

**“GEOGRAPHICAL STUDY OF VILLAGE USING FIELD SURVEY AND  
GEOINFORMTICS APPROCH: A CASE STUDY OF PEMGIRI VILLAGE IN  
SANGAMNER TAHSIL OF AHMEDNAGAR DISTRICT ”**

**\*Mr Sainath P. Aher, \*\*Mr. Sanjay B. Navale & \*Ms Pragati P. Deshmukh**

*saigeo23@gmail.com*

\*Department of Geography, S. N. Arts, D. J. Malpani Commerce & B. N. Sarda. Science College,  
Sangamner, Dist: A. Nagar (M.S.),

**Abstract:**

Villages are the backbone of our economy because of in villages most of the primary activities are practiced, where the large amount of people are engaged. In our industrial development the agriculture based industries acts as the important aspect which includes Sugarcane industry, Cotton textile industry, Food processing industry, Jute industry, Milk product industry, etc. Earth is real document for the Geographical study. On the other hand, villages detail study is required for the micro level planning of villages. Present Pemgiri village is the part of Sangamner tahsil, which is located in South West direction of tahsil. In this village survey we used the random sampling method for data collection using the questionnaires filling method. The primary data collection training we received by this questionnaire filling procedure. After that we proceed to collection of secondary data which include information of their Grampanchayat, Primary School, and High school. This village survey activity trained to surveyor in surveying techniques as well as creates the ability for understanding about the physiographic, climatic, cultural, socio – economic conditions, which plays important role in village development and planning.

**Key Word:** Village, Micro Level Planning, Development.

**Introduction:**

India is the country of rural community and Indian economy development based on rural development. Subsequently, there is no doubt the rural development is responsible for nation development. In any countries or nations rural economy plays a very essential role for the national development. In India, nearby 70 % populations living in rural area, that's why the Indian economy known as 'Agricultural Economy'. The vision of modern India consisting with rural area development at the same time rural area development depends on the action plan linked with village. For the development of rural area there problems, situation and various socio-economic condition knowledge is the important. The social,

cultural and economic situation is the major characteristic of village for implements the various scheme, plan, policy etc. The main objective to develop the village is to sort out the valley between rural and urban area as far as reduce the regional disparity. Science and technology are most prospective task of 21<sup>st</sup> century. Tues, it's need to implements for regional information sources, especially as Remote villages. An attempt has been made in this paper to avail the use of Geographical concepts, idea, techniques for perform the 'village information' and 'mapping' to prove, how the Geographical approach is authoritative for the village details mapping and its development.

**Objectives:**

- 1) To infer the physiographic elements of Pengiri village like hilly structure, geology, (rock structure) slope, aspect etc.
- 2) To identify the drainage network, its pattern, direction determines and its changing pattern.
- 3) Identification of village settlement pattern, road networks, site and situation.
- 4) To know about the agriculture development along with crop patterns dominant crop, productivity of crops, crop combination, diversification etc.
- 5) To create the various informative map of village for detail information and further various village level planning for development.
- 6) To suggest various development base planning and policy, it will support to economic development of village and reduce the imbalance.

7) According to recent condition of village we give some suggestions and guidance for the overall village development.

8) To understand the social environmental throughout the population customs, religious, literacy, festivals, tradition, land, vegetation cover, its type of soil structure and its impact upon human beings.

9) Explain the physiographic, climatic situation and local regional development.

**Methodology:**

The method of study is the soul of research work. There is great combination of geographical techniques as far as advance geographical techniques like field work, GIS, Remote Sensing in the finalization of attended research work are used. Thus, from starting of field work to complete that report writing following methodology has been adopted to complete this village survey report. (fig.1)

