# CHAPTER II

## PHYSICAL SETTING OF STUDY AREA

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CHAPTER II

PHYSICAL SETTING OF STUDY AREA

2.1 Introduction:

The previous chapter dealt with introductory part of this study and it gave scheme of methodology along with literature review. Introduction gives more details about malnutrition and child mortality among children in tribal area. Any social, economic and developmental issues are closely linked with physical setting of study area. Therefore this chapter highlights problems and prospects of physical environment related to tribal people. Physical environment of any area is a very striking factor for step up in developmental process. This basic information will provide strengths and weaknesses of the study area and hence it will be useful for designing plan of the development especially for tribal children.

2.2. Location of Study Area:

The Human food production, food intake, type of diet is closely related to and mostly depend on geographical environment of any area. Relief, climatic conditions, such as temperature, rainfall, humidity etc., drainage and water bodies, soil types, vegetation cover and wild life of area play dominant role in human settlement. These factors vary from place to place. It is necessary to study geographical features of the study area in details. With this objective in view, some important features of the area have been selected for the present research is briefly discussed.

With the respect to geographical area this study area lies in the largest district of Maharashtra. Ahmednagar district poses important location in central Maharashtra. Akole tehsil is chosen for the study, which is the western most tehsil of Ahmednagar district. According to 1981 census, this tehsil occupies total geographical area (TGA) 1488.08 sq.km out of 17053sq. km.area of Ahmednagar district, and constitutes 8.72 percent area of the district. As regards to Total Geographical Area (TGA) this tehsil ranks fifth in the district the first
Map No. 2.1. Location of Study Area.
four being Parner, Sangamner, Shrigonda and Nagar respectively. Its North South extent from South of Kalewadi to North of Pachpatta is 58 Km. while East to West width from forested area which lies at Northwest of Ghatghar to Dongargaon at East is 53 K.m. This tehsil lies between the latitudes 19°15′12″ North to 19°45′6″ North and 73°37′00″ East to 74°07′21″ East longitude. The western side of tehsil is demarcated by Sahyadri ranges. The Political boundary of Akole tehsil is on the junction of four districts Ahmednagar, Nasik, Thane and Pune. The western border of Akole tehsil is shared by Shahapur tehsil (Thane District) and Igatpuri tehsil (Nasik District). Sangamner tehsil (Ahmednagar District) is towards East, Northern border of tehsil is neighbored by Sinnar tehsil (Nasik District). Junnar tehsil (Pune District) is neighbored from South. This tehsil is situated 127 km away in south east direction of Ahmednagar districts headquarter. As per 2011 census the population of Akole tehsil is 2,91,950 living in 191 villages. This tehsil is known for agricultural products especially Rice and Nachani. Due to its distinct location and natural picturesque beauty, it is also one of the important tourism destinations of Ahmednagar district.

2.3.Geology:

Geological information of district has not been available up to satisfactory level, because no orderly geological mapping of district has yet been taken up by the geological survey of India. But for the purpose of studying ground water position and engineering point of view to construct dams some work has been done by British government. It is mentioned in Gazetteer of Ahmednagar District (1976) that Lieutenant-Colonel Sykes (1833) contributed to geology of western area of Ahmednagar district. He points out that in the district, trap rock is distinctly stratified as in the rest of the Deccan.¹

Geological complexities and geomorphologic diversities are found in Akole tehsil. Geologically, this region is formed since end of Cretaceous to beginning of Eocene era. The astounding volcanic eruption has covered vast area of the Indian Peninsular. The lava- flows are associated with intertrappean beds such as
limestone, sandstone, clay shales, red boles beds, porous ash, or scoriaceous beds. The stratigraphic sequence of geology according to depth observed likely viz. Black cotton soil, river alluvium sands, gravels, silts in recent period and Intrusive basic dyke, basalt lava flow of volcanic eruption, intertrappean beds, red bole beds, porous ash etc were originated in cretaceo-ecocene age.

