STUDY AREA

The state of Karnataka is situated in the western part of the Deccan Peninsular, India. The name of Karnataka denotes a region inhabited predominantly by Kannada speaking people. The state is extended between 11°31' and 18°45' North latitudes and 74° 12' and 78° 40' east longitudes. It covers an area of about 1,91,791 km² which is 5.83% of the total area of the country. The state extends about 750 km from north to south and about 400 km from east to west and ranks 8th largest state in India. The state is surrounded by Maharastra on the north, on the north – west by GOA, on the east by Andrapradesh, on the south-west by Kerala and on the west by the Arabian Sea.

Fig 2.1 Location of Karnataka State
The state in its present form came into existence in 1956 under the states reorganization act, on linguistic base. The state was being called as Mysore state till 1973, when it was renamed as Karnataka. At present Karnataka state is divided into four administrative divisions’ viz., Bangalore, Mysore, Belgaum and Gulbarga, and 49 sub divisions, 27 districts, 175 taluks and 745 hoblies. Bangalore is the capital of the state.

PART-A

GEOGRAPHICAL FEATURE OF KARNATAKA

Geology of Karnataka:

The geological history of Karnataka is mainly confined to the two oldest areas which are Archaean and the Proterozonic. More than three fourths of the area of the state is covered by the oldest rocks. A substantial part of north Karnataka is covered by Deccan trap.

Ancient supracrustalls are the oldest dated so far in Karnataka. They are a group of grey gneisses giving an age of 3,400 million years. They are also described as belonging to Sargur schists. Auriferous schist belts (kolar type) are next in order of age and are a series of basic igneous rocks. They are well developed in the eastern part of the state. Older gneissic complex consists of an extensive group of grey gneisses (3400 to 3000 million years) and act as the basement for an extensive belt of Schists. Younger gneiss complex consists of a group of gneissic rocks mostly of granodioritic composition. They are found in the eastern part of the state.

Younger schist belt (Dharwar type) are the prominent schistose rocks. They are Achaen in age and belong to the age group of 2900 to 2600 million years. Two main divisions in this super group are Bababudan and Chithraduraga. Ranebennur group is presently classified as the top most formation within Chithraduraga groups.
Younger (Cosepet) granites extend north-south directions as a narrow belt 50 km wide. Isolated masses of granites like those of Chithradurga, Arsikere and Banavara belong to the same age group as the younger granites (2600 million years).

The close of the Archean is marked by a period of dyke formation. The majority of the dykes are younger than 2400 million years. They are doleritic in composition. Besides dolerites, a number of alkaline dyke intrusives have been described in the southern part of Karnataka.
The elevation of the Kaldagi and Bhima group of sediments to form the land mass of Peninsular India marked the end of Proterzoic era. The Kaladgi sediments are separated from the under lying schistose and granitic rock of Achaean age by a profound unconformity the great Eparchean unconformity the peninsula of India, of which Karnataka forms of part, was not subject to any major changes after the Proterozoic.

There is a big gap in the geological history of Karnataka after the close of Bhima period. For another 500 million years, there is no evidences of any major disturbance till the end of the cretaceous. The next major event was the tremendous burst of volcanic activity. Most parts of northern Karnataka are covered by the Deccan traps. The western margin close to the coast was affected by large scale dyke intrusion. The dykes assigned an age around 65 million years, connect them with the commencement of deccan volcanic activity.

The capping of laterite is found over the Deccan traps and most spectacular development of laterites is seen around Bidar. Greater part of north Karnataka is covered by black soil and it covers all types of rocks; Deccan traps, gneisses schists even laterite. Rivers flowing through the Deccan trap area show thick accumulation of transported black solid within their valleys.

The geological history of Karnataka carton thus extends to the remote and hoary past. It displays an unequalled spread of events from the oldest Archean to the present. Lithological and tectonic diversity, a near comprehensive pre-Cambrian record and of the most part magnificent exposures have made Karnataka unique in the study of pre-Cambrian geology.

**Mineral Resources:**

Karnataka state contains deposits of asbestos, bauxite, chromite, dolomite gold, iron ore, kaolin, limestone, magnetite, ochre quartz and silica
sand. The state is the leading producer of felsites, mouldings and fuchsite quartzite.

Karnataka is the major gold producing state in the country with the two major mines located in the districts of Kolar and Raichur. But now gold deposits have been mostly exhausted. There are vast deposits of iron ore in different parts of the state. The iron ores of Bellary-Hospet region are considered to be one of the world’s best iron ores.

About 4200 sq.km of granite and granitic rocks area located in the state. Most of the ornamental granites are found in Mysore, Chamarajanagar, Bangalore, Mandya, Tumkur, Kolar, Chithradurga, Davanagere, Bellur Raichur, Koppala, Bagalkot and Bijapur districts.

Relief features of Karnataka:

Karnataka state has different types of relief features high mountains, plateaus, residual hills and coastal plains. The average elevation of the region ranges between 600-900 meters above the mean sea level. The entire landscape is unduly broken up into mountains and deep ravines. Numerous rivers take their births in the mountains ranges originating from the Nilgiris, which form the southern boundary of the state and two sets of mountains ranges running in a north-west and north-east direction. They are Western and Eastern Ghats. Among the tallest peak of Karnataka are the Mullayyanagiri [1905], Bababudangiri, Chandradrona parvata [1894m] and the Kudremuk [1895m], in Chikmangalore district and the Pushpagiri [1908m] in Kodagu district. Physiographically, the state may be divided in to 3 regions. Viz.

