

# Perspectives of Tribal Communities on NTFP Resource Use in a Global Hotspot: Implications for Adaptive Management

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## Abstract

Tribal communities depend on a large variety of Non-timber forest products (NTFPs) for their diverse needs, which has attracted high interest in recent years in view of increasing rural incomes and stimulating the forest management. This study investigates forest dependent (NTFPs based) livelihood in an ethnically diverse area in Northeast India, a global hotspot. We addressed two research questions: (1) what is the diversity of NTFPs resources that communities extract from the forest reserves to supplement their home needs? and (2) what are the perceptions of communities about sustainable development of NTFPs resources? We recorded 343 plant species that were used to fulfill varied needs of five tribal communities. Of them, 32% species harvested for their leaves and 27% for fruits. Dependence on NTFPs was more at high mountains. The seasonal use of NTFPs revealed that 79% species collected during lean period. Community perception on use of NTFPs revealed that 11% species consumed most frequently and 53% commonly. It was interesting to note that community residents sell as many as 76 species in the local markets to earn cash. All households collect NTFPs for sustenance while 31-41% households involved in commercial collection of species, viz. *Taxus wallichiana*, *Aconitum fletcherianum*, *Ophiocordyceps sinensis*, *Swertia chirayita*, *Illicium griffithii*, and *Thalictrum*

*foliolosum*. There was a gradual decrease in use of NTFPs with young age because of high labour and availability of other options. The communities perceived that unscientific and excessive harvesting may threatened these species in near future. For adaptive management of NTFPs, communities suggested that capacity building on maximum allowable harvests and yield regulation measures, tenure improvement, domestication and plantations of selected species along with access to markets for NTFPs products will create better economic gains for communities at the same time it will lead to sustainable management of NTFPs.

**Keywords:** Northeast India; global hotspot; NTFPs; sustainable use; consumption pattern; enterprises; livelihoods; adaptive management

## 1. Introduction

Past two decades have witnessed a rapid increase of interest in non-timber forest products (NTFPs) mainly among conservationists and development-workers/ organizations (Ruiz-Pérez and Arnold 1996; Arnold and Ruiz-Pérez 1998). NTFP-enterprises are considered among the best approaches for conservation of biodiversity and enhancing livelihoods (Wollenberg and Ingles 1998; Neumann and Hirsch 2000). The perception that NTFPs are more accessible to rural populations and their exploitation more benign than timber harvesting has favored NTFPs becoming economically and ecologically most potential sector for development (Saxena and Farrington 2003, Saha and Sundriyal 2012). Worldwide several thousands NTFPs are collected from wild, most commonly for fuel, fodder, food items, medicine, spices, resin, gum, latex and fibre purposes (de Beer and McDermott 1989; Myers 1988; Kaburi and Medley 2011); over 150 NTFPs traded internationally (FAO 1997). The contribution of NTFPs to forestry sector in most countries is significant, though it is often undervalued (Philips 1993; Tiwari and Campbell 1995). The value of the herbal medicines alone estimated about \$14 billion that are mainly collected from wild (CBD 2001). The NTFPs are often the only source of income for rural communities, viz. the incense harvesters in Bolivia (Enriquez et al. 2006) and Amazonia (CBD 2001). In India over 500 million population dependent on them for their subsistence, which is one of the largest forest dependent populations in the world (World Watch Institute 1991; Hegde et al. 1996; Saigal et al. 2005). NTFPs provide nearly 40% of total forest revenue and 55% of forest based employment (Tewari and Campbell 1995, World Watch Institute 1991). There are enough

evidences to recognize contribution of NTFPs in livelihoods of rural people particularly in developing countries (IUCN 1989, Arnold and Ruiz-Pérez 1998; Saxena and Farrington 2003). It is suggested that NTFPs harvesting make relatively low impact on the forests than the timber harvesting (Neumann and Hirsch 2000), and they have potential to contribute to the conservation of forests through participatory management (Plotkin and Famolare 1992; Mayers and Bass 1998). A better understanding of the potential of NTFPs in the livelihood of communities and devising location specific strategies for their protection can lead sustainable development of biodiversity (Neumann and Hirsch 2000; Belcher et al. 2005).

Tribal mountain communities have been dependent on forest resources for their needs, besides they are also involved in forest management without destroying the resource base (Malhotra et al. 1991; Saigal et al. 2005). Dependence on NTFPs is an important survival strategy for tribal and other communities in the Himalaya and northeast India (Gangwar and Ramakrishnan 1989; 1990; Sundriyal et al. 2004). Nearly 1.6 million person years of employment in India were met from NTFP while the forestry sector in total provides 2.3 million person years of employment (Shiva and Mathur 1996). The North East India, a global hotspot of diversity, has over 33% of the total Indian flora; the region is inhabited by over 100 different tribal communities that intimately dependent on forest resources, particularly the NTFPs for their sustenance (Saha and Sundriyal 2010a). For sustainable management of NTFPs, we used a participatory approach to gain better understanding on NTFPs diversity being used by tribal communities and more importantly enrichment process that can contribute to the subsistence needs of communities living in northeast mountains. The study addressed selected research questions, viz., (1) what is the diversity of NTFPs resources that tribal mountain communities extract from the forest reserves and supplement in their home needs? and (2) what are the perceptions of community residents about use and sustainable development of NTFPs resources? To address the above said questions, a detail investigation was undertaken in an ethnically diverse mountain region in western Arunachal Pradesh that exhibited a rich socio-cultural tradition of using NTFPs (Saha 2009). It is expected that the said information on NTFPs would help to upgrade livelihood of the communities and promote conservation of species by devising appropriate and adaptive planning and management (Saha et al. 2006). The inferences of the study are global in nature for biodiversity rich sites to implement similar measures for NTFPs management in respective areas.

## 2. Methods

### 2.1 Study Area

The study area falls in Western part (West Kameng district) of Arunachal Pradesh state in Northeast India (26°54' to 28°01' N latitude and 91°30' to 92°40' E longitude) (Fig.1). The study area comprised mountainous terrains with an altitudinal variation of 200 to 7090 m above sea level. The region was once acclaimed to be the botanically richest sector in entire Northeast India because of the wide range of topographic variations and floral-migration from adjacent phyto-geographical zones (Kaul and Haridasan 1987; Sarmah 2005). Socio-culturally the region harbors an extremely diverse population of local tribes (viz. Aka, Bugun, Miji, Monpa and Sherdukpen); 94% population was rural that depends on the forest resources for their sustenance (Saha et al. 2006). The forests in the region change with elevations and mainly composed of tropical/sub-tropical evergreen forests up to an elevation of 900 m, subtropical pine forests between 900-1800 m, temperate broad-leaved and conifer forests between 1800 to 3000 m, sub-alpine forests between 3000-4000 m and alpine vegetation >4000 m (Kaul and Haridasan 1987). Among the tribal communities, Monpas and Sherdukpens were agriculturist communities and they practice settled cultivation, Monpas were yak grazers and fed their animals on alpine pastures, while Akas, Buguns and Mijis practice shifting agriculture. The altitudinal differences in the study area have resulted in wide variations in climatic conditions. More description of the study area is already available (Saha 2009, Saha and Sundriyal 2010a, 2010b, 2012).

### 2.2 Research Methods

For the purpose of generating detailed information on the NTFPs utilization pattern by the tribal communities, preliminary visits were made to different regions within the study area comprising different tribal villages. All five tribal communities were investigated for their NTFPs resource use pattern by randomly selecting two villages for each community with the help of tribal heads and village resource persons (Saha 2009). Thus a total of 10 villages were surveyed, two each for Monpa, Sherdukpen, Bugun, Aka and Miji tribes. These villages situated between 500 to 3000 m altitudes above sea level. In total 40-60% households in each village were investigated for generating information on NTFPs using standard methodology (Martin 1995; Jain 1995; Sundriyal et al. 2004). Extensive field visits and interviews schedules were arranged with village people to gather information on NTFPs and their use (viz. medicinal plants, wild edible plants, fodder, fuel, house construction materials, dye, resin, gum and various other utility products) by

different tribal communities. The information comprised local name of the species, plant habit and place of occurrence, plant part used, quantum of consumption, mode of collection and use, season of collection of the species, and community adaptability for using NTFPs. Efforts were also made to visit places of occurrence of the species to collect the samples which later on made into herbarium. All species were identified to genera and species with the help of Botanical Survey of India and State Forest Research Institute, Itanagar, Arunachal Pradesh. The herbariums and voucher specimens of each species were deposited in the Department of Ecology and Environmental Science, Assam University, Silchar as well as G.B. Pant Institute of Himalayan Environment and Development, North East Unit, Itanagar, Arunachal Pradesh. All species grouped into different use categories (vegetable, fruit, mushroom, pith, dyes, spices, medicinal plants, etc). Small group discussions and separate interview schedules were also arranged with selected key informants (those having high wisdom on NTFPs use) for assessing community attitude and preferences, and community perspective for adaptive management of NTFPs. Furthermore, community responses were also categorized as per gender preference for the use of NTFPs. The data were tabulated separately for response of different age groups as well as gender category. To assess community view point for sustainable management of NTFPs, a group discussion was arranged among participants of different tribes. They were asked to evaluate option from NTFPs along with the possible threats, and strategy for adaptive management as per their own perspective. Accordingly community perspective was tabulated separately for subsistence and commercial NTFPs. Further details on methodology are available with Saha (2009) and can be met from authors on request.

