CHAPTER II
GEOGRAPHICAL BACKGROUND
OF THE STUDY AREA

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CHAPTER II
GEOGRAPHICAL BACKGROUND
OF THE STUDY AREA

2.1 INTRODUCTION

"Geographical Background of study area is determined, sustained and recycled the Groundwater" The groundwater is the precious gifts of environment that are most extensively dispersed natural resource of the earth unlike the other mineral resources. It obtains annual replenishment from the meteoric rainfall. The rainfall is the source of water for continental areas of earth’s surface. The geographical background determines the rainfall as well as groundwater. Both factors are the elements or parts of the hydrological cycle. In run off stage, water percolates beneath the land surface. This percolation is regulated by quantity and speed of rainfall, timings of rain, temperature, amount of evaporation, slope of land, dryness of air, voids and non-permeability of rocks, vegetation cover, absorbing capacity of the soil etc. factors.

The Khatav tahsil is become from uneven geographical background. This tahsil comes in Deccan plateau area, which having the average height of 600 m. This topography is characterized by the presence of rugged hill ranges on the western borders. The western parts of tahsil are occupied by the mountain ranges and central and eastern parts are the plateau area. The physical base particularly the relief, drainage, slope, geology, climate and soils play a vital role in distribution and fluctuation of groundwater level.

2.2 LOCATION

The study area encompasses the south-western part of Maharashtra, is located on 17°22'48" to 17°53'24" North latitude and 74°13'12" to 74°42'00" East longitude which are encircled by to the East- Man tahsil of Satara district, to the South- Sangli district, to the West-Karad and Koregaon tahsil in Satara district and to the North- Phaltan tahsil in Satara district (Fig. 2.1). The study area covers of 1377.79 sq. km, which comprises of 143 villages.
LOCATION MAP

INDIA

MAHARASHTRA

SATARA DISTRICT

KHATAV TAHSIL

Fig. 2.1
The area under study is one of the drought-prone areas of the Maharashtra state, where, in every summer season people faced the problems of water for domestic purpose and agricultural uses.

**2.3 PHYSIOGRAPHY:**

The physiography constitutes the physical environment, is referred as the different relief features above earth’s surface.

**Relief**

Relief is the imperative element which directly confined the surface water, which originates the groundwater through percolating processes. The relief of the tahsil is shown in Fig. 2.2.

The Khatav tahsil is a part of Maharashtra Deccan basaltic plateau with an average height of 600 m above mean sea level. Some ranges of Mahadeo hills are coming in the western part of tahsil. Especially, Solaknath, Bhapshah, Vardhangarh and Bhoosangarh are located western part of tahsil. Gradually, these hills are sited on the northern part, on central part, on north-western boundary and on southern part of tahsil.

**Relief Division:**

On the basis of altitude above mean sea level, the study region is classified into three relief divisions. (Fig. 2.2)

a) Hilly Ranges
b) Foot Hills
c) Plain Area

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Particular</th>
<th>Altitude</th>
<th>Area in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hilly ranges</td>
<td>&gt; 900 m</td>
<td>20.46</td>
</tr>
<tr>
<td>2</td>
<td>Foot hills</td>
<td>600 to 900 m</td>
<td>34.51</td>
</tr>
<tr>
<td>3</td>
<td>Plain area</td>
<td>&lt; 600 m</td>
<td>45.03</td>
</tr>
<tr>
<td></td>
<td>Total area</td>
<td></td>
<td>100.00</td>
</tr>
</tbody>
</table>

**Source:** S.O.I. Toposheet No. 47K/1 to 47K/11.
KHATAV TAHSIL: RELIEF

Source: Cartosat DEM Images

Fig. 2.2
a) Hill Ranges:

Above 900 m altitude landscape area referred as the hill ranges. Nearly 20.46 percent area is covered by that relief division in the tahsil (Table 2.1).

An area of the north and north-western part is occupied by hill ranges. It consists of scarps of Mahadev hill range and steep basaltic walls. There finds four hills- Solaknath, Bhapshah, Vardhangarh and Bhoosangarh. The Solaknath hill range on Northern part, Bhapshah hill range in central part, Vardhangarh hill range on north-western boundary and Bhoosangarh hill range on southern part of tahsil. Also, two hill forts placed in the tahsil- Bhoosangarh fort and Vardhangarh fort. The Bhoosangarh fort is positioned in the south part and Vardhangarh fort is situated in north–west part of Khatav tahsil.

The large areas of hill ranges are under the sparse forest cover presenting the picture of erosion and ruggedness of landscape having disturbances in percolation of water.

b) Foot Hills:

Area between 600 m. and 900 m. altitude comes under relief division of foot hills. About 34.51 percent area is covered by that relief division in the tahsil (table 2.1). Average gradient varies from 10 to 30 meters per kilometer. Mostly, south and eastern part is represented the foot hills in the tahsil. Most of the area in this category is occupied by the shrub, grasses and deciduous forests.

c) Plain Area:

Plain area is positioned at an altitude below 600 m., which shares 45.03 percent area in the tahsil (table 2.1). It occupies the major portion of the river valley mainly towards north-west to south the central part, which is bounded by foot hills in the tahsil. Average gradient varies from 1 to 10 m per kilometer. There finds the majority areas under the deep black soil. Therefore, these are the suitable area for agricultural activities and practices. But, scarcity of water is the limitations to agriculture as well as human settlement. The maximum use of groundwater is seen not only for agricultural uses but also for drinking purposes.
2.5 GEOLOGY

The different relief features and the soils region are basically the products of the geological mettle. According to geological formation report of Maharashtra (1970), the tahsil belongs to Deccan traps. This Deccan traps originated age from upper Cretaceous to lower Eocene. The Deccan traps are prepared from enormous basaltic lava flows which transferred out through fissures and restricted vents throughout upper createous to lower eocene period. The basalt is capped by laterite rock material which is surrounded in the plateau exceeding 910 mtrs from sea level.

