Chapter – II

Geographical Setting of the Study Region

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Chapter – II
Geographical Setting of the Study Region

2.1 INTRODUCTION

In the first chapter meaning of marketing geography and market, significance of the study of marketing geography, need and role of marketing geography, choice of the topic and region, aims and objectives, database and methodology, hypothesis, review of literature and chapter scheme have been discussed.

This chapter throws light on location, boundaries and area, historical background, territorial changes, physiography, geology, drainage, climate, soil types and natural vegetation in the Buldhana district.

2.2 LOCATION, BOUNDARIES & AREA:

Buldhana is a district in the Amravati division of Maharashtra state. The district is 500 km away from the state capital, Mumbai. Buldhana district is situated in the central part of the Maharashtra State. Akola, Jalgaon, Jalna, and Parbhani districts are the adjoining districts to the East, West, and South respectively. The Nemad district of Madhya Pradesh is in the North direction. The district lies between 19°51′ to 21°17′ North Latitude and 75°57′ to 76°49′ East Longitude. The district has five subdivisions and thirteen tahsils. Total area of the district is 9670 sq.km. The Buldhana city is the district head quarters. The distances of the other major cities in Maharashtra State from Buldhana is Aurangabad -180 KM, Mumbai -500 KM, Pune -425 KM, Amravati-200 KM, and Nagpur -350 KM. (Map 2.1)
2.3 HISTORICAL BACKGROUND:

Buldhana district like other parts of Vidarbha was included in the empire of Ashoka. From ‘Satvahana’ family Satakarni ruled the whole of the Deccan and passed his arms to the north of the Narmada. About A.D. 250, the Satvahanas were succeeded by Vakatakas in Vidarbha from Vakataka family. The Vatsagulma branch was established by Sarvasena, who was the younger son of Pravasasena. The Buldhana district was evidently incorporated in its dominion as its capital was at Vatsagulma, now the Washim. Harishena was the last known Vakataka ruler.

After the defeat of the Vakatakas in the beginning of the 6th century A.D. Vidarbha was occupied for some time by the Vishnukundin king Madhavavarman. The Vishnukundins were however soon expelled from Vidarbha by Kalachuri king Krishna Raja. He rose to power about A.D. 500. Buldharaja was the last known king of in the family of Kalachruri.

In the last quarter of the 12th century A.D., the Yadavas of Devagiri come into prominence. The founder of this family was Dridhapara-hara. Another Yadava king, Kholeshvara constructed many temples in Vidarbha including that of Sharangdhara at Mehkar. During Yadavas rule, a peculiar style of architecture called Hemadpanti was developed in Buldhana district. They are noticed at thirty places such as Amdapur, Chikhli, Deulghat, Brahmapuri, Satgaon, Saykheda, Sindkhedraja and other places in the district. The temple of Daintyasudana located at Lonar is the best example of Hemadpanti Style architect. In Yadavas court, a learned man, Hemadri, who held the post of head of secretariat annexed to the kingdom of Yadava.

In the year of 1294, Alaudin, nephew of Jalaluddin Khilji take incharge of Deccan. In 1312, Kafur, now entitled Malik Naib defeated
and slave Shankar and seized his kingdom. Thus Buldhana district come for the first time directly under Mohomoddin administration. But the king, Harpla, the son-in-law of Ramchandra seized Devagiri and ruled it for a short time as an independent king.

In 1316, Kutub-Ud-Din Mubarak Shah, who was then on the throne attacked Harpal. Thus, the Buldhana passed again with the rest of Berar into the hands of Muslims until it was assigned under the treaty of 1853 to the British East India Company. The first governor of Berar under the Bahamanis was a Persian Sardar Khan Sistani. Buldhana suffered from the terrible two years of famine in the year of 1473 and 1474. Murtaza Nizam Shah was appointed as incharge of Ahmednagar and Berar.

Chand Bibi soon claimed her supremacy over Ahmednagar and Buldhana district was included into Ahmednagar empire and it was under Berar. Though it was under Mughals, but it administrated by the Nizam Shahi and Imad Shahi kings and Bahamanis. The present district of Buldhana consists a large part of Akbar’s Sarkar of Narnala, Baitalwadi and the greater part of the Sarkar Mehkar.

The Bhosle's in Berar, Kanhoji the son of Parsoji Bhosle established firmly the Maratha power in Berar and laid the foundations of its future in the Orissa. After Kanhoji, Raghoji take charge of Berar. In the year 1775, Alijan, son of Nizam Ali was appointed as Subhedar of Berar. In 1803, British defeated Shinde and Bhosle, and then they made a Devgaon deal. At that time the circumstances were decisive. Sindkhed was known as 'Nest of Thieves.' There also 'Naik' community who rob house by house and Pendhari were injurious to society. So the revenue farmer succeeded over Pendhari.
The history of Berar since 1853 was distinct by number of important political events besides the changes made under the treaty. Its smooth course was scarcely ruffled even by the struggle of 1857. After the muting, the province was reconstituted into East Berar with headquarter of Amravati and west Berar with Headquarter at Akola, now the Akola city.

