CHAPTER II
TOPOGRAPHY AND GENERAL FEATURES

Andhra Pradesh is the largest state in South India, both in population as well as geographical area. Geometrically, it lies between the latitudes 12° 37' N and 19° 54' N and longitudes 76° 46' E and 84° 46' E (Fig 1). Geographically it is situated in the middle portion of the Eastern half of the Indian peninsula. Andhra Pradesh is bounded on the South by Tamil Nadu, West by Karnataka, North and North-West by Maharastra, North-East by Madhya Pradesh and Orissa, East by the Bay of Bengal. It has a long sea coast line of 960 Kms along the Bay of Bengal. No other state in India has such a long coast line.

Andhra Pradesh has a total geographical area of 2,75,068 Sq.Km. The state is divided in to 23 districts for administrative purpose (Fig 2). Naming the districts in clock-wise order from the North-West. They are Srikakulam, Vijayanagaram, Visakhapatnam, East Godavari, West Godavari, Krishna, Guntur, Prakásam, Nellore, Chittoor, Cuddapah, Anantapur, Kurnool, Mahaboobnagar, Ranga Reddy, Hyderabad, Medak, Nizamabad, Adilabad, Karimnagar, Warangal, Khammam and Nalgonda districts.
Map of India showing the position of ANDHRA PRADESH
Fig. 2
Map of Andhra Pradesh Showing the position of District Headquarters
TOPOGRAPHICAL DIVISIONS

About 35% of the total area of the state lies below 150 meters altitude forming coastal plains. 15% of the land is distributed between 150 and 300 meters; about 37% of the land distributed between 300 and 600 meters which together form the plateau surface consisting of peneplained surfaces. Remaining 13% of the area of the state has an elevation above 600 metres which may be treated as hilly tract, out of which 10% of the land lies between 600 and 900 metres and only 3% of the land lies above 900 metres from sea-level.

GEOGRAPHICAL DIVISIONS

The state can be divided into three distinct geographical units, viz., the Coastal plains, the Eastern ghats and the Western peneplains.

Coastal Plains:

This region stretches as the coast from northern end (Srikakulam district) to southern end (Nellore district). The northern part of the coastal plain is narrow with an average width ranging between 30 and 40Kms. The central portion is wider having an average width between 70 and 75 Kms and in some places 100 Kms even. It includes the shallow freshwater lake of
Kolleru which is a natural depression between Godavari and Krishna deltas. The width of the coastal plain in the southern part is between 50 and 60 Kms.

The Simhachalam Cliff (244m), Dolphin’s nose (357m), Kondapalli hill (573m), Kolleru lake (259 Sq.Km) Pulicat lake and the Sriharikota island dot this zone.

**Eastern Ghats:**

The Eastern Ghats are a chain of broken hills unlike the western ghats, running from north to south between the coastal plain and plateau.

The Eastern ghats are the out crops of the lower Vindhyan and Cuddapah systems. In the north, the ghats are highly dissected and intervened by a number of valleys. The width of this place is between 60 and 70 Kms and the elevations reach above 1200* metres above mean sea level. The Papikonda range in the north joins with Simhachalam hill range. Yarrada hills extended towards the coast along Visakhapatnam. Veering further south-west they form the Cuddapah range of hills called variously Palkondas, Velikondas, Erramalais, Nallamalais, Lankamalais and Seshachalam. They vary in elevation between 600 to 1350 metres.
The hills are wooded but the vegetation is poor due to porous soils and low precipitation.

**Western Peneplains:**

The Western Peneplains consisting of the Deccan peneplains (150-600 m altitude) developed on the Archaean gueisses. Kurnool except the Nallamalais portion, and Anantapur districts and the whole of Telangana fall under this region. The southern part of the region is generally poor with scanty rain fall. Towards the north of the region, a belt of Gondwanas with coal depositories has been preserved along the lowest Godavari trough. Much of this is below 150 m and most of the area is largely covered by dry deciduous forests.

**CLIMATE**

The climate in the state is pre-dominantly semi-arid to arid except along the coastal belt which is humid to sub-humid. The state of Andhra Pradesh has the monsoon type of tropical climate.

In the whole of Telangana, Coastal area and Chittoor district, tropical rainy type of climate prevails, except Hyderabad, Ranga Reddy, Mahaboobnagar and Nalgonda districts, the western parts of the Guntur and the adjoining parts of Nellore. Hot steppe type of climate is noticed in the excepted areas and in the rest
of the state. In tropical rainy type, the mean daily temperature is above 20°C with an annual rain fall of 150 to 200 cms, mostly in summer and south-west monsoon. In the Hot steppe type the mean daily temperature is 18°C and less. Maximum temperature in the summer season varies between 37°C and 44°C and minimum temperature in the winter season ranging between 14°C and 19°C.

Distribution of Rainfall:

The state receives its rainfall both form the south west as well as the north-east monsoons, 67 per cent of rainfall is from the south-west monsoon. The south-west monsoon generally spreads itself from early June till about the end of September and 25% from the north-east monsoon which occurs from October to December. By virtue of the varying land formations of the plateau and the eastcoast with the intervening hill ranges, the effects of the monsoons varies in the different regions. The monsoon sets in early towards the end of May or early June and most of the rainfall occurs in the months of August and September. Thereafter with a short break, the North-East monsoon sets in and brings in few showers in the months of October and November. The average rainfall ranges from 120 cm in the north and as we go south-westward and rainfall comes down to about 50 cms in Anantapur
district. The Rayalaseema region is a zone of precarious rainfall with annual average being hardly 67.2 cm.

In the coastal districts, the annual rainfall varies between 70 and 150 cms. The area north of Godavary receives the heaviest rainfall of about 100 to 125 cms. Though the coastal area receives the benefit of both the monsoons, the Eastern ghats to some extent act as a barrier for this region to drive the fullest benefit of the south-west monsoon winds from reaching the west plateau. The main incidence of rainfall in the coastal region occurs in the month of October. This area is also susceptible to frequent cyclones that generally occur between October and December.

In Telangana, the variation of rain ranges between 75 and 100 cms and much of it occurs during the South-west monsoon. The south-western part of Telangana receives less rainfall than its northern part.

The normal rainfall is 896mm, south-west monsoon 602mm, north-east monsoon 203mm, summer 73mm, winter 18mm. The normal rainfall in coastal area is 1000mm, (South-west monsoon 517mm and North-east monsoon 317mm). Telangana 893mm (South-west monsoon 692 and North-East monsoon 200mm) and Rayalaseema 672mm (South-West monsoon 368 and North-East monsoon 213 mm).
Rainy Days:

The total number of rainy days vary in Andhra Pradesh from the lowest of 35 days in Anantapur district to the highest of 58 days in West Godavari district. So the number of rainy days are low in Anantapur than in the coastal area and Telangana region. That is why, Anantapur is the driest part of the state and second driest part in the country after Rajasthan desert.

Temperature:

The state may be generally described as having a hot summer and a pleasant winter. The seasonal variations in temperature will be fairly hot throughout the state. On the whole the state enjoys warm-climate, maximum temperature in the summer season varies between 37°C and 44°C and the minimum temperatures in the winter season ranging between 14°C and 19°C. The variation in the maximum and minimum temperatures keeps increasingly as one goes from the coast into the interior. The hottest places in the state during the summer are Ramagundam (in Khammam district) and Rentachintala (in Guntur district).

GEOLOGY

The Geological formations in the state range from the oldest Dharwar schists to the recent alluvium.
These rocks possess rich minerals and they are well distributed throughout the state.

The Dharwar formations extend in Nellore, Guntur, Anantapur, Prakasam and Mahaboobnagar districts. The Dharwar formations contain important minerals like Mica (Gudur area in Nellore district), copper (Anantapur and Guntur districts) and Gold (Anantapur district).

The Archean or peninsular gneisses dominates the rock formations in Telangana and Rayalaseema regions. The rock formation consists of Granites, Granodiorides and branded gneisses.

The charnockites and khondolites are found in an extensive belt in the Srikakulam and Visakhapatnam districts and the upland mandals of East Godavari and West Godavari. The charnockites bands also occur in Krishna, Guntur and Prakasam districts. These formations are rich in minerals, particularly in Graphite, Manganese ore (charnockites), bauxite, chromite and iron ore (Khondolites).

The purenas are found in Cuddapah and Kurnool districts. These rocks include lime stones, sand stones, slates and shales. These rocks are also found in Mahaboobnagar, Nalgonda, Guntur, Raapa Reddy and Adilabad districts.
The Gondwana formations occur in the Godavari valley. The lower gondwanas contain the coal deposited especially at Kothagudem and Yellandu in Khammam district, Bellampalli in Adilabad district and Godavarikhani in Karimnagar district. The upper Gondwanas consist of shales and sand stones extended from Rajahmundry to Vijayawada, along Godavary trough in eastern Adilabad and Karimnagar districts.

The Deccan trap formations are found in the western and north-western parts of the state. They are composed of mostly greenish basaltic rocks, with occasional lime stone beds interbedded with the basalt.

The tertiary formations are represented by the low hills composed of Rajahmundry sand stones and conglomerates, covering small areas in east and west Godavari districts.

The laterites occur as caps over Deccan traps in western Telangana (Vikarabad, Zaheerabad, Narayanakhed Taluks). They also occur in coastal districts such as Nellore and Visakhapatnam.

Alluvium occurs extensively in the deltas of Krishna and Godavari rivers. A belt of alluvium is found deep inland along the valleys of Vamsadhara and the Nagavali rivers. The Alluvium consists of sand,
gravel, silt and clay with silt predominating in the deltas.

SOILS:

The state has a wide variety of soils and they form into six broad categories. They are red, black, alluvial, laterite, coastal sandy soils and skeletal soils (Fig 3).

Red soils:

The red soils cover about 70 per cent of the total area of the state. They occur widely in Telangana and Rayalaseema but are highly restricted in their occurrence in the districts of the coastal Andhra such as Nellore, Guntur, East and West Godavari, Visakhapatnam and Srikakulam. They are poor in nitrogen content (0.2 to 0.3%) and plant nutrients but low to medium in available phosphates and medium to high in potash. The moisture holding capacity of the red soils is also poor. Red soils are derived from the weathering of gneisses and granite.

Black soils:

They are the second important soil group in area extent. The deep and medium black soils, which are also known as black cotton soils, occur in western and north
Fig. 3. Map of Andhra Pradesh - Soils.
western portions of the state. The black soils are rich in calcium and potash but poor in nitrogen.

The deep black soils are found along the pranahita, the Godavari and Krishna rivers in broad belt, ranging from 10 to 26 Kms on either side of these rivers.

The light black soils are developed from the Deccan trap rocks, found in the north-western part of the state in Adilabad, Ranga Reddy, Medak and Nizamabad districts.

The mixed red and black soils are found in wide patches between Krishna and the Pennar rivers. In the elevated plateaus, the black soils are thin with light colour and low fertility, whereas in the low lying areas, they are thick with deep colour and high fertility.

**Deltaic Alluvial soils:**

They are the most fertile soils in the state, having been periodically renewed by the silt brought down by the river. These soils are of the recent origin and rich in plant nutrients. They occur extensively in the deltas of Krishna and Godavari. These soils also occur along the coast in Visakhapatnam and Srikakulam
districts and along the valley of Vamsadhara and Nagavali rivers and also along Pennar in Nellore district.

Coastal Alluvial Soils:

This type of alluvial soils are older and less fertile than the deltaic alluvial soils. It stretches but as a narrow belt all along the coast for a short break in Visakhapatnam district where the spurs of the Eastern Ghats meet the sea. It is generally not rich in plant nutrient and organic matter.

Laterite soils:

These soils are formed by the composition of gneisses. The colour of these soils vary from deep reddish to brown or black. They are rapidly permeable and well drained. Their fertility is poor. They occur in Srikakulam, Visakhapatnam, East Godavari, Nellore, Chittoor, Medak, Ranga Reddy and Hyderabad districts.

Coastal Sandy Soils:

They occur in the Bandar taluk of Krishna district, on the coastal margins of Bapatla Taluk of Guntur District and Chirala taluk of Prakasam district.
Skeletal Soils:

They are found in the Nallamala Slopes of Badvel of Cuddapah, Giddalur of Prakasam and a smaller patch in the Jammalamadugu of Cuddapah districts.

These soils are not fertile and are found generally on the high eroded hill slopes and near the foot hills.

RIVERS

Andhra Pradesh is popularly called a river state. The major as well as the minor rivers that flow through the state number about 34. Of these 7 are more important rivers namely - Godavari, Krishna, Pennar, Tungabhadra, Vamsadhara, Manjira and Nagavali. As the general terrain of the state slopes downwards from the west to the east, all the rivers end up in the Bay of Bengal.

Godavari:

The Godavari is the largest river in South India. It takes its origin in the western ghats at Triambak near Nasik in Maharashtra State. Its total length is about 1584 Kms of which about 772 Kms lie with in this state. Its total catchment area is 3,12,812 Sq.Kms. spread in Maharashtra, Madhya Pradesh, Orissa
and Andhra Pradesh. It enters the State near Basar village in Adilabad district and it flows through Nizamabad, Karimnagar, Warangal, Khammam and East and West Godavari districts. It splits into five branches, Vashista, Gautami, Atreya, Tulya and Bharadwaja before falling into the Bay of Bengal.

**Krishna:**

Krishna, the second largest river in the state rises about 64 Kms from the Arabian Sea (17° 58') in the western ghats, north of the hill station of Mahabaleswar in Maharashtra state. Its catchment area of 2,58,938 Sq.Kms. is spread over Maharashtra, Karnataka and Andhra Pradesh. It’s total length is 1440 Kms of which 620 Kms lie within the State. The river enters the state near Tangadigi village in Mahaboobnagar district. It flows through Kurnool, Nalgonda, Guntur and Krishna districts, splits into three main branches and falls into the Bay of Bengal between Hamsala Deevi and Nachakunta in Krishna district. The important tributaries of this river are Tungabhadra, Bhima, Dindi, Wyra, Tammileru, Chandravanka, Naguleru, Hundri and Musi.

**Tungabhadra:**

It is the main tributary of the Krishna river. It is a confluence of two rivers viz., the Tunga and
Bhadra. Both these rivers rise from the Varaha hills in Chikmagalur district of Karnataka State. It enters the state near Kosigi in Kurnool district and after flowing for 180 Kms joins Krishna river near Moravakonda 48 Kms from Kurnool. It has a catchment area of 1.93 L. Sq.Kms and it separates Kurnool district from Telanagana area.

Pennar:
Also called the Pinakini, this river rises in the Nandi hills in Kolar district of Karnataka state, enters in the Andhra Pradesh state near Chowluru in Anantapur district. After flowing in Anantapur and Cuddapah districts, it enters Nellore district through a fine gorge in the Veligonda at Somasila. Its total catchment area is about 55,213 Sq.Kms Spread over Andhra Pradesh and Karnataka. It is mostly dry because of the denudation of forests. Its main tributaries are the Chitravati, the Kuduru, Papaghni, Sagileru and Jayamangali.

Vamsadhara:
It rises in the Eastern Ghats of Orissa State, enters the state near Pathapatnam taluk of Srikakulam district. Its total length is about 185 Kms of which 90 Kms lie in Srikakulam district. The rivers catchment area is 4400 Sq.Kms. As its banks are fringed with vamsas (Bamboos), it is called Vamsadhara.
Nagavali:

It is also called as the Langulya, Originates in the Eastern Ghats in Orissa State and enters the Andhra Pradesh State near Parvathipuram taluk of Srikakulam district. Its total length is 220 Kms of which 115 Kms lie in Andhra Pradesh state. It flows through Vijayanagaram and Srikakulam districts before joining the sea near Mofazbandar in Srikakulam district.

Manjira:

This is the Chief tributary of Godavari. It rises from 823 m height in Pathoda taluk of Bir district in Maharastra state. It flows through or along the districts Osmanabad and Bidar and enters the Medak district of Andhra Pradesh in South-East direction. The catchment area is about 30,821 Sq.Kms.

Gundlakamma:

Rising in the Nallamalas in Kurnool district it flows through Prakasam district before falling into the sea near Devarampadu village in Prakasam district.

Swarna Mukhi:

Rising in the Chandragiri hills of Chittoor district, it flows through Nellore district and falls into the sea, near Siddavaram in Nellore district.
Other rivers:

There are a few independent rivulets like the Sarada, Varaha, Meghadrigadda, Saragudugedda, Thandava, Gosthani and Champavathi, all rising in the Eastern Ghats and falling into the sea in Visakhapatnam district.

Tanks and Lakes:

Huge tanks and lakes, most of them fed by river channels, dot the countryside. To cite only a few the Anantasaaram tank in Nellore district, the Anantharaja Sagar in Cuddapah, the Cumbum tank in Prakasam and Nandyal tank in Kurnool, the Pakhal lake, Ramappa lake, Lakkavaram lake all in Warangal and the Kolleru lake in West Godavari district cater to irrigation needs. The salt water lake in Pulicat is a thriving bird sanctuary.