Chapter I
1. INTRODUCTION

The oldest existing health care, a heritage of ancient India as evident from the written records of the system on natural health care dates back to almost 5000 years is still in practice.

The people are mainly dependent on the forest and forest resources for their survival. Primitive man gets much enthusiasm towards green plants and started to examine the property of using plants by trial and error and obtained different beneficial properties. Later he became enriched with the knowledge of many useful and harmful plants. This valuable information has been preserved in tribal pockets as guarded secret without script. Such vocal information has immense importance and has been preserved gradually as their family secrets. Such undocumented folklore information is gradually depleting due to change in their habitats, culture and traditions of adivasis communities. This has been accelerated by severe biotic interference, deforestation, implementation of government policies to uplift the downtrodden people, etc. There is every need to document such valuable folklore information before depletion of tribal traditions due to modern civilization and culture.

Ethnobotany is the study of adivasi tribes and their dependence / interaction with their surrounding natural resources for food, shelter, medicine, etc. It is also anthropogenic approach to botany and is essentially concerned with gathering information on plants and their local uses. Powers (1873-74) used the term “aboriginal botany” which meant a study of the plants used by aboriginals for food, medicine, shelter, textiles, fabrics, ornaments, etc. Walter Hough in 1898 defined it as “study of plants in their relation to human culture, including psychological importance and mythological reference. The term ethnobotany was first coined by Hershberger (1896)
to the knowledge of nature and its direct relationship between plants and people. It was often considered synonymous with traditional medicine or folklore medicine (Jain 1989). Robbins et al., (1916) gave a broad definition of the area of ethnobotany as the investigation and evaluation of the knowledge of all phases of life amongst the primitive societies. Jones ('1941) gave a concise definition of ethnobotany as a study of the interrelationships of primitive man and plants. According to the well-known ethnobotanist, Schultes (1962), ethnobotany is "the study of the relationship which exists between people of primitive societies and their surrounding plant environment". Bye (1992) defined ethnobotany as the study of biological basis of plants human interactions and relationships at different levels of organizations over geographic and social space and along the evolutionary time scale. According to Martin (1995) all studies (concerning plants) which describe local people's interaction with the natural environment. Cotton (1997) defined ethnobotany as the area which encompasses all studies concerning with the mutual relationships between plants and traditional people. One of the most prominent contributions of the ethnobotany to the society is natural medicine. In addition, ethnobotany also contributed many beneficial things such as food, shelter, fiber, dyes, fodder, non wood forest produces (NWFP), etc.

The term is not new even to India, Kirtikar and Basu (1933) stated "the ancient Hindus should be given the credit for cultivating what is now called Ethnobotany". Jain (1989) has established all relationships between man and plants in several respects. It is first divided into material and cultural or spiritual relations and placed in one or more of the following categories.

1) Relationship useful both to man and plants
2) Relationship useful to man, harmful to plants
3) Relationship harmful to both man and plants
4) Relationship harmful to man, useful to plants

India is, however, known for its ethnobotanic endeavours right from the time of the Vedas and Samhitas. Through the effort of the Ayurvedacharyas like Charaka, Sushruta and Dhanwantari, ethnomedicine attracted serious attention in India even during the early centuries.

Folk - medicine is an age-old system practiced by primitive people, particularly, the tribals residing in remote villages and forests. The knowledge gained over the years through trial and error is transmitted from one generation to another. In fact folk -
medicine is considered as the mother of all other traditional systems of medicine. But much larger number of folk-medicines remained endemic to certain regions or tribes in our country. Even today some miraculous medicines are known to the tribals and the knowledge of these is a guarded secret of certain families. Hence there is increasing desire to unravel the centuries-old secrets of traditional medicine (Kapoor & Chopra, 1961).

Along with material culture like food, medicine and shelter, plants have been closely associated with many social customs and mythological rituals of man. Many flowers, fruits or whole plants have been used for offerings in worship and some plants are themselves worshipped or considered sacred (Pande, 1964; Pandy, 1971; Lebot, 1991; Caroli, 1992). The ‘Dub’ grass (Cynodon dactylon) in India is one of the essential items in many social ceremonies, worship and rituals. Many Hindus grow and worship plants of Ocimum sanctum in their houses. The practice is useful, as a few are always handy for curing common ailments.

In addition, biologically based therapies, manipulative and body based systems, bio-electromagnetic systems are used in complementary alternative system. Among them biologically based therapy is most effective since this include

a) Phytotherapy or herbalism (eg: Gingko biloba, garlic, turmeric, Aloe vera, capsicum, bean pollen etc.).

b) Special diet therapy (eg: Vegetarian, fibre, ornish, natural hygiene).

c) Pharmacological, biological and instrumental inventions (eg: Coley's toxin, enzyme therapy, cell therapy and natural therapy).

