Ilkogretim Online - Elementary Education Online, 2018; Vol 17 (Issue 4):
pp 2329-2347
http://ilkogretim-online.org
doi: 10.17051/ilkonline.2018.507018

Spatio-Temporal Analysis Of Population Growth And Distribution In Rajasthan (1991-2011)

Dr. Shweta Khandelwal Assistant Professor Department of Geography University of Rajasthan. drshwetakhandelwal159@gmail.com

ABSTRACT

This study provides a comprehensive analysis of the demographic shifts in Rajasthan over the three census years of 1991, 2001, and 2011, focusing on key metrics such as population size, density, decadal growth rates, age group distributions, and sex ratios. By examining these metrics, the study reveals significant trends in population growth, urbanization, and gender dynamics, highlighting both the challenges and opportunities these changes present for the state's future development. The analysis shows a steady increase in population density, indicating growing pressures on infrastructure and resources, while a declining decadal growth rate suggests the onset of demographic stabilization. The study also uncovers persistent gender disparities, particularly in the sex ratio of the 0-6 age group, which raises concerns about ongoing gender biases. The findings underscore the need for strategic planning in areas such as urban development, resource management, social services, and gender equity to ensure sustainable and inclusive growth in Rajasthan. This study serves as a foundation for future research and policy-making aimed at addressing the evolving demographic landscape of the state.

Keywords - Rajasthan, Demographic Trends, Population Growth, Urbanization, Sex Ratio, Population Density, Decadal Growth Rate

1 INTRODUCTION

Rajasthan is one of the largest states in the area in India and the demography of the state has witnessed a tremendous change over the last few decades. Many of these changes occur over time as a result of population increment, increasing urbanization or even alteration in the social structure which has a very broad impact on the development of the state. Knowledge of these demographic trends is crucial for those who are involved in decision-making process, including policy-makers, urban and spatial planners, economists, and social scientists as they are faced with the task of finding ways of managing and utilising the opportunities that arise from an increasingly complex population.

This study focuses on analyzing key demographic metrics across three critical census years: The previous censuses were taken in the years 1991, 2001 and 2011 respectively. The first objective is to give a general picture of the demographic development of Rajasthan with regard to its population, numbers, density, growth, distribution by age groups, and sex ratios. All these measures provide a wealth of information regarding the process of growth and distribution of the population of the state and changes in social characteristics such as the gender ratio.

Hence, through analysis of population size and density, this study seeks to find out the magnitude of the growth of population and its implications on the physical environment in regard to land use, resource distribution and infrastructure demands. The decadal population growth rate gives an idea about the rate at which the population has been changing in the decade, which is indicative of factors influencing fertility, mortality and migration. The examination of age structures especially the 0-6 years age group provides information on the population growth prospects and problems of a young population. Last, the study looks at the sex ratio within the total population and in the age group of 0-6 years to determine the changing pattern of gender and to highlight the areas that have imbalanced gender.

It is with this view that this study aims at presenting insights on the trends revealed from the analysis of these demographic tables on the social and economic fabric of Rajasthan for the last two decades. It also seeks to establish the implications of these trends for future development of the state in relation to topics like urban and rural development, resources, social services and gender. Based on this demographic analysis of change in Rajasthan, the study provides a background for the future to policy makers and developers of the state so as to formulate policies and strategies in line with the future in order to foster sustainable and inclusive development in Rajasthan.

2 REVIEW OF LITERATURE

This helps the reader get an understanding of the concept of urbanization in its broadest sense and the different approaches scholars have taken in analyzing the phenomenon. According to Peng et al. (2009), urbanization is the process of changing the rural structure to the urban structure as a result of economic growth and industrialization. This mobility is described by the shift of population from numerous, compact and heterogeneous urban areas to few, dispersed and homogeneously rural areas. The process entails transition from agriculture to other sectors as observed by Sharma (2011) in the understanding of the process of urbanization as a demographic as well as sociological process.

This paper by Khandelwal (2011) offers a detailed analysis of infrastructural development and its socio-economic impact in the tribal sub-plan region of Banswara District, Rajasthan. Focusing on eight key infrastructure indicators—drinking water, education, health,

electrification, banking, communication, transport, and roads—the study effectively uses both secondary and primary data from 1991 to 2001. The application of composite index values and choropleth maps provides a clear representation of spatial variations in development across the region. The findings suggest that infrastructural improvements have contributed positively to socio-economic development in tribal areas, making the study a valuable resource for policymakers and development planners.

Vinoth Kumar, Pathan, and Bhanderi (2007) performed a spatio-temporal analysis for monitoring urban growth in Indore city. The objective of the study was to track the city's urban expansion over time using remote sensing and GIS data. The research findings likely detailed the patterns and drivers of urban sprawl, emphasizing the role of economic and demographic factors. The conclusion might have focused on the need for strategic urban planning to manage growth sustainably and avoid negative impacts like congestion and environmental degradation.

Urban areas are defined by the population size and density, and the occupations of the adult male population, and sociologically, urban areas are heterogeneous, impersonal, interdependent, and have a quality of life. While the two concepts are associated with each other, urbanization is also defined as the centralization of commercial, industrial, technological and financial activities as noted by Kundu (1993). He further states that in less developed states of India, high level of urbanization is more a product of push factors from rural economy than from actual economic development.

Khandelwal (2011) shows the positive increase with the decreasing overall and tribal population growth rates which may eventually lead to stabilization. Tribal population is still high and forms more than 73. 47% of the total population of the district and some of the tehsils like Kushalgarh, Ghatol and Bagidora have high tribal population ratio. The Bhil tribe is the largest and the rural population percentage is very high, which is 99. 01% indicating that the literacy rate and income levels are also low and the population is not much urbanized. Moreover, the sex ratio of the rural tribes is higher than the sex ratio of the whole country and the main occupation of the people is cultivation and forestry. The study therefore brings out the fact that demographic factors have progressed faster compared to economic and social development in the district.

