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COVER PAGE: DR. SARDAR PATIL

Panel of Referees

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2. *Dr. Arvind Mulimani, Professor & Chairman, Department of Geography, Karnataka University Dharwad.*
3. *Dr. B.C. Vaidya, Professor, Department of Geography, University of Pune, Pune.*
4. *Dr. K. C. Ramotra, Professor and Head, Department of Geography, Shivaji University, Kolhapur. Dr. S. C. Thakurdesai, Vice Principal, Gogate-Jogalekar College, Ratnagiri.*
5. *Dr. D. S. Narkhede, Head and Assistant Professor, Department of Geography, C. K. T. College, Panvel, Dist. Raigarh.*
6. *Dr. A. S. Patil, Associate Professor, Department of Geography, Chh. Shivaji College, Satara.*

Preface

We are very happy to bring out the proceeding of the UGC sponsored Three-Day National Conference on "Population, Environment and Tourism" was organized by the Athalye-Sapre-Pitre College, Devukh during March 3 and 5, 2011. The conference was a unique attempt to provide the platform for expansion of the research in the area of Population, Environment and Tourism, among the students, the college teachers and academicians. There was an overwhelming response from the teachers, research scholars and academicians in terms of technical contribution. Overall, 130 participants were participated and out of that, 85 participants had presented their research papers in the area of Population, Environment and Tourism.

Hon. Principal Dr. N. P. Tendolkar in his welcome address had given details of the conference as well as significance of the conference in the locality. They explained that world's population over last 50 years is increased more than double and particularly in India, it is about 3.25 times. In many ways, this reflected good news for humanity: life expectancy increased, and people were on average healthier and better nourished than at any time in history. However, during the same period, changes in the global environment began to accelerate: pollution heightened, resource depletion continued, and the threat of rising sea levels increased. Does the simultaneous occurrence of population growth and environmental decline over the past century indicate that more people translate into greater environmental degradation? One needs to contemplate the Environmental Implications of Population sizes and the influence of population dynamics on the environment and tourism precisely. The new and appropriate technologies must be introduced to minimize the impact of tourism activities on the environment and the extended conservation of natural resources. The environmental impacts and potential impacts of the tourism are fairly well documented but not well scientifically research. Building tourism facilities in ecologically sensitive areas is a matter of concern.The trend towards interdisciplinary environmental research must be encouraged, and researchers should continue to improve analytic approaches and collect new data that allow examination of the links between social and natural processes.

Hon. Shri V. M. Pitre, President, DSPM, Devrukh had stated relevance of the conference and theme in his presidential Address. He stated that this national seminar reminds me what Mahatma Gandhi has said, "Nature has enough to satisfy everyone's need but has not enough to satisfy man's greed". The theme chosen for the conference is interdisciplinary in nature and will provide platform to explore the knowledge of tourism and environmental status and how these two things are influenced by population dynamics. The outcome of this conference will benefit the young scholars, teachers and people from tourism industry.

Dr. B. C. Vaidya Head, Department of Geography, University of Pune, delivered inaugural address as well as Keynote address on the first day of the conference. In his keynote address, he talk about the interrelationship between Population, Environment and Tourism. He explained that population growth adversely affected on environment in the world in general and India in particular. Development of tourism is depends upon status of environment and quality of population.

Dr. Vinod R. Veer, Head, Department of Geography, Kissan Veer Mahavidyalaya, Wai, Dist. Satara had delivered his inspiring and resourceful talk on 'Role of Tourism & Ecotourism in the Economic Development of the Country'. In his speech, he had given concise report of the tourism development in India after independence.

On the second day of the conference Dr. S. C. Thakurdesai, Vice Principal, G. J. College Ratnagiri had given in-depth knowledge about Environment Degradation & Role of Geographical Techniques in its' Management. Dr. N. N. Sawant, Principal, Parvatibai Chougale College, Margaon, Goa had conducted two sessions on "India's Population Growth and Stabilization: An Enquiry" and "Coastal Beach Tourism: Socio-Economic Transformations – Palolem, Goa". Through these two sessions, he highlighted some important aspects of population and Tourism. Dr. Sardar A. Patil Assistant Professor in Geography, Athalye- Sapre- Pitre College, Devrukh had delivered informative talk on "Remote Sensing: Concepts and Applications". In his talk, he briefed about Remote Sensing and its application in Geographical research. He also explained the relevance of GIS and GPS in the study Population, Environment and Tourism.

On the third day of the conference Dr. D. G. Gatade, Head and Associate Professor, Department of Geography, A. S. C. College, Burli, Tal. Palus, Dist. Sangli had delivered very motivating talk on "Environmental Hazards and its Management". Ms. Anagha Purohit conducted second session of the third day on "Modern Techniques in Tourism". Dr. Milind Gokhale was the chief guest for the valedictory ceremony. He enlightened relevance of National Conference in the locality in his valedictory speech.

This proceeding comprises 16 research papers. Seven research papers are related to Population, three are related to Environment, two are related to tourism and eco-tourism and three are regarding allied themes. Two research papers render as idea about the application of Remote Sensing and GIS technique in the analysis and interpretation of land use and land cover changes due to anthropogenic activities and Environmental monitoring.

Research papers included in this proceeding are varied in their nature and cover a wide range of topics. No attempt has been made to place these papers in any defined order. In general, the research papers, which are included in this proceeding, have current concern in research related to Population, Environment and Tourism.

The publication of this proceeding has been in ordinates delayed due to factors that were almost entirely beyond our control. We are indeed gratified that least it has come out.

We take this opportunity to extend our thanks to the authors of the research papers and to the teaching and non-teaching staff of the college. We also extend our heartful thanks to UGC, Western Regional Office Pune and must acknowledge that without the financial assistance of UGC this proceeding could not have seen the light of the day. Lastly, wish to place on record our feelings of gratitude for referee panel who took keen interest in the preparation of this proceeding and many suggestions from them we have gratefully incorporated.

October, 2011

Chief Editor
Dr. Sardar Patil

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'APPLICATION OF REMOTE SENSING AND GIS FOR THE STUDY OF ENVIRONMENTAL POLLUTION AND MONITORING: A THEORETICAL APPROACH'

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ABSTRACT

Over the period, level of pollution in air, water, and soil has crossed the limit considerably because of poor environmental management. An integrated geo-spatial technology i.e. Remote Sensing (RS), Geographic Information System (GIS), and Global Positioning System (GPS) can also help in assessing, understandings, utility mapping, and service facility. The main objective of the present research paper is to enlighten advanced technology viz. Remote Sensing, GIS and GPS in determining the degree of environmental pollution and remedial measures thereof. The remotely sensed data could be analyzed with the help of GIS and may be verified partially with GPS. Today various softwares, like, ARC-GIS, ERDAS imagine, GRAM ++, are being used. In addition, softwares like, BASINS 4.0, GEOMATICA, GRASS and like that many others are available at free of cost. Geographic Information System software's satellite data is available at free of cost from Global Land Cover Facility (G. L. C.F.).

Key Words: *Remote Sensing, GIS, GPS, D-GPS, GEOMATICA, GRAM ++, ERDAS IMAGINE, ARC-GIS, GRASS, Environmental Pollution.*

1.0 INTRODUCTION:

Over the period, level of pollution in air, water, and soil has crossed the limit considerably because of poor environmental management. An alteration against the laws of nature changes the energy pattern, radiation level, chemical or physical constitution or the abundance of organism defined as environmental pollution *(Khopkar, S. M., 2004, p. 7).* Increasing population and urbanization leads to increase in environmental pollution rate *(Bhatt, Bindu, Gupta, Amit Kumar and Gogoi Gunin, 2003).* An integrated geo-spatial technology i.e. remote sensing (RS), geographic information system (GIS) and global positioning system (GPS) can contribute substantially in a more supplementary fashion to some of the interactive operations that should become an asset for assessing, understandings, utility mapping and service facility to solve complex urban environmental issues *(Idowu Innocent Abbas and J.A. Ukoje, 2009).*

Recent advances in atmospheric remote sensing offer a unique opportunity to compute indirect estimates of air quality, particularly for developing countries that lack adequate spatial –temporal coverage of air pollution monitoring *(Ludovic BASLY and Lucien WALD).* Remote Sensing technique is used to measure and monitor the real extent of the environmental degradation, especially environmental pollution.

To state the present status of the environment and to provide quantifiable estimates of the amount of environmental degradation the field of Geoinformatics is must essential *(Bhatt, Bindu, Gupta, Amit Kumar and Gogoi Gunin, 2003).* Over the last two decades, satellite data of the cloud free environment with high resolutions is available at various scales. Earth observation

by satellites gives new solutions in gathering spatial environmental information on cities as well as biodiversity rich regions. A review of current studies on use of satellite data for air pollution monitoring clearly indicates that the instrumentation on the satellites can provide us with valuable information about the constituents of atmospheric pollution, but rather limited as far as the study of surface concentrations is concerned.

2.0 OBJECTIVES:

The main objective of the present research paper is to enlighten advanced technology viz. Remote Sensing, GIS and GPS in determining the degree of environmental pollution and remedial measures thereof. However, the specific objectives are as under

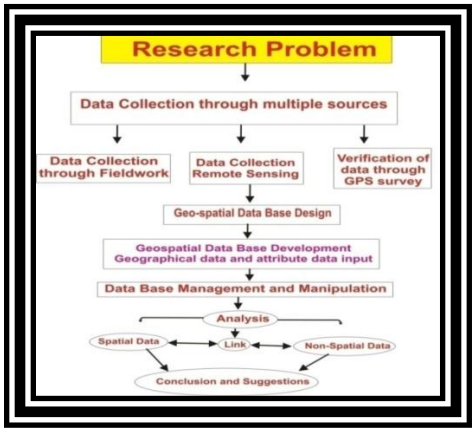
1. To comment on the role of Remote Sensing, Geographical Information System (GIS), and Global Positioning System (GPS) in the study of environmental pollution and monitoring.
2. To explain the sources of satellite data and GIS softwares.

3.0 METHODOLOGY:

There is an excessive awareness in the society for environmental pollution. However, the degree accuracy in the determination is poor due to the lack of knowledge in monitoring methodology. Recently Geoinformatics, which includes Remote Sensing, Geographical Information System (GIS), and Global Positioning System (GPS), is becoming emerging techniques in interdisciplinary of research.

The present research paper focused on the theoretical aspect only. Hence, the related data is collected through the various books, journals, and websites explained in the references.

The following flow chart tries to explain about research methodology researcher can opt for to analyze data related to environment.



Source: *Compiled by the Researcher*

4.0 REMOTE SENSING – DATA COLLECTION TECHNIQUE:

The environmental pollution and its monitoring is the matter of concern for sustainable development. Conventionally environmental pollution and planning is generally being carried out in four phases, viz. monitoring, modeling, development of decisions by planner and finally by execution *(Singh, Savindra, 2003, p. 393)*. Previous studies demonstrate that the conventional approaches to assess the pollution level are not efficient towards contact measurement, integrated path measurement, simultaneous analysis, and flux measurement. These techniques are inadequate at global level. Since, data collection plays the major role in environmental quality, precision in status planning, accuracy and speed is on the priority. It has been found that remote sensing environmental pollution monitoring equipments have the capability to assess the pollution status in the desired area that may be more beneficial for environmental pollution management.

Today there are number of satellites mapping the earth constantly. In India, the National Remote Sensing Centre (NRSC) is the focal point for distribution of remote sensing satellite data products in India and its neighboring countries. NRSC has an earth station at Balanagar, about 55Km from Hyderabad, to receive data from almost all contemporary remote sensing satellites such as IRS-P5, IRS-P6, IRS-P4, IRS-1D, IRS-1C, IRS-P3, ERS-1/2, NOAA series, AQUA and TERRA satellites.

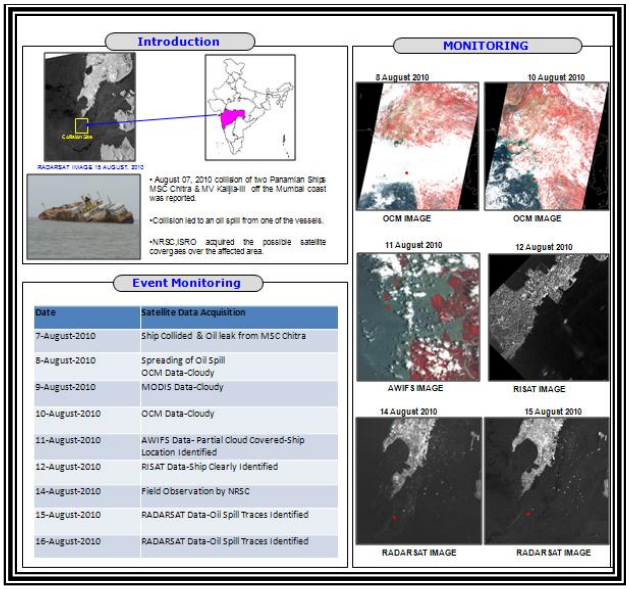
In addition to the above-mentioned satellites, ENVISAT, OCEAN SAT, CARTOSAT, WiFS, LISS series, RADAR SAT etc. are some more important satellites whose data is used for the detection of environmental pollution. Following pictures depicts recent tragic accident of the "Mumbai oil spilt" in the Arabian Sea.

Remote sensing data may be used for the study of water quality, air quality, land use and land degradation, forest cover change, fire detection etc. The remote sensing data is available from NRSC at concessional rate as well as on Internet (Download from Global Land Cover Facility (GLCF)).

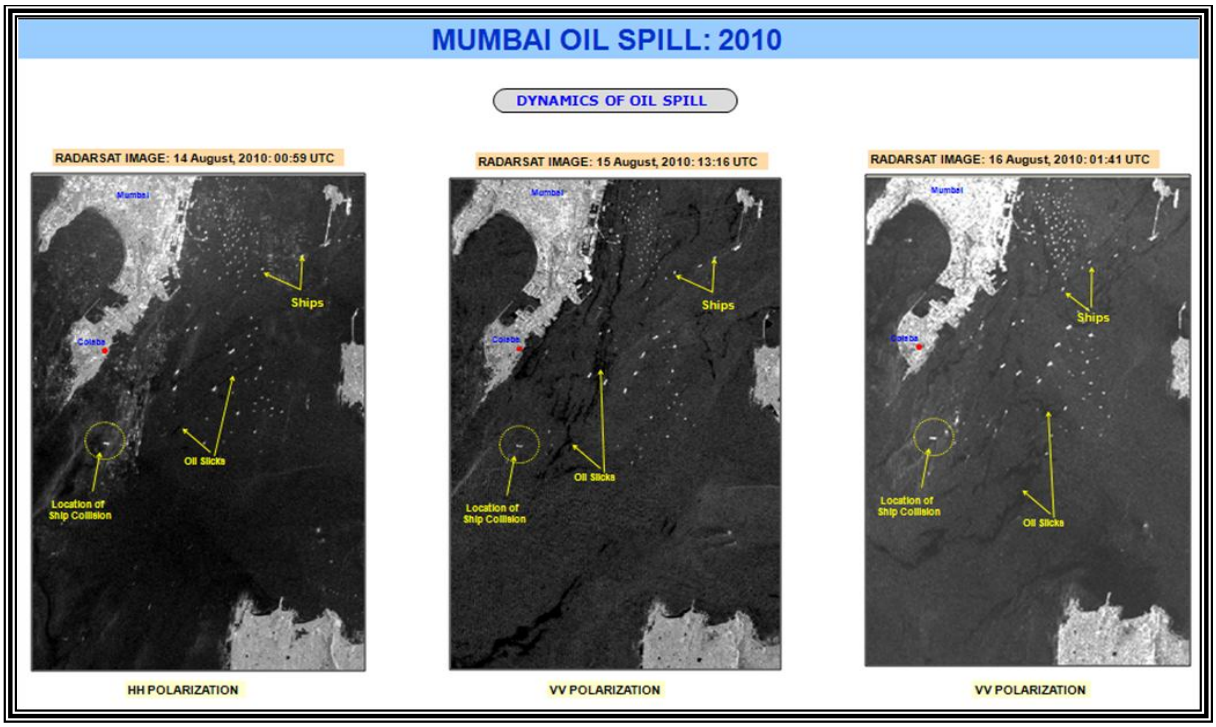
5.0 GPS AND GIS TECHNIQUES:

GPS is the most advanced system used for the verification of data collected through satellite. There are two types of GPS - Hand GPS and D GPS- used for the verification of data. Geographic Information System (GIS) is used by the environmentalists, planners and scientists for the better, efficient, and cost effective approach towards environmental planning using spatial records. GIS is the technique used for the analysis of data i.e. spatial as well as non-spatial data. Satellite imagery may be analyzed by the two ways- manual analysis and automated analysis.

The ERDAS Imagine is the basic software used for the image analysis. Along with ERDAS Imagine Arc-GIS software is used for the analysis of spatial as well as non-spatial data. In addition to these two softwares there are so many softwares available either at low cost or free of cost from the internet. These includes GRAM ++, ILWIS, GEOMATICA , GRASS, BASINS 4.0 and so many.



Source: http://www.nrsc.gov.in/tmp-images/cartosat-2B.html



Source: http://www.nrsc.gov.in/tmp-images/cartosat-2B.html

6.0 CONCLUSION:

Space technology is one of the best-suited means for the assessment of damage brought about by environmental pollution as well as detection of environmental pollution. Remote sensing satellites provide synoptic view, repetitive coverage, and high-resolution images. This advanced high-resolution sensor technology has provided immense scope to the mapping and monitoring of environmental pollution by using Remote Sensing, GIS, and GPS techniques. The development in the remote sensing and GIS provide the base for the environmental pollution monitoring, that includes water quality, air quality, forest fire detection, soil pollution and erosion, etc. This has proved by the example of Mumbai oil spilt. GPS used for the verification of data. In short, Remote Sensing technique is used for the environmental pollution monitoring is more beneficial than the conventional methods. GPS used for verification of data and GIS used for the analysis of data.

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Air pollution monitoring and GIS modeling: a new use of nanotechnology based solid state gas sensors http://iopscience.iop.org/1468-6996/6/3-/A08/pdf/STAM_6_3-4_A08.pdf

An assessment of urban environmental issues using remote sensing and GIS techniques an integrated approach: A case study: Delhi, India http://www.cicred.org/Eng/Seminars/Details/Seminars/PDE2007/Papers/Atiqur-RAHMAN_paperNairobi2007.pdf

Application of Remote Sensing Satellite Data in the Study of Urban Population-Environment Interactions

http://www.populationenvironmentresearch.org/papers/Rahman_Netzband_PERN_statement.pdf

http://earth.esa.int/ers/pub/ESA_DOC/PROBA/PROBA021.pdf (Fine Resolution Air Quality Monitoring from a Small Satellite:

http://hal-ensmp.archives-ouvertes.fr/docs/00/46/19/16/PDF/2000-telegeo-basly.pdf (Remote Sensing and Air Quality in Urban Areas)

http://hal-ensmp.archives-ouvertes.fr/docs/00/46/55/66/PDF/2001_tap_ung.pdf (Air pollution mapping over a city – virtual stations)

http://www.smaqlife.org/files/techwatch/Earth_Observation_Derived_Information/High_resolution_3D-mapping_of_urban_air_pollution_using_EO_data.pdf (High resolution 3D-mapping of urban air pollution using EO data)

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http://www.space.noa.gr/rsensing/documents/SPIE2002_AP.pdf (High Spatial Resolution Satellites as a Complement to Atmospheric Modelling and to Ground Measurements for Air-Quality Monitoring)

http://www.space.noa.gr/rsensing/documents/SPIE2002_fires_web.pdf Observations of forest fires and of their consequences by moderate resolution satellite imagery combined with European CORINE Land Cover data

http://www.wseas.us/e-library/conferences/2005athens/eeesd/papers/505-271.pdf (SATELLITE REMOTE SENSING FOR MONITORING AEROSOL)

Remote Sensing and GIS Approach for the Water Pollution and Management In Tiruchirappli Taluk, Tamil Nadu, India http://ipublishing.co.in/jesvol1no12010/EIJES1006.pdf

'SPATIO-TEMPORAL ANALYSIS OF ECONOMIC STATUS OF GENDER IN KOLHAPUR DISTRICT (MAHARASHTRA): A GEOGRAPHICAL PERSPECTIVE'

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ABSTRACT

Present paper attempts to analyze the bi-decadal dynamics of spatio-temporal pattern of economic activities of gender in Kolhapur district of Maharashtra during 1981 to 2001. It is seen during 1981 to 1991, 77.83 per cent gender work force in the district was engaged in primary sector, 10.82 per cent deal in secondary sector while, 11.35 per cent in service sector. It is observed that 69.14 per cent male were engaged in primary, 15.22 per cent in secondary and 15.64 per cent in tertiary. Similarly, 93.84 per cent female were engaged in primary, 2.73 per cent in secondary and 3.43 per cent in tertiary activities. During 1991 to 2001 transformation of economic activities has been marked as 55.87 per cent gender work force in the district was engaged in primary sector, 3.13 per cent deal in secondary sector while 41.00 per cent in service sector. While looking into male-female work participation, it is noted that 46.73 per cent male were engaged in primary, 3.06 per cent in secondary and 50.22 per cent in tertiary sector. At the same time, 74.92 per cent female were engaged in primary, 3.29 per cent in secondary and 21.78 per cent in tertiary activities. The factors responsible for this variation are geographical as well as socio-cultural.

Key Words: *Spatio-temporal, Gender Gap, Primary Economic Activities, Secondary Economic Activities, Tertiary Economic Activities, Red Collar, Blue Collar, White Collar*.

1.0 INTRODUCTION:

By virtue of the predominance of agricultural sector in India, 62 per cent employment in the country is engaged in this sector. However, the proportion of working force employed in the secondary (i.e. industry) and the tertiary (i.e. service and transport) sectors have considerable importance. In the present research paper, an attempt has been made to analyze the bi-decadal dynamics of spatio-temporal patterns of economic activities of gender in Kolhapur district of Maharashtra during 1981 to 2001.

2.0 STUDY REGION:

Kolhapur district is one of the major districts of Maharashtra bears the undulating geography of Deccan Trap. The Panchaganga, Warana, Dudhaganga, Vedganga, Bhogavati, Hiranyakeshi and Ghataprabha are the major rivers draining the land of Kolhapur most suitable for characteristic agriculture pattern of sugarcane and paddy cultivation. According to the census of 2001 population of Kolhapur district is 35,23, 162 persons with density of 455 persons per km². The average sex ratio is 949 and it ranges from a maximum of 1082 in Ajra Tahsil and minimum of 911 Hatkanangale Tahsil in 2001.

3.0 OBJECTIVE:

- Present investigation aims to analyze the spatio-temporal variation of gender in the economic activities.

4.0 DATABASE AND METHODOLOGY:

For the present research paper, secondary data is used for the analysis of two decades i.e. 1981-91 and 1991-2001. Three activities depending on the avaibility of data have been taken into consideration for the 1991-2001. The tehsil is used as a spatial unit of investigation. The percentage of economic activities is derived from following equation:

$$\text{Work force (Primary activities)} = \frac{\text{Gender Workers in Primary Sector}}{\text{Total Main Workers}}$$

5.0 DISCUSSION:

Work participation rate is defined as the percentage of total workers to the total population. In the present research paper, following economic activities are discussed at length.

5.1 PRIMARY ACTIVITIES: 1991

Primary sector includes agriculture, poultry farming, animal husbandry and mining and workers in this sector are known as 'Red Collar Workers'. According to 1991 census, the percentage of total primary workers varied from a tahsil to tahsil and it was 62.73 per cent in Hatkanangale and 89.48 per cent in Gagan-Bavda Tahsil. In remaining all tahsils the percentage of workforce in primary sector was between above 60 to 90 per cent.

The gender workers in the primary activities were 69.14 per cent and 93.84 per cent respectively, in which average of total primary workers were 77.83 per cent. Male work force participation rate was 83.57 per cent in Gagan-Bavda and 55.78 per cent in Hatkanangale Tahsil. Similarly, the female work force participation is highest and lowest (97.36 per cent and 87.76 per cent) in Bavda and Hatkanangale tahsil, respectively. In fact, the females were mostly engaged in primary activities such as the agricultural labor as well as cultivator.

In the nine tahsils of the district, for instance, Panhala, Kagal, Gadhingalaj, Chandgad, Ajra, Bhudargad, Radhanagari, Bavda and Shahuwadi, more than 90 per cent female workers engaged in the primary economic activities.

5.2 SECONDARY ACTIVITIES: 1991

Secondary sector consists of household industry, other than household industry and worker in the construction activities, and they are known as "Blue Collar Workers". In 1991, 3.61 per cent workers in Bavda and 23.37 per cent workers in Hatkanangale

were engaged in secondary sector. Other tahsils were observed less than 15 per cent workers in the secondary sector.

Similarly, the percentage of male workers varied between 5.63 per cent in Bavda to 28.43 per cent in Hatkanangale tahsil. It indicates that, there has no change in the secondary sector. Maximum and minimum work force of female was 5.13 per cent and 0.91 per cent respectively (Table-I).

Table- I

Status of Economic Activities in Kolhapur District 1981-1991

Tahsils	Primary Activities Participation in %			Secondary Activities Participation in %			Tertiary Activities Participation in %		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Karvir	62.12	89.22	70.40	17.54	4.95	13.70	20.34	5.83	15.91
Panhala	69.18	93.02	77.38	13.97	3.17	10.26	16.85	3.81	12.36
Hatkanangale	55.78	87.76	62.73	28.43	5.13	23.37	15.79	7.11	13.90
Shirol	70.42	89.29	74.79	16.20	4.92	13.59	13.38	5.79	11.62
Kagal	75.07	95.23	83.16	11.73	2.74	8.13	13.20	2.02	8.72
Gadhinglaj	74.47	95.35	82.60	10.16	1.73	6.87	15.37	2.93	10.52
Chandgad	77.69	96.57	86.24	9.17	1.41	5.65	13.12	2.02	8.09
Ajra	72.29	96.43	84.16	9.13	1.04	5.15	18.58	2.53	10.69
Bhudargad	72.94	96.30	83.22	9.29	1.41	5.82	17.77	2.29	10.95
Radhanagari	73.94	95.97	82.95	11.86	2.25	7.93	14.21	1.78	9.12
Bavda	83.57	97.36	89.48	5.63	0.91	3.61	10.80	1.73	6.91
Shahuwadi	80.95	97.11	87.60	7.34	1.01	4.73	11.71	1.89	7.66
District average	69.14	93.84	77.83	15.22	2.73	10.82	15.64	3.43	11.35

Source: *District Census Handbook, Kolhapur (1991).*

5.3 TERTIARY ACTIVITIES: 1991

This sector includes trade and commerce, transport and communication and other services, which is called as "White Collar Workers". Tertiary sector needs some educational qualification for the employment opportunities. The people engaged in tertiary activities are middle class as compared to the primary and secondary.

In 1991, the percentage of workers in tertiary economic activities in Kolhapur district was around 11.34 per cent. It varied from 6.91 per cent in Bavda to 15.91 per cent in Karvir Tahsil (Table-I). Proportion of male workers was lowest in Bavda tahsil Bavda

with 10.80 percent and highest in Karvir Tahsil with 20.34 per cent of working population.

Proportion of females in tertiary sector varied from 1.73 per cent to 7.11 per cent in Bavda and Hatkanangale Tahsil. This variation is observed because of the geographical and socio-cultural factors as well as level of urbanization in the respective tahsils.

5.4 AGRICULTURAL SECTOR AND NON- AGRICULTURAL SECTOR: 2001

Table- II depicts employment of women's in the organized sector by major agricultural and non-agricultural divisions during 2001. It is noted that in agricultural sector the highest share of women's employment was in cultivators and agricultural lab ours. Household industry workers and other workers in the service sectors are included in non-agricultural sector.

Table-II

The Kolhapur District

Agricultural Sector and Non- Agricultural Sector of 2001

Sr. No.	Tahsils	Agricultural Sector			Gaps between Gender	Non-Agricultural Sector			Gaps between Gender
		Total	Male	Female		Total	Male	Female	
1	Karvir	33.20	25.53	57.70	-32.17	35.04	38.65	23.49	15.16
2	Panhala	66.24	59.52	77.56	-18.04	18.22	21.49	12.72	8.77
3	Hatkanangale	36.53	30.57	59.89	-29.32	33.83	36.46	23.52	12.94
4	Shirol	60.04	58.12	64.56	-6.43	21.09	21.91	19.17	2.73
5	Kagal	69.73	64.30	77.56	-13.26	16.67	19.52	12.56	6.96
6	Gadhinglaj	71.43	61.86	85.38	-23.52	15.86	20.84	8.61	12.23
7	Chandgad	76.79	65.99	90.90	-24.91	12.79	18.56	5.25	13.30
8	Ajra	75.07	63.35	88.88	-25.54	14.00	20.18	6.72	13.47
9	Bhudargad	77.21	67.81	89.87	-22.07	12.64	17.81	5.68	12.13
10	Radhanagari	76.49	69.55	86.20	-16.66	13.28	17.07	7.97	9.10
11	Bavda	81.69	76.11	88.67	-12.56	10.19	13.23	6.39	6.83
12	Shahuwadi	72.27	67.85	78.36	-10.51	15.42	17.67	12.32	5.35
	District average	55.87	46.73	74.92	-28.20	23.63	28.16	14.18	13.98

Source: *http//www.censusindia.net*

In agricultural and allied occupations 74.92 per cent, women were engaged but in the non-agricultural sector, their participation is 14.18 per cent. The highest proportion of women workers was observed in agricultural and allied occupations. It is observed that, the overall status of female labor force participation rate during 1991-2001 declined by 93.73 per cent to 74.92 per cent in agricultural sector and increase by 6.27 per cent to 14.18 per cent in non-agricultural sector respectively. It means that the gaps between gender are reducing in non-agricultural sector in 2001 (13.98 per cent) than the 1991 (24.84 per cent).

5.5 DECADAL CHANGES IN 1981 AND 2001:

Table- III illustrates that the distribution of gender gaps in agricultural and non-agricultural sectors and change between 1991 and 2001. These changes in the above-mentioned variables have led to increase in agricultural sectors. It is noticed that changes between genders in agricultural sector are -24.84 per cent in 1991 and -28.20 per cent in 2001. Work participation rate is increased in agricultural sector because of the increase in absolute population of the study region. In non-agricultural sector, gender gaps have been reducing because of the educational attainment by the females.

Table-III

Changes between Gender in Agricultural and Non-Agricultural Sectors during Last Two Decades

Sr. No.	Tahsils	Agriculture Sector		Difference	Non-Agriculture Sector		Difference
		1991	2001		1991	2001	
1	Karvir	-27.23	-32.17	4.94	27.23	15.16	12.07
2	Panhala	-23.91	-18.04	-5.88	23.91	8.77	15.15
3	Hatkanangale	-32.10	-29.32	-2.79	32.10	12.94	19.16
4	Shirol	-18.90	-6.43	-12.47	18.90	2.73	16.17
5	Kagal	-20.23	-13.26	-6.97	20.24	6.96	13.27
6	Gadhinglaj	-21.15	-23.52	2.37	21.15	12.23	8.92
7	Chandgad	-19.02	-24.91	5.89	19.00	13.30	5.69
8	Ajra	-24.35	-25.54	1.19	24.35	13.47	10.88
9	Bhudargad	-23.59	-22.07	-1.52	23.59	12.13	11.45
10	Radhanagari	-22.09	-16.66	-5.44	22.09	9.10	12.99
11	Bavda	-13.89	-12.56	-1.33	13.89	6.83	7.06
12	Shahuwadi	-16.25	-10.51	-5.73	16.25	5.35	10.90
	District	**-24.84**	**-28.20**	**3.36**	**24.84**	**13.98**	**10.86**

Source: *http//www.censusindia.net.*

6.0 CONCLUSION:

It is concluded that the females are mostly engaged in primary activities such as the agricultural labour as well as cultivator. In Kolhapur district, the male workers (28.43 per cent) dominate in secondary sector of the economy. Nevertheless, proportion of persons engaged in secondary sector is very low as compared to the primary and tertiary sector. Proportion of persons engaged in tertiary activities is affected by the geographical and socio-economic factors, availability of educational facilities, and level of urbanization. This is the fact that Bavda tahsil has observed lowest proportion of persons engaged in tertiary sector and Hatkanangale tahsil has observed highest proportion of persons engaged in tertiary sector

The share of male and female population in agricultural sector was 68.89 per cent and 93.73 per cent respectively. Most of females were engaged in agricultural sectors such as cultivators and agricultural labors. Majority of people are engaged in agricultural sector as compared to the non-agricultural sector. Great deal of inter tahsils variation ranging from -13.89 per cent to -32.10 per cent in agricultural sector and 13.89 per cent to 32.10 per cent in non-agricultural sector was observed in Bavda and Hatkanangale tahsils.

