CHAPTER - II
Physical and Non Physical Profile of the Study Region

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CHAPTER - II
Physical Profile of the Study Region

2.1 Introduction

In the first chapter we have studied the significance of marketing geography, nature of marketing, role of cattle marketing systems, the significance of study, planning of study, problem of terminology, choice of the region, the salient features of cattle markets and cattle fairs, aims and objectives, hypotheses, data base and methodology, review of literature & chapter scheme. This chapter is mainly related to location and boundaries, administrative background, Physiography, Geology, drainage pattern, climate, soils, irrigation, population, livestock, transportation and natural vegetation of the study region.

2.2 Location and Boundaries

Ahemadnagar district is lying between 18°-2’ to 19°-9’ north latitudes and 73°-9’ to 75°-5’ East longitudes. It is situated partly in the upper Godavari basin and partly in the Bhima basin. The inter flure in between forming the extensive Ahemadnagar plateau, the district is very irregular but compact in shape and somewhat resembling a slanting cross with a length of 200 km and breadth of 210 km.

Ahemadnagar district is bounded on the East/North of Aurangabad district, in the north by Nashik district, East by Georai Beed and Ashti tahasils of Beed district, on the south by the Karmala tahasil of Solapur district and on the south-west by Murbad and Shahapur tahasils of Thane district. It has the total area of 17035 sq.km and a population of 33,72,935 (1991) which constitutes 4.27 percent and 5.54 percent of the
state figures respectively. Ahemadnagar is the largest district of the state in area occupying a somewhat central position in Maharashtra.

2.3 Administrative set up

Ahemadnagar is famous historical point because this city is capital of Nizamshahi. The city Ahemadnagar was founded in 1914 by Malik Ahamad the founder of the Nizamshahi dynasty of Ahemadnagar. The town was named by him after his own name viz. Ahamad.

This district is formed in 1818 soon after the overthrow of the Peshwa. In 1822, the Nizam by a treaty ceded 107 villages at his times. The boundaries of the district extended from Vani in Dindori sub division of Nashik district to Karmala at present in solapur district. In 1830, the district included the sub-collectorate of solapur with in it. The district of solapur was formed in 1838 but was abolished in 1864 when a part of its area was reverted back to Ahemadnagar district. In 1837-38 the sub division of Sinnar Chandor, Dindori, Nashik, Igatpori and Peint were made into Nashik sub collectorate under the administration of the collector of Ahemadnagar. This sub collectorate was however abolished in 1856 and the area was reverted back to Ahemadnagar. In 1869 two district Nashik and Solapur were formed in 1891. The district of Ahemadnagar had the following sub divisions viz. Jamkhed, Newasa, Akole, Karjat, Parner and Rahuri, Pathardi Peta was newly formed in 1930 and rest of Jamkhed tahsil was renamed as Jamkhed Mahal. Similarly, Karjat tahsil was downgraded as Peta in the decade 1931-1941. The tahsil of Shrirampur was newly formed in 1945 and the Pathardi and Karjat Petas were upgraded into bull-fledged thasils in 1941-1951. The enclave villages with in the district of Beed were transferred in 1950 to this district and at the same time 26 villages of Ahemadnagar district
were transferred to Beed district and one village of Aurangabad also transfer to re-adjust the boundaries so as to bring about contiguity. In 1956 the district become a part of Maharashtra when the linguistic state came into existence. For Administrative purposes the present district is divided into 13 tahsils. There are 1556 habited and two inhabited villages in this district.

2.4 Physiography

Physiography is one of the dominant parameters of physical environment and its impact on patterns and density of agriculture is immense. The study of the influence of environment upon the nature and the distribution of crops and livestock is of prime importance in agricultural geography. The relief of the district has an immense variety not to be witnessed to the same extent in many other districts of the state. This is partly on account of its size and partly on account of its western location, immediately adjoining the crest of the Sahyadri. The district includes the Sahyadri and its three eastward offshoots, the Kalsubai Adala range in the North, the Baleshwar range in the middle and the Harischandragad range in the South, the Vast Ahemadnagar Plateau in the middle running with a North West, South-Eastern trend and the river basins of the Godavari and Bhima on either side of the plateau. The Ahemadnagar district can be divided into three broad physiographic divisions viz.

(1) Mountain and hilly region.

(2) River Basins.
Physiography And Drainage Pattern of Ahamadnagar District

Map No. 2.2

Index
- Above 900 m.
- 600 to 900 m.
- 300 to 600 m.
(1) Mountain and hilly region

(A) Sahyadri

The Sahyadri covers the distance of about 60 kms, a continuous natural boundary between Ahemadnagar and Thane district. When viewed from the west from the lower levels of the Murbad lowlands, the appearance of the range is that of high wall of rocks about 1000 mt., high of dark hue relieved by narrow horizontal belts of grass and evergreen forest surrounded by isolated peaks and rocky bluffs rising in many places to a further 1000 mt. running with the North West to the South Eastern trend. The Crestline here seems to have migrated eastwards by recession due to active headword erosion in the western slopes by the active tributaries of the ulhas. The three hills forts of Kulang, Ratangad and Harischandragad and the peak of Ajuba Dongar are the most striking of the high peaks of Sahyadri within the district. This mountain region is not suitable for agriculture.

(B) Hills

There are four hilly ranges which we find in the Ahemadnagar district they are as follows.

(I) Kalsubai Range

The Kalsubai range branching off at kulang is the Northernmost of the 3 spurs which for some 40 km. forms the boundary between Ahemadnagar and Nashik district. Viewed from the Nasik district it presents the appearance of a continous and in many places a precipitous cliff of rocks. Almost every hill in this range had been a fort and many
still have water cisterns and gratiaries. East of Kulang is the twin fort of Alang, both being spots of great natural strength. Kalsubai is the highest peak in the mountain Sahyadri (1646 mt) East of Kalsubai is the natural depression in the range over which winds the Barighat road leading from Igatpuri and Ghoti on the Mumbai Agra highway to Bhandardhara.

