

## Social Benefits from Non-Timber Forest Products Among the Villagers of Champhai District, Mizoram

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**Abstract** Non-timber forest products (NTFPs) provides immense contribution to rural livelihood. Besides, they provide several benefits directly as well as indirectly to households and support them as an alternative in times of scarcity of agricultural cash crops. The purpose of the study is to assess the extent of NTFPs utilization and social benefits in Champhai district from community forests. Fuel wood, medicinal plants and wild vegetables are the main NTFPs which are routinely harvested from the community forests. Majority of the NTFP harvesters are part time exploiter. Among all the fuel wood species *Anogeissus acuminata* ( $UV_{is}=2.2$ ) has the highest use value followed by *Quercus pachyphylla* ( $UV_{is}=1.6$ ), *Macaranga indica* ( $UV_{is}=0.8$ ) and

least in *Quercus dealbata* ( $UV_{is}=0.6$ ) and *Mesua ferreda* ( $UV_{is}=0.6$ ). While *Securinega virosa* ( $UV_{is}=2.6$ ) has the highest use value among the medicinal plants followed by *Mikania micrantha* ( $UV_{is}=2.4$ ), *Lindernia ruellioides* ( $UV_{is}=2.2$ ) and *Litsea monopetala* ( $UV_{is}=2.2$ ) and least in *Artemisia vulgaris* ( $UV_{is}=1.8$ ). Bamboo shoots ( $UV_{is}=4.4$ ) *Melocanna baccifera* and *Dendrocalamus longispatus* has the highest use value among the wild vegetables followed by *Amorphophallus nepalensis* ( $UV_{is}=2.8$ ), *Amomum dealbatum* ( $UV_{is}=2.4$ ). Mushroom species ( $UV_{is}=1.8$ ) and least use value was found to be *Arenga pinnata* ( $UV_{is}=1.6$ ).

**Keywords** Non-timber products (NTFP), Extraction, Livelihood, Community forest, Use value.

### Introduction

Social benefits of Non-timber forest products (NTFP) are the benefits the society gets from producing or consuming different NTFPs. It includes all the private benefits at household level plus any external benefits of products/consumption. Poorer social groups rely on

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a widely variety of NTFPs and do have the capital or labor to manage them intensively or commercialize their activities. The World Bank (2001) estimates that 1.6 million depend to varying degrees on forests for their livelihoods, with 350 million living in or near dense forests depending on them to a high degree. many forest products provide a substantial portion of the human diet. In Swaziland (Ogle and Grivetti 1985) reported that wild foods contributed a greater share of the food for 39% of the people than did crop cultivars, thus confirming the importance of forests and associated vegetation in the food economy of certain regions.

Forest provides rural communities with diverse products for subsistence and cash income : About 100 million people living in and around forests in India depend heavily on the collection and marketing of NTFPs (Saxena 2003). Many forest products are treated as open access resources, meaning that they are freely available even to poor people. Many products can be processed simple and at low cost using traditional technologies. Some have market demand, so they offer an opportunity to earn cash income. Non-timber forest products played a prominent role in uplifting the socio-economy of human beings, particularly in tribal and rural areas for thousands of years (Maikhuri et al. 2004). The lack of productive assets, in particular land and livestock, makes poorer households heavily dependent on NTFPs for cash generation and poverty prevention (Rijal et al. 2011).

Detailed case studies of the ecological, socio-cultural and political dimensions of NTFP extraction

are therefore needed to understand better the local-specific factors that either facilitate or constrain the sustainability of NTFP harvesting (Nygren et al. 2006). Such analyses can offer valuable insights into the complexity of social, economic and political contexts of NTFP extraction and thus contribute to the understanding of NTFP extraction gained through quantitative, macro-scale analyses (Ruiz Pérez and Byron 1999, Belcher et al. 2005). Non-timber forest products are important to rural households in terms of their contribution to health, food, energy, cash income and other aspects of human welfare (Cavendish 2000).