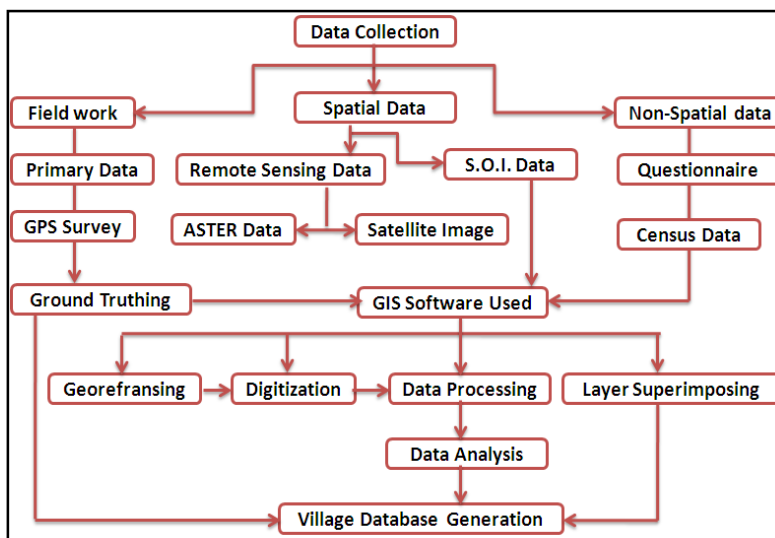


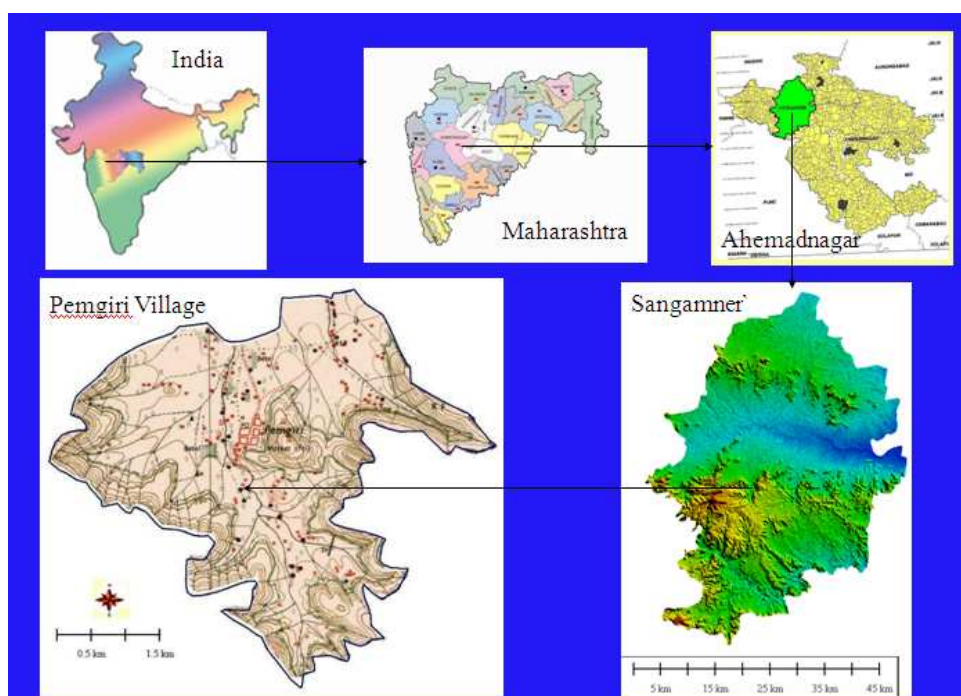
Fig.1 flow chart of methodology

**Location of the study area:**

We have selected Pengiri village which is part of Sangamner Tahsil, situated in Ahemadnager district of Maharashtra state in

India (Fig 1). The most part of Pempgiri village is covered by hilly area from east, south and west directions. Its observed location shown on S.O.I. (Survey of India) topographical map is  $19^{\circ} 27' 56''$  N to  $74^{\circ} 05' 17''$  east longitude with extension of  $19^{\circ} 25' 57.64''$  N to  $19^{\circ} 29' 02.40''$  N latitude and  $74^{\circ} 03' 42.28''$  E to  $74^{\circ} 07' 14.18''$  E. The maximum elevation of Pempgiri is 750 meter from mean sea level (fig.2). The actual distance of Sangamner tahsil to Pempgiri is nearby 25 km. The inclination of village is from

South to North direction because south direction region of the village is high due to hilly or unique structure of the earth. As well as many stream is flowing toward the north direction. The village acquired 16.6950 sq.km areas with 26.5734 km length perimeter. It situated on western boundary of the Sangamner tahsil and surrounded by Nimgaon Bk (North), Pimpalgaon Matha (East), Dhupe(South) and Shirasgaon (West) directions.

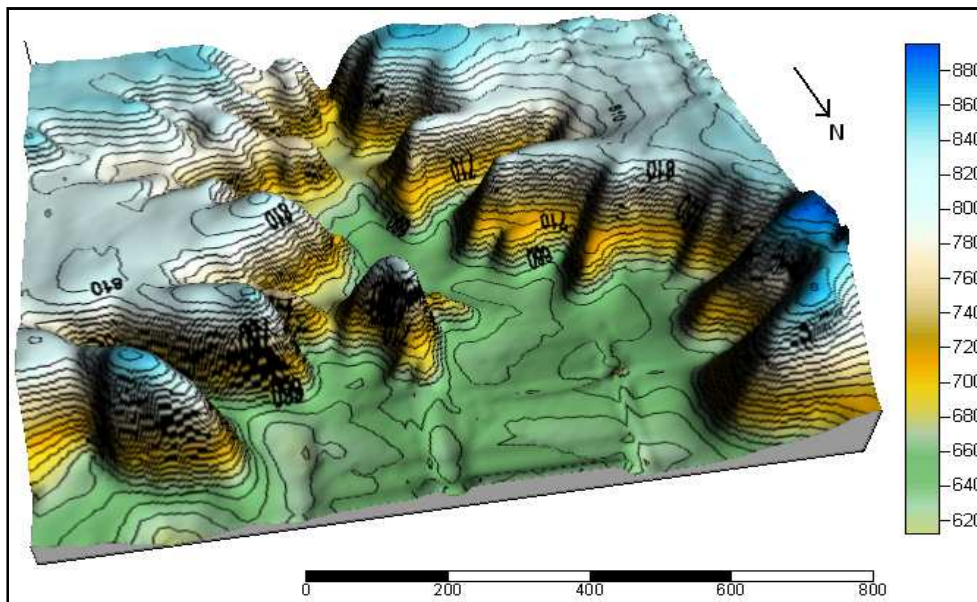


**Fig. 2: Location Map of Study Area**

### Physiography:

“The scientific study of the natural feature of the earth surface especially in its current aspect including land formation, climate, distribution of flora and fauna also called physiography”. Through the aerial view and well drawn map we easily find out the present village physiographic. The actual situation of the village is surrounding by the hilly region. The Yelushi, Kolhekati, Diwandara, Mordara, Charadara,

Gurdara, Patildara, Maulaichadara, Bamandara, Mahardara, Bhorgarh, Bhimgarh are the names of the hill. It extents spread surrounding village. The hilly structure from all direction of the village is useful for the purpose of climatic security especially the wind flow, rainfall, dry and wet air etc. factor rapidly impact could be control by present hilly structure as well as position. The approximate height of the village is around 750 m from mean sea level and slope decreases from south to north (fig. 3).

