Chapter II
Physical Profile of The Study Region

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2.1 Introduction: -

In the first chapter meaning and importance of agriculture, importance of farming development of farming, meaning of Agriculture characteristics, Main objectives of the study, Methodology database, scope Agriculture in national economy Agricultural development in India, Maharashtra and Marathwada, Study area, choice of region and topic, Review of literature and chapter scheme have been discussed.

2.2 Location & boundaries: -

The district is located in the central part of Maharashtra state in Marathwada region. It is located between 19°-15' to 20°-32' North latitudes and 75°-36' to 76°-45' East longitudes. The north – south extension of Jalna district is 150 kms and east – west stretch of the district is 110 kms. The shape of Jalna district is just like crescent. It is bounded on north by Jalgaon district on the east by Buldhana and Parbhani district on the south by Beed district and on the west by Aurangabad district. (Map-2.1)

Geographical area of this district as per the 2001 census is 7612.40 sq. km and proportion as compared with Maharashtra State is about 2.477 % Out of the total geographical area 7577.90 sq. km. (99.53%) in rural and 34.5 sq. km. (0.45%) in urban. According to 2001 census there were 970 villages in Jalna district. There are 779 Grampanchayat and Eight panchayat samities in Jalna district in 2001 total population was 16.12 lakh out of the total population nearly 51.24 % were male population and 48.76% population were female population in the study region. The district ranks 21st and 5th in the state and Marathwada respectively. In terms of area as per 2001 census, similarly the district ranks 26th in the state in terms of population.

The area included in the district in for the administrative purpose distributed over the two subdivisions. Jalna, Badnapur, Bhokardan, Jafarbad tahasil are included in administrative subdivision of Jalna. While Partur, Ambad, Ghansawangi and Mantha tahasil are included in the administrative division of Partur. At present Jalna, Badnapur, Bhokardan, Jafarbad, Partur, Ambad,
Location and Boundaries in Jalna District.

Map No. 2.1
Ghansawangi and Mantha tahasil are included in study area. The Jalna city is situated on the banks of Kundalika river (at latitude 19°-50'-42" North and longitude 75°-56'-15" East) is the premier commercial center of the Marathwada region. Jafrabad the head Quarters of the tahasil of the same name is situated as the confluence of the khelna and Purna rivers in the latitudes 20°-11'-35" North and longitude 76°-3'-35" East. Ambad situated between a ridge of hills in 19°-35'-15" North latitude and 75°-50'-17" East longitude is the head quarters of the tahasil of the same name. Bhokardan is the principal town of the tahasil of the same name settled along the right bank of the khelna river a tributary of the Purna is situated between latitude 20°-16' North and longitude 75°-46'-56" East.

2.3 **Historical Background :-**

There was long standing demand a 300 years old dream for creation Jalna as on independent district in the Marathwada which was fulfilled recently in the year 1981. A meeting of the state cabinet was held at Aurangabad 23rd and 24th January 1981 and it was decide that on the auspicious day of 1st May 1981. The Maharashtra day Jalna would be one more district in the state of Maharashtra and in the Aurangabad region. It was the 27th district as Maharashtra and the 6th district of Aurangabad region created on 1st may 1981. In newly formed district Jalna five tahasil are included, four tahasil viz. Jalna, Ambad, Jafrabad and Bhokardan were carved out from Aurangabad district on its bifurcation and included in new district. While tahasil of Partur was carved out from Parbhani district and included in it.

The city Jalna and the headquarter of newly formed Jalna district is situated on the confluence of Kundalika and Sina rivers. It was known as Hirwali in the ancient days. There are difference regions on how the city got the name Jalna. Swami Chakradhara who founded Mahanubhav Pantha and his residence as this place for some times. In the Lilacharitra of Mahanubhav there is a mention of this place as “Hirwali” till the end of Yadav rule in 1300 A.D. The place was known as “Hirwali”. According “Haquiquat nama” “Jalarai” was the chief ruler of the Hirwali. Even though the lost of battle fought against him Hirwali was named as Jalna after him. It was a tiny village around the temple Mumbadevi.
Tradition ascribes the foundation of the town as for back as the time of Rama, the hero of Ramayana whose consort Sita is supposed to have resided here. The local people still point out the place where Rama's place stood. It was then known as Janakpur subsequently at the desire of the wealthy Muhammadan Marchant who is said to have been a great benefactor of the place. The name was change to Jalna from his occupation of Jahana or weaver.³