In 1864, Malkapur, Chikhli and Mehkar were separated from the west Berar district and formed into an independent charge style the south west Berar district. In 1867, Buldhana was selected as the headquarters of the district. There was a great demand of labour in Berar. At the same time, construction of railway works throughout the whole length of the province was at its full swing. Berar was now clamoring for the establishment of local self government in the region. Taking a bold altitude the Warhad Samachar expressed the popular feeling of it. The Municipal act of 1883 was extended to Berar in 1887 and district boards were established. Another important organization founded at this time was the Gorakshan Sabha in order to save the cattle wealth of the nation.

The younger generation of Berar had to great extent been educated in Pune and Bombay was greatly, who attracted towards Indian National Congress. During the viceroyalty of Lord Curzon, Berar was permanently ceded to the British government by the Nizam. By the decision of fort William that Berar had been administered by British under the treaties of 1853. In the National Movement, Berar Swarajya Party Played a vital role and decided that the time had come to adopt a policy of co-operation. Berar Hanuman Vyayam Mandal also played an important role in the freedom movement.
After independence, from the year 1947 to 1956, the Buldhana district along with the other districts of Vidarbha region continued to form part of the central province. After the movement of reorganization of state in 1956, Buldhana along with the other districts of Vidarbha was transferred to the bilingual State of Bombay. After that, bilingual State of Bombay was divided. Like this Maharashtra, as a separate state came into existence.

The Buldhana district has been evolved by grouping together parts of West Berar, East Berar and Washim District. The tahsil of Malkapur, Chikhli and Mehar were separated from the west Berar district in 1864 and were grouped to constitute a district clumsily named as the south west Berar district but later renamed as the Mehar district. Three years later in 1867, the administrative headquarter was shifted to Buldhana. The district once again renamed as 'Buldhana'. Khambon, a new tahsil was created in 1870 by separating some villages from Balapur tahsil of Akola district. The tahsil of Khambon and Jalgaon from the Akola district were added to the Buldhana district.

The district has made commendable progress in economic, social and education field after independence. The population of the district in 1901 was 6,17,990 which increased upto 25,88,039 in 2011. The population has mainly remained agricultural. The increase in number of persons employed in industry and allied occupations over a period of time is not the only indication of the industrial growth but the growing urbanization that has taken place during the last 30 years in the district.

Presently, Buldhana district comprises 5 divisions, 13 tahsils and 1300 villages. During the last 30 years or after independence the country witnessed vast change in the political and economic sector. Though local
problems never turned the minds of the people from wider problem of national importance, the people of the district responded magnanimously at the time of the Chinese and Pakistani invasions and showed the spirit of oneness that had permeated through them for generations. However horizons are wide the progress to be achieved is immeasurable and the obstacles are many but the people of district with glorious tradition of the past are well equipped to overcome these obstacles and to continue the march of success.

2.4 TERRITORIAL CHANGES:

The boundaries of Buldhana district has been changed many times. In 1480, as part of Berar taraf (province) of Bahamani Sultanate, Chikhli and Mehkar were part of Mahur division and Malkapur, Jalgaon, and Khamgaon were part of Gawil. During Akbar’s time (1542–1605), it was part of the Sarkars (administrative unit) of Narnala, Baitalwadi and Mehkar. In 1634 the area became known as Payanghat Subah (Lowlands Province) while Chikhli and Mehkar were part of Balaghat Subah (Highlands Province), but by 1636 Berar became part of a large province called Deccan.

In 1853, the district came into existence as North Berar district with Buldhana as headquarters. It along with South Berar district with Hingoli as its headquarters constituted Berar Province. North Berar district included the present Amravati district, the northern half of Akola, and Buldhana. After the Indian Rebellion of 1857, Hingoli, along with the neighboring countryside, was restored to the Nizam. Berar province was reconstituted into East Berar district with headquarters at Amravati, and West Berar district with headquarters at Akola. After 1857, Mehkar, Chikhli, and Malkapur were part of West Berar district. In
1864, these three talukas were made independent as South-West Berar district, which was later renamed Mehkar district in 1865. In 1867, Buldhana district came into existence, combining North Berar and Mehkar districts. In August 1905 Khamgaon and Jalgaon tahsils from Akola district of Central Provinces and Berar were combined into Buldhana district.

In 1950 it became part of Madhya Pradesh with Nagpur as its capital. Finally, in 1956, along with other Marathi-speaking regions of Vidarbha, it became a part of Bombay State and part of Maharashtra State in 1960.