Two smaller spurs which run in the South-Eastern direction enclosing the valley of Adula river branch of near Bitanagar and Patta.

(II) Adula Hills

The Adula hills branch from the main Kalsubai range near the peak of Patta and run southwards at an average elevation of 900 meters carrying on their top extensive flat topped plateau levels and open jungles on the steep hill-slopes. This range abruptly ends about 2 km northwards of Sangamner. The other spur branching off from the Kalsubai range in Bitangad peak also running similarly with an Eastern trend, parallel to the Adula range and south of it has a wider flat top forming a structural level at a height of 1000 mt. Between the two spurs, the Adula river has carved its valley. This range also ends abruptly a few km. west of Sangamner.

(III) Harichandragad Range

The third range which leaves the Sahyadri at Harichandragad is the longest in the district and forms the main water-shed between the Godavari and Bhima rivers. Its direction for the first 25 kms is Eastern. The Mula river flows between it and the Baleshwar range. This range forms the boundary between Ahemadnagar and Pune districts. East of Harichandragad fort on this range lies the Bala Killa. Near Brahman wada the range gradually decreasing in height takes a turn to the south East and enters Parner tahsil which completely traverses. The summits of
the hills here widen into the plateau of Kanhore 850 meters above the mean sea level and 200 meters above the bed of the Ghod river. At the West, the range presents a wall-like front towards the river. Near the village of Jamgaon in Parner tahsil, the flat-topped ridge shoots to the North-East from a water-shed between the tributaries of the Godavari and the Bhima. The main ridge continues further South-East with the widening summits and gradually widen into a flat level country known as Balaghat that extends far into the districts of Maharashtra.

(IV) Baleshwar Range

The Baleshwar range the second great spur of the Sahyadri branches of Ratangad at 11 km of South-East of Kulang and completely traverses the Akole and Sangamner tahsil forming the watershed between the Parara in the North and the Mula in the South. On this range, east of Ratangad is a series of lofty craggy peaks such as Katra donger, Mura, Wakarai, Shirpunj. The range culminates with Baleshwar as a central mass whose summit has been crowned by a temple in Hemadpanthi style now in ruins and surrounded by spurs radiating from the centre in all direction. On the isolated hill at the end of one of these spurs extending on the north-west is the fort of Pemgad. Between Baleshwar and Hevargaon which is the last notable peak in the range is the Chandanpuri valley crossed by the Pune-Nashik road, East of Hevargaon the hills decrease in height and finally subside in the open plains just west of Rahuri. This range is about 100 kms long.

(3) River Basin

On either side of the plateau and its high crested rims are two river plains sloping towards the Godavari and Bhima rivers respectively.
These two plains are at elevation of less than 600 meters and below 450 meters in the extreme eastern parts of Shevgaon tahsil.

(I) Godavari Basin

Godavari river is flowing in the northern part of Ahemadnagar district. Kopergaon, Shrirampur, Shevgaon & Nevasa tahsils come under Godavari basin and some part of Sangamner tahsil, South West part of Pathardi tahsil and the most of the part of Rahuri tahsil are occupied by Godavari basin. The slope of this region is South to North. There are practically no hills but it is only monotonous country. However in the South and South East, the land has a mere uneven slope up towards the rims of the Ahemadnagar plateau which is deeply fissured by ravines down where water rushes with great violence during heavy rains. Between the various streams which drain the country are slightly elevated tracts of mal or upland which however do not change the general level appearance of the region.

The bank side soil are black and much more babul trees are grown. In the entire Godavari plains, irrigated farming is significant bringing prosperity to the small farmers and this is in sharp contrast to the dry farming practices of the nagar plateau. Kopargaon, Shrirampur and Rahuri tahsils have a large network of irrigation canals fed by Godavari and Pravara rivers.

(II) Ghod Bhima Basin

This basin lies west of Ahemadnagar plateau. The average height of this plateau is 650 meters in the north and less than 550 meters in the southern edges. It includes a narrow western strip to the west of the Kanhove plateau in the Parner tahsil and the western halves of the Shrigonda and Karjat tahsils. The valleys of Ghod and its tributary

[ 36 ]
Kukadi in the North in the Parner tahsil are narrow and rolling South wards in Shrigonda and Karjat tahsil. The main Bhima valley widens considerably to become an almost flat. In Shrigonda, the plain is skirted in the North-East by low hills with flat summits while large tracts in Karjat tahsil are covered with boulders and gavel inter-spersed with level tracts in which soils are comparatively deeper and richer. The land in general slopes to the south towards the rivers. There is heavy concentration of agricultural activities in the river valleys in the study region.

2.5 Geology

The study region’s geological survey of India has not taken up with systematic mapping. Information available is only through the reports submitted by the officers of the geological survey of India in connection with their visits for studying ground water position of certain areas or engineering geological aspects of some dam-sites Lieutenant-Colonel Sykes (1833) in his contribution of the Geology of western area makes brief mention of the general geology of Ahamadnagar district. The entire district is occupied by basaltic Lava-flows erupted in the Cretaceo-Eocene age which are popularly known as Deccan traps. These Lava flows are sometimes associated with inter-trappen beds such as limestone, sandstone, clay shales, red bole beds, porous ash. This mantle of black cotton soil present almost every where on the basalts, river alluvium, sand, gravel, clays and silts represent the recent deposits in the district. Calcareous coheretion and nodules known as Kankar is commonly associated with soil more concentrated in the vicinity of the stream-courses.

Basaltic rock is found in some part of the district. For want of geological mapping in the area, flow pattern and fabric of basalts exposed
in the district are not known. The thickness of the flows ranges from 3 meters to as much as 40 meters, the average thickness is around 15 meters. According to Roy (1948), the thickness of the volcanic rocks is around 900 meters. The basalt is composed of plagioclase felspars and clinopyroxene usually augite with iron ores and other minor constituents. They exhibit porphyritic texture where in thin laths of plagioclase and felspars are set between the plates of augite. Such porphyritic trap having minor lamination or patches of pink vesicular trap is exposed in the Mula river bed near Ahemadnagar cantonment.