Every all basaltic lava flow varies in thickness from 5 m to 60 m Like that all basaltic lava flows are made about 29 layers in beneath the earth surface in Western Maharashtra (Geological Survey of India, 1995). Between every two layers, groundwater is circulated to other areas through red bole material. Enormous lava flows composed various flat topped, bold, rugged hills and extensive plateaus of entire western and north-western part of tahsil. They also constituted the parts of Mahadev ranges in the tahsil. These lava flows created the plains among a soil of different thickness. The soil formed by the breakdown of basalt is observing calcium and potash minerals are found in the tahsil.

Besides, alluvium occurs in patches along banks of river Yerala and her tributaries with average thickness of 5-7 m and contains pebbles, boulders of trap and bends of sand. There is generally reached the maximum porosity, are observed greatest percolation of water.

Deccan Traps

The basalt flows scattering over greater parts of peninsular India (Deccan) which shown steps like terraced appearance (trap) are recognized as the Deccan traps. These are located on the Deccan plateau of west – central India. These are one of the largest volcanic landscape on Earth showing the large igneous province (Geological Survey of India, 1995). The Deccan Traps initiated forming from 66.230 million years ago, at the ending of cretaceous period, which may lasted less than 30,000 years in total. They consist of several layers of solidified flood basalt that collectively are more than 2000 m thick.
KHATAV TAHSIL: GEOLOGY

Legend

Source: Geological Survey of India, 1995

Fig. 2.3
and occupies an area of 5,000,00 sq. km. It composes the flat-topped hills, infinite rugged and bold, forming broad plateaux. This traps are primarily basalt, laterite rock materials happens widely approximately entire the areas of tahsil. Moreover, basalt lava flows also blanket the plains along with a soil enveloping of different thickness. A notable feature of the traps is their horizontal nature and considerable lateral spreads over an extensive area; sometimes a particular lava flow occupying almost 290-400 square miles or even more. In places, it also demonstrates a minor dip. The typical vertical, prismatic and columnar jointing is normally detected in the hard and compact basalts area. But, that area was reduced to its existing size by erosion (Geological Survey of India, 1995).

The greatly variable water bearing properties of different lava flow units control the groundwater potential in the Deccan Traps. The Deccan Traps have normally poor to moderate percolation capacity depends on the existence of primary and secondary fractures.

**Basaltic flows**

The basalts lava flows are becomes from large igneous volcanic lava occupying all Deccan plateau. They are created about 29 layers in beneath the earth surface in Western Maharashtra. An individual layer varies in thickness from 5 m. to 60 m. During the layers, red clayey materials are to be found in basalt flow, called as "red bole". Through the red bole material, groundwater is circulated to the other areas (CGWB, 1998).

Enormous basalt lava flows comprised various rugged, bold, flat topped hill and broad plateaus of entire western part of tahsil. But, surface water is stay and stored over the plain area. So, plain area is better for groundwater percolation revealed maximum groundwater level than hill and plateau area.

Also, the groundwater level is declined with increased thickness of basalt flow. According to GSDA, Some basalt layers are percolated the water as time of 3-4 s. In fact, the basaltic flow contains variable quantities of groundwater in vesicles, joints and weathered cappings. Normally, filled,
drawn vesicles are seen in the Deccan traps. So, these areas have usually poor to moderate permeability of groundwater.

Through weathering and erosion processes, basaltic lava flows produced the plains among a soil of varied thickness. Usually, water percolation or holding capacity is raised with increased the thickness of soil cover. Hence, the groundwater level is raised with increased thickness of soil.

2.6 HYDROGEOLOGY

The entire tahsil is underlain by Deccan Trap which originated of Upper Cretaceous to Lower Eocene age. In recent age, the shallow alluvial configuration also occurs as narrow stretch along the Yerala river and her tributaries flowing in the tahsil however, they have bounded areal extension. This area are the highly groundwater potential showing better groundwater level. A map depicting the hydrogeological features is shown in Fig. 2.4

**Hard Rock (Deccan Trap Basalt)**

Deccan Trap covers about 98% area of the tahsil and it happens as basaltic lava flows, which are generally horizontally inclined over an extensive stretch and provide rise to tableland form of topography also called as plateau. These flows take place in layered sequence ranges in thickness from 5 to 60 m. The weathered and fractured trap showing in the topographic lows appearance the chief aquifer in the tahsil.

The groundwater arises under semi-confined, phreatic and controlled conditions. Hence, the massive segments of basaltic lava flows are devoid or absence of water, but when it is weathered, cracked, jointed contains better potential zones groundwater (GSDA Hydrological Report, 2001). Also, the crucial aspects such as nature and density of vesicles, their distribution, inter-link, deepness of weathering and topography of the area etc. are the suitable for groundwater potential, where mostly groundwater percolated and circulated.
KHATAV TAHSIL : HYDROGEOLOGY

Fig. 2.4

Source : GSDA Hydrological Report, 2001

Legend

- Lineament
- Hard Rock (Deccan Trap)
- Hilly Area

Scale

0 4.5 9 18 Kms

N
Soft Rock (Alluvium)

Alluvium finds as narrow extends along banks and flood sediment plains of Yerala river and her tributaries. In the Alluvium, sand and gravel coarse-grained detrital material generally taking place as lenses forms better aquifer, nevertheless they have restricted areal extension. The groundwater reaches in phreatic aquifer beneath the water table conditions in flood plain i.e. Alluvium deposits close to the river banks (GSDA Hydrological Report, 2001). The predominant groundwater level is observed in soft rock of the tahsil.