2.5 PHYSIOGRAPHY

The agricultural patterns are strictly dependent on the conditions of physiography of the region such as terrain, topography, and altitude. Physiography is one of the parameter of physical environment and its impact on patterns and density of agriculture is immense. The physical environment which includes relief, drainage, climate, soil, and water influences the agriculture in many ways. The study of the impact of environment on nature and distribution of crops and livestock has a prime importance in geography. Nature with its physical characteristics provides a lot of possibilities for agriculture and agro-based industries in different areas.

Topographically, the district falls under three structural-cum-physical units: a narrow, northern strip in the Jalgaon tahsil in the Satpuda hills, the Payanghat or the Purna plains in the middle comprising the tahsils of Malkapur, Khamgaon and Jalgaon, and the Buldhana plateau comprising the Chikhli and Mehkar tahsil to the south. (Map 2.2)
The landscape in the Buldhana district is rich and varied with gently sloping fertile riverine plains. The ghat part, deeply scoured by gullies and ravines on the edge of the plateau and the sheer black walls of the Satpuda scarps to the north adds color to the variety of landforms. The district has no mountain system of considerable magnitude except for the area which lies in the north in the Gawli-gadh hills or the Satpudas.

The average elevation of the Satpudas in the northern part of district ranges between 700 and 1000 meters, with three high peaks: i) Chandigarh, 743 metres high in the north-western corner, ii) Dhormoria peak, 837 meters high near the village of Bhimgara in the Raipur reserved forest area and iii) a unnamed peak with an height of 928 meters overlooking the deserted village of Kille Pimpaldol.

The part of the Satpudas in the district has high level buttes and mesas and the south facing scarp and cliff slopes that descend through sheer vertical drops of about 500 meters height in almost places. The scarp edge is almost straight running in an east-north-east and west-south-west direction.

The trap beds have a slight northward dip and in many places consist of excellent solid basalts. The entire scarp face is wrinkled by numerous rivers and gullies. It drains southwards, though in places the drainage reveals a coarse radial pattern. A number of high level plateaus, the largest of which in the district is the one on which Bhimgara village is located, are found at an average height of about 750 meters. These are highly suggestive of a summit plane mostly denuded by sub-aerial agencies.

The Ajanta range carrying on its flat top, the high level mesa of Buldhana plateau covers the southern part of the study region. The edge
of this plateau, overlooking the Purna plains to its north, is a hilly *ghat* country at average height of 500 to 600 meters. It has a curving trend from west to east and further to south-east. It is also believed by geologists to be a fault scarp.

The bend in the escarpment is probably by active recession of the fault scarp due to sub-aerial denudation. The scar edge is at a higher elevation in the west adjoining the Buldhana about 600 meters and gradually falls in height eastwards to about 500 meters along the eastern borders of the district.

The southern edge of the Buldhana plateau descending to the floor of the Dudhna and Godavari valleys is much less imposing, partly on accounts of gentler slopes and partly due to a lesser fall in height to an extent of 100 meters to 150 meters. This edge has a number of low hills and knolls rising above the general plateau level.

Ridge of low hills runs at an elevation of 700 to 800 meters from north-west to south-east and about 100 meters above the general plateau level, broadly dividing the plateau into i) Northern Penganga valley and ii) Southern Katepurna valley. This low flat-topped watershed gradually loses elevation eastwards. The Buldhana plateau on the crest of the Ajanta range in the southern parts of the district at an average elevation of 600 to 800 metres sloping to the south-east. Differential sub-aerial erosion of the horizontally bedded traps particularly in the western parts, namely, the Chikhli tahsil, has divided the area into a number of plateaus at different levels with fairly steep slopes.

The Purna plains or *Payanghat* is the main low land region of the Buldhana district. The average elevation of this area ranges between 250 and 270 meters. The slope is extremely gentle, towards the west.
2.6 GEOLOGY

Geology is the study of the earth, the materials of which it is made, the structure of these materials, and the processes acting upon them. It includes the study of organisms that have inhabited our planet. The greater part of the district is covered by rocks of the Deccan volcanic of Cretaceous-Eocene age. The trap rocks are usually fine to coarse-grained, dark grey to greenish-black basalts of vesicular and massive types.

The hard compact massive flows are generally noticed on the hill tops of Melghat section whereas comparatively soft and amygdale varieties usually occupy the flanks of the hill or valley floors. Besides vertical and inclined jointing, columnar jointing is also well seen in more massive types. The vesicular and non-vesicular flows are at places separated by thin beds of ash. The typical inter-trapped sedimentary rocks have not been recognized in the area. No dykes have been found associated with the trap flows in the Buldhana district where a lava pile of approximately 800 meters is preserved.