2.3.1. Volcanic Rock (Basalt):

Extremely mobile basaltic lava from fissure and cracks has covered the area about five lakh sq. Km. Much of the region is underlain by basaltic rock of lava origin. This lava flows horizontally and flat top pleatues come into existence. These horizontal lava sheets have led to the formation of typical Deccan trap which is popularly known as ‘Deccan trap’ topography. In this tehsil crest of western ghat and its sub ranges toward are observed. The thickness of this volcanic rock ranges from 3 meters to 40 meters and average of thickness is 40 meters in Ahmednagar district. In case of Akole tehsil thickness of volcanic rock is highest at Kokankada (1459 mt) near Ghatghar. The hills formed by them are at some places over 1200 meter high. Other major apex points visible in region are Kalsubai (1646 mt), Harishchandragad (1422 mt), Ratangad (1237 mt.), Pattagad (1391 mt.), Bitangad (1427 mt.), Muda dongar (1552 mt) etc.

2.3.2. Red Bole Beds:

In this region red bole beds are visible in large scale. Between two volcanic rocks, thin layer of reddish porous granules is observed which are popularly known as Red bole beds. These thin horizons occure in between two successive flows of basalt. These red bole beds were structured by high temperature of lava. It is formed by baking process of molten lava. Generally red boles are sandwiched between two successive lava flows. These layers are brown to brick red in colour and fine to course in texture. These layers are exposed in discontinuous patches. These layers vary in thickness from 2 centimeters to 20 centimeters.

2.4. Physiography:

Ahmed, Aijazuddin (2008) has stated that vast geographical region, with immense diversities in physiographic, climatic and biographic
characteristics, accommodate a whole range of human response to natural settings. Akole tehsil has unique personality with regards to physiography. Physiography of region is an important element which influences population distribution, housing patterns, occupations, transportation and distribution of crops.

The tehsil is divided into two topographical divisions. The western part is marked by Sahyadri hilly region and its sub ranges. The eastern part of tehsil is characterized by gentle riverarine plain.

2.4.1. Western Hilly Region:

The crestline of Sahyadri is observed in Akole tehsil. The average elevation of crestline of Sahyadri within tehsil is about 1300 mt. The high peak Harishchandragad (1424 mt), Ratangad (1297 mt), Ajuba Dongar (1375 mt), Kulang (1470 mt) were point of convergence where traverse spurs connect with main range of Sahyadri. There are offshoots spread eastward.

The important characteristics of these spurs is that gradually decrease in height towards East. These three offshoots mainly Kalasubai and Adula sub range in North, Baleshwar sub range in middle, Harishchandragad in South.

2.4.1.1. Kalsubai and Adula Sub Range:

This range starts from Kulang. This range forms natural boundary between Nasik and Ahmednagar district. In Kalsubai and Adula sub ranges is the conical summit of Mt. Kalsubai (1646 mt.) which is the highest peak of Maharashtra lying in West corner of tehsil between Panzare and Bari village. The Adula range hills branch off from Kalsubai ranges, near peak of Patta and run southwards at an average elevation of 900 mt. Some peaks like Bitangad (1427 mt.) near Shenit, Ekdara (1251 mt), Patta (1391 mt) near Kokanwadi are found in northwest. This range also ends abruptly a few Km west of Sangamner.

2.4.1.2. Baleshwar Sub Range:

Baleshwar range is second great spur of Sahyadri and it is located at Ratangad 11 km southeast of Kulang. This range plays vital role in development of Mula and Pravara watershade. Baleshwar sub range works as interfluves
between river Pravara and Mula basin. This sub range is dissected and eroded by various tributaries of river Pravara and Mula.

Comparatively average height of this range becomes lesser towards East. Muda Dongar (1552 mt), Ghanchakar Dongar (1497 mt), North of Warliwadi (1398 mt.), Asvla Dongar (1271 mt.) Asvya Dongar (1028 mt.) etc. Total length of this range is about 100 Kms.

2.4.1.3. Harishchandragad Sub Range:

Harishchandragad sub range in south is a continuous range stretched towards east. This is the longest range of district and it is extended up to Marathwada where it is known as Balaghat range.

Total length of this range is about 200 Kms. It starts from Byroba Dongar (1149 mt), Harishchandragad (1422 mt), Kokankada Dongar (1459 mt.) Balubhai Dongar (1470 mt.) are the main peaks. Near Keli Kotul height is 1199 mt and at eastern border near Pisewadi it is 1145 mt.

2.4.2. Eastern Riverarine Plain:

The eastern region is characterized by gentle plain. This gentle slope is the result of degradation work of Pravara, Adula, Mula Rivers. The slope of this region decreases towards East and it reach up to 640mt Mula river basin near Chas village.

