# Forest Ecology and Health Care: A Study in Visakha Agency of Andhra Pradesh, India

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*ABSTRACT:* Over exploitation of forest resources by the various external agencies, mining operations and development projects of government and non-government in the tribal areas are resulting to deforestation which are adversely affecting the life of the aboriginals. The consequences of forest ecosystem degradation to tribal health are numerous. Primarily, which create natural imbalance of forest bio-diversity resulting to food problem and loosening permanent energy base. Prolonged starvation for food leads to high incidence of malnutrition, morbidity and mortality among them. Due to deforestation, some of the valuable medicinal plants become extinction and tribals also loose their prime medicinal source. The forest policies of government are also adversely affecting the livelihoods of tribals. In this research paper an attempt is made to explain tribals' interaction with forests and influence of ecological and cultural factors on their health. It also deals with their indigenous medicinal practices and effects of government forest policies on their lifestyles. Further it emphasizes the relevance of action anthropology in solving the health problems of tribals. The paper discusses the inter connectedness in between the forest ecology, health and medicine of tribes in anthropological holistic perspective with an empirical evidence of a case study in Visakha agency area of Andhra Pradesh.

## INTRODUCTION

Health is one of the social indicators of human development. Environment is the basic determinant of health in general. However, any external agents of biological, chemical, physical, social or cultural, that can be causally linked to a change in health status. In developing countries, the primary environment determinants of health are biological agents in air, water, and soil that account for most deaths. Four million children die annually from diarrhea diseases acquired from contaminated food or water, over one million people dies from malaria each year. Hundreds of millions of people suffer from debilitating intestinal parasitic infestations. Hundreds of millions people suffer from respiratory disease caused by biological and chemical agents in the air, both indoors and outdoors. In India, tribal people are experiencing much vulnerability in the area of health and they are worst affected with various kinds of tropical diseases, infections and parasitic diseases. Generally, tribal areas in Andhra Pradesh state are considered as malaria endemic zone. The tribals are very frequently affected with malaria and huge numbers of malaria deaths were recorded in the Eastern Ghats forest environment, which is considered as abode for tribal population in Andhra Pradesh state.

According to World Health Organization (1992) over one billion people are unable to meet their basic needs like adequate food, clean water and shelter,

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because they lack the necessary income and land. These are environmental hazards that take a far greater toll on human life and suffering in absolute terms compared to those environmental determinants of concern in the developed countries. Large majority of the tribal people in the Eastern Ghats of Andhra Pradesh are facing the problems of poverty, food insecurity and malnutrition which in turn resulting to high incidence of morbidity and mortality. Degradation of forest environment is the prime cause for dismal health condition among tribals. The health of tribals is dependent on forest ecology and their exploitative technologies of natural resources.

World Health Organization defines environmental health as those aspects of human health, including quality of life, that are determined by physical, biological , social and psycho-social factors in the environment. It also refers to the theory and practice of assessing, correcting, controlling and preventing these factors in the environment that potentially can adversely affect the health of present and future generations (WHO 1993).

The ecosystem approach can be viewed as one means to achieve sustainability or sustainable development. It is also much useful to understand the influence of environmental or ecological factors on the health of living organisms including man. Anthropologists realized the importance of ecosystems through their investigations on man and environment relations specifically among the traditional tribal societies. Anthropologists studying small communities have traditional exhibited a greater interest in ecological questions relying on intensive field work method amongst peasant and tribal cultures, that are dependent on nature. They have developed a healthy respect for the ecological sensibilities of the local communities. They have documented in great detail and variety of regions, the indigenous knowledge systems, conservation mechanisms and adaptations to the bio-physical world of tribal and peasant societies. For example, Durkheim and Mausses study on totemism as "primitive classification", Levi-Strauss work on myth and folklore took close notice natural world. Radicliff Brown and Malinowski wrote monographs which highlighted the embeddedness of social institutions in their ecological surroundings, Fredrik Barth is considered to be the pioneer of ecological anthropology. The studies on human-nature interactions by these anthropologists strongly testify to the continuing vitality of ecological traditions in anthropology. Clark David Wissler (1926) Kroeber (1930) Jullian Steward (1955) and Whiting (1958) also have contributed for the growth of ecological anthropology. Social anthropologists in India have paid scant attention to the ecological frame work of tribal and rural life. There is dearth of studies on environmental health of tribal communities in India.

