

## STUDY OF POPULATION DENSITY AND DISTRIBUTION IN UPPER KRISHNA BASIN: A SPATIO-TEMPORAL ANALYSIS

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### **Abstract**

*The analysis of density of population is fundamental for understanding the population geography of any area. A significantly wider regional variation in the pattern of density is revealed at tahsil level. Once again sharp edged boundaries can be noticed between the area of high density on the one hand and area of low density, on the other. Size and density of population are the fundamental issues and their disparities are of prime concern to population geographers. The geographers' task is to explain this diversity in terms of physical, social, demographic, economic, political and historical factors as an inter-related influence (Clarke, 1976).*

*The present study has aimed to explain the distributional patterns and spatio-temporal changes of population in upper Krishna basin. Population is unevenly distributed throughout the region. In central parts tahsils, a thick concentration is found while in others, it is very sparse. This variation is mainly associated with the topographical characteristics of the different parts of the region; demographic factors such as birth rate, death rate and migration, process of economic development, scarcity of water are some of the problems in the study region.*

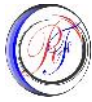
Key words – Density, Spatio-temporal, Analysis

### **INTRODUCTION**

Population distribution and densities of population are very closely associated to each other. Population analysis is a part and parcel of any regional study as population is a great resource of all the resources and an essential element of all regional geography, although past regional studies involved detailed examinations of demographic influences and effects.

The spatial organization of any region is perceived in the occupancies and nature of the spread of population over the region reflecting intra – regional variations of the resources base within the spatial framework (Deshpande, Arunamchalam and Bhat, 1980). Economic characteristics play an important role in the overall development of an area. These characteristics reflect on the economic status of any region at given point of time. Hence, it is essential to study the distribution of population in the study area.

Arithmetic Density is simply a ratio between total population and the total land area. It is the measure of population pressure on land, because it merely spells out a simple quantitative relationship between man and land, both of which may be of widely



varying quality (Chandna and Sidhu, 1980). The most common type of population density is arithmetic density.

## OBJECTIVES

The major objective of the study is to find out patterns of population density in upper Krishna basin over a space and time.

## DATA BASE AND METHODOLOGY

The present study is entirely based on secondary data. Therefore, required data was collected from the Census of India, District Census Handbook of Satara, Sangli and Kolhapur and socio-economic review and statistical abstracts of Satara, Sangli and Kolhapur districts.

In the present study, tahsil is considered as a basic unit of investigation. For the study of temporal changes in density of population 30 years i.e. 1961-2001 is selected. The density differs from tahsil to tahsil with the time. Based on the arithmetic density, study area is divided into very high, high, moderate and low density region and described as under:

Table is compiled by population density. The data collected from different sources has been tabulated and processed through statistical techniques. Quantitative methods and technique are used to convert the data. These methods are useful for the analysis.

## THE STUDY REGION

Geographically, the study region extends between 15<sup>0</sup>43' and 18<sup>0</sup>03' north latitude and 73<sup>0</sup>33' and 75<sup>0</sup>10' east longitude. It covers an area of 20,301 sq. km which is 6.59 % of the total state and includes 2,812 rural and 41 urban settlements with a total population of 78,52,069 persons according to the Census 2001, which constitutes 8.12 per cent of the state population. The region consists of 28 tehsils namely Wai, Mahabaleshwar, Jaoli, Koregaon, Khatav, Satara, Patan and Karad of Satara district; Khanapur, Shirala, Walwa, Tasgaon, Kadegaon, Palus, Kavathe-Mahankal and Miraj of Sangli district and Shahuwadi, Panhala, Hatkanangale, Shirol, Karveer, Gagan Bavada, Radhanagari, Kagal, Bhudargad, Ajara, Gadhinglaj and Chandgad of Kolhapur district. The Upper Krishna Basin is a part of Maharashtra Deccan basaltic plateau with an average height of 600 metres above the Mean Sea Level and comprises the southern part of Maharashtra state covering an area of Kolhapur district in the south, part of Sangli and Satara districts in the north east. It extends between the Sahyadrian spurs on the west and the Mahadeo ranges on the east.