2.4 Territorial Change :-

District Jalna was formed on 1st may 1981. In the newly formed district Jalna five tahasils are included. Four tahasils viz. Jalna, Ambad, Jafrabad and Bhokardan were carved out from Aurangabad district on its bifurcation and included in new district while tahasil of Partur was carved out from Parbhani district and included in it. The boundaries of all the tahasils in the newly formed district were concurrees and coinciding with the boundaries of previous tahasils of the former district from which they were carved out except that the fourteen villages of Bhokardan tahasil were excluded from the former tahasil of carved out. Thus the newly formed tahasil of Bhokardan is exclusive of fourteen villages viz. Wakad, Anad, Ghanegaon, Hivri, Murthi, Handa, Malkheda, Palaskheda, Sawart, Jitvi, Sawalabara, Dhabha, Pimpalwadi, Mahalbadha and Devhani. These villages were included in Soyagaon tahasil of Aurangabad district at the time of Jalna district on 30th April 1984 two villages of Bhokardan were included Soyagaon tahasil of Aurangabad district. In August 1992 three tahasil of Jalna district were restructed. Jalna tahasil was divided in to two seperate tahasil as Jalna and Badnapur, Ambad tahasil divided in to two tahasil as Ambad and Ghansawangi and Partur tahasil divided in to two tahasil as Partur and Mantha tahasil. Formerly there were five tahasils and at present there are eight tahasils in Jalna district.

2.5 Physiography: -

Physiography is one of the parameter of physical environment and its impact on patterns and density of agriculture is immense.⁴ The study of the
influence of environment upon the nature and distribution of crops and livestock is of prime importance in agricultural geography. Nature with its physical characteristics provides a host of possibilities for agriculture and agro-based industries different areas. The district may be broadly divided into the following physiographic regions (Map 2.2)

a) River basin.

b) The northern piedmont slopes.

c) The Ajanta plateau.

A) River basin:- The first region forming the basin of the Godavari river comprises the relatively low-lying area to the west and South of the Ajanta plateau. The river Godavari and its tributaries have formed this basin. Thus river basin is found in southern part of Ambad and Partur tahasil. River Dudhana and its tributaries have formed river basin in Jalna and Partur tahasil while river Purna and its tributaries have formed river basin in Bhokardan, Mantha and Jafrabad tahasil.

B) The northern piedmont slopes:- The region sloping away northwards from the Ajanta satmala ranges stretches from the environs of Nagad in the northern east of Kannad. (Aurangabad district) In the west through the whole of Soygaon tahasil to a small portion of Bhokardan tahasil which formed a saliens extending north westwards between Jalgaon and Buldhana district on the piedmont slopes the soil is mostly poor.

The main range of Jalna hill with branches of from the satmala range runs west-east for a length of 100 kms. There are not leading peaks in this range. The small peaks includes the wills of Jalna, Partur and Ambad having narrow ridges with flat tops that stretch eastward and gradually sink into the plain. The slope of the land towards south and the average elevation above sea level is found as 534 meters
Physiography In Jalna District

Index
Height in Mtr.

- 150 to 400
- 450 to 600
- 600 to 900

Map 2.2
Ajanta plateau: - The western edge of the Ajanta plateau flaking the Shivana basin and contacting the Elloracoves (Verul) may be considered as forming the Ellora range branching of southwards from the main Ajanta range just to the east of the satmalla hill. The Ajanta plateau region is found in Bhokardan and Jafrabad tahasils. Considering Ajanta plateau as a whole the soils generally increase in depth and fertility eastwards and accordingly the proportion of the cropped area under Jowar increased while the bajara decrease.

2.6 Geology: - No systematic geological work has been carried out in the study area. The information presented here is based on the short dealing with ground water and local geology. The district is monotonously covered by the basaltic lava flow called Deccan Trap. The lava flows are called trap because of the step like or terraced of their out - crops. The term being of Scandinavian origin. The lava flows are indicative of a great volcanic activity. The geological sequence in the district is as fallows

Alluvium .......... Recent to sub recent
Deccan Trap .......... Cretaceo - Ecocene

Deccan Trap – The lava flows consist of massive and vesicular flows for the purpose convenience these two can be further divided in to the following.

