2	3	1	5	7
IV	1	1	2	2	1	1	1	1	7	9	4	4
V	1	1	…	1	1	1	1	3	1	…	2	5
VI	1	1	3	2	2	2	2	1	1	1	1	…
Total	4	4	6	6	6	7	7	8	13	14	15	19

Source: Census of India 1981 Part X-A, Series 18 Rajasthan Town Directory
Census of India, Digital Library,Rajasthan Town Directory2001

Table 2 shows the number of towns falling in size, class according to classification in last three census years. It is clear from this table that large centers thatareclass I cities have shown little variations in their share of thetotal urban population.

Table2
Number of Towns According To size Classification in Census

	1991			2001			2011		
Size	**Towns**	**Population**	**%**	**Towns**	**Population**	**%**	**Towns**	**Population**	**%**
I	1	537371	65.5	1	694316	65.4	3	1222972	81.5
II	2	122766	15	2	167536	15.8	..	…	…
III	1	22891	2.8	5	117079	11	7	178503	11.9
IV	9	132538	16.2	4	67634	6.4	4	63311	4.2
V	…	..	..	2	11166	1	5	36226	2.4
VI	1	4540	0.5	1	4387	0.4	…	…	…
Total	14	820106	100	15	1062118	100	19	1501012	100

Source: Computed by Authors

Class I cities have increased their share from 65.5% to 81.5% in the period 1991-2011. While small centers that are class II,III, IV, V cities have increased their number but their share has decreased from 34% to 18.5%. As whole centers of both size have recorded an increase in their population, but large centers have become larger while small centers have remained quite small.

Table 3 shows that in 2011, the Gini Concentration ratio for the urban population living in various size categories of urban centers in Hadauti region was 0.7004. It is a very high coefficient of urban concentration implying that few big urban centers of Hadauti region had disproportionately large share in the Hadauti region's total urban population and a large number of small urban centers accounted the insignificant proportion of the division's total urban population.

Table 3
Hadauti region- Computation of Gini Concentration Ratio 2011

Size	**No. of units**	**Population**	**Proportion of**		**Cumulative proportion of**		X_iY_{i+1}	$X_{i+1}Y_i$
			Units	**Population**	**Units Y_i**	**Population X_i**		
All Category	19	1501012	1	1	-	-	-	-
I	3	1222972	0.16	0.82	0.16	0.82	0.1312	0.1312
II	0	0	0	0	0.16	0.82	0.4346	0.1504
III	7	178503	0.37	0.12	0.53	0.94	0.6956	0.5194
IV	4	63311	0.21	0.04	0.74	0.98	0.98	0.74
V	5	36226	0.26	0.02	1	1	1	1
VI	0	0	0	0	1	1	-	-
							3.2414	2.541

Gini Concentration = 3.2414 – 2.541 = 0.7004

Source: Computed by Authors

According to Jefferson, the primate city is commonly at least twice as large as the next largest city and morethan twice assignificant.

Using this criterion, Kota is the primate city of the region.

Using the formula of rank-size, the expected populations of all the cities have been calculated. The difference between the expected and actual population has been found out. Centers having less population than the expected population are defined as deficiency centers while the centers having apopulation more than the expected population are considered as surplus centers.

Table 4
Number of Surplus and Deficit Centers and Population of Premier City

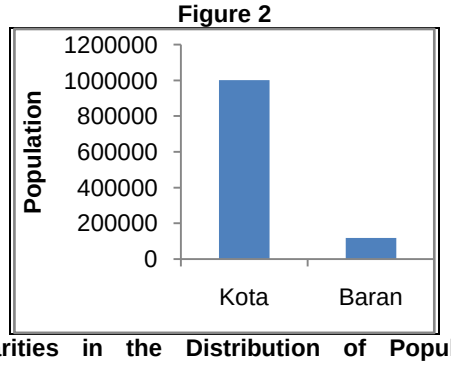
Year	**$\sum$ P**	**$\sum$ 1/R**	**Expected population**	**Actual population**	**Difference**	**Difference %**	**No. of Centers**	
							Surplus	**Deficit**
1991	820106	3.252	252220	537371	285151	-53.06	1	13
2001	1062118	3.318	320086	694316	374230	-53.9	1	14
2011	1501012	3.548	423090	1001694	578604	-57.76	1	18

Source: Computed by authors

In Hadauti region, the actual population of Kota is more than the expected population in all the three census years in consideration. The difference in the expected population and actual population is also increasing, that is Kota's population is increasing at a rapid rate. This is urban primacy where the largest city is many times larger than the second city.A huge dichotomy exists between Kota (1001694) and division's second-ranking city Baran (117992) in 2011.