1. The maiden
2. The malnad
3. The costal

The maiden: The maiden is an open country with a rolling surface that stretches to the east of the malnad. This region is divided into the Northern maiden and Southern maiden.
The Northern Maidan Region:

The northern maidan lies to the east of the semi malnad and stretches to the northern and eastern boundary of the state. In the northern parts, the region is an extensive plateau with an elevation of 365 to 610 meters above the sea level, sloping towards the east, it is traversed by several isolated ridges and a series of rocky outcrops and gigantic boulders. The area is drained by the Krishna, the Bhima and the Tungabhadra river systems. These areas presents a landscape of extensive plateau covered with rich black cotton soil and generally open treeless fields. The soil is known to be retentive of moisture and of average fertility. The rainfall ranges from 350 to 900 millimeters. There are pockets of irrigated areas served by tanks, wells and canals, the major crops that are grown in this area are jowar, wheat and cotton in dry areas and paddy and sugar cane in irrigated patches.

![Regions of Karnataka](image)

Fig 2.3
The Southern Maidan Region:

The southern maidan represents the core of old Mysore state. This region lies to the eastern edge of the malnad and is about 915 to 975 meters in height. This region is dissected by the Tungabhadra, Cauvery, Pennar and Palar rivers and is divided into numerous valleys, widely differing in size and shape. The soils are predominantly red and are generally less fertile and they exhibit a variety of colours varying with composition. The rainfall decreases and its variability increases from West to East. There are over 16000 tanks in the region and hence this region is known as “The Tank Country of Karnataka”. The major crops that are grown in this area are Rice and Ragi. In the valleys, arecanut and coconut plantations are also found.

The Malnad Region:

The malnad region which spreads about 650 k.m long and 50 to 65 km wide to the East of Western Ghats edge, is mainly forested, hilly country. It is a landlocked area with a height of more than 152 meters above the sea level in the west and gradually rises towards the East, culminating in a series of range of hills with an average height of about 900 meters. It is separated from the coastal plains by the steep wall of the ghats and in the east it gradually merges with the southern maiden. The malnad is a region of hills and dales, of forests and perennial rivers, of mountains and waterfalls, the terrain is undulating, broken up by chains of rocky hills and scoured by deep ravines. The malnad is characteristically a region of heavy and reliable rainfall decreasing from 2500 to 1000 millimeters from West to East. The climate of the region is generally hot and wet. The soils of malnad are lateritic and are leached ones; nevertheless, they are of average fertility. The major crop that is grown in malnad area is paddy and coffee, Areca nut and coconut plantations are also grown. The well known Mysore sandalwood is found in the south-eastern fringes of the region.
The Costal Region:

The costal region lying between the Western Ghats edges and the Arabian Sea is about 320 km long and 13 to 32 km wide in the north and 50 to 65 km wide in the south. It is also known as “The Konkan Coast” or “The Canara Coast”. It covers Dakshina Kannada, Udupi and Uttara Kannada Districts. This region is traversed by several ridges and spurs of Western Ghats. It is a difficult terrain full of rivers, creeks, isolated peaks and detached ranges of hills. It presents a seemingly endless mosaic of palm groves and curved snow white beaches, interspersed with lagoons and backwaters, against a backdrop of majestic mountains clad in glorious green.

The average height of the plain is 75 meters above the mean sea level but in some places the height is about 150 meters.

The soils are lateritic except in isolated stretches near the sea side where alluvium is found. The climate is hot but equable, with ample and reliable rainfall, The region receives very heavy and assured rainfall which exceeds 2,500 millimeters. The major crops grown here are rice, coconut and arecanut and some people are engaged in coastal fishing and boat building.

Drainage System of Karnataka:

The drainage system of Karnataka can be easily classified into two basins/divisions. The east flowing and the west flowing. The east flowing system can be further divided into four drainage basins. Krishna occupies a large area compared to all the other rivers in Karnataka. Next in order is the Cauvery basin, North Pennar, South Pennar, Palar rivers are the other important drainage systems. In the west flowing systems, kali Bedti, Sharavathi, Nethravathi are important river systems.

The Krishna River System:

The river Krishna raises in the Western Ghats and it flows through the state of Maharastra, Karnataka and Andrapraesh and joins the Bay of
Bengal. About one third of its total catchments area lies in Karnataka. The Krishna River flows about 483 km of length in Karnataka entering the state in north-western part of Belgaum district and flows through Belgaum, Bagalkot, Bijapur and along the boundary of Gulbarga and Raichur districts. The main tributaries are the koyna, the Yerla, the Varna the Panchaganga, the Dudhganga, the Ghataprabha, the Malaprabha, the Bhima, the Tungabadra and the Musi.

The Ghataprabha rises at Amboli in Ratnagiri district of Maharastra in the Western Ghats. It enters into Karnataka in the north-western part of Karnataka and flows through Belgaum and Bagalkot district before joining...
the Krishna at Hadalur village, north of Bagalkot. It forms 53 km high waterfalls called the Gokak Falls near Gokak in Belgaum district.

The Malaprabha rises in the West Ghats, at an altitude of 792 meters 16 km west of Jamboti in Belgaum district of Karnataka. It joins Krishna at kudalasangama about 304 km from it source and it reach near Soudatti, is through a deep gorge known as “Navilteertha or the “Peacock Gorge”, which is across colorful sandstone. Its principal tributaries are the Bennihalla, the Hirechalla. The catchment’s area of the Malaprabha and its tributaries is 11549 sq km.

The Tungabhadra river is a major tributary of the Krishna. It drains an area of about 57671 sq km in Karnataka. The Tunga and the Bhadra rivers rise very close to each other in the Western Ghats at Gangamula in Chikmagalur district. They flow separately for some distance and join each other near Kudli to form the Tungabhadra river, which later joins the Krishna river at Kurnool in Andrapradesh, and its important tributaries are the Vardha and the Hagari.