- Massive trap-hard with the without amygdules prophyritic or non porphyritic soft, with or without amygdules porphyritic or non-porphyritic. The porphyritic texture of a flow is exhibited by the presence of phenocrysts commonly of feldspar and rarely of pyroxene set in a dense ground moss. The phenocrystes of feldspar are path shaped and usually have serrate outline where as the phenocrysts of pyroxenes are some what acicular and have smooth outline. The phenocrysts of felspar usually measure about 10mm and that of pyroxenes about 2mm in length.

- The massive basalt in the dark gray to black rock having very fine to medium grained texture. It is hard and compact. The sculptors have very carefully avoided the massive trap flows while carving the caves at Ellora and Ajanta.⁵
2.7 Drainage:- Drainage is the comprehensive expression in geography. It included surface as well as underground water flow. It is the result as a combination of numerous factors including climate particularly, precipitation, insulation, humidity, cloudiness, wind force and direction structure and type of rocks, vegetation, soil and human utilization, human obstruction to natural water flow such as roads railways, dams and reservoirs also change its nature. However drainage is one of the most important components of physical environmental which affect agriculture directly and indirectly. Ground water influents becomes the base flow that maintains the flow of streams in fair weather when we speak of surface water we mean stream flow regardless of its source. Therefore surface water is by for the most important means for providing substantial irrigation which stabilizes and improves agro-economic life in an area that has other wise plenty of land potential. Because of uncertainty in the flow of source water it is probable that any attempt to improve agricultural techniques and landuse planning without combating the problem with the help of shallow and deep water table is found to be absorptive map 2.3 indicates that Jalna district has dendritic drainage pattern.

1. Godavari: - The Godavari forms nearly the entire southern boundary of the district for about the 100 kms. and separate the districts from Beed district. It flows through Ambad tahasil. Its principal tributaries are Dudhan and Galhati flow from the central part of the district

2. Dudhana:- The largest tributary of the Purna is the Dudhana which is nearly as long as the main river up to the confluence point. The Dudhana rivers rises above the Kankar village on the northern slopes of the easterly trending of shoot of the Ellora range forming the divided between this stream and the Sukna and flows some 15 kilometers to the north of Aurangabad city. This rivers flows through Partur, Jalna and Ambad tahasils for a distance of about 126 kilometers, after and initial irregular winding course it turns and flows in the south easterly direction as for as Akola. At Somthana above Akola the river is crossed by an eastern dam providing the storage for the upper Dudhana Project. After Akola it flows more southerly passing Badnapur and is joined by the Sukana at
Sadesawangi. The Dudhana has a further long course in Parbhani district before it joins Purna.

3. **Purna:** The Purna river rises in the Ajanta range about 8 km northeast of the Stamala hill above Mehur village (Aurangabad District) at the highest of about 775 meters and has the longest course of any river with in the district. It flows through Bhokardan and Jafrabad tahasils for a distance 93 kilometers.

4. **Musa:** The Musa river rises east of the Ambad hill and flows southwards for a distance of about 17 kilometers towards the Godavari and join at Jogaladevi.

5. **Girija:** The Girija is the longest tributary of the Purna in the district on the right bank. This river rises on the eastern slopes of the Ellora range to the west of Takali. It flows through Bhokardan tahasils for a distance of about 23 kilometers.

6. **Galhati:** The Galhati rises in the satmala range and flows by Pachod Burung in a southeasterly direction to join the Godavari at Chincholi. The eastern dam of the Galhati project is build across this river downstream of Baraswadi village. It flows through Ambad tahasil for a distance of about 34 kilometers.

7. **Khelna:** The head stream of the khelna lie with in a short distance (less than a km) of those of the charna in the Ajanta range. This river flows through Bhokardan and Jafrabad tahasils for a distance of about 41 kilometers.

8. **Dhamna:** The Dhamna rivers in the Laguna hill in the Ajanta range and flows nearly southwards past Vadhona, Dhamangaon and is joined by the Raighaol at Takali after which it flows in a southeasterly direction containing the trend of this tributary. From a point about a kilometer and half upstream of Dhamangaon to a point about 3 kilometer downstream of Takali. The river forms the district boundary beyond which it flows the outside the district. It flows through Bhokardan and Jafrabad tahasil for a distance of about 50 kilometers.