### *2.3 Data analysis*

Simple statistical procedure was applied for testing differences in household and village responses to NTFPs data inventory, and number of species used. The use variation and intensity of diverse NTFPs category were calculated with respect to the diversity of plant at family, genus and species level. The altitudinal distribution of the NTFPs with respect to parts used as well as the specific tribe who use these NTFPs were calculated and presented in percentage. As the data gathered for the pattern of species availability, collection, variation in utility, altitudinal and seasonal adaptability of species use, community attitude and preferences, and community perspective for adaptive management was qualitative, transcribed texts of interviews, group discussions, and key informants' discussions were collectively analyzed with direct field

observations and were ethnographically evaluated in order to interpret people's underlying thoughts about forest & NTFPs resources and their management (Martin 1995).

### 3. Results

#### 3.1 Diversity of NTFPs in use

The investigation revealed that the five tribal communities use as many as 343 plant species (varying from 254 genus and 133 families) as food, medicine, beverages, fish-poisoning, dyes, oil, firewood, fodder and other purposes (Table 1) (detail list of species is provided in Appendix I). The communities used Maximum number of species were for medicinal purpose (48%), followed by edible fruits (22%) and vegetable (19%) (Table 1). Monpa used 67%, Akas 53%, Mijis 47%, Sherdukpens 47% and Buguns 45% of all screened plant species. Most commonly used species were shoots of *Arundinaria racemosa*, tender leaves and shoots of *Oenanthe javanica*, *Diplazium esculentum*, underground tubers of *Dioscorea bulbifera*, fruits of *Actinidia callosa*, *Cornus capitata*, *Diospyros peregrina*, *Holboellia latifolia*, *Persea fructifera*, *Pyrus pashia*, vegetable mushroom from *Auricularia auricular-judae*, *Hericium erinaceus*, *Boletus edulis*, spices from *Zanthoxylum armatum*, *Illicium griffithii*, *Litsea citrata*, seed oil of *Rhus hookeri*, leaf-beverage of *Acer pectinatum*, and fermented drinks from *Elaeagnus parviflora*, *Eleusine coracana* and *Cornus capitata*. Akas and Mijis showed high affinity for NTFPs use. Akas and Buguns prefer new shoots, leaves, underground tubers and floral bud of many species as vegetables. There was also fair affinity of species use by Buguns with both Monpas and Akas. Use of protein rich algae *Prasiola crispa* as vegetable was found confined to Monpa and Sherdukpens only. Sherdukpens collect a lichen *Ramalina himalayensis* and use it as vegetable after boiling and air drying. Besides, extraction of starch from the pith of *Wallichia densiflora* (a palm) was confined among Aka, Miji and Bugun. All communities had rich traditional knowledge regarding use of medicinal plants and they collected 163 species for this purpose, the number varying between 57-118 species among different tribes (Table 1).

Tribal houses were made up of bamboo and cane. A total of sixteen species were collected for construction of house and seven for thatching purpose. Nine species collected for furniture and handicraft works. *Arundinaria maling* and *Bambusa pallida* were most preferred in house construction while *Quercus* sp. and *Illicium griffithii* for poles and beams. More than one NTFPs item from a single species were found harvested from selected species, viz., *Myrica esculenta*, *Calamus tenues*, *Quercus lamellosa*. Firewood was the only source of energy that was

collected from the surrounding forests and a total of 18 species were preferred that comprised *Quercus griffithii*, *Quercus lanata*, *Rhododendron arboretum*, *Lyonia ovalifolia*, *Exbucklandia populnea*, *Castanopsis tribuloides* and *Corylopsis himalayana* (Table 1). Communities also preferred 22 species as fodder comprising *Bauhinia variegata*, *Spondias axillaris*, *Callicarpa arborea*, *Phrynium pubinerve*, *Manihot esculenta*, *Thysanolaena maxima*, *Musa velutina* and *Syzygium aborensis* (Table 1). Many other NTFPs were also used as dyes, spices, paper and pulp, gum and resin, incense, oil, aesthetics, drinks and beverages, and for making agricultural tools (Table 1). *Rubia cordifolia*, *Engelhardia spicata*, *Juglans regia*, *Illicium griffithii* and *Terminalia citrina* preferred for dyes, *Daphne papyracea* for hand made paper, *Aconitum fletcherianum* for arrow poison and against cattle diarrhea, *Rhus hookeri* for extraction of vegetable oil, *Valeriana jatamansii* and *Juniperus recurva* as incense, and *Gymnocladus assamicus* for detergent as well as religious use. Use of such large number of species for different purposes exhibits high community indigenous knowledge about local plant resources (Appendix I).

The communities were highly adaptive to use NTFPs at all altitudes. Nearly 24% NTFPs were distributed at low-hill mountains (<900), 33% at mid-hill mountains (901-2000 m), and 43% at upper-hill mountains (>2001 m). The species collected for different plant parts; 32% harvested for their leaves, 27% for fruits, while 14% for seeds, 11% for roots, 11% stems and 9% for bark collection. Other used plants parts were flowers, fruiting body, young shoots, tubers, rhizomes and culms (Fig. 2). The quantum of NTFPs use increased with increase in elevation showing high dependence on wild plants resources at high-hills. The communities were highly skilled to use species in different seasons. A total of 30 species were harvested during dry, 43 species during wet, and 270 species collected during extended (lean) season. The communities most 'frequently used' 11% species and all efforts were made to collect them from forest areas. 53% species were 'commonly used' and communities had definite preference for such species. Number of NTFPs in 'occasionally used' category, which was demanded at scarcity times, was also high (Table 2). 76 species were sold in local markets, viz. *Clerodendron colebrookianum*, *Dendrocalamus hamiltonii*, *Dioscorea bulbifera*, *Diplazium esculentum*, *Houttuynia cordata*, *Litsea citrata*, *Pleurotus sajor-caju*, *Diospyros peregrina* and *Zanthoxylum armatum*. Besides, *Illicium griffithii*, *Aconitum fletcherianum*, *Clerodendrum colebrookianum*, *Swertia chirayita*, *Ophiocordyceps sinensis*, *Picrorhiza kurrooa*, *Dendrobium nobile* and *Artemisia nilagirica* were harvested on commercial scale.

### 3.2 *Quantum of NTFPs collection*

The collection pattern of NTFPs also varied among households and communities. All households were engaged in collection of bamboo, cane and firewood and vegetables. Contrarily use of thatch material was low (Table 3). For collection of commercial species 41% households were engaged for *Rubia cordifolia*, 31% for *Swertia chirayita*, 30% for *Illicium griffithii* and 30% for honey (Table 3). The communities manage and protect selected species because of their socioeconomic-cultural values (Table 4). *Gymnocladus assamicus* and *Oroxylum indicum* were conserved for their cultural value, *Wallichia densiflora*, *Angiopteris evecta* and *Cyathea gigantean* for their traditional food values. In recent times *Taxus wallichia*, *Panax bipinnatifidum*, *Aquilaria malaccensis* and *Illicium griffithii* were being domesticated because of their economic value. It was recorded that the communities have taken some traditional conservation actions for nearly 39 plant species using customary measures (Table 4).

### 3.4 *Community perspectives for adaptive management of NTFPs*

The community perspective varied for management for subsistence and commercial NTFPs. The communities clearly identify best options, possible threats and feasible adaptive management strategy for the sustainable development of NTFPs (Table 5). Number of species used for subsistence needs was much diverse and communities clearly perceived that high quantum of collection, habitat fragmentation and degradation, proliferation of invasive species and forest fires were important threats for these species. It was suggested that an increased control of community on forests, improving tenure and logging rules, promotion of conservation ethics, use of traditional knowledge in management of NTFPs, plantation of mix species in forest gaps, and easy access to planting material of suitable species could help to improve status of threatened species in forests (Table 5). Recognition of customary laws for management of plant resources was considered important by the communities. Selected species were harvested commercially (Table 5). The perceived threats for these species were high volume and unscientific collection, excessive lopping of branches of tree species, maximum collection per unit labor to gain maximum profits, and least considerations for sustainable use of species (Table 5). They desired proper awareness, knowledge sharing and capacity building on allowable harvest levels using the means of productive forestry for yield regulations to improve status of commercial species in forests. For this purpose appropriate tenure improvement could play a significant role. A concern was also shown for a shift from quality to quantity of NTFPs due to high commercial demand



which need to be regulated by adopting a reverse order. It was largely desired that if plantations of prioritized species could be promoted through domestication trials, selected species can be accommodated in traditional agroforestry systems. The residents also articulated for easy availability of markets for selling of NTFPs products. There was a common consensus that if some of these suggestions are implemented it will not only help to sustainably use the NTFPs resources but also increase local income and measures to mitigate the negative effect of climate change.

#### **4. Discussion**

The present study explored diversity of NTFPs extracted to supplement home needs along with the perceptions about sustainable management of NTFPs resources used by tribal communities in northeast India, a global hotspot. The study illustrated use of high genetic diversity (343 plant species) for meeting various needs, viz. food, medicine, firewood, fodder, beverages, dye, oil, fish-poisoning and various other needs. Most species were used at high-and mid-hill mountains, mainly in the forms of edible fruits, vegetables and herbal medicines. Dependence on large number of NTFPs at high mountains exhibited strong adaptations and survival strategy for local communities so as to judiciously use local plant resources (Sundriyal and Sundriyal 2001). Communities mostly use medicinal plants and they have their own system to cure various diseases, which exhibits high indigenous knowledge about plant resources. These communities also use species covering different seasons throughout the year particularly during lean period. The study explained that the residents possess huge knowledge about NTFPs resources; they have intimate relationship with the forests, which is true for other biodiversity rich areas as well (Martin 1995, FAO 2001). It is understood that if there are more diverse species and available products meeting a particular type of need, the more secure the services for communities to contribute to stability, security and risk reduction with relation to altitude, season and lean period; at the same time it also acts as a buffer to mitigate outside interference and encroachment to protect forest and wild habitats in long run. Contrarily, if the choice of species is limited to just few, it will adversely impact livelihood as well as biodiversity. Of the total species screened, 76 species (22% of all screened species) were sold in local markets thus brings income to marginal families. Several NTFPs were also used as a source of income and commonly traded outside the state. Similar report is available for Sikkim Himalaya where 24% of all wild edible species sold and consumed in large quantities (Sundriyal et al. 2004). However, the collection procedures for

a few NTFPs were destructive by using lopping and felling of branches, which should be amended. The unabated and unscientific collection may lead to the depletion of valuable forest gene bank in near future (Philips 1993, Saha and Sundriyal 2012). Fortunately the communities have realized the importance of selected NTFPs and they were managing them using their customary laws, which should be appreciated and further promoted.

