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TITLE : ECOLOGY, TECHNOLOGY AND RESOURCES MANAGEMENT AMONG THE TRIBES OF EASTERN GHATS : AN ANTHROPOLOGICAL STUDY.

Dr.V.Subramanyam,
Associate Professor,
Department of Anthropology,
Andhra University,
Visakhapatnam-03, A.P, India
vsubramanyam23@rediffmail.com

INTRODUCTION:

The man on the biosphere forced to interact with the environment in which he inhabits for his subsistence and survival. The human populations are distributed in different geographical areas and ecological zones of the globe. The ecological variations are commonly found in between the different human settlements, located in different geographical areas. The living organisms including man selects a particular ecological niche for habitation and interact with one another in an ecosystem. The tribal population in India is distributed in different ecological zones, predominantly in the high altitude areas of eastern ghats, western Ghats, Central, north eastern and himalayan mountains.

The ecological studies gained much importance in many disciplines including Anthropology. The anthropologists are mainly focusing their attention to understand the relationship between man and environment, human adaptations, environmental deterioration, natural resources utilization and management, Pollution effects on human populations and bio-diversity. In ecological perspective flora and fauna of a habitat largely determines the subsistence activities and food habits of it's population. Wissler (1926) and Kroeber (1939) carefully documented the correspondence of cultural and natural areas in north America. Jullian Steward (1955) in his empirical analysis a " Culture core" of features most closely related to subsistence activity and economic arrangement.

The economic , nutrition problems of the tribes in India and else where largely linked with ecological factors and conditions. The cultural aspects of human nutritional problems gained much importance in recent times. The nutritional

problems can be derived from inborn errors of metabolism or from cultural and environmental factors. Nutritional practices are largely determined by basic customs which are interrelated with other aspects of the social organization, such as basic economy (Whiting 1958). Problem of malnutrition is associated with the scarcity of food resources in many tribal ecological zones including eastern ghats (Subramanyam-2001). Food crisis very much prevails in most of the tribal settlements in the eastern ghats due to food material shortage and practices.

Food is the prime basic need of human beings. The importance of cultural components of food behaviour is an area much in need of encouragement and expansion. The cultural influence of food preferences, beliefs about the properties of food and taboos and social role of food in the family and community can all have importance effects in food needs and provisions (S.J.Atkinson 1992). The natural resources in an ecosystem are the basic energy base for the human beings and they exploit these resources with the help of suitable technology. Technology is a means to explore and exploit the resources. All societies have technology and control it by diverse means and with the aid of diverse social and political institutions. The technological stage of development of a society is the sole basic determinant of its social and political structures. Indigenous science and technology developed early in the history of our civilization along with the development of our society. It was very much a part of our social growth and cultural growth(Sarkar B. 1989).

The roots for the modern technology is the indigenous scientific knowledge of different human groups. It is assumed that the scientific and technical man power in India is the third largest in the world after the U.S.A and U.S.S.R. The exploitation of science and Technology has led to an increasing gap between the developed and developing countries in recent times. The tribals have their own scientific knowledge of technology and they are still considered to be primitives and traditional bounded . It is conceived that they still use the crude methods and indigenous technology in most of their activities. However, the use of a particular type of technology closely associated with the ecological factors.

With the aforementioned background the paper is aimed to discuss the ecological background of the tribes, and their distribution in the ecosystem of eastern ghats in Andhra Pradesh state. It also try to explain the role of technology in exploitation of natural resources like land, water, forest and minerals and its utilization and management by the tribals. Further it also deals with the tribals belief

system with the nature, Government intervention for the conservation of natural resources, in the eastern ghats of Andhra Pradesh. The paper is prepared on the basis of the empirical observations with in-depth and intensive field work experiences among the tribals of eastern ghats by the use of conventional Anthropological methods like observation (both participant and non-participant), schedule, interview, interview guide and case study. Secondary sources of data from the I.T.D.A.s and Forest Departments of scheduled districts are also collected in support of the primary data for the write up of the paper. It is mostly descriptive in nature.

TRIBAL POPULATION AND DISTRIBUTION : India has the world's second largest concentration of tribal population, next only to Africa. The 461 tribal groups of the country with a population of 677.58 lakhs (1991 census) account for about one fourth of the world tribal population. They are distributed all over the country, except in the states of Punjab and Harayana, with different levels of concentration. The state Andhra Pradesh consists of 33 tribal groups with 4.2 (6.31%) million population. The table.1 shows the district wise scheduled tribes population of Andhra Pradesh. From the table it is noted that the districts like Khammam, Adilabad, Visakhapatnam and Warangal have high percentage of tribal population, when compared with the percentage of tribal population in other districts. The table 2 shows the Tribe wise rural/urban population in Andhra Pradesh. The concentration of tribal population is very high in rural areas especially in mountain and forest zones of eastern ghats when compared to urban areas. Among the thirty three tribal groups, the more number of Urban dwellers are found in the plain tribes like yanadi, Yerukula and Lambada. Among the 33 tribes, lambada or sugali is the numerically dominant followed by koya, yanadi and Yerukula.