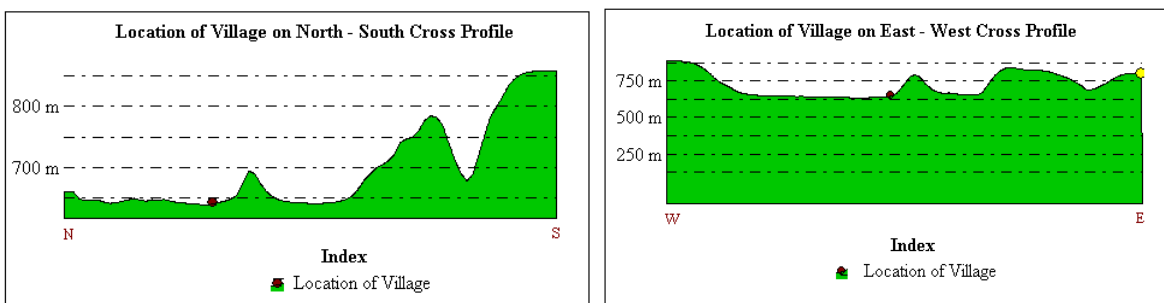


**Fig. 3: Physiography of Pemgiri Village (3D Generated in ‘Surfer 8’ GIS Software)**

**Position of Village On Cross Section Line:**

Pemgiri Village located on 640 m. height. In first cross profile direction height is increasing from North to South direction. In second profile shown the west to east cross

profile. Thus, Pemgiri Village North side height is 650 m and South side height is 850 m. according to second profile observations the height of village increasing from East to West Direction. Pemgiri Village is located at the bottom of hilly area (Fig.4).



**Fig. 4: Cross Profile of Village from North to South and East to West**

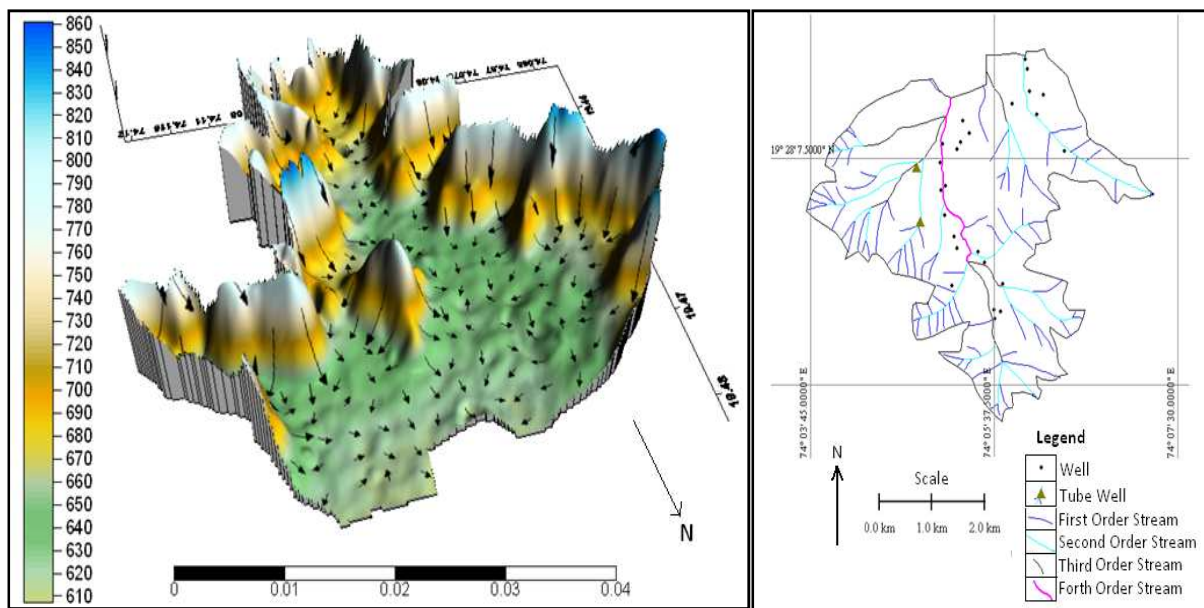
**Drainage Network:**

The drainage network is well developing because of hilly structure. In this village dendritic type of drainage pattern is developed. The major landforms in this village are cliffs and waterfalls. The waterfalls of Pemgiri village are seasonal because of seasonable rainfall. The present village having hilly and plane region

combination, hence first and second order streams occupies the hilly region and third and fourth stream order lies in the plane region (Fig. 5). In the plane region some tube wells and wells are found. The present village has less water availability because hilly and undulating surface as well as due to impermeable rock. Present village has a storage water tank. Therefore here agricultural activity is well developed.

According to village physiography here is very well scope for watershed management e.g. Here

we construct the earth work dam or weir dam also.

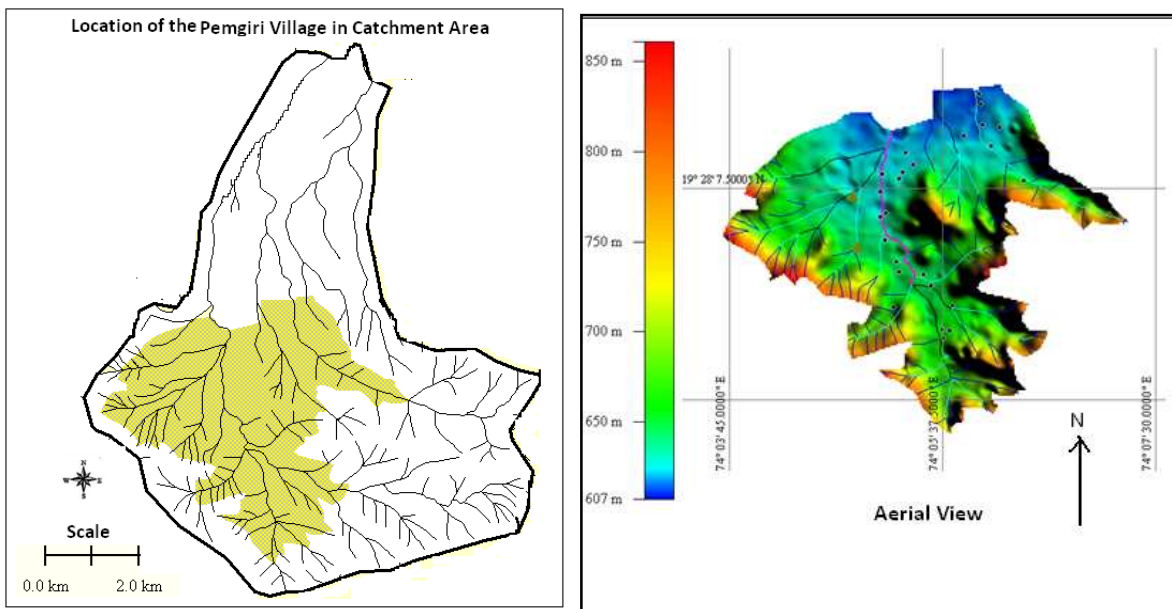


**Fig.5: Water Run Up and Drainage Network (Order wise) Structure of Village**

**Catchment Area:**

The selected Village is mainly part of the Godavari River catchment area. But Pravara River is one of the main tributary of Godavari

River. In considering micro scale catchment area the Pemgiri village is the part of Amrai odha (fig. 6). In this micro catchment area the village is situated in South Western part.