Singh et al. , (2014) note that the demographic transition in Rajasthan is slow because of poverty, illiteracy and an underdeveloped state which are some of the factors that contribute to the growth rate of population. These socio-economic factors are brought out by the authors as important in understanding why people do not practice child spacing hence the authors conclude that the population of the state will continue to grow in the next one or two years. Collectively, these studies indicate that the physical as well as socio-economic factors should be considered while analyzing the population distribution and growth in Rajasthan. As a result of poverty and underdevelopment, combined with unfavourable environmental

conditions, there has been a high level of emigration, especially from the less productive areas in the state and hence has an impact on the population density of the state.

Li, Liu, and Long (2010) examined the patterns of population and residential land change in rural China in a spatio-temporal context with the aim of establishing the dynamics of population distribution and residential land use. The study probably used quantitative research approach, possibly with the use of remote sensing data and Geographic Information Systems (GIS) for monitoring and assessment. Their research findings would have revealed clear trends of population mobility and concomitant changes in the use of residential land that would have captured the dynamics of socio-economic evolution in China's rural areas. The conclusion probably focused on the implications of these trends to planning and sustainable development of the rural areas in the region.

Wang, Fang, and Li (2014) further expanded the research to both urban and rural areas of China with regards to population and construction land. The would have been to analyse and compare the spatio temporal patterns of urban and rural areas for understanding the dynamics of urbanisation and its effect on land use. The methodology may have also employed a similar approach of using remote sensing and GIS technologies. It is likely that their conclusions highlighted the issues of accelerated urban growth and its influence on the rural territories, conclusions indicating the necessity of implementing measures to maintain the sustainable development of urban and rural areas and their impact on the environment and agriculture.

Al-Sharif et al. (2013) also investigated the nature of urban and population dynamics in Tripoli with a special attention to the spatial and temporal aspects of the process, using remotely sensed data and GIS as the main methodological tools. The study as it would have been conducted would have been to analyse the trends in urban sprawl and the population dynamics of Tripoli especially as influenced by socio-political factors. Their research findings would have probably depicted massive growth of urban areas, which could be attributed to immigration as well as natural growth. The study could have ended with suggestions for urban planning policies that can support such growth while at the same time managing for such challenges as infrastructure congestion and pollution.

Ahola et al. (2007) proposed the use of a spatio-temporal population model for risk assessment and damage evaluation in order to facilitate decision making. The aim was probably to design a system that combines population information with geographic data to estimate threats and design disaster plans. The methodology most likely included sophisticated GIS methods and population projections. They could have shown how such models can be useful in assessing and managing risks in different contexts, and how conclusions must include the need to incorporate spatio-temporal information in risk management decisions.

Glover et al (2012) undertook a study on the population genetic structure of Atlantic salmon in Norway with reference to effects of farmed escapees on wild stocks. The goal of the given research was to evaluate the genetic consequences of farmed salmon's hybridization with wild populations for three decades. From a methodological perspective, the study probably employed genetic sampling and spatial changes in the population structure. I assume that their results most likely indicated that farmed salmon caused substantial genetic changes in the wild populations, and conclusions emphasized the necessity of improving the management of salmon farming to preserve the genetic variation in wild salmon.

There are different ways through which scholars have measured urbanization. According to Tripathi (2013), the 'demographic approach' deals with population density and distribution of the urban population while the 'geographical approach' deals with growth and expansion of towns. Gory (1979) proposed an ecological approach which defined the growth of the urban area as a function of a community's organizational capacity, not just the production capacity. In the last analysis the author has also mentioned that globalization has also played its part in the process of urbanization in India, pointing out that since 1991 there has been substantial economic development and therefore the urban population has also been on the rise and is now over 30% of the total population due to demographic dividend and market incentives for investment and population pulling factors to urban centre.

3 OBJECTIVE OF THE STUDY

I Examine the changes in population size in Rajasthan across the census years 1991, 2001, and 2011.
II Assess the increase in population density over the two decades.
III To Examine Decadal Population Growth Rates.
IV To Study Age Group Distributions with a Focus on the 0-6 Years Age Group.
V To Analyze Gender Disparities Through Sex Ratio Trends.

4 RESEARCH METHODOLOGY

The method used in the study is based on the comparison of the demographic data in the form of tables for the years 1991, 2001 and 2011. The information compiled from the census data set comprises population size, population density, decadal growth rates, age/sex distribution, and much more. The approach adopted was to go through these tables systematically in order to search for trends, patterns and changes that occurred in the demography of Rajasthan over the two decades.

First, the population data was analyzed to find out overall growth of the population and changes in population density which was obtained by dividing the population by the geographical area of the state. This was succeeded by the computation of the decadal growth rate in the form of percentage increase in population over each decade. These figures were adopted in an attempt to measure the rate and size of population growth.

Secondly, the changes in the specific age groups were investigated, with emphasis on the age group of 0-6 years in the subsequent analysis. The comparisons entailed by the analysis were between the three census years to notice major changes in the quantity of children and what this may mean for future population growth.

Last of all, the sex ratio was also cross-checked with great care whether it is of the total population or only the population of 0-6 years. This way, the study compared the given ratios for the three census years to determine the shifts in the gender balance, and to identify such concerns as decreasing sex ratios in the age group of 0-14 years.

In the course of the research, only descriptive statistical techniques were employed and the results were presented in the form of interpreted findings as to what these demographic changes portend for the future development of Rajasthan. The methodology is based on quantitative analysis of numbers, which gives a solid ground to speak about the changes in the demographic picture of the state.

5 RURAL- URBAN POPULATION RAJASTHAN

Table-1 Population Rajasthan

Item	1991	2001	2011
Population	44005990	56507188	68548437
Rural	33938877	43292813	51500352
Urban	10067113	13214375	17048085
Male	23042780	29420011	35550997
Female	20963210	27087177	32997440

The details of population of Rajasthan in the year 1991, 2001 and 2011 can provide a clear picture of the demographic changes in the state in two decades. These population data tells about the changes that are occurring in Rajasthan in terms of population growth, rural urban split and sex ratio which are important from social and economic point of view.