The integrated complementary alternative medicine may be considered as only system, in future to satisfy the modern society (Sanjoy Kumar Pal, 2002). The WHO (World Health Organization) estimates that about 80% of the world inhabitants still rely chiefly on traditional medicine for primary health care (Farnsworth et al., 1985). In the recent past, herbal medicine became popular all over the world as much harmful effects of allopathic drugs are envisaged. Moreover, the cost of modern medicine is not within the reach of common man economically. Hence, search for an alternative system of medicine began, possibly traditional medicine has an answer of this “the feeling of natural in the better” has paved the way to plunge into the folds of traditional medicine system. According to Tyler (1986), the “green wave” likely gain momentum in future years to come.
India with its vastness, multi-ethnic tribes and diverse vegetation, is one of the greatest emporia of ethnobotanical wealth. The information on Indian medicinal plants is available in many geographically distributed specialized centres which are not easily accessible. Hence there is a need to create a national data base network to link the different centres which are working on various aspects of medicinal plants.

As evident from the present scenario the herbal care getting world wide acceptance thus emphasizing modern scientific evaluation of wild drug yielding plants, created new vistas in searching of new sources of alternative medicine. The alternative approaches can be divided into four categories.

1) Acupuncture and Oriental medicine
2) Traditional indigenous systems (Ayurveda, Siddha, Unani, Tibbi, Kampo medicine, traditional medicine)
3) Unconventional Western systems (Homeopathy, Environmental medicine).
4) Orthomolecular and prionic medicine
5) Naturopathy

The Government of India encouraging the academicians regarding the documentation of folklore cultures, habits and medicinal plants and established several premier institutions such as Central Institute of Medicinal and Aromatic plants (CIMAP) Lucknow, Central Drug Research Institute (CDRI), Lucknow, TBGRI, Tiruvannantapuram and many local universities have put considerable efforts together with information on medicinal uses of plants from different forest inhabitants.

The international community on different occasions made some attempts to protect traditional knowledge. The first attempt perhaps was made by WIPO-UNESCO on developing the model provisions for national legislation for the protection of folklore. In 1994, another attempt made in the United Nations Draft Declaration on the Rights of Indigenous people (Tripathi, 2003). The World Health Organization also has recognized the importance of Traditional medicine and has been active in creating strategies, guidelines and standards for botanical medicines (Patwardhan et al., 2004).

Plants are valuable for modern medicine in four basic ways, i.e.,

1) They are used as sources of direct therapeutic agents.

2) They serve as a raw material base for the elaboration of more complex semi-synthetic chemical compounds.
3) The chemical structures derived from plant substances can be used as models for new synthetic compounds.

4) Finally plants can be used as taxonomic markers for the discovery of new compounds (WHO-guidelines).

The use of plant extracts, as well as other alternative forms of medicinal treatments, is enjoying great popularity in the late 1990s (Cowan, 1999). Investigation of plants used in traditional and modern medicine in China serve as a source of inspiration and as models for the synthesis of new drugs with better therapeutic chemicals or physical properties than the synthetic drugs (Patwardhan et al., 2004).

India is the largest producer of medicinal plants and is rightly called the "Botanical garden of the world". Medical information referred in the old Indian literature includes several medicinal herbs, which have been in the use for thousands of years, in one form or the other under the indigenous system of medicine. In India, 45,000 plant species have been identified out of which about 15-20 thousand species are of good medicinal value. However, traditional communities use only about 7000-7500 plants for medicinal purposes. The Siddha system of medicine uses about 600, Ayurveda and Unani 700 each and modern medicine about 30 medicinal plants for treating human and veterinary ailments. The contribution of ethnomedicinal plants in discovering new drugs has been enormous for treating diseases like cancer, hypertension, diabetes, etc (Madhuri Sharma et al., 2009). The indigenous system of medicine (Traditional Indian Medicine) has several medicinal plants with versatile antitumor properties that need detailed research for the development of antitumor herbal drugs.

Every year millions of people are diagnosed with cancer, leading to death in a majority of the cases. According to the American Cancer Society death arising from cancer constitutes 2-3% of the annual deaths recorded world-wide (www.Cancervax.com/info/index.html).

Natural products, especially plants have been used for the treatment of various diseases for thousands of years. Terrestrial plants have been used as medicines in Egypt, China, India and Greece from ancient time and an impressive number of modern drugs have been developed from them. The first written records on the medicinal uses of plants appeared in about 2600 BC from the Sumerians and Akkadians (Samuelsson, 1999).
The "Ebers Papyrus", the best known Egyptian pharmaceutical record, which documented over 700 drugs represents the history of Egyptian medicine dated from 1500 BC. The Chinese Materia Medica, which describes more than 600 medicinal plants has been well documented with the first record dating from about 1100 BC (Cragg et al., 1997). Documentation of the Ayurvedic system recorded in Sushruta and Charaka dates from about 1000 BC. The Greeks also contributed substantially to the rational development of the herbal drugs. Dioscorides, the Greek physician (100 A.D) described in his work "De Materia Medica" more than 600 medicinal plants (Kappor 1990).

