

Assessment of Diversity and Resource Potential of Non-Timber Forest Product(NTFP) in Selected Sites of Bishnupur Forest Division of Bankura District, West Bengal, India

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Abstract: A study was undertaken to assess the diversity of non-timber forest products (NTFPS) and its resource potential in selected sites of Bishnupur Forest Division of Bankura District, West Bengal. Information about NTFPs are being collected at seven market places of the concerned study sites. The diversity however varies with availability and local knowledge. 5 major categories of nontimber forest products were recorded during our survey work at the present investigation which includes different forms of food items, fuel, jhati, snail and dry leaves among the different studied sites. The present investigation revealed that although there is high resource potential in the study sites but lack of awareness, scientific knowledge, expertise and inadequate market information, income through commercialization of such species were found to be very low. The forest dwellers are progressively dependent on NTFPs for sustaining their daily livelihood instead of utilizing it as a prospective income source and for their socio-economic development.

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1. Introduction

NON-timber forest products (NTFPs) are an integral part of development and survival of people living in and around forests and depending on them. The potential economic value of NTFPs either in terms of utilization or their market value is often underestimated or unknown (Wickens, 1994). Non-timber Forest Products (NTFPs) are important tools for addressing poverty issues for the marginalized, forest dependant communities, by contributing to livelihoods, including food security, income, health and sustainable human development (Ahenkan and Boon, 2008). Globally, an estimated 350 million people mostly in developing countries depend on NTFPs as their primary source of income, food, nutrition, and medicine (UND, 2004; FAO, 2005). These products play a vital role in sustaining the lives of local gatherers, who must increasingly adapt to diminishing resources to stay alive. The challenge is therefore to assess and quantify the value of these products and to transform the use of many of them as are socially and ecologically viable for subsistence and development (Saulei *et al.*, 1994).

The significance of NTFPs in rural livelihood improvement and for subsistence has been established by a number of studies at the national level in Nepal (Shrestha *et al.*, 2003; Gauli and Hauser, 2009), but little is known about their collection and marketing dynamics (Bista and Edward, 2006).

In India, there are about 15,000 plant species out of which nearly 3000 species (20%) yield NTFPs.

However, only about 126 species (0.8%) have been commercially developed (Maithani, 1994). NTFP activities hold prospects for integrated forms of development that yield higher rural incomes and conserve biodiversity while not competing with agriculture (Sharma, 1992).

Rural populace especially forest dwellers in India depend on the forests not only to supplement their domestic requirements for foods, fodder, fibre and medicines but also to supplement their incomes by selling part or all of their collection in local markets. In India, more than 41 million tribals and forest dwellers derive their earnings from these products after consuming about 60% of collected NTFPs for personal use (Prasad, 1985). Contemporary multidimensional forest management has led to a much broader concept of non-wood products and services include landscape amenity, clean air, water storage, biodiversity, providing a space for recreation and tranquility (Seeland *et al.*, 2007). NTFP is potentially obtainable from about 3000 species found in the forests of India. NTFP collection, an important source of income for forest dwellers and rural poor, varies from state to state ranging from 5.4 to 55 percent. Moreover, 60% of NTFP is consumed as food or as a dietary supplement especially during lean season by forest dwellers. In Manipur, India alone, nearly 90% of the population depends on forest products as a major source and some 250000 women are employed in collecting forest products (FAO, 1992). In Bastar district of Madhya Pradesh, about 75 % of forest dependent people