Table –1

District - wise Scheduled Tribe population (1991 census)

S.No	Name of the District	Total population (in lakhs)	Scheduled Tribe population (in Lakhs)	% of S.T population in total population
1.	Adilabad	20.82	3.55	17.0
2.	Anantapur	31.84	1.11	3.5
3.	Chittoor	32.61	1.05	3.2
4.	Cuddapah	22.68	0.47	2.1
5.	Kurnool	29.73	0.56	1.9
6.	Srikakulam	23.21	1.34	5.8
7.	Vizianagaram	21.11	1.90	9.0
8.	Visakhapatnam	32.85	4.69	14.3
9.	East Godavari	45.41	1.76	3.9
10	West Godavari	35.18	0.85	2.4
11.	Krishna	36.99	0.92	2.5
12.	Guntur	41.07	1.82	4.4
13.	Prakasam	27.59	0.99	3.6
14.	Nellore	23.92	2.14	8.9
15.	Mahaboobnagar	30.77	2.27	7.4
16.	Ranga Reddy	25.52	1.09	4.3
17.	Hyderabad	31.46	0.29	0.9
18.	Medak	22.70	0.95	4.2
19.	Nizamabad	20.38	1.21	5.9
20.	Karimnagar	30.37	0.83	2.7
21	Warangal	28.19	3.85	13.7
22.	Khammam	22.16	5.59	25.2
23.	Nalgonda	28.52	2.76	9.7
	Total	665.08	41.99	6.3

Table -2

Tribe - Wise Rural/Urban population in Andhra Pradesh (1981 census)

S.No	Name of the Tribe	Rural	Urban	Total	% to the total S.T.Population
1.	Andh	5,629	365	5,994	0.19
2.	Bagata	87,595	399	87,994	2.77
3.	Bhill	196	64	260	0.01
4.	Chenchu	26,050	2,384	28,434	0.90
5.	Gadaba	27,193	539	27,732	0.87
6.	Gond	1,67,612	1,865	1,69,477	5.34
7.	Goudu(in the Agency tracts)	7,573	1,398	8,971	0.28
8.	Hill Reddi	351	47	398	0.01
9.	Jatapu	86,117	389	86,506	2.72
10.	Konda Kammara	36,014	534	36,548	1.15
11.	Kattunayakam	190	209	399	0.01
12.	Kolam	21,675	167	21,842	0.69
13.	Konda Dora	1,37,406	1,832	1,39,238	4.38
14.	Konda Kapu	24,695	3,338	28,033	0.88
15.	Konda Reddi	54,107	578	54,685	1.72
16.	Khond	39,303	105	39,408	1.24
17.	Kotiya	30,653	913	31,466	0.99
18.	Koya	3,51,777	8,022	3,59,799	11.33
19.	Kulia	350	63	413	0.01
20	Mali	2,355	112	2,467	0.08
21.	Manne Dora	18,738	228	18,964	0.60
22.	Nooka Dora	17,372	84	17,456	0.55
23.	Nayak (in the agency tracts)	6,487	45	6,532	0.21
24.	Pardhan	13,598	2,425	16,023	0.51
25.	Porja	16,382	97	16,477	0.52
26.	Reddi Dora	5,218	68	5,286	0.17
27.	Rina or Rena	226	7	233	-
28.	Savara	80,990	1,111	82,101	2.59
29.	Sugali/Lambada	11,08,215	50,127	11,58,342	36.47
30	Thoti	1,363	63	1,416	0.05
31	Valmiki(in the agency tracts)	42,179	765	42,944	1.35
32.	Yanadi	2,63,677	56,767	3,20,444	10.09
33.	Yerukula	2,44,550	56,007	3,00,557	9.46
34	Unspecified	52,769	6,391	59,160	1.86
	All scheduled tribes	29,78,693	1,97,408	31,78,001	100.00

Table -3

Predominant Tribal Groups in the scheduled Districts.

Sl.No	Name of the Scheduled District	Predominant Tribal Groups	Percentage of ST to total population.
1.	Adilabad	Gond, Kolam, pardhan, Thoti, Lambada,Naikpod, Andh	16.69
2.	East Godavari	Koya,Konda Reddi, Konda Kammara, Konda Dora	3.87
3.	Khammam	Koya, Konda Reddi, Sugali or Lambada	24.54
4.	Mahaboob Nagar	Lambada, Chenchu, Yerukula	6.35
5	Srikakulam	Savara , Jatapu, Gadaba, Konda Dora	5.38
6.	Visakhapatnam	Bagata, Gadaba, Konda Kammara, Konda Dora , Kotiya, Khond, Mali, Manne Dora,Nooka Dora, Reddi Dora, Porja, Valmiki, Gond, Kulia	13.74
7.	Viizianagaram	Savara, Jatapu, Gadaba, Konda, Dora	8.49
8.	Warangal	Koya, Lambada	12.72
9.	West Godavari	Koya, Konda Reddi, Yerukula, Yanadi	2.31

ECOLOGICAL AND GEOGRAPHICAL BACK GROUND OF THE TRIBES:

The state Andhra Pradesh has two distinct regions of contrasting ecological and topographic features, one with plain land scape, and the other with high altitude of hills and forests, a top elevated eastern ghats with cold climate. Geographically the entire Andhra Pradesh has divided into three regions namely 1. Coastal 2. Telengana and Rayalaseema. Generally the coastal region is considered as wet zone and other two regions telengana and Rayalaseema Classified as dry regions. The tribal population is distributed in all the three regions, but their concentration is more in the nine scheduled districts. The table 3 explains the concentration of predominant tribal groups in the nine scheduled districts of Andhra Pradesh. The nine scheduled districts are 1. Adilabad 2. East Godavari 3. Khammam 4. Mahaboobnagar 5. Srikakulam 6. Visakhapatnam 7. Vizianagaram 8. Warangal and 9. West Godavari. All these nine districts come under the sub-plan areas of tribal development strategy of V th plan period onwards. Among the nine scheduled districts, Visakhapatnam District represents fourteen predominant tribal groups and mostly live in the agency tracts of hills and Forests.

Historically the original tribal habitations of the state can be categorized into six zones or areas. Which are supposed to be identified with the origination of specific tribe. These are.

