

Spatio - Temporal Analysis of Population Growth in the District Headquarters of Rajasthan

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ABSTRACT: The rapid population growth results to economic difficulties, problems for resource mobilization, economic instability, increased unemployment, mounting external indebtedness and finally low rate of progress. People were well aware about the importance of population studies from very ancient period. Explosively growing population has attracted the attention of social scientists and policy makers. For country like India, it is very important to study the decadal variation of population growth it helps in realizing problems. The population growth and socio economic changes are closely related to each other. In present study, Rajasthan has been chosen as study area. This state is the biggest state of our country having challenges of desert and desertification. In this state the distribution of population is irregular due to harsh physical condition. The aim of the present paper is to investigate the change in population growth rate in the District Head Quarters (DHQs) of Rajasthan during the three decades 1981-91, 1991-2001 and 2001-11. The present study is based on city/town level data obtained from the Directorate of Census Operations, Jaipur; Rajasthan. The data are concerned to the census 1981, 1991, 2001 and 2011. Due to push- pull factors, the rural urban migration is causing the process of urbanization. On micro level DHQs are working as magnets in attracting people in view of their vast avenues of employment. This is the reason the population characteristics of DHQs are changing. This spatio-temporal analysis has verified the stage of population stabilization in the DHQs of Rajasthan. Rajasthan belongs to the group of so called BIMARU states but the DHQs are showing an amazing decline in their population growth rate. The observation is showing good sign of population growth pattern

KEYWORDS: Population growth, Demographic transition, Spatio-temporal analysis, Rural Urban migration, Decadal growth, Urbanization, Pull and push factors.

I. INTRODUCTION

The understanding of population growth in an area holds the key to the understanding of entire demographic structure of the area. The socio economic transformation may take longer time; it can also postpone or permanently deny desirable pattern of development if the population growth is rapid. In developing countries the explosive stage of population growth resulted to economic difficulties, problems for resource mobilization, economic instability, increased unemployment, mounting external indebtedness and finally low rate of progress. People were well aware about the importance of population studies from very ancient period. 'Arthashastra' of Koutilya is the best example, in which detail description of conducting population, economic and agricultural census is given. The system of decennial census was started with the first census in 1872 in India. Before independence an intellectual class was realized the importance of population growth rate and also the need to check it. The increasing pressure of population on natural resources hinders economic progress and limits critically the rate of growth of social services. V.V. Singh, Alka Mittal, Neetish Sharma and F. Smarandache (2001) studied the 'Demographic and socio-economic variable, responsible for population growth in Rajasthan'. Devendra Kothari (2002) has flashed on 'Population Projection for Rajasthan 2002-2011'. In this state no remarkable change has been observed in the growth of population between the decades 1981-2011, in fact some stability has been observed. A sharp plunge was observed during the decade 1981 to 1991. The aim of the present paper is to investigate the change in population growth rate in the District Head Quarters (DHQs) of Rajasthan during the three decades 1981-91, 1991-2001 and 2001-11. Due to push- pull factors, the rural urban

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migration is causing the process of urbanization. On micro level DHQs are working as magnets in attracting people in view of their vast avenues of employment. This is the reason the population characteristics of DHQs are changing.

II. AIMS AND OBJECTIVES

The changing pattern of population growth should be explored. How and why these changes are taking place what will be its consequences. To improve the quality of life rural people are migrating to urban areas and the DHQs are being the power centers among all cities and towns. This research hopes to reflect light on such aspects. The conclusion will be very helpful for the urban planners, policy makers, administrators and researchers. The aims and objective of the paper is as follows:-

- (i) To examine the population growth rate during three successive decadal years.
- (ii) To see the changing pattern of growth rate in DHQs of Rajasthan to search the causes and consequences of population growth in DHQs of Rajasthan.

III. METHODOLOGY

The present study is based on city/town level data obtained from the Directorate of Census Operations, Jaipur, Rajasthan. The data are concerned to the census 1981, 1991, 2001 and 2011. The following formula is adopted to calculate decadal growth rate.

$$PGR = \frac{P_2 - P_1}{P_1} * 100$$

PGR= Population growth rate

P₁= Population of earlier census

P₂ = Population of successive census

The result will be obtained in percentage. Circles are used to symbolize location of DHQs and they are filled with shades according to their population growth rate.