The Cauvery River System:

River Cauvery rises in Brahmagiri at Talacauvery in Kodagu district and flows through Karnataka and Tamilnadu and empties into the Bay of Bengal. It flows through Karnataka for a distance of about 320 km and its total catchment’s area is 81150 sq km out of which 42.2% lies in Karnataka and rest in Tamil Nadu. Its major tributaries in Karnataka are the Hemavathi, Harangi, Lokapavani, Arkavathi and Shimsha which joins it through north bank and Laxmanateerta, Kapila, Suvarnavati, Bhavani and Amaravathi from the south bank. The Cauvery basins cover 18% of the state’s area comprising 7 districts lying partially in the basin. These are Mysore, Mandya, Kodagu, Chikkamagalur, Hassan Tumkur and Bangalore.

The course of Cauvery is tortuous, it’s bed is rocky, it’s banks high and covered with luxuriant vegetation. There are number of water falls in the bed of the river and it forms three well known Islands viz.,
Srirangapatna, Shivasamudram and Srirangam. The first two are in Karnataka and the last in Tamil Nadu. The important waterfalls, along the course of the river are the Chunchanakatte falls, Shivasamudra falls and Hogenkal falls. At Shivasamudram, the river branches into two and each branch has a fall of more than 100 meters, the western is known as Gaganchukki and the eastern fall as Barachukki, the two branches then meet to pass through the Mekedatu gorge, before the river forms the common boundary between Karnataka and Tamil Nadu.

The Hemavathi is one of the chief tributaries of the Cauvery. It rises on the Western Ghats at an elevation of 1219m and runs south-east. The length of the river is about 245 km and joins the river Cauvery near Krishnarajasagar.

The Kapila, a tributary of the Cauvery, rises in the Western Ghats in North Waynad. The Kapila forms the border between Karalla and Karnataka. It joins the Cauvery river at Tirumakudala Narasipur.

The Shimsha rises in Tiptur taluk of Tumkur district at an elevation of 914m. It’s drainage area is about 8470 sq km before joining Cauvery. Shimsha makes a 94m long Shimsha Falls.

Godavari Basin:

Only a small portion of Godavari basin lies in Karnataka state in Bidar district in Manjara river sub basin.

The Manjara river is one of the chief tributaries of the Godavari river. It origin is in Bihar district of Maharashtra state at an attitude of 823m above the mean sea level. It flows through the Maharashtra state, the Bidar district of Karnataka and the Andrapradesh state. The total catchment’s area of Manjara river is 30464 sq km of which 4405 sq km is found in Karnataka.

The Karanja river is one of the tributaries of the Manjara river. The Karanja river rises in Medak district of Andrapradesh state at an attitude of about 670m it flows between Andrapradesh and Bidar district of Karnataka.
and joins Manjara river at Naradasangum. It forms the boundary between Karnataka and Andhra Pradesh.

**Pennar System:** The Uttarapinakini river which flows in Karnataka and Andhra Pradesh rises in Nandidurga range of Karnataka and it is also known as Pennar. It flows in north-west direction through the Kolar and Tumkur district of Karnataka and Hindupur and Penugonda taluk of Andhra Pradesh, total length of the river is 597 km. It flows 61 km in Karnataka. Tributaries of Uttarapinakini are Jayamangala Chitravathi and Papaghini.

Dakshina Pinakini rises in Kolar district at Harnashetti village; it flows in Karnataka, Tamil Nadu and Pandichery. In Tamil Nadu it is known as Ponnaiyar. Finally it joins the bay of Bengal at Cuddalore.

**The West Flowing River System:**

These river rise in the Western Ghats and flow westwards through Uttara Kannada, Udupi and Dakshina Kannada districts and fall into the Arabian sea. The important west flowing rivers are, the Kali, the Sharavathi, the Gangavali the Bedti, the Aghanashins, the Haladi, Mahadayi the varahi, the sita, the Swarna and the Nethravathi. These rivers are very short and split.

The Kali river rises at Diggi Ghat in Supa taluk of Uttar Kannada district, with a catchment's are of 4841 sq km. It has created Lalaguli water falls of 62m high. The total length of the Kali river is 184 km and joins the Arabian sea near Karwar. The major tributaries of this river are the Panchamuri, the Barchi, the Tattihalla, the Kaneri and the Mardi.

The Sharavathi river rises at Ambuthirtha in Shimoga district in the Western Ghats. Its length is about 128 km and has a drainage area of 2771 sq km and fall into the Arabian sea at Honnavar in Uttar Kannada district. It has formed 253m high water falls called Jog falls at Gerusoppa.
The Nethravathi river takes its origin in the Western Ghats. Near Ballarayanadurga in Chikamagalur district. It flows distant about 96 km and has total catchment area of 3355 sq km and joins the Arabian sea near Kodiyalabayaal (Mangalore city) and it flows through the district of Uttar Kannada and Dakshina Kannada districts. It has formed Bandage falls. The main tributaries of Nethravathi are the Gurupura, the Charmudi and the Shirshila.

The river Gangavali known as Bedti rises at Someshwar near Dharwad at an elevation of 700m above the M.S.L. Total length of the river is about 161 km and it forms the 137km high Magod falls. It joins the Arabian Sea near Gangavati village in an Ankola taluk of Uttar Kannada district.

Of all the river systems in Karnataka, the Krishna and the Cauvery rivers are the most important, because most of the reservoirs, dams, constructed in the state are only to these two rivers. The entire irrigated area is also restricted to these river systems only. The westward flowing rivers are suited for generation of power. These rivers are continuously engaged in the process of erosion and transport large amount of silt and deposit it along their banks, thus giving rise to the fertile plant of alluvium.