1.	Bagata and Khond habitat zone	Agency areas of Visakhapatnam District (Visakha Agency)North coastal area.
2.	Savara and Jatapu habitat zone	Agency areas of Srikakulam and Vizianagaram Districts-North coastal area.
3.	Koya - Konda Reddy habitat zone	Agency areas of Karimnagar, Warangal, Khammam, West Godavari and East godavari Districts- Area along Godavari Gorges.
4.	Gond-Kolam habitat zone	Agency areas of Adilabad and Nizamabad districts-Telengana region.
5.	Chenchu habitat zone	Agency areas of Mahaboobnagar, Nalgonda, Kurnool, prakasam and Guntur districts- Nallamalai forests.
6.	Plain tribes habitats (Lambada, Yerukula and Yanadi)	Plain areas of Nellore, Prakasam, Guntur, Kurnool, Warangal, Ananthapur and Chittor districts - These tribes sparsely distributed in some other districts too.

The ecological variations mainly found in between the plain tribes and hill tribes. The lambada, Yerukula and Yanadi Tribes inhabits in the plain areas, whereas the rest 30 tribes inhabits in the agency tracts of hills and forests which falls in the eastern ghats high altitude zone. These are Andh, Bagata, Bhill, Chenchu, Gadaba, Gond, Goudu (in the agency tracts) Hill Reddy, Jatapu, Konda Kammara, Kattunayakan, Kolam, Konda dora, Konda Kapu, Konda Reddi, Khond, Kotiya, Koya, Kulia, Mali, Manne Dora, Nooka Dora, Nayak (in the Agency tracts), Pardhan, Porja, Reddi Dora, Rena, Savara, Thoti and valmiki.

TRIBAL HABITATS AND ECONOMY: The economy of the tribals is closely associated with the ecological factors and habitats in which they inhabits. Among the plain tribes, the yerukulas are the traditional basket makers and swineherders. They are known as ex-criminal tribe of Andhra Pradesh. They live mostly in multi caste villages, maintaining symboitic relations with non-tribals. The yanadis habitats are mostly found on the banks of rivers, lakes, tanks and canals. Their main livelihood is fishing. Besides this they also catch the field rats exclusively for their own consumption purpose. The settlements of Lambadas are found in separate hamlets, locally termed as tandas. Most of their habitats are located nearer to hillocks or in the places of green pastures where they could rear the cattle. Once lambadas were Known as nomads, but in modern times, they are becoming sedentary cultivators and rearing of cattle has become their secondary occupation. They are mostly distributed in the Telengana region and sparsely in Rayala seema and coastal areas. The yerukulas are found through out the state where as the yanadis are mostly concentrated in Nellore district and sparsely distributed in coastal Andhra Pradesh region.

The hill tribes habitats are scattered homesteads. Each habitat is surrounded by fruit bearing trees, agricultural fields and forest. The economy of these tribes is agro-forest based and considered to be subsistence economy. They regularly interact with their physical environment of forests and hills. In general forests and tribals are inseparable and existence and development of one depends on the other. Therefore, it is said that" the tribal communities in India largely occupy forested regions where for a long period in their history, they have lived in isolation but in harmony with nature. They draw their subsistence largely from the forest. They have had symbiotic relationship with forest which continues undisturbed in the interior even

now"(government of India 1982: 19). The hill tribes in the eastern ghat region practice both shifting and settled cultivation, and also collect the minor forest produce items. Forests constitute the second most important natural resources of Andhra Pradesh after minerals.

Among the hill tribes, chenchu, Kolam, Thoti, Konda Reddi, Khond, Porja, savara and Gadaba are classified as primitive tribes. The habitats of the primitive tribes are located on the hill tops and slopes where plain landscape is totally absent. These tribes are largely depending on shifting cultivation and minor forest produce collection. The chenchus are considered to be most primitives and they are still largely depending on food gathering activity. At present some of the chenchus are in transitional stage of food gathering to food producing. The traditional habitats of chenchus are found in contiguous forest tracts of Nallamalai hills. Much of the area of those Nallamalai hills through which krishna river flows is presently declared as Tiger Project area.

NATIRAL RESOURCES AND EXPLOITATIVE TECHNOLOGY OF TRIBALS:

The main natural resources available to the hill tribes in the agency tracts are land, water, forest and minerals. They mostly exploit the land, water and forest resources. The tribals pay very less attention to exploit the mineral resources. But they make use of many varieties of rocks or stones to make tools for grinding the food materials, walls construction and bunds formation and some other domestic purposes. The geological explorations in the eastern ghats shows the availability of boxite in huge quantity . Besides Boxite, Certain precious stones and iron ore also available. In recent time some of the tribal people in Ananthagiri area of Visakha Agency participated in the collection of precious colour stones(Rangu Rallu) along with the non-tribals. It was brought into the notice of government. In turn the Government imposed ban on such activity in the agency areas of eastern ghats. In regard to the importance of minerals W.M. Myres (1950) said that " the minerals continued to play an expanding role in a growing civilization".

LAND RESOURCES: The lands under the use of tribals have classified into 1. Wet 2.Dry 3. Podu 4. Waste and forest lands. The waste and forest lands in a tribal habitat are commonly used by all the residents for grazing their cattle, collecting

firewood, timber and other minor forest produce. The cultivable lands are hill terrain wet, dry and podu categories. The dry land is available in large extent when compared to podu and wet lands. Podu (shifting) plots are found on the hill slopes and tops where certain extent of forest lands degraded and denuded. In some tribal settlements terrace cultivation is also found on the hill terrains which also falls under wet category. The major portion of wet land cultivation in the agency tracts is seen by the sides of hill streams, where plain landscape is available. Majority of the tribal farmers grow the paddy crop in wetlands during kharif season. Mixed croping pattern (pulses, millets and oil seeds) is a dominant feature in both dry and podu cultivation. Draft animals drawn wooden plough is the major technology used in both dry and wet cultivation. Cattle dung and green menure are used for fertile the soil in these two types of farmings. The tribals still use the local variety of seeds and seedlings in all kinds of farms. Weeding is done manually. In the harvesing of the crops, the tribals use the sickle to cut the stalk. The thrashing is done with the help of draft animals or manually. The food grains are stored in bamboo bins or in big clay pots for future use.