The NTFPs management must be viewed as an important opportunity for increasing community livelihood option as well as biodiversity conservation, and such an approach will have more community patronage (Tiwari and Campbell 1995, Belcher et al. 2005). Harvesting of NTFPs usually has lower impacts on the forest ecosystem than timber harvesting, can provide an array of social and economic benefits, particularly to community operations, and can therefore be an important component of forest ecosystem management (FSC, 2002; Mayers, 1988). It is suggested that the best feasible option for the region is to adopt the increased utilization of NTFP species using an interdisciplinary approach by combining genetic and social concerns for conservation and utilization especially with relation to commercial species. Community mobilization for domestication of selected species can provide a better conservation of gene pool of species. There is a greater need to widespread more awareness about use and conservation of NTFPs among the communities. Local residents need to be trained for forest management with proper harvesting regimes of NTFPs, and added regeneration could be promoted for selected species. Many NTFPs, particularly edible species, may also serve the purpose of important gene pool for amending genetic constitution of agricultural and horticultural species (Sundriyal and Sundriyal 2001).

#### *Implications for adaptive management*

NTFPs form an integral component of rural livelihood and forest management thus could guide sustainable development of forest resources (Lawrance 2003). For sustained use and conservation of NTFPs, a large number of issues linking social, economic, cultural, ecological and policy concerns need to be addressed simultaneously. For resource-poor and socio-culturally distinct tribal communities maintenance of diversity in subsistence economy is often part of an adaptive strategy to cope up with the heterogeneous and varied ecological environment. Therefore the increased utilization approach can be applied for selected species that are in high demand in trade or utility. Also there is a need to shift from quantity to quality that can be done by developing

appropriate policies, improve upon tenure reforms of communities, technological advancement and change in extension activities (Belcher et al. 2005). There are however, many policy and institutional challenges. There is a need to improve status of many subsistence species so as to maximize their contribution in rural livelihood and biodiversity conservation. For this purpose domestication of selected species could be advantageous, for which most widely used species be targeted to improve yield and product quality. Prioritizations of species need to be done in such a way that it brings social accord, equality and environmental restoration (Koziell and Saunders, 2001). The best possible adaptive management for NTFPs is to link policies and practice. In northeast India NTFPs are considered free access material and focus of forest management is more for timber rather than NTFPs. Furthermore there is less emphasis on socio-economic gains and use of local species in forest management plans, rather more attention is paid to commercial species that are often alien species. It must be clearly understood that a low level of subsistence need must not pose threat to the biodiversity and isolation of local communities needs for mere conservation needs may lead to conflicts. A participatory mechanism is needed to be established for NTFPs management by bringing together all the stakeholders. Since all households use a wide diversity of NTFPs, they are sensitive for their regular and sustained supply. There is a need of cohesive approach in adopting traditional harvesting technique and scientifically established method of harvesting regime. Therefore strong community participation is expected in NTFPs management programmes. There is a strong need to incorporate NTFPs in forest working plans for long term management of forest areas. Moreover the residents can easily identify options, threats and possible adaptive management strategies for local species in demand, which can help to develop an effective in-field management plan. Their perception for extraction and enrichment practices can directly boost a sustained NTFPs management work plan. Community demands, rights and tenures from forests are need to be given due considerations. Furthermore improvement of organizational capacity of communities for decision making and running forest based enterprise, and equitable benefit sharing will help to sustainably manage NTFPs resources. A combined effort of communities with line departments (such as Forest department) can lead to produce best feasible approach for NTFPs management and livelihood upgradation along with biodiversity conservation across the complex and diverse but integrated mountain landscapes of global significance. Since there are cases that have proved NTFPs are more profitable and

sustainable than timbers, perhaps similar approach can also work in Northeast India to upgrade rural livelihood and forest management.

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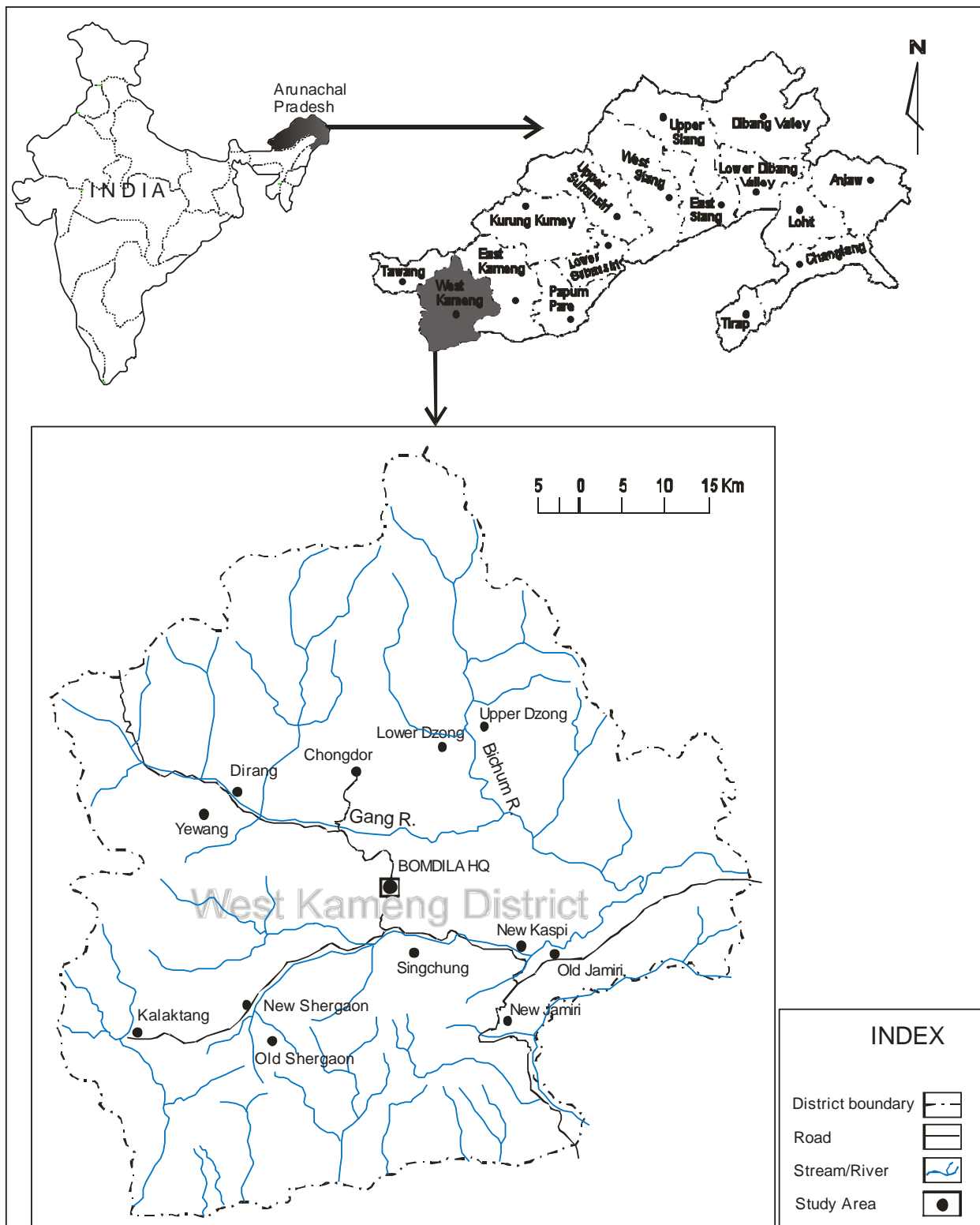
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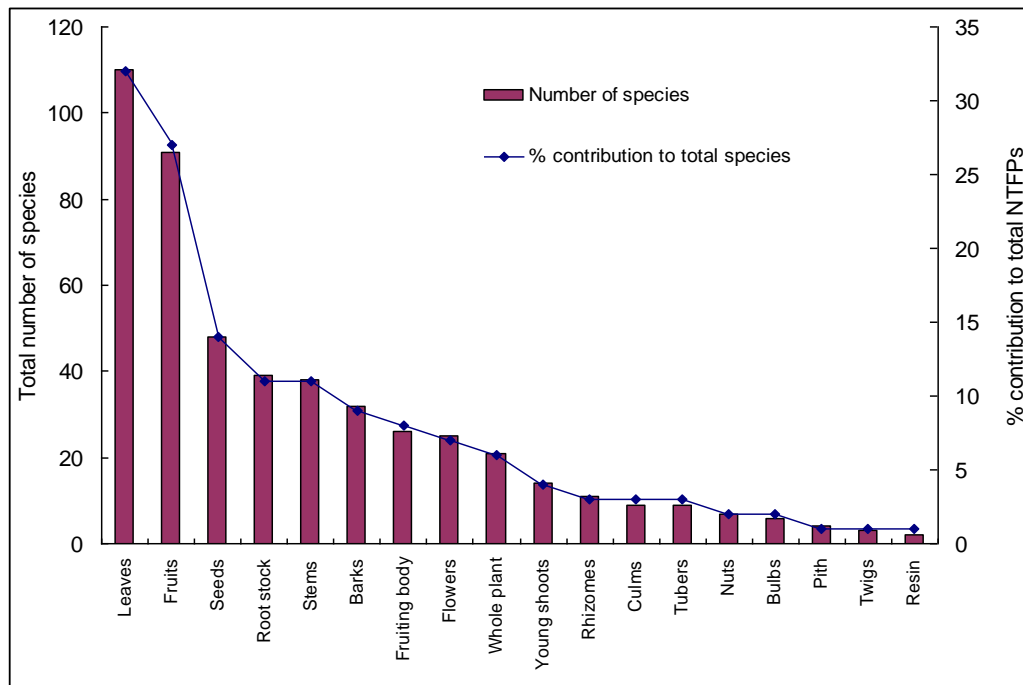
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**Fig. 1.** Map of the study sites in Western Arunachal Pradesh, Northeast India





