Role of Non-Timber Forest Products in Income Generation of the Tribal Population: A Review

Review Article

ABSTRACT

Non-Timber Forest Products (NTFPs) refer to all biological resources harvested from the forest for human use and are not having timber purposes. Two types of NTFPs such as tradable and non-tradable NTFPs are available. In international trade, tradable NTFPs are only significant. NTFPs are important components of food security and a vital source of income for the poor in many developing nations. NTFP collection accounts for almost 58 per cent of the total income earned by Kerala's tribal population. Most of the employment (54.04%) was generated by the wage sector followed by NTFP collection (33.77%). NTFPs were found to be collected and used by tribals for a variety of purposes, including food, medicine, raw materials for making implements, and as a source of income. NTFPs are marketed through various marketing channels, depending on various factors such as the product's nature, demand and proximity to the market. If co-operative societies and EDCs (Eco-Development Committees) could develop value additional units for NTFPs with the participation of indigenous groups, it ensures effective use of their spare time as well as a better livelihood through increased NTFP income.

Keywords: Food security; harvesting of NTFPs; marketing channels; non-timber forest products (NTFPs); tradable.

1. INTRODUCTION

The forests provide timber and non-timber forest products besides invaluable environmental services. Non-Timber Forest Products (NTFPs) refer to all biological materials other than timber extracted from natural forests for both human and animal use. It has both consumptive and exchange value. Different terms such as secondary forest products, Minor Forest Products (MFP), Non-Wood Forest Products (NWFP) and Non-Timber Forest Products (NTFP) are being used by governments, institutions and academics. NTFPs provide a lot of ecosystem services such as provisioning services, cultural services, regulating services and support services. Provisioning services such as food, fibre, biomass, fuel and natural medicines are the most important among these services. Overexploitation of NTFPs for these services is also taking place locally, which could lead to the local extinction of intensively collected species which leads to unsustainable use of resources. So far, very few attempts have been made to find viable solutions for valuing NTFP traditional livelihoods, limiting the scope for assessing one of the most prominent land use issues in the tropics.

1.1 What are NTFPs?

Globally NTFPs or NWFPs are defined as “forest products consisting of goods of biological origin other than wood, derived from the forest, other woodland and trees outside forests” [1]. “Plants or plant products for food, forage, fuel, medicine, fibre, and bio-chemicals, as well as animals, birds, reptiles, and fish for food, fur, and feathers, are among these items. It can also be referred to as all the resources/products that may be extracted from the forest ecosystem and are utilised within the household or are marketed or have social, cultural or religious significance” [2]. These products are crucial for society, especially a tribal community, because they contribute to diverse economic growth and long-term rural development. There are a large number of species that provide various NTFPs. Unfortunately, most of these species are currently threatened, endangered, or extinct as a result of overuse, misuse, and destructive utilisation. NTFPs, unlike timber-based products, come from a wide range of plant parts and are formed into a

diverse set of products, including decorative leaves and twigs, food items such as fruits, fungi, and juices, wood carved or woven into pieces of art or utilitarian objects, and roots, leaves, and bark processed into herbal medicines. Like timber, NTFPs are also processed into consumer-oriented products.

2. CLASSIFICATION OF NTFPs

"The United Nations Food & Agricultural Organisation claimed that at least 150 Non-Wood Forest Products are found in international markets" [3]. "Classifying these products is an important first step in understanding the NTFP industry. NTFPs can be mainly classified into edibles and non-edibles. The former includes edible plants and animals, honey, oils, fish, spices etc. while non-edible products include grasses, ornamental plants, oils for cosmetic use, medicinal products etc" [3]. These two classes can further be divided into four general categories:

2.1 Edible Plant Products

Edibles such as mushrooms, representing the most well-known and documented edible forest products, and many other food products are gathered from the forest. It's hard to estimate the economic value of these goods because they're rarely traded and are mainly collected and consumed by the harvesters themselves. Ferns, berries or other fruits, nuts, ramps (wild onions), herbs, and spices are examples of these products.

2.2 Medicinal and Dietary Supplements

This includes plant-based products that are processed into medicines. Beginning in the late eighteenth century, over 100 plant species were commonly accepted for their medicinal properties. The majority are wild-harvested and traded as botanical products" [4].

2.3 Floral Products

Forest products may appear in floral arrangements, dried flower decorations, and ornaments. A common example includes products made from pine boughs, grapevines, moss, ferns, flowers, cone, mistletoe and holly" [5].