Soils are the basic resource, without which man and his fellow creatures could not exist. They support the vegetation which includes both the variety of domesticated crops and many types of wild plant life- the trees, grasses, roots and herbs. Which man utilizes. There are four types of soils are found in the agency tracts of eastern ghats, namely 1.Rocky soil (lethosols) 2. Redloam 3. Alluvial and 4. Black soil. The major type of soil type in the agency areas is lethosols. The mountains, plateus and rough hill lands include many areas in which shallow soils overlie their rocks formations only an inch upto a foot or two of soil marbles the bed rock. Although, most of the land is rough and rolling, there are also areas of smooth or level land with such shallow soils. The red loam, alluvial and black soils are very fertile, but available in limited area. These soils are found in the plain land scape near by the hill streams and rivers. Very less number of tribal families own these kinds of soil types lands. The Bagatas are the traditional cultivators in the Visakha Agency area. Large majority of them own the fertile lands. However, the Mali tribe in visakha Agency area selects the red loam soil for growing the vegetable crops. The Malis are the traditional gardeners and Horticulturists. Their settlements are mostly found nearer to the water resources and plain landscape areas.

In the agency tracts the problem of soil erosion is very common because of hill terrian and uneven lands. It is one of the major problem to the tribal farmers of eastern ghats. Soil conservation is one of the newest agricultural sciences. The tribal farmers are following the traditional method of bund formation with the pebbles, rocks and mud especially in dry and podu cultivation plots. Even, then this problem has not yet solved in the agency tracts. The damage to the land definetly takes place due to loss of soil structure, loss of organic matter, loss of plant nutrients and loss of the soil itself. The soil exploitative methods of land use are also most important. The crops yields basically depends on the fertility of the soil . Generally the tribal farmers do not take much care to improve the soil fertility in the shifting and dry plots so that they get very low yields from dry and podu crops. Most of the crops which they raise are rainfed crops. Now certain change has taken place in the traditional cropping pattern. Some of the tribal farmers in the visakha agency area are raising the commercial crops like maize, turmeric, ginger and pippallamodi. A few tribal families owining the coffee gardens and some tribal families grow the local variety of vegetables in their kitchen gardens. Both settled and shifting cultivations are vogue in the Agency tracts of eastern ghats. The settled cultivation is seen in the wet and dry categories of lands, where as the shifting cultoration is found on the hill slopes, where major portion of the soil is lethosols. The technological variations in between these two types of cultivation's are mainly due to topographic features of the eastern ghats. In the agency tracts the plough cultivation is limited to wet and dry farmings.

SHIFTING CULTIVATION AND DEFORESTATION: The practice of shifting cultivation is still found in the agency tracts of eastern ghats. The shifting cultivation is known as podu in coastal areas of Andhra Pradesh and Vagad in Kolami and padaka in Gondi dialect of Adilabad district. In northern India this kind of cultivation is known as Jhum. This method of cultivation is still in practice all over the world especially in the areas of forest and mountain tracts. It appears to have been well established during the neolithic period more than 10,000 years ago. Shifting cultivation technology is mostly suitable for the humid triphical forest, where vegetation regenerates very fast.

In Andhra Pradesh state, shifting cultivation is extensively practised in the districts of Visakhapatnam, srikakulam, Vizianagaram, East Godavari, West Godavari, Warangal and Khammam and sparsely in Adilabad district. The

Government reports states that about 62,504 families are engaged in shifting cultivation over an area of 62,948 hectares. On an average, each family has one hectare of land on all hill slopes for the purpose of shifting cultivation. The major tribal groups practising shifting cultivation in the state are, savaras and jatapus of Srikakulam and Vizianagaram districts, Khonds, Konda doras, Nooka doras, Kotiyas, porjas, Gadabas, Bagatas and Valmikis of Visakhapatnam District, Konda Reddys of East Godavari west Godavari and Khammam districts. And also some of the families in kolam and Gond tribes of Adilabad district are also subsisting on this kind of cultivation.

The method of shifting cultivation includes four stages. In the first stage the tribal farmer select the field on the hill slope or on the hill top, where there is good growth of trees and bushes. Later, he clears the bushes and vegetation with the sickle, seeking the help of his family members and close kin families, they cut off trees and undergrowth with the help of axe and long sickle or knife and left it on the field for about ten to fifteen days to dry up. Then burn it, and the ash remains on the field. When the monsoon is about to set in during the month of May or June the tribal farmers prepares the podu plots for cultivation. After the first rainfall the farmer starts to dig the rock soil with the digging stick or hoe and disturb the clay or black soil with' V' shaped instrument with long handle called locally as konke boriga. This tool appears to be proto type plough. This kind of tool is found among all the podu cultivators. Then, he sow the seeds in the field without adding any additional manure except the ash which remains in it. Generally the tribal farmers grow the mixed crops like millets, pulses and oil seeds in podu plots. The seeds are broadcasted on the soils disturbed or kept the seeds in the holes which made with the digging stick. The shifting cultivators do not have the practice of weeding in this kind of cultivation. The weed also grow along with the plants raised in the plots. The harvesting of the crops starts in the month of October and continues till January. The tribal farmers gets very low yields from the crops which they raise in the podu plots because they neither remove the weed nor use additional manure or chemical fertilizers and pesticides. A podu plot can be used for cultivation one or two years and then it left fallow for another two or three years. Then a new plot shall be selected on the hill slope of forested zone. The rotation of podu plots is a common feature , in the methods of shifting cultivation. Some of the tribal families take up settled cultivation also, simultaneously in addition to podu cultivation.

