

Exploration of Non-Timber Forest Produces (NTFPs) used by the Mishing community in Sonitpur district of Assam, India

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Abstract

Non-timber Forest Produces (NTFPs) have attracted major global attention due to the significant role played in benefiting people and industries. It is a fact that most tribals and villagers who live in the fringe village mostly dependent on NTFPs as their source of livelihood. Sonitpur district of Assam hosts many tribes, among them Mishing is one of the prominent tribal community of the district. An assessment for NTFP used by Mishing community of Sonitpur district was undertaken during 2013-15. A survey was conducted along 20 Mishing villages and marketing areas in Sonitpur district to estimate the utilization of NTFPs by Mishing community. A total of 40 plant species under 25 family and 32 genera have been documented from the district. The different part of the plants and plant products associated with the livelihood of Mishing community indicates the dependency with NTFPs and their rich traditional and ethnobotanical knowledge.

Key words: NTFPs, Mishing community, Sonitpur, Assam

INTRODUCTION

Non-timber Forest Produces (NTFPs) are objects of biological origin, both plants and animals, derived from the forests and allied land, uses for subsistence and cash income by forest dwellers. NTFPs have long been harvested for subsistence and trade (Ticktin 2004). The World Health Organization report indicates that more than 80% of the population of South Asia uses plant-based medicines for maintaining and improving their health (Debbie 1998) and people have benefited from these plants for many generations.

It has been estimated that 25 percent of 6.2 billion world population are dependent on forest resources including plant and animal products (Iqbal 1993; Walter 2001). It is also estimated that about 60 million aboriginal people all over the world depend on the forest ecosystem for their livelihood (World Bank 2001). Tropical forests are considered to be important repositories of forest resources, especially NTFPs. Non-timber Forest Produces (NTFPs) have played a significant role in progressive growth in benefiting people and industries of a nation. An estimated 50 million economically marginalized forest dwellers in India harvest large quantities of NTFPs for their subsistence as well as for trade (Uma Shanker *et al.* 2004; Hegde *et al.* 1996). In a report it has been estimated that women forest dwellers alone collect products worth about 700 million US dollars annually (Pandey & Saini 2007). The

study on NTFPs has able to draw considerable attention throughout the country. At the same time the study of NTFPs in Assam shows negligible in comparison to other part of the India. Dattagupta *et al.* (2010, 2014) reported a study of NTFPs from Cachar district of Assam. To date, no systematic study has been carried out on potential utilization of NTFPs in Sonitpur district of Assam. No studies have been carried out related to ethnobotanical importance associated with Mishing community from this region. Therefore, an attempt has been made to carry out the exploration of NTFPs used by Mishing community in Sonitpur district of Assam.

Study Area

Sonitpur is the second largest district of Assam after Karbi Anglong, which spread over an area of 5324 sq km on the north bank of Brahmaputra river with a population about 19,24,110 (Anonymous 2011). The Sonitpur district lies between Longitude 92° 16' - 93° 43' East and Latitude 26° 30' - 27° 01' North and is bounded by Arunachal Pradesh in north, river Brahmaputra in south, Lakhimpur district in east and Darrang district in the west (Figure 1).