2.4 Specialty Wood Products

Handicrafts, carvings, turnings, musical instrument containers, unique furniture pieces, and utensils are all examples of speciality wood items. Speciality wood products are often regarded as non-traditional if they are made directly from trees rather than from milled timber. These goods can be made without cutting down any trees.

3. ECONOMIC VALUE AND GROWTH OF NTFPs

3.1 Global Scenario

Nearly 80 per cent of the population in developing countries is dependent on NTFPs for subsistence, both economically and for nutrition. Suryaprakash and Girish [6] revealed that "NTFPs are important on the employment front too. The NTFP sector is important as a major source of employment accounting for half the total employment of households. The tribals seek employment and derive income from other sources like farming and wage employment. Markets for NTFPs adding value at the local level are not well known but are thought to have a significant impact on rural economies. A few of the edible forest products are prominent enough to generate national economic data". According to Foster [4], "the U.S exported about 77 tonnes of wild-harvested American ginseng valued at more than 21 million dollars in 1993. The NTFPs sector is growing rapidly, perhaps faster than the timber industry and it is expected to grow more in the future". According to Mater [7], "the market for forest products other than trees has mushroomed by nearly 20 per cent annually over the past years. It was also noted that the U.S herbal medicine market grew at an estimated annual rate of 13 to15 per cent with sales of medicinal herbs, a forecast that the US economy would earn 5 billion dollars in the year 2000". New York Times [7] reported that "in the Pacific Northwest, mosses, ferns and other plants have sustained the commercial floral products industry and contributed more than $125 million to the region's economy".

3.2 Indian Scenario

Out of the 3,000 NTFP species in India, only 126 have developed marketability [8]. These include medicinal plants, edible plants, starches, gums and mucilages, oils & fats, resins and oleo-resins, essential oils, spices, drugs, tannins, insecticides, natural dyes, bamboo and canes, fibres and flosses, grasses, tendu leaves, animal

products and edible products. According to FAO [8], “the commercial NTFPs are estimated to generate Rs.3 billion (US$ 100 million) annually in India and also have a 42 per cent share of total removals in the category of other plant products, such as tendu leaves and lac, followed by Brazil and Mexico”. “India holds the monopoly in world trade over some of the NTFPs such as Karaya gum (*Sterculia urens*), Myrobalans (*Phyllanthus emblica*), *Terminalia chebula*, Sandalwood chips and dust (*Santalum album*)” [9]. “The marketing of NTFPs was regulated by different mechanisms in different states. Under the Forest Produce (Control and Trade) Act 1981, trading is largely controlled by public institutions, such as State Development Corporations, Federations, Cooperatives and tribal societies” [10].

3.3 Kerala Scenario

“In Kerala, NTFPs are sold through a variety of channels, based on a variety of parameters such as the product's type, demand, and distance from the market” [11]. “The Kerala State SC/ST Federation, private traders and tribals are the three main marketing agents dealing with the marketing of NTFPs in the state. The NTFP collection is carried out by 36 Tribal Service Cooperative Societies (TSCS), which cover 398 tribal villages. There are mainly three marketing channels for the trade of NTFPs in Kerala. In the first channel, the products are marketed through the Tribal SC/ST federation. The products are sold through private traders in the second channel. The Forest Department also manages the marketing of specific products in some sections of the state” [12]. “The main activity of the Federation is the marketing of NTFPs. There are two stages in the marketing of NTFPs in Kerala, the sale of collected products by the tribes to the federation through society and the marketing of the collected products by the federation” [13]. “The people that live near the forest region rely heavily on the forest resources for their survival. The collection of NTFPs is the major occupation of more than 68 per cent of the tribals in the Palakkad, Thrissur, Wayanad and Kannur districts of Kerala” [14]. “The tribes residing in the interior areas depend on the forest resources for food, medicine, construction, religious ceremonies, firewood purpose and commercial collection of NTFPs. Studies have shown that the NTFP collection contributed 58 per cent of the total income of the tribes in Kerala” [15]. “The tribals of Wayanad make use of 434 flowering plants for various purposes, of which 184 are used for food” [16], “244 for medicinal use” [17] and “68 plants are used for other purposes” [18]. These studies show that there is a greater dependence of the tribal people on NTFP species and also highlight the contribution of the NTFP sector to the livelihood of the tribes. This underlines the need for conserving forest resources, especially the NTFP species. Through the conservation of NTFP species, we can help tribes sustain and improve their livelihood prospects for a better life. Proper functioning of the various marketing institutions and a vibrant mechanism are needed for ensuring a better livelihood for the indigenous people who are dependent on these forest resources.

