CHAPTER-II:
AREA OF STUDY
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A. TOPOGRAPHY:

Maharashtra state comprises an area of 3,07,690 sq. km. with respect to the area, it is third largest state occupying 9.36% area of India. Latitudinal and longitudinal extension of Maharashtra is 15° 44’ North to 22° 6’ North latitude and 72°36’ East to 80°54’ East longitude. The east-west extension of the state is about 800 km, whereas, north-south stretch is about 720 km. Maharashtra state is well confined by the natural as well as political boundaries. Western margin of Maharashtra has naturally confined by Arabian Sea. The eastern boundary of state is locked with Chattisgarh state. There is Gujarat and Union Territory of Dadra and Nagar Haveli at north-west, Madhya Pradesh towards north, whereas Karnataka, Goa and Andhra Pradesh are at the south and south-east.

Maharashtra state comprises 35 districts. It is divided into 5 divisions such as Konkan, Desh or Deccan, Khandesh, Marathwada and Vidarbha.

1) Konkan – Konkan is a coastal strip parallel to Sahyadri ranges. It rises from Sea level to 300 meter height. Konkan area ranges from 27 to 48 km in breadth and about 800 km in length, from Goa to Tapi basin. Politically it consists of 5 districts of Maharashtra viz. Mumbai, Raigad, Ratnagiri, Sindhudurg and Thane. Konkan region formed of mostly secondary lateritic plateaus, hilly tracks and the coastal sandy low land belts. Littoral or mangrove forests, open scrub forest, moist deciduous forest and herbaceous flora of laterite plateaus are main components of vegetation.

2) Desh or Deccan – Deccan consists of east of Sahyadri, which is approximately 565 km in length. Politically it consists of 7 districts viz. Ahmednagar, Kolhapur, Nasik, Pune, Sangli, Satara and Solapur. The average height of Sahyadri hills in Deccan is 1200 m. The highest peaks of Sahyadris are Kalsubai (1646 m), Harishchandragad (1424 m) and Mahabaleshwar (1438 m). The vegetation of this region comprises moist and dry deciduous forest and semi-evergreen forest.

3) Khandesh – Khandesh is a part of northern Maharashtra and consists of three districts viz. Dhule, Nandurbar and Jalgaon. Khandesh is located in valley of the Tapi river. The land is mostly flat and plain at western part while, northern-eastern part is occupied by various parallel ranges of Satpuda. The
vegetation of Khandesh comprises dry deciduous forest, thorn forest and scrubby forest.

4) **Marathwada** – Marathwada region consists of eight districts *viz.* Aurangabad, Beed, Hingoli, Jalna, Latur, Nanded, Osmanabad and Parbhani. The total area of the region is 64,798 sq. km. The entire region is situated at the height of about 300–650 meter above MSL. The highest peak at Aurangabad district is Surpal Nath (960 m). Dry deciduous forests, open scrub jungles and vast tracts of grasslands form the components of vegetation.

5) **Vidarbha** – Vidarbha, the eastern Maharashtra consists of 11 districts *viz.* Akola, Amaravati, Bhandara, Buldhana, Chandrapur, Gadchiroli, Gondia, Nagpur, Wardha, Wasim and Yavatmal. It is a continuous stretch of land with black cotton soils derived from the Deccan Trap basalt. Altitude of the region ranges from 457 to 549 meter above MSL. The forest of this region consists tropical moist deciduous forest and dry tropical forest.

**B. PHYSIOGRAPHY:**

Since Maharashtra is a part of Deccan Plateau, the geology of the state is overall similar however, physiographically it is not similar everywhere in Maharashtra. Maharashtra can be divided into three divisions according to Physiography *viz.*

1. Coastal Lowland (Konkan Strip)
2. Mountainous and Hilly Region (Western Ghat and Sahyadri Ranges)
3. Maharashtra Plateau (Deccan Plateau)