supplement their food by tubers, flowers and fruits all the year round (Khare, 1998). In a household based survey at Midnapur forests, it was observed that of the 122 uses of plants or their parts listed by the people, the maximum were for food (44), followed by fuel (39) and medicinal purposes (18) (Malhotra *et al.*, 1991). Various study reveal that it is the poorest households with agricultural lands, livestock, adult males that are predominant collectors of forest products (Malhotra *et al.*, 1991; Hegde and Daniel, 1992). NTFPs are estimated to generate 70% of all employment in the Indian forestry sector. Commercial NTFPs alone are estimated to generate Rs.3 billion annually. One study estimated that NTFP collection generates over 2 million person years of work annually (Shiva, 1995). In addition, millions of individuals are employed in NTFP processing and marketing. With the promulgation of Wildlife protection Act, access to collection of NTFP and fishing has been prohibited in some states causing deteriorating relationship between forest department and forest users group. However, some states have given free access to a number of NTFP collection and fishing. These primarily include fodder grasses, dry and fallen twigs and branches, leaf litter and leaves and where available mushrooms, edible tubers, flowers, fruits and medicinal herbs. But more valuable NTFP are excluded from free access (e.g. cashew nuts, bamboo and fibrous grasses) (Sarin *et al.*, 1998). In addition, local communities do not get the full incomes they should from NTFP. They often get only collection charges even for products that have a very high market value. There are also products for which appropriate prices have not been set in the market. Sometimes marketing channels do not even exist. The market price for the NTFP, or the profits from products goes to middleman contractors, traders, industry etc.

The Bankura District is one of the biodiversity-rich forest regions of West Bengal, India, and limited information is available on the NTFPs of this region. Therefore, this study was undertaken in Bishnupur Forest Range, Bankura District with the following objectives.

- To prepare an inventory of the NTFPs extracted in the region,
- To estimate the quantity of NTFPs extracted by locals and the Forest Department,
- To estimate the income derived from NTFP gathering.

Materials and methods

Study Area:

The study was focused in Bishnupur Forest division of Bankura district, West-Bengal approximately an area of 10291 km². About 80% of the forest area of the district is under the control of the Forest Department, Bankura District, Government of

West Bengal. The average annual rainfall in bishnupur region of Bankura district is of about 2742 mm. The Bishnupur forest Division is dry deciduous in nature harbouring diverse nature of NTFPs.

Methodology:

Preliminary survey of markets

The study was undertaken in seven selected markets (Motukgaunj bazar, Boltola bazar, Barakalitala bazaar, Pirtola bazar, Monsatala bazar, Bosepara bazar, Basontitala bazaar) of Boishnupur Forest Division. The adjoining areas of the seven study sites had a large population dependent on the forests for NTFPs. All these study sites depended on dry deciduous forests. A preliminary survey was conducted to gather information on the geographic area of villages, occupation pattern, and other socio-economic aspects of the households.

Questionnaire survey

A questionnaire survey was conducted to collect information on

- diversity of NTFPs extracted, the parts used, their end-uses as well and
- quantity of NTFPs gathered per typical trip and quantity collected in a season.

Results:

Diversity of NTFPs collected

Several NTFPs were found to be extracted in the different study sites of Bishnupur Forst Range of Bankura District. (Table-1) 5 major categories of nontimber forest products were recorded during our survey work at the present investigation which includes different forms of food items, fuel, jhati, snail and dry leaves. The products includes species used as fuel, food items, construction materials, different types of fruits as revealed from market surveys. (Table-1) Among the food items three different types of mushroom, two different species of snail, honey, fruits (banana, datepalm, jamboline) were recorded in different study sites. (Table-2) Five different species were used as "jhati", three plant species were recorded to be used as fuel, dry leaves of seven different plant species were used for preparation of household items. Plant species used as manure, fencing poles and for fodder are not included, as they are not species specific. These are collected in all most all villages around the different study sites. The fallen twigs of various species collected are used as fuel wood and the leaves collected, either fresh or dry are used as manure or mulching material and grass is extracted exclusively for fodder. There is considerable level of variation among the different non-timber forest product Among the different study sites Basontitala and Motukgaunj recorded least diversity of nontimber forest products when compared to other study sites. (Table-1) Bosepara recorded most diverse nature of non-timber forest product.