**DISCUSION**

**1) Region of Very High Population Density (Above 601 Persons per sq. km)**

From table .1, it is revealed that tahsils like Karveer (704) and Hatkanagale (702) have recorded very high density during 1971 & 1981 as these tahsils cover area of Panchganga and Warana rivers where irrigation facilities, commercial activities, agriculture and industrial development have taken place. Development of commercial and trade activity, mainly in Gandhinagar, Ichalkarangi and Kolhapur city provides employment opportunities to population that results into high density of population.

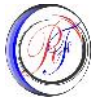
In 1991, Shirol and Miraj tahsils noted 714 and 815 persons per sq. km while Karveer and Hatkanagale tahsils retained their positions upto 2001. In these tahsils, technological innovation has been taking place in agriculture, whereas Ichalkarnaji, Kolhapur, Jaysingpur, Kurundwad, Sangli, Miraj and Kupwad are urban and commercial centres providing job opportunities in cottage and small scale industries.

Table.1

**POPULATION DENSITY**

Tahsils	Year								
	Persons Per sq. km					Fluctuations in Density			
	1961	1971	1981	1991	2001	1961-71	1971-81	1981-91	1991-2001
<b>Wai</b>	177	211	241	271	306	34	30	30	35
<b>Mahabaleshwar</b>	108	134	161	200	245	26	27	39	45
<b>Jaoli</b>	90	103	118	137	144	13	15	8	08
<b>Koregaon</b>	147	174	202	244	275	27	28	42	31
<b>Khatav</b>	111	135	154	207	231	17	19	53	24
<b>Satara</b>	209	262	320	421	503	53	58	101	82
<b>Patan</b>	136	156	175	208	225	20	19	33	17
<b>Karad</b>	235	291	358	475	561	56	67	117	86
<b>Khanapur</b>	102	143	164	192	195	41	21	28	03
<b>Shirala</b>	141	167	206	231	248	26	-25	39	17
<b>Walwa</b>	261	327	383	470	553	66	56	87	83
<b>Tasgaon</b>	168	223	270	275	348	55	47	05	73
<b>K. Mahankal</b>	N.A.	123	138	161	197	-	15	23	36
<b>Miraj</b>	231	449	547	685	815	218	98	138	130
<b>Shahuwadi</b>	95	115	13	152	169	20	18	19	17
<b>Panhala</b>	202	261	300	364	420	59	39	64	56
<b>Hatkanagale</b>	372	520	702	938	1157	148	182	236	219
<b>Shirol</b>	286	391	485	612	714	105	94	127	102
<b>Karveer</b>	511	704	903	1102	1342	193	199	199	240
<b>Gaganbavada</b>	88	92	34	98	115	4	-58	64	17
<b>Radhanagari</b>	113	140	169	189	210	27	29	20	21
<b>Kagal</b>	235	290	334	389	453	55	44	55	64
<b>Bhudargad</b>	120	146	168	198	225	26	22	30	27
<b>Ajra</b>	129	154	172	194	221	25	18	22	27
<b>Gadhinglaj</b>	257	320	363	411	450	68	43	48	39
<b>Chandgad</b>	92	116	140	168	190	24	24	28	22

Source: Compiled by author



## II) Region of High Population Density (401-600 Persons per sq. km)

It indicates that during 1961, high density (401-600 persons per sq. km.) of population was confined to Karveer tahsil. This track has sound development of irrigation which flourished agricultural economy considerably. Besides, the establishments of agro-based industries have increased employment opportunities. This tahsil facilitated river irrigation from Panchaganga and its tributaries.

Miraj (449), Hatkanagale (520) and Shirol (485) tahsils recorded increase in density by 218, 140 and 94 persons per sq. km. respectively during 1971 and 1981 (table). Process of urbanisation, employment opportunities and agricultural development rose the demand for workers and in migration attributed to increase in density.