In agricultural and allied occupations, 74.92 per cent women were engaged but in the non-agricultural sector, 14.18 per cent female population was engaged. The highest proportion of female workers was observed in agricultural and allied occupations. It is observed that the participation rate of female labor force is declined by 93.73 per cent to 74.92 per cent in agricultural sector, during 1991-2001. Non-agricultural sector has noticed increase in participation rate of female labor force by 6.27 per cent to 14.18 per cent during the same period. It means that the gaps between gender are reducing in non-agricultural sector in 2001 (13.98 per cent) than the 1991 (24.84 per cent).

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'A STUDY OF FUNCTIONAL ANALYSIS OF PILGRIMS IN AKKALKOT- A GEOGRAPHICAL APPROACH'

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ABSTRACT

Tourism is an important industry in the world. It attracts people for various purposes. Pilgrimage is one of the important aspects of modern day tourism. The institution of pilgrimage in the form of Tirth-Yatra, has its roots in the country's civilization and tradition. Fortunately, the town has been the principle seat of religious learning and pilgrimage since long. The devotees believe that Shree Swami Samarth Maharaj, the 4 th Avatar of Shree Lord Dattatraya fulfills the wishes of the people who have been regularly visiting the place. Akkalkot is one of the important pilgrim tourist centers of Solapur District in Maharashtra. Man always fulfils his desire with some activities for specific purposes, which are reflected in functional characteristics of the activities. This is validated by examining the case study. Therefore, the present paper attempts to analyze the forms of functional attributes of this town with the help of statistical techniques.

Key-Words:-*Pilgrimage, pilgrim tourist, Tirth-yatra, function*

1.0 INTRODUCTION:

India possesses a rich and diverse range of unique tangible and intangible cultural, natural and cultural tourism resources, many of which are world class in quality and located in rural areas (National tourism Policy-2002). It means that there are strong potential resources to encourage the International Tourism. In the year 2002, 2.64 millions foreign tourists were arrived in India. On the other hand, India's share of domestic tourism was 210 millions in the same year. Therefore, Center and State Government decided to give more importance to domestic tourism, particularly tourism connected with pilgrimage, which constituted fifty percent share of domestic tourism.

Akalkot is one of the religious tourist centers in the Solapur district of Maharastra State. The devotees believe that Shri Lord Dattatraya fulfills the desires of the people, who have regularly visiting the place. Recently the Government of Maharastra declares Akalkot as a pilgrim center. However, any regional planner or geographer through the tourism point of view does not evaluated Akalkot. The present paper tries to investigate the functional attribute of pilgrim center.

2.0 OBJECTIVE:

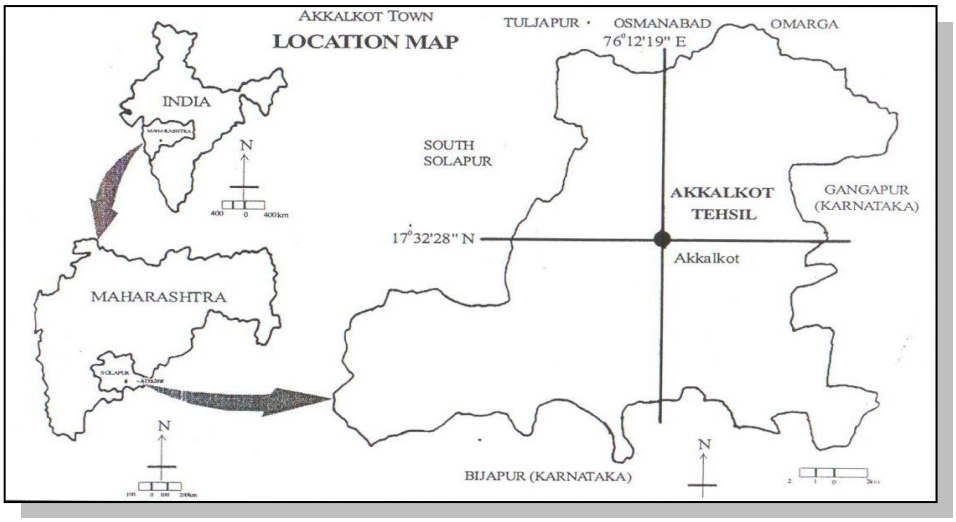
The main objective of the present research paper is to highlight the various functional attributes of the pilgrims in Akalkot.

3.0 THE STUDY REGION:

Akkalkot once upon a time had a historic importance but now it has become merely a religious place in Solapur District. It is situated on 17°32' north latitude and 76°15' East longitude having the altitude of 451.10 meters above the mean sea level (Fig. 1.1). It occupies an area about 4.42 sq. km. Akkalkot is located 42 Km. away from

Solapur by road. The town is having number of educational institutes, agricultural market centers and various Commercial banks. From 1981 to 2001, the net increase of 4.82 percent is recorded under tertiary sector.

The Akkalkot town
Location Map



4.0 DATA BASE AND METHODOLOGY:

The data for the present study is obtained through the questionnaire, which were filled by the pilgrims, at the selected places viz. Bhatk-Nivas, Murlidhar Mandir, Temple site, Shri Swami Samarth Annachhatra Madal Nivas. Total 620 pilgrims were interviewed during December, 20010-May 2011. With the views of the pilgrims residence, profession, income-level, purpose of visit, age, mode of transport etc. information was collected. Collected data have been tabulated andpresented in the form of figures. Appropriate statistical techniques have been employed.

5.0 DISTRIBUTION OF PILGRIMS (2010):

5.1 SPATIAL DISTRIBUTION OF PILGRIMS:

The study of spatial distribution of pilgrims helps to understand the nature of flow of pilgrims from various parts of the country. Table No. 1 gives an idea about the state wise distribution of pilgrims. It clearly reveals from Table-I, that the pilgrims who visited the town are generally come from Maharashtra (80.64 per cent), Karnataka (7.26 %), Gujarat (4.35 %), and Madhya-Pradesh (3.23 %) and Goa (0.52 %).

5.2 DIVISION-WISE DISTRIBUTION OF PILGRIMS:

Table-I shows the administrative division wise distribution of pilgrims within the state. Pune division has the highest percentage of pilgrims (46%), followed by Mumbai (21%), Aurangabad(16.8%), Nashik (12.8%), Amravati(2.2%) and Nagpur(1.2%). Study

clearly reveals that distance traveled as a measure determinant in the mobility of the pilgrims visited to Akalkot.

Table-I

The Akkalkot Pilgrimage

State and Administration wise Division of pilgrim

Sr. No.	State/Administrative Div	Pilgrim in Numbers	Percentage
1	Maharashtra	500	80.64
2	Karnataka	045	7.26
3	Gujrat	027	4.35
4	Madhya Pradesh	020	3.23
5	Andhra Pradesh	014	2.26
6	Goa	014	2.26
Administrative Division			
1	Pune	230	46.0
2	Mumbai	105	21.0
3	Aurangabad	84	16.8
4	Nashik	64	12.8
5	Amarawati	11	2.2
6	Nagpur	06	1.2
	Total	620	100.0

Source*: Field Work (2010)*

5.3 DISTRIBUTION OF PILGRIMS BY OCCUPATION (2002):

Table-II reveals that maximum pilgrims belong to service sector (35.48%) followed by business (20.32%) and Non-agricultural sector (21.12%). The share of the pilgrims who retired from government service was only 2.56 per cent. Thus as a whole pilgrims belongs to various types of occupation.

5.4 EDUCATIONAL QUALIFICATION OF PILGRIMS:

The Educational qualification of pilgrims helps to understand the nature of gathering. Table-II reveals that pilgrims visited Akkalkot according to education status. Percentage of illiterate pilgrims visited to Akkalkot was only 2.41, percentage of pilgrims belongs to primary, secondary and higher education status were 4.04, 39.04 and 46.45 respectively. It is found that there is positive correlation ship between the educational status of pilgrims and the intensity of visiting the pilgrimage. It means that mobility of the pilgrims strongly depends upon educational status.

Table-II
The Akkalkot Pilgrimage
Distribution of pilgrims according to Socio- Economic & Cultural Determinants

Sr. No.	Socio-Eco. cultural Determinate	Groups	Pilgrims	
			In Nos.	In Percentage
1	Education	1) Illiterate	15	2.41
		2) Primary	25	4.04
		3) Secondary	242	39.04
		4) Higher	288	46.45
		5) Technical	050	8.06
2	Occupation	1) Agriculture	96	15.48
		2) Business	126	20.32
		3) Services	220	35.48
		4) Others	162	26.12
		5) Retired	16	2.56
3	Income	i) Low (Rs.20,000 or less)	164	26.45
		ii) Middle (20,000 - 60,000)	239	38.54
		iii) Upper middle (60,000-80,000)	104	16.77
		iv) Higher (Above 80,000)	113	18.24
4	Age wise	i) Below 18	13	02
		ii) 18-60	572	92
		iii) Above 60	35	06
5	Visiting Period of pilgrims	Visiting Period		
		1) Holiday	437	70.5
		2) Punnyathi	30	4.8
		3) Prakat Din	20	3.2
		4) Datta Jayanti	10	1.6
		5) Above three	29	4.7
		6) Pandharpur Fair	55	8.9
		7) Gangapur Fair	15	2.4
		8) Adik Mass	24	3.9
6	Transportation Mode	Mode of Travel		
		1) Govt. Bus (M.S.R.T.C.)	296	47.74
		2) Railways	34	5.48
		3) Bus & Railways	54	8.74
		4) Self Vehicle	100	16.15
		5) Rented Vehicle	136	21.93
		Within the Town		
		1. Pedestrains	316	51.0
		2. Auto Rickshaw	146	23.6
		3. Self Vehicle	28	4.5
		4. Rented Vehicle	22	3.5
		5. MSRTC Bus	108	17.4

Source: *Field Work [2010]*

5.5 INCOME-WISE DISTRIBUTION OF PILGRIMS (2010):

The study of income group shows the financial position of the pilgrims. It is observed that the pilgrims of low and middle-income groups were mostly attended pilgrimage. Study also reveals that 26.45 per cent of total pilgrims have from low-income group. Share of pilgrims having the middle-income group was the lowest. It is found that pilgrims from middle-income group are more urge for traveling.

5.6 AGE - WISE DISTRIBUTION OF PILGRIMS:

Table-II reveals that out of total pilgrims 92 per cent pilgrims belongs to young and middle age group, while 6 percent pilgrims belong to age group of above 60 years and only 2 percent pilgrims belongs to the age of below 18 years.

5.7 VISITING PERIOD OF PILGRIMS:

It is observed that there are different periods of visiting to Akkalkot (Table- III). It is found that during holidays maximum pilgrim (70.5 %) visited Akkalkot followed by Pandharpur fair (8.9 %), Swami Punnyatithi (4.8 %), Adikmass (3.9 %), Swami Prakat Din (3.22 %), Gangapur fair (2.4 %) and Datta Jayanti (1.6 %). The pilgrim belongs to Datta Panth generally visited to Akkalkot at the time of Praskat Din and Datta Jayanti every year and share of them was 9.6 percent. Before the 1985 pilgrims who were visited Pandharpur fair, were not visited Akkalkot but after 1985 pilgrims were started to visited Akkalkot. Today percentage of such pilgrims goes up to 8.9 per cent. Same Pattern is observed in the case of pilgrims who were visited Gangapur fair. Now percentage of pilgrims who visited south Gangapur and Akkalkot destination is 2.4.

5.8 DISTRIBUTION OF PILGRIMS BY MADE OF TRAVEL (2010):

Since independence there has been two ways to travel, one is Maharashtra State Transport Corporation and second is Railway. After technological development in transport network, drastic change has been took place. The flow of pilgrim at any destination totally depends upon the nature and mode of transportation available to them.

Table-II reveals that State Government (MSRTC) Buses carried highest (47.7 %) pilgrims from all over the Maharashtra to Akkalkot, followed by rented vehicle (21.93 %) self vehicle (16.15 %), Government buses and railway (8.70 %) and (5.8 %) respectively. This is because Akkalkot road railway station is just 11 km. away from town and very few train senates are available at this destination. It is too noteworthy that contribution to rented vehicle is highlighting because of improvement in transport service. It also saves time and money of pilgrims.

5.9 MODE OF TRAVEL IN THE TOWN:

The table-II gives an idea about the mode of travel of pilgrims in the town. It reveals the fact about the mode of travel in the town and its relation to boost the local economy. During period of study 50.96 per cent, pilgrims were pedestrians. By Auto Rickshaws 23.54 per cent pilgrims were traveled, in the town. 8.05 per cent pilgrims visited Akkalkot by either their own or rented vehicles and a very few long route buses rendered their services up to main temple and share of such mode of travel was 17.41 per cent.

5.10 PURCHASE OF DEVOTIONAL GOODS AND ARTICLES:

The Pilgrims who were visited Akkalkot purchased various types of devotional goods and articles. The table- III gives an idea about the purchasing capacity of pilgrims.

Table - III

The Akkalkot Pilgrimage

Devotional Goods and Ariticles Purchased (2010)

Sr.No	Purchasing level in Rs.	Actual no. of Pilgrims contracted	% of Total
1	Upto Rs. 10	95	15.3
2	11 – 25	135	21.8
3	26 – 50	121	19.5
4	51 and above	296	43.5

Source: *Fieldwork (2010)*

It reveals form the table- III that the purchase of devotional goods by pilgrims ranges from Rs. 10/- to Rs. 51/- and above per head. It is found that 15.3 per cent pilgrims purchased devotional good and articles having value of Rs. 10/- only. 21.7 per cent pilgrims have purchased articles and goods having values up to Rs. 11 to 25 while 43 per cent pilgrims spent more than Rs. 51 for purchasing devotional goods and articles. Capacity of pilgrims was positively corrected with the income level of the pilgrims.

1.0 CONCLUSION:

Tourism industry is one of the fastest growing industries in the world. India is now holding the significant position in the tourism industry. India holds more than 50 per cent. of pilgrimage tourism. Akkalkot is one of the pilgrim centers in the state. The present study based on questionnaire survey of 620 pilgrims. Out of 620 pilgrims, 80.64 percent pilgrims from state itself and it followed by Karnataka and other states. After making detail investigation of pilgrims flow within the state , Pune division shares 46 per cent visit during vacation and the pilgrims belong to educated and in the private-public service sectors having middle income group. These pilgrims use to travel by government bus and rented vehicles. A positive correlation between income group and purchasing power and their length of stay is noticed in the town

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'SOCIO-ECONOMIC IMPACTS OF FLOOD DISASTER IN UPPER KRISHNA BASIN: A CASE STUDY OF VILLAGE PUNDI (TAL. PALUS, DIST. SANGLI, MAHARASHTRA)'

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ABSTRACT

Natural hazards, which damage national economy and produce hardships for large sections of population, are one of the single largest concerns for most nations. Socio-Economic environment is always influenced by natural hazards in general and by Floods in particular. The low-lying villages and villages lying on the banks of the Krishna River in the Sangli district get inundated at the times of floods. The village Pundi is one of the most severely flood affected villages and it lies on the left Bank of River Krishna. The major objective of the present research paper is to analyze the socio-economic impacts of flood disaster took place in the year 2005 and 2006.

The present research paper is based on both primary as well as secondary data. The related primary data is collected through intensive fieldwork, during post flood period. The collected data tabulated and presented by appropriate cartographic techniques. The study reveals that the flash floods occurred during 2005 and 2006 worst affected on the social and economic condition of the village. In the year 2005, a number of crops contained in 138 hectares agricultural land were damaged by the flood. While in the year 2006, 122 hectares of cropped area were damaged by the flood disaster. In spite of this, livestock, shops and households were also affected by the flood disaster during both years.

Key Words: *Natural Hazards, Flood Disaster, Socio-Economic, Floodwater, SOI topographical maps, Devastating, Chemical Fertilizers, Natural Flushing and saltation.*

1.0 INTRODUCTION:

Natural hazards, which damage national economy and produce hardships for large sections of population, are one of the single largest concerns for most nations. Human settlements have frequently affected by natural hazards such as Floods, Earthquakes, Hurricanes, Cyclones, Landslides, Volcanic eruptions, which takes a heavy toll on human lives, destroy buildings and infrastructure and have for reaching economic and social consequences for communities *(Randhir Singh Sangwan, 1999).* Socio-Economic environment is always influenced by natural hazards in general and by Floods in particular. India faces flood problems every year in one or other parts, and about 12.5 per cent of its geographical area comes under floodwater *(Gautam, Alka, 2007).* Maharashtra in general and the Sangli District in particular are affected by the floods in the recent years (Patil, Sardar A. and Gatade, D. G., 2007). The low-lying villages and villages situated on the banks of the River Krishna in the Sangli district inundated at the times of floods *(Government of Maharashtra, 1972).*

2.0 STUDY REGION:

The village Pundi is one of the most severely flood affected villages of the Palus tehsil. It is situated on 17^0 04' 01.44" North latitude and 74^0 22' 02.40" East longitude. The altitude of the Pundi from MSL is 546 meters to 559 meters. It lies on the left Bank of River Krishna *(http://www.earth.google.com) (Fig. 1).*

The Sangli District

Location Map

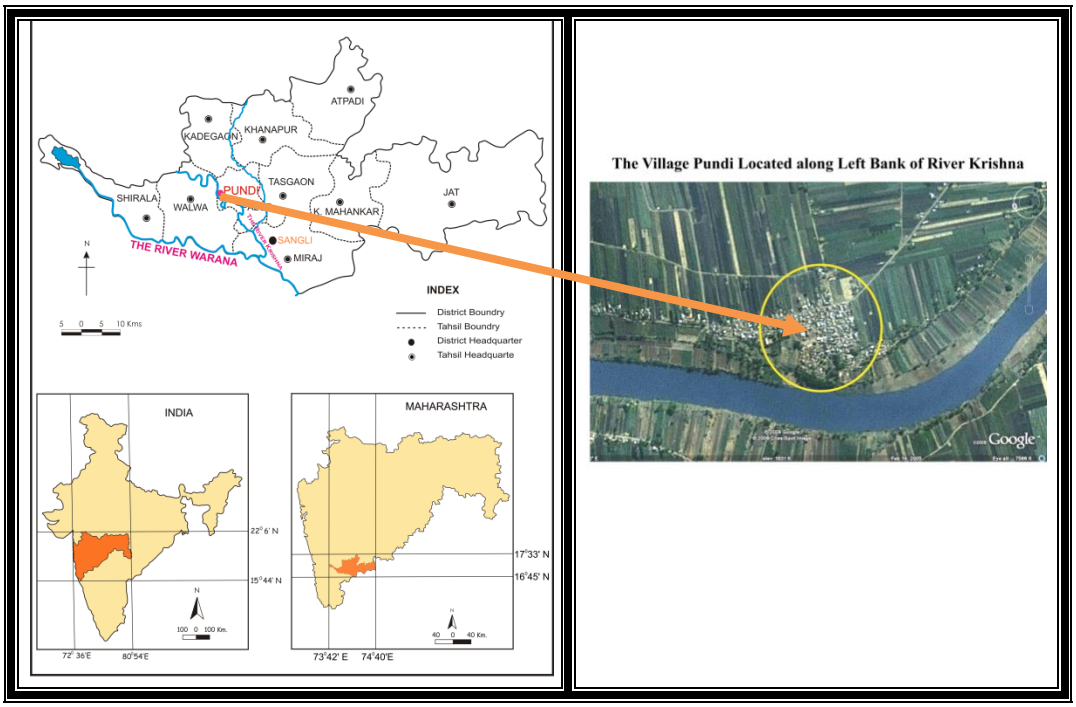

Fig. 1

3.0 OBJECTIVES:

The present study has addressed the floods of the year 2005 and 2006 faced by the Sangli district, especially experienced by the Village Pundi of Palus tehsil. The main objective of the present study is to analyze the socio-economic impacts of flood disaster occurred in the year 2005 and 2006. However, specific objectives are-

1. To assess social impacts of floods occurred during 2005 and 2006 in the study region.
2. To study impacts of the flood disasters on agriculture, transportation facilities, shops and kiosks as well as agricultural labors.

4.0 RESEARCH METHODOLOGY:

The present research paper is based on both primary as well as secondary data. However, primary data is the main source to meet the objectives of the study. Therefore, the correlated data has collected by conducting intensive fieldwork, during post flood period. . The stratified sampling method has used for the selection of households to collect the data related to impacts of the flood disaster of the year 2005 and 2006. The schedule has used for this purpose. During the field investigation, observation method as well as informal personal communications with some persons has made for the purpose of verification of data provided by other persons. The Google Earth Satellite Imageries have used for the understanding topography, collection of data and analysis of the data. Other related secondary data has collected through SOI topographical maps, books, journals, newspapers and several websites etc. that has specified under the heading of the references.

After the collection of primary and secondary data, it has processed. The processed data tabulated and presented in the form of charts and diagrams.

5.0 CONSEQUENCES OF THE FLOOD DISASTER:

Flooding is the most common environmental hazard; due to the wide spread geographical distribution of river valleys and coastal areas and attraction of human settlements to these areas *(Kewalramani, Gita, 2006).* Flooding has occurred in certain parts of country and thus flood is an oldest phenomenon in India *(Singh, Mahendra, 2008).* The flooding always occurs in the deltaic part of the river Krishna. However, this was not a usual phenomenon in the upper Krishna basin, particularly Sangli District. Recently, especially during 2005 and 2006 the flood disaster occurred in the region was unexpected and prolonged.

Upper Krishna basin in general and Sangli district *(http://www.maharashtraonline/asp/url/Sangli/himl/)* in particular experienced devastating flood situation during July 26 to August 8, 2005 and during July 28 to August 13, 2006. In the Palus tahsil the village Pundi had worst affected by the Flood. The highest floodwater level at Pundi recorded during 2005, it was 553.690 metres from M. S. L. whereas the danger level of floodwater is 552.400 metres, and warning level of floodwater is 550.490 metres from Mean Sea Level.

5.1 IMPACT OF FLOOD ON AGRICULTURE:

In the village Pundi, 491 farmers affected by the flood in the year 2005 and 456 farmers had affected by the flood in the year 2006, directly. They had loosed crops of an area 138.44 hectares and 125.63 hectares of cropland in the year 2005 and 2006

respectively. In the village, sugarcane is the major cash crop this was the basis of higher amount of economic loss because of flood disaster in the village during both years (Table- I) (Photo Plate).

Table- I
The Village Pundi
Flood Affected Cropland (2005 and 2006)

Sr. No.	Crops	Flood Affected Crops (area in hectares)			
		2005		2006	
		Loss Below 50%	Loss Above 50%	Loss Below 50%	Loss Above 50%
1.	Sugarcane	25.49	51.22	30.03	26.33
2.	Soyabean	8.4	15.96	4.3	13.75
3.	Groundnut	-	5.89	--	4.99
4	Rice	0.26	1.00	--	1.89
5	Other Crops	9.34	20.88	19.46	22.30
6	Total	43.49	94.95	53.79	69.26

Source: *Final Flood Report (2005-2006): Pundi Tarf Walva, Talahti Office.*

The village Pundi suffered by the loss of crops like sugarcane, rice, Soyabean, groundnut and other crops which includes cotton, turmeric, vegetables, maize etc. The loss of sugarcane is marked one and it was 76.71 hectares during 2005 and 66.36 hectares during 2006. After sugarcane, Soyabean was the severely affected crop by the flood disaster. The area under Soyabean affected by the floodwater was 24.36 hectares and 18.05 hectares in 2005 and 2006 respectively. The area of groundnut affected by the floodwater was 5.89 hectares in the year 2005 and 4.99 hectares in the year 2006. Rice was the minor crop affected by the flood. The Table- I demonstrates the loss of various crops occurred due to the flood in both years.

5.2 IMPACT ON LIVESTOCK:

No direct loss of the livestock had found in the village but the livestock had suffered by the scarcity of the fodder for more than three to four months. The some selected farmers responded that unavailability of the fodder affected on milk production indirectly.

5.3 IMPACT OF FLOOD ON HOUSES AND HOUSEHOLDS:

In the village Pundi, 448 households had affected by the devastating flood in the year 2005. Out of total affected households, 34 households with 195 persons had absolutely affected by the flood. They had loosed cloths, pots, food-grains and other material Viz., T. V. and Radio. By the flood, 175 households along with 1050 persons partially affected and they had loosed their valuable material in partial manner. Despite, 239 houses were inundated by the floodwater. In the year 2006, 28 households had utterly affected by the flood disaster and near about 169 households had partly affected (Photo Plate 1).

In the village Pundi, houses had only partially affected by the flood disaster. There were 20 houses partially affected by the flood disaster. Out of that, some houses got crack to the wall and some houses experienced totally collapse of walls.

5.4 IMPACT ON SHOPS AND OTHER ECONOMIC ACTIVITIES:

In the village because of flood disaster, four shops affected and their loss in terms of money was more than Rs. 2, 50,000. However, they had compensation grant of Rs. 22,000 only. The village Pundi has the well-developed milk collection system and the daily collection of milk was on an average 1600 liters during flood period. The transportation system collapsed for more than seven to eight days in both years. Thus, the loss through milk production was of Rs. 4, 80,000/- collectively. Near about thousands of tons of chemical fertilizers had damaged by the flood of the year 2005 (Photo 2)

The flash floods of both years' most awful affected on the agricultural workers that they did not get employment for more than two months after the flood recede in both years.

5.5 IMPACT OF FLOOD ON HEALTH:

Strength of human body had affected by the flood disaster. In the village Pundi, 715 persons suffered by various diseases because of explosive flood in the year 2005. Out of the total affected population, 300 persons suffered by fever, 7 persons suffered by Diarrhea, 25 persons suffered by dysentery and remaining 383 persons suffered by sundry diseases.

In the year 2006, total persons suffered by the various diseases was very less because the attention was given to precautionary measures. The persons suffered by the fever, Diarrhea, and sundry diseases were 73, 3 and 215 respectively.

5.6 IMPACT ON BASIC FACILITIES:

In the study region the flood of the year, 2005 and 2006 affected on the basic facilities and basic needs of human's like food and water. Due to unexpected nature of flood, storage of food had totally damaged by the floodwater. The scarcity of drinking

water is also foremost. In the study region, the drinking water facility of 71 villages had collapsed by the floodwater. This is the reason that many water born diseases were took place during flood in both years.

Photo 1 : Sugarcane crop was damaged by the flood water in Village Pundi

Photo 2 : Houses inundated by the flood water in Village Pundi

Photo 3 : Chemical Fertilizers damaged due to flood water during 2005 in the village Pundi

Photo Plate-1

5.7 POSITIVE IMPACTS:

The beneficial effects of floods have established beyond doubt. It fertilizes the flood plain by siltation causes flushing of the drainage arteries. Soil moisture initiates a renewed healthy ecosystem of the area. The fertilization of the land by floods has stressed by Mukharjee who considered the flood prone areas as the tract of civilization in case of Bengal delta. It is based on the fieldwork carried out by the researcher and response from the farmers, the Village Pundi has beneficial effects, which overcome on negative effects. The following are the major positive consequences appeared in the study region.

1. This has investigated at the time of fieldwork that the floods of the year 2005 and 2006 acted as the natural flushing process of the River Krishna.
2. Floods are the most vital fertilizing agent of flood plains. In the study region, about 100 farmers given response that there is siltation in the field, between four cm. to thirty cm. They further noted that the siltation of the field by the flood enriched the soil tremendously and it boosted up the agricultural productivity in the subsequent years.
3. Floods are acting as a natural process of mitigating the problem of saltation. Farmers gave response that these two floods helped to remove salts from the land and helped to improve quality of soil.
4. The nourishment of water table is also an important positive impact of flooding in the study region.

6.0 CONCLUSION:

The flood-disaster is one of the natural disasters, which affects on socio-economic conditions of the society. The floods occurred in the upper Krishna basin in the year 2005 and 2006 was one of the worst floods in the known history of the river basin. The socio-economic condition of village Pundi had horribly affected by the flood disaster in the year 2005 and 2006. In the year 2005 and 2006, 491 farmers and 456 farmers had directly affected by the flood, respectively. They had loosed the crops of worth Rs. 75 lakhs in the

year 2005 and Rs. 58 lakhs in the year 2006. The flood disaster terribly affected on transportation facilities, shops and kiosks, milk production, basic facilities of the village, livestock of the village, houses and households etc. The loss in terms of money was more than rupees ten million. The village had also noticed health problems during the flood period. Like negative socio-economic consequences, positive consequences are also observed in the study region. They are- increase in the fertility of the land, increase in the ground water level and mitigation of the problem of saltation.

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'SPATIAL PATTERN OF SEX RATIO IN AHMEDNAGAR DISTRICT OF MAHARASHTRA'

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ABSTRACT

Study of the population deals not only with the population size and growth but also with the composition. Sex composition is one of the most significant physical and qualitative aspects of population. The sex composition reflects the nature of economy and society. It also focuses on the status of women in the society. Sex ratio is an index of the socio-economic condition prevailing in an area and is useful for regional analysis. In study region, there are remarkable inequalities in sex ratio. For present study, tahsil is selected as a basic unit of investigation. The period selected for the present study is two-decade (1991-2001).The secondary data is the main source for the present research paper.

In the present research paper, an attempt has been made to analyze the spatial patterns of sex ratio over the period. The main objective of the present research paper is to find out the causes of gender inequalities and suggest the remedies for balanced development of the region. For the calculation of sex ratio following equations are used.

1. $GSR = \frac{\text{Total No. of females}}{\text{Total No. of Males}} * 1000$

2. $CSR = \frac{\text{Total No. of Girls below 6 years}}{\text{Total No. of Boys below 6 years}} * 1000$

The study reveals that, in the study region, it has noticed that very abruptly decrease in child sex ratio (0-6 years). All the tahsils denotes negative change in child sex ratio (0-6 years) in 2001 Census. Sex selective abortion, infanticide and neglect of girl child in society these are the some of the causes of decline in sex ratio. The decline in overall sex ratio in general and child sex ratio in particular will create very serious social problems in near future.

Key Words: *Sex Composition, Sex ratio, Child sex ratio, Changes of sex ratio, Spatial Pattern.*

1.0 INTRODUCTION:

Population geography is one of the advanced and distinct branches of human geography. Study of the population deals not only with the population size and growth but also with the composition. Sex composition is one of the most significant physical and qualitative aspects of population. The sex ratio is defined as the number of females per 1000 males. The sex composition reflects the nature of economy and society. It also focuses on the status of women in the society. Sex ratio is an index of the socio-economic condition prevailing in an area and is useful for regional analysis (Franklin, 1956).

In India, there are more males than females. The number of females per thousand males has been declining and it was 933, according to 2001 census. Maharashtra has also less proportion of females (922) per thousand males. High female mortality at childhood, lower status of women in society, sex selective migration, extent of urbanization, non-availability of medical facilities, sex selective abortions, infanticide etc., are major factors influencing on the sex ratio.

Recently, many geographers have studied sex ratio from different point of view (Franklin,1956; Saville,1957; Clarke,1960; Gosal,1961) at macro and meso level but very

few geographers have made an attempt to study the sex ratio at micro level. Hence, here an attempt has been made to study the problem at micro level.

2.0 THE STUDY REGION:

For the present research paper Ahmednagar district is selected as a study region. Ahmednagar district is situated in central part of the Maharashtra state and extended somewhat in the Upper Godavari and Bhima basin. It lies between 18^{O} 2′ and 19^{O} 9′ north latitudes and 73^{O} 9′ and 75^{O} 5′ east longitudes. Nashik and Aurangabad districts to the north, Beed and Osmanabad districts to the east, Solapur and Pune districts to the south and Pune and Thane districts to the west bound the Ahmednagar district. Topographically the district can be divided in to three parts i.e. the Sahyadri ranges, the plateau region and the two main basins.

The climate of the district is generally hot and dry, except during southwest monsoon season. The average annual rainfall in the district is 502 mm. The district mostly lies in the rain shadow to the east of the Sahyadri Mountain. The soil of study region can broadly classified in to three groups such as, black, red and laterite soil.