Study area: The western most biggest and beautiful state Rajasthan has been chosen as study area. This state exhibits unique feature in respect of its geology and geomorphology. This state is spread over 342,239kms located between 23°3' to 30°12' Northern latitude and 60°30' to 78°17' Eastern latitude. The world's oldest mountain divides the state into two halves. Tropic of cancer passes through the southern tip of this state. The climatic condition of the state is arid and semi arid. This state has challenge of desert and desertification. The state is also facing the shortage of drinking water. In 2001 there were 216 towns in this state which increased to 278 in 2011 it means that 62 towns were increased in only one decade (2001-11). In the decade 2001-11 the state has recorded 21.44 percent of population growth and population growth of 29.26 percent was recorded in urban areas. The total urban population in the decade 2001-11 was 17080776 out of which 10788816 people were in class I towns.

Growth of population in DHQs of Rajasthan: The story of population growth in India is fairly in tune with the classical theory of demography transition. During nineteenth century India witnessed a fluctuating but ultimately more or less a stagnant growth of population, which drifted into the twentieth century until 1921. Thereafter, India passed through successively all the phases of demographic transition and is now widely believed to have entered the fifth phase of, usually characterized by rapidly declining fertility. Population growth in India during the twentieth century can be classified into four distinct phases.

1901 to 1921- Stagnant population

1921 to 1951- Steady growth

1951 to 1981- Rapid high growth

1981 to 2001- High growth with definite slowing down

In absolute terms, the population of India increased by a whopping 180.6 million during the decade 1991-2001. Although the net addition in population during each decade has increased consistently, the change in net addition has shown a steady declining trend over the decades starting from 1961. While 27.9 million more people were added between the decades 1981-1991 than between the 1971-1981. This number decline to 17.6 million between the decades 1981-1991 and 1991-2001 it shows that although India continues to grow size, its pace of net addition is on decrease.

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Prof. Stephen Hawking (Cambridge University) was on Larry King live. Larry King called him the most intelligent person in the world. King asked him a very key question “*what worries you most?*” *Hawking said, “My biggest worry is population growth, and if it continues at the current rate, we will be standing shoulder in 2600. Something has to happen, and I don’t want it to be disaster.”*The population growth and socio economic changes are closely related to each other. The factors of fertility, mortality and migration are interlinked with social system. It means growth of population of any region modifies the social appearance of that region. District of Barmer and Jaisalmer have been the biggest contributors to the state’s rise in population over the last decade. These finding were made with the release of the provincial census report 2011. While Barmer tops the list with a population growth of 32.55 percent, it is closely followed by Jaisalmer district at 32.22 percent. The lowest population growth was registered at Ganganagar with 10.06 percent. Rajasthan has recorded a decadal population growth rate of 21.44 percent during 2001-2011. Other states and Union territories with such a sharpest fall are Haryana (8.53 percent) and Maharashtra (6.74 percent). The state has also registered the sharpest fall in population growth rate at 6.71 percent. The sharp plunge in the population growth rate in the state comes after a period of near stabilization between 1981-1991 (28.44 percent) and 1991-2001 (28.41 percent). A sharp fall in population growth rate has been observed in the towns during the three decades (1981-2011). The cities always attract people, bigger city bigger point of attraction. The Table 1 shows a sharp increase in total number of cities and towns from 1991 to 2011. In census 1991 there were 215 towns in the state which increased to 278 in 2011. Number of class I towns were 14 in 1991 and it increased to 30 in 2011. The population in class I towns in 1991 was 50.20 percent which increased to 63.16 percent in 2011. In Town class II, III and IV the situation is not same; in 1991 the population of town class II was 13.64 percent which decreased to 10.32 percent in census 2011 likewise town class III decreased from 21.47 percent to 18.27 percent and in town class IV it decreased to 6.34 percent from 12.86 percent. In the decade 1991-2001 town class I, II and III have positive change population growth whereas town class IV, V and VI are showing negative change population growth. In the decade 2001-2011 all the town class has positive population growth except town class II it is showing negative population growth. The pull and push factors are responsible for urbanization. In our country the bigger metropolises are working as magnets for migrants in view of their vast avenues of employment.