2.7 SURFACE WATER RESOURCES

Surface water is one of the water source of groundwater. Leading level of groundwater finds in surface water catchment and collected area. It refers to the drainage pattern, originates from rivers, tributaries, streams and springs. The Yerala river is the main river in the tahsil and her tributaries are-the Nani river, the Karpur river and the Chand river. Also, many other big and smaller streams drain in the tahsil which shown in table 2.2 and Fig. 2.5.

The Yerala Basin

The Yerala River is the main river, are seasonally drains through the greatest areas in the tahsil. This river is the one of the tributary of the Krishna river, originates near Manjarwadi village at the height of 928 m. from sea level on the Solakhnath hill. This place is situated far in northern direction from the distance of 29 km. to Pusegaon village. Between the Vardangarh fort and the Mahimangarh fort, firstly she flows south-east until the Vaduj village and after village, she flows south wards direction. Her length is about 120 km., occupied 925 sq. km. catchment area in the tahsil. This river is flowing through the Mol, Diskal, Lalgun, Khatav Vaduj, Nimsod and Chitali villages respectively. Near Bruhmanal village, Yerala River meets to Krishna river from the left side at the east side of Ashta village in Sangli District. Both sides and basin of river are scattered by sandy bed and alluvial soil. In British period i.e. in 1876, earthen dam was constructed near Ner village and Yeralwadi dam was build (in 1977) by near Banpuri village on the river.
Yerala. These two dams are checked and stored the water, which supplies water for drinking and agriculture. But, this river is the seasonal nature having totally dry in the summer season. The Nani river, Karpur river and Chand river are the sub-tributaries of the Yerala river.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>River</th>
<th>Length (km)*</th>
<th>Catchment Area (Km²) **</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yerala</td>
<td>120</td>
<td>924.85</td>
</tr>
<tr>
<td>2</td>
<td>Chand</td>
<td>40</td>
<td>68.26</td>
</tr>
<tr>
<td>3</td>
<td>Nani</td>
<td>25</td>
<td>64.62</td>
</tr>
<tr>
<td>4</td>
<td>Streams</td>
<td>4971</td>
<td>1351.92</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>5156</td>
<td>2409.65</td>
</tr>
</tbody>
</table>

Source: * District Gazette, Satara District, ** Complied by Researcher

**Nani river**

The Nani river is the prevalent sub-tributary of Yerala river, which originates in the vicinity of Aundh village. This river flows as of south-east direction, primarily in Khatav tahsil of Satara district and Khanapur tahsil of Sangli district. Her length is about 25 km. This river joins to the Yerala river as of close to east side of Kadegaon village (in Sangli district) from the right side. This river is totally dry in the summer season.

**Chand river**

The Chand river is another sub-tributary of Yerala river, which originates near Pachwad village in hilly area. This river flows from south-east direction, mainly in Khatav tahsil of Satara district and Khanapur tahsil of Sangli district. Her length is about 40 km. This river meets from right side to Yerala river at near east side of Kadegaon village (Sangli district). Also, like Nani river, this river is seasonal having dry in the summer season.
KHATAV TAHSIL: DRAINAGE PATTERN

Fig. 2.5
2.8 HYDROMETEOROLOGY

The climate is hot in summer season and is generally dry except in the south-west monsoon season in the tahsil. There, the year may be separated into four seasons- the Summer season from month of March to month of May, the south-west monsoon season constitute from the June to September, the north-east monsoon season from the Month of October to December and the Winter season from the January to February. Similarly, groundwater level is observed the dominantly in south-west monsoon, moderately in north-east monsoon and minimum in summer season. The fluctuation of groundwater is progressively improved from the month of January.

The Khatau tahsil comes in monsoon type of semi-arid climate with regional variations in the temperature and rainfall. In fact, these areas are come in the rainshadow belt of Sahyadri ranges. Where, rainfall is diminishing from western to eastern direction. Normally, there falls rainfall maximum about 500 mm and minimum about 100 mm, observed temperature maximum about 36.4°c and minimum about 14.4°c. There falls drought after every 4-5 years.

Temperature

The groundwater is also consequence of temperature intensity and heat, is measured moderate groundwater level in winter season and minimum groundwater level in summer season. According to geological survey report of some geologist (2005), the sun rays absorb the water from 5-8 inch depth through land area. But, its heat absorbs water from 2-4 m depth through land area.

The Government established different small weather stations in rural areas for collecting climatic and weather data. These weather stations participates significant task to the collecting temperature as well as rainfall data. In Vaduj, Khatau, Pusegaon, Aundh, Pusesawali, Mayani, Katar Khatav, Ambwade etc. villages are positioning the weather stations in tahsil. The dominant average temperature is recorded in Mayani Village in 2012-13. Table 2.3 and Fig. 2.6 shows distribution of temperature in the study region.
In the second week of June, the south-west monsoon arrives in the study region. The maximum temperature is recorded in the summer season. Mainly in July measured highly temperature Katar Khataav is 37.5°C and lowest at Pusegaon is 31.9°C respectively. From the end of September climatic conditions are changing, temperature starts to rise, wind direction is mainly from north-east and east, and days are quite warm. Due to intensive sun rays and maximum temperature, the minimum level of groundwater is found in the summer.

