Relationship between Population Density and Altitude, Tehsil wise analysis of Purna river Basin,Maharashtra

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Abstract :

Population density is the ratio of people to physical space. It shows the relationship between a population and the size of the area in which it lives. Population is not evenly distributed in some places it is scattered and some places it is dense. Geographical, social, cultural and economical factors are effects on density and distribution of population. In this paper author find out relationship between altitude and density of population. The main objective of this paper is to analysis correlation between altitude and density of population. Purna river basin is sub-basin of Tapi river basin of Maharashtra. Purna river basin has an area of about 1786.44 km. It spread about thirty two tehsils of Amravati, Akola, Buldhana, Washim and Jalgoan district. In this research paper find out correlation between density of population and average height of the tehsils. There is a negative co-relationship between average height and density of population.

Key words: Population density, Scattered Population, Correlation,

Introduction:

Demography, the study of population, is an important subfield of geography. Examination of the population distribution and reasons for this distribution are often considered geographic themes. The studies pertaining to spatial variations in the distribution and density of population have been the concern of geographers much before formal development of population geography. The density of population is the indicator of human concentration and gives some indication regarding the extent of population pressure. The term density of population refers to a ratio between population and land area. The density of persons per unit of area represent the ratio of man to land. It depends on many natural and human factors such as productivity of land, soil, water, climate, rainfall, economic resources, availability of different facilities etc., Availability of favorable conditions in an area tend to increase the density of population. These ratios are known as arithmetic density, physiological or nutritional density, agricultural density, economic density etc. In this paper the analysis of population density will be confined to the ratio of population of a given

geographical or administrative unit to the area occupied by that unit. In this paper find out the change in population density of 2001 and 2011 and also find out correlation between populatin density of 2011 with altitude of the region.

Objective: The main objectives of present paper are as follows.

(I) Analysis the change in the density of population of 2001 and 2011 in the tehsils of Purna river basin

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[\,n\Sigma x^2 - (\Sigma x)^2\,]\,[\,n\Sigma y^2 - (\Sigma y)^2\,]}}$$

(II) Analysis of correlation between density of population2011 with average height of the region.

Study area

The Purna basin lies between 20° 8' 31" to 21°28'30" North latitude to 75° 58' 25" to 77° 56' 20'" East longitude. The Purna is the right bank tributary of the Tapi River of Maharashtra The Purna basin has an area of about 1786.44 km. The basin covers 32 talukas of five district of Maharashtra . In Amravati district Chandur Bazar, Achalpur, Daryapur, Amravati, Nandgaon Khandeshwar, Bhatkuli, Morshi, Anjangaon Surgi, Chikhaldara, and Dharni talukas. In Akola, district Akola, Telhara, Patur, Balapur, Akot, Murtijapur, Malegaon, and Barshi Takli talukas. In Buldhana district Chikhali, Buldhana, Nandura, Sangrampur, Khamgaon, Mehakar, Malkapur, Motala, Jalgaon Jamod, and Shegaon and in Washim district Karanja and Mangrulpir tahsils and Muktainagar and Bhusawal tahsils of Jalgaon district.
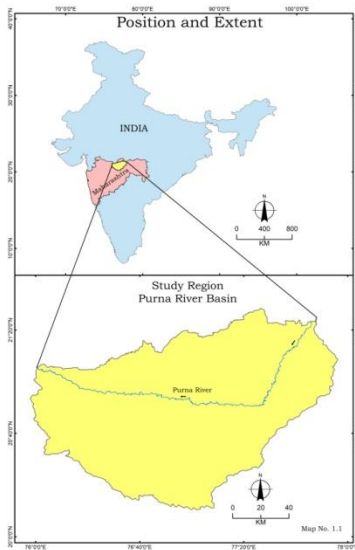
Methodology and Database

The study is purely base on secondary data which is obtained from senses of India 2001 and 2011 tehsil wise

The formula we use to determine arithmetic density is as follows

Arithmetic Density = $P.D. = \dfrac{No.\,of\ People\,of\ the\,area}{Size\,of\ Area\,(sq.km)}$

Change in Population = Population density 2011- Population density 2001

Correlation of population density and altitude by

Pearson's correlation coefficient formula

Result and Discussion:

Change in Population Density (2001 to 2011):-

As per the observation of population density of tehsils of Purna river basin from year 2001 and 2011 there is a increase in the population density of year 2011 as compared to year 2001 some tehsils has more increase and some tehsils has low. People are migrate to the places where development of educational center as well as commercial center .