**Table: 1 Growth of Urban Population by size class of UA/City/Town
1991-2011**

Size class of UA/City/Town	No. of Towns			Population			Percentage of population in size class			Percentage of Decadal growth	
	1991	2001	2011	1991	2001	2011	1991	2001	2011	1991-2001	2001-2011
All classes	215	216	278	10067113	13214375	17080776	100	100	100	31.26	29.26
Class I	14	20	30	553988	7561381	10788816	50.20	57.22	63.16	49.61	42.68
Class II	20	26	26	1372844	1841559	1762710	13.64	13.94	10.32	34.14	-4.28
Class III	72	90	100	2160916	2758917	3121275	21.47	20.80	18.27	27.21	13.55
Class IV	86	59	75	1294274	914331	1082099	12.86	6.92	6.34	-29.36	18.35
Class V	22	17	38	182623	132778	288922	1.81	1.00	1.69	-27.29	117.60
Class VI	1	4	9	2468	15409	36954	1.81	1.00	1.69	-27.29	117.60

Source: census of Rajasthan, paper2-Vol-II-Tables.

It is observed that people are attracted more towards power centers, for this they have so many reasons like better life style, education, employment etc., the national and state capitals are better examples. At present (census 2011) there are 33 DHQs in the state (fig 1a). On micro level DHQs are working as power centers. The rural urban relations are sounder in case of DHQs than other towns. Government converts their dreams into reality through the DHQs.

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Population Growth Pattern 1981-1991: The population growth rate becomes glaring when analyzed at the District Headquarter level because 44 new towns were registered in the census 1981. Out of 32 DHQs 8 DHQs have higher population growth rate than the state average. District headquarter Sawai Madhopur recorded highest population growth rate of 156.46 percent, while Ajmer recorded the lowest population growth rate (7.22 percent) in the decade 1981-91. Table 2 shows that during 1981-91 the population growth rate recorded in Sawai madhopur (156.46 percent) followed by Jaisalmer (75.75 percent), Chittorgarh (69.07 percent) and Bikaner (64.43 percent). Four DHQs has recorded high population growth rate of over 50 percent, these are Kota, Bhilwara, Jhunjhunun and Dhoulpur. Alwar , Rajsamand, Dausa, Nagour, Bharatpur, Sikar, Banswara, Jaipur and Pali have observed moderate population growth rate between 40 to 50 percent. Out of 32 DHQs nine DHQs have registered low population growth rate between 30 to 40 percent. Extremely low population growth rate (below 30 percent) has been observed in six DHQs they are Ajmer, Sirohi, Barmer, Tonk, Karouli and Dungerpur.

Table: 2 Population Growth Rate (PGR) 1981-91

Category	PGR	Number Of DHQs	Percentage	Name of the DHQs
Very low	Below 30	06	18.75	Ajmer, Sirohi, Barmer, Tonk, Karouli, Dungerpur
Low	30-40	09	28.13	Ganganagar, hanumangarh, Jodhpur, Jhalawar, Udaipur, Churu, Bundi, Baran, Jalore
Moderate	40-50	09	28.13	Alwar, Rajsamand, Dausa, Nagaour, Bharatpur, Sikar, Banswara, Jaipur, Pali
High	50-60	04	12.50	Kota, Bhilwara, Jhunjhunun, Dhoulpur
Very high	Above 60	04	12.50	Sawai Madhopur, Bikaner, Chittorgarh, Jaisalmer
Total		32	100	

Source: PCA 1981 and 1991, (town/City level) Directorate of Census Operations, Jaipur

According to the above analysis 25 percent DHQs have recorded highest growth rate during the decade 1981-1991. The rapid increase in the number of city dwellers was due to expansion of employment migration and socio-cultural uplift of people besides the urban functions also expanded and new towns also emerged in the rural areas. Figure 1 b defines that the DHQs in North Western part of the state has registered highest growth rate whereas Southern region has lowest growth rate. The DHQs of North Eastern State shows moderate growth rate.

Population Growth Pattern 1991-2001:

From census 1981 to 1991 fifteen new towns were registered. A sharp plunge in population growth rate is observed in decade 1991-2001 in comparison to the decade 1981-91. A dramatic decline has been observed in the percentage of population growth rate.