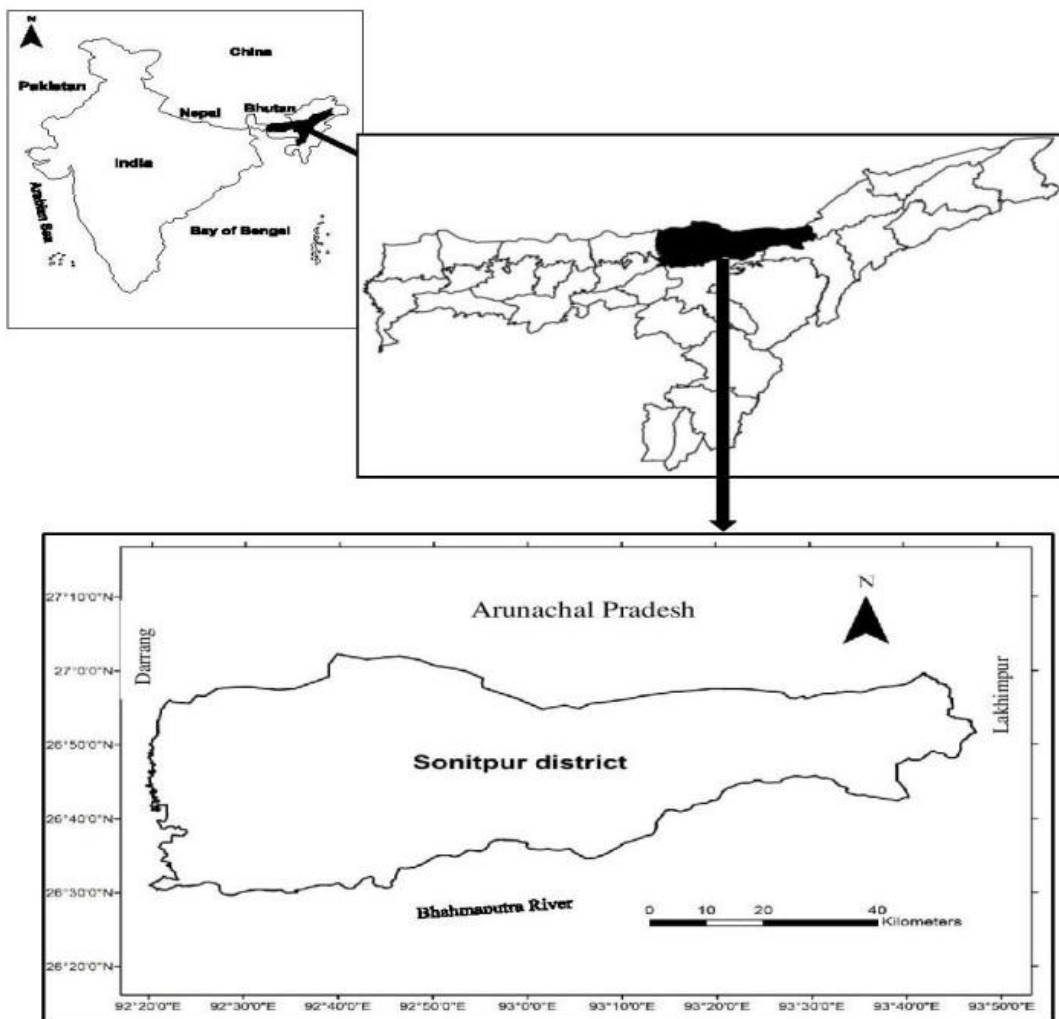


Figure 1. Map of the study area

The total forest area of Sonitpur is 1420 sq km comprising Nameri National Park (NNP); Burhachapori and Sonai Rupai Wildlife Sanctuaries (BWLS and SRWLS) and 11 Reserve Forests (RF) distributed in two broad divisions Sonitpur East and West. As per 2011 census (Anonymous 2011) data the tribal population of Sonitpur is about 2,32,207 belonging to different groups, among them Mishings, Bodos, Rabhas, Mechs, Nyishis, Garos, Adis, Mundas, Apatanis, and Lamas are some important tribal communities.

The Mishing community

The Mishing, an Indo-Mongoloid group formerly referred to as Miris, are the second largest ethnic group in Assam. With a population approaching nearly one million they are scattered over eight districts *viz.* Sonitpur, Tinsukia, Dibrugarh, Dhemaji, Lakhimpur, Sibsagar, Jorhat and Golaghat of the state. A typical Mishing village houses are made from wooden supports, stilted with a thatched roof on bamboo frame and has bamboo flooring. It is built on stilts to avoid floods during monsoon. The main source of livelihood for the Mising is agriculture. Villagers typically grow different varieties of paddy, some of which they sow in spring for harvesting in summer and others they transplant during the rainy season to harvest in the autumn. The Mishing peoples are highly dependent on plants for their livelihood activity. NTFPs are one of their major sources of income. They are very rich in their Traditional and Ethnobotanical Knowledge (TEK) which need to be explored and documented. That is why this community has been selected for the present study. Pork (*Egadin*), dry fish (*Namshing*), ethnic alcoholic beverage (*Aapong*) are some of the traditional foods of Mishing community. For preparing these foods they always use different plant species which are of medicinal value and are good for health.