**Red Bole Beds**

These are thin reddish horizons occurring in between the successive flows of basalt and are exposed in discontinuous patches. They are very well exposed along the hill-sides.

**Intrusive Dykes**

No details are available regarding true dykes in the district. Two trap dykes are reported to occur near Taskarwadi near Mula dam site, one is about 1.2 meters thick and runs in the middle of the river about 120 meters. The other is a large dyke about 10 meters thick and is seen on the left bank of the river.

**Calcareous Kanker**

These are either associated with soil or occurring as small nodules or concretions either associated with soil or as infillings in cracks fissures and joints in rocks. Whitish Kankary clay are commonly seen in the cliff at both the banks of Mula river near Ahamadnagar cantonment.
Soil and Alluvium

Back cotton soil is the ultimate product of decomposition and weathering of basalt. This is highly absorbent, and cracks and crumbles after a period of long draught. Recent alluvium and consolidated gravels have attained a thickness of 24 – 30 meters on the right bank of the mula river near the dam site. This region highly favorable for the heavy concentration of agriculture activities. The geological setting of Ahamadnagar district has a decisive role in determining the ground water possibilities in different parts of the district. This district is mainly occupied by basaltic lava flows and alluvium of the Godavari and the Parvara rivers.

2.6 Drainage Pattern

Surface drainage is the disposal of excess rain water over ground surface through an open drainage system with an adequate outlet. Surface drainage is helpful where (i) soils are deep with low infiltration rates where (ii) intensity of rainfall is high, where (iii) terrain is level to nearly – level and where (iv) the water-table is high. Drainage texture is expressed as the total length of streams per unit area. While its reciprocal is the distance between two adjacent channels. These are the two important parameters by which one can estimate soil erosion.

Any bore or well from which underlying water is extracted either under pressure or through mechanical lifts can be defined as vertical drainage. The success of vertical drainage depends upon the presence of favorable aquifer and water table for lifting the ground water on a sustained basis and the favorable quality of water that could be reutilized for irrigation purposes.

Groundwater effluent becomes the base flow that maintains the flow of streams if fair weather. When we speak of surface water, we
mean stream flow—regardless of its source. Therefore, surface water is by far the most important for irrigation. It is probable that any attempt to improve agricultural techniques and land use planning without combating the problem with the help of shallow and deep water-table is bound to be abortive. However, drainage is one of the most important components of physical environment which affects agriculture directly and indirectly. In Ahamadnagar district there are two major river system of maharashtra, Godavari in the North and Bhima in the South number of tributaries rising with in the district drain, the area of the district in general south east wards.

(I) Godavari River Basin

Godavari flows in the Norther part of Ahamadnagar district and major part of Kopargaon, Sangamner, Akole, Rahuri, Newasa and Shevgaon tahsils. The Godavari forms almost continously the boundary between Ahamadnagar and Aurangabad district at the village Toka. It receives on its right bank the combined water of Pravara and the Mula. A few kilometers downstream the shiva and the Ganda join it from the left and the Dhora from the right. The river has an overall length of 200 kms. In this district.

Most part of the river bed is sandy but in many places rocky boulders crop up and lie across its course turning the stream into large pools above and forming rapids below. In these pools which are often of great extent and depth fish abound. The banks are some times sloping but are more generally steep broken and eroded by gullies.

(II) Parvara

Parvara rises in the Eastern slopes of the Sahydri between the high peaks and hill-forts of Kulang and Ratngad after a strenuous course of 20
kms. in a picturesque amphitheater enclosed between the Kalsubai and Baleshwars ranges in an Easterly direction. It falls near the village Renad into rocky chasm 60 kms. deep and then winds about 13 kms. through a narrow deep glen that opens into a wider valley East of and below the central plateau on which the town of Rajur stands. Parvara flows between low cultivated banks still keeping its easterly course. It receives, as it enters Nevasa tahsil the waters of the mula river and the combined flow turning to the North-East falls into the Godavari at the Pravara sangam near the village Toka.

(III) **Adula River**

This river flows in Northern part of Akole tahsil on the slopes of the Patta and Mahakali peaks. It flows for 25 kms. in an easterly direction between two spurs which includes the narrow Samsharapur valley, then after falling into a rocky chasam 45 meters deep. It winds between rocky and precipitous hill sides for a couple of miles before debouching into the plains of Sangamner. It turns South and falls into the Pravara 5 kms. west of town Sangamner. The river has a number of bandhares or weirs both above and below Samsharapur to store water and make use of it for irrigation.

(IV) **Mula River**

This river rises on the Eastern slopes of the Sahyadri between Ratangad and Harichandragad for the first 25 kms. It flows parallel to the Pravara draining, the Southern most Kotul valley of Akole tahsil. The river is incised in a deep valley almost from its source and its steep valley sides are highly dissected by deep sullies formed by mountain torrents which rush into the main stream. The Mula valley development project initiated during the second five year plan period comprises the storages of
about 30,000 million cubic feet of water to irrigate 52,000 hectares of mixed crops through canals having an over-all length of about 75 kms. in a region of chronic scarcity.

(V) Dhora River

The Dhora nadi rises on the slopes of the hills, east of the city of Ahamadnagar. It flows North East draining, the Shevgaon and Newasa tahsils and entering the Godavari 7 kms. West of the town of Paithan in Aurangabad district.

(VI) Bhima River

The Bhima river drains the Southern part of the study region comprising the greater part of Parner and Ahamadnagar tahsils, and the whole of Shrigonda, Karjat and Jamkhed tahsil. It enters the district near the village Sangvi Dhumale in the Shrigonda tahsil and for some 60 kilometers forms continuous part of the boundary between Ahamadnagar and Pune districts. The river receives on its left bank waters of the Ghod river, and further East it is joined by the Saraswati Lohekera and the Navi nadi. The course of the Bhima in the district is continuously to the South East. It passes along the western boundary of Solapur lower down stream before emptying into the Krishna. The banks of the river are generally low. The river bed is sandy crossed here and there by rocky barriers. There are many deep pools but during hot months the streams dwindles down to an insignificant stream. The chief tributaries of the Bhima in the district are the Ghod and the Sina rivers.