Table 3: Population Growth Rate (PGR) 1991-2001

Category	PGR	Number of DHQs	Percentage	Name of DHQs
Very low	Below 25	05	15.63	Ajmer, Dungerpur, Barmer, Churu, Jhalawar
Low	25-35	10	31.25	Sikar, Udaipur, Sirohi, Bikaner, Banswara, Jodhpur, Kota, Alwar, Jalore, Chittorgarh
Moderate	35-45	12	37.5	Karouli, Tonk, baran, Bundi, Bharatpur, Pali, Nagaur, Ganganagar, Jhunjhunun, Sawai Madhopur, Rajsamand
High	45-55	02	6.25	Jaisalmer, Bhilwara
Very high	Above 55	03	9.38	Jaipur, Dausa, Hanumangarh
Total		32	100	32

Source: PCA 1991 and 2001 (town/City level) Directorate of Census Operations, Jaipur

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Table 3 indicates controlled population growth rate. Out of 32 DHQs only 3 DHQs have highest population growth rate. DHQ Hanumangarh registered highest population growth rate of 64.99 percent which is much lower than the extreme limit of population growth rate in the last decade. Hnumangarh city has been added to main cities for the first time during 2001 that is why this DHQ attained highest population growth rate. After Hanumangarh, DHQ Dausa has recorded 59.69 percent followed by Jaipur having 59.25 percent population growth rate in the decade 1991-2001. Again DHQ Ajmer recorded lowest population growth rate of 20.58 percent in 1991-2001, but this rate is comparatively higher than the last decade which was 7.22 percent. Only two DHQs Jaisalmer and Bhilwara recorded high population growth rate of more than 45 percent. Out of 32 DHQs 12 DHQs has recorded moderate population growth rate between 35 to 45 percent. Ten DHQs recorded low population growth rate of less than 35 percent includes Siker, Udaipur, Sirohi, Bikaner, Banswara, Jodhpur, Kota, Alwar, Jalore and Chittorgarh. Out of 32 DHQs five DHQs recorded lowest population growth rate these are Ajmer (20.58 percent), Dungarpur (20.82 percent), Barmer (21.81 percent), Churu (22.96 percent) and Jhalawar (24.27 percent). There is a serene fall in decadal growth rate from 1981-91 to 1991-2001. Out of 32 DHQs three DHQ (9.38 percent) recorded highest population growth rate in the decade 1991-2001 whereas lowest (below 25percent) was observed in five DHQs (15.63 percent). The picture has been changed from previous decade, about 15 percent DHQs have recorded high growth rate in 1991-2001 in the study area. More than 45 percent DHQs have recorded low growth rate. DHQs of North-Eastern region (Fig.1C) are showing highest population growth rate and Southern, Southern-East and Southern-West have low growth rate. Western and Eastern most DHQs are showing moderate population growth rate.