The Purna valley alluvium occupies an extensive stretch of low lying ground between Paturda and the confluence of Purna river. In the river valleys and where superficial rain-wash has accumulated, a mixture of black cotton soil associated with sub-recent conglomeratic formation or light brown laterite material is noticeable at various places. The alluvium of the plains is usually of considerable depth sometimes, exceeding upto 50 meters as noticed near Malkapur city.

The Lonar crater is situated about a kilometer to the south-west of the village of Lonar and the circular feature measuring 2,000 meters across and about 135 meters in depth. It is a shallow saline lake. Maximum depth of the brine is 5.5 meters.6
The general elevation of the surrounding area is 550 to 600 meters. A raised rim or bank, up to 100 meters in width and at places 10 to 15 meters high surrounds the hollow. This inland lake with no effluent is fed by the seasonal drainage mainly confined to its periphery and also by a number of springs such as Dhar, Sitanahani, Ramgaya etc.

Lonar crater, one of the few large isolated caldera-like depression that has given rise to a good deal of controversy regarding its origin. A number of scientific accounts about the lake and its alkalinity have been published from early 19th century, but all these accounts are based on the data collected from surface examination of the lake area only. More recently the prospecting department of Tata Iron and Steel Company Limited had carried out drilling operations in the lake area (1960) with regard to the evaluation of soda contents in the brine and silts of the lake, whereas some preliminary geo-physical and geo-chemical surveys had been undertaken by the Geological Survey with a view to ascertaining the possible nickel and cobalt contents, if any, in the Lonar crater formation.

Excepting for the east-west stretch of the western extremity of the fertile Purna valley in the north-central portion of the Buldhana district, the entire district is occupied by the trapped hill ranges of Gawaligarh in the north and the Ajanta in the south. In the northern portion of the valley belt an east-west stretch extending for over 30 km with an average width of 6 km, is the potable fresh water belt with a discharge of 8 to 12 liters per second within a depth range of 40 meters.

In the basaltic terrain the groundwater occurs partly in the western mantle and partly in the vesicular basalt and inter-trapped beds, and with lack of favorable conditions there is often acute scarcity felt, particularly in peak summer months.
2.7 DRAINAGE

Drainage is the result of a combination of numerous factors like as climate, precipitation, isolation, cloudiness, wind direction, humidity, rock types, vegetation, soil and human activity etc. Drainage system is an important component of the physical environment which affects the agriculture directly and indirectly.\textsuperscript{7} Ground water becomes the base flow that maintains the flow of streams in clean weather. When we speak of surface water, we mean stream flow regardless of its source.\textsuperscript{8} The drainage pattern of Buldhana district is not well developed. The main rivers of the district are Purna and Penganga. Network of these rivers and its tributaries has been spread over the region. The detailed information regarding rivers in the district is as below:

\textit{Purna:} The \textit{Purna}, the only perennial stream in the Payanghat plains. It rises in the south facing scarps of Gawilgarh hills in Amravati district. It flows across the northern part of this district to join the \textit{Tapi} in Jalgaon district. A large number of streams rising in the scarps both to its north and south join the river and drain the whole region. The pattern is dendritic. Its some streams have a sub-parallel drainage to the main river before their confluence in the aggraded valley floor. Many of its tributary streams are just pools of water in the hot weather but devastating floods are quite common during the rains.

\textit{Penganga:} The Penganga is a major river of the Buldhana district. It rises close to the northern scarp edge of the Buldhana plateau in the \textit{Deulghat} hills. The river has a generally south-easterly flow through the district before entering in the Akola district. Large part of Chikhli and Mehkar tahsils fall within the drainage of this river. The river has a seasonal flow, which become dry during the hot weather. The valley of
the river is open, broad and shallow, presenting a mellowed mature or even senile appearance.

_Khadakpurna_: The _Khadakpurna_ or _Katepurna_, or the lower Purna or the South Purna as it is differently called, rises in the Ajanta ranges, outside the district limits in Aurangabad. It enters the district near the village of Chinchkhed in Chikhli tahsil and has a generally south-easterly flow in the southern parts of Chikhli and Mehkar tahsils. It has a run of about 50 km in the southern parts of the district "before it leaves the district to enter into Parbhani.

It is also a non-perennial stream but has a flow for a longer period than the Penganga. Both the Penganga and the Katepurna are important left bank tributaries of the Godavari, but however they do not gain any importance till after their leaving the district limits.

_Dhamna_: The Dhamna river is a left bank tributary of Katepurna river, rising in the hills of Aurangabad district and flowing southeast drains a small part in the extreme western section of the Chikhli plateau in Buldhana.

_Koradi_: The Koradi river rises in the Buldhana plateau to the south of the township of Chikhli and maintains a sub-parallel course to the Penganga to its south and joins the latter to the north of Mehkar town.