**Fig. 6: 'Amrai Catchment Area' and Drainage Network of Pemgiri and Surrounded Region**



According to land use land cover graphical analysis most of dominant of land use under the cultivated area. Later than most of forest cover also has great dominant because of hilly region (Fig. 7)

**Land Use Land Cover:**

| AREA                 | IN (HECTOR) |
|----------------------|-------------|
| 1) FOREST AREA       | 636.76      |
| 2) CULTIVATED LAND   | 959.57      |
| A) IRRIGATED LAND    | 374.30      |
| KHARIF               | 317.10      |
| RABBI                | 57.20       |
| B) UNCULTIVATED LAND | 585.27      |
| KHARIF               | 573.87      |
| RABBI                | 11.05       |
| 4) BARREN LAND       | 79.15       |
| 5) GAVARAN           | 22.23       |
| 6) GAVATHAN          | 7.69        |
| 7) OTHER             | 3.46        |
| TOTAL AREA           | 1820.54     |



Fig. 7. Landuse landcover

**Geology:**

The village is covered by Deccan trap basaltic lava flows. The lava flows are almost horizontal in deposition but local gentle tilting undulation and minor flexures are some time seen. But for these no major faulting folding is seen in the area. The basalt is generally covered by thin mantle of black soil of recent origin. Other recent deposit such as river alluvial sands, grovels, silts and calcareous, concertino known kantar are also find in river basin. Traps rocks are generally barren of any economically useful and important minerals. However being hard dense and durable they are extensively used as building material and road material.

**Climate:**

The climate of the village is characterized by hot summer and general dryness except during the south west Monsoon season. The year can be divided into four seasons. The cold season from December to February is followed by the hot season from March to first week of June. The south west Monsoon is from the second week June till the end of the September while October and November consist the post Monsoon or retreating monsoon seasons.

**Temperature:**

Seasonal variation in temperate is quite large. From March onwards is a period of continuous increase in day temperature the night remains comparatively cools. May is the hottest month of the year with the mean daily maximum temperature occasionally rise to 43<sup>0</sup> or 44<sup>0</sup>C from about the middle of November both day and night temperature decrease rapidly December is the coldest month of the year with the mean daily minimum temperature at 11.7<sup>0</sup>C. In association with the passage with western disturbance across north India during winter season the minimum temperature in the district some time drop to 2<sup>0</sup>C or 3<sup>0</sup>C.

**Rainfall:**

The annual average rainfall is the village is 578.8 mm. The distribution of rainfall is very uneven about 77% of the annual rainfall is received during the south west monsoon season. The variation in rainfall from year to year is large.

**Soil:**

The soil of village can broadly be classified in to two groups, which are Black cotton soil also known as regour soil and the second is laterite. Soil is generating from the parents rocks of topography which is the essential part of all living life directly and indirectly. Most of the live form living in the soil which is helps for food chain and food web. In the present study area regional topography is influences' for the formations of soil. Parent rock is eroding and watered by different methods and the various soil type formations take place in village. Near the hills bottom mountain soil which has less capacity of water holding. Similarly in the middle part of village having the black cotton soil or regur soil etc. this soil patterns define the

cropping structure of local village. In the plain region of village found the black cotton soil, in this soil found the mostly proportion of humus, calcium and its water holding capacity is also high. Therefore this soil is important for the agriculture, especially for Bajara, wheat, sugarcane, onion, maize, cotton etc. \

**Vegetation:**

Especially this village is famous for the huge Banyan tree in Maharashtra, which occupies 2 acres area (approximately). The village is situated in the foot hill area. Some vegetation found in the hill slope. The Neem trees, accasia the jujube fruit are found in village. In the most type of the custard apple, banyan trees, mango trees, the tamarind trees are also found. The mixing types of flora and fauna find in the village. The climatic condition and soil are not suited for the growth of various species of vegetation. The main trees are finding in the Babul, Nim (*Azadirachta indicia*), Cactus and other trees are included in *timber wood*. *Animal husbandry is the supporting activity with the local agriculture activity. Hence, various desi and hybrid verity of livestock are found in Pemgiri village. In this village most of the people working in the agriculture and they are engaged in the supplementary livestock gardening like cows, Bulls, Goats, Hens, Buffalo etc. this livestock providing the multiple benefits to the agriculture and farmers. The dairy farming is developed in the village owing to agriculture activity which is support to the local people's developments. They sent the milk to the nearest Sangamner city which has help to them familiar developments. There is absence of wildlife in the village due to interactions of human beings. Some wildlife chances in the local region like as Wolf, Jackal, Fox, Leopard and Rabbit.*