4. ANALYSIS OF NON-TIMBER FOREST PRODUCTS

“The value of a Non-Timber Forest Product is the worth of a product or service to an individual or a like-minded group in a given context, often involving a complex of relationships” [19]. “Economic values are human-oriented and human-assigned. Values are specific to a given context and situation. Forest valuation should, therefore always be situation-specific and the result should be attributed back only to the group studied and to the actual context and situation studied” (FAO, 1995). An appropriate method of forest valuation depends on the objectives of the study.

Suryaprakash and Girish [6] undertook a study which attempted to analyse the role of NTFPs in the employment of tribals and their income, consumption pattern and factors that influence NTFP activities of tribals. The study was conducted in the Kanara forest circle of Karnataka state. It comprises five territorial forest divisions. Here NTFPs contribute to more than half the household’s total income. They account for nearly two-thirds of the non-cash income of tribal households. Five marketing channels existed in the NTFP trade. However, only two channels were prominent in the trade of NTFPs by tribal households. The NTFP sector is important as the major source accounting for half the total employment of households. The tribals seek employment and derive income from other sources like farming and wage employment. The tribal households spend more on cosmetics, tea and alcohol than on children’s education. Households depend on NTFPs both for meeting their livelihood needs and to seek cash income from the NTFP sale. The larger the number of NTFPs extracted larger the proportion of the products sold. Fuelwood is the most important

NTFP collected for domestic use in the household. Women account for more of the household's time spent in the collection and processing of NTFPs than that men. However, when it comes to the quantity of NTFPs collected, men collect more quantity of the majority of the products than that collected by women in the household. Income from farming, income from allied activities, family size and number of dependents per family have a positive influence on the NTFP income of households. The NTFP sector exhibited stronger linkages with the rest of the economy in the region with a relatively larger tribal population than in the region with a lesser tribal population.

Murthy et al. [20] assessed "the progression of Non-Timber Forest Products in a region in India where NTFPs were gathered in four diverse forest zones of the locale. The study aimed at preparing an inventory of the NTFPs extracted in the region, estimating the quantity of NTFPs gathered by local people and the forest department and finally estimating the financial income derived from NTFPs extracted. The households were classified into three i.e., large farmers, garden owners and landless labourers based on the farm holdings. In each class, if the number of households was under five, 100 per cent sampling was done; otherwise, 25 per cent of the households were randomly taken for the survey. The result indicated that all classes of NTFPs were available in the district forest zones and they were classified depending on the kind of species extracted". For example, fuelwood is measured in kilogram/year i.e., the weight of fuelwood fetched on an annual basis. Fodder, honey, mushrooms, wild mangoes and so forth gathered were measured in kg/household/year. The financial valuation of NTFPs indicates the income of the farming household was carried out irrespective of the gathering household. That is, the total population of each forest zone was considered as a whole. The financial value of the NTFPs collected was calculated using the current market value and quantified in kg per hectare each year. There were discrepancies in the projected value realised per household, as well as their financial value, among the zones studied. It was also reported that a comparison of the annual value of timber with a ten-year mean (1985-94) of Rs.239 million and NTFPs value of Rs.685 million for the year (1995-96) indicates that NTFPs contribute doubly to the economy and benefits flow directly to local communities. The authors were able to value NTFPs by directly using the current market price to estimate the income of the communities with the quantities of NTFPs gathered. Financial assessment based on market prices, on the other hand, could not account for elements of the cost involved in the production and distribution of NTFPs, such as labour costs and transportation costs. An economic study would have provided a more accurate picture of the true worth. While some NTFPs were measured in kg/households/year, an inconsistency in the unit of measurement was seen; some NTFPs were assessed in kg/year without an indication of the value of land cultivated. However, the land value was used in the financial valuation. Additionally, the author made no mention of what caused the observed variances in the estimated value of NTFPs realised by the households or the changes in the financial value of NTFPs per hectare among the four zones under consideration.