Globally, the ecological perspective on health is gaining voice and weight. Brown and In horn(1990) stress the ecological perspective on disease and human behavior, an under developed area of research within medical anthropology. According to Bonet *et al*. (2007) the leader of a rehabilitation project in the oldest section by Havana puts it: "The eco-health approach to human health-eco-health for short". Eco-health activity inherently involves three groups of participants: researchers and other specialists, community members and decision makers. The eco-health approach is based on three methodological pillars: transdisciplinarity, participation and equity". The ecosystem approach gives equal importance to environmental management, economic factors and community aspirations. The health of tribal people is closely associated with forest ecology, their economy and their cultural practices. The research paper is prepared on the basis of empirical and secondary data collected for the major research project "Environment and sustainable development: An anthropological study among the tribes of eastern ghats in Andhra Pradesh. The paper deals with the ecological, health and medicinal aspects of tribes inhabiting in Visakha agency area; which is part of the Eastern Ghats forest environment of Andhra Pradesh state. A part of the project study data has been utilized for providing explanations on the topic of "forest ecology, health and medicine of tribes", which is much concern to the focal theme of this seminar with anthropological relevance. Anthropological ethnographic methodology was employed for collection of empirical data from 367 tribal respondents (head of the households) belonging to twelve tribes namely, Bagata, , Konda dora, Konda kammara, Konda kapu, Nooka dora, Khond, Gadaba, Porja, Mali, , Dulia/

kulia,Kotiya and Valmiki spread in eleven tribal mandals of Visakha agency. The study area, Visakha agency falls under the tribal sub-plan of Integrated Tribal Development Agency (ITDA), Paderu. The secondary data on tribal health and diseases, collected from ITDA, paderu also presented in this research paper. Ecosystem approach was meticulously followed to examine the connectivity in between tribal health, forest ecology, economy and their medicinal practices. The health problems of tribals viewed and explored in anthropological holistic perspective.

## TRIBAL POPULATION

As per 2001 Census of sIndia represents 635 (461 principal tribes and 174 sub-tribes) tribal groups with a population of 84,32,62,40, which constitutes 8.20% to total population and accounts one fourth of the world tribal population. The Andhra Pradesh consists of 35 tribal groups with a population of 50.24 (6.59%) lakhs. Out of total 35 tribes in Andhra Pradesh, 16 tribes inhabiting in the agency tracts of Visakhapatnam district. Total tribal population of this district is 5, 57,572 (14.55%) and more than 98% of tribal population in the district found in live in the forest ecosystem of Visakha agency. The tribes inhabiting in Visakha agency are 1). Bagata 2). Valmiki 3).Kotiya 4).Rena/Rona 5). Reddi dora 6). Konda dora 7). Nooka/Mooka dora 8). Manne dora 9). Agency Goudu 10). Konda kammara 11). Konda kapu 12). Mali 13) Dulia/Mulia 14). Khond 15). Gadaba and 16). Porja. Among these tribes, Khond, Gadaba and Porja classified as vulnerable tribes (PTGs) based on the criteria of pre-agricultural stage of economy, low literacy rate, stagnant or diminishing population and most economic backwardness. The vulnerable tribes are still largely depending n the forest flora and fauna, substituting with shifting cultivation (*podu*). Most of settlements of these tribes are found on hill tops, slopes and in the inaccessible interior forests. They live relatively in geographical isolation with less exposure to outside. Konda kammara are traditional artisans who subsist on carpentry and black smithy. Malis are the horticulturists who grow the garden crops and vegetables. Agency Gouds are the pastoralists who depend on cattle wealth in addition to non -timber forest produce (NTFP) collection. The rest of the tribes practice both settled and shifting (*podu*) cultivation, apart from collection of Non - Timber Forest Produce (NTFP). In general the tribal economy is Agro-Forest based and largely considered as subsistence economy. The basic survival needs of the tribals are largely met by the natural forest environment.