_Banganga_: The Banganga, rising in the Gawilgarh hills of the Amravati district enters the district. After forming the boundary for a short distance between Buldhana and Akola, it meanders southwards in a flat plain before joining the Purna on its right bank near the village of Deulgaon. (Map 2.3)
Mun: The Mun river, whose source tributaries the Torna, the Vishwamitri and the Mas drain the north facing scarp slopes of the Buldhana plateau in Khamgaon tahsil, flows north, mostly forming the boundary between the Buldhana and the Akola districts. It joins the Purna on its left bank about 7 km downstream of the confluence of the Banganga with the Purna.

Gyanganga: The Gyanganga river rises in the northern scarps of Buldhana plateau near the Matargaon village. It flows almost straight north to join the Purna on its left bank near the village of Yerli after flowing past the township of Nandura.

Vishwaganga: The Vishwaganga rises in the Buldhana hills close to the town. It flows north and joins the Purna near Harsod. It is a non-perennial stream.

Nalganga: The Nalganga river rises in the northern slopes of the Deulghat hills in the Amdari reserved forest area and flows north past Malkapur town to join the Purna on its left bank near the village of Narawel.

2.8 CLIMATE:

Climate is one of the important factors which directly and indirectly affect the human life and its activities. Out of total geographical influence to which man is subjected, climate seems to be the most powerful. It is an influence that no individual or race can escape. On land or sea, on plain or mountains, in primitive and civilized societies man must face the climate to its own level.

In a large measure climate determines where man may live and thrive, What type of house he may appropriately build? What sort 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 climatic and soil condition. Since, climatic factors exert mainly a regional influence of plant life, the differences 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 differences in climatic rather than soil conditions.\textsuperscript{10} The climate dictates the range of crops which a country can economically produce. This is 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.\textsuperscript{11}

The three most important factors of climate from the stand point of plant response are temperature, water supply and light and they may be treated as primary determinant of crop growth.\textsuperscript{12} A particular type of climate prevailing over a region of earth is called climatic climax, and the crops and the vegetations to which it determines is called climax type of vegetation.

Climate 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.\textsuperscript{13} The climate of Buldhana district is on the whole dry except during the monsoon season. The year may be divided into four seasons. The cold season from December to about the middle of February, followed by the summer season lasting upto the end of May the south-west monsoon season from June to September and the post-monsoon or retreating monsoon season in October and November.

i) \textbf{Temperature:}

Temperature is one of the most influential climatic factors, which affects the distribution of agricultural crops and plants. The metabolic
processes begin at a certain minimum temperature and increase with rise of temperature until they reach optimum temperature. Further, the metabolic activity slows down until it ceases at a temperature called maximum. These are called cordial temperature points. The cordial limits of cold season crops are 0-5°C, 22-27°C, and 30-37°C and for hot season crops are 15-18°C, 30-35°C, and 44-55°C respectively. Chilling injury is caused when temperature goes below the minimum and desiccation is caused when temperature goes above the maximum.\textsuperscript{14}

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 particularly in Buldhana district different crops raised in different season. Each crop plant needs a certain number of effective heat units for germination, growth stalking, maturity and ripening. This is called the thermal constant and varies from crop to crop. Temperature above the minimum is therefore, affective in furthering the growth of a plant towards maturity and ripening. The crucial air temperature is 6°C (Schimper 1903) at and above which plants grow.\textsuperscript{15} It is also known as the crucial limit. Ideal temperature conditions for crop production are between 18.3°C and 23.9°C.

For the agricultural geographer, 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{16} There is no metrological observatory in the district. The cold weather commences towards the end of November when temperature begin to decrease rapidly, December is generally the
coldest month with mean daily maximum temperature at about 29.5°C and the mean daily minimum at about 15°C on some occasion.

The periods from the middle of February to the beginning of the south-west monsoon season is one of continuous rise in temperature. May is generally the hottest month with the mean daily maximum temperature at about 40°C and the mean daily minimum at about 25°C. The heat during summer is intense and the maximum temperature sometimes goes up to about 45°C. There is appreciable drop in temperature with the withdrawal of the monsoon early in October.

ii) Rainfall:

Precipitation includes rainfall, snow, hail, fog, dew etc. Out of these, rainfall is the major one. It is the single weather element influencing the intensity and location of farming system and farmers’ choice of enterprises. Rain is the cheapest source of water, if it is timely and adequate in quantity. But rainfall in the greater parts of the region is highly uncertain and unevenly distributed. Failures of rains or excessive rainfall in a short period have brought repeated crop failures.  