Kumar [21] undertook "a study which attempts to assess the contribution of NTFPs to income and employment by ensuring food and livelihood security for the tribal economy in the Peechi Vazhani Wildlife Sanctuary, Western Ghats, Kerala". The major tribal communities surveyed were Kadar (66.7 %), Muthuvar (18.5 %), Mannan (8.3 %) and Malayan (6.5 %). These communities are considered descendants of nomadic primitive tribal groups dwelling in the interior parts of the forests. About 84 species of NTFPs were found to be collected and used by the tribals for various purposes such as food (19 species), medicines (31 species), raw materials for making implements (6 species), source of income (18 species) and other miscellaneous purposes (10 species). This indicates that more employment (54.04 %) was generated by the wage sector followed by NTFP collection (33.77 %). This study suggests that NTFP as a development mechanism for poor communities may have disadvantages. Firstly, those collectors who need income support from NTFPs are least able to benefit from an NTFP-based development strategy. It is mainly because "they have the poorest developed skills, lack resources to store, process and market their produce, and also face prejudice and unfair treatment because of their social status. Secondly, it can expose collectors and their dependents to widely fluctuating incomes because of price variations in local and global markets" [2-25] and "extremes in seasonal and biological production [26]. Thirdly, in the long-term, there is also the risk that the price for some NTFPs will decline as factory-made alternatives such as plastic containers for bamboo and reed baskets, and plastic for rattan furniture, become more widely available and more durable. Fourthly, the institutions and

practices for monitoring harvesting rates and capacity building for commercial NTFP production require more time and resources than other development options" [27-29]. In conclusion, it suggests that NTFP collection is unlikely to generate positive outcomes for biodiversity conservation or poverty alleviation. The new laws which give rights of land and resource use, including NTFPs collection, to communities living within forests and protected areas are therefore probably misguided in terms of livelihoods and harmful to conservation in protected areas. So it suggests that the Indian government consider the provision of alternative farm-based livelihoods and investment in improved access to education for collectors and their families. However, further research is required to compare NTFP revenues within other protected areas to understand further the social, economic and legal factors affecting incomes from NTFPs.

Alex and Kattany [30] attempted "to analyse the significance of different marketing agencies involved in the marketing of NTFPs, to the livelihood of the indigenous communities of Attappady. There are mainly three tribal communities namely Irula, Muduga and Kurumba in Attappady. Three marketing agencies, Kurumba Cooperative society, Eco-Development Committee (EDC) Vanasree Eco shop and Private traders were involved in the marketing of NTFPs used for edible and industrial purposes. Among the 23 NTFPs marketed, nine products were solely marketed through the society and one product exclusively through the private shop, 10 products through society and private shops, one product was marketed through the Eco-Development Committee (EDC) and private shop and two products through all the three channels. The price spread was estimated to understand the share of the final price going to the primary collectors. The difference between the price paid by the final consumer and the price received by the primary collector is the price spread. It includes the costs and margins of different marketing agencies. The marketing costs include the price of shipping, storage, grading, and handling. The margin includes the returns to the intermediaries for their functions".

Price spread = Price paid by the consumer - Price received by the primary collector

or

Price spread = Marketing costs + Marketing margin

"NTFP collector's share in the sale price is the price received by the primary collector expressed as a percentage of the sale price of NTFP (i.e., the retail price paid by the consumer)" [31].

Although the procurement price given by the private shops and EDC for commercially important NTFPs was higher than that of the Kurumba society, the indigenous people were more benefitted from marketing through the society. It is because the EDC and private shops do not share their profit with the collectors, whereas society gives a certain level of their profit back to the primary collectors in addition to the procurement price. But the financial constraints during the lean seasons are forcing the indigenous communities to sell their products to private shops. If the society and EDC can start the value addition units of the NTFPs with the involvement of indigenous communities, it guarantees effective utilization of their free time and a better livelihood through enhancement of their income from NTFPs.

5. LAWS AND POLICIES RELATED TO NTFP TRADE

Though the laws and policies governing access to NTFPs are not NTFP trade policies, they are highly influential in NTFP trade. Regulations prescribing the mode of accession and usage of natural resources often contain provisions describing the approved harvest methods, the maximum amount of material to be harvested, the location of harvests and procedures for obtaining access. The two primary forms of NTFP access and harvesting oversight are governmental or statutory and local.