The Ahmednagar District

Location Map

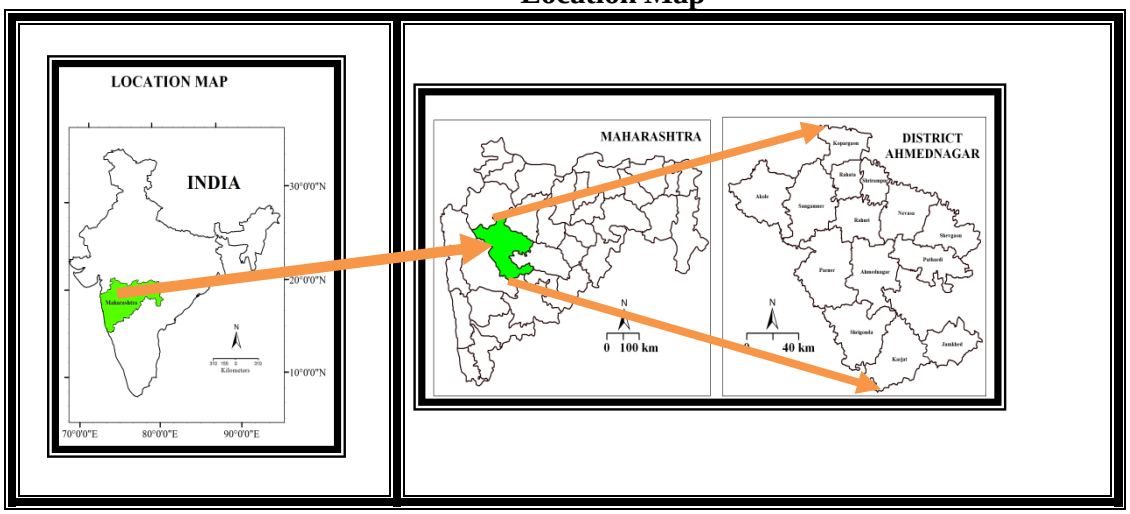

Fig. 1

3.0 **OBJECTIVES:**

1. To analyze the spatial patterns of sex ratio in the study region.
2. To find out the causes of gender inequalities in the study region.
3. To suggest comprehensive plan for balanced development of the region.

4.0 RESEARCH METHODOLOGY:

In the present research paper, tahsil is selected as a basic unit of investigation. The period of 1991-2001 is used for the temporal analysis of the sex ratio. The present study is based on secondary data, which is collected form Socio–Economic Review and District Statistical Abstract of Ahmednagar, Census of India, Census Handbook of Maharashtra as well as Ahmednagar District and District Gazetteer. Despite some data have been

collected from various published and unpublished sources, which are explained under the heading of references.

The collected data is processed and presented in the form of tables and graphs. For the analysis of data, appropriate quantitative and cartographic techniques are applied. Sex ratio is computed by using following equations.

$$1.\quad GSR = \frac{\text{Total No. of females}}{\text{Total No. of Males}} * 1000$$

$$2.\quad CSR = \frac{\text{Total No. of Girls below 6 years}}{\text{Total No. of Boys below 6 years}} * 1000$$

Where,

GSR = General Sex Ratio and

CSR = Child Sex Ratio.

5.0 SPATIAL PATTERN OF SEX RATIO IN GENERAL (1991- 2001):

5.1 GENERAL SEX RATIO IN 1991:

According to 1991 Census, an average sex ratio of the district was 949 females per thousand males. Sex ratio was highest in Parner tahsil and lowest in the Nagar tahsil and it was 1017 and 912 respectively. Due to improvement in medical facilities, in 1991, low sex ratio (below 950) was observed in Rahuri, Shrirampur, Nevasa, Karjat, Shrigonda and Nagar tahsil, while Shevgaon, Pathardi, Jamkhed, Sangamner and Kopargaon tahsils shows moderate (950-1000) and it is above the district average sex ratio. According to 1991 Census, six tahsils had low sex ratio (46.15 %),) five tahsils had moderate sex ratio (38.46 %) and remaining two tahsils had high sex ratio (15.38 %).

5.2 GENERAL SEX RATIO IN 2001:

An average sex ratio of the district was 940 females per thousand males, according to 2001 Census. In 2001, lowest sex ratio, i.e. 901 females per thousand males, was observed in Nagar tahsil. Male dominance immigration from other tahsils, industrial development, availability of educational and health facilities these are the some of the important causes of lowest sex ratio in the tehsil. Highest sex ratio was recorded in Parner tahsil i.e. 988 females per thousand males. It was caused because of less development in tahsil and mostly male out migration for job and education.

The tehsils like Nagar, Rahuri, Shrirampur, Nevasa, Jamkhed, Karjat, Shrigonda, Sangamner, Kopargaon and Rahata observed low sex ratio(below 950). Except Shrirampur (949) and Jamkhed (949) all above mentioned tahsils show lower sex ratio than district average. Moderate sex ratio (951-975) was observed in Akole (996) Shevgaon (953) and Pathardi (951) tehsils. All the tehsils, except Shrirampur, show decline in sex ratio in 2001 as compared to 1991 census.

6.0 SPATIAL PATTERNS OF CHILD SEX RATIO (0-6 YEARS): (1991-2001)

6.1 CHILD SEX RATIO IN 1991:

Average child sex ratio (0-6 years) of Ahmednagar district was 949 girls per thousand boys in 1991. The Kopargaon and Akole tahsils had recorded very low and very high child sex ratio respectively. In the study region tahsils like Nagar, Shrirampur, Shevgaon, Jamkhed, Karjat, Shrigonda Sangamner, Kopargaon show low child sex ratio (below 950). Moderate (951- 975) child sex ratio (0-6 years) was observed in Rahuri, Nevasa, Pathardi, Parner tahasils and high child sex ratio (above 975) (0-6 years) was observed in only Akole tahsil (986).

Low child sex ratio was recorded due to mostly agricultural development, industrial development, spread of agro based industries especially sugarcane industries, economic development, high per capita income, relatively more availability of health facilities and more preference given to male child.

6.2 CHILD SEX RATIO IN 2001:

According to 2001 Census, on an average, 917 child sex ratio (0-6 years) was recorded in the study region and it was lower as compare to Maharashtra state average. As compare to 1991 Census, in 2001 Census child sex ratio (0-6 years) was declined very fast and except Akole tahsil all the tahsils showing child sex ratio below 900.

Table-I
GENERAL AND CHILD SEX RATIO IN AHMEDNAGAR DISTRICT (1991-2001)

Sr. No.	Name of Tahsil	GSR* 1991	GSR* 2001	Change** **(1991-2001)**	CSR* 1991	CSR* 2001	Change** (**1991-2001)**
1	Nagar	912	901	-11	946	860	-86
2	Rahuri	943	934	-9	970	869	-101
3	Shrirampur	941	949	+8	938	877	-61
4	Nevasa	945	937	-8	953	872	-81
5	Shevgaon	954	953	-1	950	897	-53
6	Pathardi	957	951	-6	954	892	-62
7	Jamkhed	955	949	-6	942	893	-49
8	Karjat	939	933	-6	936	891	-45
9	Shrigonda	949	939	-10	946	876	-70
10	Parner	1017	988	-29	956	897	-59
11	Akole	996	974	-22	986	951	-35
12	Sangamner	953	945	-8	949	893	-56
13	Kopergaon	939	929	-10	933	885	-48
14	Rahata	-	938	-	-	863	-
	Total	949	940	-9	949	887	-62

**Source: ****Computed by authors*

** Census of India, District Census Handbook, Ahmednagar District 1991, 2001*

The Akole (951) and Nagar (860) tahsils had recorded highest and lowest child sex ratio (0-6 years) respectively. Low child sex ratio (below 875) is observed in tahsils

like Nagar, Rahata, Rahuri and Nevasa and it was 860, 863,869 and 872 girls per thousand boys respectively. Moderate child sex ratio (876-900) was observed in the tahsils like Shrigonda (876), Shrirampur (877), Kopargaon (885), Karjat (891), Pathardi (892), Sangamner (893), Jamkhed (893), Shevgaon (897), Parner (897) tahsils.

7.0 CHANGE IN GENERAL AND CHILD SEX RATIO (0-6 YEARS): 1991-2001

7.1 CHANGE IN GENERAL SEX RATIO (1991-2001):

It is observed that, except Shrirampur remaining all the tahsils shows negative Change in general sex ratio. Lowest decrease has found in Shevgaon tahsil (-1) while highest decrease has recorded in Parner tahsil (-29).

A. High changes (Above 20)

High negative changes (above 20) in general sex ratio has been observed in Parner (-29) and Akole (-22) tehsils. Highest negative change in Akole tehsil was recorded due to relatively low literacy, inadequate medical facilities and tribal population. But in Parner tahsil it was due to more male out migration than female.

B. Moderate change (Between 11-20)

Moderate negative changes (11-20) exist in Nagar tahsil (-11). Economic development, higher industrialization, higher proportion of rural to urban migration, higher level of literacy and health facilities and pre-sex determination, are the some of the causes of medium decrease in general sex ratio.

C. Low Change (Between 6-10)

Low negative changes (6-10) in general sex ratio has been observed in Shrigonda (-10), Kopargaon (-10), Rahuri (-9), Rahata (-9), Sangamner (-8), Jamkhed (-6**),** Pathardi (-6) and Karjat (-6) tehsils. Irrigation development, agricultural development, industrialization, higher level of literacy pre-sex determination and standard of living these are the some of the causes of low negative change in the sex ratio.

D. Very low change (Below 5)

Very low negative changes in general sex ratio (below 5) has been observed in Shevgaon tahsil (-1) only because small development in all basic facilities and highest proportion of out migration for education and employment.

7.2 CHANGE IN CHILD SEX RATIO (0-6 YEARS) IN (1991-2001):

It is observed that child sex ratio (0-6 years) was decreased in all the tahsils and district also. Lowest negative change in child sex ratio (0-6 years) was found in Akole tahsil (-35). This is due to underdevelopment, less literacy, hilly and tribal region. Highest negative change in child sex ratio was found in Rahuri Tahsil (-101).This is due to sex selective practices more in Rahuri and yet girl child neglected in family and

preference given to male child. In the study region, child sex ratio (0-6 years) has been decreased very rapidly from 1991 to 2001.

A. Very high (Above 101)

A very high change (above 100) in child sex ratio has been observed in Rahuri tahsil only .i.e. -101 girls per thousand boys reduced in last one decade, because of preference given to male child, agriculturally developed tahsil, high literacy and sex selective abortion by using modern sex detective techniques.

B. High (Between 81-100)

High changes (81-100) in child sex ratio has been observed in Nagar (-86) and Nevasa (-81) tahsils, that show high decline in child sex ratio (0-6 years).This is happened not only due to urbanization and immigration but also sex selective abortion in large extent.

C. Moderate (Between 61-80)

Moderate changes (61-80) in child sex ratio have been observed in tahsils like Shrigonda, pathardi and Shrirampur, respectively -70,-62, -61, girls to boys have been declined in last one decade. Except Pathardi due to economically undeveloped tahsils not agriculturally developed, Lower status of women in the society, access to medical facilities, so preference to male infants.

D. Low (Between 41-60)

Low changes (41-60) in child sex ratio has been observed in Parner (-59), Sangamner(-56), Shevgaon(-53), Jamkhed (-49), Kopargaon (-48) and Karjat (-45) tahsils. Except Sangamner and Kopargaon, remaining four tahsils little developed in agriculturally, economically, educationally.

E. Very low (Below 40)

Very low changes (below 40) in child sex ratio has been observed in Akole tahsil (-35) due to under development in tahsil, having lower health facilities and transportation facilities, hilly and tribal nature, so they away from abortion because traditionally girls get dowry.

8.0 CONCLUSION AND SUGGESTIONS:

The above analysis reveals the fast decrease in sex ratio in general and in the age of 0-6 years. According to 2001 Census, the highest sex ratio has observed in Parner tahsil (974) because of out migration of male and less development in agriculture. While the lowest sex ratio in Nagar tahsil (901) indicates undergone industrial development, leads to higher male immigration than female. In the study region, the sex ratio imbalances are more acute in Nagar, Rahuri , shrirampur, Nevasa, Jamkhed, Karjat,

Shrigonda, Sangamner, Kopargaon and Rahata tahsil, all these tahsils show lower sex ratio than district average (below 940).

In the study region, it has noticed that very abruptly decrease in child sex ratio (0-6 years). All the tahsils denotes negative change in child sex ratio (0-6 years) in 2001 Census. Sex selective abortion, infanticide and neglect of girl child in society these are the some of the causes of decline in sex ratio. The decline in overall sex ratio in general and child sex ratio in particular will create very serious social problems in near future.

SUGGESTIONS:

1. To promote a positive image of Female (girls) child in the society it is necessary for improvement of the sex ratio in the study region.
2. To promote the community for anti-dowry.
3. To implement various programmes regarding improvement of living condition & socio-economic status of the women.
4. Social awareness Programs to explain the impact of decline of sex ratio to the society.
5. Special incentives should be given to the couples having female child in the form of appreciation, money, equal opportunities in jobs, promotion etc.

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'MARKETING PROBLEMS IN ONION IN SATARA DISTRICT: A GEOGRAPHICAL STUDY'

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ABSTRACT

The present study was carried out in December-March 2011 to determine the economics of production of rabbi onion in Satara district. The onion is one of the most important vegetable crops grown in India. Satara district is leading in onion production it covers 12.38 percent of total in the State. Ten tahsils viz., Man, Phaltan, Khatav, Khandala, Wai, Koregaon, Karad, Satara, Patan and Jaoli tahsil in Satara district were selected for the study. For selection of the sample, a list of rabbi onion cultivators along with their operational holding for each of the selected villages was prepared. A list of all the onion producing farmers from each selected village was prepared and classified in three groups i.e. small (below 2 ha), medium(2- 4 ha) and large (above 4 ha) based on land holding size of the famers. From all selected villages 180 farmers were selected, randomly. Farmers in each size groups are in proportion to their number in universe all 60 small, 60 medium and 60 large category farmers were selected. The primary data were collected by survey method with the help of pre-tested schedule of questionnaires through personal interview.

Key words: *Costs, Cultivation, Economics, Onion, Production, Marketing, Problems.*

1.0 INTRODUCTION:

Onion is one of the most important vegetable grown in India. Which is used either in raw or dehydrated from to add flavor and taste to Indian cousin. Since onion has medicinal values, it is used in some pharmaceutical preparation also. The diverse agro-climatic conditions enable to India to produce onion in one or the other part round the year. At present, India stands second larger producer of onion in the world next only to China (FAO, Production Year Book, 2008). According to the United Nations Food and Agriculture Organization at least 175 countries grow onions. There are an estimated 6.7 million acres of onion in the world. Onion is commodity of mass consumption and is grown all over the country mainly by and marginal farmers as this is labour intensive crop for India. Onion is consistent earner of foreign exchange and the exports on onion and onion products reach several destinations (Kulkarni and Prema, 1997). The production of onion is 75.15 lakh MT. accounting for 8.9 percent of the total vegetables production in India (2008-09).

Most of the onion produced in India comes from the States of Maharashtra, Gujarat, Uttar Pradesh and Karnataka. However, onion is also grown in Orissa, Tamilnadu, Madhya Pradesh and Bihar. Maharashtra State accounted for 31.17 percent of the total production in the country during 2009-10.

In Satara district, fresh onion comes in market in September-October. It continues from October to April- May in Nashik, Ahmednagar, Solapur and Pune district and overall major districts of Maharashtra. The Satara district had 13826 hectares of land under onion cultivation during the year 2008-09. Man, Phaltan, Khatav and Khandala tahsils are leading in onion production in the district.

2.0 THE STUDY REGION:

The Satara district is situated in western part of Maharashtra state. This district consist eleven tahsils covering 1739 villages. The total areal extent is 10,480 sq. km. extending from 17^0 5' to 18^0 11' north latitudes and 73^0 33' to 74^0 54' east longitudes. This district is limited by Pune district to north, Solapur district to east, Sangli district to south and Ratanagiri district and Raigarh districts to west (Fig. 1). Satara district has typical landscapes due to variations in relief, climate and vegetation. The variation of relief ranges from the pinnacles and high plateau of the main Sahyadrians range having heights over 1200 meters above mean sea level to the subdued basin of Nira river with an average height of about 600 meters above mean sea level. The climate ranges from the rainiest in the Mahabaleshwar region, which has an average annual rainfall of over 6000 mm to the driest in Man, Phaltan, Khandala and Khatav tahsils where the average annual rainfall is about 500 mm. The vegetable about cover to varies from the typical monsoon forest in the west parts. Rice, jowar, bajra, onion, potato, ginger, fruits, vegetables, sugarcane and pulses are mainly cultivated in the district.

The Satara District
Location Map

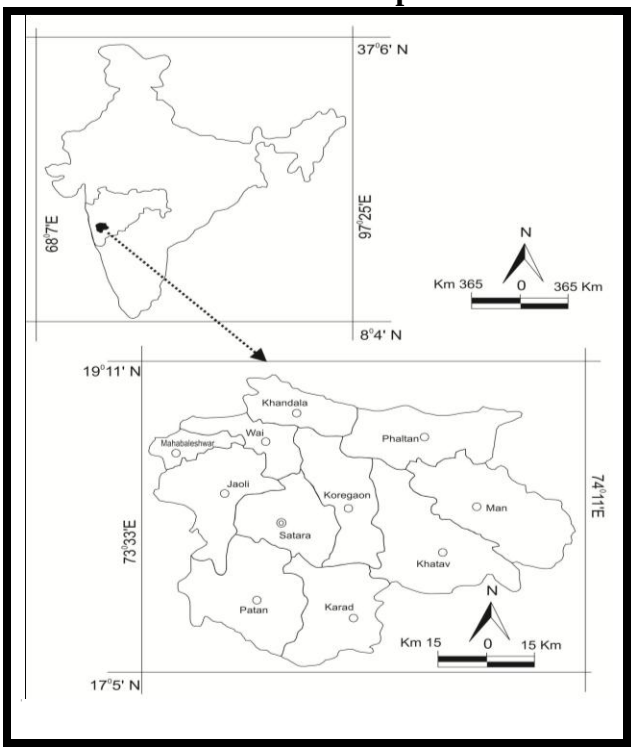

Fig. 1

3.0 OBJECTIVES:

The present study has been undertaken with the following specific objectives.

- To find out per quintal marketing cost incurred by the producer in onion.
- To study the constraints in production and marketing of onion.

4.0 DATA BASE AND METHODOLOGY:

The present study is based on primary and secondary data. The secondary data is collected from District Statistical Office, Department of Agriculture Satara District, Season and Crop Reports published by the Department of Agriculture (1985-86 to 2006-07), Statistical Abstract of Maharashtra, Socio-Economic Review of Satara District 2006-07, District Census hand book, Gazetteer, Agricultural epitomes, Agricultural statistical information Maharashtra State etc.

A list of all the tahsils of district was prepared along with hectare under onion and two villages from each tahsil were selected. A list of all the onion producing farmers from each selected village was prepared and classified in three groups i.e. small (below 2 ha), medium (2- 4 ha) and above (4 ha) based on land holding size of the farmers. From all selected village 180 farmers were selected, randomly. The primary data were collected by survey method with the help of pretested schedule of questionnaire through personal interview. The required primary data pertaining to cost, yield, prices and expenditure for the year 2010-11 were collected from selected onion growers.

5.0 MARKETING OF ONION:

Marketing can be defined as " The performance of business activities that direct the flow of goods and services from the producer to the consumer so that they may reach to the consumer at time and place and in the form of wishes and at a price he is willing to pay (Khols, 1998)". According to the (Sharma, 1981), the economic position of a farmer cannot be improved by producing, more unless he gets a 'fair price' for his produce and hence marketing is, the last stage where farmer converts all his efforts and investment in cash.

The marketing of onion is influenced by various factors such as perishability, variable prices, fluctuation of market and quantity, seasonal conditions, alternative product forms and markets, means of transportation and number of intermediaries present in onion marketing.

The marketing of onion is generally involves the assembling, grading and standardization, packaging, transportation and selling. Onion graded as small, medium and large by visual observation. In packaging, durability of packing a material, its cost, suitability for handling and ability for maintaining qualities of onion are the important points to be considered in the light of distances of market mode of transit. Onion packed in thin gunny bags and these gunny bags manufactured specially for packing onion, which permits proper aeration. Transport by tempo, tractors, bullock carts, trucks today has become very common practices. Now days, even for short distance bullock cart, tempo, tam-tam, pickup, tractor are available for transport. This practice was located in

the market. Traders adopted the various method of selling. The popular method of onion sale was the open auction method.

5.1 PER QUINTAL MARKETING COST OF ONION:

The cost of marketing or the margin between the farm prices has an important significance on both the production and consumption of any agricultural commodity. The total marketing cost comprises of sum total of costs of all the functions such as packaging, transportation, porter's charges, weighing charges, commission, market rent, postage etc. The information on these items was collected from the sample onion growers as well as market intermediaries and per quintal cost of marketing of onion Lonand, Pune and Sangli markets was worked out and has been presented in Table- I.

Table-I

Per Quintal Marketing Cost Incurred by the Producer in Onion (Rs.)

Sr. No.	Particulars	Lonand	Phaltan	Pune	Sangli	Overall
A	**Transaction**					
1	Quantity sold (quintal)	258.50	247.60	257.18	199.18	240.61
2	Sale price (Rs.)	589.70	580.20	620.10	612.25	600.56
3	Sale value (Rs.)	152437.45	143657.52	159477.31	121947.95	144380.05
4	Net price (Rs.)	452.97	456.28	471.90	473.30	463.61
B	**Costs (Rs.)**					
1	Cost of packing	24.30 (17.77)	22.60 (18.23)	24.60 (16.59)	24.10 (17.34)	23.90 (17.45)
2	Loading and unloading charges	3.00 (2.19)	3.00 (2.42)	4.00 (2.69)	3.00 (2.15)	3.25 (2.37)
3	Transportation	60.00 (43.88)	50.00 (40.34)	65.20 (43.99)	60.00 (43.18)	58.80 (42.93)
4	Commission charges	41.27 (30.18)	41.27 (33.30)	43.40 (29.28)	42.85 (30.83)	42.19 (30.80)
5	Hamali charges	2.00 (1.46)	2.00 (1.61)	3.00 (2.02)	2.00 (1.43)	2.25 (1.64)
6	Weighment charges	0.50 (0.36)	0.50 (0.40)	1.00 (0.67)	1.00 (0.71)	0.75 (0.54)
7	Market cess	0.75 (0.54)	0.75 (0.60)	1.50 (1.01)	1.50 (1.07)	1.12 (0.81
8	Miscellaneous expenses	4.91 (3.59)	3.70 (2.98)	5.50 (3.71)	4.50 (3.23)	4.65 (3.39)
Total marketing cost per quintal Rs.		**136.73 (100.00)**	**123.92 (100.00)**	**148.20 (100.00)**	**138.95 (100.00)**	**136.95 (100.00)**
Total cost of marketing Rs./ ha.		**35336.95**	**30682.59**	**38114.07**	**27676.06**	**32952.41**

Source: *Based on field work.*

Note: *Figures in parentheses indicate percentages.*

The average marketing cost incurred by the producer selling in onion below in the overall study area accounted to Rs. 136.95 per quintal. Its magnitude was higher in Pune (Rs. 148.20 per quintal) and Sangli (Rs. 138.95 per quintal) markets as compared to Lonand (Rs. 136.73 per quintal) and Phaltan (Rs. 123.92 per quintal) markets, mainly due to higher commission paid by them. Majority of the farmers of these four markets sold their produce due to higher price prevailing in that market and pay commission charges of seven percent. Similar pattern was observed in marketing cost incurred by the farmers per hectare.

Out of the total marketing cost incurred by the product-seller, the commission charges (30.80%) accounted for major component followed by expenditure on transportation (42.93%) and cost of packing (17.45%) in the overall study area. Similar pattern was observed in all the markets where in transportation cost was the major component followed by cost of packing and commission charges. These three components alone accounted for about (91.18%) percent of the total marketing cost incurred by the farmers.

An appraisal of components of marketing costs clearly revealed that commission charge formed the most significant constituent of the total marketing cost incurred by the farmers. Chatha and Kaul (1982), Pokharkar (1994), Kunwar (1972) and Kiresur (1993) obtained similar results for vegetables in different locations. This was mainly due to abnormally high rate of commission charges by the commission agent / commission agent-cum-wholesaler, which varied from seven to ten percent of the value of the produce sold.

It is worth noting that the percentage of margins realized by the different market intermediaries was higher than their cost incurred in the marketing of onion. Among the market margin was higher than other intermediaries were. This may be attributed to the fact that retailers often incurred losses due to wastage in handling, spoilage with passage of time, price fluctuation etc. resulting in higher cost of marketing and risk in handing. Shiyani et al. (1988) and Jairath (1997) reported similar results.

6.0 CONSTRAINTS IN PRODUCTION AND MARKETING OF ONION:

The selected farmers were contacted opinion survey for analyzing the constraints in production as well as in the marketing of onion. They expressed number of constraints which are listed in Table- II. The study reveals that the high price of seed, fertilizers, pesticides and fungicides were the main problem expressed by 86.11 per cent of the sampled onion-producing farmers. Followed by non-availability of funds from institutional sources (53.88 per cent), high wage rate of labour (92.77 per cent), non-availability of good quality of seeds (68.88 per cent) and ignorance of severe infestation of insect-pest disease control (60.00 per cent). Non-availability of adequate storage facilities of onion was the main problem expressed by 63.33 per cent of the sample farmers did not store onion on their farm due to lack of storage structure followed by price fluctuations and crashes 93.88 per cent. Various types of malpractices such as deducting certain amount of quantity extra (karda) etc. were common in almost all

markets. The problem of collusion (secret agreement) between commission agents and the buyers (outside traders) during the auction was also reported 30.55 per cent of the sample farmers. Problem of higher market charges was reported by 78.88 per cent of total sample farmers. The problem of cheating in weighing by the traders was 48.33 per cent of sample farmers. Undue delay in receiving payment after the sale of their produce was reported by 42.77 per cent of sample farmers. Problem of getting credit to meet the marketing cost was also reported by 60.55 per cent of sample farmers.

About 86.11 per cent of farmers felt there is need for temporary storage facilities in the market because sometimes farm produce could not be sold on the same day due to low price or lack of adequate number of buyers in the market. About 66.11 per cent of the total sample of onion growers felt there should be same system whereby in addition to Television, Newspaper, Radio information about the prices prevailing in other markets could reach the farmers. The main source of price information for farmers was through neighbors / fellow farmers or by personal visits. Lack of packing material of onion was reported by 72.77 per cent of sample farmers. Un-remunerative prices during the peak season and lack of storage facilities were reported to be the important constraints by onion growers. Besides high price of seed, fertilizers and pesticides, costly transportation and market charges, inadequate skilled labour and lack of information about arrivals and prices in the major consuming markets were main problems reported by onion producers.

7.0 CONCLUSION:

Onion is one of the most important vegetable crops grown in India. The per quintal cost of average overall markets was Rs. 136.95 included cost of packing, loading and unloading charges, transportation, commission charges, hamali charges, weighting charges, market cess and miscellaneous expenses. The net return obtained onion growers Rs. 463.61. The deducting of marketing cost obtained the onion growers net returns Rs. 326.66. The cost of cultivation fixed cost and variable cost of labour, transplanting, seeds, irrigation, bullock charges etc. major items have different cost of cultivation. The intermediaries pocket the major share of consumer's rupees. Though the farmers are producing adequate quantity of onion to meet the consumer demand, they are facing problems in marketing of their produce. On other hand, market intermediaries are accruing higher margin by incurring less cost and services. The constrains in production and marketing of onion faced by the various problems high price of seed, fertilizers, pesticides, fungicides, lack of transportation, high charges of transportation, lack of packing material, hired labour, high wage rate of labour and malpractices by traders were the main problems of onion production.

Table-II
Constraints faced by the sample farmers in production and marketing of onion

Sr. No	Constraints relating	No of sample farmers expressed the problem	Percent to total NO = 180
A	**Production**		
1	Non-availability of good quality seed	124	68.88
2	High price of seed, fertilizers, pesticides and fungicides	155	86.11
3	High wage rat of labour	167	92.77
4	Ignorance of severe infestation of insect-pest disease control	108	60.00
5	Non-availability of funds from institutional sources	97	53.88
B	**Marketing**		
1	Lack of transportation	137	76.11
2	High charges of transportation	166	92.22
3	Lack of road	67	37.22
4	Lack of market yard	129	71.66
5	Traders collusion	55	30.55
6	Malpractices by traders	135	75.00
7	Higher market charges	142	78.88
8	No correct weighing	87	48.33
9	Lat payment	77	42.77
10	Lack of credit facilities	109	60.55
11	Lack of packing material	131	72.77
12	Price fluctuation and crashes	169	93.88
13	Lack of price information	119	66.11
14	Lack of storage in market yard	155	86.11
15	Non-availability of adequate storage facilities	114	63.33

Source: *Based on field work*

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'LAND USE AND LAND COVER CHANGES DUE TO ANTHROPOGENIC ACTIVITY ALONG COASTAL STRETCH OF KANCHIPURAM DISTRICT, TAMILNADU'

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ABSTRACT

The land use/land cover pattern of a region is an outcome of both natural and socio-economic factors and their utilization by man in time and space. Land is becoming a scarce commodity due to immense agricultural and demographic pressure. The field of Geoinformatics plays an important role in generating information about the latest land use-land cover pattern in an area and its temporal changes through times. The main objective of the present research paper is to study the land use and land cover change occurred due to the anthropogenic activities. Landsat MSS – 1980, Landsat TM – 1991, Landsat TM – 2000 imageries download from GLCF website and IRS 1D LISS – III -2009 data obtained from NRSC, Hydrabad, India. The collected data is analyzed with the help of Erdas Imagine 9.1 and Arc GIS 9.3 software's. The study reveals that the land use changes were determined the main changes were identified in the buildup land has been increased because of the exponential population growth in taken place. The agricultural land and barren land has been rapidly decreased, its shows that the urbanization activities are made in the study area.

Key words:. *Land Use, Land Cover, Anthropogenic, Geoinformatics, GIS, Remote Sensing, Spatial Data, Non-Spatial Data, Landsat, GLCF,*

1.0 INTRODUCTION:

The land use/land cover pattern of a region is an outcome of both natural and socio-economic factors and their utilization by man in time and space. Land is becoming a scarce commodity due to immense agricultural and demographic pressure. Hence, information on land use/land cover and possibilities for their optimal use is essential for the selection, planning and implementation of land uses schemes to meet the increasing demands for basic human needs and welfare.

Remote sensing plays an important role in generating information about the latest land use-land cover pattern in an area and its temporal changes through times. The information being in digital form can be brought under Geographical Information System (GIS) to provide a suitable platform for data analysis, update and retrieval.

2.0 THE STUDY REGION:

For the present research paper, 10 Km buffer along the continental part of the Kanchipuram district's coastline (Tamil Nadu, India), is selected as a study region. It is located between 79^0 57' 27.02" to 80^0 12' 1.518" north latitudes and 12^0 15' 19.72" to 12^0 58' 21.739" east longitudes. Villages, which fall fully within the buffer zone, have selected as study area. There are 172 villages comes in the 10 Km buffer zone, in that 28 lies in Tambaram taluk, 56 lies in Chengalpattu taluk and 88 lies in Maduranthagam taluk. Over this long time, Saidapet taluk have bifurcated as Tambaram and

Maduranthagam have bifurcated as Thirukazhukundram and Cheyyur in study area, to make the common boundary of taluk in all years.

3.0 OBJECTIVES:

- The main objective of the present research paper is to study the land use and land cover change occurred due to the anthropogenic activities in the study region.

4.0 METHOD AND MATERIALS:

Landsat MSS – 1980, Landsat TM – 1991, Landsat TM – 2000 imageries download from GLCF website and IRS 1D LISS – III -2009 data obtained from NRSC, Hydrabad, India. It should be mentioned that the issuer has already corrected the satellite data atmospherically, radiometrically and geometrically. Land use/land cover classification scheme suggested by National Remote Sensing Agency Hyderabad (NRSA 1989) was adopted for land use/land cover mapping. Twelve land use/land cover categories identified and mapped based on supervised method using Erdas Imagine 9.1 software, the same software used to find out the changes in land use / land cover in study area.