## Materials and Methods

### Study site

The study on social benefits from non-timber forest products (NTFPs) was carried out in community forest of five villages under Champhai district viz. Khawzawl hermon ( $23^{\circ}29'25.7''$  N,  $093^{\circ}12'05.7''$  E), Khawhai ( $23^{\circ}22'47.0''$  N,  $093^{\circ}07'53.1''$  E), Kawlkulh ( $23^{\circ}38'40.8''$  N,  $093^{\circ}05'19.6''$  E), Hi-appui ( $23^{\circ}44'57.2''$  N,  $093^{\circ}06'07.8''$  E) and Ngopa village ( $23^{\circ}51'52.5''$  N,  $093^{\circ}13'19.4''$  E) during the year 2014-2015 (Fig.1).

Participatory rural appraisal (PRA) method was adopted for the field study. Both primary and secondary data was obtained through semi-structured questionnaire, field observation, personal interview and group discussion with the villagers. Both men and women are included in the interview to avoid

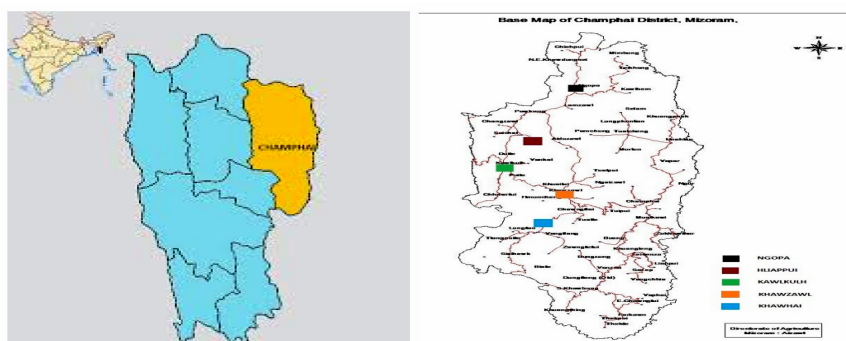


Fig. 1. Location map of Champhai district showing study site.

gender biasness in the data. Detailed information on marketing channel of NTFP was also collected from the first hand NTFP exploiter and stakeholders were interviewed from roadside market and nearby junction selling points. The socio-economic profiles of the villages are also noted to know the real picture of the village. Information on NTFPs in different aspects like use value (UV), locally growing condition, and place of availability, state of collection, use category and marketing are also collected from the five villages by participatory discussion method.

#### Benefits of NTFPs

In each of the five villages, the detailed information on their utilization was collected and as many as 10% household questionnaires were also circulated to provide information on different utilization of NTFPs, parts used, mode of harvesting and marketing channel from each of the villages. This generates information on to what extent they utilized and benefited from NTFP. Socio-economic survey, land use pattern, value addition on NTFP and marketing strategy has also taken into consideration. Household level data include socio-economic information of the sample households such as family size, age and sex, structure of the family, literacy level of each member of the family, landholding size, major occupation and infrastructure.

#### Use value (UV)

The use-value (UV) of plants was first discovered by Prance et al. (1987) and modified by Pardo-de-Santayana et al. (2007). The calculation of UV is based on the diversity of uses. It is a method in which the informants were asked to identify the nature and use of five selected plants on the basis of three categories (food, medicinal and economic) values. The overall mean value  $UV_{is}$  represents the mean number of all uses of a given plant species (s), as recognized by a single informant ( $i_s$ ). Then the overall use value of species ( $UV_s$ ) based on the information from the total number of informants can be calculated by using the following equation :

$$UV_s = \sum UV_{is} / i_s$$

**Table 1.** Socio economic profile of the surveyed villages.

Attributes	Surveyed villages				
	Kha-wzawl hermon	Kha-whai	Kawl-kulh	Hlia-ppui	Ngopa
Location (km from Aizawl)	160	180	120	153	184
No. of household	283	515	789	346	970
Total population	1200	2800	4150	1672	4351
No. of BPL and AAY household	34	114	208	175	230
Educational level					
Matriculation	50	300	420	210	500
Graduate	20	80	95	53	150
Literacy rate %	97%	98%	98%	98%	97%

Where,  $UV_s$  = The overall use value of species,  $UV_{is}$  = The use value of the species s as determined by informant i,  $i_s$  = Total number of informants interviewed for species.

