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## DEPLETION OF NATURAL RESOURCES AND ITS IMPACTS ON TRIBAL WOMEN: A STUDY IN KURUNG KUMEY DISTRICT OF ARUNACHAL PRADESH

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**Abstract:** *In mountainous regions of Arunachal Pradesh, natural resources are economically very significant. Majority of the native tribal groups are heavily dependent on land, water and forests for their survival. In this scenario the contribution of tribal women is quite significant both in the utilization and management. Changes in physical as well as human factors have enhanced the stress which led to depletion of these limited resources, hence posing considerable impacts on their users particularly on the tribal women. In this paper, an attempt has been made to explore the level of dependence of tribal women and their households on the forest products. Kurung Kumey district was selected which portray the typical mountainous environment in the state. Data have been collected through stratified random sampling and self-administered questionnaire survey was conducted in the sample villages. Besides, transect walks and focus group discussions were also conducted in these villages. The results of this study show the greater degree of interdependence between forest resources and socio-economic status of tribal women. It was also found that besides causing heavy damages to the environment, depletion of these resources also pose a major threat to the subsistent living of the poor tribal households.*

**Key Words:** *Natural Resource; Land Depletion; Arunachal Pradesh; Forestland; Gender*

### I. INTRODUCTION

Tribals are of great interest and intense significance from forest perspective, as they inhabit for a very long period time over the same region. Tribal communities reside in close touch with forest and thus, dependent on it. That is why, it's a great significance to study their do's and don'ts in order to propose better forest and environmental management interventions considering options for enhancing livelihoods of the tribal communities in Kurung Kumey district (Ramya, 2013: 1).

Mountainous regions are one of the most fragile ecosystems where slim imbalances in physical or social attributes and increased stress can result into ecological disruption and



desertification of such regions. In this regard the vital driving forces are climatic variability, population dynamics, technological development, socio-economic changes and untenable resource use and management mechanisms. Long-term impacts of such a situation usually lead to disastrous consequences including loss of biodiversity and depletion of natural resources like land, water and forest.

In marginal areas like Kurung Kumey, tribal villagers heavily depend on land resources for survival. The poor socio-economic condition of tribal villagers is caused by its physiographic condition and lack of knowledge about development programmes of the government (Ramya, 2014b: 326). Similar to the economic organizations in the mountainous regions around the world (cf. Rhoades and Thompson, 1975; Brush, 1982; Guillet, 1983) mixed mountain agriculture is practiced in these areas. For the sustainable agricultural activities forest plays a crucial role. Millions of people around the world inhabiting these areas heavily depend on forest resources for their subsistent living. Besides functioning as a wildlife habitat the forest also provide fodder, fuel wood, building material and food items for people inhabits nearby. Most of the forest products are consumed at household level; however, some of them are processed and sold in the markets which provide opportunities for additional source of income to the tribal natives. As part of their endurance strategy, the tribals living in that environment also collect many other products from forest.

For sustainable resource management and optimum utilization of the available human resource most of the activities are assigned to men and women. These socially determined roles for men and tribal women are traditionally created, culturally accepted and are given the status of being natural and normal in these tribal societies. Gender roles exist in all spheres of tribal societies all over the world, and begin with the division of labour, roles and responsibilities within the family. This gender based division of labour and productive economic activities varies from place to place in the entire Himalayan region and is usually based on its recognition (Hewitt, 1989). Demographic characteristics like age, household size and socio-economic conditions of the family are important in this regard. Beside this, geographical location, culture, prevailing customs and environmental characteristics of a region are also important factors, not only in determining gender roles but also in allocating activities and assigning roles (cf. Hewitt, 1989; Azhar-Hewitt, 1999). Usually in peripheral and marginalized areas, the role of tribal women in the use of natural resources is greater



than that of men. The latter are usually involved in very few activities like timber extraction. In these areas tribal women play substantial role in the collection, transportation, utilization and processing of non-timber forest product (NTFP) both for household use as well as for sale in the local market to earn supplementary off-farm income. About 70-80% of rural tribal women in the study area directly participate in economically recognized activities, while the remaining work in providing support mechanism that is integral to the rural economy and productive system. Moreover, according to Azhar-Hewitt (1999: 142) in subsistence economy womenfolk contribute their share in three different ways. They enable their men to work outside the village by replacing them in their absence and they themselves produce for the subsistence economy beside their own productive roles.