Population Growth in the DHQs of Rajasthan

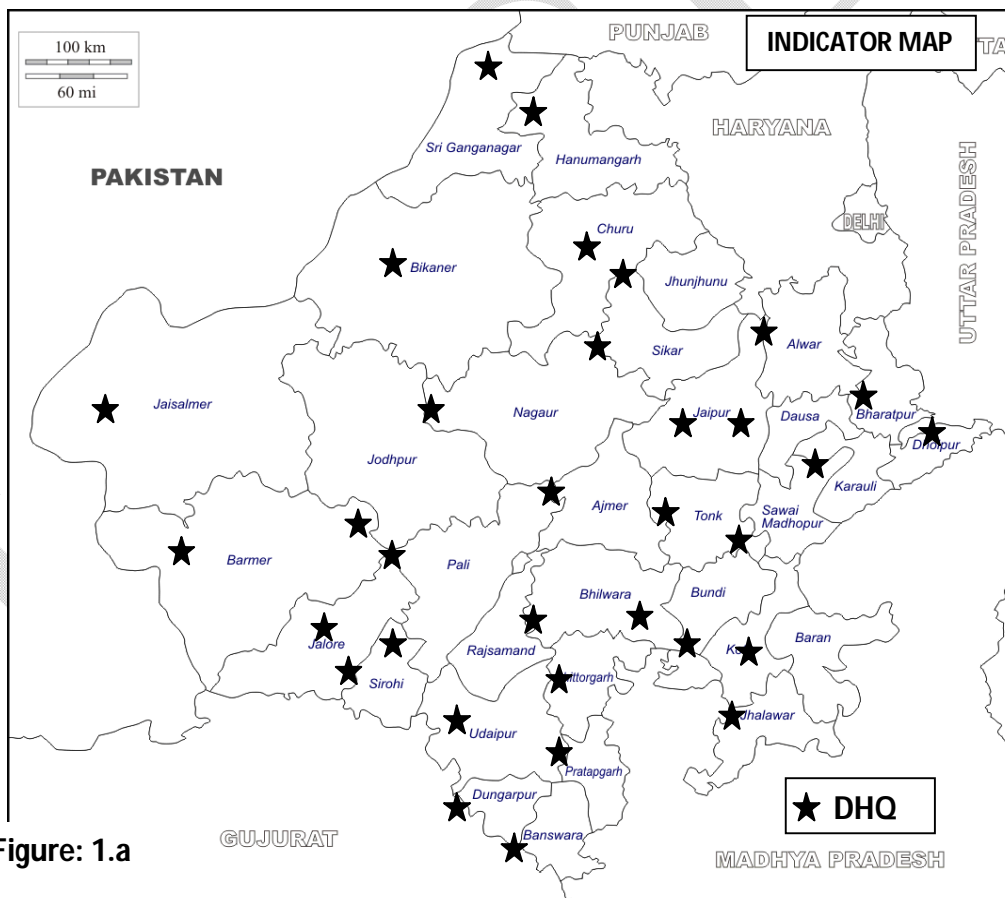
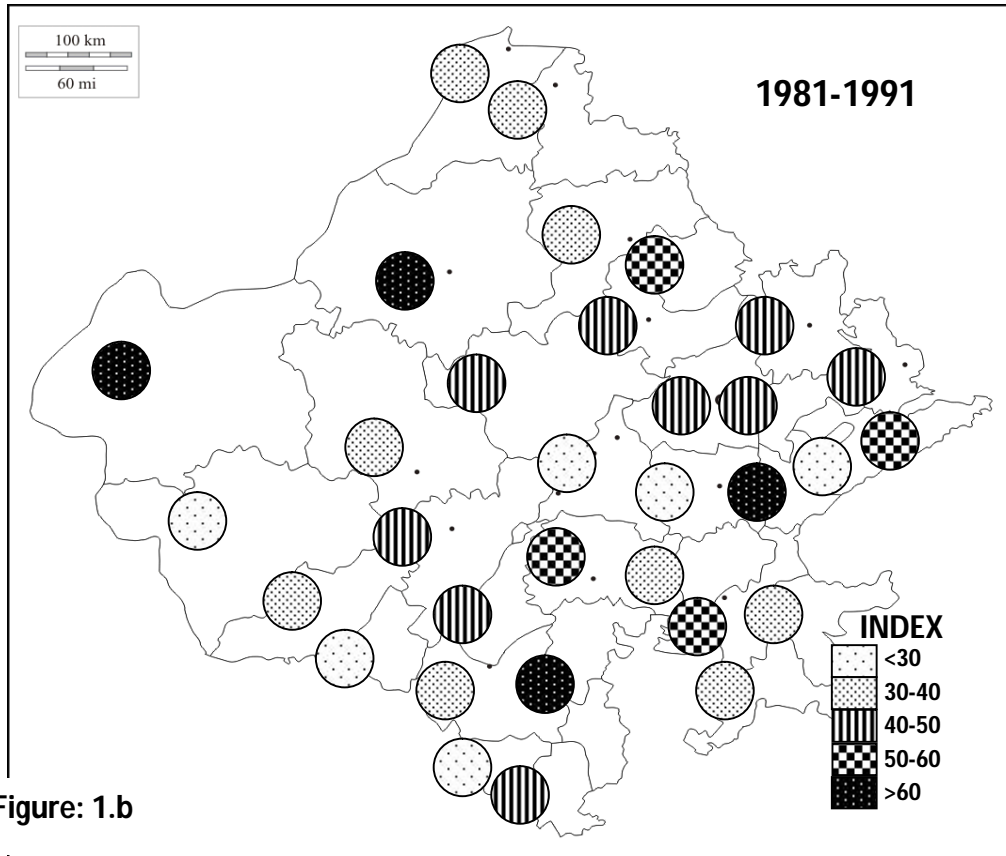