## Results and Discussion

### Socio-economic profile

Among the five studied villages, Ngopa village has the highest number of household and most populated while it was least in Khawzawl hermon village. All the villages are easily approachable by metal road and have proper public transportation facilities to the capital Aizawl. Number of below poverty line (BPL) and antyodaya anna yojana (AAY) household are high in all the villages as shown in Table 1. Majority of the villagers are literate and literacy percentage is above 97% in all the villages; 3-5% of the villagers are working under State government, 1—2% are running a small trade and the rest of them are working in their *jhoom* which is the main source of occupation. When there is less work load in the agricultural field and off season of *jhoom* crops, villagers harvest more of the edible leaves and other NTFPs from the community forest. In the mean time, they also worked as daily labor if any opportunity comes up.

### Infrastructure

Four-five Anganwadi centers, schools up to high

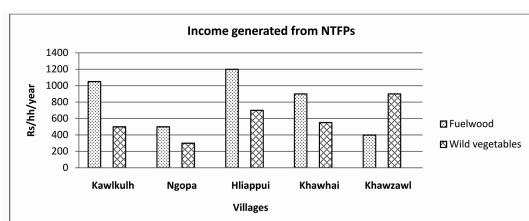


Fig. 2. NTFPs contribution to household income.

school are present in all the surveyed villages. Bank and primary health center (PHC) are present in all the surveyed villages which make life easier for the villagers.

#### Direct Benefit

##### *Contribution of income*

Fuel wood has the highest rate of income generation among NTFPs collected from the surveyed villages followed by wild vegetables (Fig. 2). Medicinal plants are not used for marketing purpose and are harvested only for their own consumption; the villagers harvest the exact required amount in times of need. Fuel woods are harvested for private used and also by a group of non-government organization (NGOs) and self help groups (SHG) in some villages which are used for fund raising. In all the studied villages, the fuel wood exploiters are allowed to harvest only the dried and dye out trees. This is an important tool in regenerating community forest. Wild vegetables are harvested by both men and women while selling is done by women in all the surveyed villages. The contribution of NTFPs to cash income varies across ecological settings, seasons, income level and caste (Mahapatra et al. 2011). The villagers harvest all the available wild vegetables present within the community forest mainly for their own consumption and sell it if they got surplus. Bamboo shoots, *Amomum dealbatum* and mushroom are the main vegetables harvested and sold to the market. *Arenga pinnata*, *Eurya acuminata*, *Solanum nigrum*, *Picria felterrae*, *Dysoxylum excelsum* are also harvested, but these are harvested mainly for their own consumption. Mushroom is harvested in larger amount from Khawzawl community forest area within the pine plantation.

Women harvest it in the month of July and sold @ Rs 200/kg which increases the income figure from wild vegetables in Khawzawl village. Products such as mushroom and bamboo shoots are having a short season of availability, whereas other products are available almost throughout the year. Although the forest-dependent communities have indigenous skills and knowledge of NTFP management and use, they are poorly equipped to seize opportunities in wider domestic and global markets. The villagers need better information in order to increase their earning capacity (Rasul et al. 2008).

##### *The marketing chain*

Women are mainly involved in selling the NTFPs. Most of the collectors were literate; they had basic knowledge of reading, writing and calculating. Fuel wood are mainly sold within the villages since transportation is an issue and can be stored for longer time, they harvest in bulk, dried and stored in roadside to get the customer. Local rate of fuel wood is @ Rs 3 for 1 piece and sometimes rate are reduce according to the amount sold. Meanwhile wild vegetables are easily perishable and there are no storage facilities, they had to sell as soon as possible. They sold to nearby junction selling point or within the village itself, if not they went to the neighboring towns where they give it to the middle man. Local rate of one bundle of edible leaves (*Eurya acuminata* and *Dysoxylum excelsum* are mainly Rs 30 in winter and Rs 20 in rainy season. The middle man takes @ Rs 25 and 15 respectively. *Amorphophalus nepalensis* one cup @ Rs 20, *Amomum dealbatum* @Rs 20/bundle, mushroom are sold to local market @ Rs 200/kg. *Picria felterrae* are dried and sold in packet 20 g packet @ Rs 30. Bamboo shoots one bundle @ Rs 30-50 it varies in season. Even though NTFP individually make a minor contribution; collectively they represent a larger proportion of the rural economy and thus become significant (Johnson et al. 2013).