(VII) Sina River

The Sina has two chief source one near Jamgaon about 20 kms. West of the town of Ahamadnagar and the other near Jeur about 60 kms.
to its North-East. The city of Ahamadnagar is built on right bank of the river. For a distance of about 55 kms. roughly, the river forms boundary between Ahamadnagar on the one hand and Beed in the other. On the right, it receives the waters of Mahekni and ultimately joins the Bhima on the Karnataka state border. The Banks of the Sina are low and its bed sandy. After heavy rains its flow is somewhat rapid as it is shown by the directness of its course. During summer the river becomes dry.

(VIII) The Ghod River

This river, the main left bank tributary of the Bhima rises on the slopes of the Sahyadri in Junnar tahsil of Pune district. It flows in the South Eastern direction for over 80 kms. forms the part of the South-Western boundary of the district with that of Pune district near the cantonment township of Sirur, receives on its left bank, the Kukdi nadi, and further down its volume is increased by the water of the Hanga and the Patnal nadi. The streams, which drain into it, the waters of Parner and Shrigonda tahsils on the right bank are few on account of the proximity of the water shed which makes the drainage small. The banks of the stream are low and its bed is generally rocky. In the dry months, the streams are easily fordable but during rains they cannot be crossed without boats. The Ghod falls into the Bhima near the village Sangavi Dhumale in Shrigonda tahsil.

2.7 Climate

The climate plays important role in the development of region. Man and the environment around him is also reflected in the habits and requirement of consumers and thus affects the prospect for consumer goods industries of various types. Climate determines where man may live and thrive what crops he may raise? What types of home he may appropriately build? What sort of clothing he may wear? And what pests
and diseases he must combat. The potential crop productivity and capability of a given area depends mainly upon the existing climate and soil conditions. Since climate factors exert mainly a regional influence on plant life, the differences in the behavior of a crop or a group of crops, this turn sets the range of commodities which that country must import if it wishes its people to live a full life in the modern sense (Stamp 1963). As the climate countries changes, so will be its plants or crops (Thomas 1967). The climate elements and their effects on plant growth are far more complex than it appears. In the field, the plant is never subjected to a single variable at any given time, but has to interact with an almost infinite number of combinations of the elements (Chang 1968).

The success or failure of the cropping season is determined by the intensity of the climatic factors. The three most important factors of climate from the stand point of plant response are temperature, water supply, and light (Hildreath et al 1941), and they may be treated as primary determinants of crops growth. Plant growth does not depend upon limited variation but is controlled by various elements acting in combination at a time. The climate of the study region is characterized by a hot summer and general dryness during major part of the year except during South-West monsoon season. Cold season is December to March. The period from March to June is the hot season, and then occurs South West monsoon period and many elements of the climate condition.
### (a) Temperature

#### Table No. 2.1

Month wise maximum & minimum temperature in Ahamadnagar district – 2010

<table>
<thead>
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<th>Sr.No.</th>
<th>Month</th>
<th>Maximum Temp. in °c</th>
<th>Minimum Temp. in °c</th>
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</thead>
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<tr>
<td>1</td>
<td>January</td>
<td>26.5</td>
<td>7.9</td>
</tr>
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<td>2</td>
<td>February</td>
<td>26.9</td>
<td>10.2</td>
</tr>
<tr>
<td>3</td>
<td>March</td>
<td>33.7</td>
<td>17.2</td>
</tr>
<tr>
<td>4</td>
<td>April</td>
<td>35.0</td>
<td>19.5</td>
</tr>
<tr>
<td>5</td>
<td>May</td>
<td>36.1</td>
<td>20.6</td>
</tr>
<tr>
<td>6</td>
<td>June</td>
<td>33.3</td>
<td>22.3</td>
</tr>
<tr>
<td>7</td>
<td>July</td>
<td>27.9</td>
<td>20.8</td>
</tr>
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<td>8</td>
<td>August</td>
<td>27.1</td>
<td>20.5</td>
</tr>
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<td>9</td>
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<td>19.0</td>
</tr>
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<td>11</td>
<td>November</td>
<td>27.97</td>
<td>16.3</td>
</tr>
<tr>
<td>12</td>
<td>December</td>
<td>25.8</td>
<td>10.2</td>
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</table>

Source: Socio-Eco abstract of Ahamadnagar district 2010

### Table No. 2.2

#### Rainfall – 1985 to 2010

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Tahsil</th>
<th>Average</th>
<th>Rainfall</th>
<th>%</th>
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</thead>
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<td>Akole</td>
<td>549</td>
<td>829</td>
<td>168</td>
</tr>
<tr>
<td>2</td>
<td>Sangamner</td>
<td>329</td>
<td>572</td>
<td>137</td>
</tr>
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<td>3</td>
<td>Kopergaon</td>
<td>333</td>
<td>644</td>
<td>146</td>
</tr>
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</table>
There is meteorological observation in the district at Ahemadnagar functioning from 1891. The records of this observatory may be taken as representative of the meteorological conditions prevailing over the district. The cold weather starts by the middle of November and continue till the end of February. December is the coldest month of the year with the mean daily maximum temperature at 25.8 °C and the mean daily temperature at 10.2 °C from March to the break of South-West monsoon. The day temperature increases progressively. In the hot, season the sweltering heat of the afternoons is some times relieved by thunder storm. May is the hottest month of the year with the mean daily maximum temperature at 36.1 °C and the mean daily minimum temperature at 20.6 °C on individual days during the hot weather period, temperature occasionally goes up to 43 °C to 44°C
(b) Rainfall