## **II. OBJECTIVES OF STUDY**

The main focus of this research is to explore the dependence of tribal women on forest resources in mountainous areas of Kurung Kumey district. Moreover, special attention has been paid to understand the threats posed by resource depletion for tribal women and their coping strategies. Kurung Kumey is one of the typical mountainous districts of Arunachal Pradesh, where tribal women are the main contributors to household economy particularly in low income families. They are dependent on forest products for household sustenance as well as for additional income generation. Increased stress has resulted into depletion of forest resources and reduced productivity.

## **III. STUDY AREA**

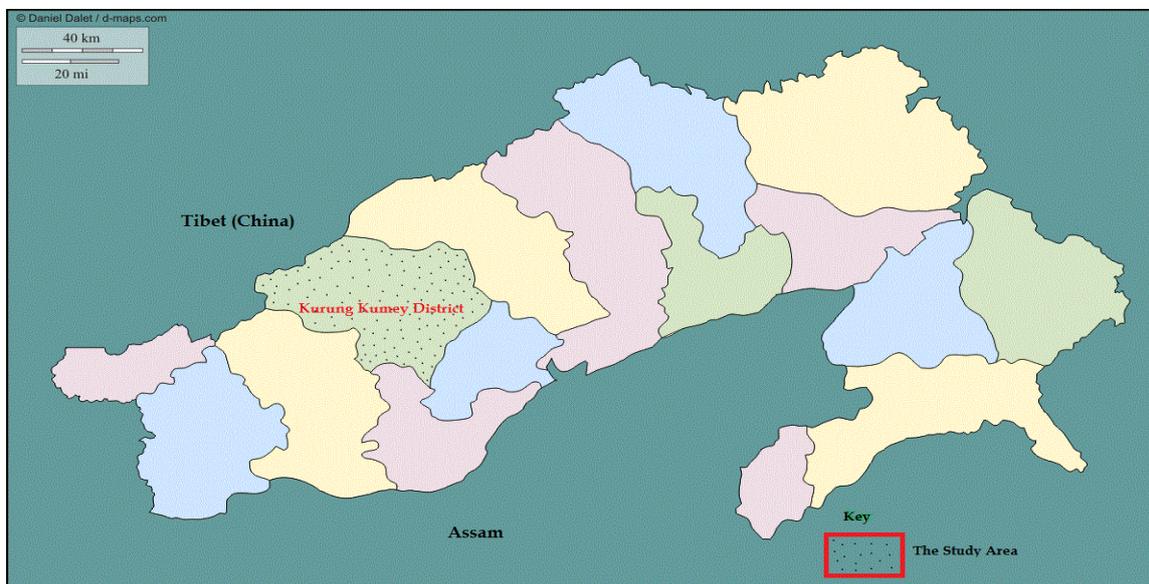
The study area under consideration is the Kurung Kumey district, situated in northern mountainous fringe of central Arunachal Pradesh. The district is located between 27° 45' to 28° 22' N latitudes and 92° 00' to 94° 15' E longitudes and spread over an area of 6,675 sq. km. It is bounded by Tibet (China) in the north, Upper Subansiri District in the East, East Kameng District in the West, Lower Subansiri District and a portion of Papum Pare District in the South. It is named after two principal rivers of the district namely, Kurung and Kumey. It has 2 subdivisions, 13 administrative circles with 9 CD Blocks. The district was created out of Lower Subansiri district in 2001.

The landscape consists of sub-montane and mountainous ranges, sloping downwards are divided into valleys by two major rivers Kurung and Kumey along with their tributaries. The climate varies from sub-tropical in the low-lying areas to temperate in the extreme northern



part, with clearly marked four different climatic seasons i.e. summer, winter, spring and autumn. May, June and July are the warmest months and the temperature begins to fall in September, with the onset of winter. Most of the rainfall occurs during the months of June to September. During this period, the southerly moisture laden winds cause heavy rainfall on striking the southern slopes of the mountain ranges.

Physiographically, it can be clubbed under a single unit- the lesser Himalayan ranges, lying across the region. The altitudinal variation seen in this area is from 200-3,000 m AMSL. The valleys in the district are longitudinal and narrow, with steep hills. The main aspect lies between south to north western and south to north-eastern alongside Kurung and Kumey rivers respectively.