**Fig. 2.** Total number of species and their plant parts used in study area

**Table 1.** Non-timber forest products (NTFPs) categories and diversity utilized by different tribal mountain communities in Northeast India (values are total number of species used, please see Appendix I for details of the species)

Species used*	Total no. of species used					Total species
	Aka	Bugun	Miji	Monpa	Sherdu-kpen	
<b>Plant origin:</b>						
Medicinal plants	68	57	59	118	70	163
Wild fruits	38	24	32	52	33	75
Wild vegetables	46	36	40	37	29	65
Fodder	17	16	17	10	7	22
Dye and colour fixer	10	7	8	15	7	20
Edible mushrooms	9	14	10	14	10	18
Fuel wood	5	10	7	16	15	18
House construction, fencing	10	8	9	13	11	16
Aesthetic or ornamental	7	7	6	6	4	14
Agricultural tools	7	6	6	8	5	14
Spices and condiments	8	5	7	9	7	13
Gum, resin and tannin	10	5	8	6	5	13
Others	5	5	4	8	8	12
Hunting and piscicide	10	7	9	7	4	11
Local drink and beverages	3	2	2	10	6	11
Incense and aroma	4	5	4	8	8	10
Furniture and handicraft	7	5	6	5	5	9
Thatching	6	6	6	2	2	7
Oil yielding	3	5	3	6	6	7
Edible pith/ flowers	3	4	3	3	3	5
Paper, pulp and fibre	3	4	3	3	2	4
Masticator	4	1	3	1	1	4
Millets and seeds	1	2	2	3	3	3
Total	177	156	157	234	159	343

**Table 2.** Community perception for use of NTFPs in Northeast mountains

<b>Use Pattern</b>	<b>No. of Plant species</b>	<b>% of total species</b>
Frequently used	38	11
Commonly used	182	53
Occasional used	123	36
<b>Total</b>	<b>343</b>	<b>100</b>

**Table 3.** Community involvement and quantum of NTFPs collection for household consumption and commercial use in Northeast mountains.

Use category	Collection level	
	% Households involved	Kg/HH/Year
<b>NTFPs of Commercial use:</b>		
<i>Aconitum fletcherianum</i> Taylor	1.4	3 ±1
<i>Calamus</i> sp.	12.59	79 ±17
<i>Cinnamomum caudatum</i> Nees	27.27	20 ±7
<i>Cordyceps sinensis</i> (Berk) Sacc	2.10	0.17 ±0.05
<i>Everniastrum cirrhatum</i> (Fr.) Hale	5.59	15 ±10
<i>Illicium griffithii</i> Hk.. f. & Th	30.07	93 ±14
<i>Litsea sebifera</i> Pers	3.5	173 ±9
<i>Myrica esculenta</i> Buch.- Ham	9.79	73 ±18
<i>Persea globosa</i> (A.Das) Kosterm	8.39	166 ±60
<i>Picrorhiza kurrooa</i> Benth.	1.4	31 ±11
<i>Pinus Roxb.urghii</i> Sargent	8.39	1076 ±669
<i>Rubia cordifolia</i> Linn.	40.56	181 ±69
<i>Swertia chirayita</i> (Roxb. ex Fleming) Karsten	30.77	14 ±9
<i>Taxus wallichiana</i> (Zucc.)Pilger	4.2	135 ±99
<i>Thalictrum foliolosum</i> DC.	1.4	6 ±1
<i>Valeriana jatamansii</i> Jones	6.29	25 ±2
<b>NTFPs for household consumption:</b>		
Fuel wood	100	3720 ± 1447
Bamboo	100	53 ±12
Cane	100	80 ±29
Cane leaf	1.39	69 ±11
<i>Imperata cylindrica</i>	8.39	63 ±22
Banana leaf	2.1	203 ±87
Leafy vegetable	100	30 ±6
Bamboo shoot	100	17 ±4
Fermented bamboo	100	0.5 ±0.2
Mushroom	100	5 ±0.6
Tubers/bulbs/ flower buds	100	23 ±3
Honey	30.06	0.4 ±0.2
Bushmeat	100	9.68 ±2.9

1 kap= 72 m; HH= Household;

\* includes the yearly royalty given to the village council for pine resin

**Table 4.** Community preference of species for cultural, market and conservation needs

Scientific name	Vernacular name	Cultural and conservation aspects	Conservation technique
<i>Amomum maximum</i> Roxb.	Borong elaichi	Economic	b
<i>Angiopteris evecta</i> (Forst) Hoffm	Taba	Traditional famine food	a, b, c
<i>Aquilaria malaccensis</i> Lamk.	Sachi	Commercial	b
<i>Citrus medica</i> L.	Tsaloo sheng	Traditional fruit	b
<i>Clerodendrum colebrookianum</i> Walp	Kangjila	Traditional food, medicine	b
<i>Colocasia esculenta</i> Schott	Niyang- leng/	Famine food	b
<i>Cornus capitata</i> Wall	Shyamrun gma	Traditional fruit, commercial	a, c
<i>Cyathea gigantea</i> (wall ex Hook.)	Tache	Traditional food, commercial	a
<i>Cymbidium alloifolium</i> (L.) Sw.	Momdang	Cultural , aesthetic	b
<i>Cyphomandra betacea</i> (Cav)	Khalangji	Vegetable	b
<i>Dendrobium densiflorum</i> Lindl.	Momdang	Religio-cultural, medicinal	b
<i>Diospyros peregrina</i> (Gaertn.) Gurke	Legalomah	Traditional fruit, commercial	a, c
<i>Dioscorea bulbifera</i> Linn.	Niyekshi	Food, commercial	b
<i>Elaeagnus pyriformis</i> Hk.f.	Manjlay mlang	Traditional fruit	a
<i>Perilla frutescens</i> L	Nam	Spice, medicinal	b
<i>Fagopyrum esculentum</i> Moench	Fapar	Traditional food	b
<i>Ficus hirta</i> Vahl	Nuphru - gubo	Traditional fruit	a, b
<i>Gymnocladus assamicus</i> P.C. Kanjilal	Myangman ba se	Religio-cultural	a, b, c
<i>Houttuynia cordata</i> Thunb	Madring	Vegetable, Commercial	b
<i>Illicium griffithii</i> Hk.. f. & Th	Lissi	Commercial	a, b, c
<i>Juglans regia</i> Linn.	Khe	Traditional fruit	a
<i>Juniperus recurva</i> Buch-Ham. Ex D.Don	Shukpa	Religio-cultural, incense	a
<i>Litsea citrata</i> Blume	Niyeng	Traditional spice	a, b, c

<i>Malus sikkimensis</i> (Wenz.) Koehne ex C. K. Schneid	Thung	Traditional fruit	b
<i>Manihot esculenta</i> Crantz	Simal alu	Femine food	b
<i>Myrica esculenta</i> Buch.-Ham	Zen sheng	Traditional fruit; medicine	a, c
<i>Oroxylum indicum</i> Vent	Namkaling	Religio-cultural; medicine	a
<i>Panax bipinnatifidum</i> Seem	Gunamanc hung	Commercial	b
<i>Phoebe lanceolata</i> (Nees.) Nees	Sanchar	Traditional fruit, commercial	a, c
<i>Prunus persica</i> Benth. & Hk. f	Aru	Traditional fruit	b
<i>Pyrus pashia</i> Buch. Ham. ex D. Don	Lugrang	Traditional fruit	a, b
<i>Solanum torvum</i> Swartz	Khalangjin g	Vegetable, commercial	a, b
<i>Spilanthes paniculata</i> Wall	Sikia pan	Leafy vegetable, commercial	b
<i>Spondias axillaries</i> Roxb.	Lapsi	Traditional fruit	a
<i>Swertia chirayita</i> (Roxb. ex Fleming) Karsten	Pangduk man	Economic, medicine	b
<i>Taxus wallichiana</i> (Zucc.) Pilger	Kitangma	Economic purpose	b
<i>Wallichia densiflora</i> Mart	Niyuk	Famine food ; cultural	a, b, c
<i>Zanthoxylum armatum</i> DC	Khagi	Traditional spice, commercial	a, b, c
<i>Zanthoxylum oxyphyllum</i> Edge	Yer	Traditional spice, commercial	a, b, c

a - *in-situ* conservation; b - *ex-situ* conservation through cultivation/rearing; c – management through traditional sustainable harvest technique

**Table 5.** Community perceptions about use, adoptive management and sustainable development of NTFPs in Northeast India