5.1 Population Growth

From the data, it is clear that the population of Rajasthan has been on the rise in the last one and a half decade. The population of the state in 1991 was 4,40,05,990. This figure had risen to 5,65,07,188 by the year 2001 meaning that there was an addition of about 1,25,01,198 people within the space of a decade. The growth continued to the next decade and according to the census of 2011 the population was estimated as 6,85,48,437. This has added further about 1,20,41,249 from 2001 to 2011. The gradual increase in the population of Rajasthan is an indication of the demographic changes that are being experienced in India where most of the states have recorded a high population growth due to factors like high fertility rates, better health facilities and reduced mortality rates.

5.2 Rural and Urban Distribution

The distribution of Rajasthan's population between rural and urban areas shows a clear pattern of growth in both sectors, although the rural population remains the majority.

- Rural Population: At the beginning of 1991, rural population of India was 3,39,38,877. It has risen to 4,32,92,813 in the year 2001 from 1,39,39,877 in the year 1991 with the addition of 93,53,936 people in the decade. The trend remained same but was gradual and the rural population grew to 5,15,00,352 by the end of 2011. This has added up to 82,07,539 people in the decade of 2001 to 2011. Although the rural population growth rate is lesser in the second decade, they still hold the majority in Rajasthan's population.
- Urban Population: The urban people despite being fewer than the rural people are growing in number at a faster rate. In 1991, the urban population was 1,00,67,113. It rose to 1,32,14,375 by the year 2001 and therefore there has been an addition of 31,47,262 people. This growth trend was maintained and by 2011 the urban population hit 1,70,48,085 with an increase of 38,33,710 people. The faster growth rate of the urban population clearly shows that urbanization process is still continuing in Rajasthan as more and more people are shifting to urban areas in search of better jobs and living standard.

5.3 Gender Composition

The gender composition of Rajasthan's population over the three census years provides further insights into the state's demographic dynamics.

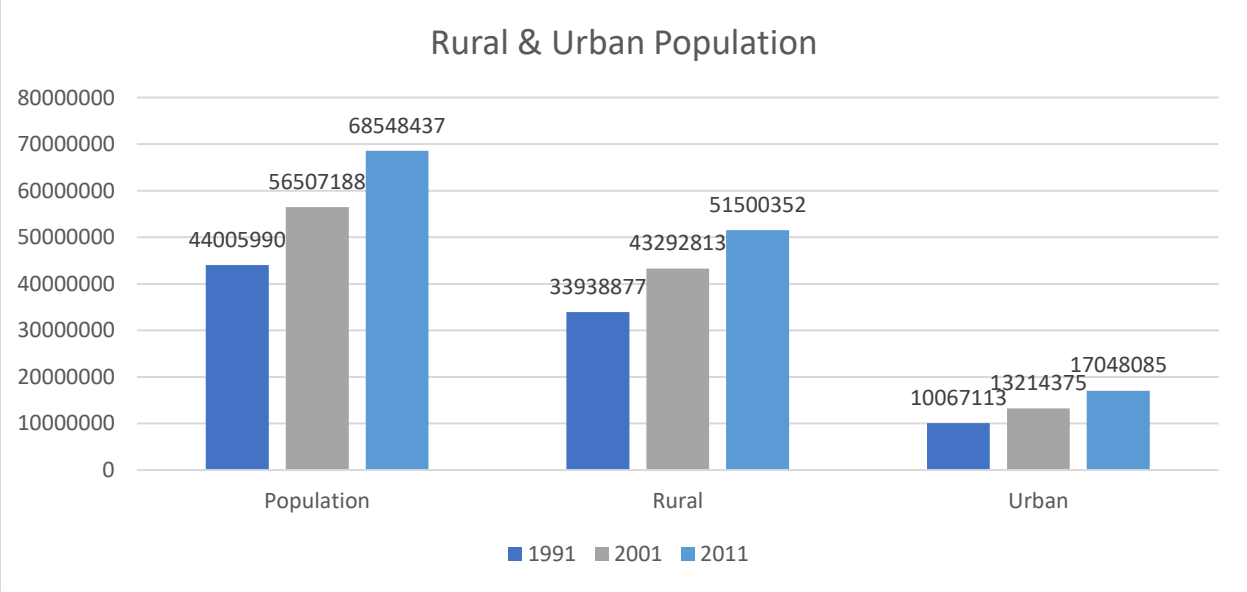
- Male Population: According to the data of the year 1991, the male population was 2,30,42,780. It was 1,46,27,780 in 1991 and by 2001, this figure raised to 2,94,20,011 with an addition of 63,77,231 males. The growth continued further and the male population of the country was accounted to 3,55,50,997 in 2011, thus added 61,30,986 males. The Male population has been growing steadily in line with the population growth in the state as observed from the above table.
- Female Population: Number of females in 1991 was 2,09,63,210. It increased to 2,70,87,177 by 2001 and this was by an addition of 61,23,967 females. According to the census of the year 2011 the number of female in the state has gone up to 3,29,97,440 from 2,70,87,177 and thus the increase in the number of female is 59,10,263. Nevertheless, the proportion of female population is increasing gradually; however, the census records show that male dominance has remained an issue of concern as the number of males has always been higher than the females in all the three census exercises.

5.4 Key Observations

Analyzing the population figure of Rajasthan from 1991 to 2011, one comes across with some significant demographic features. The state has experienced a population boost of more than 2 million people over the recent years. 4 crore people over the period of two decades. This growth has also been observed to be accompanied by a considerable shift in the population density with the urban population density rate higher than the rural one. However, the rural dwellers still form the majority of the state's population, this is due to the fact that it is predominantly a farming community. Also, the gender distribution is skewed in favour of the male gender, which shows that there are still social issues that require attention.