The minimum temperature is measured in the coldest months of the year i.e. winter season. Mainly highly temperature measured at Mayani is 17.6°C and lowest at Pusegaon is 11.3°C respectively. (Table 2.3) Early in the morning, fog is the common climatic phenomena of this cool season. The sunshine is bright with the clear sky and from north east direction wind flows in this season. Due to cold climate and low heat, the moderate level of groundwater is observed in the winter.

Table 2.3

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Weather Stations</th>
<th>Maxi. °C</th>
<th>Mini. °C</th>
<th>Average °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vaduj</td>
<td>36.5</td>
<td>15.4</td>
<td>25.95</td>
</tr>
<tr>
<td>2</td>
<td>Khataav</td>
<td>37.2</td>
<td>14.9</td>
<td>26.05</td>
</tr>
<tr>
<td>3</td>
<td>Pusegaon</td>
<td>31.9</td>
<td>11.3</td>
<td>21.60</td>
</tr>
<tr>
<td>4</td>
<td>Aundh</td>
<td>36.7</td>
<td>14.2</td>
<td>25.45</td>
</tr>
<tr>
<td>5</td>
<td>Pusesawali</td>
<td>32.8</td>
<td>12.5</td>
<td>22.65</td>
</tr>
<tr>
<td>6</td>
<td>Mayani</td>
<td>39.2</td>
<td>17.6</td>
<td>28.40</td>
</tr>
<tr>
<td>7</td>
<td>Katar Khataav</td>
<td>37.5</td>
<td>16.1</td>
<td>26.80</td>
</tr>
<tr>
<td>8</td>
<td>Ambwade</td>
<td>36.8</td>
<td>12.9</td>
<td>24.85</td>
</tr>
<tr>
<td></td>
<td>Tahsil Average</td>
<td>36</td>
<td>14.36</td>
<td>25.18</td>
</tr>
</tbody>
</table>

Source: Indian Meteorological Department, Pune (2012-2013)

Rainfall

The groundwater gets annual replenishment from the precipitation i.e. rainfall. The rainfall is the prime source of water as well as groundwater for continental areas of earth’s surface. It is very vital element to maintain the
hydrological cycle or water cycle and keep proper ecological pyramid. It is liquid state of water in the forms of droplets which condenses from atmospheric vapour and then falls as fresh water on the earth surface. Generally, rain is responsible for depositing and storing most of the fresh water on the Earth surface. That water i.e. surface flow goes underground through percolation process. Hence, this is directly influences on the drainage pattern and it highly raises the groundwater level.

The Monsoon is unequally distributed rainfall in tahsil, ranges between 200 mm. and 500 mm rainfall. There falls highly rainfall for the most part during the south-west monsoon, which declines towards the eastern direction. Where, about 70 to 85 percent mean annual rainfall falls during the south-west monsoon. Also, north-eastern monsoon comes from the second half of September, falls only 10 to 30 percent of the mean annual rainfall of the area.

The better suitability of physiography for rainfall lies in the western part are the maximum rainfall zone, receives rainfall above 550 mm. Thus, the Pusegaon circle and Pusesawali circle receives maximum rainfall. Also, by reason of foot hill and plain zone, the central and south part lies in moderate rainfall zone, receives rainfall between 450 mm. and 550 mm. So, the Khatav circle and Vaduj circle lies in moderate rainfall zone. But, eastern part of the study region is majority drought prone area counting Katar Khatav circle and Mayani circle. Both circles receive rainfall below 400 mm, hence, these area lies in low moderate rainfall zone. There always reaches the shortage of water not only for domestic purpose, but also for agricultural activities.
Source: Indian Meteorological Department, Pune (2012-2013)

Fig. 2.6
Table 2.4

KHATAV TAHSIL: AVERAGE ANNUAL RAINFALL (2012-13)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Weather Stations</th>
<th>Rainfall (in mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vaduj</td>
<td>198.7</td>
</tr>
<tr>
<td>2</td>
<td>Khatav</td>
<td>183.7</td>
</tr>
<tr>
<td>3</td>
<td>Pusegaon</td>
<td>204</td>
</tr>
<tr>
<td>4</td>
<td>Aundh</td>
<td>84</td>
</tr>
<tr>
<td>5</td>
<td>Pusesawali</td>
<td>207</td>
</tr>
<tr>
<td>6</td>
<td>Mayani</td>
<td>62</td>
</tr>
<tr>
<td>7</td>
<td>Katar Khatav</td>
<td>101</td>
</tr>
<tr>
<td></td>
<td>Tahsil Average</td>
<td>148.63</td>
</tr>
</tbody>
</table>

Source: Indian Meteorological Department, Pune. (2012-2013)

Table 2.4 and fig. 2.7 shows, glaring contrast in circle wise distribution of rainfall in 2012-2013.

In fact, in 2012-13, tahsil is received least rainfall as below 300 mm. Therefore, government had announced drought prone tahsil in summer of 2013 and supplied the drinking water through tanker. During this period rainfall distribution is quite variable and ranges between 204 mm in the western part and 62 mm in the eastern part. The Pusesawali, Pusegaon and Vaduj villages are recorded nearly 200 mm rainfall. Therefore, better level of groundwater is found here. While, about 187.7 mm rainfall is received in Khatav village. Besides, other villages received 100 mm. and less than 100 mm. rainfall.