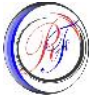
Density also increased in Satara (421), Karad (475), Walwa (470) and Gadhinglaj (411) tahsils by 101, 117, 87, 48 persons per sq. km respectively during 1991 (table). Consequently, it is due to innovation in agriculture and industrial development. Kagal (453) and Panhala (420) tahsils have acquired this category in 2001.

## III) Region of Moderate Population Density (201-400 Persons per sq. km.)

It is revealed that moderate density of population during 1961 was confined to Satara, Karad, Walwa, Miraj, Panhala, Hathkanagale, Shirol, Gadahingalaj, and Kagal tahsils (201-400 persons per sq. km). Majority of tahsils covers the fertile parts of central plain of Krishna and its main tributaries like Venna, Koyana, Warana, Yerala, Vedganga and Dudhganga. These rivers are the major sources of irrigation. Sugarcane cultivation led to establishment of sugar factory and development of allied activities, whereas dense urban population results in overall moderate population density.

During 1971, Wai and Tasgaon tahsils moved up into this category. Koregaon (202), Shirala (206) and Khatav (207) tahsils have acquired this category during 1981 and 1991 respectively. These tahsils are favourable for agriculture and establishment of agro-based industries attracts people.

In 2001, Mahabaleshwar (245), Patan (225), Radhanagari (210), Bhudargad (225) and Ajara (221) tahsils have acquired this status. These tahsils are endowed with good urbanisation, agro-based industrialisation and irrigation development encouraging employment opportunities which have resulted into in migration and increased birth rates and densities in 2001.



#### **IV) Region of Low Population Density (below 200 persons per sq. km)**

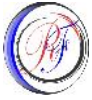
Table represents that, during 1961, tahsils such as Wai, Mahabaleshwar, Jaoli, Koregaon, Khatav, Patan, Khanapur, Shirala, Tasgaon, Shahuwadi, Gaganbavada, Radhanagari, Bhudargad and Chandgad have recorded low density of population (below 200 persons per sq.km). The tahsils of highland zone and tahsils of drought prone zone in the east have adverse topographical and climatic conditions.

Low population density tahsils of the highland zone of the region comprises of rugged topography and heavy rainfall. The rugged topography causes poor economic development due to the lack of infrastructure, absence of industry, lack of commercial/trade activity and poor accessibility resulting into unemployment which encourages people to migrate for seeking jobs outside these tahsils. The north-eastern tahsil (Khatav and Khanapur) has undulating topography with small hillocks and uncertain rainfall conditions and coarse shallow soil or light soil (malran) resulting into low density of population. The tahsils of drought prone zone cause a moisture deficiency and lack of irrigation facilities limiting agricultural development and economic growth. There are large size of rural settlements and small size towns; medium to sparse population further reveals low density.

Thus, under development and unemployment has caused migration of population. During 1971 Koregaon (174), Patan (156), Shirala (167) and Ajara (154) tahsils along with Kavathe Mahankal (123) tahsil belonged to such category (table3.4). Scarcity of food and water and implementation of family planning programmes have led to the decline of density. Whereas, Khanapur (195), Shahuwadi (169), Jaoli (149), Gaganbavada (115), Chandgad (168), and Kavathe Mahankal (197), tahsils are covered in this category during 2001.

#### **SUMMARY**

Tahsils of central plain zone like Mahabaleshwar, Wai, Satara, Kagal, Walwa, Panhala, Karveer, Hatkangale, Shirol, miraj, Kagal and Gadhinglaj have high concentration of population due to Industrial advancements and modern agricultural practices. Whereas undulating topography, heavy rainfall and poor economic activities with sparse and tiny villages cause low population concentration in Jaoli, Patan, Shirala, Shahuwadi, Radhanagari, Gaganbawada, Bhudargad, Ajra and Chandgad tahsils. While tahsils of undulating plateau zone like Koregaon, Khatav, Khanapur, Tasgaon and Kavathemanhankal have noted moderate to low population concentration. This is drought prone zone in region lacking in irrigation, communication, industrial and trade facilities with uncertain rainfall conditions.



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