Rainfall is the dominant single weather element influencing the intensity and location of farming systems and the farmers choice of enterprises. Thus, it may be said that rainfall is the most important climatic factors as it determines the potential of any region in terms of crops to be produced, farming system to be adopted, the nature and sequence of farming operations to be followed and the targets to be achieved in agricultural productivity. Rainfall effectiveness is usually expressed as the actual total rainfall minus the total possible evaporation (Moukhouse and Wilkinson 1967). The records of rainfall in the district are available for 13 rain gauge stations for period extending from 1985 to 2010 years. Total 25 years’ record is available. Table 2.2 reveals that mean annual rainfall of the study region. It was 510.5 mm from 1985 to 2010. It varies from tahsil to tahsil. Below 450 mm mean annual rainfall was noticed in Sangamner, Kopargaon and Rahata tahsils where as 450 to 500 mm mean annual rainfall was found in Shrirampur, Newasa, Parner and Shrigonda tahsils. Nearly 500 to 600 mm mean annual rainfall was recorded in Akole, Nagar, Rahuri tahsils and above 600 mm annual rainfall was recorded in Shegaon, Pathardi, Karjat and Jamkhed tahsils during the period of investigation.

2.8 Soil

Climate soils should not be regarded as part of the natural endowment of an area. In fact, it is agriculture that modifies soils except certain virgin soils which can retain their original characteristics. On the whole, soils constitute the physical base for any agricultural enterprise. Farming is a business and good soil is the part of the farmer’s stock in trade. Good soils are good to the extent that man makes judicious use of them. Our standard of living which pre dominantly depends upon
agriculture is often determined by a combination of the physical, chemical and biological characteristics of the soils with a proper combination of texture, structure salts and humans yield good results. Soils provide essential material on which agriculture is based and therefore any comprehensive survey of the geography of agriculture should include a fairly thorough treatment of soils. Even at the beginning of his work on political geography, Retzel made a statement of great significance and insight that “Jeder staat its ein stuck menschhiet” (every nation is a bit of soil and humanity) (Quoted by Klages 1958). So much so that, man gets nearly all of his food from the soils less than one percent of what he eats fish (Person and Harper 1945) of the long list of Nature’s gift to man productive soils and water are the most basic to human life (Bennet 1955). The top or upper layer of soils has an average thickness of between 15 to 20 cm. depending upon local conditions. This is the principal feeding zone of the crops providing food for human ingestion of livestock feeding.

The soil of Ahamadnagar district can generally be classified into three groups viz. black or kali, red or tambat, laterite and the gray of inferior quality locally known as barad including white or pandhari. Of these barad soils are very poor in fertility. The plains of Kopergaon and Shrirampur tahsils have comparatively a good depth of soil near the Pravara and Godavari rivers. The white tracts of deep rich lands are found. Two specially barren tracks may be noticed, one on the borders of Karjat and Shrigonda and the other North of a lime drawn East to West through Takali Dhakeshwar ten miles North of Parner and as far north as the slopes down to the Mula.

Soils on the plateau vary considerably depending upon the terrain and slope conditions over the plateau. In many parts of Parner tahsil, the soils though not very deep have a good admixture of lime and are open as
a result of which they are well suited for the production of a number of rabi crops. However, on the terraces the soils are too inferior and the hill-slopes are stony and poorer. Fairly productive black soils are seen only in low grounds skirted by waving and broken ground. In the western part of Sangamner tahsil, the soils are of the richest description along the banks of the Pravara and Mula that develop only in narrow strips and grade into inferior soils of hill slopes on the hills. In the plateau, the soils are friable and mixed with gravels and in the central parts there is a considerable portion of poor soils. Near the range of the hills, that runs South-East down the centre of the Shrigonda and Karjat sub divisions the land is very poor with occasional patches of good light soil near Karjat, Koregaon and other places. In the hilly areas to the west of Akole, read soil is deeper on the slopes than on the levels.

**The soil in the district is divided into four types**

(I) **Ghat Zone**

This Zone covers hilly terrains including Sahyadri hill tops and the western sloping hilly land with variable attitude between 500 and 1500 meters. The main soil types found in this region are high level red to reddish brown laterite soils, and light brown to dark brown shallow gravelly loams.

(II) **High rainfall zone with non laterite soils**

This zone includes the narrow strip of land West to the ghat zone and receives rainfall of 200 to 300 cms. The major soil group viz non-laterite red and to reddish brown loams includes two types of soils high level red to reddish brown shallow light textured soils, and brown to dark brown medium deep loams to clay loams locally known as Manat.
(III) Transition zone

Area on the western side of the high rainfall zone with non laterite soils comes under this zone. It receives rainfall of about 125 cms to 250 cms. The soil group consists of soils of red to reddish brown colour with varied depth and texture.

(IV) Transition zone II

Western part of Akole tahsil and the limited area from South East portion of Sangamner tahsil is covered by this zone. This part of the district receives rainfall of about 70 cms to 125 cms. The major soil group of this zone is brown to dark brown of varying depths and comprises three types of soils viz. high level low lime, shallow, reddish brown loams, intermediate, medium deep black clay loams and low level deep low lime brown back clays.

2.9 Natural Vegetation

Natural vegetation is important from the point of view of rainfall distribution and the fertility of the soil. Vegetation of some sort of the other is the natural covering of the land surface of the earth. Even so called deserts have their vegetation though it may be scanty and incospicious. During 1980-85 about 1851.6 hectares area was under forest in the study region. Area under forest decreased from 1851.6 hectares to 1713.2 hectares between 1980-85 and 2005-2010. The forest in the district is divided as protected forests, reserved forest and the rest as unclassed forests. In this area, forest is of dry and deciduous type. They are scattered in Sheltered pockets of spurs and valleys, and are situated mainly in Akola, Sangamner, Ahamadnagar, Shrigonda, Parner and Rahuri tahsils. The commercially important species found in the forest are teak, neem, babhul, sissoo, sandlewood etc.. Other important
miscellaneous speties are khair, hiwar, herkal amoni, apta etc. The
growth is stunted and poor due to poor soils and lack of adequate humus
vast stretches or grass-lands are also found. The species of grass
commonly found are kusal, dongari gavat, pavanya and marvel.