Cancer is a major public health burden in both developed and developing countries. It was estimated that there were 10.9 million new cases, 6.7 million death and 24.6 million persons living with cancer around the world in 2002 (Parkin et al., 2005). Cancer is the second leading cause of death in the United States, where one in four deaths is due to cancer (Hoyert et al., 2005). There are more than 2,70,000 higher plants existing on this planet. But only a small portion has been explored phyt chemotherapy. So, it is anticipated that plants can provide potential bioactive compounds for the development of new "leads" to combat cancer diseases. The National Cancer Institute collected about 35000 plant sample from 20 countries and has screened around 1,14,000 extracts for anticancer activity (Shoeb, 2005). Of the 92 anticancer drugs commercially available prior to 1983 in the US and among worldwide approved anticancer drugs between 1983 and 1994, 60% are of natural origin (Cragg et al., 1997). Plants have long been used in the treatment of cancer (Hartwell, 1982).

In this instance, natural origin is defined as natural products, derivatives of natural products or synthetic pharmaceuticals based on natural product models. (Jaspars et al., 1998). Cancer is the abnormal growth of cells in our bodies that can lead to death. Cancer cells usually invade and destroy normal cells. These cells are born due to imbalance in the body and correcting this imbalance, the cancer may be treated. Billions of dollars have been spent on cancer research and yet we do not understand exactly what cancer is? (www.womenshealth.com).

Because of high death rate associated with cancer and because of the serious side effects of chemotherapy and radiation therapy, many cancer patients seek alternative and / or complementary methods of treatment. The important preventive methods for most of the cancers include dietary changes, stopping the use of tobacco products, treating inflammatory diseases effectively and taking nutritional supplement
that aid immune function. Recent researches revolve round the urgency to evolve suitable chemotherapy consistent with new discoveries in cell biology for the treatment of cancer with no toxic effect. Chemotherapy, being a major treatment modality used for the control of advanced stages of malignancies and as a prophylactic against possible metastasis, exhibits serves toxicity on normal tissue (Madhuri Sharma et al., 2006).

The plants have been used for treating various diseases of human beings and animals since time immemorial. They maintain the health and vitality of individuals and also cure disease, including cancer without causing toxicity. More than 50% of all modern drugs in clinical use are of natural products, many of which have the ability to control cancer cells (Rosangkima et al., 2004). Over the past decade, herbal medicines have been accepted universally and they have an impact on both world health and international trade. Hence, medicinal plants continue to play an important role in the healthcare system of a large number of the world's population (Akerele, 1998).

Cancer is one of the dreadful diseases of 21st century. Traditional Indian medicine with its evolution through centuries has always fascinated practitioners and researchers for its applications in cancer treatment on a scientifically proven research back ground (Sunyana Jain et al., 2009).

The indigenous knowledge particularly concerned with the utilization of their local genetic resources for the treatment of various diseases has provided leads for development of biologically active molecules by the technology - rich countries. According to a study conducted under the All India Coordinated Project On Ethnobiology (AICRPE – 1992-98) over 10,000 wild plant species are reported to be used by tribals for meeting their primary health care, food and other material requirements. Out of them 8,000 wild plant species used by them for medicinal purposes (with over 1, 75,000 specific preparations / applications) and about 2,000 are found to be new claims and worthy of scientific scrutiny (AICRPE Final Technical Report, 1998).

According to the International Agency for Research on Cancer (IARC) in 2002, cancer killed > 6.7 million people around the world. Another 10.9 million new cases are expected to be diagnosed annually by 2020. Today, in Western medicine, only a limited number of plant products are being used to treat cancer. However, some of the widely used anticancer drugs, such as taxol and vinca alkaloids are obtained from medicinal plants (Aggarwal et al., 2006).
The main objectives of the present investigation are:

1) An extensive and intensive exploration studies in the area to record first hand information from tribal / herbal practitioners with special reference to the crude drugs used for cancer.

2) Preparation of herbarium for drug yielding plants and their preservation.

3) To analyze the phytochemical composition of different polar solvent extracts.

4) To evaluate the antimicrobial properties of different solvent fractions.

5) To evaluate antioxidant activity of different solvent fractions.

6) To evaluate the preliminary antitumor properties of different solvent fractions.

7) Isolation and characterization of active principles / biodynamic compounds.