It also becomes a climatic hazard to farming when it is characterized with scantiness, concentration, intensity, variability and unreliability. Normal rainfall is generally necessary for successful crop production. In such area the system of crops production must be correlated more or less to the moisture factor.

Farmers of Vidarbha region like others have often suffers on account of the failures of rains or heavy rainfall. Climatically the entire region comes under rain-shadow zone.

The monsoon rain covers the region from mid June to the end of
September. There are two peaks of rainfall in the region. The first peak is in July and the second in September. The region gets the heaviest rainfall from south-west monsoon winds in July. The south-west monsoon is the pivot around which almost the entire farm life and economy swings. The variation in the annual rainfall from year to year is large in the district.

The record of the rainfall in the district is available for the period ranging from 1990 to 2010. The details of the mean annual rainfall and rainfall co-efficient of variation is given in table 2.1

<table>
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<tr>
<th>Sr. No.</th>
<th>Tahsil</th>
<th>Mean Annual Rainfall (In M.M.)</th>
<th>Co-efficient of Variability in %</th>
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</thead>
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<tr>
<td>1</td>
<td>Jalgaon (Jamod)</td>
<td>677.20</td>
<td>30.67</td>
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<td>2</td>
<td>Sangrampur</td>
<td>658.75</td>
<td>28.32</td>
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<td>3</td>
<td>Shegaon</td>
<td>658.70</td>
<td>24.77</td>
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<tr>
<td>4</td>
<td>Nandura</td>
<td>538.70</td>
<td>38.77</td>
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<tr>
<td>5</td>
<td>Malkapur</td>
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<td>6</td>
<td>Motala</td>
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<td>Khamgaon</td>
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<td>13</td>
<td>Lonar</td>
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<td>31.77</td>
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</table>

Source: Computed by researcher.
BULDHANA DISTRICT

Co-efficient of Rainfall Variability

Index

- Above 30 %
- 25% to 30%
- Below 25%

Map 2.4
Table 2.1 shows that, above 30% rainfall variability is observed in Nandura, Sindkhedraja, Jalgaon Jamod and Sindkhedraja tahsil whereas 25% to 30% variability is observed in Sangrampur, Mehkar, Malkapur, Buldhana and Motala tahsil. Below 25% rainfall variability is observed in Shegaon, Khamgaon, Deulgaonraja and Chikhli tahsil during the study period. (Map 2.4)

The mean annual rainfall in the region varies from 538.70 to 844.96 for the period ranging from 1990 to 2010. The rainfall during the north-east monsoon that is October to November though scanty is very useful for the rabbit crops. Sometimes showers in the first quarter of the year have also beneficial effects on the growth of rabbit crops and summer crops.

iii) Other Weather Phenomena:

a) Humidity: Humidity is a state of atmosphere with respect to the gaseous form of water. Almost plants grow well in conditions of high atmosphere and humidity. Because very often saturated air completely stops the transpiration except during the south-west monsoon season when the relative humidity are high and the air is generally dry over the entire study region. The summer monsoon is the driest, when the relative humidity is between 20% to 25% in the afternoons.

b) Cloudiness: During the south-west monsoon season the air is humid and the skies are heavily clouded to overcast. During the rest of the year, the air is generally dry and skies are clear or lightly clouded.

c) Winds: Winds have many direct and indirect influences on crops. The direct effect of strong winds is entirely of mechanical nature that is in the form of crop uprooting and logging. The indirect effect of the winds is apparent on plants physiology. The transpiration from plants
makes the surrounding year moist. The crop gradually dries up and the moisture diffuses into the surrounding atmosphere.\textsuperscript{19}

In the Buldhana district 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 predominantly from direction west and north during the hot season. Winds blow mostly from directions between southwest and northwest during the south-west monsoon season. Winds blow mostly from the direction between northeast and southeast during the rest of year. Thunder storms occur in all months of the year. They occur more frequently during April to June and from September to October.

2.9 SOIL TYPES

In general soil refers to the loose surface of the earth as distinguished from solid rock.\textsuperscript{20} Soil is the thin surface-layer on the earth, comprising mineral particles formed by the break-down of rocks, decayed organic materials, living organisms, water and air. Soil is formed under specific natural conditions and each of the elements of the natural environment contributes to this complex process, described by the soil scientists as the process of \textit{pedogenesis}.\textsuperscript{21}

Soil is the very important natural resource. Because agricultural production is basically depend on the fertility of the soil. Soil formation is mainly related the parent rock material, surface relief, climate and natural vegetation. It is the natural body of soil on which plants grow and the farming activities flourish. The standard of living of the people depending on agriculture is often determined by the fertility and productivity of soils.\textsuperscript{22}
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. Great civilizations have almost invariably flourished on good soils, the alluvium in particular. 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.” Therefore 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 than one percent of what he eats being fish. Of the long list of nature’s gifts to man productive soils and water are the most basic to human life. Even today about 66% of the global population comprises farmers, deriving their livelihood directly from the soil. Geographical investigation of soil characteristics is of great significance to agricultural geographers. Soil characteristics, particularly the physical, help us to know about the distribution of crops and the selection soils for specific crops: this may be called the ‘selective’ rather than the ‘prohibitive’ influence of the soils.