Climate:

The climate of the Karnataka state may be described as Topical Monsoon type. Over greater part of Karnataka summers are languorously warm and winters are bracingly cool. Very moist rainy monsoon climate is found in the west coast and malnad interior of the state of semi arid climate, arid and very warm climate is in Bellary and Bijapur region. Higher altitude region like malnad is the highest rainfall region while the northern maiden is the driest because of lower attitude and rain shadow location. The southern maiden is relatively higher in altitude which has equable climate and moderate rainfall.
The year is divided into four main seasons which are characterized on the bases of different climatic conditions in the state. They are,

1. Winter season (December-February)
2. Summer season (March-May)
3. Southwest monsoon season (June-September)
4. Retreating or north-east monsoon season. (October-November)

**The Winter Season:**

This season is characterized by generally clear skies low humidity and the temperature is relatively low, except in the coastal belt, the temperature varies from 15°C and 24°C in the southern part and between 21°C and 25°C in the northern part of the state. January is the coldest month of the year. Normally pressure is the high and in the early morning the dense fog prevails all over the state during this period. There are little rainfall in this season. The amount of rainfall is less than 10 mm over most part of the state and it is a dry period.

**The summer season:**

During this season temperatures vary from southern maidan to northern maidan. Temperature can normally go as high as 40°C in the northern maidan, in the southern maidan they range from 25°C to 40°C. During March and April month there is generally low humidity and humidity begins increasing from May onwards. The low pressure develops over the maidan and attracts sea breezes which result in pre-monsoon showers. In the month of April-May temperature reaches the maximum, the north eastern parts of the state record the highest temperature. The total rainfall in the season increases from 50 mm in the extreme north east to 200mm in the south western part of the state and the minimum monthly temperature is also low here.
The south west monsoon season:

Karnataka state receives more than 75% rainfall from the south west monsoon during this period; the temperature is lowered because of the high humidity in the air and an overcast sky. Rainfall is heavy throughout the state but the reliability of rainfall decreases as one moves towards the east. Heavy rainfall occurs in the coastal region, western ghats and malnad regions, July is the rainiest month of the state.

The retreating monsoon season:

This season is also known as the north east monsoon season and begins in the month of October. There will be a change in the wind regime from south west or west north east and there will be a decrease of humidity and cloudiness. Rainfall occurs mainly in October and November with very little rain in December, this is the season when occasional depressions and cyclones are formed in bay of Bengal, causing widespread rain over the southern part of the state.

Distribution of rainfall in the State:

The state receives the annual rainfall from south west and north east monsoon. The south-west monsoon is the main source of rainfall in the state. We can see diversity in rainfall distribution in Karnataka. The seasonal monsoon winds, realief feature and peninsular delta covered by sea are mainly responsible for this diversity. The annual rainfall is highest over the Western Ghats and lowest in the eastern part of Chithradurga, rainfall decreases rapidly as we move towards the east of the Western Ghats. More than 4000mm annual rainfall occurs in the north of Dakshina Kannada district to the western half of Kodagu covering the Western Ghats and within this region there is an area around Agumbe, where the rainfall is 5000 to 8000 mm and Agumbe receiving 8276mm rainfall, this place is the highest rainfall receiving station in Karnataka, this is also called Chirapungi of Karnataka. Another region of the state which has very heavy rainfall is
the western half of Kodagu where the rainfall is more than 5000 mm. Rainfall in Kodagu also decreases rapidly as one passes from hilly areas to the plains. In the coastal region of Dakshina Kannada district rainfall increases from the coast towards the ghats, where as in the coastal region of Uttara Kannada district rainfall decreases form the coast to eastwards. The heavy rainfall region over the state extends between the coast and a line joining the extreme south western part of Belgaum district to Yellapur and Sirsi (Uttara Kannada district), Sakaleshpur (Hassan district), Virajpet and Ponnampet (Kodagu District).

As one proceed eastwards from the Malnad region, rainfall decreases further over the northern and southern maidan areas. The low rainfall regions include the whole of Bijapur district, major part of Raichur district, the eastern half of Bellary and Chitradurga district and small parts of Belgaum, Dharwad and Tumkur district which receives less than 750 mm rainfall. Challekere receives lowest rainfall in the state which is 456mm of the four seasons, Karnataka receives highest rainfall from south west monsoon from the month of June to September, and the state receives 75% of rainfall from this monsoon. The remaining rainfall occurs in north-east monsoon during the month of October to December, winter rainfall from January to February, and summer rainfall from March to May.

Based on the distribution of rainfall in the Karnataka state, we can divide the state into three categories they are:

**Rainfall Receiving Areas:**

This region includes Dakshina Kannada, western part of Uttara Kannada, Shimoga, Kodagu, Western part of Belgaum some part of Dharwad and Mysore district, this region receives about 2550 mm of annual rainfall, some part in fact receive a rainfall of more than 7000mm. Agumbe comes under this region, actual distribution and range of rainfall in the state.
Medium Rainfall Region:

This region includes eastern part of Chikamagalore district, Mysore district, central part of Dharwar and Belgium district, Hassan, Mandya, Bangalore and Bidar Districts. Southern part of Tumkur, western part of Kolar, northern part of Gulbarga districts also fall in this region. The average annual rainfall of this area is 950mm if one moves towards the east the range of rainfall gradually decreases.

Low rainfall region:

Raichur, Bellary, Bijapur, Chitradurga, southern part of Gulbarga, eastern part of Belgaum, Kolar district, northern part of Tumkur, southern part of Mysore district come under this region. This region receives annual average rainfall of 600 mm. Some parts of Chitradurga and Gundlupet taluk of Chamarajanagar district receive very low rainfall than the average and also the rainfall in this area is uncertain.

Distribution of temperature in the state:

Karnataka state’s average temperature differs from place to place and season to season. The southern maidan has more equable temperature and the malnad is fairly cool. In the coastal areas, the range of temperature is very low. The daily range of temperature is rarely over 5°C. the highest mean monthly temperature is recorded during the month of May in the northern maidan.