## ECOLOGY OF TRIBES

Large chunk of tribal population in India as well as in Andhra Pradesh state is concentrated in the tropical forest zones. The tribals have established symbiotic relationship with forests, since age immemorial. They consider forests as their homes and forests nurtured them. Most of the tribal settlements in Visakhapatnam district are located in the agency tracts of tropical forests. Each tribal settlement is surrounded by fruit bearing trees like mango, jack and tamarind, agricultural fields and forest. The district Visakhapatnam has two distinct regions of contrasting ecological and geographical features. One is the plain area, extending from the sea-cost to the foot –hills of Eastern Ghats with moderate temperature and the other covered by thick forests, a top elevated Eastern Ghats with cold climate. The geographical area of the Visakhapatnam district is 11,161 sq.kms, of which the agency area covers 6293 sq.kms i.e., 56.4% area of the district (Hand book of statistics, Visakhapatnam district, 2001. (1) This district is divided into three revenue divisions namely (1) Visakhapatnam (2) Narsipatnam and (3) Paderu. The entire agency area is under Paderu revenue division, comprises of eleven tribal mandals viz, Aruku valley, Ananthagiri, Dumbriguda, Gangaraju Madugula, Paderu, Hukumpeta, Pedabayalu, Munchingput, Chintapalle, Gudem Kothaveedhi, and Koyyuru. All these tribal mandals are attached to Integrated Tribal Development Agency of Paderu for tribal administration and development purposes.

Forest ecology is considered to be the decisive factor of tribal economy. The economy of tribals is largely influenced by the habitat and level of knowledge accumulated about the natural resources and skill for exploiting these resources. Most of tribals domesticate plants and animals, in addition to depending on naturally available forest resource items for their livelihoods. They are generally at subsistence level of economy, with the introduction of cash

economy and marketing system, they too forcefully selling some part of their produce in the weekly markets (*shandies*) in order to buy certain essential commodities of domestic requisite daily needs, which they may not produce by themselves.

## TRIBALS AND FORESTS

The district Visakhapatnam has the forest area of 4411.66 sq.kms which constitute 39.8% of the total geographical area (Hand book of statistics, Visakhapatnam district, 2001..1) . Tribals have long association and attachment with the forests. Their basic survival depends on the forest resources, ecologically forests influenced natural phenomenon like rainfall, atmosphere quality, floods, landslides and other natural disasters. Forests and tribals are inseparable and their existence and development of one depends on the other. Therefore, it is said that the tribal communities in India occupy forest regions, where for a long period in their history, they have lived in isolation but in harmony with nature. They draw their sustenance largely from the forest. They have had a symbiotic relationship with forest which continues undisturbed in the interior even now.

The tribals collect the Non-Timber Forest Produce Non -Timber Forest Produce (NTFP) items including medicinal herbs and sell it to Girijan Co-operative Corporation and also to private traders in the weekly shandies. Now and then the tribal men participate in small hunting games and usually the bush meat consumed by themselves. Honey collection in the forests is another source of income to them. They used to collect the edible fruits roots, tubers, seeds and leaves in the forests and consume some of it in raw form and some in cooked form. They graze their cattle in the forests and use very little quantum of timber procured from forest for house construction and other domestic and agricultural purposes. A few tribals catch fish in the hill streams, tanks and ponds exclusively for their consumption purpose only. It clearly indicates that many varieties of food materials are available to them in the forest ecosystem.

The social organization of tribals is generally based on totemic clans. The various tribal groups claim mythical affinity with certain species of natural phenomenon of specific inanimate objects and they regard these animate or inanimate objects as their ancestors. The belief system and associated practices are called totemism. These totemic objects are considered as sacred and killing or eating their flesh is a taboo. Food avoidance is also based on the totemic principles and a regulatory mechanism to protect certain of the valuable plant and animal species. However, certain food material wastage is also taking place due to the practice of totemism by the tribals. It is noted that, if their totemic animal dies, the concerned clan members observe all kinds of rituals and ceremonies and bury it as if their own kith and kin died. For instance, the tribes of Visakha agency area bears the totemic clans like korra (*sun*), Ontala(*snake*), Chelli(*goat*),and Matchya(*fish*).

## FOOD INSECURITY AND MALNUTRITION

Degradation of forest environment is resulting to food insecurity among tribals. Majority of the tribal population in Visakha agency is facing the problem of food at least a minimum of three to four months in a calendar year. In general, tribal ecology is known for malnutrition and also otherwise referred as “as ecology of malnutrition”. The food situation in the tribal areas is much worst, majority of them are not fulfilled at least with the basic prime need of food. It plays a major role in the social organization of tribal society. Hunger and its satisfaction as a fundamental human need, has an equivalent in the fundamental structure of social organization. The basic assumption is that food and the satisfaction of hunger needs are necessary for the survival of the individual. The social organization must be considered from the point of view of the individual need. Food is shown as human’s first task and basic prime need of human beings. Tribals’ right to food, health and education has not yet fulfilled. Until, even though certain constitutional provisions extended to them.