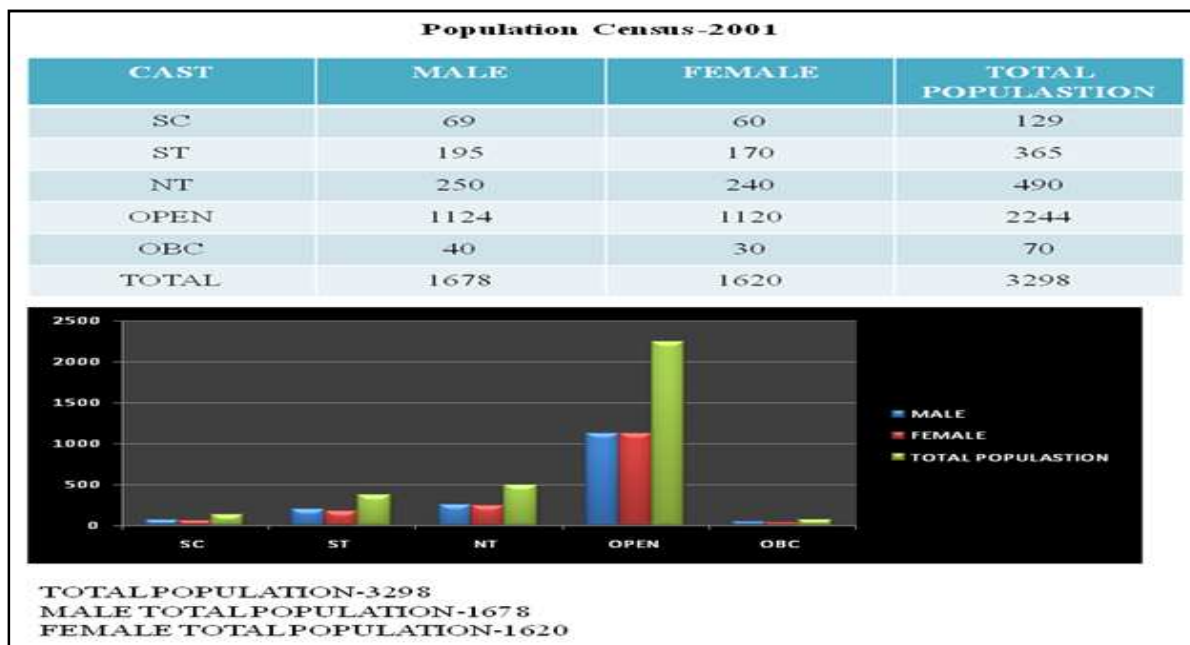
**Socio Economic Survey:**

Socio economic survey studied of selected households in a village center with view of collecting information on demographic attributes, socio economic condition etc. survey are generally conducted to collect variety of information regarding of fertility , mortality, morbidity, mobility, unemployment employment, health education, welfare etc. In Pengiri village survey arrange with demographic attributes and socio economic condition of the village.

**Population:**

Population of 2011 is the pivotal element in social study because it's significant relation with resources. Their distribution, growth and characteristic provide the basic background for

understanding and appreciating all aspect of the environment. Human being is producers to know how many people are in a village where do they live, how and why their number is increasing and what their characteristics are. The present Pengiri village population is the 3562 which finding the several characteristics. The population comprise of 1815 males and 1711 female. It means the male and female ratio is unequal. This population distributed in overall village with high distribution in central part of village. There is finding the age wise variation in population. The physiographic relief, rainfall, climate, vegetation cover and human tendency impact on distribution of population directly and indirectly. In the 2001 classification of population (*fig.8*).



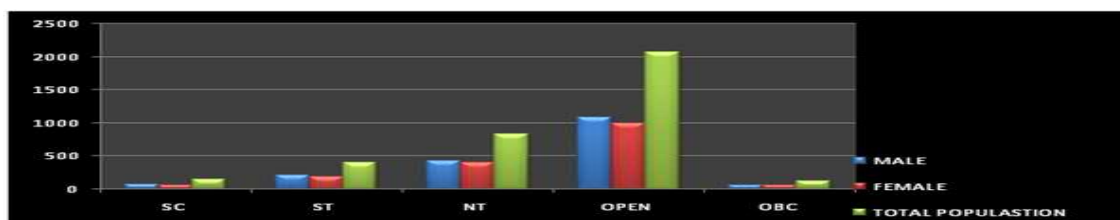
The open category occupies highest proportion and OBC category is lowest one. The 2011

population structure is same like 2001 structure, but the population is increasing in 2011(*fig.9*).



**Population Census-2011**

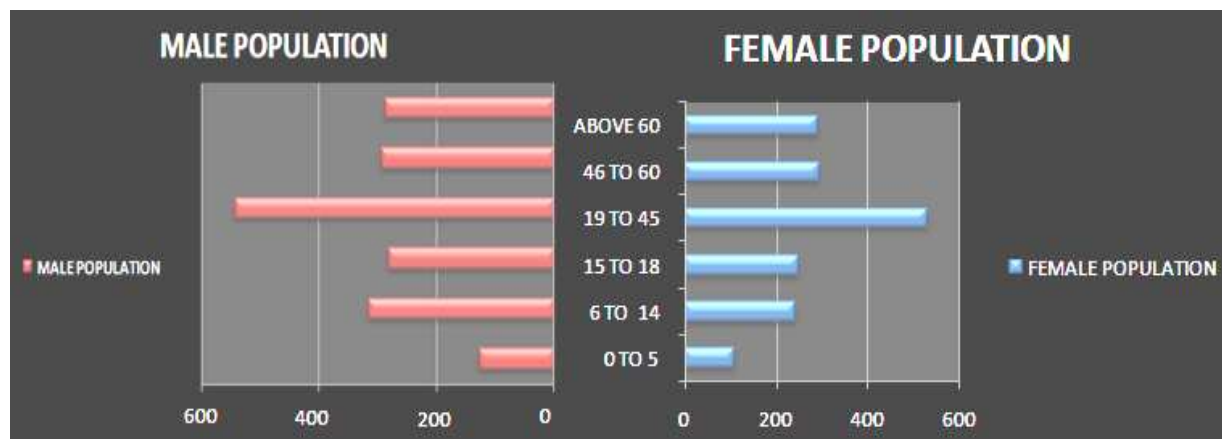
| CAST         | MALE        | FEMALE      | TOTAL POPULATION |
|--------------|-------------|-------------|------------------|
| SC           | 77          | 65          | 142              |
| ST           | 205         | 191         | 396              |
| NT           | 425         | 402         | 827              |
| OPEN         | 1080        | 992         | 2072             |
| OBC          | 64          | 61          | 125              |
| <b>TOTAL</b> | <b>1851</b> | <b>1711</b> | <b>3562</b>      |