**1. Coastal Lowland (Konkan Strip):**

The ‘Konkan’ is the narrow strip of the coastal land lying in-between Arabian Sea and Sahyadri Mountain. The world famous Western Ghats is lying in the Konkan. The Konkan strip has 720 km north-south extension; however, the width of this strip is uneven from 30 to 60 km. Konkan region is sub-divided into North and South Konkan. Mumbai, Thane, Raigarh districts are included into north Konkan whereas, Ratnagiri and Sindhudurg districts are in the south Konkan region. The majority area of the Konkan is occupied with creeks or estuaries. Important creeks are found at Vasai, Dativara, Dharamtar, Jaygarh, Dabhol, Bankot, Rajapur, Vijaydurg and Karla in Konkan.
2. Mountainous and Hilly Region:

Larger part of Maharashtra comes under the mountainous and hilly region mountain ranges like Sahyadri, Satpura, Satmala, Ajintha, Mahadeo, Harishchandra, and Balaghat occupy the greater part of Maharashtra.

Majority part of the state is with the lofty peaks of the Sahyadri Mountain with average height from 1200 to 1300 meters. Many peaks of the Sahyadri Mountain are more than 1400 meters in height. ‘Kalsubai’ (1646 m) the highest peak in Maharashtra is located in the Sahyadri Mountain. The other important peaks are Salher (1567 m), Mahabaleshwar (1438 m), Saptashringi (1416 m) and Trimbakeshwar (1304 m).

3. Maharashtra Plateau (Deccan Plateau):

The extensive tableland called as Deccan or Maharashtra Plateau is situated in the east of the Sahyadri Mountain. Over 90 % region of the Maharashtra state is occupied by this plateau. The east-west stretch of this plateau region is 750 km and the north-south width is about 700 km. The average height of the plateau is 450 m.

C. GEOLOGY:

1) Maharashtra is a part of Deccan trap. Deccan plate comprises huge accumulation of volcanic rocks, principally basaltic lavas which covers 90% of Maharashtra’s geological area. Deccan Basalt rocks are of mostly five type viz. vesicular basalt, amybdoloidal basalt, fractured jointed basalt, massive compact basalt and weathered basalt (Deolankar, 1981). Partly crystalline and partly sedimentary rocks which include granite, sandstone and gneisses are found in some parts of Amravati, Bhandara, Chandrapur, Nagpur, Nanded, Yavatmal, Nandurbar, Sindhudurg and Kolhapur districts. This is the oldest rock formation of Maharashtra.

2) Since the volcanic origin of the plateau igneous rocks like basalt and granite are the major rock formation. The Deccan plateau is rich with minerals like iron, bauxite, coal, manganese, lime, gypsum, etc. The following table shows chemical composition of the basalt rocks.
Table 1: Chemical composition of the Deccan Basalt rock.

<table>
<thead>
<tr>
<th>Composition</th>
<th>%</th>
<th>Composition</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SiO₂</td>
<td>50.61</td>
<td>CaO</td>
<td>9.45</td>
</tr>
<tr>
<td>TiO₂</td>
<td>1.91</td>
<td>Na₂O</td>
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</tr>
<tr>
<td>Al₂O₃</td>
<td>13.58</td>
<td>K₂O</td>
<td>0.72</td>
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<tr>
<td>Fe₂O₃</td>
<td>3.19</td>
<td>H₂O⁺</td>
<td>1.70</td>
</tr>
<tr>
<td>FeO</td>
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<td>H₂O⁻</td>
<td>0.43</td>
</tr>
<tr>
<td>MnO</td>
<td>0.16</td>
<td>P₂O₅</td>
<td>0.39</td>
</tr>
<tr>
<td>MgO</td>
<td>5.46</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Source: Washington (1922)

3) The step-like weathered hills of basalt is the most common feature of Deccan traps. This becomes rapidly less towards east and south. Thick intertrappean sediments separate the individual lava flows from each other. Each basaltic lava flow is usually composed of three parts viz. lower, middle and upper. The lower and middle are hard and compact greenish gray to dark grey or black in color. Upper part is comparatively soft and reddish-pink to purplish in color.

4) Gondwanas are found in some parts of Bhandara, Chandrapur and Wardha. The formations of this division are divided into groups as Chikiala beds, Kota maleri, Kamthis, Barakars and Talchirs.