The flora and fauna of forest, land and livestock are the major food resources for the tribals. The tribals once ensured with permanent energy base when the forests were intact. But now in actual practice the food intake of tribals changed considerably due to various factors. The declaration of forest areas around tribal habitats as reserved forest actually resulted in reducing the food availability in terms of roots, tubers, nuts, fruits etc. On the other hand when the tribal economy

has changed from food collection to food producing and gathering of non-timber forest produce for commercial purpose, the cash economy started playing an important role. The outside fruits have to be imported into tribal areas. In the initial stage the merchants who brought these fruits and also some outside materials started exploiting the local tribals. Moreover, the outside foods are always costly; therefore the government through its agency like Girijan Co-operative Corporation (GCC) had to supply the daily requirements to tribals through the Domestic Requirement Depots (D.R. Depots). This has further increased the dependence of tribals on outside market. In this process the tribal became part of total economy of the state and he is at the receiving end was always a looser. The pressure of high cost economy and depletion of food resources has ultimately resulted in lesser intake of food and consequent malnutrition. The vulnerable tribes like Khond, Gadaba and Porja are still largely depending on shifting cultivation (*podu*) ecology for subsistence. Majority of the people in these tribes are not able to get required calories of food materials in the forest ecosystem, and they are prone to high incidence of malnutrition, morbidity and mortality.

The calorie intake of vulnerable tribal groups living in thickly forest areas of Visakha agency is deficient only by 6.74% compared to Recommended Dietary Allowance (RDA). The most severe deficiency in calories was found in almost half of the tribal children and lactating mothers. The Khond food intake is deficient by 20% in protein content compared to RDA, Vitamin A and Vitamin B deficiencies are also more in the tribal population (Hanumantha Rao et al.1996). The influence of forest ecology among the forest dwelling tribes is only a myth and the modernization process seems to have added miseries to the tribals, as it is reflected in the nutrition deficiencies and nutritional diseases associated with these deficiencies. A clear cut food policy taking into consideration, natural foods requirement of fruits from nutrition angle and foods to be made available within the purchasing capacity of tribals is needed, so that the incidence of malnutrition, caloric deficiency can be tackled. Malnutrition is the severe health problem to the tribals in India, more so specific to vulnerable tribes (VTGs), because of large scale deforestation and discouragement of practice of shifting (*podu)* cultivation by the imposition of national forest policies, strictly in the habitats of these tribes.

## DEFORESTATION AND ITS EFFECT ON TRIBAL HEALTH

Deforestation and environmental degradation directly affects the health and well being of tribals in the poor and under developed regions. The forest degradation has resulted to the disappearance of certain varieties of edible roots, tubers, fruits, medicinal plants, small animals like wild goats, sheep, rabbits, fouls etc in many areas, which affected the nutritional standards of the population and increased the mortality rate. The Infant Mortality Rate (IMR) is very high among the vulnerable tribes. The higher IMR led to increase in desire to have more children more pregnancies spoiled the health of already malnourished mothers. In turn, it also increases maternal mortality rate too. Due to forest degradation several medicinal plants also disappeared and number of tribal medicinal men also decreased. In the interior forest areas the tribals are not access to modern health care facility. In such areas the number of quacks has increased and survival of the patient is left to the grace of god, besides increasing the expenditure on health care. In the inaccessible tribal areas a patient is carried in *'doli'* to the nearest health facility in emergency condition due to lack of proper roads and transportation facilities. *'Doli'* is the only form of ambulance available to them locally in order to transport the patient who is seriously injured or affected with some ailment. Even today, such kind of situation prevails especially in the interior tribal settlements where the aboriginals live in geographical isolation of hills and forests.

The problem of deforestation is creating the food insecurity specifically among the forest dwelling population mostly aboriginals. The National Remote Sensing Agency (NRSA) data (2001) shows that India has been loosing on an average of 1.3 million hectares of forest every year. The statistical data of Andhra Pradesh forest department 2001) (*http:// www.andhrapradeshstat.com/forestandwildlife/13/ forests/108/stats.aspx*) show that 19.49 million hectares forest lands are soil eroded or degraded due to large scale deforestation. Apart from this, over

exploitation on non-timber forest produce Non - Timber Forest Produce (NTFP) items specifically gum also resulted in high mortality of trees. Honey collection also enormously reduced due to forest degradation. In several areas the gum yielding trees, and other life supporting plants and animals died in large numbers, adversely affecting the tribal economy. Forest degradation also resulted in reduced availability of firewood and water and increase in the time spent by women on cooking fuel. Long time exposure to smoke from firewood also increased health problems for women and infants who spend most of their time within the house along with mothers. According to National Family Health Survey (NFHS) report(2005-06) firewood cooking, food consumption leads to Acute Respiratory Infection (ARI) among the children.