(fig.9).  
 TOTAL POPULATION-3562  
 MALE TOTAL POPULATION-1851  
 FEMALE TOTAL POPULATION-1711

**Population Structure: Age Sex Pyramid**

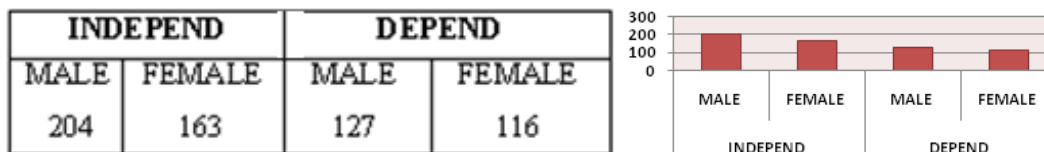
| Age Group    | Male Population | Female Population | Total Population |
|--------------|-----------------|-------------------|------------------|
| 0 to 5       | 128             | 108               | 236              |
| 6 to 14      | 318             | 242               | 554              |
| 15 to 18     | 283             | 249               | 532              |
| 19 to 45     | 545             | 529               | 1143             |
| 46 to 60     | 295             | 293               | 588              |
| above 60     | 288             | 290               | 578              |
| <b>Total</b> | <b>1851</b>     | <b>1711</b>       | <b>3562</b>      |



The given graph shows age sex composition in pyramid format. It indicates the 0 to 70 age group. The pyramid shows highest population in 19 to 45 age group; it means

the independent population is mostly included in this age group. Excluding the age group ‘above 60’ each group has male population is greater than the female ((fig.10,11,12,13,14,15).

**Dependency Data According To Sample Survey:**



(fig.10).

$$\text{Dependency Percentage} = \frac{\text{Depend Population (0-14+above 60 age group)}}{\text{Independ Population between 14 - 60 age group}} \times 100$$

$$\text{Child Woman Percentage} = \frac{\text{No of children's below 5 Year age}}{\text{No of women between 15-45 age group}} \times 100$$

**WOMEN CONDITION IN THE VILLAGE**

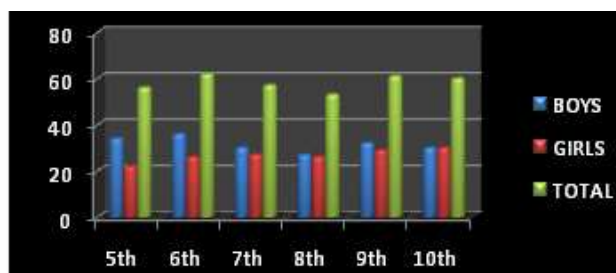
|                                    |     |
|------------------------------------|-----|
| NUMBER OF WIDOW WOMEN IN VILLAGE   | 109 |
| NUMBER OF DIVORSY WOMEN IN VILLAGE | 2   |
| A WOMEN DESERTED BY HUSBAND        | 26  |



(fig.11).

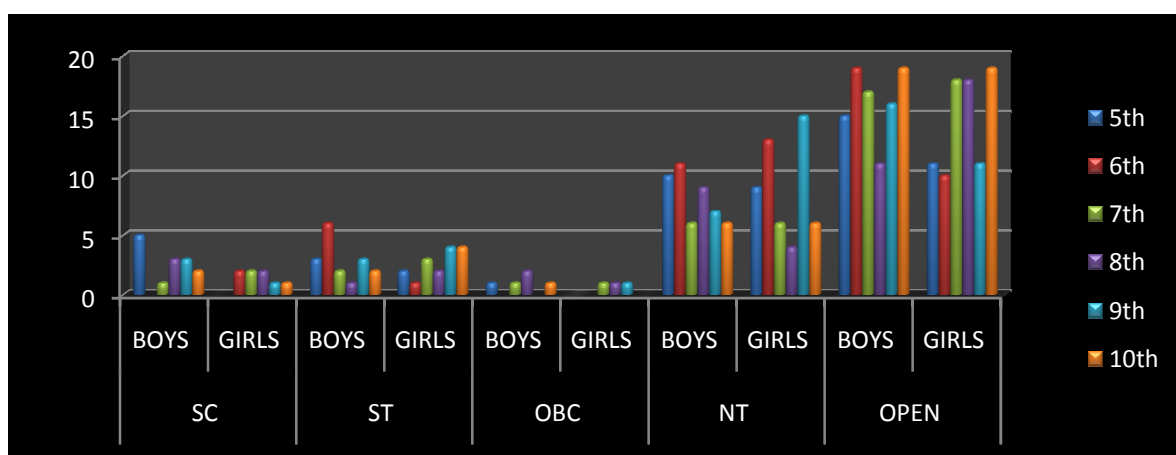
**Educational Structure:**

| Class        | Boys       | Girls      | Total      |
|--------------|------------|------------|------------|
| 5th          | 34         | 22         | 56         |
| 6th          | 36         | 26         | 62         |
| 7th          | 30         | 27         | 57         |
| 8th          | 27         | 26         | 53         |
| 9th          | 32         | 29         | 61         |
| 10th         | 30         | 30         | 60         |
| <b>Total</b> | <b>189</b> | <b>160</b> | <b>349</b> |