9. **Kundalika:** The kundalika river rises further east from Dudhna – Girija divide but well back on the north indicating a retract of the divide here. After an initial course in a south-westerly direction up to Ganewadi it change into a south-easterly course passing through Jalna town. Kundalika river flows through Jalna tahasil for a distance of about 50 kilometers. Dam was constructed near Ghanewadi which provides water to Jalna city.
Drainage Pattern In Jalna District
10. **Sukna:** The sukna rises to the west of the course of Lahuki above the Kolthan village and has an initial course parallel to the Rauri river. Sukna flows through Jafrabad Jalna tahasil.

11. **Jui:** The Jui an important tributary of Khelna rises above Undangaon and after passing by that village has a fairly long southerly and southeasterly course and joins the Khelna gone 5 kilometers below Assay. It flows through Bhokardan tahasil for a distance of 30 kilometers Jui project is constructed on Jui River.

12. **Lahuki:** The Lahuki river is a small stream rising near the source of the Dudhna on the southern slopes of the divide separating the two and flows the southeast wards past the Dudhna and Roshangaon to join in the Dudhana a little north of the Sukna. Confluence with the latter. It flows through Jalna district tahasil for a distance of about 20 kilometers.

13. **Jivrekha:** The Jivreka is the right bank tributary of the Purna. Rising above Zongaon. It flows at first in a northeasterly course as far as Akola. After Akola it turns and flows in more northerly course passing by Tembhurni and joins the Purna a little upstream of the Khelna confluence. The eastern dam forming the head works of the Jivrekha project is located about a kilometer and half above Akola.

14. **Kalyani:** The Kalyani river rises on the same divide further eastward above Walud village and flow southward up to Pirkalyan where it turns to flow southeastwards. Two left bank tributaries the Gandhi and Girija join this river. This river flows through Jalna district for distance of about 32 kilometers. Most of the rivers of Jalna district become dry in summer season. Even they are dry in winter season also. Government should have construct Kolhapur type bandharas over this river so that plenty of water will be available to the agriculture.

2.8 **Climate:**

In a large measure climate determines where man may live and thrive, what crops he may rise? What type of home he may appropriately build? What sorts of clothing he may wear? and what pests and diseases he must combat? The
potential crop producing capability of a given area is dependent mainly on the existing climate and soil condition. Since climatic factors exert mainly a regional influence of plant life, the difference in the behavior on a crop or a group of crops over extensive area as in a given state or a group of states may be considered as due primarily to difference in climate rather than soil conditions.9

It is obvious that climate dictates the range of crops which a country can economically produce. This is turn set the range of commodities which that country must important is it wishes its people to live a full life in the modern sense.10

It is obvious that climatic dictates the range of crops, which a country be economically produce. The success or failure of the cropping seasons 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 and they may metered as primary determinant of crop growth.11 climate plays an important role in affecting the characteristics of agricultural economy in a region. It can influence the choice of farming system either indirectly through its impact on soil formation or directly through such as the length of the growing season the occurrence of frost and the availability of water for crop growth.12

The climate of the study region is generally dry except rainy season. The climate of Jalna district is pleasant during the greater part of the year. The climate year may be divided in to four short seasons. The cold season from December to February is followed by the hot season from March to May. The period from June to September constitutes the southwest monsoon season. October to November forms the post monsoon season.

I. Temperature:

Temperature conditions have been far less erratic from year to year than rainfall conditions in each agricultural region. However, great annual ranges may be highly significant in different zones giving rise two or more cropping season. For this reason especially in Jalna district different crops raised in different season.

Without suitable temperature conditions germination of seeds and growth of plants are retarded. Temperature regulates all the chemical and physical processes
of plants metabolism. The metabolic processes begin at a certain minimum temperature and increase with rise of temperature until they reach maximum at a temperature called the optimum. Further with rise in temperature above the level the metabolic activity slowed down until it ceases at a temperature called the maximum. Each species has its own minimum and maximum beyond, which its life activity causes.\textsuperscript{13}

Each crop plant needs a certain number of effective heat units for germination, growth stalking, maturely and ripening this is called the thermal constant and various from crop to crop. Temperature above the minimum is there fore effective in furthering the growth of a plant towards maturity and ripening. The crucial air temperature is $6^\circ \text{c}$ (Schemer 1903) at and above which plants growth.\textsuperscript{14}

It is also known as the crucial limit. Ideal temperature conditions for crop production are between $18.3^\circ \text{c}$ and $23.9^\circ \text{c}$. For the agricultural geographical two of the best indicators of regional differences in temperature correctly available or derived are (I) length of the growing season and (II) accumulated temperature above the maximum for plant growth.\textsuperscript{15}

There is no metrological observatory in the district but it is located at Chikalthana and the records of this observatory may be taken as representative of the meteorologically conditions prevailing in the district in general. Cold weather commences by about the end of November. When temperature began to fall rapidly. December is the coldest month of the year with the mean daily maximum temperature at $28.72^\circ \text{c}$. and the mean daily minimum at temperature $13^\circ \text{c}$ in the cold season the district is sometimes.