Government Forest Policies are against the practice of shifting cultivation by the tribals. Due to imposition of forest laws on the shifting (*podu*) cultivators in tribal areas which literally created livelihood problem to them. With the result more number of hunger deaths were occurred specifically in vulnerable tribal habitats after the abandonment of shifting cultivation which was replaced by horticulture and aforestation programmes of forest department through Vana samrakshana Samithis (V.S.S). To solve this problem, the government of Andhra Pradesh, tribal Welfare Department launched a massive scheme called AP Tribal Development Project for rehabilitation of 63,371 shifting cultivator families with total outlay of Rs. 77.97 crores in the districts of Srikakulam, Vizianagaram, Visakhapatnam and East Godavari, where shifting cultivation was widely practiced. This project was largely funded by International fund for Agricultural Development (IFAD), Rome. Even then, the hunger problem very much prevails and continues mostly in interior tribal settlements, which resulting to malnutrition and early deaths. Poverty and food insecurity are major economic problems which affects the normal life of tribals and considered these problems as basic constraints for their progress.

It clearly indicates that deforestation has more negative effects on the livelihoods of tribals. There is a direct relationship between the health and environment. Due to the non-approachability of modern health facilities, they forced to depend on folk medicine. The triblas are loosing the folk medicinal plants and herbs due to deforestation, thereby loosing the valuable traditional knowledge from the tribal medicine men. Further, due to non- availability of forest produce and fertile lands for shifting cultivation (*podu*) and settled cultivation, their survival is challenged, leading to malnutrition and under nutrition. As tribals life revolves around their ecosystem they are very much aware of its relevance and importance and thereby conserve it. They have their own mechanism of maintaining eco-friendly relationship even with the practice of shifting cultivation (*podu*) cultivation. Long term fallowing system definitely ensures the sustainability of forest ecosystem with green vegetation in and around the *podu* fields. It is possible only when the population size is less in the *podu* forming tribal society. Due to enormous population pressure they are now resorted to short term fallowing system which certainly resulting to deforestation in some extent. However, the basic survival needs of the poor tribals to be fulfilled, otherwise they continuously suffer with nutritional and health disorders which ultimately results for their extinction in future.

## TROPICAL DISEASES

THE most commonly reoccurring tropical diseases in the Visakha agency area are malaria, dengue, anthrax, goiter, sickle cell anemia and G6PD deficiency syndrome. In recent time more number of malaria cases and deaths were recorded in Visakha agency area, which comes out in press. The following table 1 shows the confirmed malaria cases and deaths.

TABLE 1

*Malaria cases and deaths in Visakha agency*

| Year | No. of confirmed malaria cases | Malaria fever deaths |
|---|---|---|
| 1999 | 30094 | 6 |
| 2000 | 12538 | 2 |
| 2001 | 11865 | 1 |
| 2002 | 8412 | - |
| 2003 | 9794 | - |
| 2004 | 7255 | - |
| 2005 | 7587 | 7 |

(Source: I.T.D.A, Paderu)

TABLE 2

*Mandal-wise malaria cases recorded during 2004-2005*

| S.No | Name of the Mandal | Year | |
|---|---|---|---|
| | | 2004 No of malaria cases recorded | 2005 No of malaria cases recorded |
| 1 | Ananthagiri | 429 | 503 |
| 2 | Aruku Valley | 563 | 927 |
| 3 | Dumbriguda | 450 | 804 |
| 4 | Hukumpeta | 184 | 424 |
| 5 | Paderu | 285 | 405 |
| 6 | Peddabayalu | 321 | 443 |
| 7 | Munchingput | 366 | 332 |
| 8 | G.Madugula | 748 | 902 |
| 9 | Chintapalle | 258 | 236 |
| 10 | Gudem Kothaveedhi | 602 | 385 |
| 11 | Koyyuru | 709 | 818 |
| | Total | 4915 | 6179 |

(Source: I.T.D.A, Paderu)