**Humidity**

The humidity is highly presented in the air during the monsoon months whereas during the summer season and the winter season, the air is dry specifically in the afternoon’s period. In the plain area, the dryness is additional noticeable than in the hills area.

**Wind**

In tahsil, winds are strong and intensive principally on the hills area in the monsoon season. Their effectiveness is light to moderate during rest seasons of the year. The thunderstorms particularly happen and occur in hot seasons and post monsoons some s. The hilly areas i.e. north-western part of tahsil are normally covered with clouds as well as fog during the rainy season. The occurrence of frost is not recorded in the tahsil.
KHATAV TAHSIL: RAINFALL DISTRIBUTION (2012-13)

Source: Indian Meteorological Department, Pune (2012-2013)
Fig. 2.7
2.9 SOIL

Soil refers to the thin layer locating over the earth’s surface, jointly influenced by climate, relief, gradient of land, nature of parent rocks, vegetation and groundwater also. It is a significant element that composes the environmental settings together with air and water, and plays a fundamental role as the basis of existence of organisms including human beings. The soil is an influencing or controlling factor in the process of groundwater recharge because, it may hold the surface water in soil holes and pores. The amount of groundwater recharge, storage, discharge, the extent of groundwater pollution, etc. all are determined by the soil properties like structure, texture, porosity, specific yield, permeability etc. It is active as a natural filter to monitor out many substances and elements that mix with the water. But, it plays a central role in any groundwater conservation, protection as well as management strategy.

The Brown soil is shared dominantly land area in the tahsil, which are quietly deficient in various nutrients. Also alluvial soil is confined as a narrow belt along the banks of Yeralu river.

Especially, following soil types are found in the Khatav tahsil -

i. Brown Soil
ii. Light Brown Soil
iii. Red Brown Soil
iv. Dark Brown Soil
v. Black Soil

| Table 2.5 |
| KHATAV TAHSIL: SOIL DISTRIBUTION |

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Soil Type</th>
<th>Area in Hectors</th>
<th>Area in Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Black</td>
<td>950.65</td>
<td>0.69</td>
</tr>
<tr>
<td>2</td>
<td>Dark Brown</td>
<td>27918.43</td>
<td>20.29</td>
</tr>
<tr>
<td>3</td>
<td>Light Brown</td>
<td>32912.48</td>
<td>23.92</td>
</tr>
<tr>
<td>4</td>
<td>Brown</td>
<td>44898.17</td>
<td>32.63</td>
</tr>
<tr>
<td>5</td>
<td>Red Brown</td>
<td>30914.86</td>
<td>22.47</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>137594.6</td>
<td>100</td>
</tr>
</tbody>
</table>

KHATAV TAHSIL: SOIL

Legend

Soil

Light Brown
Red Brown
Brown
Dark Brown

Source: Satara District Planning Map (Survey of India, 2004)

Fig. 2.8
Brown Soil

Brown soil is a pre-dominantly distributed on the land, occupies about 44898.17 hectors (32.63 percent) area of total soil area.

Light Brown Soil

Light Brown Soil is the second dominant scattered soil, covers about 32912.48 hectors (23.92 percent) area of tahsil. The western and eastern foot hill region comes under the light brown soil.

Red Brown Soil

Red brown soil is the third dominant spread soil, confined to western and eastern margins located at higher altitude above 800m. This soil distributes nearly 22.47 percent (30914.86 hectors) area of tahsil having deficiency of different elements.

Dark Brown Soil

About 27918.43 hectors (20.29 percent) area comes under the dark brown soil. That soil is mostly reach along the banks of Yerala river, primarily in the areas of Diskal, Ner, Pusegaon, Katgun, Khatav, Vakeshwar, Vaduj, Ambavade and Chitali etc. villages.

Black Soil

Black soil is the last but also important soil, covered about 950.65 hectors (0.69 percent) area of tahsil. The Maradwak and Morale village are majority confined the black soil.

2.10 POPULATION

Population is the major consumer of groundwater using the water for agriculture activities as well as drinking purpose. Khatav tahsil is almost rural area, where, population is unevenly distributed. As a result of shortage of rainfall, groundwater is the essential source of water in the tahsil. According to 2011 census, there are survived about 2,73,351 persons, nearly 198 persons per km² density and 1012 persons sex ratio. Where, about 1, 35,876 persons and about 1, 37,475 persons are settled total male population and total female population respectively.
Table 2.6
KHATAV TAHSIL: POPULATION

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Circle</th>
<th>Male Population</th>
<th>Female Population</th>
<th>Population</th>
<th>Population Density (in sq.km.)</th>
<th>Sex Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pusegaon</td>
<td>30538</td>
<td>30686</td>
<td>61224</td>
<td>199</td>
<td>1005</td>
</tr>
<tr>
<td>2</td>
<td>Khatav</td>
<td>20840</td>
<td>20976</td>
<td>41816</td>
<td>243</td>
<td>1007</td>
</tr>
<tr>
<td>3</td>
<td>Pusesawali</td>
<td>17031</td>
<td>17553</td>
<td>34584</td>
<td>197</td>
<td>1031</td>
</tr>
<tr>
<td>4</td>
<td>Vaduj</td>
<td>28736</td>
<td>28925</td>
<td>57661</td>
<td>218</td>
<td>1007</td>
</tr>
<tr>
<td>5</td>
<td>Katar</td>
<td>14519</td>
<td>14900</td>
<td>29419</td>
<td>152</td>
<td>1026</td>
</tr>
<tr>
<td>6</td>
<td>Mayani</td>
<td>24212</td>
<td>24435</td>
<td>48647</td>
<td>184</td>
<td>1009</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>135876</td>
<td>137475</td>
<td>273351</td>
<td>198</td>
<td>1012</td>
</tr>
</tbody>
</table>

Source: District Census Handbook, Satara (2011)

Table 2.6 and Fig. 2.9 represents the data regarding the circle wise population, population density and sex ratio in 2011.