The findings that have been obtained by analyzing the population data of Rajasthan in the period between 1991 and 2011 are significant for understanding the perspectives of the state's further development. Population has grown tremendously and this calls for great planning to see that resources and infrastructure put in place are capable of supporting the increased population both in the rural and urban areas. It will also be seen that the process of urbanization is continuous and it will require more attention to be paid to the enhancement of the facilities that are available in the urban areas. Also, this gender inequality calls for further actions to push for gender equity and change the social factors that cause such a gap. In conclusion, the data revealed that Rajasthan is grappling with the challenges of population growth and therefore there is need for pro-active policy interventions to support the development needs of the growing population.

Figure-1 Rural & Urban Population



6 SCHEDULED CASTES & SCHEDULED TRIBES POPULATION

Table-2 Scheduled Castes & Scheduled Tribes Population

Item	1991	2001	2011
Scheduled Castes Population	7607820	9694462	12221593
Scheduled Tribes Population	5474881	7097706	9238534

The figures of SC & ST in Rajasthan for census years 1991, 2001 & 2011 would be useful to understand their growth and their geographical distribution. They also provide an understanding of the population growth of these groups as well as changes in other social and demographic characteristics of the state during these decades.

According to the 1991 census, Scheduled Castes population in Rajasthan was 76,07,820. The number of households in the same year had risen to 96,94,462, which means that the population of the households has raised by 19,86,642 in a decade. The trend was further continued in the subsequent decade and the Scheduled Castes population has increased to 1,22,21,593 by 2011. This actually show an increment of 25,27,131 people in between the year 2001 and 2011. These twenty years have seen a gradual increase in the population count of the Scheduled Castes which may be attributed to the increase in population in the state, better census taking and demographic enumeration.

The Scheduled Tribes' population in the Rajasthan state has also increased significantly over the years. The Scheduled Tribes population in 1991 was 54,74,881. This figure by the year 2001 had increased to 70,97,706, that is, an addition of 16,22,825 people in ten years. This growth was maintained in the consecutive decade, the Scheduled Tribes population in the country rose to 92,38,534 in 2011 from 71,98,706 in 2001 an increase of 21,40,828.

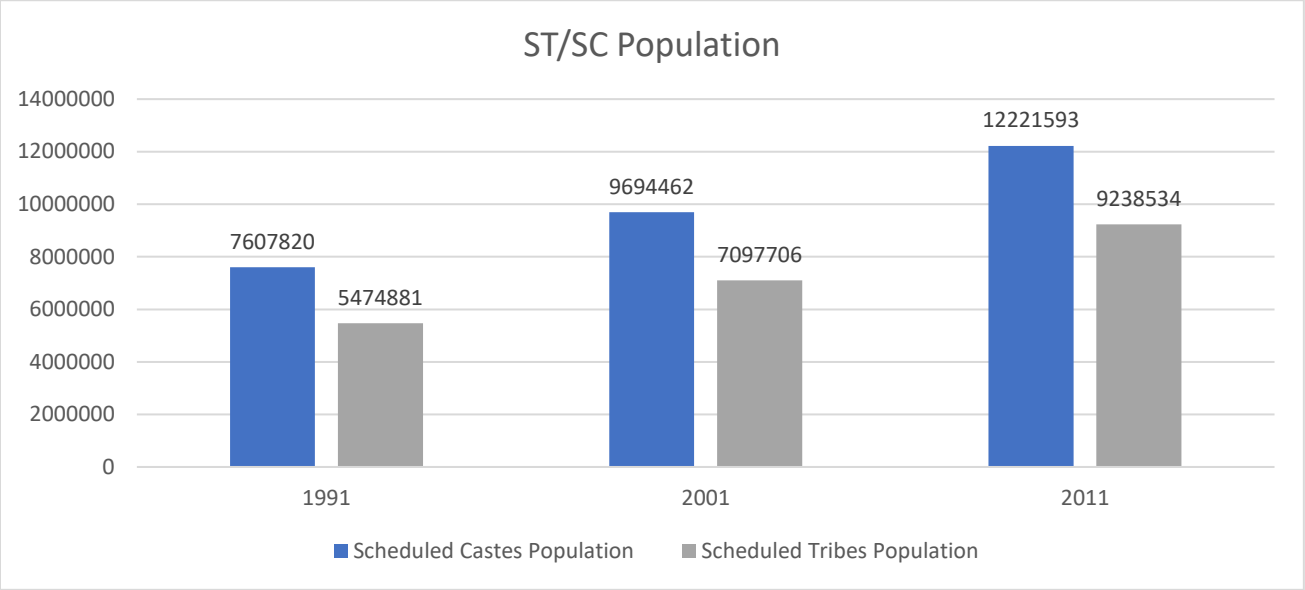
The population of the scheduled castes as well as the scheduled tribes has increased from 1991 to 2011. But during the same 20 years, the population of the Scheduled Castes increased by 4,613,773 and the Scheduled Tribes by 3,763,653. This is so because, the absolute change in the SC population is higher than that of STs in Rajasthan due to the higher base population of SCs.

The growth of population of Scheduled Castes and Scheduled Tribes has significant social and economic consequences. These communities have always been those of the lowest social class in India with vulnerabilities to various forms of discrimination and extreme poverty. Their increase in numbers could be due to advancement in health care, low mortality rates as well as better standards of living. However, it also puts more pressure on state and central governments to make sure that such growing population gets education, jobs and social welfare provisions meant to empower them.

The population growth of the Scheduled Castes and the Scheduled Tribes in Rajasthan which was enumerated in the census of 1991 and 2011 depict the growth of these communities. With the increase in the population of these marginalized groups, it is imperative that the policy makers consider the difficulties faced by these groups if social justice and economic

liberalization is to be achieved. All these trends point towards the fact that there is still a long way to go in the process of development of SCs and STs in Rajasthan and it is imperative that they are given equal chance to contribute to the growth and development of the state.