Dichotomy between 1st and 2nd Largest Urban Center

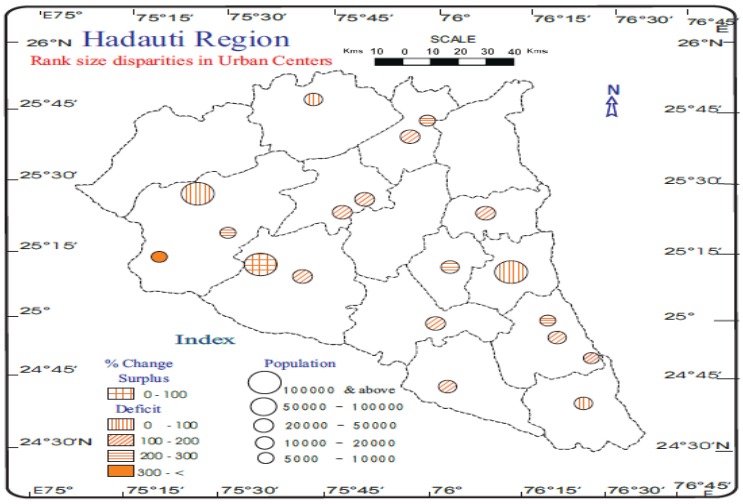
Figure 2



Disparities in the Distribution of Population among the Urban Centers

The increase in the urban population has also increased the difference between the expected (423090) and actual (1001694) population of thepremier city, Kota. There was a difference of 578604 persons, 57.76% of the actual population. It shows that centers of lower ranks were not making much progress. Baran's population increased but it showed a deficit of 79.29% that is, its actual population is much below the expected population as per the Primate city rule. Except Kota no other city had surplus population. The difference of Primate City (578604) is more than the cumulative population of second andthird largest towns.Looking at the map no.2 we find that there are 4 urban centers with population deficit percentage between 0 to 100. While there are 9 urban centers with population deficit percentage between100 to 200.These are Lakheri, Kapren, Keshoraipatan, Kaithoon, Sangod,Mangrol, Kawai, Atru and Khanpur.

Figure 3

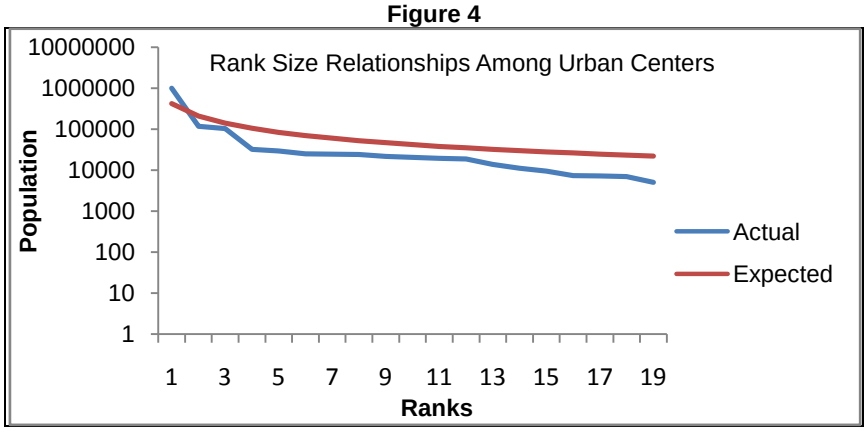


There are 4 urban centers with population deficit percentage between 200 to 300.These are Talera, Anta, Indergarh, and Kherliganj.These are centers of class IV and V category.This shows that these centers are much smaller than their' expectations. Only 1 urban settlement Budhpura lie in population deficit percentage zone of 300 and above.

Rank-size Relationships among Urban Centers based on Log Graph Method

To examine the rank size relationships,semi-log graph has been drawn for 2011 census.On its horizontal axis, ranks are shown and on the vertical axis, population size has been represented.Two graph lines have been drawn on the graph,one for actual and another for expected population. It is our expectation that both these lines will join the peak

Figure 4



points of both the axis. If the actual population line lies near the expected population line, it will give an evidence of not much variation among the urban centers; but if the actual population line lies below the expectedpopulation lines indicating that the urban centers of the region are smaller than the expectations. Only the population of Kota is very much above the expected lines and its growth has been achieved in part by pirating certain of the regional functions of the lower order towns.Kota has seen theexplosive growth of population and growth started recently in the fiftiesonwards. Kota holds the status of primate city because certain geographical factors are in its favor. Kota enjoys initial advantages for site that are-

1. Kota is situated on the Delhi-Mumbai electrified railway line which is the busiest route of West Central railway both in terms of passenger and freight.
2. It is situated at the junction of national highways connecting it directly with Delhi, Kandla, Gwalior, Jaipur, Jabalpur, Ahmedabad and Mumbai.
3. It is situated at the convenient meeting point of state highways connecting it with other parts of the state.
4. It is the place of many industries like Instrumentation India Ltd., J.K Synthetics, DCM Fertilizers, ChambalFertilizers, etc. which has given magnetic pull for business, services and people leading to cumulative effect.
5. Drinking water is in abundance due to thepresence of river Chambal.
6. Kota has emerged as the power hub of the region as well as the state. Thermal, hydel and atomic power plants are already running while wind energy projects are on the anvil.
7. The decline in industries has not decreased the growth rate but inertial advantages were enhanced as the city has turned into an educational center for medical and IIT coaching.
8. It has 4 Universities, one medical college, many engineering colleges, a polytechnique college and other regular course and professional colleges.
9. The political influence is also responsible for Kota'sgrowth because the politics of the region is centered in Kota as it is the seat for Loksabha comprising 2 districts of the region.
10. It is also the Commissioners' headquarter thus an administrative center.

Conclusion

Disproportionate growth has increased attractiveness for Kota. The people of Kota have also adapted themselves to the new demands. All this has a parasitic effect, sucking wealth from natural and human resources. Kota has more consistent and predictable rates of growth due to innovation diffusion as urban population growth is a function of the number of innovations originating within a city's economy or successfully adapted to that economy. An effective policy of regional development could rectify this type of anomaly and that the rank-size rule can be used as a diagnostic tool in regional planning.

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