In Pravara basin from village Mhaladevi it crosses contour of 600 mt and enteres plain area. Villages like Mehenduri, Rumbhodi, Induri, Unchkhadak, Akole, Sugaon Bk. settled in this alluvium plain.

Pravara river basin near Kalas Bk, river enteres Sangamner tehsil and slope comes to 580 mt. towards east. In Northeast part of tehsil Adula river basin near Devthan, Virgaon, Dongargaon and Ganore slope decreases eastward and contours reach up to 620 mt.
Map.No.2.2

Physiographic Map of Akole Taluka

Map.No.2.3

Digital Elevation Model of Akole Tehsil
Photo Plate No.1. A View of Mt. Kalasubai from Panzare Village

Photo Plate No.2. Kokankada
2.5. Drainage:

Drainage means an integrated system of tributaries which collect and carry surface water to sea. According to Khullar, D.R. (2012) the entire area enclosed by a divide and drained by a river and its numerous tributaries is known as drainage basin. Drainage pattern refers to geometrical form which is designed by river and its tributaries. Relief, slope, structural control, nature of rocks, supply of water, tectonic activities determine drainage pattern.

Rivers constitute most useful natural resources for human society and other living creatures. These rivers are chief source of food. They provide us fish and other sea foods. Rivers give protection and provide water for drinking and irrigation. Therefore many cities in the world are situated on the bank of rivers. The rivers were used for navigation form thousands of years. Riverarine navigation is the cheapest mode of transportation. Rivers become lifelines in many areas of the world and therefore fertile riverarine plains are inhabited by population. These riverarine plains become cradles of human civilization. Due to
their importance in human life rivers are considered as divine and sacred. They have attracted the attention of hydrologists, geographers, planners, and economists etc. Rivers are great source of water for irrigation, industry, and domestic purposes have hydroelectricity generation potential can be used for inland water transport and fishing opportunities.

Singh and Dhillon (1984) have pointed out that the significance of the drainage water resource in regional economic development hardly needs to be emphasized. Drainage of Ahmednagar district belongs to two main rivers: system of Indian peninsular, The Godavari at North and major tributary of Krishna River in the South. Akole tehsil is birthplace of four major rivers of Ahmednagar district. Almost all the fertile area of region has been formed by depositional work of rivers and so culture of cultivation comes into existence in Eastern part of Tehsil.

2.5.1. Pravara River:

Pravara River is the important river in Akole tehsil. It originates in eastern slopes of Sahyadri between high peak and hill fort of Kulang and Ratangad after strenuous course of 20 km in picturesque amphitheatre enclosed between the Kalsubai and Baleshwar range in eastern direction. The flow of river water reaches near village Ranad, where it jumps into 50 mt deep George. A most attractive waterfall is formed near village Ranad, so it is popularly known as Randha Fall. This waterfall is famous and has become point of attraction for tourist. This river flows 13 Km through the narrow deep glen and enters central plateau near Rajur. After flowing forward, river has created a miracle towards Northeast of Rajur. An acute meander of Nilwande is like goose neck found at the height of 600 mt above sea level. The Pravara is among those rare rivers which are famous for creating such acute meanders in its first stage. After flowing across the valley river enteres Desh part of Akole. River Pravara bestows life to crops and animals and farmers so it is popularly known by local name Amrutvahini. As the flow passes the town Akole, it receives the flow of Adula river and Mahalungi from left bank. After Sangamner, Rahuri and Newase
combine flow of Mula and Pravara confluences at Pravarasangam near village Kaigaon Toka. The total length of the Pravara is 200 Km, among it, the river drains at 75 km in Akole tehsil alone.

2.5.2. Mula River:

The river Mula originates on the eastern slopes of the Sahyadri between Ratangad and Harishchandragad. For the first 25 Km, it flows parallel to the Pravara River draining the southernmost Kotul valley of Akole tehsil. The river is incised in deep valleys almost from the source and its steep valley sides are dissected by gullies formed by mountains fast-moving water which rush in to main stream. Kurkundi River meets to Mula at Dhodwadi at the height 707mt. Near Kotul, Mula take bend to south from the rocky surface of Baleshwar ranges and it entered into Parner tehsil at Chas village. It joins Pravara before Pravarasangam. The total length of river from its origin to its confluence is 145 Km out of which it flows 58 Km in Akole tehsil.