METHODOLOGY

Extensive frequent field survey was carried out in different Mishing villages *viz.* *Dharikati, Khonamukh, Kathani, Rangajan, Rongajan miri, Baligaon, Sotaimiri, Toupamiri, Bamunipam, Bordikorai, Sikomgaon, Silenighat, Morikhuti, Bokagaon, Kekokoli, Tinighoria, Bhalukpong, Khonamukh, Chariduar, and Gudamghat* and markets nearby Mishing villages within Sonitpur district during 2013 – 2015.

During the field survey Mishing peoples were interviewed with the semi structured questionnaire in order to record the details of NTFPs used by them. The proforma of the questionnaire records vernacular names (*Mishing*) of plants, part used, purposes of uses, availability in local market, price, etc. An evaluation has been done for different life-forms *viz.* trees, shrubs, herbs and climbers (herbaceous). The prices of each items with quantity has also been recorded. Mounted Herbarium specimens of the collected plants were prepared following Jain and Rao (1977). Plants were identified matching the specimens at GUBH and also by consulting the Assam Flora (Kanjilal *et al.* 1934, 1938, 1939, 1940; Bor 1940). The prepared herbarium specimens were deposited in the Ecology and Biodiversity laboratory, Department of Environmental Science, Tezpur University, Assam, India.

RESULT AND DISCUSSION

In this paper, stress is given on the NTFPs used by the people of the Mishing community of Sonitpur district. During the survey a total of 20 Mishing villages and small rural markets in nearby villages were studied during 2013 – 2015.

During this study a total of 40 plant species were recorded which are used distinctly as NTFPs belonging to 32 genera under 25 families (Table 1; Figure 2). Among the 40 plants 16 species (40 %) were trees, 10 species were herbs (25 %), 9 species were shrubs (22 %), 3 climbers (8 %) and 2 species were tuberous plants (5%) (Figure 3). Out of these, 28 species are dicots under 23 genera belonging to 20 families and 12 species are monocotyledonous under 9 genera belonging to 5 families.

Table 1. List of recorded NTFP species used by Mishing community of Sonitpur, Assam [Abbreviations used: T - Tree; H - Herb; SH - Shrub; TC - Tuber Crop; CL - Climber]

Botanical name [Family]; Voucher specimen	Mishing name	Habit	Part used	Purpose	Local market value		Availability
					Qty.	Price (INR)	
Honey	<i>Tangud Allang / Mullang</i>			Medicine and jelly	500 ml	150	Seasonal
Silkworm Larvae	<i>Poluleta</i>			As food	1 kg	100-130	Seasonal
<i>Aegle marmelos</i> (Linnaeus) Correa [Rutaceae]; JS-234	<i>Bel</i>	T	Fruit	medicine/ Juice	1 pc	5	Mar-June
<i>Alocasia macrorrhiza</i> Schott [Araceae]; JS-226	<i>Kochu</i>	SH	Rhizome	vegetable	1kg	20	Whole year
<i>Alpinia malaccensis</i> (Bruman f.) Roscoe [Zingiberaceae]; JS-227	<i>Kamro ekkam</i>	SH	Inner part of young shoot	Vegetable	1 bundle	15	Whole year
<i>Alternanthera sessilis</i> (Linnaeus) R. Brown ex DC. [Amaranthaceae]; JS-228	<i>Morisha</i>	SH	Young leaf	Vegetable	1 bundle	10	Whole year
<i>Amaranthus spinosus</i> Linnaeus [Amaranthaceae]; JS-229	<i>Geyag</i>	SH	Leaf with stem	Vegetable	1 bundle	10	Whole year
<i>Amaranthus viridis</i> Linnaeus [Amaranthaceae]; JS-230	<i>Datha</i>	SH	Leaf with stem	Vegetable	1 bundle	10	Whole year
<i>Amorphophallus campanulatus</i> (Roxburgh) Blume [Araceae]; JS-254	<i>Ool</i>	TC	Leaf with stem and tuber	Vegetable	1 bundle	10-15	Whole year
<i>Baccaurea sapida</i> (Roxburgh) Muell.-Argoviensis [Euphorbiaceae]; JS-235	<i>Buri aaye</i>	T	Fruit	eaten directly	1 dozen	5-7	May- Oct
<i>Bambusa balcooa</i> Roxburgh [Poaceae]; JS/215	<i>Di-Bang</i>	H	Whole Calm:	House construction and other home Furniture	1 Calm	80	Whole year
<i>Bambusa nutans</i> Wallich ex Munro [Poaceae]; JS/216	<i>Ea/di-bang</i>	H	Young shoot	vegetable	1 shoot	25-35	Whole year
<i>Bambusa pallida</i> Munro [Poaceae]; JS/217	<i>Di-Bang</i>	H	Whole culm	House construction	1 calm	50-60	Whole year
<i>Bambusa tulda</i> Roxburgh [Poaceae]; JS/218	<i>Di-Bang</i>	H	Whole Calm	House construction and other home furniture	1 Calm	80	Whole year
<i>Boswellia serrata</i> Roxburgh ex Colebrook [Burseraceae]; JS/236	<i>Dhuna</i>	T	Bark/Resin	Smoking home and other area	1 kg	50-60	Whole year