Affected by the cold waves in association with the eastward passage of western disturbances across north India, when the minimum temperature made drop down to about $2^\circ \text{c}$ to $4^\circ \text{c}$ from the beginning of the month of March there is a rapid rise in the both day and night temperatures. May is the hottest month of the year with mean daily maximum temperature $39.8^\circ \text{c}$ and mean daily minimum temperature $24.4^\circ \text{c}$ during the hot season the heat is often intense and the dry
temperature on individual days may rise about 45°C. There is relief from the heat
on some days when thunder showers occur during the afternoon.

With the advance of the southwest monsoon into the district by the second
week of June there is an appreciable drop in both the day and night temperatures
and the weather is pleasant. With the withdrawal of monsoon by about the end of
September the day temperature increase a little and a secondary maximum in day
temperature is recorded in October but night temperature decrease progressively
after the withdrawal of the monsoon. After October both day and night
temperatures steadily decrease.

II) Rainfall: -

Rainfall as the primary ecological parameter has created a variety of
farming enterprises, types or system in the world. It is the single dominant weather
elements influencing the intensity and location of farming system and farmers
choice of enterprises. It also becomes a climate hazard to farming when it is
characterized with scantiness, concentration intensity. Variability and unreliability.
It is all the more important in the minimal regions where average or normal rainfall
is generally necessary for successful crop production. In such area the system of
crops production must be correlated less to the moisture factor.¹⁶

Above more than 84 percent of annual rainfall on the study is received
during the southwest monsoon season the rainless month being July. July gets the
heaviest rainfall from southwest monsoon winds. The southwest monsoon is the
pivot around which almost the entire farm life and economy.

Swings rainfall has control and for this reason is a seasonal rhythm of
conditions influencing the patterns of land use.¹⁷

The record of the rainfall in the district is available for the period ranging
from 1980 to 2005. The details of the mean annual rainfall and rainfall co-efficient
of variation is given in table No. 2.1
Table No. 2.1
Mean Annual Rainfall and Co-Efficient of Rainfall Variability In Jalna District 1980 To 2005

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the tahasil</th>
<th>Mean annual rainfall in m.m.</th>
<th>Co-efficient of Variability in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jalna</td>
<td>713.65</td>
<td>22.27</td>
</tr>
<tr>
<td>2</td>
<td>Ambad</td>
<td>676.98</td>
<td>25.14</td>
</tr>
<tr>
<td>3</td>
<td>Bhokardan</td>
<td>618.77</td>
<td>27.13</td>
</tr>
<tr>
<td>4</td>
<td>Jafrabad</td>
<td>667.18</td>
<td>23.12</td>
</tr>
<tr>
<td>5</td>
<td>Partur</td>
<td>691.38</td>
<td>29.24</td>
</tr>
<tr>
<td>6</td>
<td>Jalna district</td>
<td>674.19</td>
<td>19.55</td>
</tr>
</tbody>
</table>

Source:– Computed by the Author.

The mean annual rainfall in the region varies from 619 mm to 713.65 mm generally rainfall decreases from central part of the district towards north side and it increase to the southern side.

The co-efficient of rainfall variability is calculated by the following formula.

\[
\text{Co-efficient of rainfall variability} = \frac{S}{\bar{X}} \times 100
\]

Where \( S \) = The standard deviation

\( \bar{X} \) = The mean of the rainfall during 25 years.

It will be seen from table 2.1 that co-efficient of rainfall variability ranges from 22.27 % to 29.24 % in study region. It was highest in Partur tahasil where as lowest variability was found in Jalna tahasil during the period of investigation.