2.5.3. Adula River:

River Adula rises in Northern part of Akole tehsil on the slope of Patta and Mahakali peaks. It flows 25 Km easterly direction between two spurs which includes the narrow Shamaharpur valley after falling into rocky chaps 45 mt. deep It flows between rocky and precipitous hillside before reaching the Sangamner Plain It turns to south and joins Pravara river 5 Km west of Sangamner. Though only 40 Km in length, the Adula during rainy season subjected to rapid floods owing to the rocky bed and heavy rainfall in upper part of catchment area. Ahmednagar District Gazetteer (1961) The river has perennial flow from village Samsharapur where the bed is rocky and water is used for irrigation. In spite of heavy rainfall western and Northern part of Akole tehsil face acute water shortage in summer. Bhandardara Dam play crucial role to satisfy the thirst of district which is located on Pravara River and highest rain catchment area.
2.5.4. Mahalungi River:

The river Mahalungi is another important river in Akole tehsil. It originates on the southern and eastern slope of Patta (1391 mt) and Avenda peaks (1135 mt.). After flowing 6 km towards east this river enters Sinnar Taluka of Nasik District. It flows nearly parallel to Adula River and these two rivers are separated by Adula hill range.

Mahalungi River enters Ahmednagar district and joins Pravara River near Sangamner town. This river flows around 40 km long and is characterized by seasonal stream. During heavy rain tremendous force of water makes flood like situation in Sangamner town. This is due to heavy discharge in a narrow catchment area.

Photo Plate No.4. Randha Fall on River Pravara in Akole Tehsil.
Map No. 2.4

Drainage Map of Akole

Photo Plate No. 5. Bhandardara Reservoir in Akole.
2.6. Climate:

The element of climate is largely influenced by latitudinal extent, relief and areal distribution of land and water. Husain Majid (1999) has stated that climate is a very significant factor because it determines the agricultural landuse, and agricultural patterns of region. The climate of district is characterized by hot summer and general dryness during major period of year except during southwest Monsoon season. The rainfall and temperature are the twin factors of climate.

2.6.1. Rainfall:

In all weather parameters, rainfall is one of the strong determinants of population distribution, settlements, human occupations and plant growth as well as crop production in any region.

As said by Penchalain and Ramanaich (1992) have pointed out that rainfall is ecological parameter of agriculture, in any region, where agriculture is rain fed, rain influences the practice, types, system and productivity of farming. The area acquires maximum rainfall during southwest Monsoon. The average annual rainfall in the district is 578.8 mm. Ahmednagar district receives very scanty rainfall because it lies in rain shadow zone. Rainfall distribution in Ahmednagar district is uneven and erratic in nature. Rainfall decreases towards the east.

In case of Akole tehsil, due to its significant location near crestline of Sahyadri, it receives huge amount of rainfall in west, but the precipitation decreases from west to east. This tehsil receives average annual rainfall of 2500 mm which is the highest in district. Western region of tehsil on the Sahyadri ghatmatha receives highest rainfall in district. Westernmost village of tehsil, Ghatghar is popularly known as the Cherrapunji of Ahmednagar District. It receives 4500 mm average annual rainfall. The western track from Bhandardara to Ghatghar gains rain between 2500 mm to 4500 mm annually. Villages like Panzare, Murshet, Shiganwade, Udadvane, Ghatghar Samrad, Mutkhel, Ratanwadi, Koltembhe, Pachnai, Kumshet, Bari, and Jaghagirdarwadi are located
in this zone. Between Bhandardara to Rajur belt rainfall decreases slightly. This zone receives 1550 to 2500 mm average rainfall annually. Villages like Shenit, Bitaka, Manhere, Vaki, Warnghushi, Ladgaon, Kodani, Ambevangan, Ranad, Katalpur Savarkute, and Ambit are found in this zone. From village Rajur, rainfall decrease very fast towards east. In Kotul village average annual rainfall is 650 mm, near tehsil headquarter Akole average annual rainfall decreases up to 510 mm. Towards the northeast corner of tehsil, Village Devthan receives average annual rainfall only 208 mm.