##### Indirect benefit

##### *Substitute for agricultural cash crops*

There comes an unproductive season for the agricultural cash crops, in such situation they have to depend

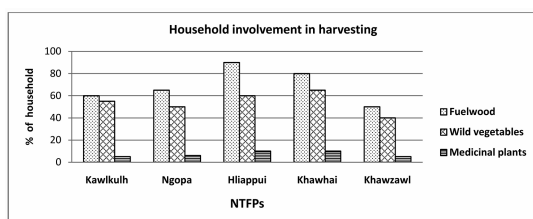


Fig. 3. Household involvement in harvesting of major NTFPs.

on NTFPs from the community forest area. Since they rely on their *jhoom* crops which they grow once a year on rain-fed because of unavailability of irrigation facility, they exploit NTFP (Sahoo et al. 2010). Most of the villagers are part time NTFP exploiter; they exploit NTFP depending on their availability in each season. They also serve as a safety net during seasonal food shortages and other economic crises : About 60% of the harvest of NTFPs goes unrecorded and is consumed by households themselves (Shiva 2001). Landless farmers and widows rely more on the harvesting of NTFP in all the seasons. Fuel wood are high in demand all through the year since most of their energy consumption pattern is fuel wood along with the LPG, they have to harvest from the community forest besides from their own land. Ten percent of the villagers are still dependent on fuel wood alone and they are mainly from the poorer sections of the society who do not have a land to collect fuel wood other than community forest area. Rural household use most of their agricultural outputs for subsistence consumption and the cash they earn from selling NTFPs are used for other needs such as buying of agricultural tools, school fees for their children and other basic needs. However, in case of medicinal plants, the dependence and utility by the local people was lesser as compared to the modern drug. NTFP play an important social domain of Mizo villagers (Lalremruata et al. 2007). Figure 3 indicates the utilization of various NTFPs in different villages.

#### Use value (UV)

In this method, five respondents are randomly chosen out of 10 respondents. Each informant was then asked about the uses of those selected plants in order to determine the number and range of uses of each species. Data from each informant were then used to calculate

Table 2. Use value (UV) for selected five fuel wood species.

Fuel wood species	Total ( $\sum U_{is}$ )	Mean ( $UV_{is}$ )	Standard deviation
<i>Quercus dealbata</i>	3	0.6	0.55
<i>Macaranga indica</i>	4	0.8	0.45
<i>Mesua ferrea</i>	3	0.6	0.55
<i>Anogeissus acuminata</i>	11	2.2	0.64
<i>Quercus pachyphylla</i>	8	1.6	0.55

the mean number of uses of a given plant species.

Among the fuel wood species, *Anogeissus acuminata* has got the highest mean use value ( $UV_{is} = 2.2$ ) followed by *Quercus pachyph alla* ( $UV_{is} = 1.6$ ), *Macaranga indica* ( $UV_{is} = 0.8$ ) and *Mesua ferrea* and *Quercus dealbata* with the least mean use value ( $UV_{is} = 0.6$ ) (Table 2). Overall use value for fuel wood species :

$$UV_s = \sum UV_{is} / i_s \\ = (0.6 + 0.8 + 0.6 + 2.2 + 1.6) / 5 \\ = 1.16$$

Among the medicinal plant species, *Securinega virosa* has got the highest mean use value ( $UV_{is} = 2.6$ ) followed by *Mikania micrantha* ( $UV_{is} = 2.4$ ), *Lindernia ruellioides* and *Litsea monopetala* ( $UV_{is} = 2.2$ ) and *Artemisia vulgaris* with the least mean use value ( $UV_{is} = 1.8$ ) (Table 3). Overall use value for medicinal plant species :