In the Rajur and Akole ranges, some ever-green species also grow.
The forest consists of the following species. Dhawada, Terminavia,
tomentosa, Moyen, Salai, Bhawa, Apta, Teak, Hirda, Chandan, Babul,
Jambhul, Karnj, Moho, Nimb, Khair Maharuk etc. The forests in Akole
and Sangamner tahsils produce small quality of teak poles charcoal,
firewood, grass and myrobalans. The forest produces are transported in
truck to Ghoti and Sangamner markets.

Tahsilwise area under forest is very less Shrirampur tahsils
recorded zero% area under forest Kopargaon, Nevasa and Sheogaon
tahsil have recorded upto 2% area under forest, whereas 5% area under
forest is noticed in Ahamadnagar, Pathardi, Jamkhed, Karjat and
Shrigonda tahsil. The Akole tahsil recorded 20% area under forest
because this tahsil is hilly area and is Eastern part of Sahyadri mountain
ranges. The area under forest is decreasing from 1980-85 to 2005-2010.

Non physical determinant

2.10 Irrigation

Irrigation is one form or another has been in vogue from time
immoral. For instance, in Egylot, it goes back to 4000 BC. or beyond,
and in other parts of the world. it is equally old and is described often in
great detail in ancient literature such as the Rigveda or the records of
ancient travelers and traders. It developed in response to conditions of
climate and the same holds good today in many parts of the world.
Irrigation is essentially the artificial application of water to overcome
deficiencies in rainfall for growing crops. It is regarded as an integral part of a second infra-structure and is one of the basic ingredients of agricultural activities. To be successful and well developed agriculture requires supply of water at regular interval and in required quantities. This could be done by artificial application of water to land for growing crops and it is known by the term irrigation.

**Modes of irrigation**

There are different irrigational sources in Ahamadnagar district. The following modes of irrigation are used for irrigating the agricultural land.

(A) Major and medium irrigation projects.
(B) Minor irrigation projects.
(C) Well irrigation.

(A) **Major and medium irrigation project**

An irrigation project which covers more than 10000 hectares as the cultivated command area is called major irrigation. The major irrigation projects are essential for the all round development of the region. They can change the socio economic structure of the region. Medium irrigation projects are those with culturable command areas between 2000 to 10000 hectares Ahamadnagar district is getting irrigational advantages of nine major projects. These are as fallows.

(1) **Bhandardhara Project**

It is named as Wilson project and it was completed in 1926 near Bhandardhara-Shendi tahsil Akole. Total cost of project was Rs. 4161 lakh. Its height is about 82.29 meters and 130 kms canal was constructed from this project. The water storage capacity of this project is about
313.6 million cubic meters. Storage of water depends upon the rate of monsoon rainfall. It provides irrigational facilities to 80453 hectares but actually 63000 hectares land is available for the cultivation in the jurisdiction of Bhandardhara Project, the permanent irrigation gives some area. Some area benefits of irrigation are seasonal from this project.

(2) Mula Project

Dam was constructed on Mula river near Balagarn Nandur in Rahuri tahsil. It was completed in 1975. The total expenditure of Mula project was Rs. 3403.34 lakhs. The height of the project is 46.63 meters and 70 kms canal is constructed from this project. The total water storage capacity of this project is about 736.32 million cubic meters. About 127385 hectares land gets benefit of this project but actually 120000 hectares land can be brought under agriculture in the command area of the Mula project.

(3) Ghod Project

It was constructed across the Ghod river near Chinchni in Shirur tahsil of Pune district. It was completed in 1965 and its total expenditure was Rs. 595 lakh. The height of the project is about 29.6 meters and about 117 kilometers canal was constructed from this project. Water storage capacity of this project is about 216.4 million cubic meters. Its water potential is about 39041 hectares, 20500 hectares of land can be brought under irrigation. The year to year fluctuation was found in irrigation due to variability of rainfall in the command area of this project.
(4) **Uppar Pravara Project**

It is not completed project. It can be completed by the end of 2013. About Rs. 23500 lakh amount will be spent on this project and about 66.06 meter high dam will be built on the project. About 352.94 million cubic water will be stored, in the project, and 64260 hectares land will be brought under irrigation after the completion of the dam.

(5) **Karanjwan Project**

It is known as upper Godavari project. It is constructed on Godavari river near Karanjawan village in Dindori tahsil of Nasik district. It was completed in 1974 and about Rs. 5958 lakh amount was spent on this project. Nearly 39, meter dam was constructed on Godavari river and about 21 kilometer canal has to dug from the project. Total water storage capacity of the project is 175.55 cubic million lakh and about 34.15 cubic million lakh water was stored in the dam. Nearly, 1347 hectares land will be brought under irrigation in the jurisdiction of the project.

(6) **Waghad Project**

It is known as upper Godavari project. It was completed in 1979 near Waghad village in Dhindori tahsil of Nasik district. The total expenditure of this project was about Rs. 1990.43 lakh and about 46.92 meters hight dam was constructed Nearly 60 kilometers canal was dug from this project. Storage capacity of this dam is 76.48 cubic million meters and about 27.59 cubic million meters water was stored in the dam in 2010. About 6750 hectares of land is benifited from this dam.

(7) **Yedgaon Project**

This project was constructed on Kukadi river near Yedgaon village in Junnar tahsil of Pune district. It was completed in 1977. The total
expenditure was Rs. 930 lakh and the height of dam is 23.6 meters. About 114 kilometers canal was constructed from this dam. The total water storage capacity of this dam is 93.43 cubic million meters and about 25 cubic million meters was stored in the dam during 2010. About 3015 hectare land is benifited by this dam but actually 2412 hectares land can be brought under cultivation.

(8) Manik doh Project

It is constructed on Kukadi river near Manik doh village in Junnar tahsil of Pune district. It was completed in 1984 and about Rs. 1627 lakh amount was spent on this project. The height of the dam is 51.6 mtr. Where as 12 kms canal is constructed.