Soil Types in the Buldhana district:

There are three major soil types in this district, locally called as Bharkali, Morand and Barad. Morand soils are silt and lime mixed heavy in texture and blackish one suitable for cotton growing. Black soil is also found in Chikhli and Mehkar area but the depth of Top soil being very low hence suitable for wheat growing. Sandy soils are locally called as Barad, percentage of sand is more than silt and clay hence light in nature
hence identified as light soils. These are very poor fertile soil types than Morand. Constitute the physical basis of all agricultural practices. The infiltration and transmission of moisture through soil depends upon the particle size, amount of organic matter in the soil depth. These factors are also depends upon the approach of soil for the saturation its swollen capacity and individual physical properties. (Map 2.5)

Soils in the district can be divided into three parts:

1) Coarse shallow soil
2) Medium black soil and
3) Deep black soil

Table 2.2
Soils in Buldhana District (Area in Sq.km)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Tahsil</th>
<th>Course Shallow</th>
<th>Medium Black</th>
<th>Deep Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Buldhana</td>
<td>433.55</td>
<td>138.39</td>
<td>135.76</td>
</tr>
<tr>
<td>2</td>
<td>Chikhli</td>
<td>343.70</td>
<td>173.52</td>
<td>170.25</td>
</tr>
<tr>
<td>3</td>
<td>Deulgaonraja</td>
<td>474.85</td>
<td>151.55</td>
<td>148.69</td>
</tr>
<tr>
<td>4</td>
<td>Meherkar</td>
<td>320.23</td>
<td>514.50</td>
<td>150.87</td>
</tr>
<tr>
<td>5</td>
<td>Lomar</td>
<td>260.23</td>
<td>419.24</td>
<td>122.93</td>
</tr>
<tr>
<td>6</td>
<td>Sindkhedraja</td>
<td>258.00</td>
<td>414.74</td>
<td>121.66</td>
</tr>
<tr>
<td>7</td>
<td>Khamgaon</td>
<td>581.21</td>
<td>317.14</td>
<td>149.69</td>
</tr>
<tr>
<td>8</td>
<td>Shegaon</td>
<td>428.04</td>
<td>234.03</td>
<td>110.42</td>
</tr>
<tr>
<td>9</td>
<td>Malkapur</td>
<td>165.72</td>
<td>197.86</td>
<td>84.49</td>
</tr>
<tr>
<td>10</td>
<td>Motala</td>
<td>280.25</td>
<td>334.62</td>
<td>142.88</td>
</tr>
<tr>
<td>11</td>
<td>Nandura</td>
<td>171.68</td>
<td>204.97</td>
<td>87.53</td>
</tr>
<tr>
<td>12</td>
<td>Jalgaon Jamod</td>
<td>299.44</td>
<td>219.86</td>
<td>44.72</td>
</tr>
<tr>
<td>13</td>
<td>Sangrampur</td>
<td>346.98</td>
<td>254.26</td>
<td>51.71</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>(9660.00)</strong></td>
<td><strong>4564.72</strong></td>
<td><strong>3574.68</strong></td>
<td><strong>1521.60</strong></td>
</tr>
</tbody>
</table>

Source: Soil Survey Department, Buldhana
BULDHANA DISTRICT

Soils

Index (Type of Soil)

- Course Shallow
- Medium Black
- Deep Black

Map 2.5
Coarse shallow soil covers the high lands in district. The depth of such soil remains very less. The infiltration is much less in these type of soils and run off is more. This type covers an area of 4564.72 Sq. Km. Medium black soil is developed comparatively in the plains along the tributaries of main rivers and small plateau of the district. This type of soil area generally low in clayey material. The area covered by the type of soil in the district is 3574.68 sq.km. and remains at 37 percentage of the total soil.

Deep black soil generally develops along the banks of the major river and main tributaries of the river in the district it has been developed along Purna (Tapi) Nalganga, Vishwaganga, Penganga, and Purna rivers. The soils contain much clayey material which generally has nature of swelling in high degree. The black cotton soil derived from the deccan trap of the region are more fertile and contains rich plant elements such as lime, magnesia, Iron and alkalis. The cropping pattern of the district is generally based upon the fertility of the soil.

