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A STUDY ON POPULATION GROWTH OF MAN RIVER BASIN IN MAHARASHTRA

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Abstract:-The study of population growth is essential for understanding the population change and better predictions in future population rates. Population projections have been used for planning to ensure provision of basic requirements and prerequisites for human development. The purpose of this research is to study the population growth and future trends and also to identify population growth hot spots in Man river basin. Decadal population growth and population projection calculated with the help of secondary data. Population growth hot spots were identified, extracted and integrated within GIS framework. The highest decadal population growth rate recorded is 28.32 per cent and lowest population growth rate recorded 14.75 per cent in the decade 1981-1991 and 2001-2011 respectively. The projected rise in Man river basin population to 13.28 lakh in 2050 represents an increase of 4.22 lakh over the 2011 population of 9.06 lakh. Out of total 346 villages consisting of 59 villages are falling as hot spots.

Keywords: Population Growth, Population Projection, Geographic Information System (GIS), Hot spots, Man River Basin,

INTRODUCTION

The population growth is a significant demographic characteristic which helps in understanding the population change and also predicting the future demographic characteristic of a region. [1] Population projections have been used for planning to ensure provision of basic requirements such as food, shelter and clothing as well as prerequisites for human development such as health, education and employment. [2]

The world had 2.55 billion people in 1950 and 6.92 billion in 2011. By 2050, this number could rise to more than 9.25 billion [3] World population rise around 9.2 billion in 2050 and peaking still higher later in the century. [4] The population of India was only about 238.4 millions at the turn of 20th century and reached 1210 million in 2011. The population of India rise by one and half times in the first half of the twentieth century, while in the later half it recorded a phenomenal three-fold increase. Population will be reach to 1399 million in 2026. [5]

Major concentrations of population growth rate have recorded in Jammu and Kashmir and also some minor concentration of districts has been recorded in Uttarakhand. [1] The decadal growth rate was slow up to 1931, then became more rapid between 1931- 41 (11.5 per cent) and then decreased to 5.4 during 1941-51. Since 1951, the growth rate increased once more in the Himachal Himalaya. [6]

Population growth rate is 17.64 percent of Maharashtra in 2011. Thane has registered highest population growth rate of 54.86 percent followed by Pune, Aurangabad and Nandurbar district.[7] The decadal population growth of Ahmednagar district was 24.54 percent in 1981- 91 decade and 19.75 percent in next decade. [8]

OBJECTIVES:

1. To study the population growth and future trends in Man river basin.
2. To identify population growth hot spots in Man river basin.

DATA SOURCE AND METHODOLOGY:

Man River Basin demarcated with help of Cartosat-1: DEM: 1 arc second (v1.0) [9] data using Arc GIS SWAT model. [10] Village wise geo referenced map were prepared using district census abstract for overlaying and integration of thematic layers [11] Census 1961 to 2011 village wise population growth data were prepared and attached to the village's polygons on the maps.

1. Population growth calculated with the formula i.e. $R= P_2-P_1/P_1*100$ this formula.
(whereas, R=Population Growth Rate, P_2 = Population of the next year, P_1 = Population of base year)
2. Population projection calculated using Arithmetic Increase Method.
Pn =P+N*C (whereas, Pn = population after 'n' decades, P= present population, C= rate of change of population with respect of time is constant)

3. Population Growth Hot spots:

The following criteria were laid down for villages to be eligible as hot spot. Villages satisfying one of the following conditions during 1961 to 2011, were identified, extracted and integrated within GIS frame work to map population growth hot spots. [12]

Criteria for villages are eligible as hot spots:

1. 100 per cent population in any decade during 1961-71 to 2001-2011
2. Consistently above 10 percent population growth from 1961-71 to 2001-11
3. Population growth above 50 per cent in 2001-11 decade.

STUDY REGION:

The study region selected for present study is Man River Basin. The Man is a tributary of the Bhima River. It rises in the Tital hill in Man tahsil. [11] It covers total area of 4757.47 km2 and lies between in 17^0 51' to 17^0 00' North and 74^0 22' to 75^0 30' East Longitude in Satara, Sangli and Solapur districts in Maharashtra state. Total 346 villages are identified in Man basin. Its bed is sandy and its banks are highly eroded. This basin is drought prone region.

RESULT AND DISCUSSION:

1. Population Growth and Future Trend:

The population of Man river basin is 906774 consisting of 463136 male and 443638 females in census 2011. In Census 2011, India and Maharashtra has registered a decadal growth of 17.64 and 16.01 percent respectively and Man river basin that of 14.75 percent, over the Census 2011. Thus, the growth rate in the Man river basin is lower by 2.89 and 1.26 points compared to national and state average respectively. The decadal growth rate of man river basin was lower as compared with the decadal growth rate of national and state average in the decade 1961-71 to 2001-11 as shown in Statement-1. But the growth rate of Man river basin is more than Sangli (9.23 %), Satara (6.93 %) and Solapur (12.16 %) in 2011. The highest decadal population growth rate recorded is 28.32 per cent and lowest population growth rate recorded 14.75 per cent in the decade 1981-1991 and 2001-2011 respectively in Man basin. The projected rise in Man river basin population to 13.28 lakh in 2050 represents an increase of 4.22 lakh over the 2011 population of 9.06 lakh as shown in statement 2.