Figure-2 SC/ST Population



7 POPULATION IN THE AGE GROUP & SEX RATIO

Table-3 Population in the age group & Sex Ratio

Item	1991	2001	2011
Population in the age group 0-6	8859492	10651002	10649504
Sex Ratio - Total Population	910	921	928
Sex Ratio - 0-6 Years	916	909	888

The census data of Rajasthan for census years 1991, 2001 and 2011 has provided demographic facts and figures highlighting the state's population characteristics primarily the population density of age group 0-6 years and the sex ratio of various age groups. This data exposes patterns that are important in understanding the social and economic matters affecting Rajasthan particularly with reference to gender and population.

7.1 Population in the Age Group 0-6 Years

Population of children of age group 0-6 years in Rajasthan has dynamically changed over a period of two decades from 1991 to 2011. In 1991, this age group was 88,59,492. The population has escalated to 1,06,51,002 by the year 2001 and out of this there are 17,91,510 children more than the population of the year 1991. This growth could be as a result of high birth rate in the 1990s; this depicts a period of expansion of the population in the state.

But the next ten years witnessed a slight decline in the child population in the age group of 0-6 years and came down to 1,06,49,504 in the year 2011. This small reduction of 1,498 children may be an indication that Rajasthan is going through a process of demographic transition whereby birth rates start to decline. This is in par with the trends observed across India where literacy, health and economic factors that lead to a decline in fertility rates are seen.

7.2 Sex Ratio - Total Population

The sex ratio expressing the number of females per 1,000 males can be viewed as one of the most important indicators of gender balance in the population. The statistics show that there has been a slow but steady increase in the sex ratio of the Rajasthan state over the period of 20 years. For the year 1991 the sex ratio was recorded as 910 females per 1000 males. This ratio was better in 2001 and stood at 921 and it has even improved in 2011 and the figure was 928.

The gradual rise in the mean of the sex ratio points toward a favorable change in the ratio of male and female populations in the state. Such positive trend may be attributed to the impact of one social and policy innovation or the other that seeks to enhance the status and survival of girls and women in Rajasthan. Other factors which may have led to this slow change include improved health care, education for girls, and change in perception on gender.

7.3 Sex Ratio - 0-6 Years Age Group

However, the sex ratio of the population of India has changed for the better if we look at the overall sex ratio of the population of India but the sex ratio of the children under the age of 6 years is not very encouraging. The sex ratio of this group of people in 1991 was 916 females for every 1000 males. In 1991 it was 919, it reduced to 909 in 2001 and in 2011 it came down to 888 females for every 1000 males.

The sex ratio of children within the age group 0-6 years has reduced which indicates that gender gap is increasing at birth and in childhood. This may be explained by the continued societal bias and the preference of having male child in some quarters. Some of the factors that may be causing this worsening ratio include practices such as sex-selective abortions, and gender-based discriminations. The statistics show, however, that there are still many problems in providing girls with equal chances to live and develop from the birth taking into consideration the general tendencies of the gender equality improvement.

7.4 Key Observations

The following are some of the important trends that can be noted from the data available for the Rajasthan state for these two decades. The growth rate of children below 6 years of age was high between 1991 and 2001 and then became stable which may be an indication of change in fertility levels. There has been a continuous increase in the overall sex ratio

bringing the chances of gender equality nearer. But the decreasing sex ratio among children below the age of 15 years shows that gender discrimination is still prevalent and requires intervention on children at the earliest age.

The demographic changes that have taken place in Rajasthan between 1991 and 2011 are indicative of the state's development as well as the problems that still persist. Although the state has managed to bring improvement in the overall sex ratio, further declining in the child sex ratio of 0-6 years reveals that gender discrimination still exists in the state. It is therefore important that these inequalities be dealt with so that boys as well as girls can have a equal chance to live healthy happy lives. As the state of Rajasthan progresses further, there is a need to focus on the issue of gender equality and to empower young girls in particular so as to help in transforming the society.