Table 2.1
Rainfall in Akole Tehsil

<table>
<thead>
<tr>
<th>Year</th>
<th>Rainfall (mm)</th>
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<tr>
<td>1985</td>
<td>184</td>
<td>1995</td>
<td>374</td>
</tr>
<tr>
<td>1986</td>
<td>244</td>
<td>1996</td>
<td>620</td>
</tr>
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<td>296</td>
<td>1997</td>
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<tr>
<td>1988</td>
<td>734</td>
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<tr>
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<td>444</td>
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<td>403</td>
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<tr>
<td>1994</td>
<td>509.8</td>
<td>2004</td>
<td>1074</td>
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Source: Data from District Agricultural Development Officer Z.P.

Table 2.2
Rainfall Distribution in Akole Tehsil.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Rain gauge station</th>
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<tr>
<td>1</td>
<td>Ghatghar</td>
<td>4500</td>
</tr>
<tr>
<td>2</td>
<td>Bhandardara</td>
<td>2450</td>
</tr>
<tr>
<td>3</td>
<td>Rajur</td>
<td>1550</td>
</tr>
<tr>
<td>4</td>
<td>Kotul</td>
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<td>5</td>
<td>Akole</td>
<td>510</td>
</tr>
<tr>
<td>6</td>
<td>Devthan</td>
<td>208</td>
</tr>
</tbody>
</table>

Source: Data from Taluka Krushi Vibhag, Akole Tehsil.
Shukla, P.R. (2003) have said that according to Indian Meteorological Department (IMD) the day which receives the rainfall of 2.5 mm or more than that rainfall is defined as rainy day.\textsuperscript{8} This tehsil has the highest rainy day in district i.e. 41 days.

2.6.2. Temperature:

Temperature is vital aspect of climate. It determines structure of human settlements and occupations up to some extent. It supports plants and animal life and is closely related to the cropping pattern of area. From March, temperature increases progressively and May is the hottest month of the year with the mean daily maximum temperature at 38.9\textdegreeC and mean daily minimum temperature at 22.4 \textdegreeC. Cold weather starts from middle of November and continues till the end of February. December is the coldest month of area with the mean daily maximum temperature at 28.5\textdegreeC and the mean daily minimum temperature at 11.7\textdegreeC.

2.6.3. Humidity:

Humidity is simply amount of water vapors present in air. Water vapors are in invisible form and it is gaseous state of water. Michel, Hogan (2010) has pointed out that humidity is one of the fundamental abiotic factors that defines any habitat and is a determinant of animals and plants that can thrive in a given environment.\textsuperscript{9} Generally human skin is sensitive to humid air because human body uses evaporative cooling as a simple mechanism to regulate temperature.

Air of region is dry during summer season, from February to May, and average humidity is about 20 percent, in afternoon and relative humidity becomes high in Southwest monsoon season. Forest cover in this tehsil is comparatively higher than other tehsils of district and so humidity also increases slightly.

2.7. Soil Types:

Soils is the thin layer on the earth, comprising minerals particles formed by the breakdown of rock, decayed organic matter, living organism water and air. Pedogenesis or soil generation process is controlled by elements like
climate, vegetation and relief. Soil is function of Parent material, climate, relief, vegetation in respect to time. As noted among all physical resources, nature of soil determines type of economic activity. Dependence of our economy on agriculture and consequent pressure of growing population on land resources turns the attention of geographer and other scientist to the soil. In a number of studies problem of Pedogenesis has been discussed. Bhattacharya A. (1972) has noted the striking similarity between the soils of Rajmahal hills and black soils of the Deccan trap. He has discussed various problems faced in mapping soils of a region. In another study Singh and Singh (1971) has discussed that the result of analysis of ten soil profiles located in different part of Rajasthan have been discussed. A Notable contribution made to the study of soil types as related to different land uses is that those of Siddiqi (1969) on eastern U.P., Roy (1971) has studied soil types in detailed on Chota Nagpur Pleatues. The Soils of Ahmednagar district can be broadly classified into three subtypes. Black soil, Red soil and Grey or (Pandhari mati) in which following subtypes of soil are found in Akole tehsil.