Botanical name [Family]; Voucher specimen	Mishing name	Ha bit	Part used	Purpose	Local market value		Availabi lity
					Qty.	Price (INR)	
<i>Calamus floribundus</i> Griffith [Arecaceae]; JS/231	Jeying	SH	Whole culm	Binding house furniture etc.	1 cane	20-30	Whole year
<i>Centella asiatica</i> (Linnaeus) Urban [Apiaceae]; JS/219	Manimu ni	H	Whole plant	Medicine and vegetable	1 bundle	5	Whole year
<i>Citrus maxima</i> (J. Burman) Merrill [Rutaceae]; JS/237	Sinkin	T	Fruit	Eaten directly	1 fruit	5	May- Aug.
<i>Colocasia esculenta</i> (Linnaeus) Schott [Araceae]; JS/259	Enge	TC	Stem, leaf	Vegetable and medicine; Vegetable	1 bundle	10-12	Whole year
<i>Dillenia indica</i> Linnaeus [Dilleniaceae]; JS/238	Sampa	T	Fruit	Vegetable	1 pair	5-7	Whole year
<i>Dioscorea alata</i> Linnaeus [Dioscoreaceae]; JS/212	Nimti	CL	Tuberous root	Vegetable	1 kg	20-25	Whole year
<i>Diplazium esculentum</i> (Retzius) Swertz [Dryopteridaceae]; JS/220	Okang	H	Leaf blade	Vegetable	1 bundle	5	Whole year
<i>Elaeocarpus floribundus</i> Blume [Elaeocarpaceae]; JS/239	Omora	T	Fruit	Medicine / vegetable	1 kg	20	Apr- July
<i>Garcinia cowa</i> Roxburgh ex DC. [Clusiaceae]; JS/240	Thekera	T	Fruit	Eaten directly	fruit	10	Jul- Oct
<i>Garcinia paniculata</i> Roxburgh [Clusiaceae]; JS/241	Tepor tenga	T	Fruit	Eaten directly	1 fruit	10	Jul- Oct
<i>Justicia adhatoda</i> Linnaeus [Acanthaceae]; JS-225	Bahek phul	SH	Leaf	medicine	1 bundle	10	Whole year
<i>Lasia spinosa</i> (Linnaeus) Thwartes [Araceae]; JS/221	Sengmor a	H	Leaf	Medicine	1 bundle	10-15	Whole year
<i>Leucas aspera</i> (Willdenow) Link [Lamiaceae]; JS/222	Durum	H	Young leaf	Vegetable and medicine	1 bundle	5/bunc h	Whole year
<i>Mangifera indica</i> Linnaeus [Anacardiaceae]; JS/242	Aam	T	Fruit	Eaten directly	1 kg	30-35	May- Sep
<i>Murraya koenigii</i> (Linnaeus) Sprengel [Rutaceae]; JS/232	Narasing ha	SH	Tender leaf	Vegetable	1 bundle	5	Whole year
<i>Musa balbisiana</i> Colla [Musaceae]; JS/223	Vim-Kol	H	Fruit /Inflores cence	Vegetable /medicine	Fruit - 4pc Inflores cence- 1pc	20 10	Whole year
<i>Paederia foetida</i> Linnaeus [Rubiaceae]; JS/213	Bunka fore	CL	Young Leaf	Vegetable and medicine for stomach problem.	1 bundle	10	Whole year
<i>Phyllanthus acidus</i> (Linnaeus) Skeels [Phyllanthaceae]; JS/243	Pomlokh i/Pora – aamlokhi	T	Fruit	Eaten directly	1 kg	15-20	Sep - Nov
<i>Piper longum</i> Linnaeus [Piperaceae]; JS/214	Kola Jaluk	CL	Seed	Medicine / spice	100gm	20-30	Whole year
<i>Solanum americanum</i> P. Miller [Solanaceae]; JS/233	Bangko	SH	Fruit	Vegetable	250 gm	10	Whole year