Village boundary map obtain from Census of India and geo-referenced by using Arc GIS 9.3 software and vector layer creation and thematic map preparation have done in the same, to manipulate population data SPSS 17 have used. Fig: 1 shows details methodology adopted for the research.

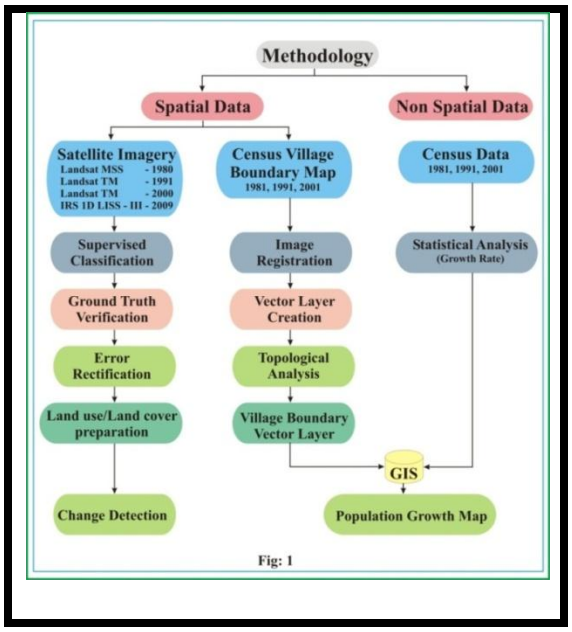
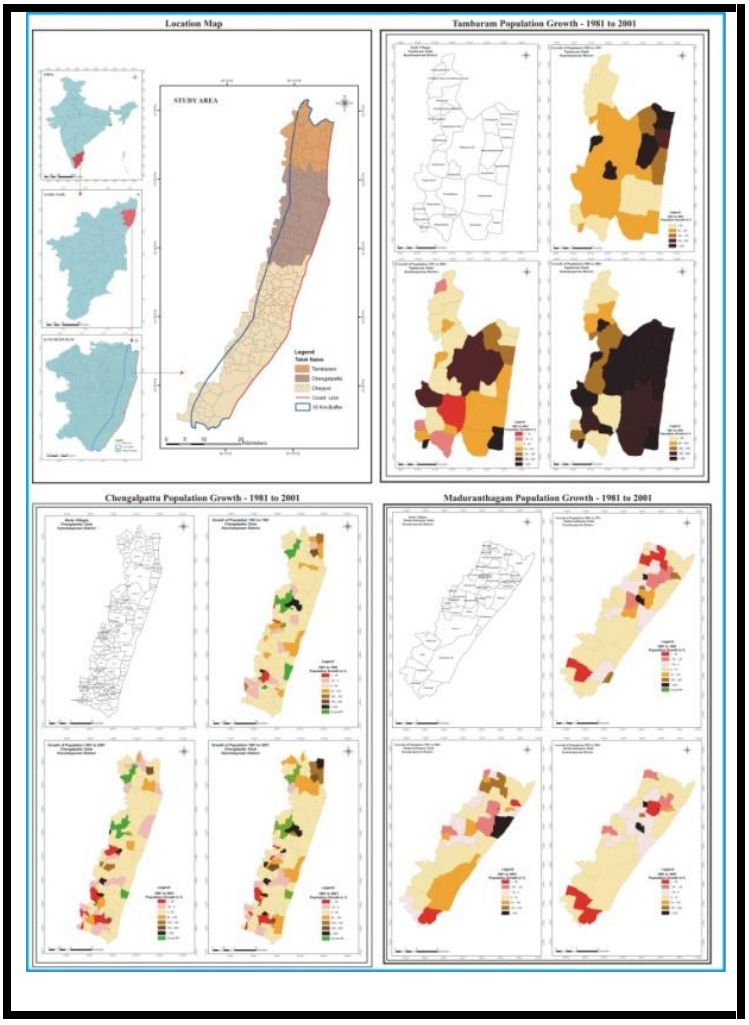
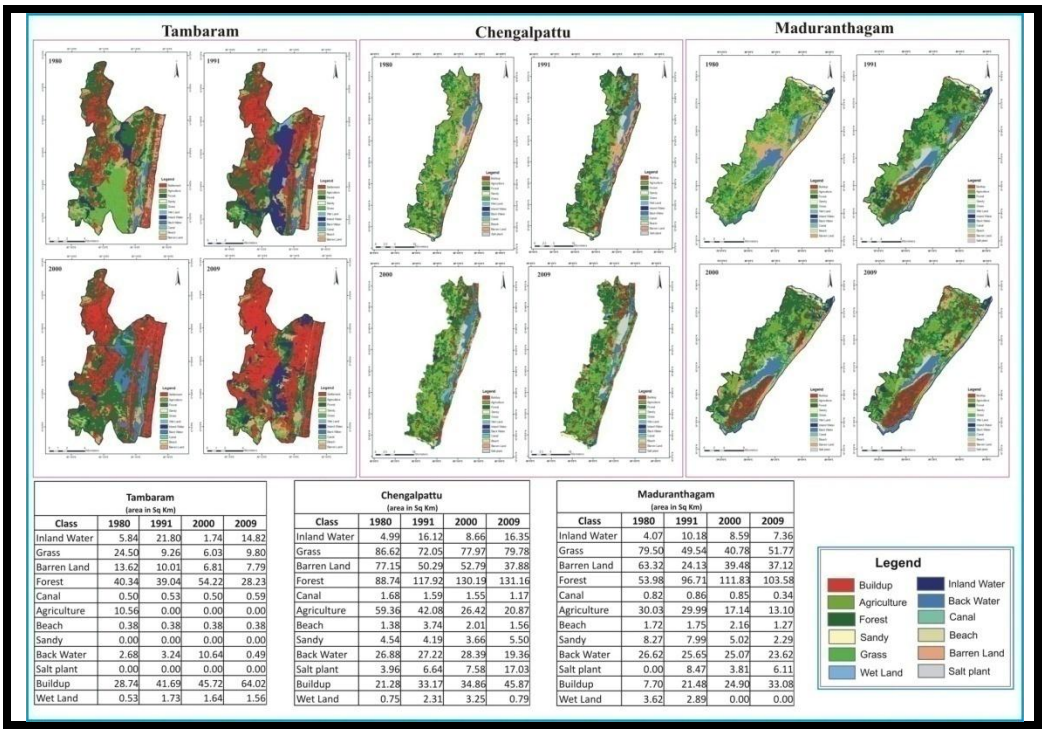


Fig: 1

5.0 RESULTS AND DISCUSSION

The land cover (LC) is defined as the observed physical layer including natural and planted vegetation and human constructions, which cover the surface of the Earth. In this inventory, water bodies, barren land, or sand surfaces are also listed. Land cover classification is a tool that provides significant information for natural resource managers, decision makers, and stakeholders. It serves to categorize natural ecosystems, managed crops, and urban areas. As a general form, land cover classifications provide the fundamental information to appraise the impact of human interactions within the environment and to assess scientific foundations for sustainability, vulnerability, and resilience of land systems and their use (Han et al. 2004).





Tambaram (area in Sq Km)

Class	1980	1991	2000	2009
Inland Water	5.84	21.80	1.74	14.82
Grass	24.50	9.26	6.03	9.80
Barren Land	13.62	10.01	6.81	7.79
Forest	40.34	39.04	54.22	28.23
Canal	0.50	0.53	0.50	0.59
Agriculture	10.56	0.00	0.00	0.00
Beach	0.38	0.38	0.38	0.38
Sandy	0.00	0.00	0.00	0.00
Back Water	2.68	3.24	10.64	0.49
Salt plant	0.00	0.00	0.00	0.00
Buildup	28.74	41.69	45.72	64.02
Wet Land	0.53	1.73	1.64	1.56

Chengalpattu (area in Sq Km)

Class	1980	1991	2000	2009
Inland Water	4.99	16.12	8.66	16.35
Grass	86.62	72.05	77.97	79.78
Barren Land	77.15	50.29	52.79	37.88
Forest	88.74	117.92	130.19	131.16
Canal	1.68	1.59	1.55	1.17
Agriculture	59.36	42.08	26.42	20.87
Beach	1.38	3.74	2.01	1.56
Sandy	4.54	4.19	3.66	5.50
Back Water	26.88	27.22	28.39	19.36
Salt plant	3.96	6.64	7.58	17.03
Buildup	21.28	33.17	34.86	45.87
Wet Land	0.75	2.31	3.25	0.79

Madurathagam (area in Sq Km)

Class	1980	1991	2000	2009
Inland Water	4.07	10.18	8.59	7.36
Grass	79.50	49.54	40.78	51.77
Barren Land	63.32	24.13	39.48	37.12
Forest	53.98	96.71	111.83	103.58
Canal	0.82	0.86	0.85	0.34
Agriculture	30.03	29.99	17.14	13.10
Beach	1.72	1.75	2.16	1.27
Sandy	8.27	7.99	5.02	2.29
Back Water	26.62	25.65	25.07	23.62
Salt plant	0.00	8.47	3.81	6.11
Buildup	7.70	21.48	24.90	33.08
Wet Land	3.62	2.89	0.00	0.00

Table-I Areal Changes of different land use/land cover features

	Tambaram (area in Sq Km)				Chengalpattu (area in Sq Km)				Maduranthagam (area in Sq Km)			
Class	**1980-91**	**1991-2000**	**2000-09**	**1981-09**	**1980-91**	**1991-2000**	**2000-09**	**1981-09**	**1980-91**	**1991-2000**	**2000-09**	**1981-09**
Inland Water	15.96	-20.06	13.08	8.98	11.13	-7.46	7.69	11.36	6.11	-1.58	-1.23	3.29
Grass	-15.23	-3.24	3.77	-14.70	-14.58	5.92	1.82	-6.84	-29.96	-8.76	10.99	-27.73
Barren Land	-3.61	-3.20	0.98	-5.83	-26.85	2.49	-14.90	-39.27	-39.19	15.35	-2.36	-26.19
Forest	-1.30	15.18	-25.99	-12.11	29.18	12.27	0.97	42.42	42.73	15.12	-8.25	49.60
Canal	0.03	-0.03	0.09	0.09	-0.09	-0.04	-0.38	-0.51	0.04	-0.01	-0.52	-0.48
Agriculture	-10.56	0.00	0.00	-10.56	-17.28	-15.66	-5.56	-38.49	-0.04	-12.85	-4.04	-16.93
Beach	0.00	0.00	0.00	0.00	2.37	-1.73	-0.45	0.18	0.03	0.42	-0.89	-0.45
Sandy	0.00	0.00	0.00	0.00	-0.35	-0.53	1.84	0.96	-0.28	-2.98	-2.73	-5.98
Back Water	0.56	7.40	-10.15	-2.19	0.34	1.18	-9.03	-7.52	-0.97	-0.57	-1.46	-3.00
Salt plant	0.00	0.00	0.00	0.00	2.68	0.94	9.45	13.07	8.47	-4.66	2.30	6.11
Buildup Land	12.95	4.03	18.30	35.28	11.89	1.69	11.01	24.59	13.78	3.42	8.18	25.38
Wet Land	1.20	-0.09	-0.08	1.03	1.56	0.94	-2.46	0.04	-0.73	-2.89	0.00	-3.62

Changes in land use and land cover are key factors for global environmental change (Bürgi 1999). Growing human population causes land scarcity and the conversion of wild lands to agriculture and other uses and, thus, land use/land cover change. Population growth can push the rural poor onto marginal lands. Other important determinants of changes in land use and land cover include several types of policy: human settlement and land tenure policy, fiscal policy, trade policy, and agricultural policy. In addition, changes in technology (e.g., road building), culture, power, and political/economic institutions can influence land use/land cover change (Reid et al. 2000).

Data obtained from the evaluation of remotely sensed data and image classification analysis were carried out according to Mathuranthagam, Chengalpattu and Tambaram taluks of the Kanchipuram District landcover classes. Land cover database which were classified according to the Kanchipuram in the years 1980, 1991, 2000 and 2009 satellite images are presented in Fig. 1. The classification of the map consisted of twelve classes in the respective years such as Inland water, Grass, Barren land, Forest, Canal, Agriculture, Beach, Sandy, Backwater, Saltpan, Buildup land and wetland. The result of the year 2009 classification is presented in Fig 2. Eleven classes instead of the twelve were determined following the classification in the year 2009 for the Mathuranthagam whereas on the other areas all twelve class are presents in the respective years. The twelfth class that is unavailable was the class of wetlands in Mathuranthagam. Classification of the area of interest derived from the analyses of the satellite images is presented in Table-I. Class counts, land use of every class, total area of every class, and percentages of every class in total area of research area for the years 1980, 1991, 2000 and 2009 were calculated. In addition, percent changes in the percentage of Kanchipuram District classes in the whole research area between 1980, 1991, 2000 and 2009 were calculated using the data from the satellite images. Because of the analyses for changes of percentages and proportions for every class of land use class is presented below:

5.1 CHANGES IN MATHURANTHAGAM:

(1980 TO 1991)

The following results were identified in the year 1980, the extend of the individuals were calculated in km^2: Inland water (4.07), Grass (79.50), Barren land (63.32), Forest (53.98), Canal (0.82), Agriculture (30.03), Beach (1.72), Sandy (8.27), Backwater (26.62), Buildup land (7.70) and wetland (3.62). During the year 1991, the extend of the individuals were calculated: Inland water (10.18), Grass (49.54), Barren land (24.13), Forest (96.71), Canal (0.86), Agriculture (29.99), Beach (1.75), Sandy (7.99), Backwater (25.65), Buildup land (21.48) and wetland (2.89). It is identified that there is a increasing trends towards inland water (6.11 km^2), and forest is about (42.73 km^2) and also a significant reduce of Grass land (29.96 km^2), Barren land (39.19 $km^{2)}$). There is new artificial feature was created in this area for the occupational purposes that is saltpan is about 8.47 km^2 which is created in the barren land near the backwater region.

(1991 to 2000):

In the year 2000, Inland water (8.59), Grass (40.78), Barren land (39.48), Forest (111.83), Canal (0.85), Agriculture (17.14), Beach (2.16), Sandy (5.02), Backwater (25.07), Saltpan (3.81 Buildup land (24.90). The changes for the taken place there is less changes have been made by this region the main changes is forest has increased about 15.12 and also barren land has been increased about 15.32 but the agricultural land was decreased about 12.85 sq. km this is due to increase of barren land resulted decrease the agricultural land.

(2000 to 2009):

During the year 2000, Inland water (7.36), Grass (51.77), Barren land (37.12), Forest (103.58), Canal (0.34), Agriculture (13.10), Beach (1.27), Sandy (2.29), Backwater (23.62), Saltpan (6.11) Buildup land (33.08). It is identified that there is an increasing trends toward the buildup lands. It is because of due to the population growth. The buildup lands are increasing and other features are decreasing trends.

5.2 CHANGES IN CHENGALPATTU:

1980 to 1991

The following results were identified in the year 1980, the extend of the individuals were calculated in km^2: Inland water (4.99), Grass (86.62), Barren land (77.15), Forest (88.74), Canal (1.68), Agriculture (59.36), Beach (1.38), Sandy (4.54), Backwater (26.88), Saltpan (3.96) Buildup land (21.28) and wetland (0.75). During the year 1991 the changes is Inland water (16.12), Grass (72.05), Barren land (50.79), Forest (117.92), Canal (1.59), Agriculture (42.08), Beach (3.74), Sandy (4.19), Backwater (27.22), Saltpan (6.64) Buildup land (33.17) and wetland (2.31). It is identified that there is a decreasing trends towards Barren land, agricultural; the grassland is decreased about five by increasing the inland water, forest areas has been increased by decreasing the barren land.

1991 to 2000

During the year 1991 the changes in Inland water (16.12), Grass (72.05), Barren land (50.79), Forest (117.92), Canal (1.59), Agriculture (42.08), Beach (3.74), Sandy (4.19), Backwater (27.22), Saltpan (6.64) Buildup land (33.17) and wetland (2.31). During the year 2000 the changes in inland water (8.66), Grass (77.97), Barren land (52.79), Forest (130.19), Canal (1.55), Agriculture (26.42), Beach (2.01), Sandy (3.66), Backwater (28.39), Saltpan (7.58) Buildup land (34.86) and wetland (3.25). It identified that where is reduction in the inland water (8.66 km^2) agricultural land (26.42 km^2) there is always increase of built-up lands.

2000 to 2009

During the year 2000 the area under Inland water (8.66), Grass (77.97), Barren land (52.79), Forest (130.19), Canal (1.55), Agriculture (26.42), Beach (2.01), Sandy (3.66), Backwater (28.39), Saltpan (7.58) Buildup land (34.86) and wetland (3.25). Inland water (16.35), Grass (79.78), Barren land (37.88), Forest (131.16), Canal (1.17), Agriculture (20.87), Beach (1.56), Sandy (5.50), Backwater (19.36), Saltpan (17.03) Buildup land (45.87) and wetland (0.79) was present during 2009. The inland water has been increased about eight sq. km and barren land is reduced about 14 $km^{2.}$ It is clearly shows the strong relationships between inland water and barren land. The agriculture land also reduced and it has become a residential area. There is back water has reduced about 10 km^2 and saltpan is increased about 10 km^2 its clearly shows the relationships between saltpan and Backwater.

5.3 CHANGES IN TAMBARAM:

1980 to 1991

During the year 1980 the land use were determined they are follows, Inland water (5.84), Grass (24.50), Barren land (13.62), Forest (40.34), Canal (0.50), Agriculture (10.56), Beach (0.38), Backwater (2.68), Salt pan (3.96) Buildup land (28.74) and wetland (0.53). During the year 1991 the changes is Inland water (21.80), Grass (9.26), Barren land (10.01), Forest (39.04), Canal (0.53), Agriculture (0), Beach (0.38), Backwater (3.24), Buildup land (41.69) and wetland (1.73). its shows that the inland water were increased by decreasing the grass land, The agricultural land fully vanished by increasing the settlement in the agriculture are its shows the urbanization activity are made in the study area.

1991 to 2000

During the year 1991 the changes is Inland water (21.80), Grass (9.26), Barren land (10.01), Forest (39.04), Canal (0.53), Agriculture (0), Beach (0.38), Backwater (3.24), Buildup land (41.69) and wetland (1.73). During the year 2000, the changes are Inland water (1.74), Grass (6.03), Barren land (6.81), Forest (54.22), Canal (0.50), Agriculture (0), Beach (0.38), Backwater (10.64), Buildup land (45.72) and wetland (1.64). It has identified that grasslands and inland water is decreased its results forest is increased about 15.18. Backwater and buildup land also increased.

2000 to 2009

During the year 2000, the changes are Inland water (1.74), Grass (6.03), Barren land (6.81), Forest (54.22), Canal (0.50), Agriculture (0), Beach (0.38), Backwater (10.64), Buildup land (45.72) and wetland (1.64). During the year 2000, the changes are Inland water (14.82), Grass (9.80), Barren land (7.79), Forest (28.23), Canal (0.59), Agriculture (0), Beach (0.38), Backwater (0.49), Buildup land (64.02) and wetland (1.56). It is identified that the forest has decreased by increasing the inland water and grassland. The buildup land has rapidly increased in this region its shows that the exponential of population growth.

6.0 CONCLUSION:

In the present research paper, land use changes were evaluated in Kanchipuram District by using Landsat Satellite images of the 1980, 1991, 2000 and 2009. The study reveals that the land use changes were determined. The main changes were identified in the buildup land has been increased because of the exponential population growth in the study region. The agricultural land and barren land has been rapidly decreased, its shows that the urbanization took place in the study area. The forest also increased by decreasing the inland water, because of the inland water areas are now becomes the forest. Finally it has identified that due to the over growth of population all agricultural and barren land becomes the settlement.

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'SPATIO-TEMPORAL ANALYSIS OF POPULATION GROWTH RATE OF RURAL SETTLEMENTS IN KOLHAPUR DISTRICT, 1981-2001'

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ABSTRACT

The study of population growth of individual rural settlements is essential for the identification of changing man and environment relationship at more microscale. Hence, present paper aims to study spatial variations in population growth rate from 1981-2001. The paper based on secondary sources of the data mostly collected from District Census Handbooks, Kolhapur District, 1981 to 2001 where the simple decadal growth rate has been computed and categories in different groups. The study reveals that, high growth rate of population is associated with the rural settlements of eastern plain part of the study region and situation is contrast in the western part.

Keywords: *Spatial, Temporal, Population Growth, Rural Settlement, Environment etc.*

1.0 INTRODUCTION:

As geography studies changing man and environment relationship, settlement shows how man's intervention in environment has taken place and changes with the course of time. Settlements are dynamic in nature. Growth of rural settlements is directly or indirectly influenced by various physical as well as cultural factors. The spatial pattern of population growth rate indicates the trend of man and environment relation in one way and future trend in another. According to Pore and Lokhande (2011) geographical factors create the spatial variations in class wise changes of rural settlements. This fact increases the significance of studying the individual growth of rural settlements.

2.0 THE STUDY REGION:

For the present research paper, the Kolhapur district of Maharashtra is selected as a study region. It is situated in the extreme southern part of Maharashtra State. It lies between 15^0 43' north to 17^0 17' north latitudes and 73^0 40' east to 74^0 42' east longitudes. Sangli district to the north, Belgaum district of Karnataka state to the east and south, and Ratnagiri and Sindhudurga districts to the west surround it. The Kolhapur district comprises 7685 sq. km area in twelve tahsils. In general the physiography of the district may be grouped in three parts i.e.: (1) The Sahyadri hills in a north-south direction (2) The Plateau situation to the east of the Sahyadri hills and (3) The River valley basin of Varna and Panchaganga. The climate of Kolhapur is generally temperate. The average annual rainfall varies widely from about 600 mm in Shirol tahsil in the east to 6000 mm in Bavada tahsil in the west. The temperature ranges between 14^o c to 38^o c. As per the census of India 2001, the total population of Kolhapur district was 35, 23,162 (455 persons per sq. km.). The decadal growth rate (1991-2001) of population is 17.85 per cent. About 70.19 per cent of total population resides in rural area.

3.0 OBJECTIVE:

Present paper aims to study spatio-temporal pattern of growth rate of population of rural settlements in Kolhapur district of Maharastra 1981-2001.

4.0 DATABASE AND METHODOLOGY:

Present investigations is based on secondary sources of data mainly collected from District Census Handbooks, Kolhapur District, 1981 to 2001, District and Ground Water Survey and Development Agency, Government of Maharashtra. Various statistical techniques have been applied in which the village wise simple decadal growth rate has been computed by utilizing the fallowing formula:

$$\text{Growth Rate} = \frac{Pt_2 - Pt_1}{Pt_1} \times 100$$

Where, P1 = Population of previous decade and
P2 = Population of current decade.

5.0 POPULATION GROWTH OF RURAL SETTLEMENTS:

In last two decades, the rural settlements of the study area experiences both increase and decrease in the population size. To know the spatial pattern of growth rate of population both positive and negative growth rate have been classified in to five groups.

DECADAL GROWTH (1981 – 1991)

During 1981-91, out of 1200 rural settlements of the study area, about 1021 rural settlements (85.1 %) show increase in their population size, 115 rural settlements (9.6 %) decreases their population size and remaining 64 rural settlements (5.3 %) rural settlements were newly created. All the rural settlements of Hatkangale tahsils have increasing population and the tahsils like Shirol, Karvir and Kagal have high proportion of rural settlements, which experiences increase in population whereas their low proportion observed in Bavda and Radhanagari tahsils.

The growth rate of population below 10 per cent has been observed in 13.1 per cent rural settlements of the study area in which Ajra, Gadhinglaj, Bhudargad and Shahuwadi tahsils have high proportion of rural settlements than the other tahsils of the study area. Only 1.7 per cent rural settlements of Shirol tahsil and 2 per cent rural settlements of Hatkangale tahsil have growth rate of population below 10 per cent. Contrary to this, 5.7 per cent rural settlements of the study area have above 50 per cent growth rate of population where this proportion of rural settlements ranges from maximum in Karvir tahsil followed by Panhala and Shirol tahsils to minimum in Bavda and Gadhinglaj tahsils (Table-I and Fig. 1).

Table-I
Kolhapur District: Increasing Population of Rural Settlements
(1981-1991)

Sr. No.	Tahsil	Increasing Population Rate in %										Total Increased	
		Below 10		10 to 20		20 to 30		30 to 50		Above 50			
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	Shahuwadi	22	15.8	54	38.8	32	23.0	11	7.9	5	3.6	124	**89.2**
2	Panhala	9	7.4	39	32.2	37	30.6	7	5.8	12	9.9	104	**86.0**
3	Hatkanangle	1	1.7	18	30.5	25	42.4	11	18.6	4	6.8	59	**100**
4	Shirol	1	2.0	8	15.7	23	45.1	10	19.6	5	9.8	47	**92.2**
5	Karvir	8	7.0	36	31.6	32	28.1	14	12.3	13	11.4	103	**90.4**
6	Bavda	2	2.2	12	13.0	14	15.2	9	9.8	0	0.0	37	**40.2**
7	Kagal	13	15.5	47	56.0	15	17.9	2	2.4	3	3.6	80	**95.2**
8	Bhudargad	20	19.6	29	28.4	25	24.5	10	9.8	5	4.9	89	**87.3**
9	Ajra	26	29.2	26	29.2	15	16.9	4	4.5	4	4.5	75	**84.3**
10	Gadhinglaj	26	28.9	36	40.0	10	11.1	2	2.2	3	3.3	77	**85.6**
11	Chandgad	16	11.0	42	28.8	52	35.6	22	15.1	6	4.1	138	**94.5**
12	Radhanagari	13	11.5	38	33.6	23	20.4	6	5.3	8	7.1	88	**77.9**
Study Area		**157**	**13.1**	**385**	**32.1**	**303**	**25.3**	**108**	**9.0**	**68**	**5.7**	**1021**	**85.1**

Source: District Census Handbooks, Kolhapur District, 1981 & 1991.

The population decreased by 9.6 per cent in rural settlements of the study region, where this proportion is high in Radhanagari, Ajra and Gadhinglaj tahsils and low in Hatkangale, Bavda, Chandgad and Kagal tahsils. Low rate of decreasing population (below 10 %) observed in 3.4 per cent settlements of the study area, where this proportion is high in Ajra and Gadhinglaj tahsils and nil in Shirol and Hatkangale tahsils. On the other hand, high rate of decreasing population (above 50 %) observed in 1.3 per cent settlements of the study area, which is high in Radhanagari tahsil, and nil in six tahsils of the study region (Table- II and Fig. 1).

Table-II
Kolhapur District: Decreasing Population of Rural Settlements, (1981-1991)

Sr. No.	Tahsil	Decreasing Population Rate in %										Total Decreased	
		Below 10		10 to 20		20 to 30		30 to 50		Above 50			
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	Shahuwadi	3	2.2	2	1.4	2	1.4	4	2.9	1	0.7	12	**8.6**
2	Panhala	3	2.5	2	1.7	2	1.7	6	5.0	4	3.3	17	**14.0**
3	Hatkanangle	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	**0.0**
4	Shirol	0	0.0	2	3.9	1	2.0	0	0.0	0	0.0	3	**5.9**
5	Karvir	3	2.6	2	1.8	0	0.0	4	3.5	2	1.8	11	**9.6**
6	Bavda	1	1.1	0	0.0	1	1.1	0	0.0	0	0.0	2	**2.2**
7	Kagal	3	3.6	1	1.2	0	0.0	0	0.0	0	0.0	4	**4.8**
8	Bhudargad	5	4.9	1	1.0	3	2.9	4	3.9	0	0.0	13	**12.7**
9	Ajra	7	7.9	1	1.1	2	2.2	2	2.2	1	1.1	13	**14.6**
10	Gadhinglaj	8	8.9	1	1.1	1	1.1	3	3.3	0	0.0	13	**14.4**
11	Chandgad	4	2.7	0	0.0	0	0.0	1	0.7	1	0.7	6	**4.1**
12	Radhanagari	4	3.5	3	2.7	4	3.5	4	3.5	6	5.3	21	**18.6**
Study Area		**41**	**3.4**	**15**	**1.3**	**16**	**1.3**	**28**	**2.3**	**15**	**1.3**	**115**	**9.6**

Source: District Census Handbooks, Kolhapur District, 1981 & 1991.

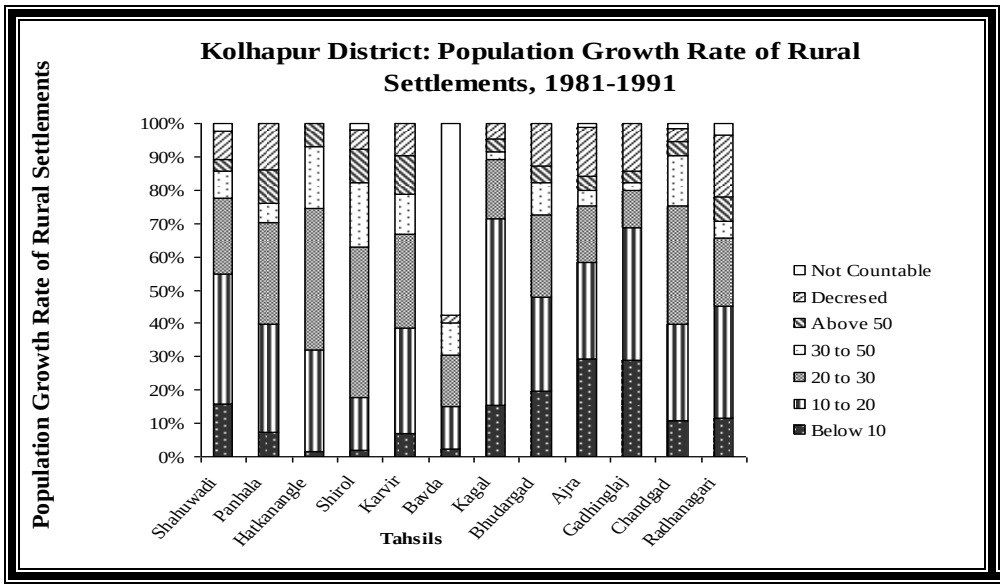

Fig. 1

DECADAL GROWTH (1991 – 2001)

So far as decade 1991-2001 is concern, out of the 1188 rural settlements, 1015 rural settlements (85.4%) experiences increase in population, 151 rural settlements (12.7%) experiences decrease in population and the growth rate of remaining 22 rural settlements (1.9 %) has not been computed because, they were either newly created or decreased in this decade. High proportion of rural settlements experiencing increase in population observed in Kagal, Shirol and Hatkangale tahsils medium proportion in Panhala, Ajra and Gadhinglaj tahsils whereas their low proportion observed in Bavda and Radhanagari tahsils.

About 23.5 per cent rural settlements shows increasing population at a low rate which is below 10 per cent. The high proportion of rural settlements having low growth rate of population has been observed in Gadhinglaj and Shirol tahsils and low proportion of rural settlements having low growth rate of population observed in Panhala and Bavda tahsils. On the other hand, the high proportion of rural settlements having high growth rate of population (above 50 %) has been observed in Panhala and Karvir tahsils, where low proportion of rural settlements having high growth rate of population observed in Chandgad and Bavda tahsils (Table-III and Fig. 2).

Table-III

Kolhapur District: Increasing Population of Rural Settlements (1991-2001)

Sr. No.	Tahsil	Increasing Population Rate in %										Total	
		Below 10		10 to 20		20 to 30		30 to 50		Above 50			
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	Shahuwadi	38	27.5	48	34.8	22	15.9	10	7.2	1	0.7	119	**86.2**
2	Panhala	6	4.6	15	11.5	5	3.8	6	4.6	49	37.7	81	**62.3**
3	Hatkanangle	7	11.7	25	41.7	16	26.7	7	11.7	3	5.0	58	**96.7**
4	Shirol	19	35.8	17	32.1	10	18.9	2	3.8	3	5.7	51	**96.2**
5	Karvir	20	15.6	64	50.0	17	13.3	9	7.0	10	7.8	120	**93.8**
6	Bavda	4	10.3	14	35.9	17	43.6	1	2.6	1	2.6	37	**94.9**
7	Kagal	23	26.7	37	43.0	20	23.3	2	2.3	2	2.3	84	**97.7**
8	Bhudargad	28	26.2	40	37.4	17	15.9	7	6.5	3	2.8	95	**88.8**
9	Ajra	23	24.7	26	28.0	7	7.5	10	10.8	6	6.5	72	**77.4**
10	Gadhinglaj	42	45.2	23	24.7	5	5.4	2	2.2	3	3.2	75	**80.6**
11	Chandgad	43	29.9	46	31.9	20	13.9	10	6.9	1	0.7	120	**83.3**
12	Radhanagari	26	22.2	52	44.4	14	12.0	3	2.6	8	6.8	103	**88.0**
Study Area		**279**	**23.5**	**407**	**34.3**	**170**	**14.3**	**69**	**5.8**	**90**	**7.6**	**1015**	**85.4**

Source: District Census Handbooks, Kolhapur District, 1991 & 2001.