Dominantly, Pusegaon circle is shared the total population (61224) in tahsil with 30538 male populations and 30686 female populations. There is counted nearly 199 per sq. km population density and almost 1005 sex ratio. Totally, the second dominant population is habited in Vaduj circle (57661) among 28736 male populations and 28925 female populations. There is counted about 218 per sq. km population density and nearly 1007 sex ratio. The third dominant total population is settled in Mayani circle (48647) with 24212 male populations and 24435 female populations. There is distributed about 218 per sq. km population density and nearly 1007 sex ratio. Besides, Khatav, Pusesawali, Katar Khatav etc. circles are distributed less than 40,000 population.
2.11 EDUCATION

The term Education is one of the very significant qualitative indicators of social development. The education is determined by the index of human development and quality of human life. It creates the people socially and economically additional careful and awaked and helps bringing a change in the mental attitudes towards socially responsibilities. The well educated people take knowledge about such condition of surface water and groundwater but, the less or illiterate people never take knowledge about situation of surface water and groundwater. Hence, Education is key factor for conserving water and also groundwater.

Water Literacy means undertaking and knowing where and when water comes from and how to use it. It keeps knowledge and standards for water information that every young and adult people should know and understand by age 18 year as fundamental knowledge for fit, healthy and sustainable living in the 21st century. The various government and non-government educational institutions and NGO's plays vital role in the work to increase the water literacy.

Literacy

According to 2011 census, about 1,94,866 persons are literate populations. Out of which about 1, 04,505 persons are the male literate population and about 90, 361 persons are the female literate population. (Table 2.7 & Fig. 2.10)

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Circles</th>
<th>Male No.</th>
<th>Male Percent</th>
<th>Female No.</th>
<th>Female Percent</th>
<th>Total No.</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pusgaon</td>
<td>24247</td>
<td>23.20</td>
<td>20696</td>
<td>22.90</td>
<td>44943</td>
<td>23.06</td>
</tr>
<tr>
<td>2</td>
<td>Khataw</td>
<td>14631</td>
<td>14.00</td>
<td>12735</td>
<td>14.09</td>
<td>27366</td>
<td>14.04</td>
</tr>
<tr>
<td>3</td>
<td>Pusesawali</td>
<td>11815</td>
<td>11.31</td>
<td>10313</td>
<td>11.41</td>
<td>22128</td>
<td>11.36</td>
</tr>
<tr>
<td>4</td>
<td>Vaduj</td>
<td>23267</td>
<td>22.26</td>
<td>20325</td>
<td>22.49</td>
<td>43592</td>
<td>22.37</td>
</tr>
<tr>
<td>5</td>
<td>Katar Khataw</td>
<td>11878</td>
<td>11.37</td>
<td>10193</td>
<td>11.28</td>
<td>22071</td>
<td>11.33</td>
</tr>
<tr>
<td>6</td>
<td>Mayani</td>
<td>18667</td>
<td>17.86</td>
<td>16099</td>
<td>17.82</td>
<td>34766</td>
<td>17.84</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>104505</td>
<td>100.00</td>
<td>90361</td>
<td>100.00</td>
<td>194866</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: - Satara District Census Hand Book 2011
KHATAV TAHSIL: LITERACY RATE
(2011)

Source: District Census Handbook, Satara (2011)
Fig. 2.10
The table 2.7 and Fig. 2.10 represents the data regarding the circle wise literacy rate in Khatav tahsil in 2011. The dominant literacy rate is shown by Pusegaon and Vaduj circle, showing above 20 percent person’s literate population. Where, above 20 thousand male and female populations are educated.

The Pusegaon and Vaduj village are big villages of tahsil, having various educational facilities. Therefore, both circles have seen better literacy rate. About 34,766 (17.84 percent) persons are literate population in Mayani Circle. There is found about 18667 (17.86 percent) persons literate male population and about 16,099 (17.82 percent) persons literate female population. Remaining circles i.e. Khatav, Katar Khatav, Pusesawali are comprised the below 30 thousand literate population.