NTFPs use	Available options	Threats	Strategy for adoptive management and sustainable development
<b>NTFPs of subsistence needs</b>	Fuelwood, bamboo culms, cane twine, leafy vegetables & mushroom, bamboo shoot, tubers/ bulbs/ flower buds, and thatch leaves	Intense local use, unsustainable collection, excessive lopping, deforestation, habitat fragmentation and degradation, invasive species, forest-fires	More community control on forests, improved tenure, improved logging rules, recognition of community conservation ethics, traditional knowledge management, mix species plantation, availability of planting material, area specific management plans
<b>NTFPs of Commercial use</b>	<i>Cordyceps sinensis</i> , <i>Aconitum fletcherianum</i> , <i>Picrorhiza kurrooa</i> , <i>Valeriana jatamansii</i> , <i>Swertia chirayita</i> , <i>Illicium griffithii</i> , <i>Cinnamomum caudatum</i> , <i>Calamus</i> sp., <i>Myrica esculenta</i> , <i>Persea globosa</i> , <i>Pinus roxburghii</i> , <i>Taxus wallichiana</i> , <i>Litsea sebifera</i> , <i>Thalictrum foliolosum</i> , <i>Rubia cordifolia</i>	Excessive and unsustainable harvesting, lopping, habitat degradation, forest thefts, lack of ecological know-how, lack of community control, forest fires, climate change	Alloable harvest, yield regulations, biodiversity information system, shift from quantity to quality, availability of markets, sustainable harvest protocols, domestication trails, development of protocol of species, plantations, management plans for species, promotion of productive forestry

**Appendix I.** List of NTFPs of plant origin, their habit, occurrence, plant part collected and uses preferences

	Name of the species	Family	Common name	Plant Habits	Occurrence ( m msl)	Plant part collected	Uses
1	<i>Abroma augusta</i> (L.) L.f.	Sterculiaceae	M:Dieng tyrkhum As: Bon kopahi	S	200- 900	Root, leaf, seed	Used in urinary problem, diabetes, problem in function of heart, stem fibre used as substitute of jute
2	<i>Acer pectinatum</i> Wall. ex G. Nicholson	Aceraceae	M: Khubilam shing	T	2100-3300	Leaf	Substitute of tea leaves
3	<i>Aconitum fletcherianum</i> Taylor	Ranunculaceae	Mj: Napang M: Chanduk / Ngyeng	H	3000-5000	Root	Respiratory tract infection, rheumatism and as poison for hunting
4	<i>Acorus calamus</i> L.	Araceae	M: Jingka che /Suta / Boch	H	2000-2050	Rhizome oil, leaf,	Fragrance, tuberculosis, cattle skin diseases
5	<i>Actinidia callosa</i> Lindl.	Actinidiaceae	M. Khosu-gong	W-c	1800-2800	Fruit	Wild fruit
6	<i>Aerides odorata</i> Lour.	Orchidaceae	As: Kopoful M: Momdang	E	250-900	Fruit, Leaf	Healing wound, boil
7	<i>Agaricus</i> sp.	Agaricaceae	M: Yachara / Indeng tatar	P	1500- 2000	Fruiting body	Vegetable
8	<i>Agrimonia pilosa</i> Ledeb.	Rosaceae	M: Lymiong tynning	H	1500-2500	Leaf	Astringent & health tonic
9	<i>Agrocybe cylindracea</i> (DCex Fr) Maire	Bolbitiaceae	M: Mulang bamu B: Mujee	P	1200- 1500	Fruiting body	Vegetable
10	<i>Albizia lebbbeck</i> (L.) Benth.	Mimosaceae	M. Dieng-sah-rin	T	700-2100	Leaves	Eye infection and leafy vegetable
11	<i>Alnus nepalensis</i> D. Don	Betulaceae	S: Khar sing M: Gong-shing	T	2000-2500	Stem, Branch	Fuel wood, agricultural tools
12	<i>Alpinia malaccensis</i>	Zingiberaceae	M: Khumpi -	H	Up to 1200	Flower, fruit,	Ornamental plant,



13	(Burm.f.)Rosc. <i>Alstonia nerifolia</i> D. Don	Apocynaceae	young –young Np: Chatiwan	T	1800-2200	pith Stem, Branch	fruit, vegetable Fuel wood
14	<i>Amanita</i> sp.	Amanitaceae	M: Lenchong Bamu	P	200-800	Fruiting body	Vegetable
15	<i>Amaranthus spinosus</i> L.	Amaranthaceae	As. Khutura/ Kanta notya	H	250-1000	Leaf and twig	Leafy vegetable/ young shoot
16	<i>Amblyanthus glandulosus</i> (Roxb.) DC	Primulaceae	M: Pakang menti	S	1800-2000	Leaves and seeds	Blood purifier
17	<i>Amomum dealbatum</i> Roxb.	Zingiberaceae	Mj, Ak: Khree / Bokolok/ Jakkar Np: Chu-rumpha	H	Up to 1200	Flower bud, Capsule	Vegetable, fruits, spice, mouth freshner
18	<i>Amomum maximum</i> Roxb.	Zingiberaceae	M: Borong elaichi	H	250-1500	Fruits	Spice
19	<i>Anaphalis contorta</i> (D Don) Hk f	Asteraceae	M: Mon sheng	H	200-1500	Flower and leaves	Appendicitis, blood cloting
20	<i>Anthogonium gracile</i> Wall ex Lindl.	Orchidaceae	M: Momdang	H	1600-2200	Whole plant	Aesthetic/ ornamental
21	<i>Aphanamixis chittagonga</i> (Miq.) Haridasan & R.R. Rao	Meliaceae	Ni: Gangru changne As: Samphal	T	900-1200	Seed oil, bark	Laxative, anthelmintic, livers and spleen disease
22	<i>Aquilaria malaccensis</i> Lam.	Thymelaeaceae	Np: Sachi, As. Agar	T	200-900	Wood oil	Medicine, fragrance, incense sticks
23	<i>Ardisia thyrsoiflora</i> D. Don	Myrsinaceae	M. Thengpi choreng	S	1500-2400	Fruit	Wild fruit
24	<i>Arisaema consanguineum</i> Schott	Araceae	Np. Banko	H	2000-2200	Whole plant, leaf	Ornamental, vegetable
25	<i>Arisaema nepenthoides</i> (Wall.) Mart.	Araceae	Np: Banko	H	2200-2600	Whole plant	Ornamental
26	<i>Arisaema wattii</i> Hk.f.	Araceae	Np. Banko	H	1400-2000	Whole plant	Ornamental
27	<i>Artemisia nilagirica</i> (Clarke) Pamp.	Asteraceae	M: Merangma/ Nilam	H	1200-1600	Leaf, Oil Whole plant	Skin disease, insect repellent, fragrance, incense sticks
28	<i>Arundina graminifolia</i> (D.	Orchidaceae	M: Momdang	H	150-800	Bulbous stem	Skin and heal crack

29	Don) Hochr. <i>Arundinaria maling</i> Gamble	Poaceae	M: Mo Shee	T-g	2000-3000	Culm	Roofing and mat; incense sticks
30	<i>Arundinaria racemosa</i> Munro	Poaceae	M. Faksow	T-g	2000-2500	Shoot, Culm	Young shoot, house construction
31	<i>Astilbe rivularis</i> Buch.-Ham. ex D.Don	Saxifragaceae	M: Phlampo Azong	H	2000-3600	Fruit	Beverages, stomach problem,
32	<i>Auricularia auricula- judae</i> (Bull: Fr.) Wettst	Auriculariaceae	B: Mokhailiong Np:Kan chayo	P	250-1500	Fruiting body	Vegetable
33	<i>Baccaurea sapida</i> (Roxb.)Mull.Arg.	Euphorbiaceae	As. Letecu	T	500-800	Fruit	Fruit, dye
34	<i>Balanophora dioica</i> R. Br. ex Royle	Balanophoraceae	M: Khibo riboo	H	900-2100	Whole plant	Abdominal pain
35	<i>Bambusa pallida</i> Munro	Poaceae	M: Bong sing As: Bijuli banh	W- g	150-700	Culm	House construction; incense sticks
36	<i>Bambusa tulda</i> Roxb.	Poaceae	As: Jati banh	T-g	150-1500	Culm	House construction, walling, utility items
37	<i>Bauhinia variegata</i> L.	Caesalpiniaceae	As. Kanchan	T	300-1000	Young leaf	Leafy vegetable; fodder
38	<i>Begonia aborensis</i> Dunn	Begoniaceae	M. Gangchula	H	900-1500	Rhizome	Post delivery pain
39	<i>Begonia hatacoa</i> Buch.- Ham ex D.Don	Begoniaceae	Mj: Serimbang	H	200-1700	Leaves, petiole	Vegetable
40	<i>Begonia inflata</i> Clarke	Begoniaceae	M: Chulen derm	H	150-900	Bulbs and leaves	Stomach ache and against leech bite
41	<i>Belamcanda chinensis</i> (L.) DC.	Iridaceae	M: Nga to	C	250-1800	Rootstock	Bodyache
42	<i>Berberis aristata</i> DC.	Berberidaceae	Shem-dham- mento	S	1500-3000	Fruit	Wild fruits
43	<i>Bergenia ciliata</i> (Haw.) Sternb.	Saxifragaceae	M: Brar sheng	H	3000-4050	Leaves	Cough and diarrhea, leafy vegetable
44	<i>Betula alnoides</i> Buch-Ham ex D Don.	Betulaceae	M: Khrengpa- shing	T	2500-3000	Bark	Convulsion, bronchitis, leprosy,