In this decade, about 12.7 per cent rural settlements of the study area experiencing decrease in population size which has spatial variations. The proportion of rural settlements decreasing population is high in Panhala and Ajra tahsils and low in Hatkangale and Karvir tahsils. Low decrease (below 10 %) found in 5.7 per cent rural settlements of the study area whereas high decreased (above 50 %) found in 2.9 per cent rural settlements of the study area. The proportion of rural settlements having high and low rate of population decrease has also spatial variations (Table-IV and Fig. 2).

Table-IV
Kolhapur District: Decreasing Population of Rural Settlements (1991-2001)

Sr. No	Tahsils	Decreasing Population Rate in %										Total	
		Below 10		10 to 20		20 to 30		30 to 50		Above 50			
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	Shahuwadi	9	6.5	2	1.4	0	0.0	0	0.0	0	0.0	11	**8.0**
2	Panhala	6	4.6	2	1.5	5	3.8	10	7.7	26	20.0	49	**37.7**
3	Hatkanangle	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	**0.0**
4	Shirol	2	3.8	0	0.0	0	0.0	0	0.0	0	0.0	2	**3.8**
5	Karvir	3	2.3	1	0.8	0	0.0	1	0.8	0	0.0	5	**3.9**
6	Bavda	2	5.1	0	0.0	0	0.0	0	0.0	0	0.0	2	**5.1**
7	Kagal	2	2.3	0	0.0	0	0.0	0	0.0	0	0.0	2	**2.3**
8	Bhudargad	3	2.8	1	0.9	1	0.9	3	2.8	3	2.8	11	**10.3**
9	Ajra	12	12.9	3	3.2	2	2.2	1	1.1	1	1.1	19	**20.4**
10	Gadhinglaj	10	10.8	5	5.4	0	0.0	0	0.0	1	1.1	16	**17.2**
11	Chandgad	15	10.4	3	2.1	2	1.4	3	2.1	1	0.7	24	**16.7**
12	Radhanagari	4	3.4	1	0.9	2	1.7	1	0.9	2	1.7	10	**8.5**
Study Area		**68**	**5.7**	**18**	**1.5**	**12**	**1.0**	**19**	**1.6**	**34**	**2.9**	**151**	**12.7**

Source: District Census Handbooks, Kolhapur District, 1991 & 2001.

The analysis of the population changes of rural settlements in last two decades reveals that, above 80 per cent rural settlements of the study area experiences increasing population and this proportion is high in the tahsils like Shirol, Hatkangale, Karvir and Kagal and low in the tahsils like Radhanagari, Ajra, Gadhinglaj, Chandgad and Bavda. On the other hand, the proportion of rural settlements that decrease population is high in Radhanagari, Ajra, Gadhinglaj and Chandgad tahsils and low in Shirol, Hatkangale, Karvir and Kagal tahsils. In short, the rural settlements of eastern developed tahsils have high population growth and of western hilly tahsils have low population growth. The natural increasing population and in migration are the major causes of high population growth rate. Increasing immigration in eastern tahsils leads to high population growth rate. Though the migration data is not available at tahsil level this fact can be proved by the observation of sex ratio. The sex ratio of eastern tahsils is low and of western tahsils is high and male migration from western part to eastern part of study area is the main cause this phenomenon. The decreasing population is either the result of dividing large settlements (mostly in eastern part) or migration due to the construction of dams or any other cause (mostly in western part). The merging of some part of village to the nearer urban centre is also main cause of depopulation.

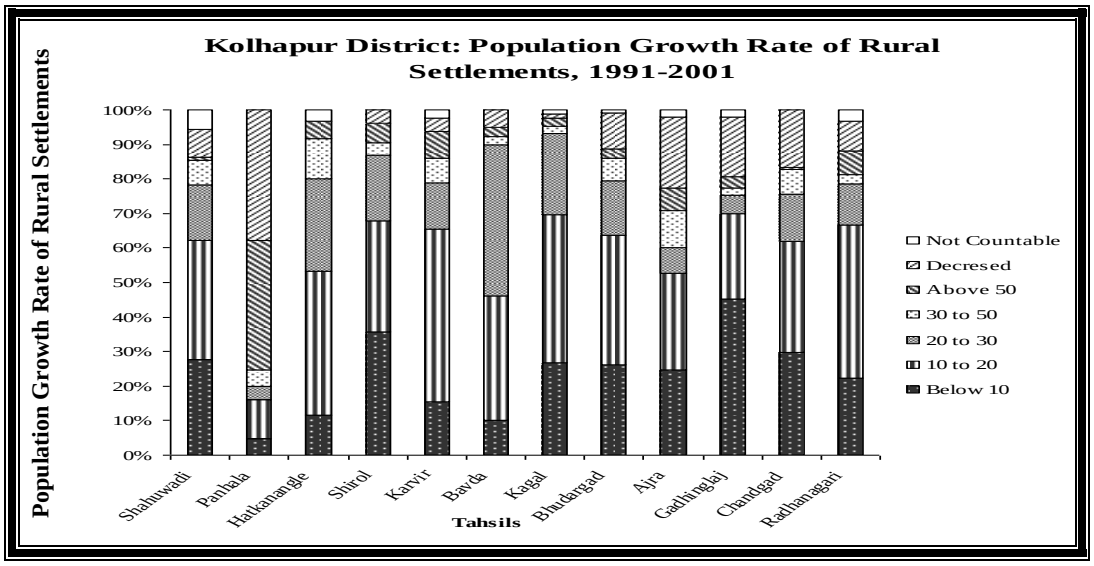

Fig.2

6.0 FACTORS AFFECTING ON GROWTH OF RURAL SETTLEMENTS:

Settlement dynamic is the direct outcome of various socio-economic factors and indirectly affected by physical factors. The increasing population is the direct determent and topography and other physical factors are indirect determents. It is interesting to note that, the growth rate of population is low in western part due to undulating topography and low development; which results, comparatively low increase of upper class settlements in western tahsils than the tahsils located in eastern part of the study region. Migration and judicial factors affected on the individual growth of rural settlements.

7.0 CONCLUSION:

The study regarding growth rate of population of rural settlements clearly reveals that, the most of the rural settlements of Karvir, Shirol, Hatkangale and Kagal tahsils have high population growth rate and very less rural settlements decrease their population in this part. By contrast, most of the rural settlements of other tahsils have low population growth rate and in some cases low rate of decreasing population. The distribution of rural settlements is the outcome of these changes in rural settlements taken place with the time.

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'RELIGIOUS PRACTICES OF VEERSHAIVA-LINGAYAT COMMUNITY IN SOUTH MAHARASHTRA PLATEAU: A GEOGRAPHICAL ANALYSIS'

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ABSTRACT

Among the Indian religions, Veershaivism is a unique religion. Though very similar to Hinduism, it has its own base. Lingayatism is the term used for Veershaivism. Both the terms have the same meaning. Veershaivas believe in a monotheistic world. In which Shiva is supreme deity. They worship Shiva as a lingam. Veershaiva religion has a spiritual base. Despite the spiritual base Veershaivism is well known for its social features. A very important role has been played by Veershaiva religion in giving shape & direction to the Indian society. In the present research paper, an attempt has been made to study Veershaiva Lingayat community from the religious point of view. For the present study the south Maharashtra plateau covering, the Kolhapur, Sangli, Satara, Solapur districts, is selected as a study region. The geographical position of the study region is in the southern part of Maharashtra. The study region lies at the western limit of the Deccan Plateau. The primary data is collected through the field survey to know the social & cultural dynamics of Veershaivas. The primary data as the main source is collected through intensive fieldwork with the help of schedule, questionnaire & through methods of observations, interview & discussions with experts. Secondary data is collected from books, journals, district Census handbooks, district gazetteers, statistical abstracts of the state, socio-economic review and district statistical abstracts etc.

Key Words*:* Veershaiva, Lingayat, Religions, Christian, Buddha, Jains, Sikh, Parsi, *astavarnas, panca acaras and sat stalas.*

1.0 INTRODUCTION:

Religion has been the basis of India's thoughts, the unique guiding principle of her civilization through the ages. On Indian soil various religions are formed. Hindu, Islam, Christian, Buddha, Jains, Sikh, Parsi & Veershaiva are the major religions of India.

Among the Indian religions, Veershaivism is a unique religion. Though very similar to Hinduism, it has its own base. Lingayatism is the term used for Veershaivism. Both the terms have the same meaning. Veershaivas believe in a monotheistic world. In which Shiva is supreme deity. They worship Shiva as a lingam. The term Veershaiva is derived from Veer (Heroic nature) & Shiva (Worshiper of Shiva). The term Lingayat derived from the Lingam or the abstract symbol of Shiva in which God worshiped without any shape. Veershaiva religion has a spiritual base. Despite the spiritual base Veershaivism is well known for its social features. A very important role has been played by Veershaiva religion in giving

shape and direction to the Indian society. It is because of its fundamental social nature.

The Veershaivism, though small in number, constitute a separate entity and have succeeded in maintaining their distinctive features as said earlier is an independent religion. The Veershaiva religion, philosophy, ethics, sacred books, mythology, ideology, aesthetics, holy days, rituals, festivals, outlook towards life & culture, etc. are far distinct from Hindu religion.

Veershaiva religion is one of the oldest religions of India. Though found sparsely all over the India, but highly concentrated in south central India. Especially in Karnataka, Maharashtra, Andhra Pradesh & Tamil Nadu, where roughly 40 million population resides. In this area, 25 per cent are members of Veershaiva religion.

2.0 THE STUDY REGION:

For the present study the south Maharashtra plateau covering, the Kolhapur, Sangli, Satara, Solapur districts, is selected for the study of Veershaiva-Lingayat community. The geographical position of the study region is in the southern part of Maharashtra. The study region lies at the western limit of the Deccan Plateau.

The study region extends from 15^0 44' N to 18^0 35' N latitudes. While stretched from 73^0 33' E to 76^0 25' E longitudes. The whole study region has total area of 42, 264 sq.km. It situated in the river basins of the Krishna, Panchganga, Bhima and their tributaries but most of the study region belongs to drainage system of Krishna River.

From locational point of view the study region is surrounded by Raigarh, Ratnagiri and Sindhudurg districts of Konkan on west, Pune along with Ahmednagar districts of western Maharashtra region to the north, Omanabad district of Marathwada region of Maharashtra state to north-east and Gulbarga along with Bijapur districts of Karnataka state and Goa state to the south. Study region-having population 1, 27, 50,248 that is 13.18 per cent of Maharashtra. However, 13.40 percent area out of total area of Maharashtra is covered by the study region.

3.0 OBJECTIVES:

In the present research paper, an attempt has been made to study Veershaiva Lingayat community from the religious point of view. However, specific objectives are as under:

1. To highlight the religious practices of the Veershaiva Lingayat community.
2. To examine the cultural practices of the Veershaiva Lingayat community.

4.0 DATABASE & METHODOLOGY:

. For the present study the south Maharashtra plateau covering, the Kolhapur, Sangli, Satara, Sholapur districts, is selected for the study of Veershaiva-Lingayat community. The geographical position of the study region is in the southern part of Maharashtra. The study region lies at the western limit of the Deccan Plateau.

The primary data is collected through the field survey to know the social & cultural dynamics of Veershaivas. The primary data is the main source of data and is collected through intensive fieldwork with the help of schedule, questionnaire in addition to observations, interview & discussions with experts. Secondary data is collected from books and journals, district Census handbooks, district gazetteers, statistical abstracts of the state, socio-economic review and district statistical abstracts etc, which are enlightened under references.

5.0 DISCUSSION:

A. RELIGIOUS BELIFS:

Lingayats do not label themselves Hindus and claim an independent status for their faith. The Lingayat theological doctrine of saktivisistadvaita (a qualified monistic philosophy characterized by Sakti, the spiritual power of Shiva); its socialization agents, the guru and the jangama (monk); and its notion of istalinga are distinctively Lingayat in character. Its system involving *astavarnas* (eight supportive systems), *panca acaras* (five principles of conduct), and *sat stalas* (six stages related to social and religious progress) has helped to transform Lingayatism into a distinct framework. Their ethical and behavioral norms have given them a capacity to coexist with other sociocultural groups and at the same time preserve their religious and cultural homogeneity and identity. Lingayats believe in a one-and-only God and

worship him in the form of istalinga, which resembles the shape of a globe. Lingayats are antimagic and anti supernatural in their religious orientation. They do not worship stone images and the deities of the desk tradition. They believe that devotion to Basava and the other Lingayat saints will bring them their blessings and guard their lives.

B. RELIGIOUS PRACTITIONERS:

They have their own priests who officiate at the various life-cycle rites, of which the prominent ones are those dealing with birth, marriage, and death. Priesthood among Lingayats is not inscriptive and is open to all irrespective of sex. Lingayats do not consider the world as *Maya,* an illusion, and reject the Hindu notions of karma, rebirth, purity, and pollution.

I. **CEREMONIES:**

The Lingayat ritual calendar gives prominence to the birthdays of their saints, the first in importance being the birthday of Basava. In addition, they celebrate Hindu festivals such as Dipavali, Dasera,Sankratetc. Their centres of pilgrimage are at Kalyan, Ulive, and Srisaila, the places where Basava, his nephews Cennabasava, Allama Prabhu, and Akka Mahadevi are laid to eternal rest.

II. **LINGADHARANE:**

Lingadharane refers the ceremony of initiation among Lingayats. Usually performed when a child reaches three to eight days old, the baby receives Istalinga from the family Guru worshiped until age eight to eleven years of age. Usually between the ages of eight and eleven years, the child receives *Diksha* from the Guru. From then on, the child wears the Linga at all times for the remainder of her life, worshiped as their own Istalinga. The child keeps the Linga in a small silver and wooden box and cloth, wearing it on the chest or around the body using a thread.

III. BURIAL:

Unlike most other Hindus who cremate the dead, the Lingayat bury their dead. They bury the dead in the *Dhyana mudra* (meditating position) with their *Ishta linga* in their left hand.

IV. Death and Afterlife:

For Lingayats there is no life after death. They believe that there is one and only one life and that a Lingayat can, by his or her deeds, make this life a hell or heaven. At death, he or she is believed to have returned to God and to be united with him. They call this state *aikya* (unity with linga). Since the dead person is believed to have attained the status of Shiva, the body is washed, clothed, decked with flowers, worshiped, and carried in a procession to the burial yard accompanied by singing in praise of Shiva

C. WORSHIP OF THE LINGA:

Veershaivism did not advocate the worship of idols, and the worship of a multitude of Gods and Goddesses. It emphasized the worship of only one God namely Lord Shiva. Shiva was the only Supreme Being to be worshipped in the form of a Linga. Every man or woman who became a Veerashaivite became a Lingayat or a bearer of Lord Shiva. He or she had to wear the image of Shiva on his/her body and Worship it daily. This one of the most important features of Veershaivism consists in the wearing of the personal Angam or Ishtalinga, the emblem of the God Shiva on the body of member of the faith. This applied to both men and women to all age groups irrespective of their social status. The utterance of "*Namah Shivay*" and was the most important simple form of salutationto Lord Shiva. The Ishta Linga or the personal Lingarn was an inseparable part of Veerashaivites life and remained with the devotee till death. For the woman, it was her spiritual husband and for the man his spiritual consort. The Linga was the Source and goal of all things. The Linga helped to grant all objects desired and undesirable. This emphasis on the Ishtalinga can be noted as a symbol of equality of membership in the community.

Since both men and women, young & old were required to Wear a personal Lingam, there was sense of equality of sexes and age groups. Anyone who wore the Ishtalinga, irrespective of his occupational sub grouping was Regarded an equal. Linga was the ultimate reality to all in the Veerashaivite Community. Veershaivism also protested against many of the rituals perpetuated by Brahmanical Hinduism. It was-against temple worship sacrifices and pilgrimages. Veerashaivites were forbidden to visit temples where a statue Linga had been installed. TheyWere discouraged from participating or undertaking sacrificial ceremonies, which Involved

slaughter, and elaborate offerings to Gods and Goddesses. Endowment to Temples was also forbidden because Veershaivism believed that such acts as these encouraged inequality between one devotee and another. Veerashaivisin also Discouraged visiting holy places is**,** such visits did not ensure inn& purity according to them. Visiting holy places did not havelany ritual significance for the Veerashaivite. To this day, Lingayats as a group do not participate in the Kumbha Mela festivals, which are an important attraction to several Shaivite groups in Hindu society. Veerashaivism discouraged its followers from praying to idols of village deities.Meat eating and drinking of liquor was tabooed.

D. THE ANTI-RITUALISTIC NATURE:

The anti-ritualistic nature of Veerashaivism was seen in the simple codes of conduct it laid down for its members. Every Lingayat by offering his daily prayers to Istalinga was' expected to find peace and liberation without the help of a priest temple, or sacrifice. Veerashaivism advocated vegetarianism and whatever little rituals it adopted in the course of times, which were similar for both men and women belonging to any caste or professing any occupation. All Linga wearers equaled free and pure from the taints of birth and death. This point leads us to the next important feature namely the antipollution ideology of Veerashaivism.

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'AGRICULTURAL LAND USE AND CROPPING PATTERN IN SANGLI DISTRICT (MAHARASHTRA)'

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ABSTRACT

Agriculture being a basic activity plays a vital role in Indian economy in which 78.8 per cent people are engaged in this activity. Agriculture affected by physical, socio-economic, as well as organizational factors. Still the Indian agriculture gambles with the monsoon, specifically in drought prone areas. Inadequate rainfall of monsoon and frequent drought conditions are affect general land use and hampered the development of agriculture of the region, resulting in high fluctuations in production. The Sangli District is selected as a study region, which falls in drought prone area of Maharashtra. The paper aims to understand the agricultural land use and to analyze the associated cropping pattern. The very low and inadequate rainfall of this area dominates the land use and cropping pattern. Farming system and crop-combination of arid and sub arid areas is called dry farming. In study area, middle and western part of Sangli District is highest proportion of land under sugar cane. In Miraj, Walva, Palus and Shirala tahsils major agriculture land is under sugar cane and soyabean because this area is irrigated. This area is famous for the Krishna and Man river basin. Generally cropping pattern of district is different from the eastern dry zone VS western wet land.

Key words: *Agriculture, Land use, Cropping Pattern, Economy, Monsoon, Drought prone, Demographic explosion, Kharif and Rabbi.*

1.0 INTRODUCTION:

Land is a basic natural resource. Land and water resources play a major role in the development of any region. The proper utilization of land and Water resources of a region helps to achieve the desired level of development. No subject is probably causing a worldwide concern as ecology in general and environmental degradation in particular. Land is one of the most significant gifts of nature to humankind, which should be utilized carefully. Nevertheless, there is no doubt that most of our present environment difficulties originate from man's ecological misbehavior (Ward 1972). Demographic explosion, technological excesses development process, ever increasing needs and man's ability to transform and utilize the land, at his will, have changed seriously the physical and chemical properties of soil leading to their deterioration.

Agricultural land use simply means the proportion of the area under different crops. It related to the ecological situation, socio-economic condition and other technological factors.

2.0 THE STUDY REGION:

Sangli district is one of the agriculturally developed district of India (Husain, 2003), located in the southern part of Maharashtra state. It is situated between $16^0\,45'$ N. and $17^0\,33'$ N. Latitudes and the $73^0\,41'$ E. and $75^0 41'$ E. Longitudes. Solapur and Satara districts in the north, Bijapur in the east, Belgaum in the south and the Ratnagiri district to the West bound

it. Total area of the district is 8572 Sq. km. The district headquarter is located at Sangli. There are 10 tehsils, 731 villages and 8 towns in the district. Area of 629200 hectares is under agriculture in Sangli district and support population of district is 25, 81, 835 according to 2001 census. According to 2001 census, the density and literacy rate of the study region is 258 persons per sq km. and 76.7 per cent respectively.

3.0 OBJECTIVES:

1. To understand the Agricultural land use pattern of the study region.
2. To study the cropping pattern of study region.
3. To study the dry zone and wet land cropping pattern in Sangli District.

The Sangli District
Location

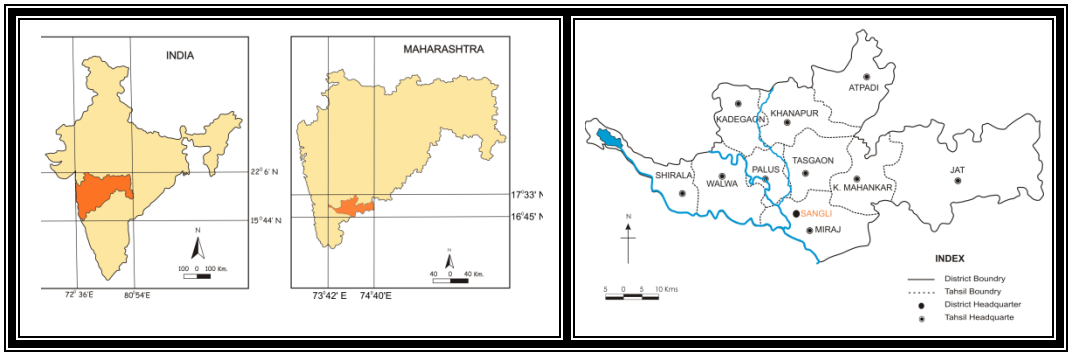

Fig. 1

4.0 DATA SOURCE AND METHODOLOGY:

The data of different kinds have been collected from the primary and secondary sources. The primary data collected through interviews and discussions and secondary data from published and unpublished report and abstracts such as socio-economic review, Agricultural office, Tehsildar office and zilla parishad Sangli.

As the entire study is based on the data collected by various sources and interviews, discussions with the knowledgeable persons the following methodology is adopted.

1. The Tehsil is considered as unit of investigation and percentage of area under various crops in both *Kharif* and *Rubbi* season is considered.
2. Agricultural land use information on cadastral map, land record and field notes are used for the study.
3. Information and results are presented through Tables and suitable Diagrams.

5.0 DISCUSSION AND ANALYSIS:

The Sangli District is southern district of Maharashtra having climatic as well as agricultural variety. The varieties of crops produced in this region but the food grains are the major crops of this area which posses' highest proportion of land of the net sown area. Generally the rain feed crops are the major crops of eastern side of Sangli district. Jawar, Bajara and Pulses are important crops of the drought prone area (Table No. I and II and Fig. 2) of the study region.

The varieties of crops are produced in the study region. However, the dominance of drought prone condition of the area reflects in the cropping pattern. Food grains are the major crops of the region, which accounts highest proportion of land of the total net sown area. The main food grains are Jawar (41.61%) Bajara (15.19%) Maize (1.05%) Wheat (5.12%) other cereals (0.09%) whereas, pulses covers only 13.60 per cent of land which includes Gram (5.85%) Tur (2.69%) and other pulses (5.06%) observed in study region.

TABLE-I
LAND UNDER VARIOUS CROPS 2005-06 (Area in Ha.)

Sr.no	Crops	Miraj	Jath	Khanapur	Kadegaon	Walva	Tasgaon	Palus	Shirala	Atpadi	K.Mahankal	Total
1	Kharif Jowar	12290	197	2900	16960	6185	30620	6100	2790	200	9134	87376
2	Rabbi Jowar	13705	54328	1450	870	3065	2100	1350	1510	16450	18530	113358
3	Bajara	7920	22238	6500	1785	85	540	-	-	20500	13720	73288
4	Maize	500	1932	400	105	655	220	140	165	600	390	5107
5	Wheat	4600	3120	2500	1560	4485	2560	2300	1540	840	1225	24730
6	Other cereals	70	12	255	65	-	80	-	-	-	-	482
7	Gram	5050	1624	3100	530	6335	4050	2610	1680	750	2530	28259
8	Tur	1410	262	3600	2403	665	2190	270	172	1100	910	12982
9	Other Pulses	4500	2241	3800	4130	655	2430	980	1310	1500	2870	24416
10	Sugarcane	11610	151	10	742	18070	630	4475	4190	18	200	40096
11	Cotton	500	1800	155	105	15	40	-	-	450	60	3125
12	Groundnut	100	22	100	70	15	-	15	-	-	90	412
13	Soyabean	16307	14	4300	7534	23100	5600	7185	3860	200	460	68560
14	Other oil seeds	16	5	25	15	15	5	-	-	45	-	126
	Total	78578	87946	29095	36874	63345	51065	25425	17217	42653	50119	482317

Source *– Agriculture Office Zilla Parishad Sangli.*

Kharif and Rabbi Jawar and Pulses
(2005-06)

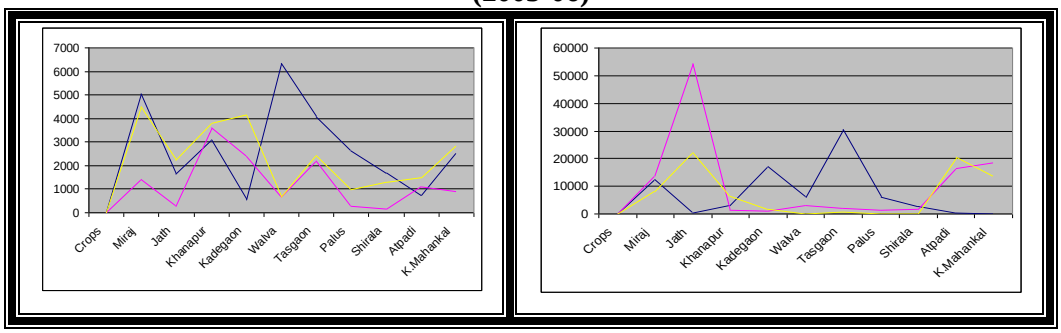

Fig. 2

TABLE -2
PERCENTAGE TO TOTAL NET SOWN AREA OF SANGLI DISTRICT

Sr. No.	Crops	Miraj	Jath	Khanapur	Kadegaon	Walva	Tasgaon	Palus	Shirala	Atpadi	K.Mahankal	Total
1	Kharif Jowar	2.54	0.04	0.6	3.51	1.28	6.34	1.26	0.57	0.04	1.89	18.07
2	Rabbi Jowar	2.84	11.26	0.3	0.18	0.63	0.43	0.27	0.31	3.41	3.84	23.47
3	Bajara	1.64	4.61	1.34	0.37	0.01	0.11	-	-	4.25	2.84	15.17
4	Maize	0.1	0.4	0.08	0.02	0.13	0.04	0.02	0.03	0.12	0.08	1.02
5	Wheat	0.95	0.64	0.51	0.32	0.92	0.53	0.47	0.31	0.17	0.25	5.07
6	Other cereals	0.01	-	0.05	0.01	-	0.01	-	-	-	-	0.08
7	Gram	1.04	0.33	0.64	0.1	1.31	0.83	0.54	0.34	0.15	0.52	5.8
8	Tur	0.29	0.05	0.74	0.49	0.13	0.45	0.05	0.03	0.22	0.18	2.63
9	Other Pulses	0.93	0.46	0.78	0.85	0.13	0.5	0.2	0.27	0.31	0.59	5.02
10	Sugarcane	2.4	0.03	-	0.15	3.74	0.13	0.92	0.86	-	0.04	8.76
11	Cotton	0.1	0.37	0.03	0.02	-	-	-	-	0.09	-	0.61
12	Groundnut	0.02	-	0.02	0.01	-	-	-	-	-	0.01	0.06
13	Soyabean	3.38	-	0.89	1.56	4.78	1.16	1.48	0.8	0.08	0.09	14.22
14	Other oil seeds	-	-	-	-	-	-	-	-	-	-	0.02
	Total	16.29	18.23	6.03	7.64	13.13	10.58	5.27	3.56	8.88	10.39	100

Source *– Computed by the authors.*

The proportion of oilseeds remains only 14.31 per cent in the study area which includes the groundnut (0.08%) soyabean (14.21%) other oilseeds shares is (0.02%), Besides this sugarcane (8.31%). The eastern study area possesses the dry farming nature of the agriculture agricultural land depends upon the monsoon rainfall of the area and only little area is under irrigation. Generally well, tube well and canal irrigation through tank is developed in the study area.

6.0 Conclusions:

- Natural, socio-economic and other technological factors have affected the cropping pattern of the study region
- The eastern part of Sangli district falls in drought prone region, which affects the cropping pattern in resulting the four-crop combination.
- Generally, the rain fed crops are the major crops of this area for i.e. Bajara, Kharif Jowar, Pulses and Rabbi Jawar in eastern study region.
- The cropping pattern of this area hampered frequently through the frequent drought conditions.
- Very low percent of the cultivated land in dry zone of eastern part is under irrigation by means of wells, tube wells and tank irrigation in the study area which cannot replaced the specific cropping pattern of this study region.
- Various projects, which are taken by the Govt. of Maharashtra specifically for the droughtprone area named Mahishal, Takari and Tembu, are in the progressive stage. After the competition of three projects water is supplied to the agriculture by Canals then and then the total scenario of the existing cropping pattern may be change in the drought prone areas in near future.
- The main food grains grown are Jawar (41.61%) Bajara (15.19%) Maize (1.05%) Wheat (5.12%) other cereals (0.09%) whereas, pulses covers about 13.60% of land which includes Gram (5.85%) Tur (2.69%) and other pulses (5.06%) observed in study area.

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'BUFFALOES REARING AS A SIDELINE FOR FARMING: A CASE STUDY OF VILLAGE HINGNI (DISTRICT SOLAPUR, MAHARASHTRA)'

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ABSTRACT

India has 66 per cent of economically active population, engaged in agriculture. The scarcity of rainfall and traditional method of farming are the causes of poor economic condition of farmers. There is a need to improve economic condition of farmers. The Buffloes rareing is one of the ways to improve economic condition of farmers. So, present paper attempt to analyse the impact of Buffloes rearing on earning of farmers in the village Hingni. The paper is based on primary data. To examine the impact of Buffaloes on earning of farmers, the statistical technique has been used i.e. coefficient of correlation, coefficient of determination and regression analysis. The rate of change in dependent variable has been estimated with the help of 'b' coefficient, which is the line of best fit. It was assumed that the numbers of Buffaloes are higher; the more is the earning of farmers. It is found that 64.26 per cent of the total variation in net earning of farmers from Buffaloes is influenced by the variable 'X' i.e. number of Buffloes. The regression coefficient indicates that increase of one Buffloes causes 19.15 thousand rupees increase in net earning of farmers per year.

Keywords: *Buffaloes, Net Earnings, Correlation, Regression*

1.0 INTRODUCTION:

In modern sense, the agriculture consists of practice of cultivation of crops raising livestock, fish, pig farm, goat farm and poultry. India derives nearly 33 per cent of the Gross Domestic Production (GDP) from agriculture and has 66 Per cent of economically active population engaged in agriculture. Agriculture is a largest employment-generating sector in India.

Though mixed farming has been a common practice in India since immemorial due to existence of complementary and supplementary relationship between crop production and animal production systems. The share of livestock product is estimated at 21 per cent of total agricultural sector. With the development of technology in dairy farming, transportation and growth rate of literacy, the practice of animal rising have been changed considerably. Government policies also play important role to change in animal rising from subsistence to commercialization. Dairy has gained momentum due to commercialization and it is a rural income generating activity in India. Therefore, there is considerable increase in Buffaloes and milk production. Buffaloes are playing a more constructive role in promoting rural welfare and reducing poverty, especially in developing countries like India.