**Illiteracy**

According to 2011 census, about 74,281 persons are the illiterate populations. Out of which about 29,202 persons are the male illiterate population and about 45,079 persons are female illiterate population. (Table 2.8 & Fig. 2.11)

**Table 2.8**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Circles</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>1</td>
<td>Pusegaon</td>
<td>5975</td>
<td>20.46</td>
<td>9805</td>
</tr>
<tr>
<td>2</td>
<td>Khatav</td>
<td>3791</td>
<td>12.98</td>
<td>5941</td>
</tr>
<tr>
<td>3</td>
<td>Pusesawali</td>
<td>3430</td>
<td>11.75</td>
<td>5379</td>
</tr>
<tr>
<td>4</td>
<td>Vaduj</td>
<td>6572</td>
<td>22.51</td>
<td>9717</td>
</tr>
<tr>
<td>5</td>
<td>Katar Khatav</td>
<td>3539</td>
<td>12.12</td>
<td>5533</td>
</tr>
<tr>
<td>6</td>
<td>Mayani</td>
<td>5895</td>
<td>20.19</td>
<td>8704</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>29202</td>
<td>100.00</td>
<td>45079</td>
</tr>
</tbody>
</table>

Source: Satara District Census Hand Book (2011)
KHATAV TAHSIL: ILLITERACY RATE (2011)

Source: District Census Handbook, Satara (2011)

Fig. 2.11
Table 2.8 & Fig. 2.11 shows the circlewise illiteracy in 2011. Dominantly, above 15,000 persons are illiterate populations in Pusegaon and Vaduj circle. The Pusegaon and Vaduj village are big villages of tahsil, where positioned various educational facilities only in that villages. But, other villages of circle have problems of educational facilities and transportation facilities. Therefore, both circles are counted also maximum illiteracy population. About 14599 persons are illiterate population in Mayani Circle. Remaining circles i.e. Khatav, Katar Khatav, Pusesawali are shared the below 10 thousand illiterate population.

2.12 OCCUPATIONAL STRUCTURE

The occupational structure is become from primary, secondary, tertiary economic activities are used groundwater through wells and tube wells. All these activities have necessity of groundwater for various purposes. The primary activities have need to maximum groundwater for including farming, mining, livestock etc. like this; the secondary activities have need to groundwater for manufacturing and processing industries, household industries, construction etc. And tertiary activities is mainly comprised the different services for human society such as education, medical, tourism, trade, transportation, communication, administrative services, bankings etc., where groundwater employs for drinking purposes.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Circle</th>
<th>Primary Number (in %)</th>
<th>Secondary Number (in %)</th>
<th>Tertiary Number (in %)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pusegaon</td>
<td>20585 76.99</td>
<td>582 2.18</td>
<td>5569 20.83</td>
<td>26736</td>
</tr>
<tr>
<td>2</td>
<td>Khatav</td>
<td>13193 76.78</td>
<td>424 2.47</td>
<td>3565 20.75</td>
<td>17182</td>
</tr>
<tr>
<td>3</td>
<td>Pusesawali</td>
<td>11383 82.23</td>
<td>149 1.08</td>
<td>2311 16.69</td>
<td>13843</td>
</tr>
<tr>
<td>4</td>
<td>Vaduj</td>
<td>18132 74.78</td>
<td>498 2.05</td>
<td>5618 23.17</td>
<td>24248</td>
</tr>
<tr>
<td>5</td>
<td>Katar Khatav</td>
<td>12473 85.65</td>
<td>235 1.61</td>
<td>1855 12.74</td>
<td>14563</td>
</tr>
<tr>
<td>6</td>
<td>Mayani</td>
<td>16282 75.84</td>
<td>646 3.01</td>
<td>4540 21.15</td>
<td>21468</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>92048 77.98</strong></td>
<td><strong>2534 2.15</strong></td>
<td><strong>23458 19.87</strong></td>
<td><strong>11804</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: District Census Handbook, Satara (2011)
KHATAV TAHSIL: OCCUPATIONAL STRUCTURE (2011)

Source: District Census Handbook, Satara (2011)
Fig. 2.12
The table 2.9 and fig. 2.12 shows the data concerning the circle wise economic activities and engaged population in Khatav tahsil during 2011. In terms of total economic activities, Pusegaon circle is dominant persons engaged in all economic activities and is followed by Vaduj, Mayani, Khatav, Katar Khatav and Pusesawali etc. circles in the tahsil respectively.

In Pusegaon, about 20585 persons are busy in primary activities, 582 persons in secondary activities and 5569 persons in tertiary activities. In Vaduj circle, nearly 18132 persons are active in primary activities, 498 persons in secondary activities and 5618 persons in tertiary activities. The Pusegaon and Vaduj are the big villages of tahsil, where founds major economic activities, various administrative offices and educational facilities. Whereas, in Mayani circle, 16282 persons are engaged in primary activities, 646 persons in secondary activities and 4540 persons in tertiary activities. Besides, due to less accessibility, there is no development in transportation facilities, migration etc., Khatav, Katar Khatav and Pusesawali circles are indicated below 20 thousand people in different activities.

2.13 LAND USE PATTERN

Land use pattern is utilizing the land for different purposes. The cultivation, non-cultivation, forest, grazing etc. are the several purposes using land for different aids. The groundwater is basic water source for different land use. Agricultural land use is used the majority groundwater (about 83 percent) are pre-dominantly observed in the tahsil.