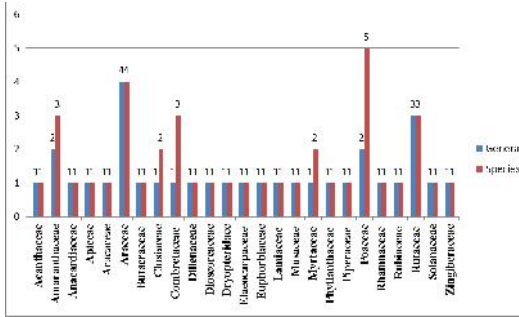


Figure 2. Number of species, genera and family recorded

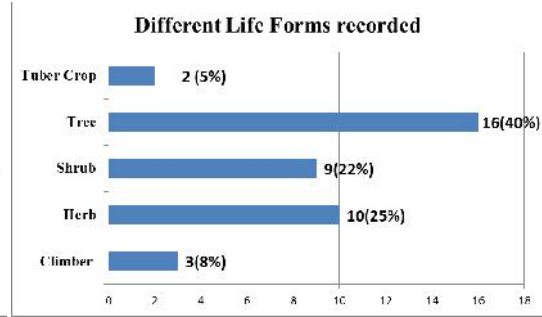


Figure 3. Number of species under life-forms and their percentage contribution

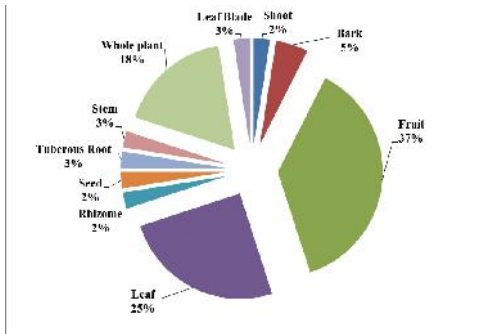


Figure 4. Percentage of plants part collected as NTFPs for marketing

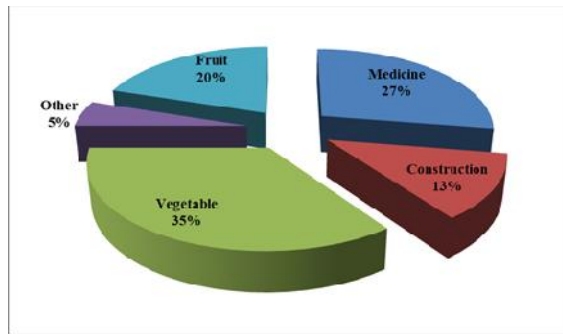


Figure 5. utilization of different NTFPs and its purpose



PLATE - I. NTFPs on sale in village markets: A. Silkworm larvae; B. Fruits of *Phyllanthus*