Map 2.4 indicates that Jalna and Jafrabad comes under jurisdiction of below 25 % variability where as about 25 % variability was found in Partur Bhokardan and Ambad tahasil.
Co-efficient of Rianfall Variability In Jalna District
1980-81 to 2004-05

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- Above 25%
- Below 25%

Map 2.4
Map 2.5 Gives the idea about agro climate zone of the Jalna district. There are two agro climate zones in Jalna district Bhokardan Jafrabad Jalna and Partur tahasil comes under assured rainfall zone. Where as scarcity zone is found in Ambad tahasil. The southwest monsoon during June to September influence the agronomy of the district to a very great extent. It also affects the agricultural operations, cultivable practices and the system of crop rotation. The rainfall during the northeast monsoon that is October to November through scanty is very useful for the rabbi crops. Sometimes showers in the first quarter of the year have also beneficial effects on the growth of rabbi crops and summer crops.

III) Other Weather Phenomena: -

(a) Humidity: -

Except during the southwest monsoon season when the relative humidity are high and the air is generally dry over the entire study region. The summer monsoons are the driest when the relative humidity are generally between 20 % to 25 % in the afternoons.

(b) Cloudiness: -

During the southwest monsoon the skies are generally heavily clouded or overcast. In the rest of the year the skies are mostly clear.

(c) Winds: -

Winds are generally light to moderate with increase in speed during the latter half of the hot season and in the monsoon season. The wind blows predominately from direction west and north during the hot season. They are mostly from directions between southwest and northwest during the southwest monsoon season. They blow mostly from the direction between northeast and southeast during the rest of year.

IV) Special Weather Phenomena:

Thunderstorms occur in all months of the year. They occur more frequently during April to June and from September to October. Dust storm occurs sometimes during summer afternoon in the study region.
2.9 Soil Types:

Unlike climate, soil should not be regarded as part of the natural endowment of an area. In fact it is agriculture that modified soils excepting 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 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 predominantly depends on agricultural, is often determined by the combination of physical, chemical and biological characteristics of the soil and crops and livestock raised in them. Thus soils endowed with a proper combination of texture, structure, salts and humus yield good results. Great civilizations have almost invariably flourished on good soils the alluvium in particular soils provide essential material on which agriculture is based and there fore any comprehensive survey of the geography of agricultural should include fairly through treatment of soils. Even at the beginning of his work on political geography Ratzel made a statement of great significance and in sight "Jeder Staalist ein Stuck Menschheit" (every nation is a bit of soil and humanity) (Quoted by Klages 1958). There fore no students of civilization can afford to forget even for an instant the crucial importance of soils. These are the source of practically the entire stock of the man's food, clothing and we even increasing list of other needs. So much so that man gets nearly all of his food from the soils less that one percent of what he eats being fish of the long list of natures gift to man productive soils and water are the most basic to human life the topor upper layer of soils has an average thickness of between 15 and 20 cm depending upon local conditions.

The main factor that has influenced the development of soil in Jalna district is the conducting and hilly topography. Different types of soil are found in the study region. Deep black soils (more than 36" depth) cover about 10.62 % portion of the Jalna district, while medium black soil (between 9" to 36" depth) covers 59.79 % portion of the study area. About 29.66 % portion of the district is covered by course and shallow (below 9" depth) soil. The soil of Jalna district is black cotton. Soil is derived from the trap volcanic rock and is rich in plant food. It is
soil of regur formed by the weathering of the trap rock. The soil varies consider apply in texture and depth and can be classified as light medium and heavy soil formed as a result of their location. The soil along the river basins are deep, black and very fertile.

The geological formation of the soil can be stated as 1) Middle traps of Deccan territory 2) older alluvial deposits of Godavari 3) Modern alluvial deposits of Godavari and other rivers forming upper layer. The plant nutrients such as lime Magnesia’s iron and alkalis are available in black soil on which dry crops such as cotton flourish well. It swells and becomes sticky on watering while develops cracks on drying. The black soil is found in Ambad and Partur tahasil are very shallow where as coarse soil are observed in Jalna, Bhokardan and some parts of Partur and Ambad tahasils. Since the black soil retains moisture for pretty long time, crops such as cotton, sugarcane, Jowar, Bajara, Pulses etc. are grown in comparatively medium shallow black soils and coarse soil. The soils of the study area are more suitable for the agriculture developments. (Map-2.6)

2.10 Natural Vegetation: -

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 through it may be scanty and inconspicuous. Natural vegetation is important from the view point of rainfall distribution and the fertility of the soil. It also checks the soil resources to the greater extend. It also keeps the environmental balance forest provides wood for making farm implements.