2.7.1 Medium Black Soil:

Geology of tehsil is formed by basaltic lava. Black colour of soil has been attributed by pedologist to the presence of small proportion of titaniferous magnetite and iron and black constitute of parent rock. The soil derived from basalt is popularly known as Black Cotton soil because cotton is the best crop grown on this soil also called as Regur Soil. This type is found in eastern part of tehsil mainly along the riverside. Due to its mineral content it appears black so locally it is known as ‘Kali mati’. It is characterized by high fertility and retentivity of moisture. Therefore these soils are largely used for cultivation. This soil is favorable for staple food crops like Bajra, Jowar, wheat, maize, grams, horse gram, beans etc. Recently due to availability of irrigation facility, this area is encouraged for horticulture. This soil become useful for the production of commercial crop like Sugarcane, Pomegranate, Banana, Grapes, Guava, Papaya, Brinjal, Almond etc.
2.7.2 Laterite Soil:

Laterite soil is found in heavily precipitous region of Akole tehsil. It is popularaly agreed that the Laterite is formed under condition of heavy rainfall and high temperature with alternative wet and dry spells. This soil is product of leaching process where lime and silica get washed away and oxides of irons and aluminum remain in the soil. According to Kuriyan, George (1970) it is probably the end product of decomposition found in region of heavy rainfall more than 200 cm. Almost all Laterite soils are poor in lime and magnesia and deficient in nitrogen. This soil is found on the summits of western ghat at the height of 1000 to 1500mt above mean sea level. In the study region Kalsubai hills, Harishchandragad hills and Baleshwar hill, Ajuba Dongar and northwestern part of Ghatghar and remaining hilly spurs show red to reddish brown soil, but this land is largely covered by forests. This soil has thin and shallow layer on the basalt which is unevenly spread according to topography. In Akole tehsil tribal
people harvest several crops. In low laying areas paddy is grown effectively. Some beans and staple food like Nagli, Varai, Sal, Khurasani are also cultivated by tribals.

2.7.3 Alluvial Soil:

The fertile track of alluvial soil can be seen along the Pravara, Mula and Adula river basin. These rivers continuously erode the mountainous part of origin and transport it through river bed and deposit the silt and clay in plain region. In the region lying on height, the depth of soil is not much. Near Mhaladev village, Pravara enters lowland and deposition takes place along both banks. Fertile alluvium is observed along with river bank up to a few meter thickness. This soil is derived from sedimentation process of rivers.

A narrow strip of alluvium starts from Mhaladev and expands eastward up to village Kalas bk. This region has become prosperous due to rich fertile soil and availability of water resources. Ganore, Hivargaon, Devthan, Virgaon villages come in Adula river basin. Rumbhodi, Manoharpur, Pansarwadi, Navlewadi Akole, Sugaon, Induri and Unchkhadak etc. villages are settled in Pravara basin. This low lying area of eastward is characterized by fertile alluvial soil.

From the distributional point of view soils of Akole tehsil have great variety. Most of the area (416 sq. Km) is covered by forests and probably more than that is occupied by mountains, therefore mountain and forest soil is found in this tehsil up to some extent. This forest and mountain soil is rich with humus but deficient in potash. Some hilly tracts of tehsils are built with red soils. According to Pacharane, S.R. (2013) on hilly areas in west part of Akole Taluka has red soil which is derived from residual weathering of basalt Alluvium, Laterite, Medium Black soil, Forests and Mountain soil and Red soil are some major types of soil observed in Akole tehsil.

2.8. Natural Vegetation:

Natural vegetation is a primeval plant cover unaffected by man either directly or indirectly. The word forest is derived from Latin ‘fores’
meaning outside plants, forest is defined as an area of plant community, predominantly of trees and other woody vegetation, usually by close canopy. Many scholars have emphasized conservation. Kaushik, R.C. (1969) has discussed the prevalent practices of conservation of Indian forestry in general and suggested certain measures to improve it. Puri, G. S. (1969) has raised these problems with reference to forest and other renewable resources of West Bengal. Pandey, N. J. (1970) has traced the history of forest resources use in eastern U.P. from ancient times. Sharma, S.K. (1971) also has marginally touched upon the conservation theme in his study of the forest resources of Bundelkhand.

Soil, topography and climate geographical factors which influence vegetation. The main climatic factors are rainfall and temperature. Rainfall is the main determinant of vegetation. Due to variation of rainfall within the tehsil, various types of plants are observed. In Akole tehsil 416.98 sq.Km area is under forest which is 27.7 percent out of Total Geographical Area. Vegetation in tehsil varies with altitude and distribution of rainfall. Mixed evergreen forests and wet Deciduous Forests are observed in western part of tehsil which receives excess rainfall. Central province of study region is occupied by deciduous forests and shrubs are found on open area. The rest of tehsil is occupied by dry deciduous trees. Distribution of this type of forest is found in eastern tehsil.