2.10 NATURAL VEGETATION:

Natural vegetation prevents soil erosion, regulate the flow of rivers and reduce the floods, check the spread of deserts, add to soil fertility and ameliorate the extremes of climate. Forests play a significant role in the control of soil erosion by water and wind. Roots of the trees absorb much of the rain water and use it slowly during the dry season. Thus, they regulate the flow water and help in controlling the floods. The cover of natural vegetation acts as rain-holder and a rain-banker. The trees also act like millions of tiny dams and check the flow of water like a barrage. It also keeps the environmental balance forest provides wood for making farm implements.
Therefore, forests are great instrument to put a check on the spread of desert. The fallen leaves of trees provide humus to soil after their decomposition. In this way natural vegetation helps in increasing the fertility of soil.\textsuperscript{29} It also effect on climate. It ameliorates the extremes of climate by reducing the heat in summer and cold in winter. They also influence the amount of rainfall by lowering the temperature of moistures laden winds and increase the relative humidity of the year through the process of transpiration. Natural vegetation reduces the surface velocity of winds and retards the process of evaporation.\textsuperscript{30}

Buldhana district has 7.08\% area under forest to total geographical area. Most of the forest area of the district falls under Buldhana, Mehkar, Khamgaon and Jalsaon Jamod tathsils. Forest area is divided into reserved, protected and unclassified forest, out of which unclassified forest area in in the charge of Revenue Department. Out of total forest area, 91\% is reserved area and 9\% is protected forest area.

The forest area is mainly situated on the Balaghat plateau of the Ajanta hills and the Purna valley. The forest belongs to "Southern Tropical Dray Deciduous". The varieties of the forest found in the district are Superior teak forest, inferior teak forest, Anjan forest, Babul forest, mixed forest, salai forest, grass and brushwood area. Some trees and plants like Teak, bel, tiwas, kuram, lendia, dhawada, tando, samel, anjan, char, bija, behada, bharti, chilati, khair, acacia, haldus, neem and bor are also observed here.

The forest of Buldhana district is economically important. Out of the total geographical area of the district 11.97\% area was under forest during 1990-95 and it was decreased upto 7.08\% during 2005-2010.
### Table 2.3
Tahsilwise Change in Forest Area of Buldhana District

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Tahsil</th>
<th>1990-95</th>
<th>2005-2010</th>
<th>Volume of Change (In %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Area Under Forest (In“00” hect)</td>
<td>Area Under Forest (In %)</td>
<td>Area Under Forest (In“00” hect)</td>
</tr>
<tr>
<td>1</td>
<td>Jalgaon-Jamod</td>
<td>109</td>
<td>18.22</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>Sangrampur</td>
<td>135</td>
<td>20.77</td>
<td>84</td>
</tr>
<tr>
<td>3</td>
<td>Shegaon</td>
<td>19</td>
<td>2.43</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>Nandura</td>
<td>24</td>
<td>5.17</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>Malkapur</td>
<td>16</td>
<td>3.31</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>Motala</td>
<td>94</td>
<td>13.07</td>
<td>57</td>
</tr>
<tr>
<td>7</td>
<td>Khamgaon</td>
<td>203</td>
<td>19.94</td>
<td>115</td>
</tr>
<tr>
<td>8</td>
<td>Mehkar</td>
<td>140</td>
<td>15.33</td>
<td>116</td>
</tr>
<tr>
<td>9</td>
<td>Chikhli</td>
<td>164</td>
<td>18.83</td>
<td>99</td>
</tr>
<tr>
<td>10</td>
<td>Buldhana</td>
<td>48</td>
<td>6.81</td>
<td>38</td>
</tr>
<tr>
<td>11</td>
<td>Deulgaonraja</td>
<td>35</td>
<td>4.28</td>
<td>35</td>
</tr>
<tr>
<td>12</td>
<td>Sindkhedraja</td>
<td>48</td>
<td>5.86</td>
<td>30</td>
</tr>
<tr>
<td>13</td>
<td>Lonar</td>
<td>35</td>
<td>4.33</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>District total</td>
<td>1070</td>
<td>11.97</td>
<td>648</td>
</tr>
</tbody>
</table>

*Source: Computed by the Researcher*

The review of changes in forest area in Buldhana district during the period for 1990-95 and 2005-2010 is briefly presented in table 2.3. It indicates that out of total geographical area 7% geographical area was found in Jalgaon Jamod, Shegaon, Nandura, Malkapur, Buldhana, Deulgaonraja, Sindkhedraja and Lonar tahsil while 7% area was found in

Positive change in forest area was noticed in Malkapur (3.45%) tahsil. Below 5% negative change in forest area was found in Shegaon, Nandura, Mehkar, Buldhana, Deulgaonraja, Sindkhedraja and Lonar tahsil while above 5% negative change was observed in Jalgaon Jamod, Sangrampur, Motala, Khamgaon and Chikhli tahsil during 1990-1995 to 2005-2010.

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