TOPOGRAPHY AND GENERAL FEATURES

Geometrically the Rayalaseema is located between 12°30' and 16°15'N latitudes and 76°55' and 79°55' E longitudes covering 24.95% of the total land area in Andhra Pradesh [Map.1]. Rayalaseema forms the southern and south-eastern portion of the Deccan plateau with an area of 69,043 sq km. It includes within its fold the districts of Anantapur [19,300 sq km], Chittoor [15,152 sq km], Kadapa [15,378.41 sq km] and Kurnool [18,799 sq km]. It is situated almost in the centre of the southern part of the Indian peninsula. It is bounded on the south by Tamilnadu and Karnataka, on the west by Karnataka, while Telangana and Coastal regions of Andhra Pradesh on north and east respectively. The Rayalaseema has no coastline and is accessible only by land. The region lies mostly at an altitude of 300 to 700m above MSL.

Historical Background

The Rayalaseema originally comprising the districts of Anantapur, Chittoor, Kadapa and Kurnool in Andhra Pradesh and Bellary in Karnataka had a chequered history. The first known important land mark in the history of Rayalaseema is provided by the edicts of Ashoka which indicate that this area formed a part of the Mauryan empire. The next epoch is that of the Satavahanas, whose empire stretched over this region in the first and second centuries A.D. The Iksvakus, the Pallavas, the Chalukyas, the Rashtrakutas ruled over this region as coevals from 300 to 973 A.D. The next note—
MAP-1: STUDY AREA
RAYALASEEMA REGION

ANDHRA PRADESH

RAYALASEEMA REGION
KURNOOL
ANANTAPUR
KADAPA
CHITTOOR
KARNATAKA
TAMILNADU
worthy epoch is that of the Cholas of the Tamil country. The Kakatiyas of Warangal expanded their power over this area from 1158 A.D. to 1323 A.D. This period is of a particular importance because successive Kakatiya monarchs cleared a number of forests, established a number of settlements and improved the economic conditions of the Rayalaseema region.

The next epoch in the annals of this region was during the rule of successive Vijayanagara dynasties from 1336 A.D. to about 1700 A.D. The Rayalaseema reached the acme of its glory in the region of the illustrious emperor, Sri Krishnadevaraya (1509-1529 A.D), in whose regime it was aptly designated 'Ratnalaseema'. After Vijayanagara dynasty, it had formed parts of the empire of the Bijapur Sultans and Nawabs of Golkonda, the Mughals, Mysore kings, Nizam and the British empire till independence. At the time of Andhra state formation Bellary district was allotted to Karnataka state, which at that time was styled Mysore state.

The meaning of the word Rayalaseema and its application is an interesting one. The word Rayalaseema in Telugu means the "Seema of Rayalu" (Bujanga Rao, 1946 - 1947). According to Brown’s dictionary that the word ‘seema’ has a couple of meanings, first as meaning ‘country or district’ in general and second as ‘homeland or native country’. As for the word Rayudu “Its plural Rayulu’ was the title assumed by the last Telugu dynasty, the kings of Vijayanagaram”. Thus, according to Brown, the word Rayalu is used sometimes to mean ‘the Vijayanagar kings generally; and sometimes to mean the ‘King of last telugu dynasty of Vijayanagar’ that is, the dynasty known as the Aravidu Dynasty. It is now used in a restricted sense as a part of Andhra Pradesh.

Rayalaseema is also known as ceded area because this was transferred from the kingdom of Mysore to the Nizam after the war in 1800 and afterwards handed over to the British Government in lieu of money payments (Hooker and Thomson, 1885).

Geographical Divisions

Absence of conspicuous high mountain ranges and dense forests, paucity of perennial rivers, a low rainfall and an enervating climate are all the part of nature’s endowment to this land and no wonder its material progress is hampered. The region has an undulating surface dotted with ridges and clusters of rocky hills, part of which fall within the range of Eastern Ghats. The only prominent mountains in this region are the Nallamalais and Sheshachalam hills noted for their beautiful landscape with wooded slopes, enchanting valley and rich vegetation. Nallamalai is considered as the paradise
of herbalists. It extends in Kurnool and Kadapa districts in North–South direction with an elevation of 900m above MSL. The other prominent mountain ranges in Kurnool district are Erramalai and Velikonda. The Velikonda ranges separates Kurnool district from Nellore district. The Velikonda and Palakonda hills in central part and Penchalai and other minor hills in Southern part of the Kadapa district are noteworthy. Proddutur, Jammalamadugu and part of Kadapa taluks constitute the plains of the Kadapa district.

In the South-eastern portion of the region, the mountain plateau is formed by the hilly terrain in the Western part of Chittoor district. The plains of the eastern region of the district are clearly distinct. The prominent hills are Horsely, Avulapalli and Tirupati hills deserve mention in this part. In western part of the region, the prominent hills as such are not visible, but out crop and low barren hills do occur frequently. Besides these, there are numerous isolated hillocks and mounds present in this portion. Generally this region is a continuation of Mysore plateau from the South, the Telangana from the north and Eastern Ghats in the east. The altitude of the southern part of the region, which is a continuation of the Mysore plateau, is about 600m above MSL. On the west and south-west, the altitude varies from 300 to 600m. Some of the portion on the eastern part, which was covered by Eastern Ghats, has an elevation of 900m above MSL. The whole Rayalaseema region slopes down from north and north-east to south-east. The areas with an altitude of less than 75m found in Srikalahasti and Satyavedu taluks, which are towards the coast of Bay of Bengal.