2.8.1. Mixed Evergreen Forests:

There are certain patches of natural mixed evergreen forests confined to hills. This kind of vegetation has been developed on the western slopes of ‘leeward side’. The average rainfall is more than 2000mm in this region. Only during the dry spell of summer some trees shed their leaves Karanj, Jambul, Amba, Kakad, Sag, Behada, Hirda, Bhutikesh, Pangara, Lokhandi, Khirani, Pandharkuda, Kalakuda, Pisa, Umbar, palas, Kadhilimb, karwat, Vavli, Pimpri, Shindi, Sonchafa, Tambat, Makadlimbu, Kakad, Kaju, Savar, Bhendiche zad, Dhaman, Ghatbor are the major trees in this province.
2.8.2. Wet Deciduous Forest and Shrubs:

This area is habitat of thick shrubs like Pahadwel, Karwel, Junglee methi, Ranbhendi, Savar, Ambhushi, Moh, Karanj, Pangara, Bahava, Raktkanchan, Nilgiri, Arjunsandada, Gulmohar, Vad, Varas, Anjan, Bondara and scattered plants like Karwand, Nirgudi, Tantani, Shiras, Pandharpalli, Kosht, Rankeli, Bambu, Chikankharanta, Malkanguni, Kanphuti, Kirmira etc.

Some herbs are found in large scale due to the altitudinal and rainfall variation. These are Agya, Kallavi, Markallavi, Fulora, Lavhale, Pankanis, Pandhargavat, Kanphuti, Gogisag, Terda, Kapalphodi, Gokarn, Rantil, Ranudid, Ranova, Karwat, sarata, pathre, Undirkani, Garvei, Sadamandi, Saonsali, Maka, Chirboti, Katemath, Chakwat etc. Even Bamboo is found in certain area in this tehsil. Majority of herbs are found at hillslope of Ratangad, Harishchandragad plateau, Hills of Kalsubai and foothills of Kalsubai Bari and Jaghagirdarwadi, Panzare, Udawane, Warngushi, Shendi, Bhandardara and foothills of Harishchandragad Pachnai, Shirpur, Lavhali Otur, and Lavhali Kotul etc.

2.8.3. Dry Deciduous Forest:

This kind of forest is found in open or scattered territory. Generally the area receives less or scanty rainfall, so in such conditions dry deciduous trees grow. Trees like Neem, Bor, khair Chandan, Babhul, Hivar, Ashok, Acesia, Subabul, Vilayti chinch, Bakan, Gulmohar, Badam are found in large scale. Mahaduk, Apata, Bhokar, Chinch, Pimple, Avala, Vedibabhalu such trees are common in eastern part of tehsil. Shrubs found in this are Boganvel, Erand, Didvani, Nirgudi, Tarwad, Lajalu, Rui, Bhuiringani, Tantani etc. This dry deciduous vegetation is abundant in this area. This type of forest is observed in hilly track of scanty rainfall near Brahmanwada belt.

2.9 Wildlife and Birds:

In the District vegetation is very sparse which is resulted in to poor wildlife in Ahmednagar district, but in the study area Akole tehsil most of the patches are covered by natural evergreen and semi evergreen forests. This
vegetation provides habitat to flourish wildlife. Fauna is rich due to variety of vegetation. In patches of mixed evergreen forests some wild animals, birds are found enormously. Dahanukar N. (2004) has stated that Western Ghat is one out of ten biodiversity hotspots of world. Entire western ghat has over 5000 species of flowering plants, 139 mammal species, 508 bird species, 179 amphibian species and 288 fresh water fish species. It is assumed that many undiscovered species live in western ghat and at least 325 globally threatened species occur in western ghat. Akole tehsil has very rich biodiversity. Western part between Kalsubai and Harishchandragad were confirmed as wildlife sanctuary which becomes good corridor for wild animals.

2.9.1. Harishchandragad-Kalsubai Wildlife Sanctuary:

Wildlife in Ahmednagar district is poor and sparse, but in study area fauna is rich due to variety of vegetation. In patches of mixed evergreen forests, various wild animals and birds are found. Due to thick and vast forest region extending from Kalsubai Hills to Harishchandragad covering an area of 361Sq.Km this area has been declared as wildlife sanctuary by the state government of Maharashtra.