**Figure 1: Location of Study Area**

Economically, district is lagging behind when compared with other areas/districts of the state. The employment opportunities are very limited as there is no industrial establishment. Therefore, most of the educated people and few skilled labours have migrated to other localities within the state in search of job opportunities. In spite of this however, a few of the population is also engaged in secondary and tertiary activities such as electrical, banking, teaching, and transportation. The remaining population, which does not have the capability to diversify their economy, are heavily dependent on local resources particularly on agriculture as over 80% of the population are into various types of farming especially subsistence farming. These marginal groups, including subsistence farmers, wage-labour, and specifically the tribal women heavily depend on forest and land resources to meet their subsistence needs and to generate additional income.



#### **IV. MATERIALS AND METHODS**

This study is based on empirical research carried out in Kurung Kumey district in 2012. Three villages were selected purposively on the basis of their location in various geo-ecological settings. Data were collected with the help of self-administered questionnaire, for which, 25 households were randomly selected from each village making 75 questionnaires all together. The questionnaire comprise of four sections on socio-economic and demographic characteristics of sample households, gender based activities related to forestland and status of forestland, its utilization and management respectively. The changes noticed in forest related resources during last one decade and its impacts on their users. Questions were also included related to general perceptions on land resource depletion, its causes, indicators and coping strategies. Respondents for this study were tribal women and had the experience of forest related activities. All discussions, interviews and questions were asked in their native language for clear understanding, which were later on translated into English. To understand the old utilization and management system and status of common resources in the villages, focused group discussions were also carry out with the prominent of the villages mostly the tribal men.

#### **V. FINDINGS AND RESULTS**

Communal forestland of the area is extensively utilized by the local people particularly tribal women through different activities (table 1) for household needs and generating income. It provides an opportunity for those households having no other income generating sources. In the study villages both men and women uses these resources but the involvement of tribal women is greater in term of participation ratio, number of activities and frequency of trips to forestland.

Tribal women were found more actively engaged in majority of the activities. Two activities were performed by both men and women, while five were exclusively performed by women such as collection of fruits and vegetables, fodder/grass, animal dung, grass for broom making and washing clothes. Only two activities were carried out exclusively by men including hunting and construction materials.

The frequency of trips to the forestland also shows an interesting situation that men are only involved in those activities which are carried out either seasonally or occasionally. Moreover, time required for these activities is also less. Contrary to this, tribal women are the more frequently involved in activities that need daily trips like fodder/grass and dung collection. Some of these activities do need even more than one trip per day (Table 1).

**Table 1: Gender Role and Frequency of Trips for Various Activities**

Activities	Carried Out By	Frequency of Trips
Collection of Fruits and Vegetables	Women	Occasionally
Collection of Fuel Wood	Both	Twice a Week
Collection of Animal Dung	Women	Daily
Collection of Fodder/Grass	Women	Daily
Collection of Medicinal Plants	Both	Occasionally
Hunting	Men	Seasonally
Construction Materials	Men	Occasionally
Broom Making	Women	Daily
Washing Clothes	Women	Occasionally

**Source:** Fieldwork

Most of the productive lands of the area are located in the hills. Therefore these activities are quite time consuming. On the average tribal women spend about 5-6 hours per day in forestland related activities in collection of the products and their processing. Time spent in collection of products has close relation with the type of products and location of lands. For instance vegetation type cane, a perennial plant previously found abundantly around the villages and usually used as a material for making handicrafts has become extinct from most parts of the region. Fire wood and grasses, being the most important resource; have disappearing from the nearby locations, therefore, tribal women normally have to travel through long and difficult terrains (Figs. 2 & 3).



**Figures 2 & 3: Tribal Women Collecting Roofing Grass and Carrying Head Loads of Firewood**



In addition to supplement domestic necessities, forestland resources are also used widely for income generation in most of the households. Differences were noticed in the amount of cash generated through these activities in different villages but on the average each household, engaged in forestland product collection, was earning more than 60% of the total household income from selling these products. Cash value of the products was relatively low in villages located close to the source region, whereas the monetary value of these products was substantially high in villages located away from the hills. However, the household residing close to the forestland were getting maximum benefits from these resources and heavily depend on the forestlands.

Almost all of these products have decreased in all villages. Reasons for this decrease are both physical and social. Besides the topographical conditions of the area, climatic variability like other semiarid areas is higher in Kurung Kumey district. These are the two major physical factors responsible for decreased productivity of forestland. Social factors which increase the vulnerability of natural vegetation include population pressure, raised life standard and dwindling role of social institutions.