In last five years, the problem of suicide of farmers has become very prominent in Maharashtra. The majority of farmers are cultivating crop according to tradition and if rainfall is scarce, it results into crop failure. Prices of food grains decrease considerably during harvesting season. This situation is the cause of poor economic condition of farmers, which make them to commit suicide. So, there is a dire need to improve economic condition of farmers to overcome this problem. The economic condition of

farmers can be improved through rising of Buffaloes as a sideline for farming. Rising of Buffaloes is an important way to improve economic condition of farmers. Agriculture enterprise has not provided constant employment to rural population but Buffaloes has not only provided gainful employment but also provided assured and regular income. More over Buffaloes gives fertilizer, which is very useful to increase fertility of soil, also give biogas, which save our firewood in turn help to conduct environmental balance. On this basis, it can be hypothesized that the higher is the number of Buffaloes, the more is the earning, which helps to improve economic condition of farmer. Hence, an attempt is made to test the hypothesis, the number of Buffaloes & net earnings of farmers through the study of the village Hingni (p).

2.0 THE STUDY REGION:

The village Hingni (p) lies in Eastern part Barshi Taluka of Solapur District, which is part of drought prone region of Maharashtra plateau. Absolute location of village is 18^0 8' 53'' North latitude and 75^0 49' 55'' East longitude. The geographical area of village is 360 hectors, out of that 90 per cent is under cultivation. The share of cultivators and agricultural labors are 35.7 and 46.8 per cent respectively that indicates the agriculture is the main occupation of peoples of the village. The village has hot and dry climate, with an average annual rainfall of 665.84 mm. The village has surface irrigation facility due to Hingni Pangaon Medium Project.

The Village Hingni
Location Map

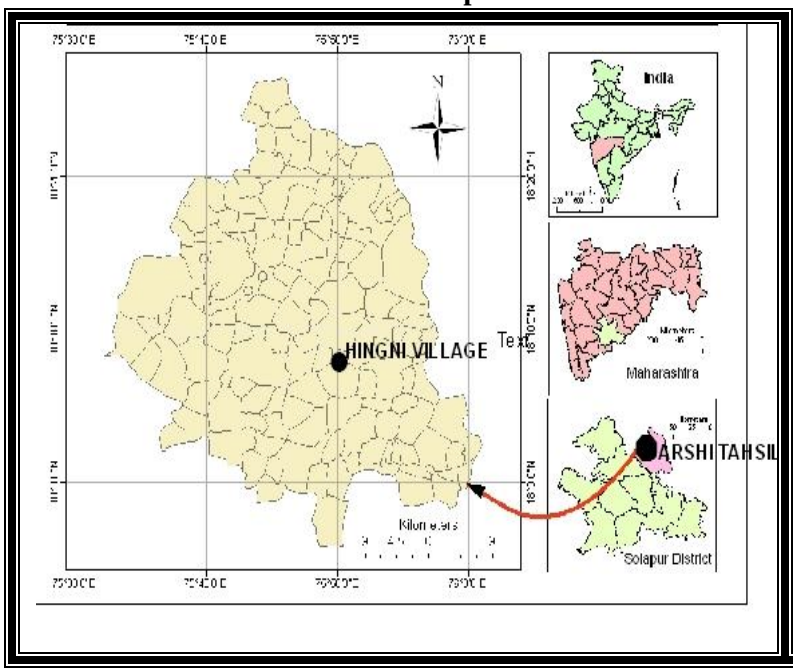

Fig. 1

3.0 OBJECTIVES:

The main objectives of this paper are

1. To assess the impact of Buffaloes on the earning of farmers as a sideline for farming.
2. To estimate the rate of change in the net income of farmers in relation to change in number of Buffaloes.

4.0 Data collection and Methodology:

In order to meet these objectives the relevant primary as well as secondary data is collected for the year of 2009-10. The primary data is collected with the help of field survey along with questionnaire. During the field survey, out of 127 animal raising farmers 24 farmers were surveyed. This constituted about 18.89 per cent to total animal raising farmers. Systematic sampling method was applied, every 5^{th} milk animal raising farmer is considered in the village. The secondary data was collected from Talathi office, Agriculture officer and Gram Panchayat Karyalay.

Collected data is processed and tabulated. To examine the impact of Buffaloes on earning of farmers the Pearson's Coefficient of correlation technique has been applied. The degree of relationship by considering number of Buffaloes as an independent variable 'X' and net earnings of farmers as dependent variable 'Y' is measured.

The functional form of linear relationship has been measured by using regression equation Y on X i.e. y = a + bx. The rate of change in dependent variable has been estimated with the help of 'b' coefficient, which is the line of best fit. The't' test is used with the view to understand the confidence level. Analysis of the study has been made with help of the statistical techniques and based on these results conclusions are drawn.

5.0 DISCUSSION AND ANALYSIS:

A. NUMBER OF BUFFALOES:

The table-I indicates that the share of Milk animals is 78.52 per cent of total livestock in the village and ranks first in livestock, which is more than the taluka average i.e. 36.79 per cent. In village Hingni (p), 75 per cent farmers are raising Milk animals. The various Milk animals are rearing in the village, such as crossbreed cows, Indigenous cows, and buffaloes.

Table-I

Livestock in the village Hingni (p) 2009-10

Livestock	Milk Animals	Bullocks	Goats
Per cent to total Livestock	78.52	18.79	2.28

Source: *Field Survey*

Table-II

Milk animals in village Hingni (p) 2009-10

Buffaloes	Cows	Buffaloes
Per cent to total Livestock	31.62	68.38

Source: *Field Survey*

The table-II exhibits that buffaloes are dominants among Milk animals and shares 68.38 Per cent of total Milk animals. Cows shares 31.62 per cent of total Milk animals and ranks second in totals Milk animals. The main causes of high percentage of buffaloes are:

1. Buffaloes are well suited in Indian climate than crossbreed cow.
2. Expenditures of Buffaloes are less than crossbreed cow.
3. Domestic cell of milk of buffaloes is high due to high percentage of fats in milks.
4. The Availability of green fodder due to high percentage of irrigated area.

Table-III

Number of Buffaloes and Net Earnings of Farmers

Sr. No. of Famers	Number of Buffaloes	Net earnings of Farmers in 000Rs.
1	2	49.83
2	2	18.57
3	2	10.03
4	1	-3.22
5	2	22.84
6	1	9.29
7	2	22.84
8	1	9.29
9	1	3.03
10	2	2.1
11	2	4.08
12	2	31.08
13	4	53.00
14	1	9.29
15	1	3.03
16	1	3.03
17	4	84.42
18	1	1.05
19	2	4.08
20	1	7.3
21	2	10.34
22	1	7.3
23	1	9.98
24	2	2.1

Source: *Field Survey*

B. NUMBER OF BUFFALOES AND NET EARNINGS OF BUFFALOES RAISING FARMERS:

The table -III indicates that the number of Buffaloes of a farmer is ranging from one to four in the village. The farmers who have one Buffalo have 1.05 to 9.98 thousand rupees per year, whereas the farmers who have two Buffaloes have 2.1 to 49.93 thousand rupees per year. The farmers who have four Buffaloes have 53 to 84.42 thousand rupees

per year. It is to be observed that there is a variation in net earnings of those farmers who have the same number of Buffaloes and there are some exceptions that have high higher number of Buffaloes but net earnings is relatively low. Both of these are due to the variation in cautiousness of farmers, Variation in the breed of animals and Variation in income from crops. It is to be observed that there is one farmer who has loss in Buffaloes rearing.

C. CORRELATION BETWEEN THE NUMBER OF BUFFALOES (X) AND NET EARNINGS (Y):

The positive relationship between the number of Buffaloes (X) and net earnings (Y) of farmers has been observed in the village. The coefficient of correlation in this regard is at r = + 0 .8016. It indicates that there is a very good positive relationship between the variables 'X' and 'Y'. The degree of linear association between these two variables obtained by using the coefficient of determination (r2) is found to be at 0.6426, which reveals that the independent variable (X) i.e, the number of Buffaloes are explaining 64.26 per cent of the total variations in dependent variable (Y) i.e. the net earnings of farmers in the village. It is a good explanation because more than 64 per cent of the variations in (Y) net earnings to be influenced by the variable (X) i.e. number of Buffaloes and about 35.74 per cent of the variation is left to be influenced by other variables.

LINE OF BEST FIT
CORRELATION BETWEEN THE NUMBER OF BUFFALOES AND NET EARNINGS

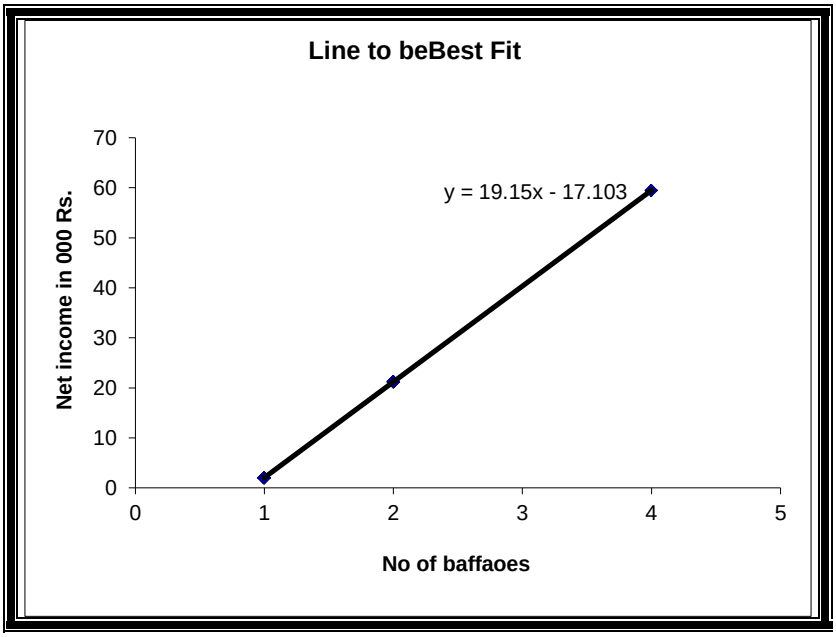

Fig. 2

The functional form of linear relationship of Y on X found to be at Y = -17.103 + 19.15 x. The line of best fit is shown in the figure 2. The regression coefficient indicates that increase of one Buffalo causes for an increase of 19.15 thousand rupees of farmers per year. By testing the significance of regression coefficient (a test of significance), the validity of this causal relationship has been confirmed,

The equation used $t = (b-\beta)\sqrt{(n-2)\Sigma(Xi-\bar{X})^2 \div \Sigma (Yi-yi)^2}$

The calculated value of 't' in this exercise is found at 6.28. It is observed that this calculated value is greater than the tabulated value of 't' (2.82) at the 22 degree of freedom (df = n –2, where 'n' is 24) even at 1 per cent level of significance.

In order to understand the degree of fit of regression equation and the accuracy level of predicted values (y) for farmers of Village Hingni (p) the standard error (SE) of estimate is being done with the equation SE (Y) = SY $\sqrt{1-r2}$, where SE (Y) is the standard deviation of residuals (Y-y); and 'SY' is the standard deviation of 'Y'. The confidence interval of the predicted values are worked out at Y = Y ± SE (Y) (The

Table-IV

Residuals from regression of net earnings from number of Buffaloes

Farmers	Y	y	Y-y
1	49.83	21.197	28.63
2	18.57	21.197	-2.63
3	10.03	21.197	-11.17
4	-3.22	2.047	-5.27
5	22.84	21.197	1.64
6	9.29	2.047	7.24
7	22.84	21.197	1.64
8	9.29	2.047	7.24
9	3.03	2.047	0.98
10	2.1	21.197	-19.10
11	4.08	21.197	-17.12
12	31.08	21.197	9.88
13	53.00	59.497	-6.50
14	9.29	2.047	7.24
15	3.03	2.047	0.98
16	3.03	2.047	0.98
17	84.42	59.497	24.92
18	1.05	2.047	-1.00
19	4.08	21.197	-17.12
20	7.3	2.047	5.25
21	10.34	21.197	-10.86
22	7.3	2.047	5.25
23	9.98	2.047	7.93
24	2.1	21.197	-19.10

Source: *Compiled by Researcher*

SE (Y) for the present exercise is 12.26 and SY is the 20.51). Thus, it is assumed that if the values of 'Y' (Y-y) lie within the range of Zero to ± SE, the prediction could be

expected to be accurate. In other words, the role of independent variables in explaining the change in dependent variable can be accepted as correct.

In this context it has been observed that the predicted values (given in table -4) of 18 farmers out of 24 in the present study lie within the range of ± SE, 4 within ± SE to ± 2 SE and 2 above ± 2 SE. Now the obvious inference is that the 75 per cent of the total number of observation (n is 24) the regression is a good indicator meaning thereby that the variations of net earnings of farmers in village Hingni (p) is the function of the variations of number of Buffaloes. In the case of other farmers with residuals between > ± SE to ± 2 SE and above 2 ± SE, the situation is different because here the regression is a poor indicator. It clearly indicates that these are the farmers on whom the influence of variables other than the independent one. The variations of net earnings in the latter case may be due to the variation in cautiousness of farmers, Variation in the breed of animals.

6.0 CONCLUSION:

This study reveals that there is high positive correlation between number of Buffaloes and net earnings of farmers in village Hingni (p). The numbers of Buffaloes are found to be more effective than the other variables considering per year net earnings of farmers from milk. It is found that increase of one Buffalo causes for an increase of 19.15 thousand rupees per year of farmers those rearing Buffaloes. Therefore, it is to be stated that the raising of Buffaloes is helpful to improve economic condition of farmers. Public awareness to raise Buffaloes as a sideline for farming is essential to overcome the problem of suicide of farmers due to poor economic condition.

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'SATISFACTION INDEX OF RELIGIOUS TOURISTS VISITING NALDURG KHANDOBA, DIST- OSMANABAD'

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ABSTRACT

Religious tourism, also commonly referred to as faith tourism, is a form of tourism, whereby people of faith travel individually or in groups for pilgrimage, missionary, or leisure (fellowship) purposes. The world's largest form of mass religious tourism takes place at the annual Hajj pilgrimage in Mecca, Saudi Arabia. North American religious tourists comprise an estimated $10 billion of this industry. Religious tourism in India has immense potential to evolve as a niche segment; there are hurdles to be overcome i.e. poor tourism infrastructure, poorer infrastructure of religious centres inadequate facilities for lodging, boarding etc.

The present paper is an attempt to highlight the facilities available and difficulties faced by the Naldurg Khandoba pilgrims and suggest some viable suggestions in order to develop the religious tourism. By taking into account objectives of the study primary as well as secondary data is collected and utilized. The satisfaction Index is calculated by using following equation: - **SIi=∑MiNi / N**

The study reveals that there is an unsatisfactory of the tourists regarding Darshan, sanitary conditions and accommodation where as tourists are satisfied about transportation facility.

Key words: *Religious Tourism, Khandoba, Tourist Satisfaction Index, Relative Importance Index and Pilgrims*

1.0 INTRODUCTION:

Tourism means ‘a journey’ in English and a ‘circular trip’ in French. Tourism is a temporary movement of peoples at a place outside their normal place of work or residence. Tourists always visit a particular place in search of pleasure. Sometimes other motives like business, education, religious, medical; friends, relatives etc supplement this motive. Tourism is classified as religious tourism, educational tourism etc. based on motives.

Religious tourism, also commonly referred to as faith tourism, is a form of tourism, whereby people of faith travel individually or in groups for pilgrimage, missionary, or leisure (fellowship) purposes. The world's largest form of group religious tourism takes place at the annual Hajj pilgrimage in Mecca, Saudi Arabia. North American religious tourists comprise an estimated $10 billion of this industry.

Religious tourism in India has immense potential to evolve as a niche segment, there are hurdles to be overcome i.e. poor tourism infrastructure, poorer infrastructure of religious centers inadequate facilities for lodging, boarding, travel etc.

2.0 THE STUDY REGION:

The historical Place Naldurg is one of the important cities in Osmanabad district of Maharashtra state. Naldurg is situated on 17^0 49' North latitude and 76^0 20' East longitudes and is 40 Km. away from Solapur city to the east. Lord Khandoba, Tomb of Nanima and Naldurg fort are the points of attractions. Khandoba is Venerable Gods of many people especially low caste people. Three to Five lacks people gather at the time of Khandoba's festival in Poush Shudha Dashmi every year.

3.0 OBJECTIVES:

The present paper is an attempt to highlight the facilities available and difficulties faced by the Naldurg Khandoba pilgrims and suggest some viable suggestions in order to develop the religious tourism. However, specific objectives are-

1. To evaluate spatial interplay of pilgrims demand and satisfaction.
2. To study the problems of pilgrims and their expectation.
3. To suggest comprehensive plan for the solution of problems.

4.0 DATA SOURCE AND METHODOLOGY:

Present analysis is based upon the primary data hence, observation and interview method is applied for the collection of data. For that purpose, questionnaire is prepared and data is collected through random sampling method. The collected data processed and tourist Satisfaction Index and Relative Importance Index is calculated. The equations are as given below:-

RIi=∑MiNi / N

Where

RIi= relative importance index for i th factor

Mi= Numerical value for the i th order of importance for a particular factor

Ni= Number of respondents assigning the i th order of importance for the Particular factor

N=Total number of respondents for each factor.

SIi=∑MiNi / N

Where

SIi= satisfaction index for I th factor

Mi= Numarical value for a particular level of satisfaction for the I th factor

Ni= Number of respondents deriving the particular value of satisfaction for the I th factor

N=Total number of respondents for that factor for all level of satisfaction.

Ultimate satisfaction index =∑SIRI /∑RI

5.0 FACTOR WISE LEVEL OF SATISFACTION:

Tourism industry always deals with the human being in each stage. Satisfied tourist is most important and powerful medium of publicity, while dissatisfied tourists were injurious to the industry. Hence, it is very important to give best service to the maximum number of tourists.

Pilgrims satisfaction depends upon many things like accommodation, blind faith eradication, climatic condition, co-operation from local people, co-operation from NGOs, co-operation from priest, co-operation from trust, darshan facility, entertainment and cultural program, food and drinking water, infrastructure development, medical facilities, parking facility, personal safety, police protection, sanitation, shopping facilities, transport etc. By considering the above factors pilgrims were requested to express their satisfaction in the points (out of 10) and the classification was done on the basis of points 8-10 for excellent, 6-8 for good, 4-6 for satisfactory and 0-4 points for unsatisfactory. The average values for the different level of satisfaction were calculated. By multiplying these values by respective frequencies gives total satisfaction. When total satisfaction is divided by total frequency of the respective factor would give the satisfaction index for the factor.

Table – I
Factor wise level of satisfaction

Factor	Excellent	Good	Satisfactory	Unsatisfactory	Total
Accommodation	88	79	174	289	630
Blind faith eradication	11	10	231	378	630
Climatic Condition	118	91	194	227	630
Co-operation from local people	221	177	133	99	630
Co-operation from NGOs	0	0	185	445	630
Co-operation from Priest	202	162	163	103	630
Co-operation from Trust	111	82	175	262	630
Darshan Facility	133	97	189	211	630
Entertainment and Cultural programme	278	193	134	25	630
Food and Drinking Water	141	111	203	175	630
Infrastructure Development	43	59	189	339	630
Medical facilities	59	65	185	321	630
Parking facility	242	181	129	78	630
Personal safety	161	136	178	155	630
Police protection	149	127	192	162	630
Sanitation	0	0	208	422	630
Shopping Facilities	182	147	180	121	630
Transport	287	201	131	11	630

Source- *Field Work*

Table – II
Factor wise level of satisfaction wise average value assigned by tourists

Factor	Numerical Values for			
	Excellent	Good	Satisfactory	Unsatisfactory
Accommodation	8.2	6.7	4.9	2.5
Blind faith eradication	8.1	6.2	4.7	1.9
Climatic Condition	8.3	7	5.1	2.9
Co-operation from local people	8.9	7.7	5.6	3.7
Co-operation from NGOs	0	0	4.5	1.5
Co-operation from Priest	8.9	7.6	5.6	3.7
Co-operation from Trust	8.2	6.9	5.1	2.8
Darshan Facility	8.4	7.2	5.2	3.1
Entertainment and Cultural programme	9.4	7.9	5.8	3.9
Food and Drinking Water	8.4	7.2	5.3	3.1
Infrastructure Development	8.1	6.4	4.8	2.1
Medical facilities	8.1	6.5	4.9	2.3
Parking facility	9.1	7.8	5.7	3.8
Personal safety	8.5	7.4	5.4	3.5
Police protection	8.4	7.3	5.4	3.4
Sanitation	0	0	4.6	1.6
Shopping Facilities	8.7	7.4	5.5	3.6
Transport	9.6	7.9	5.8	3.9

Source- *Field Work*

It can be seen from the table-I that out of 630 pilgrims only 88 have ranked accommodation as excellent and 79 as good. 287 pilgrims have ranked transport as excellent, 201 as good, 131 as satisfactory and only 11 as unsatisfactory. 278 pilgrims have ranked entertainment program as excellent 193 as good and 134 as satisfactory and so on. The level of satisfaction of pilgrims in respect of factors like accommodation ,blind faith eradication, climatic condition, co-operation from local people, co-operation

from NGOs, co-operation from priest, co-operation from trust, darshan facility, entertainment and cultural program, food and drinking water, infrastructure development, medical facilities, parking facility, personal safety, police protection, sanitation, shopping facilities, transport etc.

Table-III
Factor wise satisfaction index (points out of 10) and there rank.

Factor	satisfaction index	Positional Rank
Transport	8.2	1
Entertainment and Cultural program	8.0	2
Parking facility	7.4	3
Co-operation from local people	7.0	4
Co-operation from Priest	6.9	5
Shopping Facilities	6.5	6
Personal safety	6.2	7
Police protection	6.0	8
Food and Drinking Water	5.7	9
Darshan Facility	5.5	10
Climatic Condition	5.2	11
Co-operation from Trust	4.9	12
Accommodation	4.5	13
Medical facilities	4.0	14
Infrastructure Development	3.7	15
Blind faith eradication	3.1	16
Sanitation	2.6	17
Co-operation from NGOs	2.4	18

Source- *Field Work*

Table-IV
Factor wise order of importance attached by the tourists

Factor	Order of importance				Total	R.I. Index
	1st	2nd	3rd	4th	respondents	(points out of 10)
Accommodation	443	154	16	17	630	9.1
Blind faith eradication	34	218	320	58	630	5.9
Climatic Condition	318	280	13	19	630	8.6
Co-operation from local people	150	190	150	140	630	6.4
Co-operation from NGOs	26	115	192	297	630	4.5
Co-operation from Priest	411	123	80	16	630	8.7
Co-operation from Trust	180	166	180	104	630	6.7
Darshan Facility	525	80	17	8	630	9.5
Entertainment and Cultural programme	358	232	28	12	630	8.7
Food and Drinking Water	504	102	11	13	630	9.4
Infrastructure Development	354	204	64	8	630	8.6
Medical facilities	360	142	68	60	630	8.2
Parking facility	230	180	80	140	630	7.0
Personal safety	458	140	24	8	630	9.2
Police protection	402	144	44	40	630	8.6
Sanitation	284	146	186	14	630	7.8
Shopping Facilities	435	170	13	12	630	9.1
Transport	331	248	41	10	630	8.6

Source- *Field Work*

It is interesting to note that the satisfaction index for the pilgrims for Transport works out to 8.2, entertainment 8.0, for parking facility 7.4, for co-operation from local 7.0, for food and drinking water 5.7, for accommodation 4.5, for shopping facilities 6.5 and for sanitation 2.6. It is to be noted that transportation have ranked highest.

Table-V
Factor wise contribution to ultimate satisfaction

Factor	points out of 10		
	SI	RI	SI X RI
Accommodation	4.5	9.1	40.64
Blind faith eradication	3.1	5.9	18.32
Climatic Condition	5.2	8.6	44.35
Co-operation from local people	7.0	6.4	45.04
Co-operation from NGOs	2.4	4.5	10.68
Co-operation from Priest	6.9	8.7	59.60
Co-operation from Trust	4.9	6.7	32.87
Darshan Facility	5.5	9.5	51.80
Entertainment and Cultural programme	8.0	8.7	69.34
Food and Drinking Water	5.7	9.4	53.48
Infrastructure Development	3.7	8.6	31.96
Medical facilities	4.0	8.2	33.06
Parking facility	7.4	7.0	51.50
Personal safety	6.2	9.2	56.39
Police protection	6.0	8.6	51.43
Sanitation	2.6	7.8	20.15
Shopping Facilities	6.5	9.1	59.04
Transport	8.2	8.6	70.01
	∑	**144.2**	**799.65**

Source- *Field Work*

It could be seen from Table 4 that Out of 630 respondents 443, 154, 16 and 17 respondents assigned first order, second order, third order and fourth order importance for accommodation, respectively. Out of 630 respondents 402 respondents' assigned 1st order, 144 respondents' assigned 2nd order, 44 respondents' assigned 3rd order, 40 respondents' assigned 4th order of importance for police protection (Table-IV). To calculate relative importance index 10 points are given to 1st order of importance, 7.5 points for 2nd order of importance, 5 points for 3rd order of importance and 2.5 points for 4th order of importance.

It is remarkable to note that the maximum points are given to darshan facility followed by food and drinking water, personal safety and other in the order of importance.

The ultimate satisfaction of the tourists depends on both order of importance of a particular and satisfaction derived from the respective factor. To calculate ultimate satisfaction weighted satisfaction index was calculated by using both satisfaction index and relative importance index.

The Ultimate Satisfaction Index is 5.54 out of 10 points (Table-V). This is satisfactory level of satisfaction but further improvement is essential by providing better and better services.

6.0 CONCLUSIONS:

- Relative importance index of darshan facility is at first rank but satisfaction index is at tenth rank, which means improvement in darshan facility is required.
- Relative importance index for transportation is six but satisfaction index is at first rank that means transportation in study area is well developed from point of tourists.
- According to the pilgrims darshan, food, personal safety, shopping facility and are very important but study region is lacking most in this facility.
- Pilgrims are not satisfied with sanitary condition in the fair.
- Accommodation facilities have thirtieth rank of satisfaction index while it holds fourth rank in case of relative importance index it reveals that accommodation facilities have tremendous scope for development.

7.0 SUGGESTIONS:

- Cheaper accommodation facilities like *dharmashala* are required to attract more pilgrims.
- Information on the mythological significance of the places of pilgrimage will need to be provided in advance so that tourists are better prepared. Traditional

dances, music and theatre related to the religious shrine will have to be built into the itinerary

- It is essential to develop nearby tourists' potential stations to attract more tourists.
- Discourses on the essence of the religious beliefs, workshops on yoga and ayurvedic practices can add immense value to religious tourism.
- There will need to be taken care of will be to provide the tourists with a holistic religious experience. Tourists may not find it worthwhile to come all the way just for a pilgrimage.

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'URBAN MORPHOLOGY: A CASE STUDY OF PANDHARPUR TOWN, MAHARASHTRA'

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ABSTRACT

Urban centers are the areas of complex land use pattern where different types of activities have been taken place in the different parts of the urban centers. Present paper intends to focus on existing structure of Pandharpur urban center its land use and affecting factors on them. The study is mainly based on records of Pandharpur municipal council. Different land use categories have been observed in the study region and simple percentage of these categories has been worked out. The results have been crosschecked through fieldwork and Google Images. It is concluded that, generally the morphology of Pandharpur influenced by its religious importance in both central part and peripheral part also.

Key words: *Urban Morphology, Town, Land Pattern, Residential use and Literacy rate.*

1.0 INTRODUCTION:

Urban morphology is considered as the study of urban tissue or fabric as a means of discerning the structure of the built landscape (www.wikipedia on answer.com). Special attention should be study how physical form of a city changes over time and to how different cities compare to each other. This can involve the analysis of physical structures at different land use ownership or control and occupation. It will clear that one can decide the exact location of different pareses which are right or wrong by studying urban morphology. In addition, to overcome the traffic problem and developed urban morphology should be studied. The origin and development process affects on the morphology of urban centers. Classifying different type of morphologies, although, it is clear that a much wider range of types will be required before the rudiments of any theory of morphology can be finished around these ideas (Batty, 2000).

2.0 THE STUDY REGION

The study region selected for present investigation is the "Pandharpur town" located in Solapur district of Maharashtra state. It is pilgrimage centre in Maharashtra famous for the *Vitthal* temple. It lies at 17°.67'' North latitude and 75°33'' East longitude. It comprises 19.53 sq. km. as per the 2001 census the population of study area has about 91379 populations.

3.0 OBJECTIVE:

- Present paper intends to focus on existing land use structure of Pandharpur urban center and factors affecting on them.

4.0 DATA BASE METHODOLOGY:

The study regarding the land use area has been made from the data available in the records of Pandharpur municipal council. Google Images as well as field trips have crosschecked this land use pattern. The occupation and literacy of people in different parts of the study region has been also collected throw household schedule with the help of stratified area sampling technique. The description morphogenetic seems apposite, dose the emphasis on cartographic representation (Whitehand, 2001). Hence, the morphology of the Pandharpur urban centre has been represented with the help of different cartographic techniques. Gaubatz Piper (1999) focused on Chinese urban form in the contexts of interpreting continuity. Strauss (1955) has analysis urban morphology and the problems of the modern urban fabric.

5.0 MORPHOLOGY/ LAND USE PATTERN:

The land use study of the Pandharpur urban center clearly ravels that, the land of the city has been used for the different purposes like residence, commerce, industries, transport, agriculture etc. Hence, the land use pattern of the Pandharpur has been classified in to seven different categories (Table 3 and Fig. 2).

A. RESIDENTIAL USES

Actually the urban centers satisfy the need of shelter and to satisfy this need, city, grow both horizontally and vertically About 207.56 hector area which is 10.63 per cent of the total area have the residencies use. Generally, the residential use of land has been observed in the all part of town but in particular high residential use observed at Vitthal temple area and the area located between Pune road and Karad road. Actually, the residential use observed in all parts of the study region hence the civil facilities available therein is noteworthy.

Total 140 households have been enumerator which have total 968 population out of these 563 are male and 405 are females. About 20 household from each area have been considered. Highest population covered of College Road North area. It means the coverage family size in this area is high. The Slum areas and Isbavi have low average family size (Fig. 1).

Table-I

Study Region: Population Structure of Sampled Houses

Sr. No.	Area	Male	Female	Total	Literacy Rate
1	Slum	62	40	102	83.72
2	Isbavi	56	46	102	83.33
3	Vitthal Temple	68	38	106	89.13
4	College Road North	176	122	298	45.18
5	College Road South	55	53	108	97.97
6	Bhakti Marg	70	60	130	94.64
7	Yamai Tukai	76	46	122	75.43
	Study Region	**563**	**405**	**968**	**74.22**

Source: *Field Work, 2011 and Computed by Researchers*

LITERACY RATE:

According to census of India of 2001, literacy has been defined as the ability to read and write with understanding. Literacy is the vehicle of socio-economic transformation as it facilitates the acquisition of specific skills and occupational competence and accelerates the process of social change (Husain, 2008). The overall literacy rate of sampled houses is 74.22 per cent which varied from lowest as 45.18 per cent in college road north are to highest as 97.97 per cent in college road south area (Table 1 & Fig.1). The educated people are found at the southern part of the college road.

OCCUPATIONAL STRUCTURE:

Overall picture shows that, 35 per cent of total working population in sampled housed are engaged in the service sector. The percentage of population engaged in hookers category is low as 1.43 per cent. In the sampled houses 32.86 per cent working population in Laborer category, 13.575 are in shopkeeper category and 17.14 per cent are in other category (Table 2). However, it has spatial variations. Most of working population of slum areas is laborers (80%). About 60 per cent working population are comes under this category so far as. Isbavi area is concern Vitthal temple area have 50 per cent in service sector and reaming 50 per cent are shopkeeper. It is due to shops of religious goods. College road north area have 70 per cent laborer and on the other hand service sector dominates in college road south area (70%), Bhakti Marg area. Yamai Tukai area dominates with laborer category (Fig. 1).