$$UV_s = \sum UV_{is} / i_s \\ = (2.6 + 2.4 + 2.2 + 2.2 + 1.8) / 5 \\ = 2.24$$

Among the wild food species, Bamboo shoot has got the highest mean use value ( $UV_{is} = 4.4$ ) followed by *Amorphophallus nepalensis* ( $UV_{is} = 2.8$ ), *Amomum dealbatum* ( $UV_{is} = 2.4$ ), mushroom ( $UV_{is} = 1.8$ ) and *Arenga pinnata* with the least mean use value ( $UV_{is} = 1.6$ ) (Table 4). Overall use value for food species :

$$UV_s = \sum UV_{is} / i_s \\ = (4.4 + 2.8 + 2.4 + 1.8 + 1.6) / 5 \\ = 2.56$$

It is evident that the highest UV value in each



**Table 3.** Use value (UV) for selected five medicinal plants.

Medicinal plants	Total ( $\sum U_{is}$ )	Mean ( $UV_{is}$ )	Standard deviation
<i>Artemisia vulgaris</i>	9	1.8	0.84
<i>Lindernia ruellioides</i>	11	2.2	0.84
<i>Securinega virosa</i>	13	2.6	0.55
<i>Litsea monopetala</i>	11	2.2	0.84
<i>Mikania micrantha</i>	12	2.4	0.89

NTFP has got a broad spectrum of uses in comparison to the other NTFPs which has a limited way of uses. The mean of the five selected plants in fuel wood, medicinal plants and vegetables/wild food are greater than zero and standard deviation is lesser than the mean. This indicates that there is a high chance that the data collected about their uses will be positive.

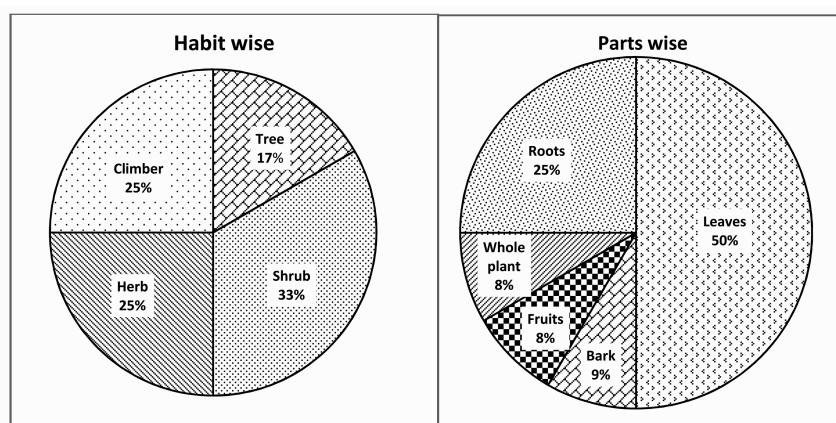
Different plant parts and habit are found collected for their medicinal value for treating different ailments. Shrubs have the highest percentage of utilization followed by herbs and climbers and least in tree species (Fig. 4.) This is because of the easy accessibility of these shrubs and herbs. Medical remedies most frequently mentioned by the informants in our study included treatments for diarrhoea, skin irritations, fever and wounds all treated with traditional knowledge. Leaves are heavily utilized and contribute as much as 50% with comparison to other parts of medicinal plants which was found to be the same findings with Sahoo et al. (2012) followed by

**Table 4.** Use value (UV) for selected five vegetables.

Vegetable species	Total ( $\sum U_{is}$ )	Mean ( $UV_{is}$ )	Standard deviation
Bamboo shoot	22	4.4	0.55
<i>Amorphophallus nepalensis</i>	14	2.8	0.45
<i>Amomum dealbatum</i>	12	2.4	1.09
Mushroom species	9	1.8	1.3
<i>Arenga pinnata</i>	8	1.6	0.45

roots, bark and least 8% in fruits and whole plant. Easy harvesting and high productivity of leaves leads to the high consumption as compared to other parts of medicinal plants. Promotion of collecting NTFP not only assure the income but also allow proper utilization because the NTFP which they have collected are mostly the by products or end products such as seeds, fruits and leaves which will go waste if not collected at appropriate time (Jonson et al. 2013).