45	<i>Bidens biternata</i> (Lour.) Merr & Sherff	Asteraceae	M: Kampo-roga	H	200-1500	Flower	fuel wood Flower as vegetable
46	<i>Boehmeria macrophylla</i> Hornem	Urticaceae	Mj: Phamsi	S	300-800	bark, young leaf	Fibre, leafy vegetable
47	<i>Boehmeria platyphylla</i> D.Don	Urticaceae	Mj: Rinya	S	Upto 1800	bark, Seeds and leaves	Fibre, gastric and blood pressure, pulp or fibre
48	<i>Boehmeria rugulosa</i> Wedd	Urticaceae	M: No sheng shu	T(s)	1800-2200	Bark	Bark as binder of incense sticks
49	<i>Boletus edulis</i> (Steinpilz) Speisewert	Boletaceae	M: Sherkhang bamu	P	2500-3000	Fruiting body	Vegetable
50	<i>Brassaiopsis glomerulata</i> (Blume) Regel	Araliaceae	M: Maan	S	1800-2100	Leaves, fruits	Leaf in boil, killing of snake, fruit in cough and cold
51	<i>Buddleja asiatica</i> Lour	Buddlejaceae	M: Famjas/ Faab/ Sherbu/Agia chita	S	300-1800	Flowers, leaves	Local wine, sinus, fodder
52	<i>Butea minor</i> Baker	Fabaceae	M: Popola Sheng	S	300-2000	Seeds	Headache
53	<i>Calamus acanthospathus</i> Griff	Arecaceae	As: Jati Ni: Tasar	C	800-1200	Leaf, Stem	House construction, thatching, furniture
54	<i>Calamus erectus</i> Roxb.	Arecaceae	M: Jeng	W-c	Up to 1200	Stem, Pith	Furniture, house construction and vegetable
55	<i>Calamus flagellum</i> Griff. ex Mart.	Arecaceae	Ak. Raidang Ni. Thare	W-c	Up to 1200	Stem, Pith	Furniture, house construction and vegetable
56	<i>Calamus leptospadix</i> Griff	Arecaceae	M: Lejai	W-c	Upto 1200	Stem, Pith	Furniture, house construction and vegetable
57	<i>Calamus tenuis</i> Roxb.	Arecaceae	M: Jati Ni: Ring-chang- so	W-c	300-1000	Stem, Pith	House construction, furniture, vegetable
58	<i>Calanthe triplicate</i> (Quillam) Ames	Orchidaceae	M: Momdang	H	1200-2500	Roots, Flowers,	Swelling, diarrhea, pain, gastro

59	<i>Callicarpa arborea</i> Roxb.	Verbenaceae	As. Khoja	T	300-1200	pseudo bulb Fruit,bark, leaf	intestinal problem Wild fruit, masticator, fodder
60	<i>Canarium strictum</i> Roxb.	Burseraceae	B: Shraii	T	250-800	Fruit, Resin	Wild fruit, incense, resin, agricultural tools.
61	<i>Cannabis sativa</i> L.	Cannabaceae	M: Kui-nama	H	Up to 1800	Inflorescence, leaves	Dysentery, loss of appetite, tension, fibre
62	<i>Cantherallus cibarius</i> Fr.	Cantharellaceae	B: Mohong	P	200-1500	Fruiting body	Vegetable
63	<i>Caryota urens</i> L.	Arecaceae	As: Baraflwar	T- p	300-800	Leaf, Plant	Broom, thatching, ornamental,
64	<i>Cassia mimosoides</i> L.	Caesalpiniaceae	As: Son-pat	S	Up to 900	Leaves	In ring worm infection
65	<i>Castanopsis indica</i> (Roxb. ex Lindl.) A. DC	Fagaceae	Kara-changne (Nyishi); Angke- asing (Adi)	T	300-500	Fruits, stem	Fruits, agricultural tools
66	<i>Castanopsis tribuloides</i> (Sm.) A. DC.	Fagaceae	As. Phul hingori	T	500-800	Fruits, Stem	Fruits , fuel wood, agriculture tools
67	<i>Chenopodium album</i> L.	Chenopodiaceae	As. Bethu	H	2000-2500	Seeds, leaf	Millet, leafy vegetable
68	<i>Chimonobambusa callosa</i> (Munro) Nakai	Poaceae	M. Rasu	S	2000-2500	Young shoot, Culm	Fencing,fuel, bamboo shoot, house construction
69	<i>Chimonobambusa hookeriana</i> (Munro) Nakai	Poaceae	M. Oie Songja	T-g	2000-2300	Young shoot, Branch, culm	Young shoot, house construction
70	<i>Cinnamomum bejolghota</i> (Buch.-Ham) Sweet	Lauraceae	Aka: Moin-chin	T	300-800	Bark, wood	As binder in incense sticks ; agricultural tools, fuel wood
71	<i>Cinnamomum caudatum</i> Nees	Lauraceae	M: Chingcha	S	250-1500	Bark, wood	Bark oil, spice, incense sticks , fuel wood
72	<i>Cinnamomum tamala</i>	Lauraceae	M: Bachan Pang	T	900-1500	Seeds, leaf,	Massage oil, spice

	(Buch.-Ham.) T.Nees & Eberm.		sheng			bark	
73	<i>Cirsium falconeri</i> (Hk.f.) Petr.	Asteraceae	M: Brongse	H	2200-2600	Root	Jaundice
74	<i>Cissus javana</i> DC	Vitaceae	B: Eatiao	C	300-1200	Fruits	Fruits
75	<i>Citrus medica</i> L.	Rutaceae	M: Tsaloo sheng	T	500-1200	Mesocarp, Juice of petiol	As appetizer, wild fruit
76	<i>Cleisostoma williamsonii</i> (Rchb.f.) Garay	Orchidaceae	M: Nyakshing joraman	E	1200-2000	Leaves, stem	Bone facture
77	<i>Clematis buchianiana</i> Dc.	Ranunculaceae	M: Danying khongru	W-c	800-2500	Whole plant	Leprosy and as poison
78	<i>Clerodendrum colebrookianum</i> Walp	Verbenaceae	M.: Kangjila; Mj: Sunipru	S	900-1200	Leaves	Vegetable., hypertension
79	<i>Colocasia esculenta</i> (L.) Schott	Araceae	Ak: Bloo, M:Niyang-leng/ Bojong; Mj: Scha	H	Up to 900	Leaves and rhizomes	Vegetable
80	<i>Coprinus atramentarius</i> (Bull.) Fries	Coprinaceae	B: Mankhrok	P	1200	Fruiting body	Vegetable
81	<i>Ophiocordyceps sinensis</i> (Berk) Sung et al.	Clavicipitaceae	M: Yartsa gumbu	P	4500-5500	Fruiting body	Revitalizer
82	<i>Coriaria nepalensis</i> Wall	Coriariaceae	M: Wadang Sheng	H	1500-1900	Seeds	Stomach pain and headache
83	<i>Cornus capitata</i> Wall	Cornaceae	M.: Shyamrungma	T	2500-3000	Seeds, fruit	Headache, wild fruit
84	<i>Cornus oblonga</i> wall	Cornaceae	S:Namret; M: Jala-shyamrungma	T	2500-3000	Fruit	Fruits
85	<i>Corylopsis himalayana</i> Griff	Hamamelidaceae	M: Jambray-shing	S	1800-2500	Stem,Branch	Fuel wood
86	<i>Costus speciosus</i> (J.Konig) Sm.	Zingiberaceae	Np. Betlauree	H	500-1500	Rhizome	Medicinal, vegetable
87	<i>Cotoneaster microphyllus</i> Wall. ex Lindl	Rosaceae	B: Piko mlang	S	2000-3500	Fruit	Fruit
88	<i>Crassocephalum crepidioides</i>	Asteraceae	M: Bankhwan	H	1200-2400	Young shoot	Leafy vegetable,

89	(Benth.) S. Moore <i>Croton caudatus</i> Geiseler.	Euphorbiaceae	Np: Halongre	S	Upto 900	Seeds, oil	fodder Purgative, fish poison, insecticides
90	<i>Cudrania cochinchinensis</i> (Lour) Kudo and Masam	Moraceae	M. Jausu	S	1200-1500	Fruit, Leaf	Fruit, beverage, colour fixer
91	<i>Cuscuta reflexa</i> Roxb.	Convolvulaceae	B: Ojuay Hing M: Prengri/ linga mon	P	Up to 2500	Seed, Whole plant	Purgative, stomach trouble, diaphoretic poisoning
92	<i>Cyathea gigantea</i> (wall ex Hook.) Holttum.	Cyatheaceae	Ak: Tache	T- f	Upto 1200	Pith	Pith as starch food
93	<i>Cyathula prostrata</i> (L.) Blume	Amaranthaceae	M: Rooptang	H	Up to 900	Seeds	Blood purifier
94	<i>Cymbidium aloifolium</i> (L.) Sw.	Orchidaceae	M: Momdang	E	300-900	Bulbs and leaves	Sinus, bleeding, aesthetic, eye weekness and malignant tumors
95	<i>Cymbidium hookerianum</i> Rchb.f.	Orchidaceae	M: Yangra momdang	E / L	2000-2700	Seeds, flower	Cuts and wounds, ritual/ worship
96	<i>Cymbopogon citratus</i> (DC.) Stapf	Poaceae	M: Sooma sheng	H	1800-2200	Leaves	Essential massage oil
97	<i>Cyphomandra betacea</i> (Cav.) Miers.	Solanaceae	M. Khalangji	S	Up to 1800	Fruit	Vegetable, Jam
98	<i>Daphne papyracea</i> Wall. ex W.W. Sm. & Cave	Thymelaeaceae	M: Sugu shing; Shok shokpa	S	2000- 2800	Bark	Paper, fibre, dye
99	<i>Datura stramonium</i> L.	Solanaceae	M: Fruk Sheng	H	Up to 2700	Seeds	Sinus
100	<i>Debregeasia wallichiana</i> (Wedd) Wedd.	Urticaceae	M: Nang Shen	S	800-1200	Fruits	Stomach problem
101	<i>Debregeasia longifolia</i> (Burm. f.) Wedd.	Urticaceae	M. Moshji/ Sheng Mrep	S	600-1500	Leaves and seeds	Blood purifier, fruits
102	<i>Dendrobium densiflorum</i> Lindl.	Orchidaceae	M: Momdang	E	150-1200	Leaves	Bone fracture
103	<i>Dendrobium hookerianum</i> Lindl	Orchidaceae	M: Lisang momdang	E	600-1500	Flower	Worship