The table 2 shows the mandal wise recorded malaria cases during the periods of 2004-2005. About 4915 malaria cases were recorded in the eleven tribal mandals, whereas 2340 cases were not presented in the mandal wise data prepared by Integrated Tribal Development Agency (ITDA) in the year 2004. Similarly about 6179 cases were recorded in the eleven tribal mandals and 1408 cases were not presented in the mandal wise data prepared by ITDA, in the year 2005 (these figures are not tallied with the data presented in table 1). From the table it is noted that more number of malaria cases were occurred; considerable number of infant and meternal deaths also occurred in Aruku Valley mandal, followed by Gangaraju Madugula and Koyyuru mandals. Even more number of Anthrax cases was also occurred in these three mandals. Dengue cases are very limited in number, which occur now and then in Visakha agency area. Still a considerable number of Iodine Deficiency disorders (IDD) are found in the Visakha agency area. However, more number of patients affects with tropical diseases was found among the vulnerable tribes like Khond, Gadaba and Porja.

TABLE 3

*Cause-wise deaths in the year 2005 (source I.T.D.A, Paderu)*

| S.No | Cause of death | No. of deaths |
|---|---|---|
| 1 | Old age | 154 |
| 2 | Jaundice | 59 |
| 3 | Heart attack/Heart failure | 34 |
| 4 | Cardio vascular arrest | 33 |
| 5 | Tuberculosis | 27 |
| 6 | Epilepsy | 25 |
| 7 | Cirrhosis of liver | 28 |
| 8 | Myocardial infraction | 22 |
| 9 | Acute Respiratory Infection | 31 |
| 10 | Pain abdomen | 20 |
| 11 | Paralysis | 16 |
| 12 | Asthma | 15 |
| 13 | Appendicitis | 24 |
| 14 | Peptic ulcer | 14 |
| 15 | Viral fever | 11 |
| 16 | Cancer | 11 |
| 17 | Accidental | 08 |
| 18 | Infant | 08 |
| 19 | Maternal | 08 |
| 20 | HIV positive | 06 |
| 21 | Diarrhea | 04 |
| 22 | Poisoning | 03 |
| 23 | Convulsions | 03 |
| 24 | Snake bite | 02 |
| 25 | Sickle cell anemia | 02 |
| 26 | Kidney failure | 02 |
| 27 | Rabies | 01 |
| 28 | Others (suicide, suspicious, etc) | 122 |
| | Total | 693 |

The table 3 shows cause wise deaths in Visakha agency area during the year 2005. From the table it is noted that about 693 deaths were occurred due to old age, major and chronic diseases. It is interesting to note that no single malaria death was mentioned in the table. Out of the total deaths, liver disorder were more (jaundice) followed by heart failure and cardio vascular arrest. A considerable number of infant and maternal deaths also occurred in the period. Surprisingly, about six HIV positive cases of deaths were occurred in the tribal communities of Visakha agency area. It is basically due to hetero-sexual

relations. Moreover, culturally, pre and post marital sexual relations are acceptable in majority of the tribal communities, except in Bagata and Kotiya tribes. More number of R.T.I and S.T.D cases is also found among the tribal communities in the agency areas mainly due to traditional cultural sexual behavior. They do not follow scientific preventive measures and methods in the sexual act. Tuberculosis cases of deaths also occurred. Long starvation for food is the major cause for this kind of disease among the tribes.

The field investigations in Visakha agency area reveal the high incidence of tropical diseases like malaria, goiter, anthrax, dengue and sickle cell anemia. Among the tropical diseases the cases of malaria are more in number. Now and then the tribals are also suffering with minor ailments like cold, cough, fever, body pains, water borne infections and skin diseases. A total of 54 persons were suffered with the chronic diseases like T. B, Cancer, Leprosy and asthma in the sample households of 367. The table 4 shows the number of tribals suffered with various kinds of diseases during 2004-2005. Among sample households in the eleven tribal mandals of Visakha agency area. From the table it is noted that the diseases are very commonly found in all the twelve tribes and also in all the eleven tribal mandals of Visakha agency.

The table 4 shows the mandal, village, and tribe wise morbidity incidence among the sample households in eleven tribal mandals of Visakha agency. From the table it is noted that 104 persons affected with minor ailments, 239 persons affected with tropical diseases and 54 persons affected with chronic diseases, out of the 647 sample households. It clearly indicates that majority of the tribal people in the Visakha agency are affecting with the tropical diseases.