Decadal Population Growth / Year	1971	1981	1991	2001	2011
Man River Basin*	20.09	16.63	28.32	15.83	14.75
Satara District**	20.78	18.02	20.24	14.58	6.93
Sangli District**	25.10	18.91	20.45	16.92	9.23
Solapur District**	21.17	15.88	24.84	19.14	12.16
Maharashtra***	27.45	24.54	25.73	23.73	16.01
India***	24.80	24.66	23.87	21.54	17.64
*Source: *Calculated by researcher **District Census Handbook- Satara, Sangli, Solapur District (1991, 2001, 2011) ***Complied by researcher*					
STATEMENT -1: PERCENTAGE DECADAL VARIATION IN POPULATION DURING 1961-71 TO 2001-11					

Year	2021	2031	2041	2051
Projected Population*	1003361	1111650	1219938	1328226
Projected Population**	1012223	1117672	1223122	1328571
**** Least square method ** Arithmetic increase method Source: Calculated by researcher.***				
STATEMENT: 2 POPULATION PROJECTION (2021-2050)				

2. Population Growth Hot Spots:

Out of total 346 villages 59 villages are falling as hot spots. Statement- 3 and Figure- 1 reveal that twelve villages reported 100 percent population growth during 1961 to 2011. In decades 1961-71 and 2001-2011 one village identified 100 percent population growth, 1971-81 no villages identified 100 percent population growth, eight villages identified in the decade 1981-91 and three villages identified 100 percent population growth in the decade 1991-2001. Thirty eight villages consistently reported above ten per cent population growth and twelve villages falling identified above fifty per cent population growth.

Criteria for Villages qualifying as hot spots	**Name of the Villages as Hot Spots**
100 % population growth in any decade	Gatewadi, Valai, Panvan, Maptemala, Gulewadi, Mitki, Balewadi, Karadwadi, Jambhulni, tippehali, Uchetan, Mangalvedha = 12
Consistently > 10 % population growth	Kumbhari, Bagewadi, Mallal, Jat, Dahivadi, Dhamani, Waki, Dhuldev, Warkute, Mhaswad, Kalchondi, Palasavade, Shenwadi, Gunjegaon, Khupsingi, Shelewadi, Khavaspur, Haldihivadi, Dhayati, Shivane, Vazare, Ankadhal, Diksal, Rajuri, Manegaon, Chinake, Watambare, Gheradi, Bamani, Sangewadi, Kadlas, Save, Sangole =38
Population growth > 50 % in last decade	Yelegaon, Gatewadi, Khadki, Kuranwadi, Laxminagar, Naralewadi, Bagalwadi, Gunappawadi, Bamani, Khadaki, Chinchumbe, Mangalvedha=12
***Source:** Calculated by researcher*	
STATEMENT – 3: VILLAGES SATISFYING CONDITIONS LAID DOWN FOR CLASSIFYING AS HOT SPOT.	

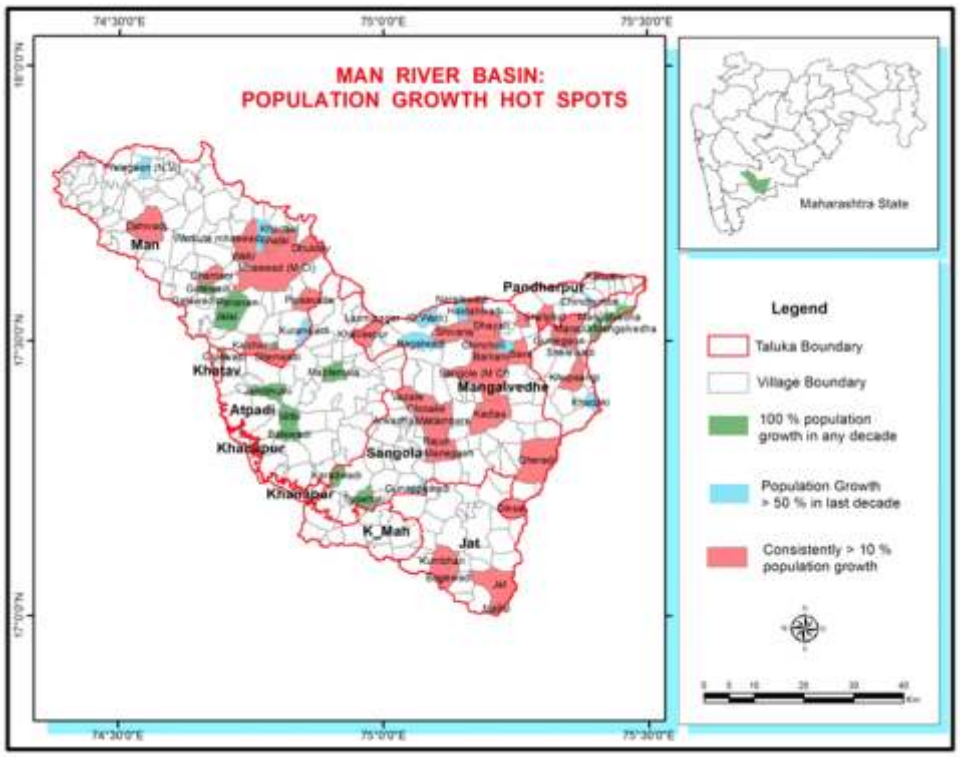

Figure 1 Population Growth Hot Spots

CONCLUSION:

There is gradual change in population growth rate in Man river basin from 1971 to 2011 except it is higher in 1991 decade. Village wise population growth data has been generated using GIS for rapid retrieval of information and dynamic preparation of maps to highlight hot spots of population growth. This information can reach instantly for prepare focused population growth control policy to planners and policy makers.

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