The average monthly maximum and minimum temperature for different stations is given in the table 2.1. Temperature is lowest in the beginning of January and increases thereafter gradually at first and rapidly after the middle of February or beginning of March. In the southern maidan region, the highest temperatures occur in April, while in the northern maidan and coastal areas they occur in May. In January, the mean daily maximum temperature is 31° to 32°C in the coastal area and slightly above 30°C in the northern maidan area except in Bidar district where it is 28° to 29°C, in the
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Table 2.1. Average Monthly Maximum and Minimum Temperature for Representative Stations in Karnataka (in°C)
rest of the state, the mean daily maximum temperature in January varies from 27° to 29°C over the ghat areas, it is 24° to 27°C. In April, the mean daily maximum temperature is about 32°C in the Gulbarga-Raichur region and decreases to about 37°C in Bidar area, over the rest of the maidan area, it varies from 33° to 36°C, over the ghats and malnad area it is 28° to 32°C.

The highest maximum temperature is in May which is the warmest month over major part of the state, reaches 43°C in Gulbarga-Raichur region. It exceeds 40°C in the area north east of a line joining Bidar, Gadag, and Bellary. It is 35° to 38°C over the southern maidan area. Over the western ghats and Malnad area, it is 32° to 34°C.

Temperature decreases after May and by July, the daily maximum temperature decrease appreciably. The warmest region in July is Bellary, Raichur-Gulbarga area where the mean daily maximum temperature is about 32°C. It decreases to 29°C towards Bidar. It is about 28°C in the coastal area. In the southern maidan, the maximum temperature is 26° to 27°C. In the ghats and malnad area, it is about 20° to 24°C. It is of interest to note that in the coastal area, ghats and Malnad areas eastwards up to Hassan, and the maximum temperature in July is lower than the maximum temperature in January. This is because of the continuous clouding and frequent rains over the area in July, while in January the skies are clear with bright sunshine during the day time. By October, the maximum temperature increases over the coast and malnad areas and decreases over the rest of the state, although the decrease is not appreciable. After October, temperature gradually decreases throughout the state reaching the lowest in the beginning of January.

**Soil:** Soil resources are very important for agriculture and forests. Soil is one of the important natural resources in Karnataka. There is a wide variation in the geology, topography, climate and vegetation in Karnataka which has influenced the soil formation. The soil of the state can be classified into four main groups as follows:
1. Laterite soils
2. Red soils
3. Black soils
4. Alluvial soils

Laterite soils: The laterite soils are formed by the weathering of laterite rocks. These soils are found in the hilly, heavy rainfall region of the Western Ghats. They are acidic in nature and are deficient in lime and other nutrients. They occur in Chikkamagalur, Shimoga, Dakshina Kannada, Uttara Kannada, Kodagu, Belgaum and Dharwad districts and they also occur in Bidar district and to a small extent in Bangalore and Kolar district. They usually do not have much agricultural value because of their porosity and poverty in minerals. These soils are best suited for paddy crop and also for plantation crops like coffee, Tea, coconut, arecanut and pepper.

Red soil: The red soils are derived from igneous rocks, principally granites and gneisses. They are shallow compared to the black soils. They are poor because they are not moisture retentive and are deficient in lime, nitrogen and humus. The red soils are the most extensive in the state. They spread over the whole of the southern and central part of the maidan. These soils are classified into red loamy and red sandy loams.

Red loamy soils occur in western parts of Belgaum, Uttara Kannada, Shimoga, and Chitradurga. Dakshina Kannada, Hassan and Kodagu district and parts of Tumkur, Kolar and Bangalore districts. The soils are well drained with moderate permeability. Crops like ragi, wheat, Jowar and other millets groundnut and castor are grown under rainfed conditions. Coffee, cardmom and cashew are grown in hilly region.

The red sandy loams are found in some parts of Chitradurga, Tumkur, Kolar, Dharwad, Bellary, Shimoga, Bangalore, Mandya and Mysore districts. The water holding capacity of this soil is poor. Paddy, sugarcane,
ragi, pulses, millets and oil seeds are some of the important crops that are grown in this soil.

**Fig 2.5**

**Black soils:**

The black soils are called regurs. These soils are rich in lime and magnesium but poor in phosphorous and organic matter. The black soils are often classified into shallow black soils, medium black soils and deep black soils.

Shallow black soils are found mostly in north and north-west parts of Belgaum, Bijapur, and Gulbarga and Bidar districts. These have moderate to high water holding capacity. Baijra, Jowar and other millets are the common crops in this belt.
Medium black soil covers most of the remaining portion of the northern maidan except some areas of Dharwar and Bidar. On the low land they yield good crops and on the high land with their cover the yield is low.

Deep black soils occur mostly in Raichur, Bellary, Dharwar and in certain areas of Bijapur and Gulbarga district. The texture is usually clayey throughout the profile. Cotton, groundnut, maize, chillies and other pulses are grown in this type of soils.

**Alluvial soils:**

Alluvial soils are mostly found in river valleys and in some parts on the west coast region. These soils are mostly transported and contain alternative layers of sand and silt. The alluvial soils on the west coast are poorer than the eastern part. They are sandy loam in texture and rich in organic matter, they are found to yield good crops of paddy, sugarcane, plantain and arecanut.

**Vegetation:**

Karnataka has a rich and varied vegetation due to its situation, climate, soil and rainfall, most of the forest area is confined to the Malnad region.

**Distribution of forest in the state:**

The total forest area of Karnataka state is 36384.06 km² as against the geographical area of 191791km². The percentage of forest area to geographical area is 20% as against the all India average of about 23% and 33.33% prescribed in the national forest policy. Thus the percentage of forest area in the state is less than the all India average and the standard prescribed.