Soils

The major portion of the Rayalaseema is covered by the red soils, red loam and black cotton soils. The red soils are generally deficient in organic matter and poor in plant nutrients but rich in phophoric contents. The moisture holding capacity of the red soils are also poor and therefore, irrigation is necessary to raise good crops. The black cotton soil is also found in north-western portion of the region. Alluvial soils are almost negligible and are restricted only to river courses. Alkaline and saline soils have a very limited occurrence in the region. The general distribution of the different kinds of soils is given below
Distribution of different types of soils in the area

<table>
<thead>
<tr>
<th>Soils</th>
<th>Anantapur</th>
<th>Chittoor</th>
<th>Kadapa</th>
<th>Kurnool</th>
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<tr>
<td>Red</td>
<td>Anantapur</td>
<td>Punganur</td>
<td>Rayachoti</td>
<td>Koilkuntla</td>
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<td>Kalyanadurg</td>
<td>Chandragiri</td>
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<td>Black</td>
<td>Gooty</td>
<td>Chittoor</td>
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<td>cotton</td>
<td>Tadipatri</td>
<td>Putter</td>
<td>Jammalamadugu</td>
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<td></td>
<td>Rayadurg</td>
<td>Palamner</td>
<td>Proddutur</td>
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<td>Bangaruapalem</td>
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<td>Kuppam</td>
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<td>Red</td>
<td>Madakasira</td>
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<td>Kadapa</td>
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<td>loam</td>
<td>Hindupur</td>
<td>Pulivendula</td>
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Geology

In the Rayalaseema the Dharwar formation is the oldest group of rocks, consisting mainly of schists. The next in order, are the peninsular gneisses which are younger than the Dharwars and occupy a considerable area in this region. Their main utility is in masonry construction. The puranas formations are sedimentary rocks younger than Dharwar and peninsular granites, which are considered to be azoic. They contain lime stones and well-known Kadapa slabs. Asbestos, barytes, steotite and others also occur in these formations.

The oldest rocks in Kadapa and Kurnool districts are those of Dharwars formation made up partly of basic igneous rocks and partly of highly altered sedimentary beds. The rocks types of Chittoor and Anantapur consist of Precambrian rocks, mostly Archaean formations. These include biotite gneiss, pink quartzy falsopathic gneiss, Amphibolites, Biotite chists, Hornblende schists, Hematite and Magnetite quartzites and t alc schists. The eastern fringes of Gooty and Anantapur taluk, rocks belong to Kadapa and Kurnool systems. These rocks are over laid unconformable by Kadapa rocks and Gondwana rocks. Recent and sub recent formations are also noticed in the region, which is of mainly of alluvial soils with occasional artefacts and laterites.

Climate

The average rainfall is so scanty and meagre that it is insufficient to fill the wells, streams and rivulets which in turn is due to the fact that it is only a rain shadow region. While the nearby Western Ghats prevent the benefit of the south-west monsoon,
the north-east monsoon, which loses most of its moisture before reaching the Rayalaseema districts.

Rayalaseema region experiences a semi-arid climate. In fact, it is the driest part of the country next to ‘Thar’ desert of Rajasthan. The maximum summer temperature touches 49°C while in the winter it comes down to 15-19°C with an annual temperature range of 30°C. The relative humidity is always low, except during rainy season. The maximum rainfall occurs during south-west monsoon. However, rainfall is also received during north-east monsoon period, but it is not very significant. The rainfalls in Chittoor district vary between 600-1000mm, while it is between 500-900mm in Kadapa, 500-1200mm in Kurnool and between 425 – 790mm in Anantapur district. In Anantapur district out of 26 years 13 years have been declared as drought years. This clearly shows that this region is an arid region and victim of repeated droughts. Therefore, agriculture is not well developed in this region.

Rivers

This region is traversed by various major, medium and minor rivers. Among those Krishna, Thungabhadra, Pennar, Hagari, Hundri, Papagni, Kunderu, Chitravathi, Gundlakamma, Piler, Araniar, Kushesthatli and Swarnamukhi drain in this tract. Barring Krishna river, all the rivers are non-perennial and purely rain fed. The river Krishna is the major one, which constitutes the northern border of the region. It passes through the northern taluks of Kurnool district and drains only a meagre part of the region before entering into Guntur district until now this river had not been of any assistance to irrigation for this tract. The river Thungabhadra, another important one, is a tributary of Krishna, it covers the northern part of Kurnool district before joining the Krishna River near Kurnool.