Botanical name [Family]; Voucher specimen	Mishing name	Ha bit	Part used	Purpose	Local market value		Availabi lity
					Qty.	Price (INR)	
<i>Syzygium cumini</i> (Linnaeus) Skeels [Myrtaceae]; JS/244	Jamun	T	Fruit	Eaten directly	1 kg	30-35	June-Sep
<i>Syzygium jambos</i> (Linnaeus) Alston [Myrtaceae]; JS/245	Jamun	T	Fruit	Eaten directly	1 kg	30-35	June-Sep
<i>Terminalia arjuna</i> (Roxburgh ex DC.) Wight & Arnott [Combretaceae]; JS/246	Arjun	T	Bark	Medicine	1 kg	20	Whole year
<i>Terminalia bellirica</i> (Gaertner) Roxburgh [Combretaceae]; JS/247	Bhomora	T	Fruit	Medicine	1 kg	20	Jul-Dec
<i>Terminalia chebula</i> Retzius [Combretaceae]; JS/248	Silikha	T	Fruit	Medicine	1 kg	30	Jul-Dec
<i>Thysanolenia latifolia</i> (Roxburgh ex Horneman) Honda [Poaceae]; JS/224	Kahuo	H	Whole plant	House roof making	1 bundle	50-60	Whole year
<i>Ziziphus jujuba</i> P.Miller [Rhamnaceae]; JS/251	Bon bogori	T	Fruit	Direct use	1 kg	10	Jan-April

Among the dicots, 3 species each of climbers and herbs (3 genera and 3 families); 6 species were shrubs (5 genera and 4 families) and 16 species were trees (12 genera and 11 families). Among monocots 7 species are herbs (4 genera and 3 family); 3 species are shrubs (3 genera and 3 family) and 2 species are of tuberous crops (2 genera and 1 family).

During the investigation 132 respondents were interviewed, they include 82 males and 50 females. Considering the age-groups, 48 respondents were of 32 – 45 years; 27 individuals of 46 – 55 years; 36 individuals of 56 – 65 years; 14 individuals of 66 – 75 years and only 7 individuals were 76 – 85 years old. Through the survey it has been estimated that majority of the NTFPs are collected and marketed by females. The different plant parts collected as NTFPs for different purpose are also recorded during the study. Fruits (37 %) were most extensively collected, followed by leaves (25 %), whole plant (18 %), bark (5 %), stem and tuberous roots (3 %) and seed, rhizome and shoot (2 %) as shown in Figure 4. Fruits, vegetables, construction materials are largely collected by the community from the surrounding forests and natural habitat. It has also been estimated that the highest number of species they collect to use as vegetable (35 %), followed by medicine (27 %), fruit (raw edible fruits) (20%), construction materials contribute about 13 % and other miscellaneous purpose contributes about 5 % of the total recorded species (Figure 5).

Apart from the plants, two other very important commercial NTFPs, viz. honey and silkworms, were also reported from the area. In village markets of Sonitpur district honey were selling at Rs.100/ for 500 ml and silk worm larvae at a price of Rs.120 – 130 for 1 kilogram (PLATE 1-A). *Phyllanthus acidus* is another commercially important NTFP largely marketed in this district (PLATE 1-B). From this study it is quite clear that the majority of the collectors and vendors were women (PLATE 1-C), which is very significant. The availability of NTFPs are also recorded and found that majority of the recorded NTFPs are available throughout the year and some are also seasonal.

CONCLUSION

Several studies reported that NTFPs plays significant role in the livelihood pattern of tribal community living in the adjacent areas of different forests (Johnson *et al.* 2013, Dattagupta *et al.* 2010, 2014). From the current study it is clear that the Mishing community living nearby forest areas are highly dependent upon the NTFPs for their sustenance. A considerable amount of NTFPs are being collected by the Mishing community for the local markets in the Sonitpur district. During the present study 42 NTFPs including two non-plant elements. It has been observed that the majority of the NTFPs were collected throughout the year and that is their major source of income. Through conversation with individuals of different age groups it has also been noticed that the traditional knowledge on the use of different NTFPs among the youth is decreasing very fast. Numbers of vendors also expressed that the forest resources are depleting day by day which signifies the exploitation of valuable forest resources is beyond the sustainable limit and is also ascribed to the loss of forest habitat due to several other anthropogenic activities.