5) Laterite has originally suggested by Buchanan (1807) as a name for highly ferruginous deposits first observed in Malabar in India. Laterite rocks occur in the form of plateaus at Konkan strip i.e. from sea level to up to 300 feet elevation and at high elevation of Sahyadri ranges in the form of plateaus. High altitude Lateritic plateaus occur in Satara, Kolhapur, Ratnagiri and Sindhudurg districts in Maharashtra. Vertical slits present on lateritic rocks in which soft silica matter is present. Because of high rainfall, exposed rock slits become empty due to wash out of soft silica matter. Lateritic rock shows brown and black colored because of high concentration of ferrous and aluminum.
D. SOIL:

Shallow, medium and deep-black soils are mostly found in the state of Maharashtra. Black cotton soil is mainly found in Deccan plateaus. Black cotton soil name itself indicates of its properties, namely, color and best suited for cotton crop. Black cotton soil is also known as vertisols, regur and grumosol. Black cotton soil covers about 26.3% of the areas of the Maharashtra state (Challa et al., 1995). This soil is found at various districts viz. Jalgaon, Amravati, Vidarbha, Vardha and Gondia district. It is also in valley between Parbhani and Nanded district and in Krishna valley. Black cotton soil is formed by black basalt rock. Black cotton soil possesses peculiar characters such as, when it get weight, it swells and become very sticky in nature while, when dry, it shrink. This soil is highly fertile.

Soils found on hill tops are composed of sandy and stony material with murum. This soil is shallow natured and the thickness ranges from few to 50 cm.

Alluvial soils are formed by alluvium found at upstream region or nearby relief. Alluvial soil is dark brown in color and several meters in depth.

The Eastern Maharashtra especially Wainganga basin consists of varieties of rocks such as granitic, gneissic and sediment resulting in formation of different soils. Soils are light to pale yellowish to in red color. Soils are stony and non-fertile.

Various types of basaltic rocks are found in Western part of Maharashtra result in diverse types of soils varying in their composition.

Lateritic soil is formed by lateritic rock in high elevation. This soil is very stony because of the presence of weathering fragments or iron concentration with acidic pH ranging 4.5-6.0. Lateritic soil possesses seldomly organic matter. Lateritic soil is distributed at Mahabaleshwar, southern part of Mahabaleshwar, around Bhima Shankar and Matheran.

Red soil is formed by laterite rock erosion by heavy rain fall. It is distributed in southern part of Sahyadri. It possess oxide clays and kaoinite.

Coastal saline soil is formed by erosion of sand barsand sedimentary platform rock by water wave, tide and heavy rain fall.

In semi arid climate of Maharashtra such as, Sangali, Satara, Solapur and Ahmadnagar saline, alkaline and saline-alkaline soils are found.
E. CLIMATE:

Maharashtra shows typical tropical type of climate. The year can be divided into three main season’s viz. winter, summer and rainy season. North-South ranges of Western Ghats serve as tower blocking the mansoon clouds coming from Arabian Sea resulting into heavy rainfall in Konkan and Ghat region. Over 2000 mm rainfall per annum occur in Konkan and about 5000 mm in ghat region. Region (Desh, Deccan) on eastern part of Western Ghats receive rainfall of about 600-635 mm except for Ahmednagar, Solapur and eastern part of Pune district. Average rainfall of Marathwada is about 900 mm. The western part of Vidarbha is little hotter and receives about 900-1400 mm rainfall per annum. In eastern part of Vidarbha comprising Chandrapur, Bhandara and Nagpur the rainfall is about 1250-1400 mm. In Khandesh, the temperature is high and rainfall is about 900-1000 mm. Average rainfall in Maharashtra ranges from 381-508 mm.

Winter touches the state in the month of November and persists till February. The weather is generally pleasant with clear sky and cool gentle wind.

Average temperature of Maharashtra is 26\(^\circ\)C-28\(^\circ\)C. The state faces extremely hot summer from March till the starting of rainy season in early June. Average temperature of Marathwada ranges from 27\(^\circ\)C to 38\(^\circ\)C. The western part of Vidarbha is little hotter and annual mean temperature is more than 40\(^\circ\)C. In Khandesh, the temperature is high with average temperature 42\(^\circ\)C.