The percentage distribution of forest area in the state varies from district to district. Uttara Kannada has large percentage of forest area (80%) to its total geographical area, which accounts 27% of the total forest area of
the state. Dakshina Kannada with 58% of forest area stands second and next to it are Mysore, Shimoga, Kodagu and Chikkamagalore districts, least area under forest is in Bangalore and is only 0.1%, next to it is Mandya with 0.7%.

Types of vegetation:

The difference types of the forest in the state is governed by climatic condition, altitude, rainfall and the nature of the soils. There are wide differences between the types of forests at different place in the state. The important vegetation types are discussed below.

Evergreen forest:

These types of forests are found in the regions, where rainfall is more than 250cm. The evergreen forests occupies the windward slopes of the Western Ghats, the forests consists of thick mass of gigantic trees. The trees are as high as 20 to 30 meters. Area coming under this types of forests are in the districts of Uttara Kannada, Shimoga, Dakshina Kannada, Chikkamagalore and also in western part of Hassan, southern part of Mysore and Kodagu.

The typical species of trees found in this area are Teak, Rosewood, Kinotree, Etc.; The other important trees are Mati (Terminatalia lomentosa), Hebbalasu (Artocarpuse hirsuta), Kaadulavanga (Machilues micrantha) Dhooma (Diptecarpus indicus), kalhonne (Calophyllum appalum), kootageru (Holigarna arnottiana), kendale, (Schlei cheraoleosa) Pachigida (Artosarpus lakoocha) pataganni (Oxoxylum indica)

Mixed Forest:

This type of forest is also called semi evergreen forest. This type of forest is concentrated in the regions, where the rainfall is 120-150cm. They are characterized by evergreen trees mixed with deciduous trees. Western part of Mysore and Hassan, eastern part of Kodagu, some part of
Chikkamagaluru come under this region. The common trees found in these forests are sandalwood, teak, nandi, matti, honne, bamboos etc.

**Deciduous forest:**

This type of forest is found in the eastern part of mixed forest region. These types of forests are in the areas of receiving annual rainfall of 60-120cm. Dharwar, Hassan, Tumkur, Kolar and Bangalore are included in this types of forests. This types of vegetation reflects seasonal rain distribution of the region. During winter season, trees shed their leaves. This forest is not so thick like evergreen forests, important trees of these forests are teak, mathi, nelhi, neem, godda, buruga, sagade, kodauala, jackfruit, tamarind etc.

**Scrub forests:**

This type of forests is found in the region where rainfall is less than 60 cm. These types of forests is concentrated in the semi arid region of the Chithradurga, Bellary, Raichur, Davanagere, Haveri, Gulbarga, Bidar and Gadag districts. The plants growth is very poor in these forests, this types of forest is characterized by cactus and short thorned trees and grasses and other important trees like yakke, thangadi, kakke, babul and shisham.

**PART-B**

**HISTORICAL BACKGROUND OF KARNATAKA**

The present Karnataka state is formed by the integration of the areas predominantly inhabited by the kannada speaking people. The name ‘Karnataka’ has both historical and sentimental value for the local people. The word Karnataka is mentioned in Mahabarata and also in Shudraka’s mruchehkatika and Varahamihira’s Brihatsmhita. The army of the Chalukyas of Badami was called Karnatabala. But there is no conclusive theory regarding it’s origin. The most popularly accepted theory is that the
name Karnataka is derived from Karunadu, literally means lofty land, as much of Karnataka is a high plateau land, the name is fully justified.

The history of Karnataka goes back to the period of epics. It is claimed as the birth place of puranic heroes, Parasurama and Hanuman. The earliest references were made in Ramayana, Mahabharata and Jain legends. The capital of Vali and Sugreeva, ‘monkey kings’ of the Ramayana is said to have been Hampi in Bellary district. The place Vatapi which is associated with the sage Agastya, is obviously Badami in Bagalkot district.

Karnataka has many sites of pre-historic period and most of them in the river valleys. The pre historic culture of Karnataka compares favorably with that of the one that existed in Africa and is the quite distinct from the pre-historic culture of north India. Ragi, the corn of the state, is found commonly in pre-historic sites of Africa and Karnataka. The early inhabitants of Karnataka knew the use of iron far earlier than those of the north.

The two thousand years history of the state reveals a profuse growth of it’s language, art and culture. The first poetic classic ‘Kavirajamarga’ of emperor Nrupatunga describes the land as stretching between Cauvery and Godavari. This historians are thrilled by the array of dynasties that ruled and marched their armies on battle over this land. In the 4th century BC Karnataka was a part of the great Mauryan empire. Siwamagiri (Kanakagiri in Koppal district) is said to have been the southern capital of the Mauryas. About 30 B.C local dynasty, Sathavahana came to power. The Satavahana empire lasted nearly 300 years. With the disintegration of the dynasty, the Kadambas came to power in the north, and the Ganga’s in the south. The first Kannada inscription found as Halmidi was issued by the Kadamba dynasty. The Ganga’s started their rule in 550 AD form Kolar and extent their domain to the major parts of southern Karnataka. Many Ganga princes were scholars and writers and they also patronized scholarships. The gigantic monolithic statue of Gomateshwara at Saravanabelagola is considered to be a monument of the Ganga period.
From the beginning of the sixth century A.D the Chalukya’s of Badami established a new empire. They are remembered also for their contribution to the field of art. Their monuments are found at Badami, Aihole and Pattadakal. Pulkeshin II built a vast empire that extended from the Narmada in the north to the Cauvery in south. Harsha of Kanuaj was also defeated by him.