## MEDICINES

Since the tribals are the original inhabitants of forests, they have the knowledge in herbal medicine and know the many varieties of medicinal value plants and herbs. Even today, the interior tribals are largely depending on their own traditional health care system in which they use the products of plants and herbs for curing various diseases. They also collect the medicinal plants and herbs along with other Non-Timber Forest Produce (NTFP) items in the forests and sell it to Girijan Cooperative Corporation (GCC), Visakhapatnam and private traders. In general forests are the store houses for herbal medicine. Out of the 2000 items of drugs mentioned in different epics, over 800 are of vegetable origin. A large number of these

TABLE 4

*Mandal/village/tribe-wise morbidity incidence among sample households*

| S.No | Name of Mandal | Name of the field village | Name of the tribe | No.of persons Suffered with minor ailments | No. of persons affected with tropical diseases | No. of persons affected with chronic diseases |
|---|---|---|---|---|---|---|
| 1 | Munchingput | Vanabhasingi | Mali | 5 | 13 | 1 |
| 2 | Pedabayalu | Seethagunta | Valmiki | 11 | 20 | 5 |
| 3 | Hukumpeta | Sanyasammapalem | Bagata | 8 | 21 | 7 |
| 4 | Dumbriguda | Kiloguda | Dulia/Mulia | 9 | 8 | 3 |
| 5 | Aruku Valley | Kothavalasa | Konda kapu | 14 | 8 | 13 |
| 6 | Ananthagiri | Bangarammpeta and sarvampalem | Nooka dora | 4 | 29 | 5 |
| 7 | Paderu | Barsingi | Konda dora | 14 | 30 | 4 |
| 8 | G.Madugula | Nittamamidivalasa | KondaKammara | 15 | 39 | 4 |
| 9 | Chintapalle | Rajendrapuram | Porja | 8 | 14 | 3 |
| 10 | G.K. Veedhi | Kadugula | Khond | 2 | 19 | 3 |
| 11 | Koyyuru | Mulpeta | Gadaba | 7 | 28 | 4 |
| | Total | 104 | 239 | 54 | | |

are obtained from plants of the forests. Different parts of various plants and roots, shoots leaves, fruits, barks, seeds etc are used for preparation of drugs. Some of drugs obtained from the forests have much commercial value and exported to different parts of the world.

In the study area about 904 tribal medicine men were identified (V. Subramanyam *et al.*, 2006). These medicine men are distributed in eleven tribal mandals, but their number may vary from one mandal to another. The highest number of tribal medicine men found in Gangaraju Madugula, followed by Ananthagiri, Gudem Kothaveedhi and Pedabayalu. In other mandals their number is less than hundred. The medicine men are found in Konda dora, Khond and Bagata tribes. The tribal people are still having the superstitious beliefs in evil eye, sorcery and witch craft. They attribute supernatural powers as cause for certain of the diseases. For cure of such diseases they consult the local *Guruvu* or *Goravagadu*. Large majority of the tribals are mostly access to *Disari Vaidyam*(indigenous medicinal practice), and health services of community health workers. Still majority of them have negative attitude towards modern health care system. The local tribal medicine men also now facing the problem to get some of the medicinal plants and herbs in the forests due to its' extinction in forest degradation condition. It is felt need to protect, conserve and regeneration of such valuable medicinal plants and herbs by involving the tribals actively in the aforestation programmes. An anthropologist can play a vital role in this task of protecting the medicinal herbs and plans as well as promotion of indigenous medicine among aboriginals. And also the anthropological action oriented approach can be considered as most practicable and workable intervention strategy for expanding modern health with health administration and indigenous people. Integrate approach to be adopted to promote both the indigenous and modern health care facilities in the tribal areas. Tribal patients to be ensured in providing both the system of treatments in one roof, which should made available within their reach.

The table 5 shows the medicinal herbs that are collected by the tribals in Visakha agency for medicinal purposes. The medicinal plants collection is one of the sources of income to tribals in the study area. The tribal medicine men use these herbs for curing certain of the diseases among the tribal patients who approaches them.

TABLE 5

*List of medicinal herbs collected and used for medicinal purposes by the tribals in Visakha agency*