The Leopard (Bibatya) is occasionally found in the dense forests and hills over this region. These leopards have find safety in mixed deciduous forests. Recently most of the dense patches of forest were cleared for various purposes and simultaneously human encroachment increased on forests and so these leopards had to take shelter in sugarcane fields. This is the main cause of conflict between humans and wild animals. According to TOI (2013) that a study covering only 179 sq k.m. area of this tehsil 81 leopards were observed. Density of The leopard was calculated on GIS software. This researcher has estimated leopard density at five (4.8 per 100 sq.km). Many striped Hyaenas were also found (5.03 per 100 sq.km) in this area. Number of large predators was observed in the landscape to 10 per100 sq.km. The Wild cat, Rusty spotted cat, Indian civet, jackal, India fox were also observed during investigation.
Other carnivores are Hyaena Taras (Hyaena hyaena), Wild cat Ranmanjar (Felis Chaus), Jackal (Canis aureus), Wolf, Palm civet, Mongoose, Wild bear, etc. Some herbivores animals are The Black buck, Barking Deer, Sambhar, Hare (Lapus nigricaud), Langur (Presbytis Entellus) Parempine (Hystrix lucura), Deer (Muntiacus Muntjak), etc. A giant squirrel and porcupine very distinctive and interesting animals were found in this sanctuary.

A Government of Maharashtra has declared giant squirrel as state Animal. Apart from these wild animals this forest and sanctuary is very comfortable for common hill and terrestrial birds like grey francolin (Titar), Kokil, Greater Coucal (Bhardwaj), Crow, Water bees, Bat, Bulbul, Pigeon, Harriyal, big Owl, Painted Partridges and grey bulbul etc. They were found in large scale. There are water birds like White Necked storks, Egrets, Herons, Water hens, Duck, Ibises that were observed near reservoirs and lakes. Some birds like Demoiselle cranes or Siberian cranes are migrating to Bhandardara every year. In reptile category lizards, the great lizards and many species of snakes were observed in forest area.

Birds are found in Akole, Bhandardara, Rajur Ratangad and Harishchandragad environment.

2.10. Landuse:

Landuse refers to operations or activities carried out by man to get economic benefits by using land. The chief use of land is for satisfying our need of food, habitation and housing material. Land use commonly depends on physical personality of region and it is an expression of human struggle to satisfy his needs. In recent period land use studies become centre of attraction for the geographers. Geographer has used various tools to assess quantitative changes in utilization of land in the course of time. According to Census Handbook, total geographical area of Akole tehsil is 1505.08 Sq.Km (150400 Hectares) Land use of any region give a clear picture about economic behavior of region. This land use pattern is based on Socio Economic Review of District 2005. According to Shafi, M.(1969) land use of any region gives precise locational insight about the use of land and one can then make attempt to encourage proper use of land in
relation to physical, economic, social and cultural factors and eliminate the misuse of land. About 65.59 percent of area is under the irrigated or non irrigated cultivation. In tribal zone proportion of non irrigated land is considerable. The Area under the cultivation means percentage of net sown area to crops or extent of cultivated area sown during the agricultural year. It is interesting to note that not much progress has been recorded in size of land.

The net sown area has been increasing constantly. Land under forest is also significantly much larger than nontribal sector. Out of Total Geographical Area 27.70 percent land is under forest. In this tehsil reserved forests, protected forests and open scrub forests were observed.

These forests were observed in hilly areas particularly in Sahyadri mountainous region and subranges which are offshoot of it. Western part of tehsil and Kalsubai and Adula, Baleshwar and Harishchandragad spurs are covered by dense vegetation. Recently vegetation cover is being removed for various activities especially for cultivation activities. This has been noticed that forest land has become agricultural land. Thus proportion of forests is continuously declining due to human interference in forests. In the third type of land use cultivable waste, fallow land, barren land has been considered. This type of land use also includes road, railways, settlements, pastures land grassland. This type of land use is facing declining status in recent days.

2.11: Resume:
This chapter gives a general proposal of physical profile of study region. Physical setting of study area gives clear idea about topography of tehsil. This could be important from the view point of natural resources. Thus landscape of study area, geology, drainage, climate soil types, forests and land use provide basic information related to primary resources. These all factors presents problems and prospects of tribal community.
References:


