DESCRIPTION OF THE STUDY AREA
Map indicating the Study Area
CHAPTER-III

DESCRIPTION OF THE STUDY AREA

This chapter deals with the description of the study area.

3.1. Description of the study area:

The State of Karnataka with its territorial content as it exists now was formed on the 1st of November 1956 under the States Reorganisation Act. It was known as Mysore State until the 1st of November 1973. It is located in the western part of the Deccan Peninsular Region of India and it lies between $11^\circ3'$ to $18^\circ45'$ N latitudes and $74^\circ12'$ to $78^\circ40'$ E Longitudes.

The State extends to about 700 kms from the North to South and 400 km from East to West and covers an area of 1,91,791 sq.km (5.84 per cent of India's total area). The narrow elongated belt of the State between the Arabian Sea and Western Ghats forms a enchanting coastline of about 400 km. As per the 1991 census, the State has a population of about 44.97 million (5.31 per cent of country) with a population density of 235 persons per sq. Km. It is the eighth largest State both in terms of area and population in India.

3.2. Rainfall

Within the State, there are considerable temporal and spatial variations with regard to rainfall in amount as well as its distribution. The annual rainfall ranges from 466.5 to 4694.4mm, the average being 1354.7mm. Of the total rainfall, south west monsoon accounts for 73 per cent, Northeast 16 per cent, hot weather 10 per cent and cold weather 1 per cent. The average number of rainy
Flows vary from 103 to 123 in the coast (Zone 10), 106 to 118 in the hill tracts (Zone 9), 68 in Bangalore area (Zone 5) and only 40 in Chitradurga (Zone 4). The western ghats receive the highest rainfall while the eastern part of Chitradurga gets the lowest. The monthwise distribution of rainfall is given in Table 3.1.

North eastern, northern, central, south eastern and southern dry regions of the State which make up as much as 12.04 m ha of geographical area receive average annual rainfall from 455 to 889 mm. The coastal and hill region together accounting for 3.73 m ha of geographical area, receives 904 to 1303 mm annual rainfall. The remaining 3.28 m ha (Zones 1.7 and 8) receive 612 to 1303 mm annual rainfall. Most of this rainfall is received from June-October leaving the remaining part of the year almost dry. Frequent droughts of varying intensity occur during rainy season. The co-efficient of variability of mean annual rainfall is high, exceeding 30 per cent in the districts of Bijapur, Chitradurga, Gulbarga, Raichur and Bellary. In the coastal hill zones, co-efficient of variability is between 15-20 per cent while in the remaining area it ranges from 20-30 per cent. This analysis of rainfall clearly brings out the fact that 12.04 m ha of geographical area out of the total 19.05 m ha (68%) receives low rainfall with frequent dry spells and agricultural productivity in this area is highly unstable.

3.3. Temperature:

The average minimum temperature for the whole state in winter is 17.5° varying from 20.3° in the coast to 14.3 - 16.3° C in the interior. The temperature increases after February reaching the highest point in April in the southern plains
and May in the northern plains. The mean maximum temperature is higher than 40° C in Bidar-Gulbarga region. It progressively declines towards south western parts the lowest being 28.3° C at Agumbe (hill regions).

The temperature prevalent throughout the state facilitates year round cropping if water is available. However, certain adjustments in the nature of crops to suit the local temperature regimes during different parts of the year is essential to ensure satisfactory yield of crops. Most frequently, the delayed sowing/planting of crops in the south west monsoon period results in exposure of crops like Rice to low temperature at the critical stage (flowering stage) affecting the yield adversely. Similarly, high temperature in April-May in the northern districts of the state affects the seed setting of crops resulting in poor productivity.

3.4. Soils:

Broadly five soil types are encountered in the State. They are black soil, red soil, mixed red and black soil, laterite soil and coastal alluvial soil. The extent of occurrence of the different types of soil in the state is given in Fig.1. It is observed that black soil (vertisol) accounts for an area of 3.3 m ha and red soil (alfisol) for 3.6 m ha.

Black soils are further classified into shallow black soil (less than 23 mm depth), medium black soil (23-29 mm depth) and deep black soil (more than 90 cm depth). Shallow black soils need suitable soil and moisture conservation measures for satisfactory crop yields because of low water holding capacity limited by the shallow depth. Medium and deep black soil are fertile and produce
good yield because of high clay content. Deep black soils produce deep cracks on drying and need a higher amount of rain to moisten the profile. Therefore in the deep black soils, rain water from early rains is conserved and rabi crops are grown. Medium black soils are suited for both kharif and rabi sowing depending upon the amount and distribution of the rainfall. Both medium and deep black soils need to be managed carefully when put to irrigated farming because of their proneness to salinity and water logging. Black soils are generally low in nitrogen, phosphorus and medium to high in potash. Under situations of adequate moisture availability they respond well to manure and fertilizer application and produce bumper crop yields.

Red soils occur in the undulating landscape area of acidic rocks such as granite and granite gneiss. Red soils are further classified into red sandy soil and red loamy soils. These soils are also distinguished based on topographic situation as upland soils, midland soils and low land soils. The upland and mid land soils are low in moisture holding capacity and poor in soil fertility. These soils are well drained and respond well to management and irrigation. Soils in low land area are prone to salinity, alkalinity and water logging problems if the irrigation water is not managed properly.

Mixed red and black soils are derived from complex biological material comprising gneiss. They occur in parts of Zones 2, 3 and 4. Because of mixed properties, these soils are relatively more productive when soil moisture is not limiting. They can be used intensively under irrigation with provision of drainage in low lying areas.
Laterite soils occur on gently undulating plain and hilly topography of peninsular gneiss and Dharwad schist, in major part of Zone 9. These soils are also found in parts of Zones 1, 2 and 5. The soils are well drained with low moisture holding capacity and rapid permeability. They respond to liming, irrigation and manurial practices. The soils are low in phosphorus and potash.

The coastal alluvial soils occur on gently sloping to nearly level plains as a narrow strip in Zone 10. The soils are formed a materials washed down from western ghats. They are deep to very deep with texture varying from gravelly to clay loams. In some low lying areas, salinity has developed due to inundation of sea water. The soils are productive when properly managed.

3.5. Irrigation:

As per 1995-96 statistics the net irrigated area in the State is 2.30 million ha which is 19.25 per cent of the gross cropped area and 22.09 per cent of the net sown area of 10.42 million hectares. Canals, wells and tanks are the main sources of irrigation accounting for 41.28 per cent, 18.57 per cent and 9.98 per cent, respectively.

3.6. Major crops grown in the State:

Cereals occupied an area of 5.33 million hectares (59.09 per cent of net sown area), the major Cereals being Rice, Jowar, Bajra, Maize, Wheat etc., Pulses occupied an area of 1.51 million hectares (16.74 per cent of net sown area) comprising of Bengalgram, Redgram, Greengram, Blackgram, etc., Oilseeds comprising of Sunflower, Groundnut, etc., accounted for 1.19 million
hectares (13.19 per cent of net sown area) while the fibre crop Cotton and the Commercial crops Sugarcane occupied 0.67 (7.42 per cent of net sown area) and 0.32 (3.54 per cent of net sown area) million hectares, respectively during 1995-96.

3.7. AGROCLIMATIC ZONES OF KARNATAKA:

The basis and details of the zones indicating the number of taluks, major districts, rainfall, elevation, soils, geographical area and cropped area are presented in Table-3.1.

3.7.1. NORTH EASTERN TRANSITION ZONE:

The North eastern transition zone is a small zone which is made up of entire district of Bidar and part of Gulbarga district. It is predominantly a Kharif zone which receives most of its rain during June-September. The annual rainfall ranges between 800-900mm. The soils are shallow to medium black clay soils in major areas. The crops grown are Pulses, Rabi and Kharif Jowar, Groundnut, Oilseeds, Cotton, Bajra, Sugarcane and Paddy.

3.7.2. NORTH EASTERN DRY ZONE:

The zone consists of parts of Gulbarga and Raichur district and it receives most of its rain between June to September. The rainfall varies from 630-807mm. The soils are deep to very deep black clay in majority of the area and shallow to medium black soils in minor pockets. The crops grown are rabi and Kharif Jowar, Bengalgram, Tur, other Pulses, Small millets, Bajra, Groundnut, Paddy, Cotton and Chillies.
3.7.3. NORTHERN DRY ZONE:

It is the largest zone and consists of the entire districts of Bijapur, Bellary, parts of Raichur, Dharwar and Belgaum districts. This zone is characterised by scarce rainfall and its poor distribution. The soils are medium and deep black in majority of the zone and sandy loam in the remaining areas. The crops grown are Kharif and Rabi Jowar, Pulses, Small millets, Bajra, Groundnut, Paddy, Cotton, Ragi, Wheat, Sugarcane and Forage crops.

3.7.4. CENTRAL DRY ZONE:

This zone consists of the whole of Chitradurga district, parts of Tumkur, Chickmangalore and Hassan districts. The annual rainfall ranges from 580-717 mm. The soils are red loams in most of the zone and shallow to deep black in the remaining areas. Important crops raised includes Jowar, Groundnut, Tur and other Pulses, Small millets, Bajra, Sugarcane, Paddy, Cotton, Ragi, Wheat, Maize and Plantation crops.

3.7.5. EASTERN DRY ZONE:

This zone has a low rainfall pattern but with a more uniform distribution. The zone consists of whole of Bangalore and Kolar districts and parts of Tumkur district. The soils are mostly red sandy loams. The rainfall varies from 679-889 mm. The crops raised are Small millets, Bajra, Pulses, Groundnut, Paddy, Ragi, Maize, Soyabean, Horticultural crops, Fodder crops and Mulberry.
3.7.6. SOUTHERN DRY ZONE:

This zone consists of the whole of Mandya district and parts of Mysore, Tumkur and Hassan districts. It receives low rainfall and soils are predominantly red sandy loams. The important crops grown include Paddy, Ragi, Pulses, Small millets, Groundnut, Oil seed, Cotton, Sugarcane, Mulberry and Plantation crops.

3.7.7. SOUTHERN TRANSITION ZONE:

This zone comprises parts of Hassan, Shimoga, Mysore and Chickmagalore districts. It receives 700-1500mm rainfall spread out in three different seasons. The soils are mostly lateritic and red sandy loams and red loamy soils in smaller proportions. Kharif Jowar, Pulses, Groundnut, Paddy, Ragi, Maize, Cotton, Plantation crops, Sugarcane, Aromatic Plants and Tobacco are the important crops grown.

3.7.8. NORTHERN TRANSITION ZONE:

It consists of parts of Dharwar and Belgaum districts. The rainfall ranges from 619-1303mm. The soils are shallow to medium black clay soils and red sandy loams in almost equal proportions. Important crops of the area are Jowar, Pulses, Groundnut, Paddy, Ragi, Fodder crops, Small millets, Sugarcane, Cotton, Wheat and Horticultural crops.

3.7.9. HILLY ZONE:

The Malnad or Hilly zone of Karnataka represents unique Agroclimatic features with rolling topography of mountains and deep valleys. The zone consists of parts of as many as seven districts, via Uttara Kannada, Belgaum, Shimoga, Chickmagalore, Dharwad, Kodagu and Hassan. The rainfall varies
from 1300-3800mm. The soils are red clay loamy in most of the zone. Paddy, Pulses, Maize, Jowar, Sugarcane, Ragi, Cotton, Spices and Plantation crops are the important crops grown.

3.7.10. COASTAL ZONE:

It is characterised by heavy rainfall. It consists of the entire Dakshina Kannada district and part of Uttara Kannada district. It receives heavy rains which vary from 3000-4700 mm. The soils are red lateritic and Coastal alluvial type. Paddy, Groundnut, Pulses, Tur, Sugarcane and Plantation crops are grown in this zone.
<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Region (Taluka)</th>
<th>Main areas</th>
<th>Rainfall range (MM)</th>
<th>Elevation in major areas (M.S.L.)</th>
<th>Soil Type</th>
<th>Total geographical cropped area</th>
<th>Gross cropped area</th>
<th>Net cropped area</th>
<th>Total cropped area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>North Eastern Transitional (7 Taluka)</td>
<td>Bidar</td>
<td>629 to 919.00</td>
<td>800-900</td>
<td>Shallow to medium black clay soils in major areas. Red lateritic Soil in remaining areas.</td>
<td>871.0 (4.6)</td>
<td>698.2</td>
<td>618.2 (70.8)</td>
<td>37.8 (6.1)</td>
</tr>
<tr>
<td>2.</td>
<td>North Eastern Dry Zone</td>
<td>Gulbarga</td>
<td>639 to 896.8</td>
<td>300-458 in all taluks</td>
<td>Deep to very deep black clay soils in major areas shallow to medium soils in minor pockets</td>
<td>1782.7 (9.3)</td>
<td>1389.9</td>
<td>1336.5 (75.8)</td>
<td>83.2 (6.2)</td>
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<tr>
<td>3.</td>
<td>Northern Dry Zone (35 taluks)</td>
<td>Bijapur Railchur Bellary</td>
<td>464.6 to 755.7</td>
<td>450-800 in 28 taluks in remaining taluks 800-900</td>
<td>Black clay medium and deep in major areas, sandy loams in remaining areas.</td>
<td>4753.8 (25.1)</td>
<td>4.15.7</td>
<td>3548.7 (76.3)</td>
<td>892.3 (18.0)</td>
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<td>4.</td>
<td>Central Dry Zone (17 taluks)</td>
<td>Chitradurga Tumkur</td>
<td>455.5 to 714.4</td>
<td>800-900 in major areas in remaining areas 450-800</td>
<td>Red Sandy loams in minor areas shallow to deep black soil in remaining areas.</td>
<td>1943.9 (18.2)</td>
<td>1048.8</td>
<td>1022.8 (52.6)</td>
<td>157.2 (15.4)</td>
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<td>5.</td>
<td>Eastern Dry zones (24 taluks)</td>
<td>Kolar Banglore</td>
<td>679.1 to 888.0</td>
<td>800-900 in major areas in remaining areas 900-1500</td>
<td>Red loamy soils in major areas clay lateritic soils in remaining areas.</td>
<td>1808.2 (9.5)</td>
<td>905.3</td>
<td>875.6 (48.4)</td>
<td>170.8 (19.5)</td>
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<td>6.</td>
<td>Southern Dry zone (19 taluks)</td>
<td>Mysore</td>
<td>670.6 to 888.6</td>
<td>800-900 in major areas in remaining areas 450-800</td>
<td>Red sandy loams in major area and in remaining areas, pocket of black soils.</td>
<td>1739.4 (9.1)</td>
<td>955.2</td>
<td>804.7 (46.3)</td>
<td>224.1 (27.6)</td>
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<td>7.</td>
<td>Southern Transition Zone (13 taluks)</td>
<td>Hassan</td>
<td>611.7 to 1053.9</td>
<td>800-900 in major areas partly 900-1500 and partly 450-800</td>
<td>Red sandy loams in major area and in remaining areas, red loamy soils.</td>
<td>1218.8 (6.4)</td>
<td>877.3</td>
<td>552.1 (45.3)</td>
<td>147.4 (26.7)</td>
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<td>8.</td>
<td>Northern Transition zone (14 taluks)</td>
<td>Dharwad Belgaum</td>
<td>618.4 to 1303.2</td>
<td>800-900 in major areas 450-800 in remaining areas.</td>
<td>Shallow to medium black clay soils and red sandy loamy soils in equal proportion.</td>
<td>1194.9 (6.3)</td>
<td>1077.9</td>
<td>904.6 (75.2)</td>
<td>82.3 (9.1)</td>
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<td>No.</td>
<td>Zone (Taluka)</td>
<td>Village</td>
<td>Area (Ha)</td>
<td>Clayey soil in major areas in 4 taluks 900-1500 and in 6 taluks 450-800</td>
<td>Red loamy soil in major areas</td>
<td>Red lateritic Coastal alluvial</td>
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<td>3</td>
<td>Hilly Zone (22 taluks)</td>
<td>Shimoga Chickma galur Kodagu</td>
<td>964.4 to 3685.1</td>
<td>2566.7 (13.4)</td>
<td>868.7</td>
<td>627.6 (24.5)</td>
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<td></td>
<td>1167.4 (6.1)</td>
<td>349.4</td>
<td>95.1 (37.3)</td>
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<td></td>
<td>10 Coastal zone (13 taluks)</td>
<td>Uttara kannada Dakshina Kannada (37.3)</td>
<td>3010 to 4994.4</td>
<td>349.4</td>
<td>254.4 (21.8)</td>
<td>95.1 (37.3)</td>
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<td>455 to 4694</td>
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<td>Total</td>
<td>11867.3</td>
<td>10643.4</td>
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Note: Figures in brackets indicate percentage.
AGRICULTURAL ZONES IN KARNATAK