Time required to be spent in extraction of the forestland resources has increased in all areas as the hill slopes once providing all these resources are now bare and degraded. Tribal women have to travel longer distances to collect grasses. Time calculation for man was not possible as their involvement was in discrete types of activities but according to their own estimate they spend twenty to thirty hours per year on the average. Details of village-wise time spend by tribal women is shown in Table 2.

**Table 2: Village-Wise Time Spend by Tribal Women in Forests**

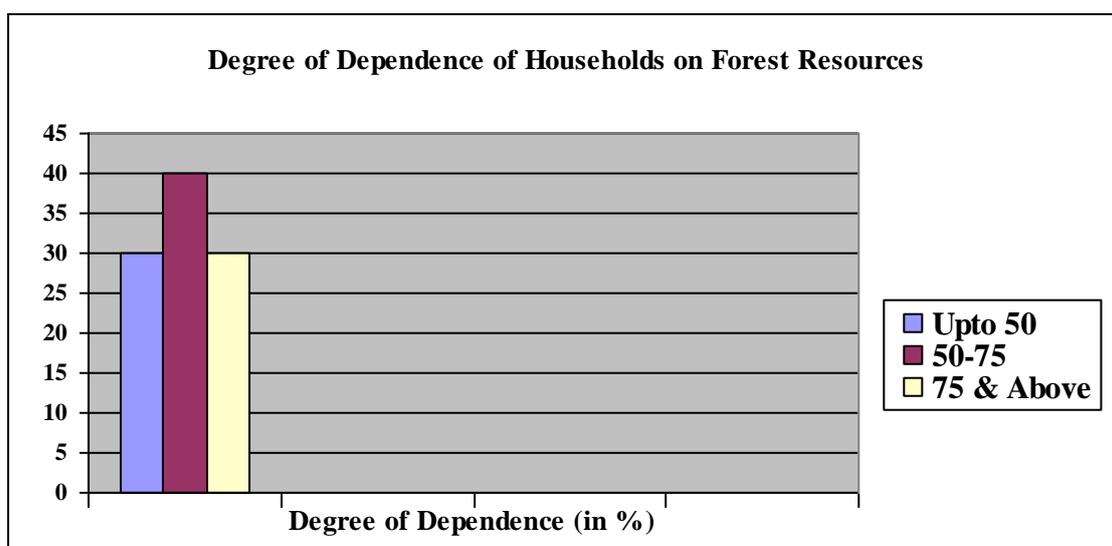
Village	Average Time Spend in Forestland (Hours Per Day)	
	Decade Ago	Currently
Hiya-I	9-10	7-8
Hiya-II	3-4	5-6
Yarda	4-5	5-6

Source: Fieldwork

The socio-economic characteristics of the users confirm that majority of them belong to lower socio-economic strata having no regular source of income. Out of all (75), 69.33% (52) of the interviewed tribal women were found dependent on common land resources to some extent. Majority of the users 63 (84%) were utilizing these products for household



sustenance and one-third (25) of them were earning additional income from these resources as well. Degree of dependence on common lands was different in dependent households. Almost 40% (30) of the users were extracting half of their livings from forest and more than 30% (23) households were dependent up to 75% on these products. Few households were even entirely dependent on these resources and were having very small earnings through other sources. These households are faced with serious problems due to depletion of natural resources.



**Figure 4: Degree of Dependence of Household on Forest Resources**

Income derived through these products varies (Rs. 1,000 to 10,000/month) from village to village as well as from person to person based on location, resource availability and socio-economic conditions of the families. Their contribution also depends upon the availability of other sources of household income. However, on average these dependent families derive 5,000 to 6,000 rupees per month through these products besides their utilization for household sustenance (table 3).

**Table 3: Income Derived from Forest Products**

Income Per Month (in Rs.)	No. of Households	Percentage
Less than 4000	26	34.66
4000-8000	31	41.34
More than 8000	18	24.00
<b>Total</b>	<b>75</b>	<b>100</b>

Source: Fieldwork

Those households which were earning more than 50% of their household income through selling of forest products depend primarily on firewood, wild fruits and vegetables. Income



derived from forest is consumed in different sectors of household. Around one-third of tribal women income goes into food security while a good share of the income is spent on health. Others include house maintenance, celebrations, clothes, travelling, etc.