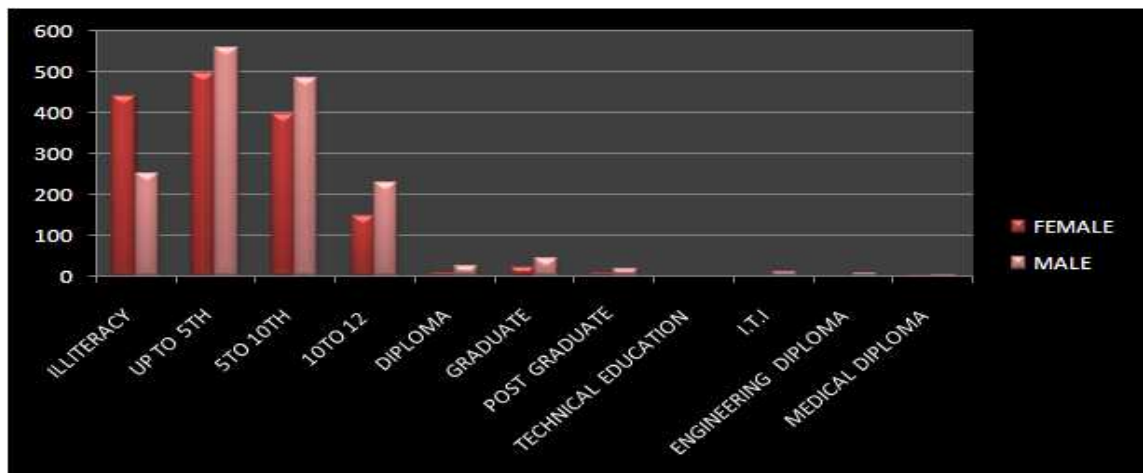
(fig.12).

| CLASS        | SC        |          | ST        |           | OBC      |          | NT        |           | OPEN      |           |
|--------------|-----------|----------|-----------|-----------|----------|----------|-----------|-----------|-----------|-----------|
|              | BOYS      | GIRLS    | BOYS      | GIRLS     | BOYS     | GIRLS    | BOYS      | GIRLS     | BOYS      | GIRLS     |
| 5th          | 5         |          | 3         | 2         | 1        |          | 10        | 9         | 15        | 11        |
| 6th          |           | 2        | 6         | 1         |          |          | 11        | 13        | 19        | 10        |
| 7th          | 1         | 2        | 2         | 3         | 1        | 1        | 6         | 6         | 17        | 18        |
| 8th          | 3         | 2        | 1         | 2         | 2        | 1        | 9         | 4         | 11        | 18        |
| 9th          | 3         | 1        | 3         | 4         |          | 1        | 7         | 15        | 16        | 11        |
| 10th         | 2         | 1        | 2         | 4         | 1        |          | 6         | 6         | 19        | 19        |
| <b>TOTAL</b> | <b>14</b> | <b>8</b> | <b>17</b> | <b>16</b> | <b>5</b> | <b>3</b> | <b>49</b> | <b>53</b> | <b>97</b> | <b>87</b> |



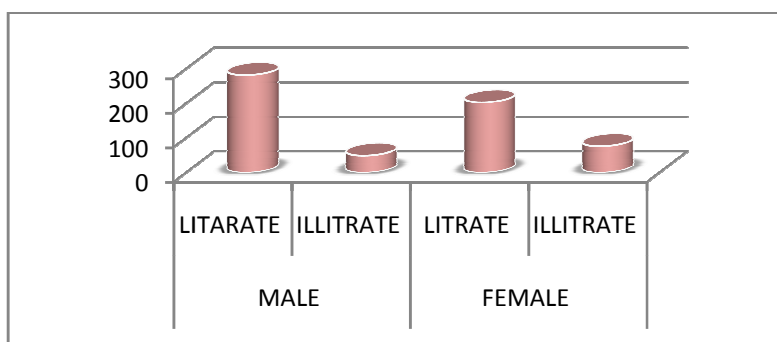
(fig.13).

| QUALIFICATION | FEMALE | MALE | QUALIFICATION       | FEMALE | MALE |
|---------------|--------|------|---------------------|--------|------|
| ILLITERACY    | 439    | 249  | POST GRADUATE       | 6      | 16   |
| UPTO 5TH      | 496    | 557  | TECHNICAL EDUCATION |        |      |
| 5TO 10TH      | 395    | 483  | I.T.I               |        | 8    |
| 10TO 12       | 145    | 227  | ENGINEERING DIPLOMA |        | 6    |
| DIPLOMA       | 7      | 24   | MEDICAL DIPLOMA     | 1      | 3    |
| GRADUATE      | 21     | 44   | TOTAL               | 1510   | 1617 |



(fig.14).

| MALE     |           | FEMALE  |           |
|----------|-----------|---------|-----------|
| LITARATE | ILLITRATE | LITRATE | ILLITRATE |
| 282      | 49        | 203     | 76        |



(fig.15).

$$\text{Literacy Percentage} = \frac{\text{Litarate Population}}{\text{Total Population}} \times 100$$

**Occupational Structure:**

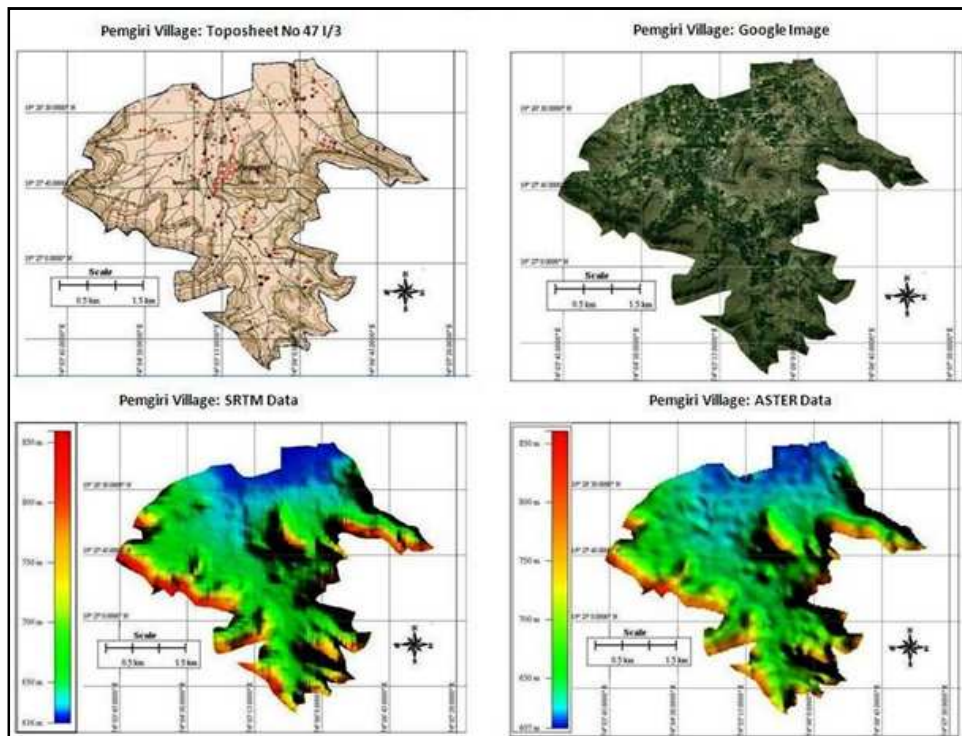
| TYPES            | INDEPEND | DEPEND |
|------------------|----------|--------|
| AGRICULTURE      | 500      | 2500   |
| HORTICULTURE     | 25       | 125    |
| ANIMAL HUSBANDRY | 350      | 750    |
| STORE            | 3        | 40     |
| HOTEL            | 6        | 30     |
| TRANSPORTATION   | 2        | 2      |
| PRIVATE CLASSES  | 1        | 10     |
| HELTH CENTER     | 1        | 1      |