No doubt, the practice of shifting cultivation in the eastern ghats is resulting to some extent of deforestation. But the large scale deforestation taking place due to smuggling of timber by the non-tribal timber merchants, public construction works and other agencies. The government of Andhra Pradesh Tribal welfare department launched a massive scheme called Andhra Pradesh tribal development project for rehabilitation of 63,371 shifting cultivator families with total out lay of RS.77.77 crores in the districts of Srikakulam, vizianagaram, Visakhapatnam, and East Godavari, where shifting cultivation is widely practised. This project is largely funded by International fund for agricultural Development (IFAD) of Rome. Apart from this, the Forest Department of A.P has taken up the joint Forest Management (JFM) programme in 1993. This programme under APFP, funded by the world Bank for a period of six years. It envisages protection and management of 1,73,000 hectares of forests, through the vana samrakshana sarmitis (VSS) which are village level peoples participation.

WATER RESOURCES :- The practice of agriculture is mainly dependent upon the rainfall. The agency areas of Eastern ghats region receives highest rainfall an average of 1165 mm in a calender year because of the flora is very conducive for it. Even though, the agency areas receives highest rainfall, the tribal people did not developed the technology of storage and conservation of water resources. Most of the rainfall water, merges into the reservoirs constructed down the hills, rivers and sea.

It is a well known fact that almost all the human settlements lies near by a water point. In the Eastern ghats, each tribal settlement is usually situated near by a hill stream (Gedda) or spring (Oota neeru). The tribal people in the area refer any type of water resource as Ganga and it has religious significance. The universal importance of water as a basic necessity of all forms of life, makes its utilization a most complicated. Water is a Biological necessity and has great economic importance. All life is completely dependent upon water, which includes drinking water for man and beast, soil water for vegetation and surface water for the habitat of all types of aquatic life (J.M. Garland1950). It is most important to human life and such natural resource should be properly conserved and utilized .

Surface waters like hill streams, tanks, ponds and reservoirs are the major sources of water supply to the tribal people in the agency areas of eastern ghats. The other ground water resources are the springs and wells. Among these two sources of

water supply .The spring water is largely used for drinking and terrace cultivation purposes. Many springs are of limited volume of intermittent nature that they are of value as source of water supply for individual houses, especially isolated farm steads, and small tribal settlements. The tribal people are not showing much interest to trap the ground water. They make use of freely available surface water. The I.T.D.A has dug a considereable number of bore-wells in the agency areas with a view to provide protected drinking water facility to the tribal people. But most of them are not using such water supply for drinking purpose and they mostly use it for other domestic, cleaning and bathing purposes. During 1991-93 the I.T.D.A implemented the 'Jeevandhara' water supply programme for irrigation purpose in some of the villages with a view to increase the extent of wet cultivation area and for agricultural and economic development among the tribal people. Even this kind of water supply is also not properly used by the tribal farmers fully for irrigation . Only in few tribal settlements certain medium and large farmers are using it. Certain advanced tribes like Bagata, Konda dora, Kotiya, Jatapu, Konda kapu, Koya ,Mali, Valmiki and Gond are benefited much with this programme. The Malis in the visakha Agency area are considered to be the better users of all sources of water for the irrigation of vegetable crops and paddy. Generally in summer months very little water is available in the streams, ponds and tanks. Even in such period the Malis make use of the available little water for growing vegetables with pot irrigation.

RAINFALL AND TECHNOLOGY IN CONSERVATION OF WATER SOURCES:

The natural rainfall is the source for all kinds of water supply. The tribal people have the belief that the gods and godesses are rain providers; so that they worship Konda Devata, Varuna Devudu, Adivithalli, and sanku Devudu to get rain by offering sacrificial blood of fowls or cattle, before the early monsoon setting. The local guruvu or priests propitiate their gods to get the rain. In primitive societies priests or rain makers , propitiate their gods, while in modern technical times farmers call on governments to apply science to the problem. (pereira 1973:20)

It is a well known fact that the tropical forest areas or agency areas receives highest rainfall because of thick vegetation. The " Hydrocycle" usually precipitated as rain. The rainfall water on the land surface or hill slopes run off directly into streams to drain by way of rivers and back into the sea. It is a cyclic process. The tribals have developed certain indigenous technology to conserve the rainfall water in

the form of checkdams, ponds and tanks. The government has also established small, minor irrigation divisions in the scheduled areas of Eastern ghats. These divisions in the Eastern ghats region have constructed the tanks checkdams and reservoirs. Due to certain technical problems some of the tanks, and checkdams are also washed away during the heavy rainy reasons. To pographically it is also very difficult task for the tribals to conserve the water with locally available technology. They construct the checkdams, ponds and tanks with pebbles, rocks and clay. The tribal farmers divert the stored water through the canals to their agricultural fields for the wet crops which they raise. If they wanted to divert the checkdam water for the highly elevated fields they make use of the hollow bamboo or wood logs by joining one another with the use of addafibre covering the gaps with the paste of limestone powder and mud. Generally springs flow in the form of nalaas and merged into the hill streams. The tribal farmers use the spring water in terrace cultivation. They usually prepare small fields from the bottom of the hill terrain up to the place of springs origination. They construct the bunds on the four sides of each field and made holes two inches above the bottom most bund of each field. Like thus the springs over flow water reaches from the top most field to the bottom most one. This kind of irrigation technology is very commonly found in terrace cultivation throughout the agency tracts of eastern ghats. Only limited area is available even for this kind of cultivation in the Eastern ghats. The major water conservation problems in the tribal areas are uneven landscape, erosion, heavy rainfall leading to overflow of the streams, lack of concrete cheekdam construction sttructures and tank structures. And also large majority of the tribals have not developed water conservation attitude and most of them make use of only freely available surface water for both wet cultivation and domestic purposes. They drink the polluted stream water without any hesitation. Due to this , the incridence of water born diseases are very high among the tribal population in the eastern ghats of Andhra Pradesh.