Figure-3 Population in the age group 0-6

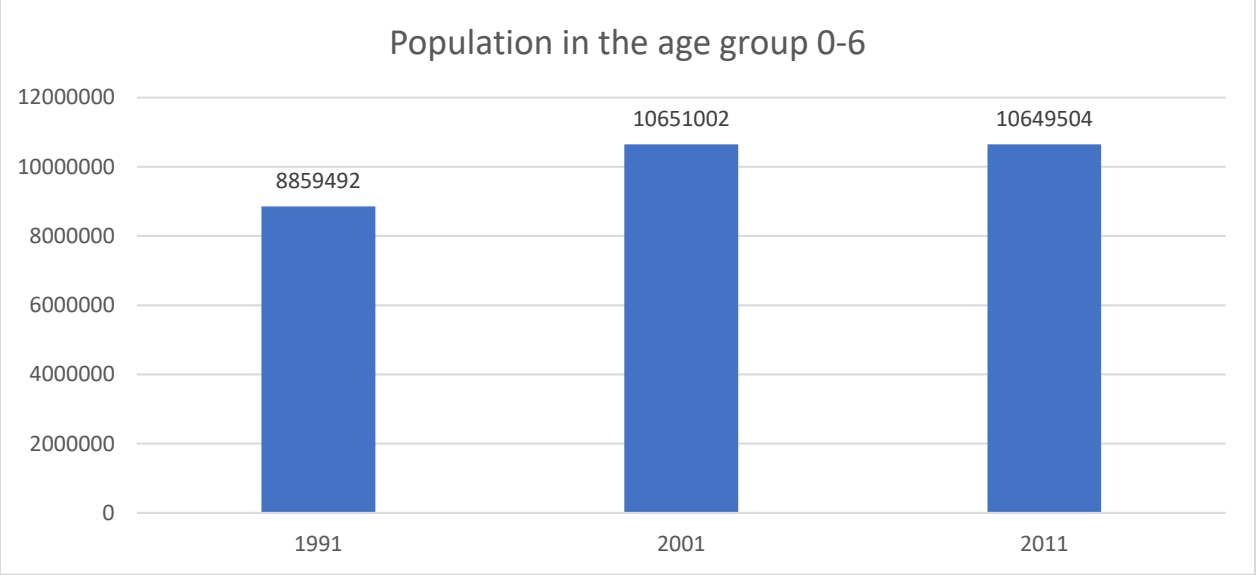
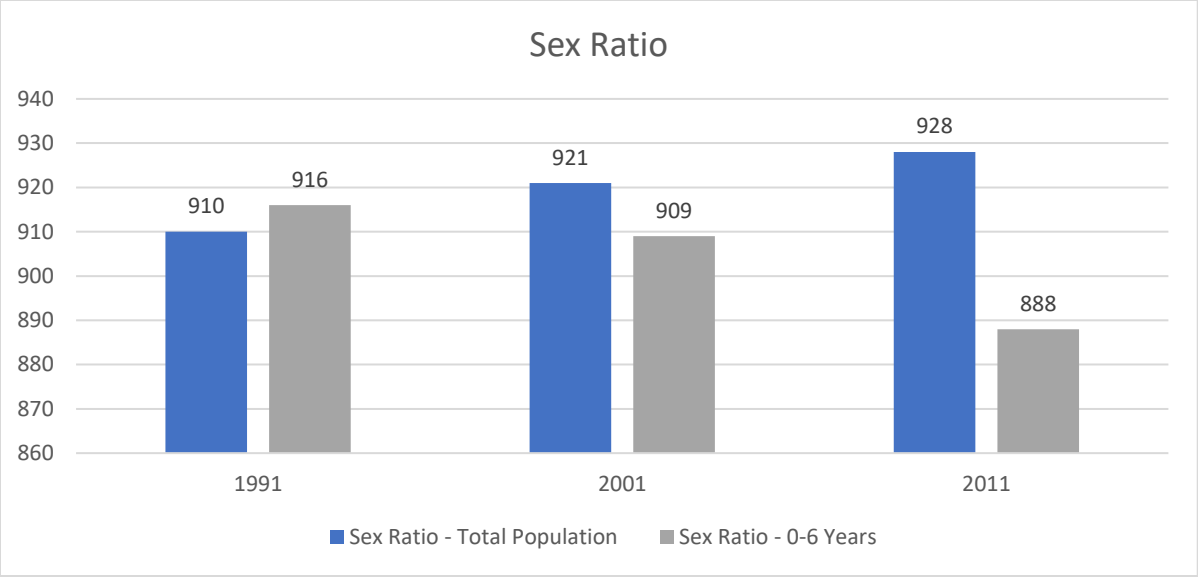


Figure-4 Sex Ratio



8 DENSITY & DECADAL POPULATION GROWTH RATE

Table-4 Density & Decadal Population Growth Rate

Item	1991	2001	2011
Density	129	165	200
Decadal Population Growth Rate	28.44	28.41	21.3

The demographic statistics of Rajasthan in 1991, 2001 and 2011 has enabled one to understand the population density and decadal rate of population growth which are important demographic factors that defines the population growth and other demographic issues that faces the region. Knowledge of these indicators is critical in decision making especially in issues like city planning, resource allocation or economic development.

8.1 Population Density

Population density refers to the number of people living in a given area, usually measured in persons per square kilometer and it gives an idea of how crowded or congested an area is and has impacts on almost all aspects of life including infrastructure, environment among others. The data shows a steady increase in population density in Rajasthan over the two decades in question:The data shows a steady increase in population density in Rajasthan over the two decades in question:

- In 1991, Rajasthan had a population density of 129 persons per square kilometer.
- By 2001, this figure had risen to 165 persons per square kilometer, marking a significant increase.
- The upward trend continued, with the population density reaching 200 persons per square kilometer by 2011.

The increase of population density from 129 in 1991 to 200 in 2011 also depicts the high population growth in Rajasthan. When more people occupy the same geographical space, demand on the resources, structures and services also escalates. This increasing density could result in such problems as overcrowding of structures especially in urban areas, increased demand for housing, transport and other facilities, and possibly lead to environmental problems. If not well controlled these pressures can lead to such problems as pollution, traffic jams, and increased demand on public facilities. Therefore, the high population density is an indication that there is need for the development of efficient urban planning so as to address the growing population.

8.2 Decadal Population Growth Rate

The decadal population growth rate, which indicates the percentage increase in population over a ten-year period, is another critical measure of demographic change. It provides insight into how rapidly a population is expanding, which can influence economic development, labor markets, and the provision of social services. The data from Rajasthan reveals significant trends in this regard:

- In 1991, the decadal population growth rate was 28.44%, reflecting a period of rapid population expansion.
- By 2001, the growth rate had slightly decreased to 28.41%, showing relative stability in population growth during that decade.
- However, between 2001 and 2011, the growth rate experienced a more pronounced decline to 21.3%.

The fact that the growth rate was a relatively stable between 1991 and 2001, and then decreased dramatically in the next decade indicates that Rajasthan is in a process of demographic transition. The drop from 28. In 1991 the figure was 44% while in 2004 the percentage was only 21. 3% in 2011 show that there is a slow down in the rate of growth in the population of the country. Several factors could explain it including; low birth rates, improved access to family planning services and improving socio-economic status that is likely to favor small families. These negative effects of the slowing down of population growth rate could in the long run turn out to be advantageous in that they could help in lessening the pressure on resources and facilities, enhance the quality of life, and assist in the enhancement of the economic planning.