104	<i>Dendrobium jenkinsii</i> Wall. <i>ex</i> Lindl.	Orchidaceae	M: Momdang	E	150-1000	Stem	Revitalizer
105	<i>Dendrobium nobile</i> Lindl.	Orchidaceae	M: Bomzang momdang	E	150-1200	Stem, Seed, Flower	Revitalizer, healing wound, aesthetic
106	<i>Dendrocalamus hamiltonii</i> Nees & Arn. <i>ex</i> Munro	Poaceae	As: Kako	T-g	150-1200	Young shoot, Culm, leaves	vegetable, house construction, fodder
107	<i>Desmodium confertum</i> DC	Fabaceae	As: Salpani	S	1000-1200	Root,Seed, young leaves	Vegetable
108	<i>Desmodium microphyllum</i> (Thunb.) DC.	Fabaceae	M: Pangja	H	up to 1600	Leaf	Beverages
109	<i>Dillenia indica</i> L.	Dillaniaceae	As: Ou-tenga	T	100-600	Fruit	Pickle, dysentery, as binder in incense sticks
110	<i>Dioscorea bulbifera</i> L.	Dioscoreaceae	Ak: Niyekshi M. Khojeng jokthang	C	Up to 2100	Tuber	Vegetable, medicinal
111	<i>Dioscorea deltoides</i> Wall	Dioscoreaceae	M: Pasang jokthang	C	450-3100	Tuber, leaves	Vegetable, fish poisoning
112	<i>Dioscorea prazeri</i> Prain & Burkill	Dioscoreaceae	M: Chung jokthang Ak: Niyekshi	C	300-500	Tuber	Vegetable
113	<i>Diospyros lotus</i> L.	Ebenaceae	M: Ambray	T	Up to 3000	Fruit, bark	Wild fruit, dysentery
114	<i>Diospyros peregrina</i> (Gaertn.) Gurke	Ebenaceae	M. Legalomah/ Janogong	T	1800-2700	Fruit, Seed oil	Wild fruit, dysentery, diarrhoea
115	<i>Diplazium esculentum</i> (Retz.) SW.	Polypodiaceae	M: Dangsum	H	900-1800	Young shoot	Leafy vegetable
116	<i>Dobinea vulgaris</i> Buch.-Ham	Anacardiaceae	Mj: Bempo	S	500-1500	Flower	Dizziness
117	<i>Drymaria cordata</i> (L.) Willd. <i>ex</i> Schult	Caryophyllaceae	Mj: Phoribang/ Sogo/ Panmuaii;	H	600-1300	Whole plant	Stomache, stone
118	<i>Drymaria diandra</i> Blume	Caryophyllaceae	M: Ribang	H	800-1200	Leaves	Vegetable
119	<i>Elaeagnus parvifolia</i> Wall. <i>ex</i> Royle	Elaeagnaceae	Nyngongbong/ Dam rep	S	2000-3500	Leaf, Fruit, Seed	Beverage, wild fruit, Against sinus

120	<i>Elaeagnus pyriformis</i> Hk.f.	Elaeagnaceae	S: Manjlay mlang M. Kyameng Shing	S	Up to 1200	Flower, fr and seed	Tooth ache, wild fruit
121	<i>Elaeocarpus aristatus</i> Roxb.	Elaeocarpaceae	As. Garela sopa	T	300-1000	Fruuits	Fruits
122	<i>Elaeocarpus glandulosus</i> Wall ex Merr.	Elaeocarpaceae	M: Flen ajang	T	Up to 1200	Leaves	Rheumatism and blood clotting
123	<i>Elaeocarpus lanceifolius</i> Roxb.	Elaeocarpaceae	Np. Bhadrasey	T	1600-2000	Fruuits	Fruuits
124	<i>Elaeocarpus sikkimensis</i> Mast.	Elaeocarpaceae	M: Gashakhi As. Seleng	T	1200-2000	Fruits	Fruits
125	<i>Elaeocarpus varuna</i> Buch.- Ham ex Mast.	Elaeocarpaceae	M. Yearga	T	500-800	Fruits	Fruits
126	<i>Elatostema sessile</i> J.R. Forst & G. Forst.	Urticaceae	Mj: Panplo	H	700- 1200	Leaf	Vegetable.
127	<i>Eleusine coracana</i> (L.) Gaertn.	Poaceae	S: Langdo M: Faphar;	H	Up to 1800	Seed	Beverage, millets
128	<i>Elsholtzia flava</i> Benth.	Lamiaceae	M: Laskang	S	1500-2400	leaves and stem; Seed	Dhup, spice
129	<i>Elsholtzia blanda</i> Benth.	Lamiaceae	M: Neb shu	S	900-2200	Leaves	To clear pus and maggot of cattle
130	<i>Engelhardia spicata</i> Lesch. ex Bl.	Juglandaceae	M: Corcor shing	T	1500-1800	Bark	Dye
131	<i>Entada pursaetha</i> DC.	Mimosaceae	As: Ghilla	W-c	Up to 1200	Seeds,bark and fruit	Shampoo,fish poisoning,emetic, anthelmentic, dye
132	<i>Epilobium wallichianum</i> Hausskn.	Onagraceae	M: Som-jong- mento	H	4100	Whole plant	Cough, phlegmatic congestion
133	<i>Eria pannea</i> Lindl.	Orchidaceae	M: Momdang	E	300-800	Roots and leaves	Bathing for healthy skin
134	<i>Erythrina arborescens</i> Roxb.	Fabaceae	As: Madar	T	2200-2500	Whole plant	Fencing
135	<i>Erythrina stricta</i> Roxb.	Fabaceae	As.:Madar	T	200-800	Young leaf	Leafy vegetable, fodder
136	<i>Euonymus theifolius</i> Wall. ex	Celastraceae	M: Khow sheng	S	1700-2100	Fruits	Lower abdominal



137	M.A. Lawsen <i>Eupatorium cannabinum</i> L.	Asteraceae	M: Nam	H	900-1800	Young shoot, seed	pain Vegetable, diuretic, emmenagogue
138	<i>Euphorbia neriifolia</i> Linn.	Euphorbiaceae	M: Leptang Sheng	T	600-800	Roots	Tumer, cancer
139	<i>Everniastrum cirrhatum</i> (Fr.) Hale ex Sipman	Permeliaceae	S: Punpun	Sm	1200-3000	Thallus	Eaten as vegetable, spice, use in treatment of bleeding piles
140	<i>Everniastrum nepalense</i> (Taylor) Hale ex Sipman	Permeliaceae	M: Punpun/ Pathar phul	Sm	1000-2500	Thallus	Dye for wool & silk
141	<i>Exbucklandia populnea</i> (R. Br. Ex Griff.) R.W. Br.	Hamamalidaceae	M: Shok shing	T	2200-2600	Stem, Bud,branches	Fuel wood, handicraft, agricultural Tools
142	<i>Fagopyrum esculentum</i> Moench	Polygonaceae	M: Fapar/ Tem	H	2000-4400	Whole plant, seeds	Vegetable, bread, arthritis
143	<i>Ficus hirta</i> Vahl	Moraceae	Mj. Nuphru -gubo Np. Khasreto	T	300-900	Fruit or roots, leaves	Wild fruits, fodder
144	<i>Ficus semicordata</i> Buch- Ham ex Sm	Moraceae	Np. Khaniu	T	300-800	Fruit, leaves	Fruits, fodder
145	<i>Flemingia macrophylla</i> (Willd.) Merr.	Fabaceae	M: Miloo sheng	S	Up to 1200	Seeds	Headache
146	<i>Fragaria daltoniana</i> . J. Gay	Rosaceae	M: Phaa mrep	H	2500-4000	Fruit	Blood purifier, fruits
147	<i>Fragaria nubicola</i> (Hk. f.) Lindl. ex Lacaite	Roseaceae	Ak: Khumin; M: Zoo sing Np: bhui ashelu	H	2400	Fruit	Fruits
148	<i>Galinsoga parviflora</i> Cav.	Asteraceae	B: Masaibuk	H	600-800	Leaf	Leafy vegetable, fodder
149	<i>Garcinia lanceaefolia</i> Roxb.	Clusiaceae	As. Rupahi thekera	T	600-800	Fruit	Fruit
150	<i>Gaultheria fragrantissima</i> Wall.	Ericaceae	M. Shaksingma	S	1800-2500	Seeds, fruit	Bone fracture, back ache, wild fruit
151	<i>Gaultheria hookeri</i> C.B.	Ericaceae	M. Shaksingma	S	2000-2500	Fruit	Wild fruit