5.1 Statutory/Governmental

Dyke and Emery (2010) and Richards and Saastamoinen [32] opined that "statutory/governmental oversight often distinguishes between subsistence and commercial harvesting of NTFPs, creating lax and strict rules respectively, even ignoring them in some cases. Researchers suggest various forms of Statutory control". "The states may nationalize trade in important NTFPs by setting prices or harvest quotas, licensing dealers and collecting revenue through fees and taxation as in the case of tendu leaves (*Diospyros melanoxylon*) in India" [33], "medicinal plants in Bulgaria" [34] and rattan [35]. "Governments can also control access to NTFPs to states, by

leasing collection rights to private companies for the harvest, as in the case of Brazil nuts (*Bertholletia excelsa*) in Amazonia" [36,37]. "Another method of state control includes licensing gatherers which is a common approach for regulating the harvest of many pan-world wild species, particularly mushrooms" [38]. Although, governments often use a combination of all three approaches since these forms of controlling access are not mutually exclusive as in the case studied by McLain and Lynch [39]. He reported that NTFP harvesters in Washington State USA, require an additional permit for the harvest of NTFPs from federal lands despite a state permit to harvest, transport and sell NTFPs. "State control of NTFP trade is most rigid in nationalised schemes and leasing arrangements, and less controlled in the case of licensing systems, mainly owing to the costs of enforcement, the lack of staff to provide oversight and the diffuse nature of wild harvesting. Some national agencies have resorted to the use of disciplinary power and the threat of surveillance to ensure that gatherers comply with NTFP harvest and trade regulations to compensate for this" [40].

5.2 Local and Customary Oversight

Access to NTFP resources is still determined by family, clan, tribe or village ties in many areas of the globe. Under common property resource systems, access to NTFPs is part of a larger bunch of resource rights and obligations which are determined by local communities. Menzies and Li [41] cited this "as the case in countries with strong central governments such as China, where village councils, with the consent of higher officials, enact NTFP harvest codes of conduct that effectively exclude non-members of their villages from access to locally controlled forests". Likewise, Ribot [42] reported that "charcoal harvesters in Senegal are obliged to consult with village chiefs before being granted access to local forests". "In Nepal, the government has ceded control over the management, use and sale of NTFPs to local forest groups, who may in turn create their own NTFP harvest codes and exclude outsiders from using forest resources [43] which implies the devolution of control over forests to local groups has resulted in greater local control over resource access in many countries". Wynberg and Laird [44] reported that "customary laws are generally followed and enforced for the use and protection of the marula tree, *Sclerocarya birrea* in Southern Africa. He opined that local, customary laws often provide effective access and resource management oversight when land tenure and resource rights are secure, customary laws are strong, the local capacity exists to manage the resource base, and commercial pressures on species are not overwhelming".

6. MAJOR ISSUES FACED BY NTFP COLLECTION

1) NTFP-collecting people are susceptible to accidents by wild animals (Wasps, Snakes, Aggressive mammals etc.) in addition to the risk of falling into steep places, drowning, etc.
2) Overexploitation of NTFPs leads to unsustainable use of resources.
3) Lack of proper training and provision of harvesting tools for NTFP collection by the officials.
4) Lack of proper infrastructure for the storage and processing of NTFPs.

7. CONCLUSION

Historically, governments have undervalued non-timber forest products (NTFPs) compared to timber products. Existing expertise and information are also poorly documented or unavailable. In addition, as field experiences have shown, there is currently a shortage of adequate strategies and tools to encourage the sustainable use of NTFPs, successfully regulate trade, and formulate development strategies. The development of appropriate instruments and procedures for sustainable NTFP extraction and trade regulation will be a challenge in the next years. This can be accomplished by effectively utilising the region's existing expertise and experience among facilitators, entrepreneurs, and researchers. This entails actions like locating, establishing connections with, and involving such individuals in a variety of networking activities that foster the flow of knowledge and information and provide outcomes that are immediately valuable and interesting to the concerned NTFP conservation programme. There are numerous hurdles to overcome when it comes to the production of NTFPs sustainably. The disappearance of forest cover, inequitable market access for marginalised groups, and logging and poaching mafia monopolisation of high-value NTFP are only a few examples. There was an assumption in the articles that undervalued anticipated post-harvest losses and the market cost of perishable NTFPs. The authors also assumed that all NTFPs can be traded, which may not always be the case. Non-market prices are designed to be

used for non-traded NTFPs. If the authors did not segregate the NTFPs into traded and non-traded before evaluating their financial value, future studies would be richer. Also, indications must be made about the estimate of the value of NTFPs used for domestic purposes by households.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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