Table-1: List of Non-Timber Forest Products obtained at various markets through survey

List of NTFP Items	Motukgaunj Bazar	Boltola Bazar	Borokalitala Bazar	Pirtola Bazar	Monsatala Bazar	Bosepara Bazar	Basontitala Bazar
Dry Sal Leaf	+	+	+	+	+	+	
Leaf used for Domestic Animal Food	+	+				+	

List of NTFP Items	Motukgaunj Bazar	Boltola Bazar	Borokalitala Bazar	Pirtola Bazar	Monsatala Bazar	Bosepara Bazar	Basontitala Bazar
Honey and Bees Wax		+	+			+	
Mushrooms when Available		+	+			+	
JATI		+	+		+	+	
Date palm Juice		+		+		+	
Bark used as fuel			+	+	+		
Snails from Wetland			+	+		+	+
Banana				+	+	+	
Jamboline				+	+	+	
Date Palm				+	+	+	
Leaf for boom formation					+		+

Quantity of NTFPs extracted

A survey of sample households in the selected villages reveals that a significant amount of different forms of NTFPs were collected at different study sites. It was observed that the rate of collection of NTFPs were different for different products. Among the food items mushroom collection varies between 10-25 kg /day /individual. Among the different species of mushroom Poal chatu were collected in least amount. Gheri were collected in higher amount in comparison to gugli as food item (Table-2) The average rate of jhati collection were found to be 50kg/individual/day. Plant species used as fuel recorded collection rate of 20-30 kg/individual/day. Different species of dry leaf were collected at the rate of 30-50kg/day/individual.(Table-2)

Gheri	<i>Helix aspersa</i>	Gastropoda	Food	10-15 kg /day / individuals	Rs.30-40/kg
3. Jhati					
Sal	<i>Shorea robusta</i>	Dipterocarpaceae	Fuel	Near about 50kg/individual/day	Rs.15/kg
Acar	<i>Antiaris toxicaria</i>	Moraceae	Fuel	Near about50kg/individual/day	Rs.15/kg
Chalta	<i>Dillenia indica</i>	Dilleniaceae	Fuel	Near about50kg/individual/day	Rs.15/kg
Jam	<i>Syzygium cumini</i>	Myrtaceae	Fuel	Near about30kg/individual/day	Rs.15/kg
Neem	<i>Azadirachta indica</i>	Meliaceae	Fuel	Near about30kg/individual/day	Rs.15/kg
4. Plant species used as fuel					
Acar	<i>Antiaris toxicaria</i>	Moraceae	Fuel	20-30kg/ individual/day	Rs.35/kg

Table-2- Resource potential of selected NTFPS at different study sites of Bankura District

NTFP Product/Species Name	Scientific Name	Family/Class	Used as	Amount Collected	Market price
1.Mushroom					

Karam Chatu			Vegetable	10-15 Kg/day/individual.	Rs. –80-120/kg
Poal Chatu	<i>Volveriella volvacea</i>	Pluteaceae	Vegetable	1-5 Kg/day/individual	Rs. –40-60/kg
Kurikuri Chatu	<i>Agaricus bisporus</i>	Agaricaceae	Vegetable	10-25 Kg. Kg/day/individual	Rs. –90-150/kg
2. Snail					
Gugli	<i>Bellayma bengalensis</i>	Gastropoda	Food	5to7 kg /per day / individual	Rs100/kg

Banyan tree	<i>Ficus benghalensis</i>	Moraceae	Fuel	30-50kg/ individual/day	No Economic Use
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Jam	<i>Syzygium cumini</i>	Myrtaceae	Fuel	20-30kg/ individual/day	Rs.35/kg
Neem	<i>Azadirachta indica</i>	Meliaceae	Fuel	20-30kg/ individual/day	Rs.35/kg