Jalna district has limited area under forest the forests are scattered all over the district in small patches. They fall in the southern dry deciduous forest type. These forest has thorny shrubs with barren and rocky patches scattered all over. On the whole the forests in the district are of an interior type. Sandalwood is found in valleys at foothills in Bhokardan and Jalna tahasils. Wood obtained from the forest is mostly used for making coal and agricultural implements. Other forest produces includes Karanj, Bhagwat, Bhilwan, Tarwed and Honey etc.
Table No. 2.2
Tahasil wise change in forest area in Jalna district

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the tahasil</th>
<th>1980-85</th>
<th>2000-2005</th>
<th>Volume of change in %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area under forest in “00” hect.</td>
<td>Area under forest in %</td>
<td>Area under forest in “00” hect.</td>
<td>Area under forest in %</td>
</tr>
<tr>
<td>1</td>
<td>Jalna</td>
<td>19</td>
<td>0.99</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>Ambad</td>
<td>06</td>
<td>0.26</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>Bhokardan</td>
<td>19</td>
<td>1.50</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>Jafribad</td>
<td>02</td>
<td>0.27</td>
<td>02</td>
</tr>
<tr>
<td>5</td>
<td>Partur</td>
<td>02</td>
<td>0.13</td>
<td>02</td>
</tr>
<tr>
<td>6</td>
<td>Jalna District.</td>
<td>48</td>
<td>0.62</td>
<td>57</td>
</tr>
</tbody>
</table>

Source: - Computed by the Author

The review of changes in forest area in Jalna district during the period for 1980-85 and 2000-2005 is briefly presented in table no. 2.2. The quinquennial average area under forest and their relative share of each tahasils in the total geographical area has been developed for the study of distribution of forest area.

Table 2.2 indicates that out of the total geographical area below 0.60 % geographical area was found under forest in Ambad, Jafribad and Partur tahasils while above 0.60% area was found under forest in Jalna and Bhokardan during 2000-2005 (Map 2.7A).

Zero percent change was observed in forest in Partur and Jafribad due to decrease in rainfall below 0.2 % negative change in forest area was noticed in Bhokardan on the other hand below 0.4% positive change in forest area was noticed in Jalna and Ambad due to decrease in forest area rate of rainfall is decreased in entire study region. Livestock is also decreased to a certain extend in the study area. (Map 2.7 B)
2.11 Agricultural System In The District: -

Farming is the main economic activity of the people living in the district. The production of crops is mainly dependant on the soil types. A climatic condition, the economic condition of a farmer and the system of farming etc. The district leads in the dairy production of the Marathawada region. It has the best feeding of cattle in the region which is know as Deohi breed it is recognized as its home brand. The cattle are reared by cultivation or by the Gavalis or by the herders who go to the fodder areas or the forest areas in the district with cattle. The good quality of gross or fodder is available mainly in rainy season and in winter months. There is a shortage of fodder in summer. Its prices go high in this season and the number of people sale their cattle in the market due to shortage of fodder or due to high rates of fodder or and land of water supply.

"Agricultural crops are influenced by varicose factor such as ecological, technological and institutional." (1966)\textsuperscript{22} the ecological factors determine the broad pattern of agricultural landuse. But these technological and institution factors determine the actual use of land.

The technological and institutional factors have brought drastic shifts in the cropping practices. There are a number of crops which are useful as the food of cattle in the district in kharif period hybrid jowar, bajara, tur, mung, udad, til, cotton, groundnut are produced where as in the rabbi period jowar, wheat, pulses, chilli are cultivated. sugarcane and bananas are crops which are cultivated throughout the year. In the irrigated areas groundnuts and sunflower are grown-vegetables and fruits are grown in the irrigated areas or in the areas of a plenty of required water of the district. In the northern part of district mostly kharif and rabbi crops are produced. Thus there is the cultivated area of food crops like jowar wheat, bajara and that of non food crops like cotton sugarcane etc. jowar especially Shalu jowar is cultivated in Jalna, Ambad, Badnapur, Partur, and Ghansawangi talukas. Bajara is produced mainly in Jafabad and Bhokardan. The cotton is mainly produced in the talukas of all in district cotton is major cash crops in the district, the farmer pay attention to agriculture sowing hybrid seeds, manure and chemical fertilizers. They also follow government policy towards the development of agriculture.
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