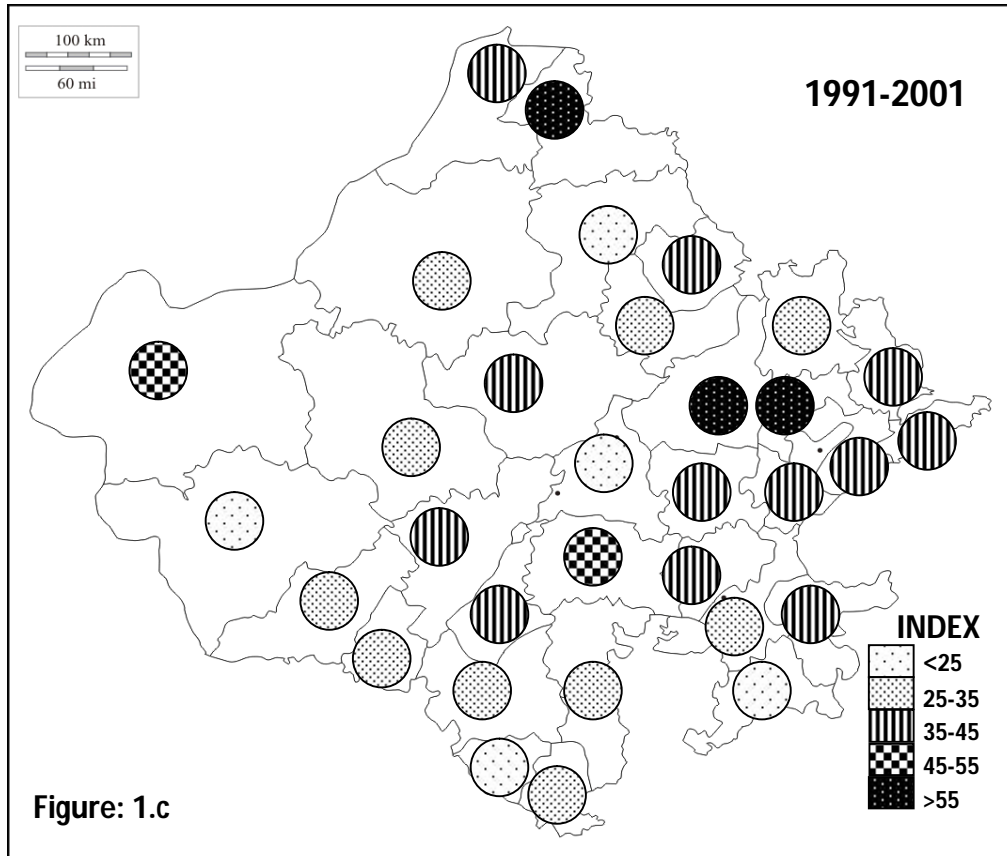
Figure: 1.a



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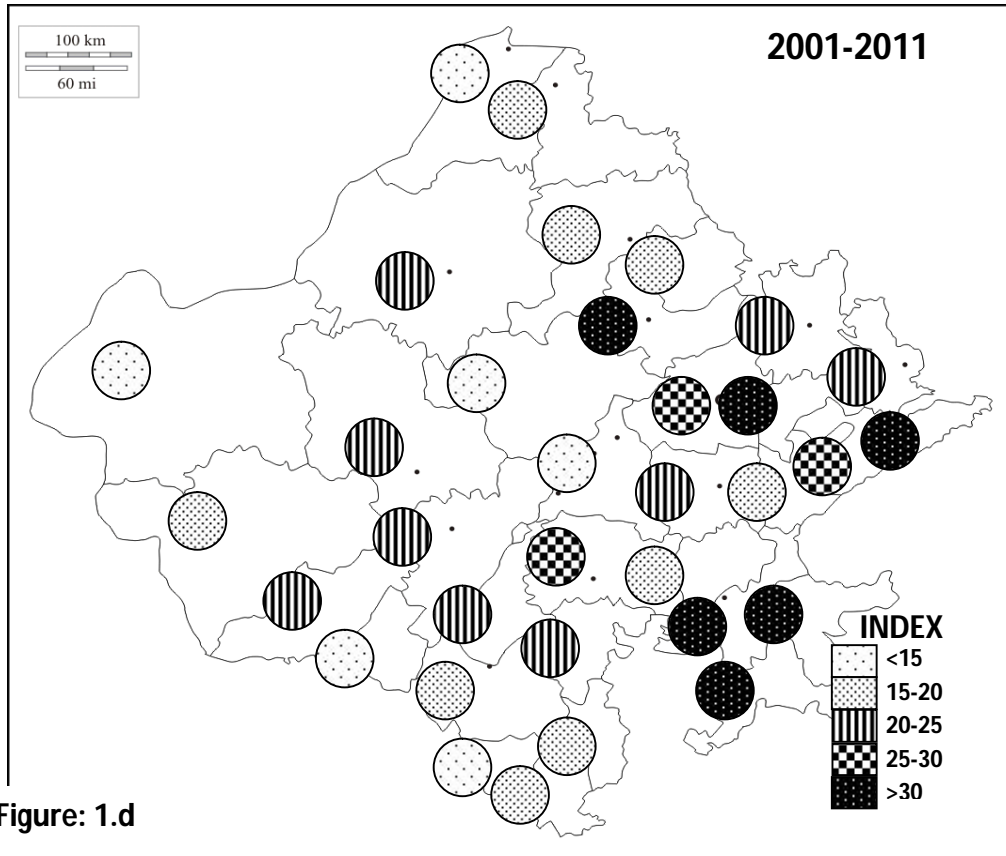