Rashtrakutas, who were once feudatory of Chalukyas of Badami, established a new empire in the mid 8th century. The Rastrakuta’s were in turn over thrown by the Chalukyas of Kalyana (973-1189 A.D) king Amoghavarsha Nrupathunga belonged to their dynasty. After the Chalukyan empire, the Yadava’s of Devagiri and the Hoysala of Dwarasamudra divided Karnataka between themselves. Hoysala’s continued the great tradition of their art of loving overlords, the Kalyana Chalukyas, and their fine temples are found at Belur, Halebid and Somanathapura. The first great ruler of the dynasty, Vishnuvardana (1108-1141) freed Gangavadi from Cholas and in commemoration of his victory built the celebrated Channakeshava temple at Belur. He also patronized saint Ramanujacharya and converted himself to Srivaishnavism.

In the 14th century, the greater Vijayanagar empire was established. It was an age of glory and prosperity. A confederation of the Muslim sultans of the Deccan, destroyed the Vijayanagar empire in 1565 A.D in the Battle of Talikota. The vast ruins at Hampi, near Hospet, remain even today as somber reminders of the Vijayanagar glory. The Bahamanis, who came to power in the north during 14th Century AD made great contributions in the field of Indo-saracenic art. The Adilshahis, who rose from the ruins of Bahamanis, ruled over the great part of Karnataka.

In AD 1399 Yaduraya, the ruler of a small principality called Mysore, founded the Wodeyar Dynasty and enlarged the principality into mighty kingdom, with Srirangapatna as its capital. The Wodeyars were thrown out by Hyder Ali, the intrepid Muslim general of Mysore. With the defeat of
Tippu, the son of Hyder Ali, by the British the Wodeyars were restored to power as feudatory of the British.

During the British rule, the Karnataka area was distributed among the princely states of Mysore, Hyderabad and the British province of Bombay and Madras and the small principality of Coorg.

The formation of the present state resulted in the fulfillment of the age old aspirations of the kannada speaking people to join together in a single state. The old kingdom of Mysore formed the nucleus of the new state. Under the states reorganization act 1956, the kingdom of Mysore gathered around the district of Kanara, Bijapur, Dharwar and the major portion of Belgaum district from Bombay province and Gulbarga, Raichur and Bidar district from the princely state of Hyderabad, Dakshina Kannada district (excluding Kasaragod taluk) from the old Madras presidency and the whole of the ‘part C’ state of Coorg.

Fig 2.6 Development stages of Karnataka

The state renamed as Karnataka with effect from 1st November 1973, under the Mysore state act.
PART-C

SOCIO ECONOMIC BACKGROUND OF KARNATAKA STATE

In the previous section a detailed account of the Geographical and Historical perspectives of the Karnataka state has been given. This section gives a bird’s eye view of Economy and Demography of Karnataka state.

Economy of Karnataka—an over view:

Agriculture provides the main economic support to the state, nearly 65% of the total population depends on agriculture. The growth rate of the economy during the period of 2000-2001 was 6.2% which is little more than the national average 6%. The growth rate of the other sectors appears to be significant. The growth rate of industry was 7.1%, agriculture was 3.2% and tertiary sector was 7.2% during the later period of 1990’s. The state is also in the forefront in information Technology (IT) sector, Karnataka is aptly described as the silicon state of India, which accounts for a software export amounting to around 32% of national export. In the hardware sector, about 20% of national production originates from the state.

The state is also in the forefront in human development index (HDI). The HDI for Karnataka is 0.442 as against the country’s average of 0.346. Karnataka is in the 7th place among the states of the India in HDI.

Agriculture:

Karnataka is a rural and agrarian state. Agriculture in Karnataka has always held the centre stage of the state’s economy. Agriculture at present is the main source of food for the population and fodder for the cattle. It provides livelihood for around 65% of the population. Of the total geographical area of the state i.e., 1,90,50,000 hectares, the net sown area is 56.22% and 16% is covered by forest and the remaining land is under other categories of land use, the state has an irrigation potential that is estimated at
550000 hectares and has a net irrigated area of about 230000 hectares. Nearly 75% of the cultivable area comes under rain fed agriculture.

The major crops grown are grouped as cereals, pulses, oils seeds and cash crops. Out of 1, 16, 96,181 hectares of total gross cropped area, during 1997-98, 45.99% of the area was under cereals, 14.38% under pulses, 20.28% under oil seeds and 6.93% under cotton and sugarcane crops. The remaining 8.5% of the areas was under other crops.

The state produce about 85 lakh tonnes of food grains, 17 lakh tones of oilseeds and 10 lakh tonnes of other crops. The important food crops are rice, jowar, ragi, bajra, maize, small millets and wheat, pules which are Bengal gram, green gram, black gram, horesgram etc., ground nut, sesameum, cast or sunflower etc. are among oilseeds. Cotton, sugarcane, tobacco, coconut etc. are among cash crops. The state has the largest and most varied horticulture crops wealth than any other states in the country. Many tropical, sub-tropical and humid tropical and some of the temperate horticulture plants thrive in the state. The different agro climatic regions offer scope for cultivation of wide variety of vegetable, fruits, flowers, and plantation and spice crops including medicinal and aromatic plants. About 18 lakh hectares of land has been brought under horticulture crops accounting to 14% of the cropped area with an annual production of about 124 lakh tonnes of horticulture produce. Besides the state is also foremost in the production of coffee in the country. The area under coffee is about 1.26 lakh hectares and the production of coffee is 209100 mtr which is about 18% of the total coffee production in the country.

Karnataka is a pioneer state in establishing floriculture commercially. The climatic conditions favour the growers, 20,000 hectares of land has been brought under floriculture. Karnataka ranks top among the silk growing state of the country. Agro-Climatic conditions of the state favour mulberry cultivations as well as silk worm rearing. Sericulture has been a major agricultural activity in Karnataka.
Industry:

Karnataka which is endowed by nature with both beauty and a land of vast economic resources has evolved from a basically agricultural economy into an industrial one. Karnataka state has been in the forefront of introducing new industries and modern techniques right since the time of Tippu Sultan. The benevolent ruler of Mysore followed suit and fostered the development of industries through importing techniques and expertise from European countries and China. Sir M. Vishweshwaraiah since then the industrial sector of Karnataka is dominated by the public enterprise.