The pennar, which is an another important medium river drains large area in this region. It touches all the four districts of the Rayalaseema. In Kadapa district the Pennar river and its tributaries appear almost like fish bone of the several tributaries like pennar, Kunduru and Sagileru on the northern side and Cheyyuru, Papagni and Chitravathi on the southern side are note worthy. The sacred river Swarnamukhi takes its origin in Chandragiri hills of Chittoor district and passing along the board valley, where Chandragiri and Tirupati are situated. It flows in a north-easterly direction into Nellore district. The tributary of this river is Kalyani. In addition to these rivers the region has a number of rainfed streamlets. Almost all the rivers in this region glide from
the plateau area of the west to east or from south-west to north-easterly direction and cutting through the intermediary hills of the Eastern Ghats and enters into the coastal districts. Most of the rivers in this region are seasonal. As all are minor rivulets, in Anantapur district, the drainage pattern is very poorer than those in other districts of the Rayalaseema.

**Forests and vegetation**

According to Andhra Pradesh forest department (Information brochure 2010), the forest area in the state is 63,32,739 sq km forming 20.36 % of the state’s territory [Map. 2]. This is far below the 33% stipulated in national forest policy.

The forests of the region are mostly of the tropical dry deciduous, they are found only in the eastern and south-eastern portions of the region. In this type of forests, the trees begin to shed their leaves by about December and between February and May. The forests look very open and at times eye- showing, but no area is completely leaf less at any one time of the year. Flowering and fruiting are generally far advanced before the first flush of new leaves appears with the conventional showers in April – May. These forests are widely spread in almost all the districts of the sturdy area. Some of the typical trees in these forests are: *Tectona grandis*, *Shorea roxburghii*, *Sterculia urens*, *Ziziphus xylopyrus*, *Diospyros melanoxylon*, *Gardenia spp.*, *Trema orientalis*.

Dry deciduous forests generally occur at about and above 400m in shallow soils of well drained hill sides [Plate1d-f]. The canopy is closed though uneven and not dense. Most of the species are deciduous. This type of forests are confined to some hill slopes and plateau of Kadapa district, northern portion of the hills of Chittoor district and southern portion of the Kurnool district adjoining the Kadapa district.

Moist deciduous forests are found in patches between Rollapenta and Bairluty, Gundlabrahmeswaram (Nallamalais) in Kurnool district and Talakona in Chittoor district [Plate1a-c]. The common plants in these forests are: *Tectona grandis*, *Mangifera indica*, *Dalbergia latifolia*, *Albizia amara*, *Grewia tiliaefolia*, etc.

Western and north-western portion of the region have low rainfall and hence characterized by scattered open scrubs with deciduous elements [Plate1g-h] (Champion and Seth, 1968). The forests in the whole region barring those in the north-eastern and south-eastern portions are almost devoid of any tree growth. Scrub type of forests is met with all dried parts like Anantapur, Kurnool, Kadapa and peripheries of forests in other
Map-2: Forest coverage of Eastern Ghats
a. Moist deciduous forest at Rolla Penta

b. Moist deciduous forest at Japali Theeratham (Tirumala)

c. Moist deciduous forest at Gundlabrahmeswaram

d. Dry deciduous forest at Peccheruvu

e. Dry deciduous forest at Talakona

f. Dry deciduous forest at Ahobilam

g. Tropical scrub forest at Kalasamudram

h. Tropical Scrub forest at Sri Lankamalleswaram
districts. The main species in the forests are *Acacia chundra*, *Albizia amara*, *Canthium parviflorum*, *Flacourtia indica*, *Ziziphus* spp., *Dodonaea viscosa*, *Grewia lenax*, etc.

The area under forests in Rayalaseema is about 22.30% to the total geographical area. The study of the district wise forests area shows that Kadapa district with 32.6%, Chittoor district with 29.9%, Kurnool district 19.9% and where as lowest forest area is found in Anantapur district with 10.3%. This indicates there is substantial deterioration of forests from year to year.

The forests, for commercial purpose are extensive in the Kadapa and Kurnool districts. In Kadapa district the production of timber and red sanders which has got special foreign market is of great significance. In Kurnool district, bamboo and fuel produced in Nallamalais is not only consumed locally but also exported to neighbouring districts. In Chittoor districts very little red sander is produced and consist mostly of fuel and bamboo. At present Anantapur district is the poorest in the matter of timber and fuel production. Since most of the forests are of scrub type used for intensive grazing.