The Pandharpur City
Population Structure in Sampled Houses

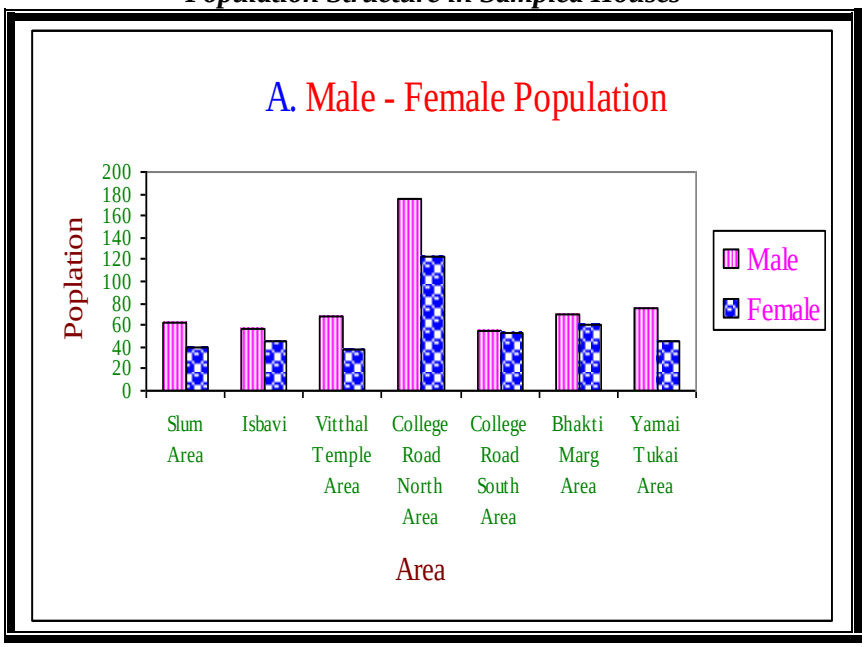

Fig. 1

The Pandharpur City
Literacy

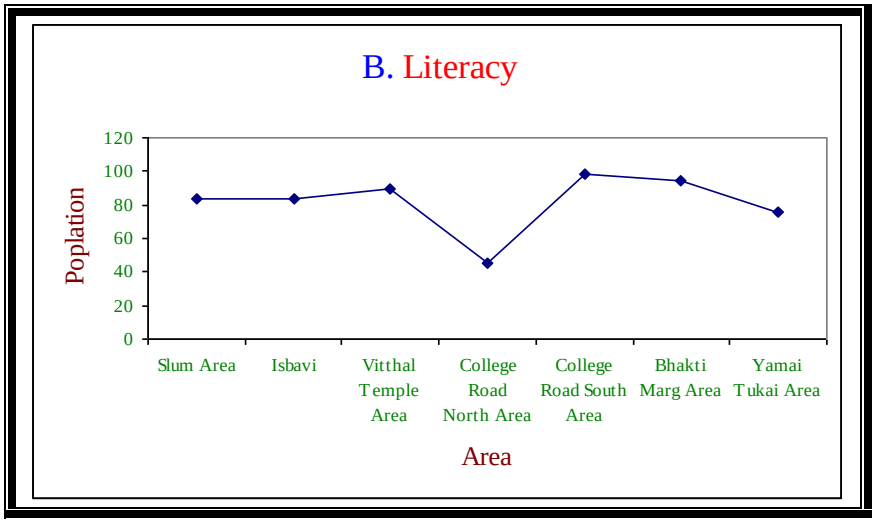

Fig. 2

The Pandharpur City
Population Structure in Sampled Houses

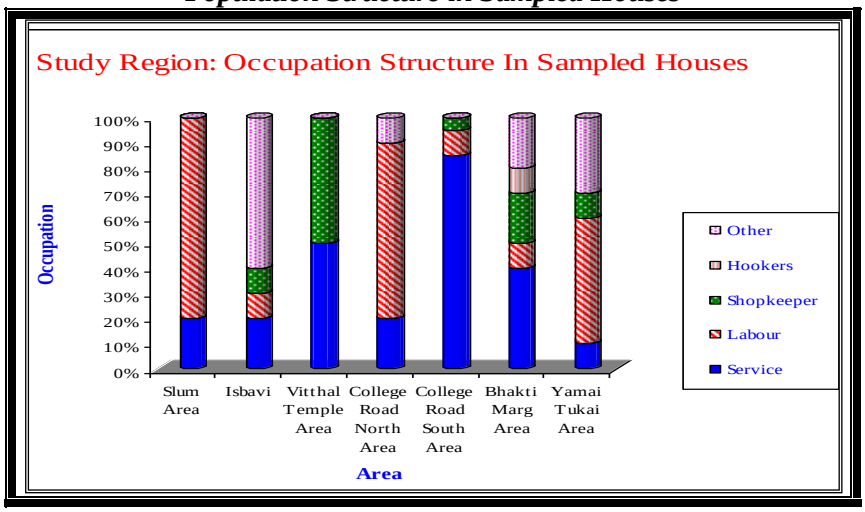

Fig. 3

Table-II
Study Region: Occupation Structure of Sampled Houses

Sr. No.	Area	Service	Labor	Shopkeeper	Hookers	Other
1	Slum	20.00	80.00	0.00	0.00	0.00
2	Isbavi	20.00	10.00	10.00	0.00	60.00
3	Vitthal Temple	50.00	0.00	50.00	0.00	0.00
4	College Road North	20.00	70.00	0.00	0.00	10.00
5	College Road South	85.00	10.00	5.00	0.00	0.00
6	Bhakti Marg	40.00	10.00	20.00	10.00	20.00
7	Yamai Tukai	10.00	50.00	10.00	0.00	30.00
	Study Region	35.00	32.86	13.57	1.43	17.14

Source: *Compiled (Field Work, 2011) and Computed by Researchers.*

B. COMMERCIAL USES:

City is the center of commerce and that is why they are key consideration in the economic development not only of the city itself but the economic development of surrounding region also. About 35.71 percent hector area has been used for commercial purpose, which has negligible percent of total area i.e. 1.83 per cent. The majority of commercial area is located along the road specially to attract the peoples. Juni Peth, Navi Peth, Market Yard etc. are the important places for the commercial use.

C. INDUSTRIAL USES:

The industrial development mostly taken place in the urban centers. Only 0.40 per cent of the total area has been utilized functional purpose, all industries are related to domestic, and religious things like ice factories, still workshops, haladi-kunku, industry etc. The industries are mostly located on Solapur road.

Table-III
Pandharpur Town: Land Use Pattern, 2010

Sr. No	Land Use Category	Area in Hectare	% to Total Area
1	Residential	207.56	10.63
2	Commercial	35.71	1.83
3	Industrial	8.53	0.44
4	Public / Semi public	98.32	5.03
5	Transport and Communication	197.42	10.11
6	Open spaces gardens, playground etc.	628.69	32.19
7	Agricultural	528.77	27.07
8	Water bodies	248	12.70
Study Region		**1953**	**100.00**

Source: *1) Records of Municipal Council, Pandharpur.*
2) Crosschecked through fieldwork and Google earth images.

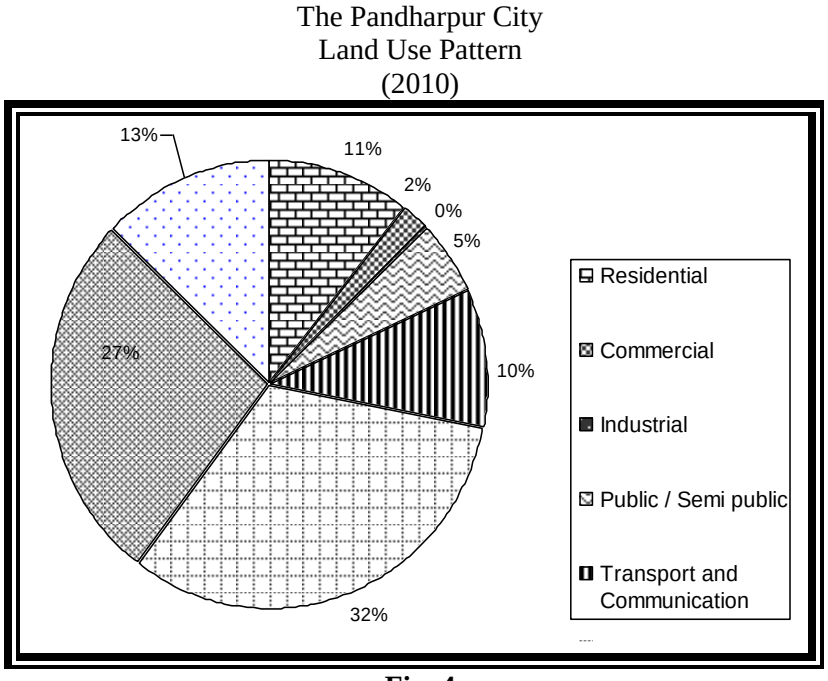

Fig. 4

D. PUBLIC/SEMI PUBLIC USES:

About 5.03 per cent of the total area i.e. 98.32 hector has been uses to public and semi public things. Public/semi public utilization means the area under educational institutes, hospitals, administrative buildings; banks etc. These features are attached with the commercial use and along the road mostly around S.T. stand.

E. TRANSPORT AND COMMUNICATION:

Transport and communicational routes are the developmental links. It creates the development but in case of its unsuitability creates various, problems like traffic conjunction, accidents etc. About 10.11 percent area which mean's 197.42 hector area is under the transport and communicational routes. Laximi road, link road, Temburni road etc. are the major roads in the Pandharpur city. The area under by bus stand and railway station is also included in this category.

F. OPEN SPACE GARDENS PLAY GROUND ETC. UTILIZATION:

Generally, urban centers are crowded in nature, where it is difficult to find open space, but the study reveals that, most of the land of Pandharpur comes under this category. About 52.90 per cent area (628.69 hector) is under open space gardens, play ground etc. The inclusion of peripherial areas like Isbavi, Sangola road eastern part, which has majority open space, results in of high percentage under this category. The open space of peripheral area now days acquired by pilgrimage at the fair period. There is trend to acquire this area by high-class peoples and by different *Varkary Sampradayas to* construct the *mathas*.

G. AGRICULTURE:

Actually, agriculture is less observed in urban part but the inclusion of Isbavi and Gopalpur side river area in the city is responsible for 27.07 per cent area under agricultural use. The agriculture land use found along the river.

H. WATER BODIES:

The area under water bodies in the Pandharpur is 12.70 per cent Bhima River and Takli tank are the water bodies in the study region. These water bodies can be developed for recreational purpose as a natural tourist centre.

6.0 CONCLUSION:

Pandharpur is River site pilgrimage center. Multistoried and closed building with small road in main city and peripheral area has bungalow type buildings attend. Transport and communication uses area mainly at of railway land in the town and land acquired by S.T. stand. Residential area is 10.63 per cent, whereas the area under industrial development is negligible. Public and Semi pubic user seems on larger side due to Gajanan maharaj, Kaikadi maharaj, Tanpure maharaj maths etc. Tendency of *Varkari Sampradaya* to acquire lands of peripheral area for *math* purpose has been observed. The recreational activities such as gardens are sufficient for the inner area but not a single Garden for inner area and Railway ground in railway land for outer area. The town has no swimming tanks, stadium and there is deficiency of amenities like market, playgrounds, parking and sport facilities.

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'COMPARATIVE STUDY OF SPATIAL PATTERNS OF URBANIZATIONS IN SOLAPUR AND KOLHAPUR DISTRICT (MAHARASHTRA)'

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ABSTRACT

In this paper, an attempt has been made to analyses the comparative study of spatial pattern of urbanizations in Solapur and Kolhapur districts of Maharashtra. The urbanization can be well studied through the district of an area when the development over two different districts occurs inequality leads to unequal results in numerous economic, social and cultural problems. The existence of regional inequalities is because of the historical, unequal distribution of natural resources and cultural factors. Disparities between two districts of Pune division has been studied with the help of seven indicators such as urban population ratio, rural urban ratio, urban growth rate, urban population density, average number of urban centers, decadal growth rate and accessibility. The results of the studies are brought out through tables and maps.

For the calculation of average number of urban centres following formula is applied:

$$Anj = \frac{Nj}{Aj} \text{ x 1000 sq.km.}$$

Hence, the index of accessibility of the tahsil is determined with the help of zone of influence of towns, for that purpose the following formula given by the V.L.S. Prakash Rao is used.

$$R = \sqrt{\frac{TPxA}{TUP}}$$

The study reveals that the Solapur district is more urbanized than the Kolhapur district. But, number of urban centres are more in the Kolhapur district than the Solapur district. Both the districts have observed spatial variation in the level of urbanization.

Key words: *Spatial pattern, Urbanization, Industrialization, Urban accretion, Urban density, Accessibility and Composite level of urbanization.*

1.0 INTRODUCTION:

An inequality in the levels of urbanization is an important topic to the geographers to know the causes for inequalities and at what level the urbanization is in a study area. Urbanization is closely interlinked with two other processes i.e. industrialization and modernization. Moreover, these three processes i.e. urbanization, industrialization and modernization, sometimes work in juxtaposition. Thus, the three processes of urbanization, industrialization and modernization do not seem to properly juxtapose as they had been in the past in the industrialized developed countries at their corresponding level of urbanization (Sing, R. B., 1993).

The level of urbanization is one of the significant measures of development. The country which is most urbanized is being regarded as a developed nation. With the growing impact of modernization and changing nature of the human society, urbanization

is being accepted as a way of life and it has become the essential part of the growth as well as an important index of material progress and prosperity of a society.

Urbanization can well be studied through the district of an area. The existing regional inequalities are because of urbanization that is the product of industries, use of natural resources and other economic activities.

2.0 THE STUDY REGION:

The Solapur and Kolhapur districts are located in the southern part of Maharashtra (Fig. 1). These two districts are the part of Pune administrative division, which is considered as the developed part of the Maharashtra State.

The Study Region
Location Map

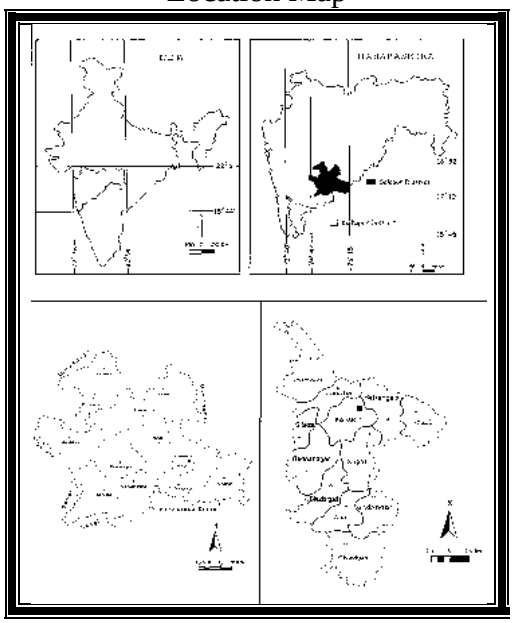

Fig. 1

3.0 OBJECTIVES:

- The present paper has attempted to find out the comparative study of level of urbanization in Solapur and Kolhapur districts of Maharashtra.

4.0 DATABASE AND METHODOLOGY:

The present study is mainly based upon the secondary data. Hence, the related data is collected from the published sources such as, District Census Handbooks and District Statistical Abstracts of the Kolhapur and Solapur Districts. For the spatial analysis Tahsil is selected as a unit of investigation. The collected data has been processed, tabulated and presented with the help of appropriate cartographic techniques. The indicators like, percentage of urban population to total population; percentage of urban population to rural population; urban growth rate (1991-2001); density of urban population in per sq. km.; average number of urban centre per 1000 sq.km.; decadal

urban growth rate (1991-2001) in percent and accessibility are used for the comparative study.

For the calculation of average number of urban centers' following equation is used:

$$Anj = \frac{Nj}{Aj} \text{ x 1000 sq. km.}$$

Where,

Anj- is the average number of urban centers of i^{th} tahsil

Nj- is the number of urban center in i^{th} tahsil

Aj- is the area of the i^{th} tahsil

The index of accessibility of the tahsil is determined with the help of zone of influence of towns, for that purpose, the following formula given by the V. L. S. Prakash Rao is used.

$$R = \sqrt{\frac{TPxA}{TUP}}$$

Where,

R- is the radius of the urban influence

TP- is the population of the town

A- is the total area of the tahsil

TUP- is the total urban population of the district.

The values of the indicators have been calculated for each tahsil as well as for the study area as a whole.

5.0 RESULT AND DISCUSSION:

A. URBAN ACCRETION:

Urban growth contains only the percentage variation of urban population during a given period but urban accretion includes not only the urban growth but also economic viability in the regional and intra urban context. Urban accretion has been calculated based on five indicators namely ratio of urban population, urban-rural population ratio, growth rate of urban population, density of urban population and decadal urban growth rate.

RATIO OF URBAN POPULATION:

The simplest and the most commonly used index for measuring the degree of urbanization is the percentage of population living in urban areas. A general perusal of U/T statistics shows that (Table-I and II) only three tahsils possess the largest urban centers in study region e.g. North Solapur, have the highest ratio of urban population in Solapur district and Karveer and Hatkanangale have the highest ratio of urban population in Kolhapur district (more than 40 per cent). Nine tahsils such as, Barshi, Pandharpur, Akkalkot, Mangalwedha and Sangola in Solapur district and Shirol, Kagal, Gadhinglaj and Ajara in Kolhapur district have recorded urbanization between 40 and 10 per cent. Less than 10 percent urban population is pragmatic in only four tahsils that are Karmala and Madha in Solapur district and Panhala and Shahuwadi in Kolhapur district. It is attention grabbing to note that, there is complete absence of urban centers in seven tahsils

e.g. Mohol, Malshiras and South Solapur in Solapur district and Chandgad, Bhudargad, Radhanagari and Gaganbavada in Kolhapur district.

RATIO OF URBAN TO RURAL (U/R):

The impact of urbanization on the rural base of the region is taken into consideration. A general perusal of U/R statistics (Table-I and II) shows that higher the ratio of urban to rural population, greater the level of urbanization. Eastern part of the district, which includes North Solapur tahsil in Solapur district and Karvir and Hatkanangale tahsils in Kolhapur district have the highest level of urbanization. Akkalkot tahsil in Solapur district and Shirol, Kagal, Gadhinglaj and Ajra tahsils in Kolhapur district have the medium level of urbanization. Lower Urban to Rural ratio is concentrated in the tahsils like, Barshi, Pandharpur, Madha, Karmala, mangalwedha, Sangola (Solapur District) Panhala and Shahuwadi (Kolhapur District).

URBAN GROWTH RATE (1991-2001):

Their location and regional setting influence the growth rate of urban population of individual tahsil. The average growth rate of urban population in Solapur district was 2.92 per cent but it is ranges from 0.53 per cent in Madha to 3.63 per cent in North Solapur. There are two tahsils in Solapur district, which have experienced the growth rate of more than the district average. Six tahsils of the Solapur district have experienced the growth rate less than the district average. Mohol, Malshiras and South Solapur tahsils have not registered urban population.

The average growth rate of urban population in Kolhapur district was 2.87 per cent but it is ranges from 0.16 percent in Shirol to 2.69 percent in Karvir tahsil. Two tahsils of the Kolhapur district have recorded the growth rate more than the district average. Six tahsils of the district have experienced the growth rate of less than the district average. Four tahsils, like Chandgad, Bhudargad, Radhanagari and Gaganbavada have not registered urban population.

URBAN DENSITY:

Geographers have to consider density of population because it is necessary for the planning of the region. It is a measure of the incidence of population concentration and expressed in terms of persons per square kilometer. Urban densities have also been used as index of urbanization and it calculated by dividing the total urban population by the total area of the district.

The recent expansion of administrative, transportation, general services, housing, water supply, heath care, education, recreation and growth of commercial activities have made their own concentrations to the process of urban population concentration in most of these districts.

There is only one tahsil in Solapur district, i.e., Mangalwedha, has observed highest urban density. Six tahsils, such as Akkalkot, Pandharpur, North Solapur, Karmala, Madha and Barshi have recorded medium density of urban population. The Sangola tahsil has very low density of urban population (Table-I). Hence, Mohol, Malshiras and south Solapur tahsils have absence of urban population.

In Kolhapur district, higher urban density is observed in the Karvir and Hatkanangale tahsil. The tahsils, like Panhala, Shirol, Gadhinglaj, Ajra and Shahuwadi have evidenced medium urban density. The Kagal tahsil, due to concentration of developed agricultural area, has recorded lowest urban density in the district.

DECADAL GROWTH RATE (1991-2001):

The absolute growth rate of specific decade is obtained by dividing the difference between the population of two dates and divided by hundred. The average decadal growth rate of the Solapur district was 34.23 per cent during 1991-2001. However, it is ranges between 5.48 per cent (Madha tahsil) and 44.40 per cent (North Solapur). There are two tahsils of the Solapur district that have experienced the growth rate of more than the district average and six tahsils of the district have experienced the growth rate less than the district average.

The average decadal growth rate of the Kolhapur district was 33.46 per cent but it is ranges from 5.08 per cent in Shahuwadi to 39.18 per cent in Hatkanangale tahsil. One tahsil of the district has experienced the growth rate more than the district average moreover the growth rate of less than the district average have recorded in seven tahsils of the district.

B. AVERAGE NUMBER OF URBAN CENTERS:

Different measures of average size of urban centers coupled with average spacing have used as a measure of degree of urbanization, at micro, meso and macro levels. The average number of urban centers in Solapur district is 0.67 per thousand square kilometer area. It ranges from 0.63 to 2.13 urban centers per thousand sq. km. There are four tahsils namely Akkalkot, North Solapur, Mangalwedha and Pandharpur that have more index values than the district average. All remaining four tahsils have less index values than the district average.

The average number of urban centers in Kolhapur district is 2.32 centers per thousand square kilometers as minimum in Shahuwadi tahsil and maximum in Hatkanangale tahsil. It ranges from 0.96 to 8.20 urban centres per thousand square kilometers. More index values than the district average are recorded in four tahsils namely Karveer, Hatkanangale, Shirol and Kagal.

C. ACCESSIBILITY:

The average accessibility of rural population to the urban centre is 9.12 per cent in Solapur district. However, it varies from 4.50 per cent in Mangalwadha tahsil to 21.95 per cent in North Solapur tahsil. While in three tahsils, namely North Solapur, Barshi and Pandharpur tahsils' accessibility index is the more than the district average. All remaining five tahsils have less accessibility than the district average.

The average accessibility of rural population to the urban centre is 6.59 per cent in Kolhapur district. However, it varies from 1.38 per cent in Panhala tahsil to 18.72 per cent in Karvir tahsil. While in two tahsils namely Karvir and Hatkanangale tahsils accessibility index is the more than the district average. All remaining six tahsils have less accessibility than the district average.

D. COMPOSITE LEVELS OF URBANIZATION:

An analysis of the spatial distribution of various indices of urbanization in Solapur and Kolhapur district represent an interesting contrast. Here, the composite levels of development of urbanization have calculated with the help of seven indicators to show the district inequalities in urbanization of Solapur and Kolhapur district. For this purpose the combined rank score method is adopted to give ranks for seven indicators of which fiver are of urban accretion and two are of special organization (Table-I and II). The results reveals that the lower the index value, the higher the level of urbanization and vice versa. The composite indices of levels of urbanization presented in table- III and IV reveals the high, medium and low levels of urbanization.

E. HIGH URBANIZED REGION:

In the study region, the three tahsils specifically North Solapur, Karvir and Hatkanangale are high-urbanized tahsils. Solapur city is district head quarters with more than 0.8 million populations plus development in transportation, industries, educational facilities, commercial facilities and tourism is took place. Moreover, North Solapur tahsil has urban center that is to say Solapur city and has a composite index value below 20.34 that is an indicator of high urbanization(Table-III).

Kolhapur city is district headquarters with more than 0.5 million population. Karvir is one tahsil having five urban centers explicitly Kolhapur city, Pachgaon, Kalmba, Gandhinagar and Uchgaon. Hatkanangale is another one tahsil having four urban centers i.e. Ichalkaranji, Kabanoor, Vadagaon and Korochi. In this district, two tahsils have a composite index value below 17.86 that is an indicator of high urbanization(Table-IV).

F. MEDIUM URBANIZED REGION:

Five tahsils of the study region have observed medium urbanization i.e. Pandharpur, Barshi, Akkalkot, Shirol and Kagal. The composite index value of the Solapur district ranges from 20.34 to 31.37. In this category, Barshi, Pandharpur and Akkalkot are the three tahsils that have five towns namely Barshi, Pandharpur, Akkalkot, Mainergi and Dudani (Table-III).

The composite index value ranges between 17.86 and 31.50 in Kolhapur district. In this category, Kagal and Shirol are the two tahsils are found and each tahsil have two towns. Kagal and Murgud towns are present in the Kagal tahsil whereas the Shirol tahsil have two towns namely Kurundwad and Jaysingpur (Table-IV).

Table No-I
Composite levels of Urbanization in Solapur District (2001)

Sr. No.	Name of tahsils	Ratio of urban population (U/T)	Ratio of urban rural population (U/R)	Urban growth rate (Gibbs Method)	Urban Population Density (per km^2)	Average number of Urban Centre per 1000 km^2	Decadal growth rate 1991-2001	Accessibility	Total score of rank
1.	North Solapur	90.24 (1)	987.80 (1)	3.63 (1)	4886 (4)	1.48 (2)	44.40 (1)	21.95 (1)	11
2	Barshi	30.74 (2)	39.86 (3)	1.65 (3)	2889 (7)	0.63 (7)	17.99 (3)	11.64 (2)	27
3	Pandharpur	22.69 (3)	29.35 (4)	1.34 (4)	5288 (3)	0.77 (4)	14.36 (4)	9.83 (3)	25
4	Mohol	--	--	--	--	--	--	--	--
5	Akkalkot	21.42 (4)	270.98 (2)	0.63 (7)	7843 (2)	2.13 (1)	6.55 (7)	8.45 (4)	27
6	South Solapur	--	--	--	--	--	--	--	--
7	Madha	7.78 (8)	8.44 (8)	0.53 (8)	3515 (6)	0.66 (5)	5.48 (8)	5.29 (7)	50
8	Karmala	9.40 (7)	10.37 (7)	1.16 (5)	4626 (5)	0.63 (7)	12.32 (5)	5.33 (6)	42
9	Malshiras	--	--	--	--	--	--	--	--
10	Mangalveda	12.67 (5)	14.51 (5)	0.99 (6)	17364 (1)	0.88 (3)	10.44 (6)	4.50 (8)	34
11	Sangola	10.33 (6)	11.52 (6)	2.96 (2)	409 (8)	0.64 (6)	34.81 (2)	5.97 (5)	35
12	District Average	31.83	46.69	2.92	3813	0.67	34.23	9.12	Mean =31.37
									S.D .=11.03

Source: *Computed by Author*

Table-II
Composite levels of Urbanization in Kolhapur District
(2001)

Sr. No.	Name of tahsils	Ratio of urban population (U/T)	Ratio of rural population (U/R)	Urban growth rate (Gibbs Method)	Urban Population Density (per km^2)	Average number of Urban Centre per 1000 km^2	Decadal growth rate(1991-2001)	Accessibility	Total score of rank
1	Karvir	60.52 (1)	153.28 (1)	2.69 (2)	5901 (1)	7.45 (2)	31.13 (2)	18.72 (1)	10
2	Panhala	1.45 (8)	1.47 (8)	1.50 (4)	1327 (7)	1.75 (7)	16.30 (5)	1.38 (8)	47
3	Hatkanangale	50.03 (2)	100.11 (2)	3.28 (1)	5354 (2)	8.20 (1)	39.18 (1)	14.35 (2)	11
4	Shirol	17.93 (3)	21.84 (3)	0.16 (8)	2367 (5)	3.93 (3)	17.76 (3)	5.58 (3)	28
5	Kagal	13.29 (4)	15.32 (4)	1.59 (3)	806 (8)	3.65 (4)	17.27 (4)	4.15 (4)	31
6	Gadhingalaj	11.73 (6)	13.28 (6)	1.24 (6)	2786 (4)	2.07 (5)	13.27 (7)	3.41 (5)	39
7	chandgad	--	--	--	--	--	--	--	--
8	Ajra	12.23 (5)	13.96 (5)	1.37 (5)	1903 (6)	1.82 (6)	14.73 (6)	2.78 (6)	39
9	Bhudargad	--	--	--	--	--	--	--	--
10	Radhanagari	--	--	--	--	--	--	--	--
11	Gaganbavda	--	--	--	--	--	--	--	--
12	Shahuwadi	3.11 (7)	3.21 (7)	0.50 (7)	2896 (3)	0.96 (8)	5.08 (8)	2.34 (7)	47
13	District Average	29.82	48.48	2.87	4222	2.32	33.46	6.59	Mean=31.50 S. D. =13.64

Source: *Computed by Author*

Table-III
Levels of Urbanization in Solapur District

Sr. No.	Levels of Urbanization	Range Values of Region	Number of Tahsils	Name of Tahsils
1	High	20.34 and below	1	North Solapur
2	Medium	20.34 to 31.37	3	Pandharpur, Barshi, Akkalkola
3	Low	31.37 and above	4	Mangalwedha , Sangola , Karmala, Madha.

Source: *Computed by Author*

Table-IV
Levels of Urbanization in Kolhapur District

Sr. No.	Levels of Urbanization	Range Values of Region	Number of Tahsils	Name of Tahsils
1	High	17.86 and below	2	Karvir , Hatkanangale
2	Medium	17.86 to 31.50	3	Shirol , Kagal
3	Low	31.50 and above	4	Panhala , Gadhingalaj , Ajra , Shahuwadi.

Source: *Computed by Author*

The Study Region
Levels of Urbanization
2001

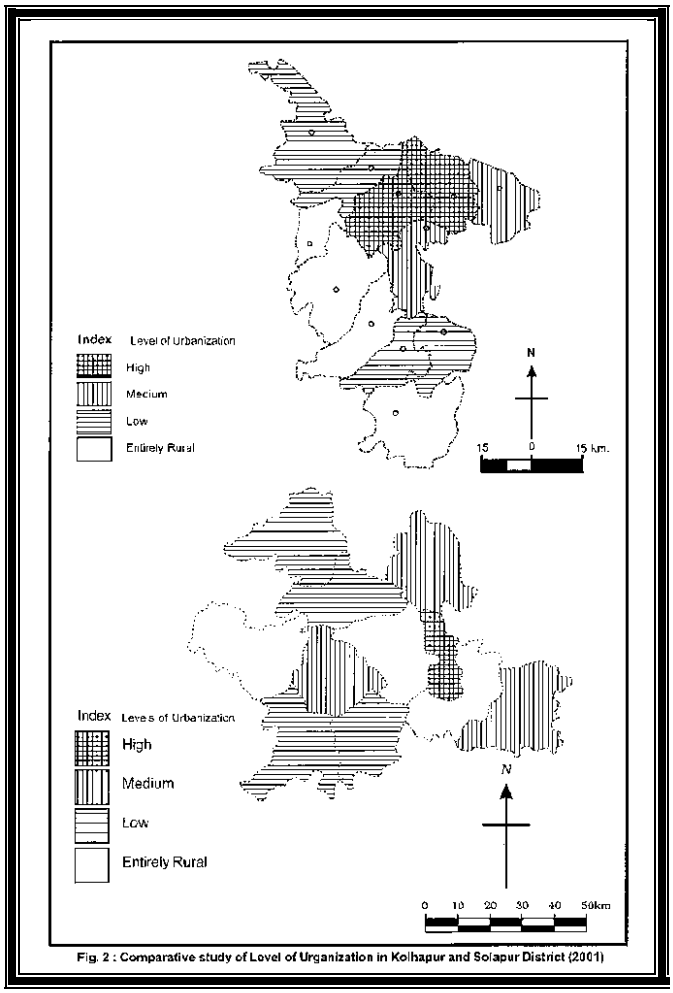

Fig. 2

G. LOW URBANIZED REGION:

The eight tahsils of the study region have recorded lower urbanization. They are- Mangalwedha, Sangola, Karmala, Madha, Panhala, Gadhinglaj, Arja, and Shahuwadi. The four tahsils specifically Mangalwedha, Sangola, Karmala, Madha have index value more than 31.37 and have a lesser intensity of all the urban factors (Table-I). These tahsils cover 7.71 per cent of the urban population. These tahsils have less urbanized due to the lack of major industrialized areas and drought prone conditions prevailed through long time.

Panhala, Gadhinglaj, Arja, and Shahuwadi tahsils of the Kolhapur district have a lesser intensity of all the urban factors and index values are than 31.50 (Table-II). These tahsils cover 4.61 per cent of the urban population and are backward in urbanization because of lesser level industrial and economical development along with highly hill areas.