8.3 Key Observations

The data from Rajasthan between 1991 and 2011 highlights several important demographic trends:

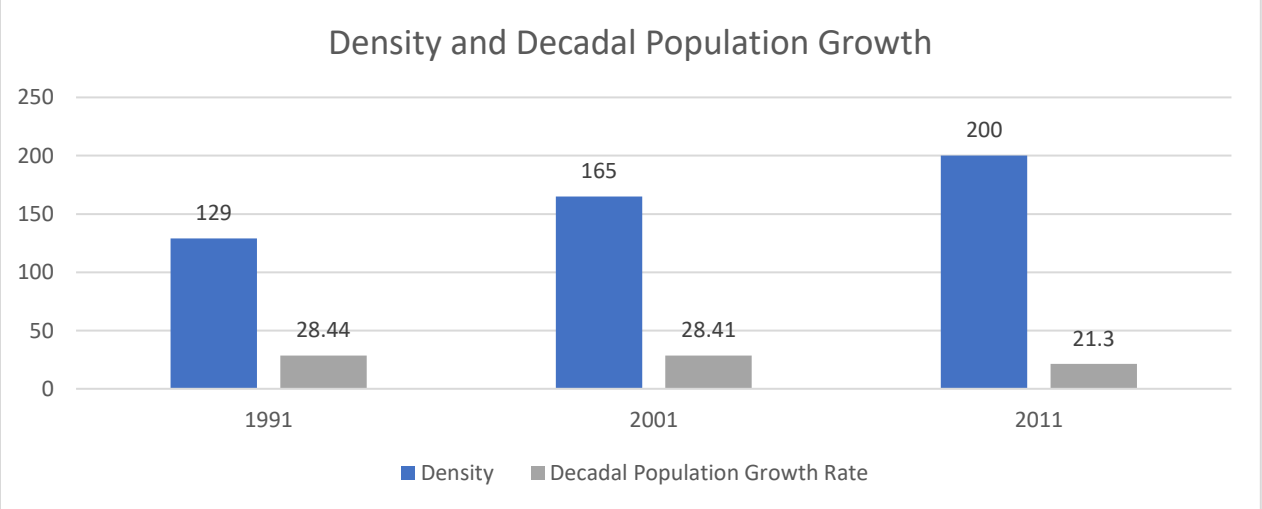
- Increasing Population Density: The increase of the population density from 129 to 200 people per square kilometer within the last 20 years demonstrates the need for constructing infrastructures, accommodation and other facilities. With people

congregation in one area, especially the urban areas, there is a big pressure towards sustainable development.

- Declining Decadal Growth Rate: The decadal population growth rate has been decreasing sharply from 28 percent to the current rate. 44% to 21. 3% indicates that Rajasthan is gradually approaching toward a situation where it will have a stable population. This is a trend that can be said to be brought about by the demographic factor that can work well for the country by bringing about better population control, hence the improvement in the management of the latter and the availability of adequate resources for better planning in the future.

The trends of population density and decadal growth rate of Rajasthan from 1991 to 2011 is showing both the problems and possibilities of the state. The rise in population density indicates the need for efficient management of the growing demand of infrastructure and service provision while the slowing rate of population growth is a positive sign for sustainable population growth in the future. These trends explain why policy should be formulated and implemented ahead of time so that the development of Rajasthan is both sustainable and inclusive to accommodate the increasing population to improve their quality of life. These demographic trends will therefore play a very important role in the formulation of policies that will determine the future of the state.

Figure-5 Density and Decadal Population Growth



9 DISCUSSION & CONCLUSION

The study of the demographic profile of Rajasthan in the census years 1991, 2001 and 2011 shows that there are changes in the population parameters such as population density, decadal population growth rate and sex ratio by age. These results imply that the demographic transition in the state is a multifaceted process which requires further planning and implementation of public policies.

The enhanced population density points to a rise in the numbers of people per unit area especially in the urban regions. This trend shows that it is high time for sustainable development of the cities and resources to help feed the increasing population without reducing their standards. The decadal population growth rate, however, has been coming down which indicates that Rajasthan is gradually heading towards a more stable population size which might help in reducing some of the pressures that come with high population growth rate. This transition should be attributed to advancement in health, education and overall social and economic development which has created a chance for the state to move from the simple quantitative development of services and facilities to their qualitative improvement.

However, data on gender disparities, especially the deteriorating sex ratio in the group of 0-6 years indicate that the problem of gender discrimination is still relevant. Although the trend of the sex ratio has improved in many countries, the deterioration of the sex ratio in the young age group means that gender equity issues should be addressed starting from the childhood.

In conclusion, it can be stated that despite the improvement in many demographic indicators Rajasthan still has many problems. Solving these problems will involve the use of a comprehensive model that will call for the encouragement of sustainable development, fair distribution of resources and services and eradication of gender prejudice that is deeply entrenched in the society. These demographic characteristics should be useful in guiding policy makers and planners in Rajasthan to create a new vision of a more equitable, coherent and sustainable future for the state and its people.

10 STUDY IMPLICATION

Some of the demographic characteristics that were evident in Rajasthan during the period between 1991 and 2011 are of significant implication to the development of the state and its policy direction. Since the population density, growth rate and gender distribution of Rajasthan is changing at a rapid pace, it is important to know how these changes will affect the state in the future and what steps can be taken to enable sustainable development.

10.1 Urban Planning and Infrastructure Development

Another important consequence of the population growth in Rajasthan is the necessity to introduce the effective city planning and construction. Due to the increased people flow from the rural areas to the cities and towns, the need for accommodation, transportation, Water and Sanitation and Health care will be highly demanded. In order to meet this demand, the state needs to focus on the growth and development of the infrastructure it provides. If it is not properly managed, Rajasthan is likely to experience problems such as overcrowding, traffic jam, environmental pollution among others that are likely to reduce the quality of life in the urban area. Hence, there is need to ensure that the strategies applied in the

development of cities are both effective and sustainable in the sense that they should not be at the expense of environmental degradation or social injustice.

10.2 Resource Management

This has also lead to an increase in demand for the natural resources in Rajasthan including water, land and energy among others. Resource management will be an important factor of consideration to ensure that the needs of the people are met while at the same time ensuring that the future generation is also in a position to access the same resources. This could include such measures as practicing better agriculture through better farming techniques, water conservation and use of renewable resources. Also, the state has to ensure that the resources are fairly distributed in order to avoid tension and inequality in the society. Thus, the effective control over the resources allows Rajasthan to meet the population's requirements and not to exhaust the resources that will be crucial for the state's further development.