FOREST RESOURCES: The tribals are known as forest dwellers. The forest dwelling tribal population in our country is estimated around 4.8 million. About 30 tribal groups in Andhra Pradesh live in the forested zones of Eastern ghats. In the past the hill tribes, mostly depended on the forest resources. After the introduction of plough cultivation in the forested zones of tribal habitats, tribals dependency on forests have marginally reduced. However, still they interact with the forest

ecosystem and collect the seasonal minor forest produce items. It is a secondary source of income for the large majority of the tribal families in the eastern ghats.

FOREST AREA IN THE STATE OF ANDHRA PRADESH. The state of Andhra Pradesh has total forest area of 61613.61 square kilometers. Forests in Andhra Pradesh cover about 22.40 percent of the total geographical area. Of the three regions of the state, Telengana has the largest share of the total area under forest (10.16 percent) , followed by coastal Andhra (7.12 percent) and Rayalaseema(5.86 percent). In each of these regions, however, the share of the area under forests compared to their respective total areas is broadly similar (Telangana 24.24 percent, Rayalaseema 23.84 percent and coastal Andhra 21.11 percent) and almost equals the share of forest area at the state level.

At the district level, only eight of the 23 districts have an area about 25 percent under forest. Of these three are in coastal Andhra (Visakhapatnam 41.40 percent, East godavari 29.90 percent and prakasam 26.10 percent) two in Rayalaseema (Cuddapah 32.40 percent chittoor 30.30 percent) three in Telengana (Khammam 47.80 percent Adilabad 36.50 percent and Warangal 29.90 percent). The table 4 shows the district wise distribution of forest area in the state.

TABLE-4

S.No	Name of the District	Forest area (in sq.km.)	Percentage of the total geographical area of the district
1.	Srikakulam	703.94	12.00
2.	Vizianagaram	1161.84	18.50
3.	Visakhapatnam	4698.56	41.40
4.	East Godavari	3232.55	29.90
5.	West Godavari	812.29	10.40
6.	Krishna	663.04	7.50
7.	Guntur	1605.98	14.40
8.	Prakasam	4467.85	26.10
9.	Nellore	2448.42	18.60
	coastal Andhra Pradesh	19794.47	21.40
10.	Kurnool	3453.50	19.60
11.	Ananthapur	1968.05	10.30
12.	Cuddapah	4980.33	32.40
13.	Chittoor	4536.97	30.30
	Rayalaseema region	14938.85	22.30
14.	Ranga Reddy	730.60	9.70
15.	Nizamabad	1681.08	20.90
16.	Medak	876.07	9.20
17.	Mahaboob Nagar	3036.43	16.40
18.	Nalgonda	858.33	6.00
19.	Warangal	3713.27	28.90
20.	Khammam	7550.33	47.80
21.	Karimnagar	2516.81	21.20
22.	Adilabad	5917.37	36.50
23.	Hyderabad,	-	-
	TELANGANA REGION	26880.29	23.40
	ANDHRA PRADESH	61613.61	22.40

FLORA AND FAUNA: The hill tribes in the agency tracts are largely depend on the flora and fauna for their livelihood. The eastern ghats are covered with thick forest growth of numerous trees and dales. Trees liees like Gallnut, Nalla Maddi, Jack, tamrind, teak, bamboo, buruga, mango, eucalyptus, sampangi , gumtrees, silveroak etc, and tree creepers like adda, soapnut etc are common in the forest. Inaddition to these, coffee plantations also found under the shades of the big trees, maintained by the Coffee Board, Forest department and Girijan cooperative corporation. A number of wild animals are also present in the forests of eastern ghats. The most commonly found animals in the forest are bison, wildpigs, deer, bears, cheetas, tigers, lions, foxes and wolfs, sankes, numerons birds, wild fowls, peacocks and hares.

FOREST RESOURCES AND ITS UTILIZATION: The dense forests of the scheduled areas are endowed with rich minor forest produce. The forests in coastal districts are potentially rich and varied items like addaleaf, fibre, and fruits, tamarind, myrobalams, broom grass, soapnuts, markingnuts, punagamseeds, nuxvomica, honey and R.S roots are abundantly available, while gumkaraya, Mohwa flower, Mohwa seed and Tunki leaf are some of the important items available in the Telengana region: Honey, nuxvomica, Mohawa flower, Mohwa seed and soapnuts are available in large quantities, besides gum in the Nallamalai forest belt of Rayalaseema region. The tribals collect these seasonally available minor forest produce items and sell it to the Girijan cooperative corporation and also to the non-tribal private traders in the weekly shandies. The G.C.C. has the monopoly right to purchase minor forest produce items from the tribals. Through this source a tribal family may get an average of Rs 2000/- to Rs 3000/- in come per an year. In addition to the minor forest produce, they also collect the edible fruits, roots, tubers and leafy vegetables for their own consumption purpose.

The tribals also collect the firewood for fuel purpose, timber for house construction and making of agricultural wooden implements, furniture and other articles for domestic usage. Some of the families in the Gadaba, Porja, Kolam, Savara and Chenchu Tribes collect the firewood for marketing purpose. It is considered to be the primary occupation to them. The tribals in the Visakha Agency area use the adda fibre for rope making purpose.

The tribal people in the eastern ghats now and then participate in small hunting games in which they catch rabbits, deers, wild pigs, sambar, fowls and other birds. The flesh of these animals and birds are used only for their own consumption purpose. In the Agency area of Visakhapatnam, the tribals observe the Etikala or Etum festival in the month of April or May in every calendar year. This festival is associated with the hunting of animals and birds. All the tribal men compulsorily participate in the hunting activity, during that festival occasion. In addition to these some of them catch small fish and crabs in the hill streams, tanks and ponds exclusively for their consumption purpose.