6.0 CONCLUSION:

Based on above results it can be concluded that there is spatial variation in the level of urbanization. On an average Solapur and Kolhapur district, have 31.83 per cent and 29.82 per cent urban population respectively. The composite levels of development of urbanization have calculated with the help of seven indicators to show the district level inequalities of urbanization in Solapur and Kolhapur district. Comparatively the Solapur district has higher urbanization than the Kolhapur district and it is because of the geographical disparity. However, Solapur district has urban centers less than Kolhapur district due to variation in the development of transportation, industries, market, commercial, historical, tourist and educational facilities.

The trend of urban concentration is observed in the Solapur as well as Kolhapur district. During 2001 census, the three tahsils, namely North Solapur, Karvir, and Hatkanangale have accounted 71.21 per cent and 86.5 per cent of the total urban population in the Solapur and Kolhapur district respectively. The tahsil wise urban growth indicates that North Solapur, Karvir and Hatkanangale progressed rapidly due to development in transportation, industries, tourism, and educational facilities.

7.0 SUGGESTIONS:

Population growth, particularly in slum areas where the population growth rate is high, should be checked with all available family welfare measures. Proper targets for each high level of urbanization tahsils should be planned and the urban development authorities should review the progress from time to time. Providing sufficient economic and social infrastructures should encourage the growth of urbanization in backward tahsils. The tendency to locate private and public offices in the congested high levels of urbanization tahsils should be decentralized.

The decentralization of industries has been given priority and is an effective strategy for the attainment of balanced levels of urbanization and development. For checking undue concentration and the resultant problems in highly urbanized tahsils, decentralization policy should be adopted.

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'ROLE OF GEOMORPHOLOGY IN TOURISM DEVELOPMENT AT MATHERAN, MAHARASHTRA'

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ABSTRACT

The various landforms created by differential geomorphic processes are important for not only geologists, geomorphologists and geographers but also local peoples to show secret of history of the earth and its evolutions in all the time and place. Geographical landscapes are resulting from the places generated by interaction of different powers of human and nature. Matheran plateau is such example located on Sahyadri Range, which is one of the leading tourist centers in India. The present research paper aims to focus on role of Geomorphology in tourism development. It is evident from the discussion that the laterite controls every aspect of surface expression of Matheran. The hill station is known for its characteristic canopy cover on top is very fragile system supported by lateritic plateau. The ever-increasing number of tourists coming to Matheran and thereby increasing pressure on the resources in this small area had led to severe problems of land and eco-degradation. Therefore there is urgent need for an inclusive development plan with due attention to lithology of this region.

Key Words: *Geomorphology, Tourism, Lateritic*

1.0 INTRODUCTION:

Activity of tourism is principally based on resources and attractive places either naturally created or manmade *(Mohammad Reza Iravani and Mohsen Pourkhosravani, 2011, p.1).* The various landforms created by differential geomorphic processes are important for not only geologists, geomorphologists and geographers but also local peoples to show secret of history of the earth and its evolutions in all the time and place. Geographical landscapes are resulting from the places generated by interaction of different powers of human and nature. Matheran plateau is such example located on Sahyadri Range, which is one of the leading tourist centers in India. The characteristic shape and features of this plateau owe their existence to the presence of laterite. Over the years, the Duricrust has undergone disintegration along its edges. Processes like spring sapping contribute to the marginal disintegration of laterite. The Sub-surface flow is very dominant in laterite because of its porosity. The water that percolates through rock accentuated in the substratum. Lateritic terrain shows poor drainage development. The rock being porous allows more infiltration. Lateritic plateaus are wrongly termed as wasteland or barren areas, but ecologically, they fall in early succession stage of the region, have herb and grass cover many of which are endemic or uncommon floral species with special adaptations. These are very special ecosystems as they are limited in size and number. They are thus of great ecological significance that attract to the tourists towards the region.

2.0 THE STUDY REGION:

Matheran plateau is an outlier of Sahyadri Range. It is a major peak in Prabal-Malang range. It is a lofty plateau standing out in the coastal planes at the base and not far away from Sahyadri range. The characteristic shape and features of this plateau owe their existence to the presence of laterite. The nearest occurrence of laterite is at Bhimashankar where it exists at crest –line.

3.0 OBJECTIVE:

- The present research paper aims to focus on role of geomorphic processes and the resulting landforms in the tourism development of Matheran.

4.0 METHODS AND MATERIALS:

The present research paper is mostly based on primary data hence the related data is collected through intensive fieldwork in the study region and represented with the help of maps and diagrams.

5.0 DISCUSSION:

In case of Matheran, Deccan trap is parent rock, which has flat layers one above the other. Laterite in Matheran was originally in the form of a flat top made up of Duricrust, giving it an appearance of Plateau. Because of geomorphic processes, various landforms are formed on the Matheran plateau, which attracts the national as well as international tourists.

5.1 WEATHERING AND EROSION OVER MATHERAN PLATEAU:

Over the years, the Duricrust has undergone disintegration along its edges. Processes like spring sapping contribute to the marginal disintegration of laterite. Marginal disintegration is a process of breaking up of cap. The Sub-surface flow is very dominant in laterite because of its porosity. The water that percolates through rock accentuates in the substratum. The lower layer, made up of impervious trap the water cannot continue to percolate. This volume of water flows in horizontal direction and emerges out as springs. These kinds of springs are seen at the base of Duricrust. Oozing spring water removes the subsurface material, creating a hollow cave like cavity at the base along the margins of the plateau. Here the edges lose their support due to the hollows and cavities curved out by springs and develop the cracks parallel to the edges as the slab tilt. These cracks slowly widen and the edges collapse. The broken and boulders roll along the slope. Such processes slowly convert the plateau in to gentle slopes. The slope angle depends on the size of plateau and amount of vegetation. Over the years, the cap is replaced by regolith. In Matheran, such processes have removed the original duricrust from large areas. The remnants of the original crust are seen in form of high plateaus like Rugby, Olympia, Mount Berry and Governor's Hill etc. Even these are

undergoing marginal disintegration. This can be seen near Bird wood point. Rest of the cap has been lost due to marginal disintegration.

5.2 DRAINAGE DEVELOPMENT:

Lateritic terrain shows poor drainage development. The rock being porous allows more infiltration. Thus, very little water is left for surface flow. As very little water flows over surface stream, development is restricted. Number of steams over such plateaus is small compared to plateaus having a different lithology. Short and swift streams, which are active during monsoon, plunge over the cliff forming waterfalls along the boundaries, further dissecting the slopes. These slopes have replaced the original surface. They are covered by soil and support the characteristic plateau top vegetation. Stream networks over the plateau form small basins. Two of these are significantly large viz. Simpson tank and Charlotte lake basin. The rest are poorly developed networks mostly comprising of first and second order streams. Stream Channels are small shallow and uneven, lower orders ones and hardly have any specific channels. A large volume of water flows in form of surface flow down the slope. Comparatively small amount of water is collected plateau ted in streams and that too in their lower course. This mechanism helps to check erosion in this soft rock despite heavy rainfall. The plateau has two major drainage networks-namely Vetal stream and Pisarnath Stream networks. Both these are used for water supply. Bunds are built on these streams creating lakes and reservoirs.

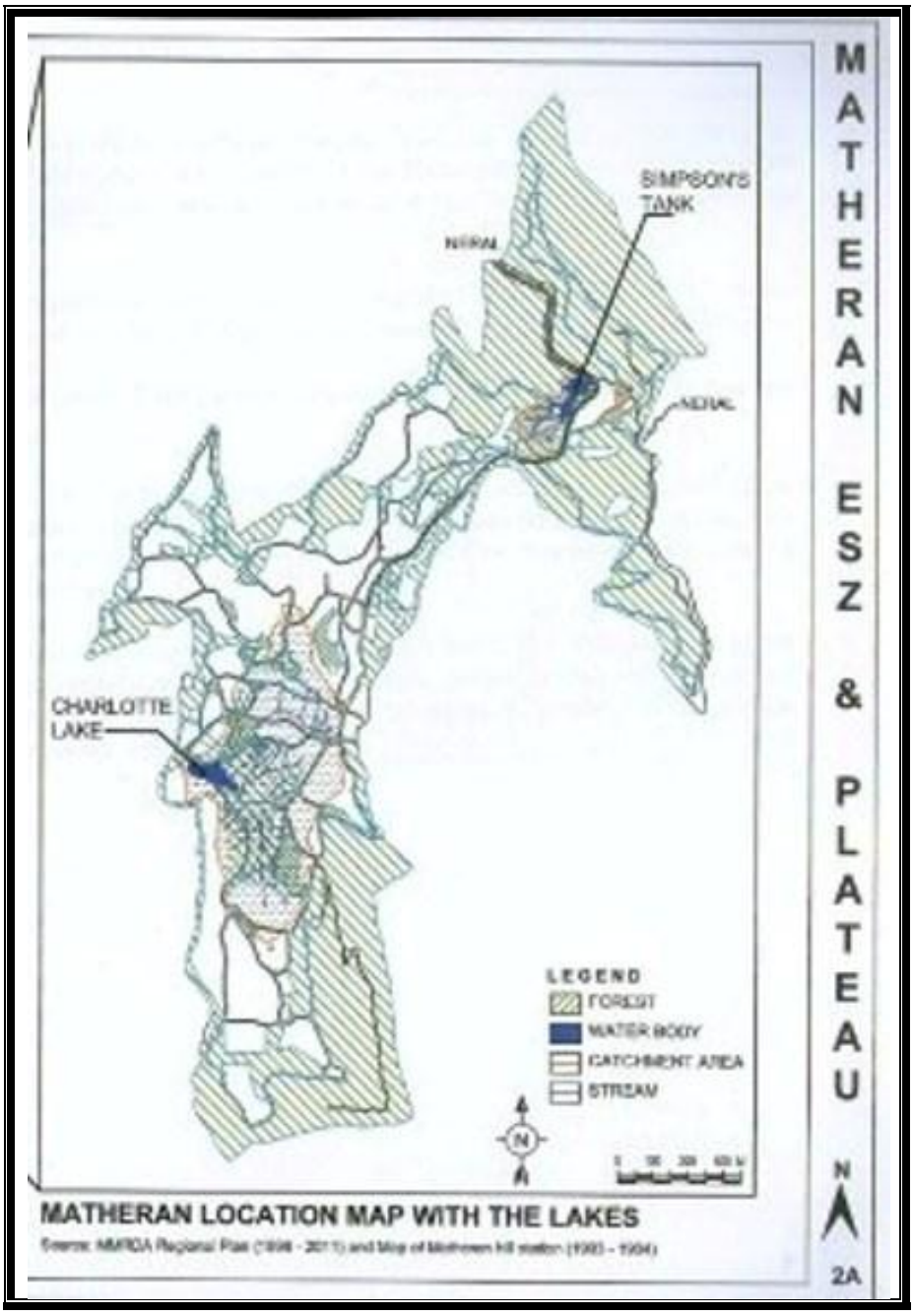
The presence of laterite has affected the lithological, hydrological and pedological characteristics of the plateau, which in turn are decisive in distribution of vegetation, soil, moisture, water table, springs and drainage pattern.

5.3 HABITATS AND LANDSCAPE TYPES IN THE ECO-SENSITIVE ZONE:

The types of vegetation changes with elevation, rainfall, strata and microclimate-

- **Lower slopes and foothills**: Lower slopes and foot hills shows moist deciduous vegetation.
- **Terraces**: The hill has typical stepped or layered topography with highest terrace at about 580 m elevation having average width of 0.4 km. The minor terraces situated at foothills of the cliffs have a semi evergreen forest with a preponderance of moist deciduous species.
- **Rocky escarpment**: the plateau edge/escarpment consists of steep rocky barren slopes having sparse vegetation. It forms an important habitat for endemic plant species.
- **Forested slopes and Matheran plateau**: The high rainfall, soil, temperature have combined to give rise to a subtropical wet hill evergreen forest type on the plateau.

The precipitation/ rainfall on the plateau is above 3000 mm. and the crest forest is a unique climax ecosystem.



5.4 IMPORTANT LANDSCAPE TYPES ON MATHERAN PLATEAU:

The Matheran rock is composed of basaltic trap overlaid with a thick lateritic cap. The disintegration of the laterite leads to the formation of red clay, which is hard but enriched by large amounts of humus. According to Champion (ibid), the lateritic nature of the soil is unfavorable for good tree growth. The depth of the soils varies from a few inches to about 50 feet at the parts of the table- land.

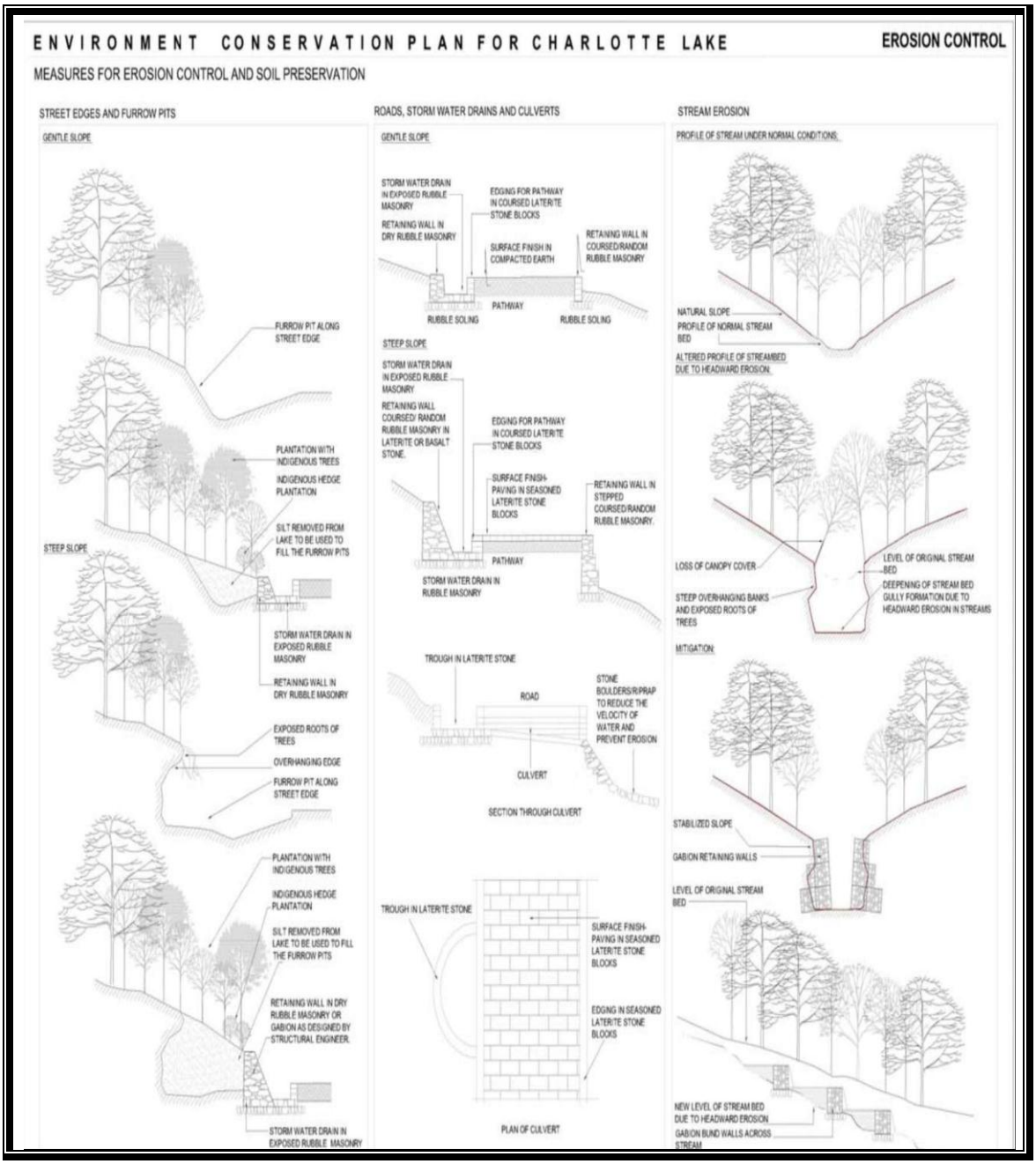
LATERITIC CAPS-

Lateritic plateaus are wrongly termed as wasteland or barren areas, but ecologically, they fall in early succession stage of the region, have herb and grass cover many of which are endemic or uncommon floral species with special adaptations. These are very special ecosystems as they are limited in size and number. They are thus of great ecological significance. The plants that grow on these rocky outcrops are specially adapted to these unique conditions. They are capable of growing in extremely limited amounts of soil. A centimeter or less of this soli is enough to support their monsoon growth. During monsoon and post-monsoon months (June – December) it has seasonal cover of this pioneering vegetation. Along with this, the seasonal flora also has specific association with local wildlife like bees, wasps, birds, butterflies etc. There are some niches formed where soil accumulation has actually initiated the process of forestation and have few trees like Gela, Ajani that are actually dominant in evergreen or semi-evergreen forests. Majority of plant species that grow on plateau are very, less in population and in endangered status.

FORESTED SLOPES:

The duricrust or lateritic cap disintegrates giving rise to gentler slopes forming the 'lithomarge', also known as wash. This wash is composed of weathered laterite; it is loose material held together by vegetation. The crest forest of Matheran developed on soil formed by the disintegration of the lateritic cap.

Champion (1936) has classified the forest of Matheran as a subtropical evergreen type. He however, admits that he has not seen these forest and his conclusions are based on the data contained in the revised working plan for the Matheran Plateau Forests (1922). Champion (ibid) further feels that the occurrence of these forests at 2500 feet is low for the type. Matheran receives a very heavy annual precipitation of 208"-258", the maximum being recorded in July (84.22"). Though the data for relative humidity are not available, humidity in general is high throughout the year and is conducive to the growth of vegetation. The high rainfall, soil and a temperate climate have combined to give rise to a sub-tropical wet hill evergreen forest type.


ENVIRONMENT CONSERVATION PLAN FOR CHARLOTTE LAKE
EROSION CONTROL
MEASURES FOR EROSION CONTROL AND SOIL PRESERVATION
STREET EDGES AND FURROW PITS
GENTLE SLOPE
FURROW PIT ALONG STREET EDGE
PLANTATION WITH INDIGENOUS TREES
INDIGENOUS HEDGE PLANTATION
SILT REMOVED FROM LAKE TO BE USED TO FILL THE FURROW PITS
STEEP SLOPE
STORM WATER DRAIN IN EXPOSED RUBBLE MASONRY
RETAINING WALL IN DRY RUBBLE MASONRY
EXPOSED ROOTS OF TREES
OVERHANGING EDGE
FURROW PIT ALONG STREET EDGE
PLANTATION WITH INDIGENOUS TREES
INDIGENOUS HEDGE PLANTATION
SILT REMOVED FROM LAKE TO BE USED TO FILL THE FURROW PITS
RETAINING WALL IN DRY RUBBLE MASONRY OR GABION AS DESIGNED BY STRUCTURAL ENGINEER.
STORM WATER DRAIN IN EXPOSED RUBBLE MASONRY
ROADS, STORM WATER DRAINS AND CULVERTS
GENTLE SLOPE
STORM WATER DRAIN IN EXPOSED RUBBLE MASONRY
EDGING FOR PATHWAY IN COURSED LATERITE STONE BLOCKS
RETAINING WALL IN DRY RUBBLE MASONRY
SURFACE FINISH IN COMPACTED EARTH
RETAINING WALL IN COURSED RANDOM RUBBLE MASONRY
RUBBLE SOLING
PATHWAY
RUBBLE SOLING
STEEP SLOPE
STORM WATER DRAIN IN EXPOSED RUBBLE MASONRY
RETAINING WALL COURSED/ RANDOM RUBBLE MASONRY IN LATERITE OR BASALT STONE.
EDGING FOR PATHWAY IN COURSED LATERITE STONE BLOCKS
SURFACE FINISH- PAVING IN SEASONED LATERITE STONE BLOCKS
RETAINING WALL IN STEPPED COURSED/RANDOM RUBBLE MASONRY.
PATHWAY
STORM WATER DRAIN IN RUBBLE MASONRY
TROUGH IN LATERITE STONE
ROAD
STONE BOULDERS/RIPRAP TO REDUCE THE VELOCITY OF WATER AND PREVENT EROSION
CULVERT
SECTION THROUGH CULVERT
TROUGH IN LATERITE STONE
SURFACE FINISH- PAVING IN SEASONED LATERITE STONE BLOCKS
EDGING IN SEASONED LATERITE STONE BLOCKS
PLAN OF CULVERT
STREAM EROSION
PROFILE OF STREAM UNDER NORMAL CONDITIONS:
NATURAL SLOPE
PROFILE OF NORMAL STREAM BED
ALTERED PROFILE OF STREAMBED DUE TO HEADWARD EROSION.
LOSS OF CANOPY COVER
STEEP OVERHANGING BANKS AND EXPOSED ROOTS OF TREES
LEVEL OF ORIGINAL STREAM BED
DEEPENING OF STREAM BED GULLY FORMATION DUE TO HEADWARD EROSION IN STREAMS
MITIGATION
STABILIZED SLOPE
GABION RETAINING WALLS
LEVEL OF ORIGINAL STREAM BED
NEW LEVEL OF STREAM BED DUE TO HEADWARD EROSION
GABION BUND WALLS ACROSS STREAM

Champion (ibid) states that the Matheran forest shows even more than the Mahabaleshwar forests, the effects of human interference and considers them largely second growth. According to him, most of the sub-tropical wet hill evergreen forest has been fundamentally altered by shifting cultivation or looping but that where it is properly developed, the forest is a dense evergreen wood of mixed species though of low height, generally not exceeding 25 feet and occasionally up to 50 feet. Trees of girth up to 6 feet, though hollow and of spreading habit, Climbers, Orchids, ferns and mosses and other herbaceous undergrowth are in great abundance and deciduous trees such as Terminalia tomentosa, Bbidelia retusa, Soymida febrifuga, Terminalia belerica and Heterophragma roxburghii are also known to occur.

6.0 CONCLUSION:

It is evident from above discussion that the laterite controls every aspect of surface expression in Matheran. The hill station is known for its characteristic canopy cover on top is very fragile system supported by lateritic plateau. The ever-increasing number of tourists coming to Matheran and thereby increasing pressure on the resources in this small area had led to severe problems of land and eco-degradation. Therefore there is urgent need for an inclusive development plan with due attention to lithology of this region.

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PHYSICO-CHEMICAL ANALYSIS OF DRINKING WATER IN SADAVALI INDUSTRIAL ZONE OF SANGMESHWAR TAHSIL, DIST. RATNAGIRI (MAHARASHTRA)

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ABSTRACT

Water is an essential resource for life on earth. Even though planet of the earth contains 71% water out of that 97% is concentrated in oceans. Increasing urbanization and rapid industrialization in Konkan region affects the drinking water resources directly and indirectly. Ground water resources like bore well and well are significant in Konkan region in general and Sangmeshwar Tahsil in particular. Sadawali is a growing industrial zone of Sangmeshwar Tahsil, Ratnagiri district. Water from well is mainly used for drinking and domestic purpose in this area. A Physico-chemical study of both sources was carried out by analyzing sample from three bore wells and from three wells of different locations. Different parameter like colour PH, Chloride, TDS, DO, COD, BOD, etc. were determined by standard analytical methods. The main purpose of analysis is to check potability of water. According to WHO standards for drinking water the range of checked parameters were found within permissible range. Hence water from both sources was found to be potable and safe for drinking purpose.

Key Words: *Physico-Chemical, Ground Water, Drinking Water.*

1.0 INTRODUCTION

Ground water is one of the earth's important resources. The subsurface water generally includes chemical and physical properties, geological environment, natural movements, recovery and utilization. The term ground water is usually reserve for subsurface water that occurs beneath water table in soil and geological formation that are fully saturated. Ground water becomes usable source when rocks in the zone of saturation are perennial. Ground water hydrology is regardless as specialized science that involves geology, hydrology and fluid mechanics. Study of ground water requires knowledge of basic principles of geology, physics, chemistry and mathematics. Geology provides with qualitative knowledge of framework of flow but chemistry provides tool for qualitative analysis of the groundwater. Groundwater is an economic source and more than 85 per cent of public water supplies are obtained from well. Ground water supplies for rural area have certain advantages over surface water. Depth of water table below ground level is governing factor in determining pollution since, as water level approaches nearer ground surfaces, greater is the risk of contamination. Major sources of ground water pollution are urban pollution, industrial pollution, agriculture pollution and pollution from well etc. Rapid industrialization and urbanization resulted in successful pollution of water resources available on earth, which causes significant effects on ecosystem (Trivedi and Goel, 1986) plants and animal life. In order to avoid future problem it is necessary to

protect ground water sources from further pollution. Periodical and continuous monitoring of ground water quality is necessary so that an appropriate step may be taken for water resources management.

2.0 STUDY REGION:

According to Ministry of Water Resources, Government of India, 23604.76 ham/year ground water is available in Ratnagiri district out of that 4088.65 ham/year ground water is available in Sangmeshwar tehsil (Mandal, D. N., 2009, p. 15). It means ground water is the main source of water in the Ratnagiri district as well as in Sangmeshwar tehsil. Hence, for the present research paper Sadavali MIDC area is selected as a study region for the micro level analysis of the status of ground water. It is situated 2 Km away from Devrukh (Head Quarter of Sangmeshwar Tehsil) on Sakharpa-Devrukh road. It located on 17^{O} 05' 27.05" north latitude and 73^{O} 35' 22.55" east longitude. The average height of the study region from MSL is 530 feet (www.earthgoogle.com).

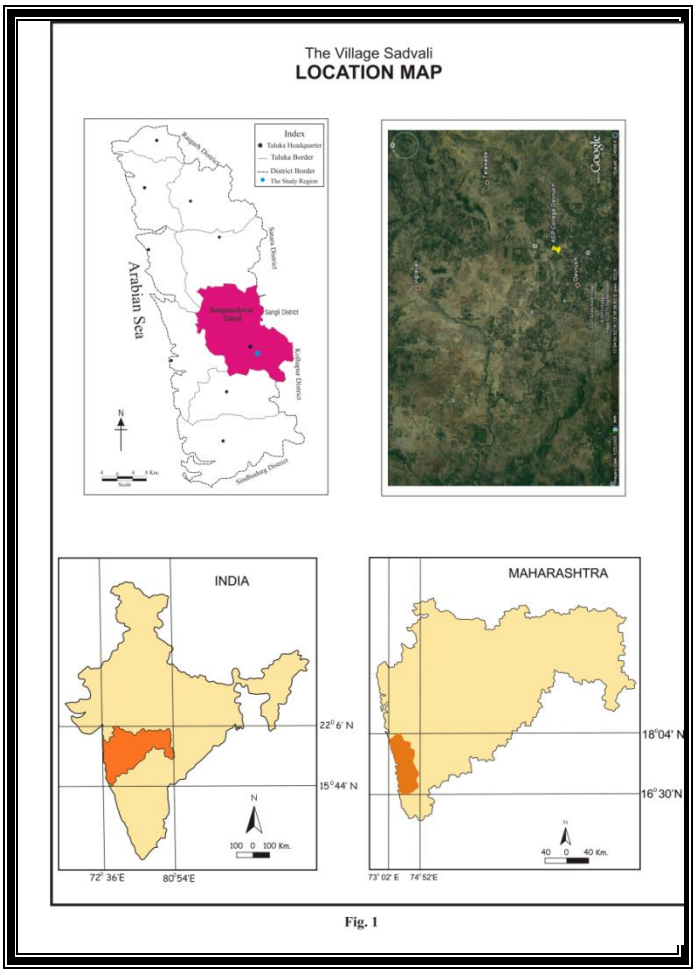

Fig. 1

According to 2001 census, population of the study region is 3490 persons and 769 households are living there (PCA, Ratnagiri district). The average temperature of the study region ranges between 25 and 30 ^{O} Celsius and annual rainfall is 2200-2600 mm. There are about 110 wells out of which 101 are private and 3 are public wells and 9 public bore wells. The well water and bore water is the main source of drinking water of the peoples of the village and is available throughout the year.

3.0 OBJECTIVE:

- The main objective of the present research paper is to check the potability of drinking water in the study region.

4.0 MATERIAL AND METHODS:

The primary data is the main source to mitigate the objective of the research paper. Hence, primary is collected through intensive fieldwork. For the collection of water samples, random sampling method is applied. The thirteen water samples from thirteen different locations are collected in sterilized bottles from the study region. Out of that, ten water samples from wells and three water samples from tube wells are collected. The collected water samples are analyzed in the laboratory using standard methods APHA (1995) for checking the potability with respect to WHO standards for drinking water.

5.0 RESULTS AND DISCUSSION:

The odor and color of water from both sources are unobjectionable. Total Solid (T. S.) of well water is 230.5 mg/lit while that of bore water is 280 mg/ lit. Therefore, both the values are within permissible range but T. S. of bore water is more than the well water. Total Dissolved Solids (TDS) of bore water (193 mg/lit) is higher than the well water (152.8 mg/lit). Total hardness of bore and well water is 102.66 mg/lit and 57.3 mg/lit, respectively. Calcium and magnesium hardness is also high in bore water than well water. Therefore, bore water is harder as compared to well water. Chlorides are also more in bore water i.e. 194 mg/lit than well water i.e. 170.95 mg/lit. Alkalinity, CO_2 and dissolve oxygen is nearly same in both the samples and is in the satisfactory range (Table-III).

All the analyzed parameters are within permissible range, as per the WHO norms.

Table-I

WELL WATER SAMPLES

Sample No. / Parameters	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10
Colour	clear	Clear	clear	clear	Clear	clear	clear	Clear	clear	Clear
pH	5.0	6.2	6.0	6.1	6.0	5.8	6.5	6.3	5.5	5.4
TS (mg/lit)	280	200	240	190	220	270	255	260	190	200
TDS(mg/lit)	240	120	120	172	138	120	130	143	178	167
Chlorides(mg/lit)	172.0	167.5	168	177	168	169	160	177	173	178
Alkalinity (mg/lit)	180.7	180	210.4	178.2	189.3	190.9	220	216.4	190.2	198.4
T. Hardness (mg/lit)	16	84	72	24	67	85	74	65	35	39
Ca++ (mg/lit)	4.008	25.65	20.84	18.35	27.42	18.34	15.70	19.44	26.76	22.90
Mg++(mg/lit)	2.92	14.25	12.48	12.77	10.53	12.43	9.56	13.55	3.56	7.45
DO (mg/lit)	6.08	6.68	6.89	6.66	6.56	6.34	6.78	6.94	6.20	6.05
CO2(mg/lit)	8.8	4.4	4.4	5.0	5.5	8.8	4.5	4.5	4.0	4.2
Residual Chlorine (mg/lit)	0.2	0.3	0.3	0.3	0.3	0.2	0.4	0.3	0.2	0.2
TSS (mg/lit)	40	80	120	60	40	100	60	60	70	90

Table-II

TUBE WELL SAMPLES

Sample No. / Parameters	TW1	TW2	TW3
Colour	clear	clear	clear
pH	6.8	6.9	6.4
TS (mg/lit)	160	240	440
TDS(mg/lit)	120	180	280
Chlorides(mg/lit)	187	194	198
Alkalinity (mg/lit)	220	180	200
T. Hardness (mg/lit)	124	64	120
Ca++ (mg/lit)	44.88	22.44	40.08
Mg++(mg/lit)	19.30	10.14	19.50
DO (mg/lit)	6.68	6.48	6.48
CO2(mg/lit)	-	-	4.4
Residual Chlorine (mg/lit)	0.4	0.3	0.28
TSS (mg/lit)	40	80	160

Table-III

AVERAGE COMPARISON

Sample No. / Parameters	Well water	Tube well water
pH	5.88	6.7
TS(mg/lit)	230.5	280
TDS(mg/lit)	152.8	193
Alkalinity(mg/lit)	195.45	200
Total Hardness (mg/lit)	56.1	102.66
Chlorides (mg/lit)	170.95	194
DO (mg/lit)	6.52	6.54
CO2 (mg/lit)	5.41	4.4
Residual Chlorine (mg/lit)	0.27	0.32
Ca++ Hardness (mg/lit)	40.08	35.8
Mg++ Hardness (mg/lit)	19.50	16.3

6.0 CONCLUSION:

According to World Health Organization (WHO) standards for drinking water, the range of checked parameters is within permissible range. Hence, water from both sources is potable and safe for drinking purpose but preference should be given to the well water.

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