Besides these three major NTFPs— fuelwood, medicinal plants and wild vegetables, broom grass and immature timber yielding plants are also harvested for their day to day use (Table 5). Extractions of any NTFPs are allowed as long as they follow sustainable harvesting, but harvesting and processing of mature tree for timber is restricted by the village leaders. This is because they want to save the trees for future generation as well as conserving the biodiversity. The bulk of NTFP are reported traded illegally and unsustainably harvested from the wild in various parts

**Fig. 4.** Habit wise and parts wise distribution of medicinal plants.

**Table 5.** List of medicinal plants used by different villages from community forest under Champhai district.

Sl. No.	Species	Local name (Mizo)	Family	Habit	Parts used	Formulation
1	<i>Aporosa roxburghii</i> (Wall. ex Lindl.) Baill.	Chhawntual	Euphorbiaceae	Tree	Bark	Bark is boiled and used as a remedy for stomach ulcer and diarrhoea
2	<i>Artemisia vulgaris</i> L.	Sai	Asteraceae	Shrub	Leaves	Decoction of leaves used in treatment of sores
3	<i>Benincasa hispida</i> (Thunb.) Cogn	Mai-pawl	Cucurbitaceae	Climber	Fruit	Juice of the fruit is recommended for cholera, diarrhoea and vomiting
4	<i>Blumea lanceolaria</i> (Roxb.) Druce	Buarze	Asteraceae	Herb	Leaves	Decoction of leaves is given to cancer patient to nourish them.
5	<i>Costus speciosus</i> (J.Konig) Sm.	Sumbul	Zingiberaceae	Herb	Roots	Juice of crush roots given to kidney related problems
6	<i>Dendrocnide sinuate</i> (Blume) Chew	Thakpui	Urticaceae	Shrub	Roots	Decoction of roots used in disease of liver, jaundice and skin itching.
7	<i>Hedyotis scandens</i> Roxb.	Kelhnamtur	Rubiaceae	Climber	Leaves	Decoction of leaves is used in urinary problems
8	<i>Imperata cylindrical</i> (L.) Raeusch	Di	Poaceae	Shrub	Roots	Decoction of roots used for expelling thread worms from the body.
9	<i>Mikania micrantha</i> Kunth	Japan hlo	Asteraceae	Climber	Leaves	Juice of the crush leaves used as antiseptic for cuts
10	<i>Litsea monopetala</i> (Roxb.) Pers	Nauthak	Lauraceae	Tree	Leaves	Crushed leaves applied to cattle sores and also added along their food
11	<i>Lindernia ruellioides</i> (Colsm.) Pennell	Tha-suih	Scrophulariaceae	Herb	Whole plant	The whole plant is used as a poultice for cramps, rheumatism, sciatica and wounds
12	<i>Securinega virosa</i> (Roxb.ex wild.) Baill.	Saisiak	Euphorbiaceae	Shrub	Leaves	Decoction of the leaves used for bath in case of measles and chickenpox

of the state (Thapa et al. 2000, Tiwari 2000). Even though the villagers are not allowed to harvest timber from the community forest, there is a consideration in some crucial situation like in Hliappui village, where *Schima wallichii*, *Gmelina arborea* and other available trees were gathered more often from the community forest and used it for construction of a widow house which was permitted by the local leaders. Several initiatives have been taken by State governments, particularly in Northeast India, in order to better utilise these resources for improving the livelihoods of forest dependent people, as well as for environmental conservation. Although these wild plants for food and other available means are not consumed in large quantities but their role in rural communities cannot be ignored. It can help rural communities to improve their livelihood in an environmentally sustainable manner while harnessing the potential of the wild

fruits and other edible parts in a way that can meet both short and long term subsistence, economic and conservation needs (Rasul et al. 2008).

### Conclusion

The community forests under Champhai district are rich in natural resources and it supports the basic needs for the villagers. The wild vegetables like *Dysoxylum excelsum* and *Picria felterrae* may also be collected from wild and cultivated in their own land and home garden so as to give higher and lasting benefits. Unsustainable harvesting was observed from some of the harvesters and awareness is necessary to have a sense of ownership. Introducing a new strategy on the conservation or multiplication of the NTFPs in the community forest area will provide a better step which will be beneficial for all the villagers.

This will uplift the forest dwellers as well as provide more benefits for the society. Further research and development needs for the higher social benefits.

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