The tribals use very simple technology in minor forest produce and hunting. They use sickle, knife, digging stick, axe and hands in the minor forest produce collection, while in hunting they use nets, bow and arrow, spear, and axes and pebbles. The chenchus in the Nallamalai forest use the digging stick in roots collection, knife or sickle for cutting the tubers, and to make cut marks on the bark of gum tree, and hands to pluck the edible fruits and leaves. Still they are using indigenous technology in preparing arrack with Mohwa flower. In visakha Agency area the tribals are experts in traping toddy from Sago palm(Jeelugu) and Palm trees. Such trees are mostly found in the forest.

TRIBALS BELIEF SYSTEM WITH THE NATURE: Worship of the natural objects and products is the regular feature and part of the life of tribal people. They refer the forest as Adivithali, the hill or hillock as Konda Devta, Land as Lakshmi, water source as Gangamma. They believe that the forest will nourish them and provide food for their livelihood. They believe that Gods and Goddesses should be seen properly with a view to get protection from wild animals, snakes and natural calamities. The podu (Shifting) cultivators in the agency areas have the belief that konda Devata (hill goddess)shall protect their crops and helps to get good yields from the crops which they raise. Because of this reason, they worship this deity atleast twice in a calender year, especially at the time of sowing and harvesting of the crops. They consider that forests and hills are the abode for spirits. Majority of them still have the superstitious beliefs, witch craft and sorcery. For various diseases they consult the local medicine man (guruvu), witch doctor and make vows to local deities. The animal and fowl sacrificial are very common among most of the tribes in the eastern ghats of Andhra Pradesh.

In the agency areas, the tribals considered some of the following trees are sacred in nature, which they do not cut neither for fire wood nor for the house construction, agricultural and other domestic purposes. Such trees are 1. Ravi (ficus religiosa) 2. Jammi (Prospis cinarana) 3. Marri (Ficus Tuberculcate) 6. Neem (Margosa indica) 7. Dondera (butia frondosa) 8. Lim(melia Azadirachta) 9. Nerudu (Myrtus cyneimum) 10. Maredu (Aegimer mctos).11 Jalli (arachis futicosa).

The tribal social organization is generally based on totemic clans. Some of the tribal groups in the agency areas claim mythical affinity with certain species of natural phenomenon of specific inanimate objects and they regard these animate or inanimate objects as their ancestors. These totemic objects are considered sacred and killing or eating of the flesh is a taboo. The following totemic clans are found among the tribes of Visakha agency area 1. Korra (sun), 2. Pangi(kite) 3. Ontala(snake) 4. Killo (tiger) 5. Gollori(Monkey)6. Kimudu (Bear) 7. Matsya (fish) and 8. Chelli (goat). Generally each clan member prefix the name of their totemic object as their surname. The natural objects of flora and fauna in the agency areas ecology has religions, economic and social significance, which are much attached to the life styles of the tribal people.

ROLE OF GOVERNMENT IN CONSERVATION OF NATURAL RESOURCES:

An agricultural research center has been established at chintapalle, with a view to develop agriculture in the tribal areas though the introduction of new crops of high yield variety, pest control, soil erosion, Siri culture and horticulture. The agricultural development unit in I.T.D.A is looking into the soil conservation and land development. The government has established Minor irrigation divisions in the agency areas, in order to conserve the water resources with better watershed management. The S.M.I divisions were constructed a considerable a number of Checkdams, tanks and reservoirs with a view to increase the extent of wet land cultivation area. The Indian government has formulated the national forest policies in 1952 and 1988 inorder to conserve the forest resources and ensure environment stability and maintenance of ecological balance in the forested zones of our country. The national Forest policy,1988 stressed the importance of people's participation in protection, conservation and development of forests. The main objective of this policy is that the forest communities should be motivated to identify themselves with the development and protection of forests from which they derive benefits. Broadly

the concept is called joint Forest Management (JFM). Based on the aims and objectives of the J.F.M. the government has been directed to constitute the local village community into " vana Samrakshana Samithi" (V.S.S). The state Andhra Pradesh has taken up the Joint Forest Management (JFM) programme in 1993. It is one of the 22 Indian states initiating the J.F.M.strategy to regenerate degraded forests and improve the economy of Forest dwellers.

The JFM programme is one of the three major components under the world Bank aided" Andhra Pradesh Forest Project (APFP). The other two components are production forestry scheme, and community and private forestry stream. This programme envisages protection and management of 173,000 ha of forests through the Vana Samrakshana Samitis (V.S.S) which are village level people's institutions. The state forest Department has started a compaign called" Vana samrakshana Udyamam" (VASU) in 1996, on the same lines as APFP. This programme is not covered by world Bank aid, though efforts are being made to mobilize funds from the state government. Thus, with the same theme and concepts, J.F.M. in Andhra Pradesh is now being carried out under two streams- JFM(APFP) and JFM(VASU). The state Forest department and the N.G.O sector are playing key roles in conveying this programme to the people. The state government initiated" Janma Bhoomi" programme also aimed to make the people to participate in the ongoing development sechmes and to provide knowledge for the better management of natural resources like land ,water, and forest. For instance the " Neeru-Meeru" programme is mainly focused on the conservation of water resources and water shed management in Urban, Rural and tribal areas of Andhra Pradesh. Even the tribal people benifited with this in some extent to withstand during water crisis situation especially in summer months. This programme atleast created some awareness and developed water conservation attitude among the tribals in certain extent.