## **VI. DISCUSSIONS**

This study reveals that a variety of forest products are collected to supplement the subsistence household needs. Tribal women are the main users of forest. They are mainly involved in the collection, transportation and processing of these products. The contribution of men in these activities is very low. They are involved in very few activities that are performed occasionally. Contrary to this, tribal women are daily tripping the forestland and spending up to seven hours in collecting grass, dung and other products of daily use. Most of these products are consumed to fulfil the domestic needs of the household. However, many households are also earning cash income from the sale of these products. More than 60% of the women are involved in these activities for the last 30 years. It means that they have a substantial knowledge about the resource as well as changes that have taken place in the last three decades.

Extensive utilization and mismanagement have contributed towards declining productivity of communal forestland in the study area. Users of these resources, poor tribal women, are faced with many problems such as loss of income, food insecurity and increased risks and efforts required in their collection. Biodiversity has reduced and now limited number of products like perennial fruits, grasses and few medicinal herbs are available for collection. Wild vegetables, fruits and other forest products were considered as poor house meal. These were used in all households due to their abundance and free availability in past.

As majority of forest dependents are poor tribal women and in many cases these tribal women are the only earners of the households, they are deeply concerned about the depletion of communal resources. Decreased biodiversity, loss of perennial trees and grasses at hill slopes means more time and energy required to reach to trees and grasses at higher altitudes. These tribal women now have to cover long distances and difficult terrains like narrow gorges and steep slopes. Besides, many of the tribal women complained about the decrease of cash earning due to unavailability of various forest products such as wood, medicinal herbs, and wild fruits previously sold by these tribal women. Their decreased productivity and limited availability has resulted in additional cost to be borne by household

in the purchase of these products. Looking at the sectors of expenditure (table 5) it is obvious that loss of income means food insecurity and negligence of health, the most essential issues.

**Table 5: Sectors of Expenditure**

Sectors	Expenditure	Percentage
Food	1700	27.64
Health	1100	17.89
Children Education	650	10.57
Self	500	8.13
Others	2200	35.77
<b>Total</b>	<b>6150</b>	<b>100.00</b>

Source: Fieldwork

For house sustenance and additional income some strategies have been adopted like many household items are now prepared from synthetic material (used plastic bottles, plastic rubbers, etc.) instead of traditional raw material (figs. 5 & 6). These are decorated to fetch higher prices in the local markets.



**Figures 4 & 5: Use of Traditional Raw Materials and Modern Synthetic Materials for Making of Household Items.**

Scarcity of wood has brought an important change in the type of energy use. Straw has become the most common source of energy for cooking in the area. Straw collection, storage and management are entirely performed by tribal women increasing the duration of tribal women's labour further. This has many implications related to tribal women health as well as it increases indoor pollution several times.



## VII. CONCLUSIONS

Forest in the region is widely utilized as one of the main natural resource bases in this one of the mountainous regions of Arunachal Pradesh. The inhabitants of the region heavily depend on forest resources to supplement the subsistence household needs. Many households are also earning cash income from the sale of these products. Tribal women are the main users and are mainly involved in the collection, transportation and processing of these products spending long hours in forests. Tribal women have a substantial knowledge about the resource as well as changes that have taken place in the last few decades or so.

This study also shows that forests in the study area are dwindling with the passage of time. This can be attributed to anthropogenic factors and non-equilibrium dynamic pattern. Population growth and weakening local level control mechanisms are further accelerating this process. The native inhabitants are aware from this circumstance and they are trying their possible best to combat this situation. They do have the capacity, knowledge and managerial skills to change the existing scenario. Tribals constitute a ray of hope for the future of the forests. They have the grip of the rights and knowledge and their physical and cultural survival relies on ensuring their conservation. In many instances, tribals are adapting their knowledge to a varying situation, working out and executing options for sustainable and impartial livelihoods (Ramya, 2014a: 106).

However, due to changes in the socio-economic structure collective survival strategies in terms of mutual cooperation and implementation of locally formulated rules for resource utilization is weakening. The depletion of these resources is now becoming a major threat not only to the subsistence livelihood of the poor tribal households but it is also causing heavy damages to the natural environment of the area. Consequently, to meet their daily needs these poor tribal women have to seek alternative sources of income. It is feared that declining natural resources may instigate tribal women to migrate, which will have many social implications.

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