Figure: 1.d

Population Growth Pattern 2001-2011:

A rapid increase in urban population growth was observed in decade 2001-11. Table-1 depicts a tremendous increase of 62 towns in the total number of all class towns from census 2001 to 11 on the other hand there was only an increase of only one town was observed in the decade 1991-01.

Table: 4 Population Growth Rate (PGR) 2001-2011

Category	PGR	No. of DHQs	Percentage	Name of the DHQs
Very low	Below 5	06	18.18	Ganganagar, Sirohi, Dungepur, Ajmer, Nagaur, Jaisalmer
Low	15-20	09	27.27	Barmer, Banswara, Udaipur, Bundi, Hanumangarh, Jhunjhunun, Churu, Sawai Madhopur, Pratapgarh,
Moderate	20-25	09	27.27	Jalore, Chittorgarh, Alwar, Bikaner, Rajsamand, Tonk, Pali, Jodhpur, Bharatpur
High	25-30	03	9.09	Karauli, Jaipur, Bhilwara
Very high	Above 30	06	18.18	Sikar, Dhaulpur, Jhalawar, Dausa, Kota, Baran
Total		33	100	33

Source: PCA 2001 and 2011, (town/City level) Directorate of Census Operations Jaipur

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Table 4 shows that out of 33 DHQs six DHQs has recorded highest population growth rate and similarly six DHQs has recorded lowest population growth in the decade 2001-11. DHQ Baran has recorded highest population growth of 49.99 percent while DHQ Ganganagar has registered the lowest population growth of merely 6.7 percent in the decade 2001-11. Besides DHQ Baran other five DHQs of highest population growth are Kota (44.27 percent), Dausa (39.54 percent), Jhalawar (39.26 percent), Dhaulpur (36.08 percent) and Sikar (31.5 percent). Nine DHQs has recorded in each low and moderate category of population growth. Three DHQs Karouli, Jaipur and Bhilwara have traced high population growth rate between 25 to 30 percent. The effect of an increase in total number of towns can be clearly observed in this analysis. According to it about 27 percent DHQs have high population growth rate and in more than 45 percent DHQs low population growth rate has been observed in the decade 2001-11. Most of the DHQs in the Eastern and North Eastern part of the state are showing highest population growth (fig 1.d) whereas DHQs in Western and South Western region are showing lowest population growth due to its unkind physiographic condition. DHQs of North Western state are showing moderate population growth rate.

Changing pattern of population growth in DHQs of Rajasthan:

A great decline has been observed in population growth rate in the DHQs during the last three decades. Most of the

Changing pattern	Category	Range	1981-91 to 1991-01		1991-01 to 2001-11	
			No. of DHQs	Percentage	No. of DHQs	Percentage
Negative	Very low	Below -20	05	15.63	11	34.38
	Low	-20 to -10	07	21.88	09	28.13
	Moderate	-10 to 0	09	28.13	08	25
Positive	High	Above 0	11	34.38	04	12.5
Total			32	100	32	100

DHQs are showing negative change in population growth rate. More than 60 percent DHQs are showing negative change in population growth during the decades 1981-91 to 1991-01. Out of 32 DHQs eleven DHQs (34.38 percent) are showing positive change (Table-4).

Table: 5- Changing pattern of population growth in the DHQs in Rajasthan

Source: PCA 1991 and 2001 (town/City level) Directorate of Census Operations, Jaipur

DHQ Sawai Madhopur has registered lowest change in population growth of -115.12 percent followed by Bikaner (-37.18 percent), Chittorgarh (-34.62 percent), Jaisalmer (-27.2 percent) and Kota (-20.8 percent). DHQ Hanumangarh has recorded highest change in population growth of 34.26 percent during the decades 1981-91 to 1991-01. The number of DHQs having negative change has been doubled in the successive decades. More than 85 percent DHQs are showing negative change in population growth during the decades 1991-01 to 2001-11. Out of 32 DHQs only four DHQs (12.5 percent) have registered positive change in population growth. DHQ Kota has recorded highest change in population growth of 15.06 percent followed by Jhalawar (14.99 percent), Baran (13.7 percent), and Sikar (6.1 percent). DHQ Hanumangarh has recorded lowest change of -48.47 percent in population growth. Including Hanumangarh there are eleven DHQs which have recorded negative change in population growth.