Table 2.3
Statement showing distribution of Medium Projects in A.nagar district – 2010

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Project</th>
<th>Year of comp.</th>
<th>Expenditure in Lakh</th>
<th>Height in mt.</th>
<th>Length of canal km.</th>
<th>Irrigation potential in hect.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ghatshil Pargaon</td>
<td>1980</td>
<td>155.75</td>
<td>22.46</td>
<td>31</td>
<td>2380</td>
</tr>
<tr>
<td>2</td>
<td>Takali Bhan</td>
<td>1977</td>
<td>60.00</td>
<td>16.32</td>
<td>5</td>
<td>1594</td>
</tr>
<tr>
<td>3</td>
<td>Mahegaon Sangvi</td>
<td>1965</td>
<td>3.46</td>
<td>15.24</td>
<td>27.35</td>
<td>1028</td>
</tr>
<tr>
<td>4</td>
<td>Bhojapur</td>
<td>1973</td>
<td>166</td>
<td>32.65</td>
<td>29.65</td>
<td>4500</td>
</tr>
<tr>
<td>5</td>
<td>Mandohol proj.</td>
<td>1981</td>
<td>186.70</td>
<td>26.07</td>
<td>26.00</td>
<td>4228</td>
</tr>
<tr>
<td>6</td>
<td>Tajanapur Proj</td>
<td>2010</td>
<td>2586.22</td>
<td>42.00</td>
<td>12.00</td>
<td>2744</td>
</tr>
<tr>
<td>7</td>
<td>Khairi Proj.</td>
<td>1994</td>
<td>1944.22</td>
<td>18.91</td>
<td>21.00</td>
<td>2778</td>
</tr>
</tbody>
</table>
(9) Waduj Project

It is built neat Waduj village in Junnar tahsil of Pune district. The work was completed in 1981. The total expenditure was Rs. 814 lakh and the height of the dam is 26.42 meter. About 54 kilometers canal was constructed from this dam. Water storage capacity is 35 million cubic meter. Irrigational potential of Waduj project is about 28873 hectares, and during 2009-10 about 15014 hectares got irrigation facilities by this dam.

(A) Medium Project

At present there are eleven medium projects in the district table No. 2.3 indicates that out of the eleven project Tajanpur project is not completed there fore it does not provide water for irrigation, one project is found in Pune district that is Bhojapur and one in Beed district even than these projects provides irrigational water in the boarder area of the Ahmednagar district. The total expenditure of project varies from projects to project. The highest expenditure was done on Tanjapur project (1530 lakh). Whereas the lowest expenditure was found in the case of Mahesangvi project (Rs.3.46 lakh). The maximum height of the project also various from project to project. Sina project is having maximum height (84 mtr) while Takalibhan project height is only 5 mtr
from the bottom of the river. Sina project is having 67.96 million cubic mt. storage capacity on the other hand Takalibhan medium project is having only 5.68 million cubic met. storage capacity. Visapur project is having maximum irrigation potential (37200 hect.) whereas Mahe Sangvi project irrigational potential are only 1028 hect. water storage capacity of the medium projects depends upon the rate and distribution of the monsoon rainfall. Some time these project are having very less water due to lack of monsoon rainfall. At that time these project provides water during winter season for the agriculture. Even then these project have changed agricultural structure to the greater extent in their command area.

(B) **Minor Irrigation Schemes and Wells**

An irrigation project which covers less than 2000 hectares as the cultivated command area is called minor irrigation scheme. During the rainy season, when water collects and forms a pond, it is usually called a tank. This water is used for irrigating the standing crops after the wet season. Tank irrigation therefore needs much rainfall for later storage and utilization level of water in tanks is solely dependent on the quantum of rainfall of the season.

After the independence, Government has given more tress on minor irrigation in the state of Maharashtra.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Tahsil</th>
<th>Minor Irrigation</th>
<th>K.T.W.</th>
<th>Wells</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Akole</td>
<td>03</td>
<td>114</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>Sangamner</td>
<td>46</td>
<td>171</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>Kopargaon</td>
<td>32</td>
<td>32</td>
<td>03</td>
</tr>
</tbody>
</table>
Table 2.4 reveals that out of the total minor irrigation schemes nearly, maximum minor irrigation was found in Parner, Ahamadnagar, Shrigonda and Sangamner tahsils. Akole, Pathardi & Karjat tahsils are second in minor irrigation schemes. The remaining tahsils are low irrigation of particular category. Total district depends upon on minor & well irrigation facilities.

As the cost of construction of well is low, they are suited to the poor and marginal farmers. There was great demand for irrigation wells due to paucity other irrigation facilities. Well irrigation was important during the period of second five year plan. Maharashtra state had given priority for the construction of new wells as well as repairing of old wells in every district. Particularly, irrigational wells increased through five years’ plans in Ahemadnagar district. The maximum wells are found in Sangamner tahsils (950) and lowest wells are noticed in Rahata in 2010.
The irrigational wells are also increased in all tahsils because of uncertainty of monsoon.

2.11 Population

Growth of population, density of population, sex ratio and literacy are the elements of population which are important in the social, cultural and economic development of region. It is the people that propel, social progress creates social wealth, and social wealth develops science and technology through their hardwork continuously and it transform the human environment. Man is both creature and moulder of his environment. Man being a powerful geographical factor on the earth surface not only determines the economic pattern of resource utilization but is himself a very dynamic and important resource for the society. He plays a crucial role in the entire progress of production and he is also the beneficiary of the whole of resource utilization and economic development. Man gets nearly all his food from the soil less than one percent of what he eats fish. The analysis of different elements of population is as follows.