ETHNOLOGY

Tribal population

Tribals, a distinct ethnic group usually confined to definite geographical areas. About 250 million ethnic people scattered all over the world except the European continent. The largest concentration can be found in the African continent and the second largest concentration is recorded in India. In India ethnic population is about 9.55% of country's total population (Ministry of welfare, Govt. of India 1992) belonging to 550 tribal communities of 227 ethnic groups as per the classification made by anthropologists on linguistic basis. They inhabit about 5000 forested villages (Anonymous, 1985). Predominant tribal areas cover about 15% of the total geographical area of the country. There are about 106 different languages and 227 subsidiary dialects spoken by tribals in India. The tribal people of India mostly live in the forests, hills, plateaus and naturally isolated regions.

Andhra Pradesh with 35 tribes and 60 other small tribes has a tribal population of 4.985 million, which constitutes 7.15% of the state's total population of 76.35 million. Thus Andhra Pradesh forms a very large component of ST's in South India (TCR & TI, 2008). Of all the recognized tribes in Andhra Pradesh eight are predominant (Shashi, 1994). This state has been divided into three geographical regions namely Andhra (Coastal), Telangana and Rayalaseema.
The present study area Rayalaseema comprises of Anantapur, Kadapa, Chittoor and Kurnool districts possess thick population and diversified groups of tribals. The main tribal communities of the area are Chenchu, Sugali, Yanadi and Yerukala and most of them are scattered all over the region except Chenchus. The Chenchus are restricted to the Nallamalais of Kadapa and Kurnool districts only. The percentage of tribal population in about 10.84 (Anantapur 3.54, Chittoor 3.32, Kadapa 2.09 and Kurnool 1.89). Anantapur district has the highest tribal population in the region.

Habitat of Tribes

Normally forests are the natural and traditional habitat of ethnic people. These tribes differ from one another in race, language, culture and beliefs and present a spectacle of striking diversity. The diversity is caused by various social characteristics, traditions, linguistic trades, physical features, etc [Plate 2g-h]. Tribals of the region belong to the Proto- Australoid racial stock and speak dialects of the Dravidian family. A brief ethnographic account of each tribe is given below.

The Chenchus

Main concentration of the Chenchus is restricted to Nallamalais which spread in the districts like Mahaboobnagar, Nalgonda, Kurnool, Prakasam and Guntur. These areas include dense Nallamalai forest as well as the extended plateau on both sides of the river Krishna. The Chenchus have lived in this ecology and environment from times immemorial and this provides them shelter, food and asset pattern of traditional with occasional interruptions.

It is believed that the Chenchus inhabited in this area much earlier than the Dravidians themselves. Manusmurithi mentions this tribes name as Chenchus and treats them as a part of the Andhras. Their ancestors were referred to as the Adichenchus meaning that they existed from times immemorial. The name Chenchu has many alluding references to its origin (Reddy, 1972). Some believe that the name is derived from persons who lived under a chettu (Tree) is a chenchu (Aiyappan, 1948). Some others believed that these people were in the habit of eating a kind of rat, which is locally known as chenchu and the same term, is applied to designate the people.

Chenchus still live as true sons of the nature in the green wilderness of Nallamalai forests. The chenchus country is a typical refuge area of a primitive hunters and food collectors. The general features of chenchus are significant and reveals that they have slender and of medium stature. The colour of the skin varies from dark black-
brown to a rich copper colour. The facial growth is not very strong and at the most men have sprouting beards and moustaches. A chenchu is dolichocephalic. The primitive chenchu is characterized by a low face, very steep forehead, a deeper depression at the root of the nose, and a broad flat nose with wide nostrils. The extreme primitiveness of physical type found among the chenchu tribe.

Chenchu live in a bee hive shaped tiny huts with wattle walls in small groups [Plate 2f]. Generally chenchu settlements are called as ‘Gudem’ or ‘Penta’. During marriage, a ceremony filled with mirth and merriment takes place. Practices like bride price, tying of the thali and high expenses for marriage seem to be of recent origin. Divorce is as free as marriage and no formal procedure is laid down. Adultery is not considered as a serious crime. A chenchu family with 5 to 6 children is a rare feature and the family size of chenchus is very small often with 3 or 4 members [Plate 2. a].

The chenchus are divided into four endogamous sub – divisions (Mohan Rao, 1993).
1. Adavi chenchus (Forest dwellers).
2. Deva chenchus (Temple servants).

Their whole life revolves round the forests for food gathering and honey collection.

**The Yanadis**

The Yanadis are more primitive aboriginal and concentrated mainly in Chittoor, Kadapa, Nellore, Ongole and Guntur districts of Andhra Pradesh. The tribes are set to be direct descendents of Palaeolithic people. Chenchus and Yanadis both are from one parental stock and are believed to be originated in Nallamalai hill tracts (Raghavaiah, 1962). Yanadis speak only Telugu language with a characteristic dialect and accent. They don’t have any special functions. Ceremonies or celebrations particular to them (Kurup, 1970). They are integrated with Hindu social system and practice.