| S. No | Name of the medicinal plant/herbs | |
|---|---|---|
| | Botanical name | Local name (vernacular) |
| 1. | *Abruspercatirius* | Guruvenda |
| 2. | *Achyranthes aspera* | Uttareeni |
| 3 | *Adathoda spp* | Addasaaramu |
| 4 | *Aegle marmelos* | Bilavamu |
| 5 | *Aloe indica* | Kalabanda |
| 6 | *Andrographis paniculata* | Nelavamu |
| 7 | *Argyreia speciosa* | Chandra pala |
| 8 | *Asparagus recimosus* | Pilli geddalu |
| 9. | *Boerhaia diffusasa* | Atikamamidi |
| 10 | *Bombax malabaricum* | Mundla boorugu |
| 11. | *Butea superba* | Teega modugu |
| 12. | *Caesalpinia bonduc.* | Gacheha kaya |
| 13. | *Cassia angustifolia* | Sunamukhi |
| 14 | *Cassia tora* | Tantemu |
| 15 | *Catunnaregam spinosa* | Munga |
| 16 | *Celestrus paniculata* | Bavangi |
| 17 | *Cantella asiatica* | Saraswati |
| 18 | *Curculigo orchioides* | Nelathadi geddalu |
| 19 | *Decalepis hamiltoni* | Maredu geddalu |
| 20 | *Eclipta alba* | Guntagalagara |
| 21 | *Goloriosa superba* | Adavimabhi |
| 22 | *Gymmema sylvestre* | Podapatri |
| 23 | *Helicteres isora* | Nulitaata |
| 24 | *Helicteres isora* | Sugandhipala |
| 25 | *Holorhena anti dysienterica* | Dudipalageddalu |
| 26 | *Holetema adakodien* | Nelagummadi |
| 27 | *Ipomoea maauriteana* | Kumkuma |
| 28 | *Mallotus philippensis* | Dulagondi |
| 29 | *Mucuna aruriens* | Bhootulasi |
| 30 | *Ocimum basilicum* | Tegada |
| 31 | *Operculina turpethum* | Nela Usirika |
| 32 | *Phyllanthns amarus* | Erra chintra mulamu |
| 33 | *Plumbago rosea* | Tella chitramulamu |
| 34 | *Plumbago zeylanica* | Magasirigedda |
| 35. | *Pueraria tuberosa* | Patal kunda |
| 36 | *Solanum xanthocarpum* | Mullavanga |
| 37 | *Syzygium cumini* | Neredu |
| 38 | *Terminalia arjuna* | Naramamidi |
| 39. | *Tinospora cordifolia* | Tippa teega |
| 40 | *Tribulus terrestris* | Chinnapalleru |
| 41 | *Vernonia cinera* | Sahadevi |
| 42 | *Woodfordia fruiticosa* | Seringi |

## CONCLUSION

Forests are the abode for the tribals in Visakha agency area. In the past, the tribal people were totally, depended on their physical environment for subsistence and survival. With the introduction of plough cultivation into the forest areas, they too started to domesticate plants and animals. At present tribal economy is agro-forest based and largely considered as subsistence economy. The ecoilogical factors have much influence over the nutritional and health status of tribals. Degradation of forest ecology is resulting to survival problem for large majority of the tribal population. The ecology of tribals is known as 'ecology of malnutrition'. The tropical diseases like malaria, dengue, goiter, sickle cell anemia, G6PD deficiency syndrome, and diarrhea are regularly reoccurs and resulting to high mortality rate in the tribal areas of Visakha agency. The agency area is considered as endemic Zone for the malaria epidemic.

Still large majority of the interior tribals are not access to the modern health is system and they depend mostly on ethno-medicine. Due to forest degradation several valuable medicinal plants also become extinction and number of tribal medicine men also decreased. In the interior tribal areas the number of quacks has increased and survival of the patient is left to the grace of god, besides increasing the expenditure on health care. The tribals have much faith on their own medicine and more access to it. Hence, each primary health center should be provided with the facility of tribal medicine along with modern medicare services. Consequently, it is possible to introduce them slowly into the allopathic medical system. I.C.D.S (Integrated Child Development Scheme) and public distribution system should be strengthened in the tribal areas to tackle the problem of malnutrition. Health programmes to be linked with the economic and education programmes in the tribal areas with an integrated approach. The tribals right to food, right to health and right to education has not yet fulfilled. Tribals accessibility to modern health services is still question mark especially in the interior settlements of Visakha agency. Infrastructure development to each and every tribal settlement is much essential to achieve expected progress in all sectors including health in the tribal areas. Anthropological action oriented research definitely contribute for the welfare and development of poor tribals.

Anthropological holistic integrated approach is much applicable to understand interconnectedness in between forest ecology, health and medicine of tribals. Participatory action research and intervention from academics, on the issues of tribal health has ample scope to trace out the root causes and to provide solutions to it and serve to the community at field level itself. Documentation of indigenous medicinal knowledge of tribals by the Anthropologist is also useful to pharmaceutical industries. Scientific validation is to be given for tribal medicines to popularize and to increase its market value at global level.

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