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LITERATURE CITED

- Anonymous 2011. *District Census Handbook (Sonitpur)*. Directorate of Census Operations, Assam, Series-19, Part XII B.
- Bor, N.L. 1940. *Flora of Assam*, Vol. 5, Omsons Publications, New Delhi (reprint).
- Dattagupta, S.; Gupta, A. & Ghose, M. 2010. Non-Timber Forest Products of the Inner Line Reserve Forest, Cachar, Assam, India: dependency and usage pattern of forest-dwellers. *Assam Univ. J. Sci. Tech.: Biol. Environ. Sci.* 6 (1): 21 – 27.
- Dattagupta, S.; Gupta, A. & Ghose, M. 2014. Diversity of non-timber forest products in Cachar District, Assam, India. *J. For. Res.* 25(2): 463 – 470.
- Debbie, S. 1998. Risks or remedies? Safety aspects of herbal remedies in the UK. *J. Royl. Soc. Med.* 91: 294 – 296.
- Hegde, R.; Suryaprakash, S.; Achoth, L. & Bawa, K.S. 1996. Extraction of non-timber forest products in the forests of Biligiri Rangan Hills, India, 1: contribution to rural income. *Econ. Bot.* 50(3): 243 – 250.
- Iqbal, M. 1993. *International Trade in Non-Wood Forest Products: An Overview*. Food and Agriculture Organization, Rome, Italy.
- Jain, S.K. & Rao, R.R. 1977. *A handbook of field and herbarium methods*, Today and Tomorrow's printers and publishers, New Delhi.
- Johnson, T.S., Agarwal, R.K. & Agarwal, A. 2013. Non-timber forest products as a source of livelihood option for forest dwellers: role of society, herbal industries and government agencies. *Curr. Sc.* 104(4): 440-443.
- Kanjilal, U.N.; Kanjilal, P.C. & Das, A. 1934. *Flora of Assam*, Vol. 1, Omsons Publications, New Delhi (reprint).

- Kanjilal, U.N.; Kanjilal, P.C. & Das, A. 1938. *Flora of Assam*, Vol. 2, Omsons Publications, New Delhi (reprint).
- Kanjilal, U.N.; Kanjilal, P.C. & Das, A. 1940. *Flora of Assam*, Vol. 4, Omsons Publications, New Delhi (reprint).
- Kanjilal, U.N.; Kanjilal, P.C.; Das, A. & De, R.N. 1939. *Flora of Assam*, Vol. 3, Omsons Publications, New Delhi (reprint).
- Pandey, R.K. & Saini, S.K. 2007. Edible plants of tropical forests among tribal communities of Madhya Pradesh. *Indian J. Trad. Knowl.* 6 (1): 185 – 190.
- Ticktin, T. 2004. The ecological consequences of harvesting non-timber forest products. *J. Appl. Ecol.* 41(4): 11 – 21.
- Uma Shanker, R.; Ganeshaiyah, K.N.; Krishnan, S.; Ramya, R.; Meera, C.; Aravind, N.A.; Kumar, A.; Rao, D.; Vanaraj, G.; Ramachandra, J.; Gauthier, R.; Ghazoul, J.; Poole, N. & Chinnappa Reddy, B.V. 2004. Livelihood gain and ecological cost of non-timber forest product dependence: assessing the roles of dependence, ecological knowledge and market structure in three contrasting human and ecological settings in South India. *Environ. Conserv.* 31(3): 242 - 253.
- Walter, S. 2001. *Non-Wood Forest Products in Africa. A Regional and National overview. Les produits forestiers non ligneux en Afrique. Un aperçu régional et national.* Working Paper Document de Travail FOPW/Oll1. Food and Agriculture Organization, Forestry Department, Rome, Italy.
- World Bank 2001. *A Revised Forest Strategy for the World Bank Group.* (Draft). Washington D.C.