The Yanadi lead a carefree, life with contentment and unbridled merriment. Their diet chiefly consists of vegetable food and animals, wild fowls and other birds of food value. They even dig rat holes and use them in menu. However, the best satiating food for them is fish. Honey gathering in forests and plains is also a common practice among them.
Two sub-tribes are recognized within Yanadis, based on their occupation, Manchi yanadi, the superior type and the Challa yanadi is inferior type and carry different names including Garapa Yanadis, Chettu yanadis, Kappa yanadis, based on their habitation and the food taken. The Yanadis are short statuned with dark skin colour, platyrrhine nose, long head, prominent chin, thick lips and scanty hair both on head and body. They reside in huts usually construct adjacent to a water source. Yanadis living in and around forests keep themselves busy in collecting and selling minor products. [Plate 2d-e].

The Yerukalas

The Yerukalas originally a Tamil tribe speaks ‘Yerula’ but which has no scripted of their own to data. The Yerukalas are the medium stature with well-built bodies, black in colour with small hair and brown eyes. They are chiefly basket and roap makers. They prepare a wide variety of baskets with plant materials. They also rear pigs and some people wander from place to gain aliving. The women of this tribe are noted for their sooth saying.

The Yerukalas are said to have been existing since the time of the Mahabharatha and consider themselves as the descendents of Ekalavya, who excelled in the art of archery. Thurston (1909) wrote that Korava or Yerukalas are a vagrant tribe found out the state. Etymologically, the word yerukala is derived from the Telugu word ‘Eruka’ which means foresight or disclosing the facts about the future, present and past of one’s life. The women of this tribe get their livelihood by telling ‘Eruka’. This was probably the reason why these people are called Yerukala (Raghavaiah, 1962).

The Yerukalas are medium statured with well built bodies, dark brown to black skin, coarse, straight and black or dark brown hair and dark brown eyes. Yerukala men wear shirt (Angi) and dhoti and women wear the saree and a simple ravika. They construct houses with stones and bricks and roof covered by palm leaves or grass [Plate 2e]. Yerukala problems are solved in ‘Kula panchayat’. The members of this panchayat belong to yerukal society. The head of kulapanchayat is to decide all the judgements. He is the supreme, he settle all the disputes in the community as per the horns to their society. They worship Hindu Gods.

The Sugalis

The Sugali is one of the main tribes of Andhra Pradesh. The sugalis have the rich heritage and culture and are subjected to severe exploitation due to their socio
PLATE-2: General features of Tribes

a. Chenchus  
b. Sugalis  
c. Yerukalas  
d. Yanadis  
e. Yanadi tribal hamlet at Lankamalla foot hills  
f. Chenchu tribal hamlet at Peccheruvu  
g. Herbal vendor at Srisailam  
h. Herbal vendor at Atmakur
economic backwardness and illiteracy. The sugalis are predominantly concentrated in Anantapur, Kurnool, Chittoor, Prakasam, Guntur, Mahaboobnagar, Warangal, Adilabad, Khammam and Nalgonda districts.

The sugalis are known variously in different parts of the country as Lambadi, Brinjari, Banjari, and Boipari, etc. The sugali tribes live near the small hills in detached clusters of huts called ‘Thandas’ in close proximity to the forests. Sugali tribe mostly depends on the agriculture works. They speak in language called ‘Lambadi’. This language concept related the Urdu and Hindi languages. But this language has no script of its own. In general sugalis are of a dark reddish brown and women are tall and of good looking while the men are robust [Plate 2b].

Sugali men wear the brown coloured cloth and mass of brass collars around the neck. Sugali women hands are covered with bracelets up to the elbow and also wear the kadayams. The dress of the women is striking and consists of a kind of patchwork of very bright colours. A kind of stomacher, with the holes for the arms and tied at bottom to cover their upper part of the body and has some strings behind dangling at their backs. They wear wide earrings, necklace, rings on the fingers and toes. They pay little attention to cleanliness; their hair once plaited, is not combed or opened for a month.

Generally sugali people use ‘Naiks’ at the end of their names. Each thanda has a headman called ‘Nayakan’. The nayakan’s statement is law. He is considered the thanda priest. Nayakan is incharge of all cultural activities like scarifies and religious responsibilities of the thanda. They worship Hindu Gods.

Due to poorness, illiteracy and lack of technical skills, they took to crimes like robbery, cattle lifting and kidnapping children until the middle of last century (Thurston, 1909). Now, sugalis have new opportunities to work for their socioeconomic betterment. Most of them have taken agriculture and various types of labour. They are cultivating crops like red gram, ground – nut, castor, sorghum, rice, etc. Their staple food is a coarse cake made of wheat or maize. Their women collect forest produce and sell fire wood out of sheer economic necessity. Both males and females are addicted to heavy drinking.

The wealth of knowledge on medicinal plants among the tribals of Rayalaseema appears to have been developed their age old trial and error methods and transmitted orally from generation to generation.