This observation verifies the stage of population stabilization in the DHQs of Rajasthan. Rajasthan belongs to the group of so called BIMARU states but the DHQs are showing an amazing decline in their population growth rate. The observation is showing good sign of population growth pattern. To achieve this stabilization the government of Rajasthan has initiated many innovative measures and has made a number of changes in its approach to population program management schemes. The total fertility rate and crude birth rate has been declined to a great extent. In the census 1981 the total fertility rate was 5.2 percent and crude birth rate was 37.1 percent which plunge to 4 percent and 29.7 percent correspondingly in the census 2001. Reproductive and Public health played a vital role in resolving the population stabilization. Jan Mangal, Swastya Karmi, VIKALP (a system based service delivery model) and Rajasthan

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Health system Development Project (RHSDP) are some schemes contributed in population stabilization. The proper screening of such programs can stabilize the population growth rate completely. Education and effectual execution of Family welfare programs will unquestionably check the population growth, which will turn in better health, fine economic status and better opportunities for education and services.

REFERENCES

1. Abuzar, M. (1982). The Growing Population of India, Asian Profile, Vol. 10, pp. 311-326.
2. Bourgeois- Pichat, J. (1971). "Stable, Semi-stable Populations, and Growth Potential." Population Studies. Vol.25, pp. 235-254.
3. Bhalla, L.R., (2012). Geography of Rajasthan, Kuldeep publishing house, Jaipur pp. 321- 343.
4. Bala, Raj (1980). Some Hypothesis on Urban Growth in India, Population Geography, Vol. 2, pp. 59-77.
5. Bala, Raj and G. Krishan (1982). Urbanization in a Border Region: A Case study of India's Border Districts Adjoining Pakistan, The Geographical journal, Vol. 148, pp. 43-49.
6. Chandna,R.C.,(1992): A geography of population; Kalyani publishers, New Delhi (pg. no. 81)
7. Coale, A. (1971). The Growth and Structure of Human Populations: A Mathematical Investigation. Princeton, NJ: Princeton University Press.
8. Kothari, Devendra. (July 2002), "Population projection for Rajasthan and Districts: 2002-2011", Occasional paper 3. Indian Institute of Health Management Research and Forum of population Action, Jaipur.
9. Gosal, G.S. (1982). Recent Population Growth in India, Population Geography, Vol.4, pp. 33-53.
10. Government of Rajasthan (2005), "District-wise Performance of Family Welfare Programme-2004", Directorate of Family Welfare, Jaipur. (Net)
11. Government of Rajasthan, "Various Plan Documents", Planning Department, Jaipur. (Net)
12. Government of Rajasthan (1999), "Population Policy of Rajasthan", Department of Family Welfare, Jaipur.
13. Lakshamana, C. M. (2007). Geographical analysis of Population Growth: A Study in Karnataka, National Geographical Journal of India, Vol.53 (3, 4) pp. 87-102.
14. Mittal, Alka (2004), "Billion plus Population: Challenges Ahead", Paper submitted to Academic Staff College, University of Rajasthan, Jaipur during 57th Orientation Course.
15. Marks, E., W. Seltzer and K. Krotki. (1974). Population Growth Estimation: A Handbook of Vital Statistics Estimation. New York City, NY: The Population Council.
16. Ogden, Philip E. (1998), "Population Geography." Progress in Human Geography, Vol. 22.1, pp. 105-114.
17. Rajender Kumar, (2002). "Urbanization in Rajasthan 1901-2001: A Demographic Reappraisal", Annals of the Rajasthan Geographical Association, Vol. 27, pp.139-146.
18. Ray, P. (1979). Methods of Describing Growth of Population, Geographical Review of India. Vol. 41, pp. 250-266.
19. Singh, Harbans (1982). A Perspective on population Growth in India, Population Geography, Vol. 4, pp. 54-56.
20. Provincial census report, 2011. www. Rajcensus.Gov.in
21. Singh, V.V., Alka, Mittal, Sharma, Neetish, and Smarandache, F., Determinants of population growth in Rajasthan: an Analysis. Jaipur. (pg. no. 11)