SUMMARY AND CONCLUSIONS: The tribal population in the state of Andhra Pradesh is mostly concentrated in Eastern ghats. Eastern ghats are considered to be the abode for tribal population. On the basis of geographical and ecological background the tribes in A.P. state has broadly classified into 1). Hill tribes and 2).Plain tribes. The large Majority of the hill tribes population subsist on forest, land and water resources. The chenchus in Nallamalai forest still largely depend on food gathering and hunting for their livelihood. However, the chenchus who had

rehabilitated in the colonies and road side settlements are now in transitional stage of food gathering to food producing. They are also facing the problem of adaptation to new environment. The life styles of plain tribes are better than that of the hill tribes.

The ecology of the shifting cultivators and the environmental conditions of the primitive tribes (Khond, Porja, Gadaba , savara, chenchu, Kolam, Konda Reddi and Thoti) are not much conducive for their livelihood, and prone for mal nutrition. In genereal the incidence of malnutrition among the tribal population is more, resulting to the health problems and reducing the working capacity among them. This is one of the reasons, that the tribals are not able to contribute for the nation development. The large number of tribal population stand in the lower rung of the society and falls under the below proverty line. This situation prevails among the tribal societies because lack of sufficient food resources, and also not making use of the available natural resources fully by them. They still use the traditional technology and crude methods in exploitation of the resources.

Food crisis is the major problem to them. The exploitation of the tribals by the non-tribals is still continuing because of their innocence, ignorance and illiteracy, the problem indebtedness is rampant especially among the interior tribals, and ultimately it leads to land transformation and land alienation. The interior forested zones in the eastern ghats are known for naxalite activities. The extremists, also taking shelter in the interior tribal settlements and they too sharing the available food resources along with the tribals. The exploitation of non-tribal moneylenders and traders, the problem of land alienation and extremists activities are creating unrest among the interior tribals. These tribals still relatively lives in isolation. The impact of external agencies on the interior tribals resulting to the disturbances in their livelihood.

The available cultivable land for the tribals is not sufficient to meet atleast the food requirement of the entire tribal population. The exact landholding particulars of the tribals are also not available. Only a section of the tribal families have patta lands. Large majority of the tribal families in the eastern ghats own the banjar or waste lands of dry and podu categories. Very limited extent of plain land scape lands are available for cultivation. Such kinds of lands are mostly owned by the advanced Hill tribes like Bagata, Koya , KondaDora, Kotiya, Gond, Mali and Jatapu. Among the plain tribes, Lambada tribe own large extent of land especially in warangal and Mahaboob nagar districts, even though, once they were considered as pastoralists. They are economically better than the other tribes. The Bagatas are economically

better than the other tribes in Visakha agency area, because they are the traditional land owners. The landless tribal families have forced to depend on labour employment and minor forest produce collection for their subsistance purpose. Such families should be identified and provided them with economic supporting schemes like milch cattle and agricultural land distribution. The valumiki tribe in the agency area and Lambada tribe in the plain areas are benifited much with the modern education and employment.

The agency areas receives highest rainfall, but the rainfall water merges into the rivers and sea. The tribal people have not developed the attitude of conservation of water resources and they are not fully making use of the available water resources such as streams and springs. In the entire eastern ghats of A.P, only the Mali tribe is considered as better water using community for the irrigation of the vegetable crops which they raise in all seasons. The tribals drink the polluted stream water without any hesitation, with the result, they suffer with water born diseases. They have not yet evolved the proper technology in conservation of soil, inorder to prevent the soil erosion from rain fall and water flows on hill slopes where they practice dry and shifting cultivation.

Collection of minor forest produce items by the tribals has also marginally reduced due to depletion of forest. The 1988 forest policy vehemently restricts the tribals entry into the reserved forests and prevents the practice of shifting cultivation Moreover the amount which they get from the minor forest produce items is not commensurate with that of the number of labor hours they spent for collection. The Girijan cooperative corporation is also not paying much attention to procure the Minor forest produce items from the tribals due to varied reasons. The non-tribal private traders also buy the minor forest produce items from the tribals in the weekly shandies with low price and false weights and measures. This problem to be solved by strengthening the Girijan Cooperative corporation and eradication of pilferage and corruption. With the introduction of cash economy and marketing system, the tribals are also forced to sell some quantity of the agricultural produce in the nearby weekly markets in order to fulfill some of their requirements other than food. It is noted that the tribals sell much protein and nutritive value pulses, vegetables, fruits, oil seeds and millets in the shandies, and buy the stored food items eatables clothes and other daily essential requirement items like salt kerosene, match boxes , cigars, detergent soaps, cosmetics, etc. They sell their produce with low price and buy their daily

other essential items with high price from the non-tribal traders. In the contemporary times the non-tribals influence has much seen among the tribals of eastern ghats. The tribals contact with the civilized non-tribals led to culture change among them.

The problem of deforestation and depletion of forests resulting to natural imbalance in the tribal areas. The administrators and planners has a misconception that in tribal areas shifting cultivation leads to deforestation. In fact, it is not the sole cause for deforestation and there are various reasons for it. Lot of timber and wood are used in construction works, and making of modern woodern furniture in the so called civilized and industrialized societies. The commercial value forest produces like timber, baboo, firewood, sandal wood, spices, medicinal plants etc, are exported to the urban markets and made use in industries. No doubt the shifting cultivators in agency areas are forced to cut the trees and clear the bushes for their subsistence purpose. The damage done to the forests by the tribals relatively less than the damage done by the other agencies to the natural forests. To solve this problem in some extent, the tribals should make them to participate fully in aforestation programme. And also horticulture programmers should be intensified and suitable plant species has to be germinated and planted to regenerate the degraded forest in the agency tracts. The tribals should be provided with sufficient knowledge in conservation of natural resources and exploit such resources in a better way which can definitely helpfull for their sustainable development.

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