Princely state of Mysore saw many modern industries during the latter half of 19th century. The other areas too had a few major industries found during the same period. In the old Mysore state where the enlightened Maharaja and their able dewans recognized the need for modernization initiated planned economic development. Today there are about 1020 large and medium scale industrial units with a total investment exceeding 400,000 crore, employing 5.5 lakh people. A virtual spurt in the state’s industrial progress came in the early fifties. The leading industries in Karnataka are iron ore, and steel, engineering, machine tools, automobile, silk, sugar, paper, soap, fertilizers, cement, watches, sandalwood oil, vanaspati, motor cycles and aluminum.

Currently there are 9266 registered industrial units employing over 9 lakh work force in the state. The small and village industries comprise around 1,26,000 registered units with an investment of Rs. 1.275 crores and employment of nearly 8,70,000 person. Besides there were about 8,00,000 un registered units spread all over the state providing employment to over three million people. The growth of industrial production in the state during the VII plan was 6.6% compared to only 3.6% during VI plan. This growth is still less than the national industrial growth of 7.6 percent.

Service Sector: The Karnataka state has made little more development in service sector. These sectors are education, banking, electricity, health,
transport and communication etc., the achievements made in these sectors in Karnataka have been impressive compared to other states in India.

**Education:** The state has made and unparalleled progress in the field of education. The state has a well developed network of schools, colleges and specialized institution to provide primary, secondary and college education. It has the larger number of professional and vocational training institutions besides an array of premier research institution in the country. During the period 1999-2000, in the state number of primary schools was 49612 and in the same period total number of high schools was 8248, total number of PU colleges was 2042 and the total number of college was 935. There are 13 universities spreading across the state, including two deemed universities, two universities of agricultural sciences and a kannada University exclusively to promote the study of kannada language, are and cultural of state.

The state has at present 76 engineering colleges, 181 polytechnics and 300 industrial training institutions working. The state has made a headway in the field of medical education. Now there are 19 medical colleges, 41 dental college, 61 pharmacy colleges, 25 nursing colleges, 31 colleges of ayurvedic medicine, 11 homeopathic colleges and one unani college of medicine and 30 physiotherapy colleges in Karnataka.

**Banking:**

The position of the state in the field of banking is better than many other states of the country. The state has a fairly well spread out network of banking system in both public and private sectors. Nineteen nationalized banks, State Bank of India and its 7 associate banks are operating in the state. There are also 25 private sector banks and 13 regional rural banks in the state. Karnataka stands fourth rank in the country having 9.5 bank offices per lakh population, as against 7.1 bank offices at all India level. The spread of banking services in the rural areas was much better in
Karnataka. Compared to the other states, the number of banks in rural segments per lakh population was 8 in the state. Karnataka was in the 8th rank among the major states in per-capita deposit, the development of credit was better in the state compared to all India figures.

**Power:**

Karnataka is a pioneer state in the field of hydral power generation in the country, with the setting up of the first hydro electrical project station in 1902 at Shivanasamudram, the oldest power station in Asia. The power generation in Karnataka was comfortable till 1970. However due to rapid industrialization, remarkable growth in agriculture, increase in per capita consumption of power the state is facing acute power shortage even though several power projects are functioning in the state. There are 23 major power projects, 10 non-conventional energy projects, 2 independent projects, 8 wind power projects, 11 mini hydral projects.

**Health:**

In the field of health Karnataka’s position is better compared with the other states of the country. The policy of expansion and successful implementation of comprehensive public health services has enabled the state to occupy a unique place in the country. At present, the state has an extensive network of 293 hospitals, 242 community health centers, 1,601 primary health centers, 589 primary health units or dispensaries and 8143 A.N.M sub centers with more than 39500 beds strength. There is one primary health centre for every 30,000 population; one primary health unit for 20,000 population; a sub-centre for 5,000 population and one community health centre for every one lakh population.

**Transport and Communication:**

In the field of transport and communication also state’s position is better. The total road length in the state is 1998 was 1,42,687 kms of which
2,335 kms national highways, 11,037 kms state highways, 28,301 kms major
district roads. The average road length per one lakh population is 288 kms.
This is above the national average of 238.8 kms. The state has 4.8% of the
total railway length in the country. There are 15 vehicles per km² in the
state against 12 the country. In the field of communication also the state’s
position is better, there are 9852 post offices working in the state. The area
covered by a post offices in the country is 21.4 km², where as in the state it
is 19.5 km² for a population of 4,680. There were 4,032 combined
telegraphic offices and 253 independent telegraphic offices working in the
state and the number of persons per telephone set in the state is 51 as against
62 for the country and there are radio stations which cover about 96% of the
state’s population television relaying covers 75.9% of the total area and
69.8% of the total population in the state as against 88.5% and 75.5% for the
country.

Population:

According to 2001 census report with an area of 1,91,791 sq.km the
state has a population of 5,27,33,958 person with 2,68,56,343 males and
2,58,77,615 females, living in 27,575 inhabited villages and 270 urban
centers. The state is having 5.13% of the total population of the country and
ranks 9th among the states in the country.

The rate of growth of population in Karnataka has declined
considerably from 21.12% in 1991 to 17.25% in 2001 as against 23.85% to
21.35% for the country. The population density is 275 per km² in Karnataka
against 324 for the country in 2001. Karnataka has a larger proportion of its
population living in urban area. The share of urban population in the state is
33.98% as against 27.78% for the country. In terms of sex ratio also the
position of the state is very well compared to the other states of the country
the sex ratio in Karnataka is 964 females per every one thousand males
compared to 933 for the country. The literacy rate in Karnataka is 67.04%
compared to 65.37% in the country.