10.3 Social Services and Education

The decadal population growth rate has been declining which means that Rajasthan has a chance to move from the quantitative expansion of social services to the qualitative improvement of these services. When the rate of growth slows down, the state can direct more resources to enhancing the standards of education, health care and social services. This way the government will not only have a larger population to work with, but also a healthier, better educated and a productive one. This approach will be very important in the socio-economic development of Rajasthan as people with better education and health standards are in a better position to support and benefit from the economic growth.

10.4 Gender Equality and Social Equity

The declining sex ratio in the 0-6 age group highlights a critical social challenge that Rajasthan must address: the prejudice that continues to prevail with an emphasis on male offspring. Although the absolute sex ratio has increased in the past decade, the fact that the sex ratio in the age group of 0-6 years is highly skewed towards the male sex shows that the problem of discrimination against the girl child has not gone away. To counter this, the state has to use measures to prevent this practice including public education, enforcement of laws against selective abortions, and the support of women rights including education and employment. It is not only a question of equity, but also of making sure that all people, irrespective of their gender, are able to benefit from the state's development.

10.5 Economic Planning and Labor Markets

Rajasthan is also facing the challenges of demographic transition that will impact the overall economic planning and employment opportunities as well. If there will be a change in the population growth rate within the state, the government may need to revise the economic strategies and employment training programs in response to changes in the supply of labor

force. For example, developing positions that would correspond to the changing demography like employment for the older people will be necessary. Also, skills development and education will be other strategic areas that will require investment to ensure that workforce meets the challenges of a dynamic economy. Therefore, it is recommended that the government of Rajasthan should adopt economic policies that are in tune with the demography of the State in order to meet the challenges as well as harness opportunities that are latent in the process.

11 FUTURE SCOPE OF THE STUDY

The directions for the further development of this work are connected with the enlargement of the materials used by the most recent census data and the investigation of the effects of the trends like migration, climate shift, and technologic progress on the demographic picture of Rajasthan. Future studies could extend the study of population changes and its impact on socio-economic characteristics such as the impact of population changes on urbanization, gender and resource use. Also, longitudinal designs could afford more understanding of how existing policies are impacting on population growth, density, and distribution so as to inform future planning and development in the state.

References

1. Ahola, T., Virrantaus, K., Krisp, J. M., & Hunter, G. J. (2007). A spatio-temporal population model to support risk assessment and damage analysis for decision-making. International Journal of Geographical Information Science, 21(8), 935-953.
2. Al-Sharif, A. A., Pradhan, B., Shafri, H. Z. M., & Mansor, S. (2013). Spatio-temporal analysis of urban and population growths in Tripoli using remotely sensed data and GIS. Indian Journal of Science and technology, 6(8), 5134-5142.
3. Baker, L. A., Brazel, A. T., & Westerhoff, P. (2004). Environmental consequences of rapid urbanization in warm, arid lands: Case study of Phoenix, Arizona (USA). The Sustainable III Proceedings of Sienna Conference, 1-10.
4. Bhalla, L. R. (2016). Geography of Rajasthan.
5. Glover, K. A., Quintela, M., Wennevik, V., Besnier, F., Sørvik, A. G., & Skaala, Ø. (2012). Three decades of farmed escapees in the wild: a spatio-temporal analysis of Atlantic salmon population genetic structure throughout Norway.
6. Gory, L. M. (1979). Twentieth-century urban growth: An ecological approach. Sociological Focus, 12(3), 187–202. https://doi.org/10.1080/00380237.1979.10570976
7. Khandelwal, S. (2011). Dynamics of tribal demographical attributes and disparities of population composition in Banswara district of Rajasthan. National Geographical Journal of India, 57(2), 65-72.
8. Khandelwal, S. (2011). Level of Infrastructure Development in Tribal Sub-Plan Area: A Study of Banswara District (Rajasthan). Studies in Geography, 111-125.

9. Kundu, A. (1993). Urbanization and alternate policy perspectives. Economic and Political Weekly, 28(26), 1351–1352.
10. Kundu, A. (2011). Trends and processes of urbanisation in India. Human Settlement Group, IIED, UNFPA.
11. LI, Y. R., LIU, Y. S., & LONG, H. L. (2010). Spatio-temporal analysis of population and residential land change in rural China. Journal of Natural Resources, 25(10), 1629-1638.
12. Mondal, S., & Dubey, R. N. (2017). Comprehensive Analysis of Poverty in India: A Spatio-Temporal Dimension.
13. Orum, A. (2011). Urbanization. In Encyclopedia of Social Theory (pp. 853-858).
14. Peng, X., Chen, X., & Chen, Y. (2009). Urbanization and its consequences. Demography, 2(1), 1-16.
15. Portov, B. A., & Paz, S. (2008). Climate change and urbanization in arid regions. Annals of Arid Zone, 47(3 & 4), 1–15.
16. Sadashivam, T., & Tabassu, S. (2016). Trends of urbanization in India: Issues and challenges in the 21st century. International Journal of Information Research and Review, 3(5), 2375-2384.
17. Sharma, P. (n.d.). Urbanization and development. In Urbanisation and Emerging Population (pp. 375-412).
18. Singh, V., Sharma, N., Smarandache, F., & Mittal, A. (2014). Determinants of population growth in Rajasthan: An analysis. viXra. https://doi.org/10.5281/zenodo.30152
19. Tripathi, S. (2013). An overview of India's urbanization, urban economic growth, and urban equity. Institute for Social and Economic Change, MPRA Paper No. 45537, 1-21.
20. Vinoth Kumar, J. A., Pathan, S. K., & Bhanderi, R. J. (2007). Spatio-temporal analysis for monitoring urban growth–a case study of Indore city. Journal of the Indian Society of Remote Sensing, 35, 11-20.
21. WANG, J., FANG, C. L., & LI, Y. R. (2014). Spatio-temporal analysis of population and construction land change in urban and rural China. Journal of Natural Resources, 29(8), 1271-1281.