**Analysis and Interpretation:**

The purpose of mapping of village becomes an achievable by various methodological and fields work study in the selected Pemgiri village. The various data sources are applied for the purpose of detail study of Pemgiri village as well as its GIS mapping (fig. 16). In the village nearby 101 houses and settlement are 98 which observed by using remote sensing data. The 7 temple found in the village, at the same time various tourist spot also observed like Huge Vad tree (covered nearby 3 acres area), Mordara waterfall, Yelushi Waterfall etc. The metalled and unmetalled road network is also found in village as far as village. The hilly area of village is mapped accurately with the help of software tool

which is just only 16638977 sq m (4111.49 acre). The drainage network is flowing toward northern direction, this measurement happen along with topographical data. Some seasonal streams are flowing over to the western, eastern and southern hilly area and joint to the main central stream of village. Various physiographical structured measurements are recorded like slope, height from actual sea level using Digital Elevation Model (SRTM). These types of multiple mapping are useful for creating the database at rural level. The generated databases are created using the various software operations and field surveying. These types of various data sources are useful for the various policies, shame, and project implementation at rural level for development and are in command of the regional disparity.





*Fig. 16: Spatial Mapping of Pengiri Village*

### Results and Conclusion:

According to various mapping result of Pengiri village various conclusion are prepared, the 42% area are plain and remains area cover by hilly and barren structure. The western, eastern and southern whole side covers by hilly area which is useful for forest plantation and tourism development. Some plantation already having on the hilly area, this role model should be applied to the remaining area of village. One of the streams flowing into central part of village, which is useful for construct the small scale K. T. for the purpose of water conservation. Toward the west side of hilly area is having one of the important fort and temple

which have great mythology and historical perspective. It is useful for tourism development activity. The village is few K.M. from Sangamner city, that's why safe air spot can develop at the hilly area to the Sangamner peoples. Village should be attached by metalled road to the nearest city. The local environment is safe and ideal for Livestock farming due to availability of feeder for livestock and market for milk. Hence, there is scope to develop the dairy farming for growing the local people's income and slandered of living. Soil degradation creates due to excessive irrigation. It should be control by using organic fertilizer for crop pattern.

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**References:**

- Thomas M. Lillesand, (2009), Remote sensing and image Interpretation, Published by John Wiley & Sons (Asia) Pvt, ltd, Singapur, p.p-491-498.
- M. Anji Reddy, (2006), Remote sensing and Geographical information System, BSP Publications,Hydrabad-500095 (A.P.), p.p162-163 & 171-174.
- George Joseph, (2007), Fundamental of Remote Sensing, Published by- University Press (India)Private Ltd.Hydrabad 500 029, p.p.-289-297.
- Dr. B.C. Panda, (2006), Remote sensing principles and Application, published by Vinod Vasishtha for Viva Book Private ltd. N. Delhi-110 002. P.p-104-106.
- Lillesand T.M. and Kiefer R. (2003): Remote Sensing and Image Interpretation, John Wiley and Sons.
- Liverman D., Battreson M., Bell T., Nolan M., Marich A. and Putt M. (2006): Digital Elevation Models from Shuttle Radar Topographic Mission Data ----- New Insights into the Quarternary History of Newfoundland. Current Research (2006) Newfoundland and Labrador Department of Natural Resources Geological Survey, Report 06-1, pp. 177-189.
- Pokharel S. B. (2007): Remote Sensing and GIS Analysis of Spatial Distribution of Fracture Patterns in the Makran Accretionary Prism, South-east Iran. Unpublished M.Sc dissertation submitted to College of Arts and Sciences, Georgia State University.
- Ramaswamy S.M. (2006): Remote sensing and active tectonics of South India. International Journal of Remote Sensing, v 27. Pp-4397-4431.
- M. A. Khan, Watershed management for sustainable agriculture, published by Agrobios (India) Jodhapur – 2002, p.p. 13-19.
- Savindra Singh, Physical Geography, Prayag Pustak Bhawan, Allahabad – 2009, p.p. 215-230 and 249-265.
- Dr. Kasum Lata, GIS based monitoring system for urban water supply system. (Research Fellow, National Institute of Urban Affairs, India Habitat Centre, and New Delhi).
- Hari Prasad Sharma, GIS-based Rural Water Supply and Sanitation Database, (Nepal / Department of Water Supply & Sewerage, 13 November 2007).
- Water harvesting brings ray of hope to Ahemadnagar by Sharad Mistry- Indian Express Newspapers (Bombay) Ltd.
- Census of India, Primary Data: Grampanchyat-Pemgiri village, Z.P. primary school-Pemgiri, Revenue office- Sangamner Tahsil.