In Khatav tahsil, total geographical area is covered 137816 hect. area. Among this, 111378 hect. area is come under the Cultivable land and is followed by Net Sown Area(10296 hect.), Follow Land (101082 hect.), Area Not Available for Cultivation (8173 hect.), Grazing Land (5540 hect.), Land Under Forest (4911 hect.) and Non-Agricultural (1225 hect.) etc. in the tahsil respectively.
Table 2.10

KHATAV TAHSIL: GENERAL LAND USE (in Hectors)(2011)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Circle Name</th>
<th>Total Geographical Area</th>
<th>Land Under Forest</th>
<th>Area Not Available for Cultivation</th>
<th>Non-Agricultural Use</th>
<th>Total Follow Land</th>
<th>Cultivable Land</th>
<th>Net Sown Area</th>
<th>Grazing Land</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pusegaon</td>
<td>30746</td>
<td>1055</td>
<td>851</td>
<td>213</td>
<td>15499</td>
<td>17313</td>
<td>1814</td>
<td>926</td>
</tr>
<tr>
<td>2</td>
<td>Khatav</td>
<td>17195</td>
<td>374</td>
<td>1402</td>
<td>191</td>
<td>16847</td>
<td>18558</td>
<td>1711</td>
<td>923</td>
</tr>
<tr>
<td>3</td>
<td>Pusesawali</td>
<td>17582</td>
<td>567</td>
<td>890</td>
<td>204</td>
<td>16808</td>
<td>18588</td>
<td>1780</td>
<td>849</td>
</tr>
<tr>
<td>4</td>
<td>Vaduj</td>
<td>26415</td>
<td>718</td>
<td>1362</td>
<td>271</td>
<td>15163</td>
<td>16908</td>
<td>1745</td>
<td>831</td>
</tr>
<tr>
<td>5</td>
<td>Katar khata</td>
<td>19390</td>
<td>952</td>
<td>1938</td>
<td>174</td>
<td>18571</td>
<td>20140</td>
<td>1569</td>
<td>997</td>
</tr>
<tr>
<td>6</td>
<td>Mayani</td>
<td>26486</td>
<td>1245</td>
<td>1730</td>
<td>172</td>
<td>18194</td>
<td>19871</td>
<td>1677</td>
<td>1014</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>137816</td>
<td>4911</td>
<td>8173</td>
<td>1225</td>
<td>101082</td>
<td>111378</td>
<td>10296</td>
<td>5540</td>
</tr>
</tbody>
</table>

Source: Socio-Economic Review and District Statistical Abstract of Satara District (2012-13)

The table 2.10 and Fig. 2.13 shows the circlewise general land use pattern in 2012-13. The Pusegaon circle is confined dominant geographical area (30746 hect.), is shared about 17313 hect. area under cultivable land but, nearly 15499 hect. area under total follow land and 1814 hect. area under net sown area. The second dominant i.e. 26486 hect. geographical area are occupies by the Mayani circle through nearly 19871 hect. area under cultivable but, 18194 hect. land under follow land and only 1677 hect.land under net sown. The Vaduj circle is shared just 1745 hect. land under net sown for different crops and 15163 hect. land under follow land. Besides this, remains Khatav, Pusesawali and Katar khatav circles comes under drought prone area, therefore, have less land under net sown area and more land covers under follow land.
KHATAV TAHSIL: GENERAL LAND USE
(in Hectares) (2013-2014)

Legend

- Cultivable Land
- Total Follow Land
- Land Under Forest
- Grazing Land
- Non-Agricultural Use

Source: Socio-Economic Review and District Statistical Abstract of Satara District (2012-13)  
Fig. 2.13
2.14 IRRIGATION RESOURCES

The water is the basic essential things for drinking purpose and irrigation. In tahsil, water is available in different sources like well, tube well, lake, dam etc. Among these, the well and tube well are the pathway of use of groundwater. There, well is major source of water for irrigation and also, traditional water supplier for storage of surface water and groundwater. In reality, well is accumulated the groundwater through the several streams which comes from different directions. There is collected water from percolation to surrounding area. Therefore, in post-monsoon period, these wells are totally filled by the water but, these are purely dry in the pre-monsoon in the Khatav tahsil.

Table 2.11
KHATAV TAHSIL: WELLS AND TUBEWELLS DISTRIBUTION

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Circle</th>
<th>No. of Villages</th>
<th>No. of Wells</th>
<th>Tube wells</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pusegaon</td>
<td>34</td>
<td>990</td>
<td>437</td>
</tr>
<tr>
<td>2</td>
<td>Khatav</td>
<td>27</td>
<td>554</td>
<td>693</td>
</tr>
<tr>
<td>3</td>
<td>Pusesawali</td>
<td>21</td>
<td>566</td>
<td>597</td>
</tr>
<tr>
<td>4</td>
<td>Vaduj</td>
<td>22</td>
<td>851</td>
<td>396</td>
</tr>
<tr>
<td>5</td>
<td>Katar Khatav</td>
<td>21</td>
<td>624</td>
<td>596</td>
</tr>
<tr>
<td>6</td>
<td>Mayani</td>
<td>18</td>
<td>853</td>
<td>388</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>143</strong></td>
<td><strong>4438</strong></td>
<td><strong>3107</strong></td>
</tr>
</tbody>
</table>

Source: Irrigation Department, Khatav Tahsil (2013-14)
KHATAV TAHSIL: WELLS and TUBEWELLS (2013-14)

Source: Irrigation Department, Khatav Tahsil (2013-14)

Fig. 2.14

Legend

Scale

0 5 10 20 Kms

Source: Irrigation Department, Khatav Tahsil (2013-14)

Fig. 2.14
Khatav tahsil is the drought area, there, Ner dam and Yeralawadi dam is the two essential big water bodies which supplies water for surrounding area. Also, well is the major water source for all circles investigated in research in the tahsil. The Yerala river basin is distributed maximum wells in tahsil. The dominant number of wells and tube wells are seen in Pusegaon circle (about 990 wells and 437 tube wells). While, the least number of wells and tube wells are shown in Pusesawali circle (about 566 wells and 597 tube wells). Besides, other circle has indicated about 700 and it's below number of wells and tube wells.
REFERENCES

2. Census of India, Maharashtra state, 2011.