5. Dry leaves					
Akash moni	<i>Acacia auriculiformes</i>	Leguminosae	Fuel	30-50kg/ individual/day	No Economic Use
Gamar	<i>Gmelina arborea</i>	Lamiaceae	Fuel	30-50kg/ individual/day	No Economic Use
Krishnachura	<i>Delonix regia</i>	Caesalpiniaceae	Fuel	30-50kg/ individual/day	No Economic Use
Eucalyptus	<i>Eucalyptus tereticornis</i>	Myrtaceae	Fuel	30-50kg/ individual/day	No Economic Use
Neem tree	<i>Azadirachta indica</i>	Meliaceae	Fuel	30-50kg/ individual/day	No Economic Use
Peepal tree	<i>Ficus religiosa</i>	Moraceae	Fuel	30-50kg/ individual/day	No Economic Use

Economic potential of NTFPs

Data represented in Figure 1 reveals that among the different NTFPs bark has the highest economic potential in comparison to other products in most of the selected study sites. Honey seems to have higher economic potential next to bark. Neem kati and snail are found to be the products of least economic potential with in the concerned study sites.

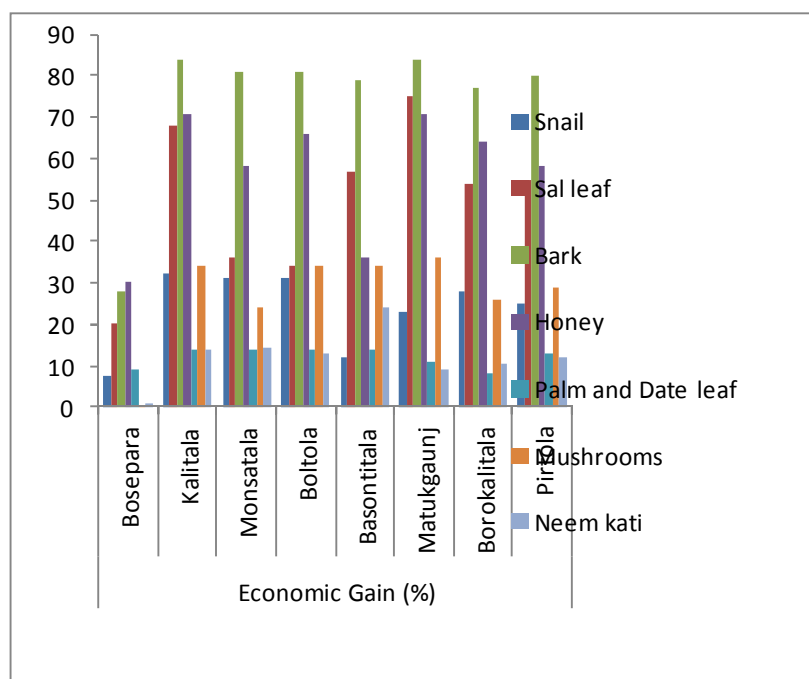


Fig-1- Economic potential of different NTFPs at Bishnupur forest range at different study sites of Bankura District

Socioeconomic condition:

Data presented in Table-3 reveals the socioeconomic condition of the concerned study sites. From the data it was observed that average family income in seven different study sites ranged between Rs 4500-8000/-. The level of income per family was found to be highest in Monsatala bazaar and least in Motukgaunj bazar. Depending upon the survey feedback during present investigation revealed that people engaged in NTFPs collection belongs to mostly of tribal community of the concerned study sites. (SC, ST, OBC etc) Most of the feedbacks obtained from the interviewees revealed that most of the people of the concerned study area belongs to below poverty line. Both male and females are equally involved in collection, harvesting, processing of NTFPs in the concerned study area.

Table 3: Socioeconomic condition of study sites of Bankura District, West Bengal dependent on NTFPs.