As per the observation of table no. 1 change in population density from year 2011 to 2001 is categories are as fallows.

Change (Below 25):-

As per the comparison of density of population of the year 2001 with the year 2011 maximum tehsil of Amravati district come in this category these are Anjangoan Surgi 20%, Batkuli 8%, Chandur Bazar 15%, Darypur 16%, Morshi 14%, Nandgoan Kh 7% Dharni and Chikhaldara 24 and 10% of the change in population density. In Akola district Murtijapur 7% Barsi Takli 21% and Patur 24% of change.

Change (25 to 50):-

In the category of 25 to 50 % of the change in population density of the year 2001 to 2011. Maximum tehsils of Buldhana district come under this these are Chikhli 33%, Jalgoan 33%, Malkapur 44%, Mehkar 35%, Motala 29%, Nandura 38%, Sangrampur 26%, Khamgoan 28%, and Shegoan 43 % of the change in population density.

Change (50 to 75):-

Table No. 1
Purna River Basin Density of Population

Sr. No.	District	Tehsil	Population Density in %		Change in %	Average Height(in Merers
			2001	2011		
1	Amravati	Dharni	99	123	24	604
2		Chikhaldara	38	48	10	775
3		Anjangaon	283	303	20	420
4		Achalpur	385	419	34	460
5		Chandur Bazar	271	286	15	415
6		Morshi	212	226	14	365
7		Amravati	749	872	123	330
8		Bhatkuli Jain	187	195	8	325
9		Daryapur	207	223	16	290
10		Nandgaon Khandeshwar	158	165	7	315
11	Akola	Telhara	257	283	26	355
12		Akot	273	301	28	400
13		Balapur	240	270	30	280
14		Akola	576	643	67	285
15		Murtajapur	206	213	7	310
16		Patur	164	188	24	405
17		Barsi Takli	163	184	21	345
18	Buldhana	Jalgaon	228	261	33	492
19		Sangrampur	192	218	26	435
20		Shegaon	255	298	43	260
21		Nandura	291	329	38	275
22		Malkapur	348	392	44	255
23		Motala	186	215	29	420
24		Kamgoan	228	256	28	385
25		Mehkar	207	242	35	440
26		Chikhli	223	256	33	410
27		Buldhana	155	179	24	420
28	Washim	Malegaon	180	214	34	460
29		Mangrul Pir	204	238	34	425
30		Karanja	229	260	31	370
31	Jalgoan	Bhusawal	718	793	75	300
32		Muktaenagar	215	256	41	365