(A) Growth of Population

The growth of population may be approached just by taking into consideration next the growth of population over the basic year. We have taken into consideration the last six decades (1951-2001). The growth rate of population has a great significance for the geographer. Table 2.5 reveals that total population has showed constant increase from 1951 to 2001. The highest increase was observed in the decade of 1961-71.
### Table No. 2.5

**Growth rate of Population since 1951 – 2001 in Ahamadnagar district**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Rural</th>
<th>Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>1951</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>1961</td>
<td>+ 25.88</td>
<td>- 12.81</td>
<td>+ 32.83</td>
</tr>
<tr>
<td>1971</td>
<td>+ 27.00</td>
<td>+ 34.27</td>
<td>+ 27.00</td>
</tr>
<tr>
<td>1981</td>
<td>+ 19.36</td>
<td>+ 39.71</td>
<td>+ 16.82</td>
</tr>
<tr>
<td>1991</td>
<td>+ 24.54</td>
<td>+ 51.83</td>
<td>+ 20.47</td>
</tr>
<tr>
<td>2001</td>
<td>+ 19.80</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>2011</td>
<td>12.42</td>
<td>12.15</td>
<td>13.50</td>
</tr>
</tbody>
</table>

Source: District senses handbook of Ahamadnagar district 2012

The lowest increase was recorded in the decade of 1971-81 (19.36%). Rural population showed decrease in 1951, 1961, 2001.

The population plays dominant role in the development of cattle market system. According to 2001 population census, the population of the district was 40.41 lakh. The talukawise population is given in the following table.
Population Growth Rate Since 1951 - 2011 of Ahamadnagar District

Graph No. 2.1

Population Growth rate in %

Years


Rural
Urban

Graph No. 2.1
Table No. 2.6

Talukawise population in Ahamadnagar district – 2011

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Taluka</th>
<th>Rural / Urban / Total</th>
<th>Total Population</th>
<th>Total Male Population</th>
<th>Total Female Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Akole</td>
<td>Total</td>
<td>291950</td>
<td>147880</td>
<td>144070</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>281904</td>
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<td>142682</td>
<td>139242</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>10046</td>
<td></td>
<td>5238</td>
<td>4808</td>
</tr>
<tr>
<td>2</td>
<td>Kopargaon</td>
<td>Total</td>
<td>302452</td>
<td>155738</td>
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</tr>
<tr>
<td></td>
<td>Rural</td>
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<td>122516</td>
<td>114663</td>
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<td></td>
<td>33222</td>
<td>32051</td>
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<td>3</td>
<td>Rahuri</td>
<td>Total</td>
<td>322823</td>
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<tr>
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<td>130828</td>
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<tr>
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<td>Urban</td>
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<td></td>
<td>36124</td>
<td>33686</td>
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<tr>
<td>4</td>
<td>Karjat</td>
<td>Total</td>
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</tr>
<tr>
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<td>Urban</td>
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<td>Jamkhed</td>
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</tr>
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<td>34017</td>
<td></td>
<td>17397</td>
<td>16620</td>
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<td>6</td>
<td>Shrigonda</td>
<td>Total</td>
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<td></td>
<td>16048</td>
<td>15086</td>
</tr>
<tr>
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<td>Samgamner</td>
<td>Total</td>
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<td>251096</td>
<td>236843</td>
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<td>Urban</td>
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<td>9</td>
<td>Shrirampur</td>
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<td>140990</td>
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<td>354297</td>
<td>329747</td>
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</tr>
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Source: District sense handbook of Ahamadnagar district 2012
Talukawise Population of Ahamadnagar District - 2011

Graph No. 2.2
The total population of Ahemadnagar district is 4543169. Out of them, 3630542 population is rural and 912617 population is urban. The total male population is 2342825 and the total female population is 2200334. The total male urban population is 469918 and the total female urban population is 442699. The total rural male population is 1872907, whereas the total rural female population is 1757635 according to the 2011 census.

The highest populated tahsil is Ahamadnagar and the lowest populated tahsil is Jamkhed, total literacy of the district is 75.30%. Out of them 84.68% is in urban and rural is 72.92%. The male literacy is 85.70% and female literacy is 64.35%.

2.12 Livestock

Livestock constitutes one more important aspect of cattle market. Without livestock market can not be conceived. The entire field operation from ploughing to the harvesting of crops is carried out by the draught animals mainly bullocks, and male and female buffaloes. They are keystone in farming. In addition to crops, draught and milk stock are raised and maintained by the individual farmer. All the agricultural operations are based on them and they are the chief source of power and manure.

According to 2007 cattle census, the total livestock is 2891 thousand out of them cattle is 1383 thousand, buffaloes are 241 thousand and sheep and goats are 1251 thousand, remaining are other livestock.

Classification of Livestock

The data regarding the livestock of Ahemadnagar district is derived from the unique hihal livestock and agricultural census which is arranged for every five years. According to this census livestock is classified into
five broad classes i.e. bovines sheep, goats, other animals and poultry. Bovines includes cattles of various uses as male for breading and working and females for milk. However, the present classification of livestock is grouped into five categories i.e. total cattle buffaloes, sheep, goats and other livestock. The hightest livestock observed in Akole tahsil and the lowest livestock is recorded in Karjat and Shrigonda tahsil during the period of investigation.

2.13 Transportation

Ahemadnagar district has good network at roads. But in the plateau and hilly area of west Ahemadnagar district, the road transport is rarely seen. During rainy season due to kaccha roads the interior area does not get service by roads. Regarding railway, there is single broadgauge railway line linking Pune to Manmad and Delhi. The total length of railway line in the district is 197 kms, still the district requires adequate transport facilities mainly linkage of railways for the development of cattle markets. The adequate transport facilities limit the market development of the region of the district. There is an urgent need for constructing all weather roads with bridges for connecting market centres. The length of National highway in the district is 202 kms. State highway is 1661 kms. The district road is 2727 kms other district road is 3346 kms, and village road is 4941 kms. There are 1146 villages are linked by roads and 330 villages are linked seasonal roads.

Each tahsil have a bus-stand. There main national highway goes to Agra. There is a railway stations in Ahemadnagar district. Thus the means of transport and communication of the district are good. However, there is a need to convert some of the district roads into state highways and the state highways to national highways.
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