Parameters	Borokalitola Bazar				Pirtola Bazar			
Family Income	4500-7000/-				5500-8000/-			
Social Status of people engaged in NTFP collection	GEN	SC	ST	OBC	GEN	SC	ST	OBC
				+	+	+	++	+
Below Poverty line (BPL)	Y		N		Y		N	
	+			-	+			-
Gender of People involved in NTFP collection	M		F		M		F	
	+		+		+		+	
	+		+		+		+	

Parameters	Motukgaunj Bazar				Boltola Bazar			
Family Income	4500/-				4500-6500/-			
Social Status of people engaged in NTFP collection	GEN	SC	ST	OBC	GEN	SC	ST	OBC
		+				+++	+++++	
Below Poverty line (BPL)	Y		N		Y		N	
	+				+			+
Gender of People involved in NTFP collection	M		F		M		F	
	+		+		+		+	
	+		+		+		+	

Parameters	Monsatala Bazar				Bosepara Bazar			
Family Income	4500-8000/-				5500-7000/-			
Social Status of people engaged in NTFP collection	GEN	SC	ST	OBC	GEN	SC	ST	OBC
		++++	++			++	+++++	+++
Below Poverty line (BPL)	Y		N		Y		N	

different species Acar were found to be highly popularized to be utilized for Jhati preparation. Acar jam and neem were widely used as fuel to a considerable extent. Significant amount of dry leaves of *Acacia auriculiformes*, *Gmelina arborea*, *Delonix regia*, *Eucalyptus tereticornis*, *Azadirachta indica*, *Ficus religiosa*, *Ficus benghalensis* were potentially harvested to be utilized as fuel by the local tribal people which has got no market value. A true market is totally absent for products such as bees wax, bark of plant species utilized as fuel, Date Palm Juice, leaves of plant species used for boom formation, leaves of plant species used as domestic animal food. In general, the diverse group of NTFPs were used mainly for local subsistence and less used for trade, income generation and livelihood improvement. Our findings were similar with earlier findings of Uprety *et al.*, (2010) in Bardiya District of Nepal. The tribal communities in Bankura District in and around the selected study sites have utilized and traded several NTFPs in different ways but without paying adequate attention to their conservation. Inappropriate collection of barks of several plant species to be utilized as fuel is an activity promoting sustainability threat. Also uncontrolled collection of dry leaves to be utilized as fuel is another potential threat towards depletion of soil fertility status as these dried leaves promote natural enrichment of the soil nutrient pool after decomposition. Also there is possibility of overharvesting of the nontimber forest products.

The socioeconomic data of the present investigation reveals (revealed from the response of interviewees) that most of the people in the seven study sites engaged with NTFP collection, harvesting, processing etc belongs to tribal community and below the below poverty level (BPL). Therefore they are very much dependent upon these NTFPs for maintaining their daily livelihood.

Data obtained during present investigation also reveals that areas adjoining Bosepara market region is highly enriched with different types of NTFPs and therefore suitable management strategies to be formulated for effective and sustainable use of these products.

Conclusions

It is clear that NTFPs as a group, contribute more than timber to domestic and international economies. There is potential to further increase income from NTFPs in the four forest zones studied, especially the moist deciduous forest zone, given that there are more species that could yield NTFPs and contribute to household income. However, restraint needs to be exercised in the harvest of NTFPs, as unsustainable extraction practices may develop due to increasing demand, causing communities to disregard traditional

harvest techniques. Conversely, faulty techniques of harvest may result in loss of natural stock and affect regeneration.

In order to avoid the drastic consequences mentioned above, information about NTFP yields as well as extraction rates needs to be generated for taking decisions on whether a given practice is sustainable or not in the long run. Research is also required on the ecological aspects of NTFPs such as distribution, regeneration pattern, growth rates, yield in different forest types and silvicultural techniques for managing multiple products. The extraction and utilization rates over time and different seasons need to be assessed over a period to identify trends or patterns in yield and use of NTFPs. Research is also required on various harvest mechanisms as such knowledge will ensure sustainable harvest of resources, which in turn can contribute to the economic well-being of the people and involve them in the conservation of biodiversity. However, NTFP activities should be based on participatory planning and management, as socio-cultural issues play an important role in the sustainability of the NTFP resource base.

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