Akola and Bhusawal are in the range of 50 to 75 % of the change in population density in the year 2011 compared to the year 2001. These are Akola 67% and Bhusawal 75%. These are town and commercial center.
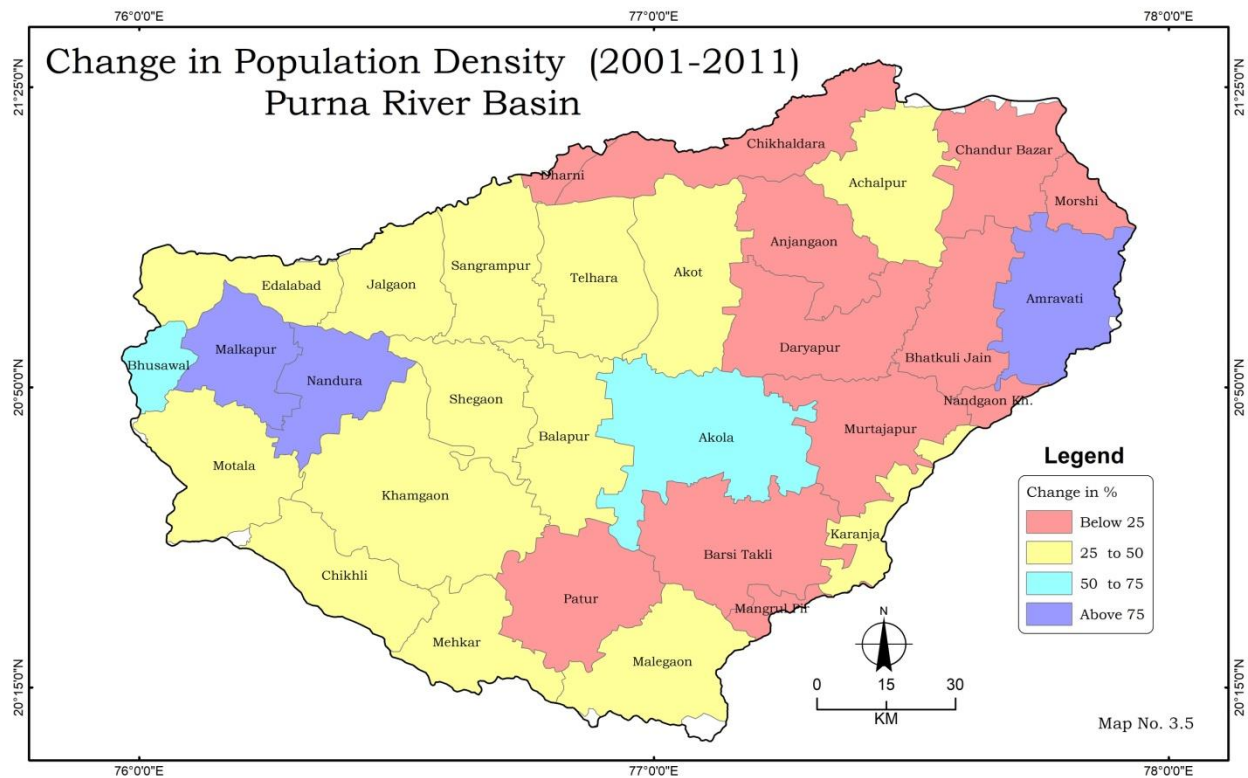
Change (Above 75):-

Amravati 123%, Malkapur, Nandura. Amravati is the most developed city of this region it is also the most important educational center of the region so people are migrated to Amravati for educational purpose. Nandur and Malkapur are regional market places another domestic facilities are also developed to this places so people migrate to this places from near area.

Correlation between density of population and altitude

Landforms influence the distributional pattern of population both macro and micro scales. The most striking evidence of the influence of landforms upon population distribution at macro level has been observed between mountain lands and plains. The factors like attitude, slope, and drainage subsoil water table have been affecting population distribution more dearly at local level.

The areas characterized by difficult terrain have conspicuously sparse population. Ever since the earliest civilization, valleys have been the chief attraction, while slopes and hilltops have scrupulously been avoided. Wherever the landform is hospitable, population have tended to cluster. By comparison, the rugged terrain has repelled human settlement largely because of limited cultivable land, high cost of agricultural operations and in accessibility.

Table: 2
Correlations Matrix

Parameter	Sample Size	Correlation Coefficient (r)	t Stat	p-value	Result
Population & Height	32	-0.43	-2.61	0.01	Reject H_{01}

As per the calculation of Correlation Coefficient (r) between denstity of population and tehsils wise average height shows in   (Table:2). The Correlation Coefficient (r) between density of population and elevation of the region is -0.43 which shows that there is strong negative relation with p value 0.01. This shows that the correlation is statistically significant at 5 % level. , there is significant correlation between density of population and elevation of the region. Also the correlation between density of population and elevation is negative, it shows that lower the elevation higher the density of population in the study area and vice versa.

Conclusion

1)From year 2001 and 2011 there is a increase in the population density of year 2011 as compared to year 2001 some tehsils has more increase and some tehsils has low increase in population density.

2) There is significant correlation between density of population and elevation of the region at 0.05 los.

3)It can be inferred from the above analysis that there exists strong negative relationship between density of population and elevation in the study region

4)It shows that lower the elevation higher the density of population in the study area and vice versa. From the above it can be inferred that altitude determines the density of population.

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