152	Clarke <i>Gaultheria trichophylla</i> Royle	Ericaceae	M. Shakshingma	S(p)	3500-4500	Fruit	Wild fruit
153	<i>Gentiana speciosa</i> (Wall.) Marq	Gentianaceae	B: Wang	C	2000-2700	Leaf	Leafy vegetable
154	<i>Globba clarkei</i> Baker	Zingiberaceae	M: Khumpi	H	Up to 1500	Pith	Vegetable
155	<i>Goodyera schlectandaliana</i> Rchb. f.	Orchidaceae	M: Momdang	H	2000-2500	Whole plant	Internal injuries and improve blood circulation
156	<i>Gymnadenia orchidis</i> Lindl.	Orchidaceae	M: Salap panja	H	2500-3000	Tuber	Aphrodisiac
157	<i>Gymnocladus assamicus</i> P.C. Kanjilal	Leguminosae	M: Myangmanba se	T	1500-1800	Fruit	Detergent
158	<i>Gynocardia odorata</i> R. Br.	Flacourtaceae	Ak: Umpho Ni: Takuk change	T	200-800	Fruit, seed, bark	Fruit fish poison, seed as insecticide and bark fabrifuge
159	<i>Gynura bicolor</i> (Roxb. ex Willd.) DC	Asteraceae	M: Menchella	H	100-2500	Leaves	Muscle stretch or pain
160	<i>Habenaria arietina</i> Hk.f.	Orchidaceae	M: Momdang	H	1700-2500	Root	Fever, liver trouble
161	<i>Habenaria dentata</i> (Swartz) Schltr	Orchidaceae	M: Lumum	H	900-1200	Tubers	Fever, liver trouble, vegetable
162	<i>Halenia elliptica</i> D. Don	Gentianaceae	M: Yu-mo-won	H	1800-4500	Whole plant	Malaria, dysentery
163	<i>Hedera nepalensis</i> K. Koch	Araliaceae	M: Ron rwa Sheng	W-c	1500-3000	Root, flower	Tooth ache
164	<i>Hedychium coronarium</i> J.Konig	Zingiberaceae	M: Khumpi	H	Up to 1500	Flower	Ornamental, avenue/garden plant
165	<i>Hedychium gardnerianum</i> Shepp. ex Ker Gawl	Zingiberaceae	M: Dudum/ Fenka	H	1200-2400	Rhizome	Kidney problem, leafy vegetable
166	<i>Hedychium gracile</i> Roxb.	Zingiberaceae	M: Khumpi	H	1200-1500	Fruit	Ornamental, fruits
167	<i>Hedychium stenopetalum</i> Lodd	Zingiberaceae	M: Copy /Dangley	H	1200-1500	Rhizome	Ornamental, vegetable
168	<i>Helixanthera parasitica</i> Lour.	Loranthaceae	M: Ningongbong	S(sp)	2800-3000	Fruit , leaf	Gum or resin, beverages
169	<i>Helwingia himalaica</i> Hk.f. & Thomson ex C.B. Clarke	Helwingiaceae	M: Damberoo ajang	E	1200-2500	Leaves	Body pain
170	<i>Hemifragma heterophyllum</i>	Scrophulariaceae	S: Jiri mlang	C	1800-3600	Fruit	Fruit

171	Wall. <i>Hericium erinaceus</i> (Bull. Ex Fr.) Pers	Hericiaceae	M: Pushed bamu	P	3000-3500	Fruiting body	Vegetable
172	<i>Hodgsonia macrocarpa</i> (Bl) Cogn.	Cucurbitaceae	Ak. Gijje, Np. Hiboguti	C	300-1000	Fruits	Fruits
173	<i>Holboellia latifolia</i> Wall.	Lardizabalaceae	M: Khropchang	W-c	1000-4000	Fruit	Wild fruit
174	<i>Homalomena aromatica</i> (Spreng.) Schott	Araceae	Np: Sugandhmantri	H	200-500	Rhizome	Skin disease, essential oil
175	<i>Houttuynia cordata</i> Thunb.	Saurureaceae	B: Madring	H	1500-2400	Root, leaves	Vegetable, appitiser, tonsilities
176	<i>Hovenia dulcis</i> var. acerba (Lindl.) Sengupta & Safui	Rhamnaceae	M. Nying As. Chetia bola ; Adi Pike-asing	T	1000-1500	Fruit, pseudocarp	Fruit
177	<i>Hydrocotyle himalaica</i> P.K. Mukh.	Araliaceae	M: Tsela gorgor/ Gimasak	H	800-1500	Young shoot	Vegetable
178	<i>Hypericum choisyianum</i> Wall. ex N. Robson	Clusiaceae	M: Sanje	H	2400-3600	Leaf	Substitute of tea
179	<i>Ilex dipyrrena</i> Wall	Aquifoliaceae	As: Bikha kulia	T	1500-2500	Fruit	Fruits
180	<i>Illicium griffithii</i> Hk f. & Th.	Illiciaceae	M: Mun-sheng, Lissi	T	1800-2800	Fruits	Spice, carminative, dye, agricultural tools
181	<i>Impatiens angustiflora</i> Hk. f.	Balsaminaceae	M: Yulegon	H	1800-2500	Roots	Urinary complaint, malaria veneral diseases
182	<i>Imperata cylindrical</i> (L) Raeusch	Poaceae	A: Ulu kher	g	Up to 1200	Leaf	Thatching
183	<i>Indigofera stachyodes</i> Lindl.	Fabaceae	M: Mukumjen- shing /Zia sheng	S	1800-2000	Roots	On cuts and wounds
184	<i>Inula cappa</i> (Buch.-Ham. ex D. Don) DC.	Asteraceae	-	S	2000-2500	Leaf	Fodder
185	<i>Juglans regia</i> L.	Juglendaceae	M. Khe sing / Mankha/ Akhor	T	1000-1800	Fruit, Leaf	Fruit , dye, mulching

186	<i>Juniperus recurva</i> Buch-Ham. ex D. Don	cupressaceae	B: Shukpa	T	2000-2200	Leaf and branches	Incense
187	<i>Juniperus squamata</i> Buch – Ham ex D. Don	cupressaceae	B: Shukpa	T	2800-3500	Leaf and wood dust	Incense
188	<i>Laetiporus sulphureus</i> (Bull. ex Fr.) Murr.	Polyporaceae	B: Miling	P	3000-3500	Fruiting body	Vegetable
189	<i>Lentinus lepideus</i> (Fries. ex Fries.) Fries.	Polyporaceae	M: Baksar bamu	P	2600	Fruiting body	Vegetable
190	<i>Leucas cephalotes</i> (Roth) Spreng.	Lamiaceae	B: Mangkhejai	H	1800-2000	Flower	Ornamental
191	<i>Lindera neesiana</i> (Wall. ex Nees) Kurz.	Lauraceae	As: Barahalkusa	H	1800-2000	Flower	Ornamental
191	<i>Lindera neesiana</i> (Wall. ex Nees) Kurz.	Lauraceae	M: Ngyeng	T	1800-2400	Fruit	Sedative, analgesic, spice,
192	<i>Liparis paradoxa</i> (Lindl.) Reichb. f	Orchidaceae	M: Pla minto	H	1200-1800	Tuber	Respiratory tract infections
193	<i>Lithocarpus fenestratus</i> (Roxb.) Rehder	Fagaceae	M: Lah-gong	T	2200-2500	Nut	Fruit
194	<i>Lithocarpus listeri</i> (king ex Hk.f. ) Grierson & D.G. Long	Fagaceae	M: Fa gong	T	2800-3000	Nut	Fruit
195	<i>Lithocarpus pachyphyllus</i> (Kurz) Rehder	Fagaceae	M: Lah gong	T	2000-2500	Nut	Fruit
196	<i>Litsea citrata</i> Blume	Lauraceae	M: Niyeng; Mj: Pinew	T	1300-2700	Fruit	Spice
197	<i>Litsea sebifera</i> Pers	Lauraceae	Ak: Laham	T	Up to 900	Leaf, flower, bark	Diarrhoea, dysentery, rheumatic problem and binder of incense stick
198	<i>Lobaria isidiosa</i> (Mull. Arg.) Vain	Lobariaceae	S: Punpun	Sm	1500-3500	Thallus	Antitumour property
199	<i>Lyonia ovalifolia</i> (Wall.) Drude	Ericaceae	M: Shak-Shing	T	1500-3000	Leaves, stem	Pain in limbs, fuel wood, agricultural tools
200	<i>Maesa indica</i> (Roxb.) A. DC	Myrsinaceae	M: Sya Sheng	S	300-1500	Leaves	Headache
201	<i>Mahonia napaulensis</i> DC.	Berberidaceae	N: Chutro	S	2000-2900	Fruit, wood	Fruit, cosmetic

202	<i>Manihot esculenta</i> Crantz	Euphorbiaceae	As: Simal alu	S	150-700	Leaves and tubers	Vegetable
203	<i>Manilkara hexandra</i> (Roxb.) Dub	Sapotaceae	M. Lungkarma sing /Mohua	T	1000-1200	Fruit, seeds	Vegetable. butter
204	<i>Melastoma malabathricum</i> L.	Melastomaceae	As: Phutkola	S	300-800	Fruits	Dye
205	<i>Michelia punduana</i> Hk. f. & Th.	Magnoliaceae	M: Kojan shing	T	1200-1500	Seeds	Gastric, tumer and tuberculosis
206	<i>Miliusa globosa</i> (A. DC.) Panigr & S.C. Mishra	Annonaceae	Ni: Tase-mayang ; As. Bon poniol	T	300-800	Seed	Dye
207	<i>Musa velutina</i> Wendl. & Drude	Musaceae	Mj: Lu Likhbiyo	T- h	300-1600	Fruit, pith, leaves, sheath	Fruit, vegetable, thatching, fodder
208	<i>Mussaenda roxburghii</i> Hk.f	Rubiaceae	N: Dobiphul	S	1800-2200	Young Leaf	Leafy vegetable
209	<i>Mycena pura</i> (Pers. Ex Fr) Kumm.	Agaricaceae	Ak: Lumio zee; M: Sher bamu B: Murray	P	1200-1800	Fruiting body	Vegetable
210	<i>Myrica esculenta</i> Buch.-Ham ex D. Don	Myricaceae	Zen sheng/ Kafal	T	1000-2300	Bark, fruit	Liver tonic, asthma, wild fruit
211	<i>Myrsine semiserrata</i> Wall.	Myrsinaceae	M: Son-shing /Jhingni	T	1000-2700	Seeds	Anthelmintic
212	<i>Nardostachys jatamansi</i> (D Don) DC	Valerianaceae	N: Haswa/ Jatamanshi	H	3600-4800	Root stock	Aromatic, palpitation of heart, mental disorders, insomnia and epilepsy
213	<i>Oenanthe javanica</i> (Blume) DC.	Apiaceae	M: Jimom	H	1000-2000	Young shoot	Vegetable.
214	<i>Oroxylum indicum</i> (L.) Kurz	Bignoniaceae	M: Namkaling	T	Upto 1200	Seed, leaf, fruit, bark	Dysentery, ulcers, incense stick
215	<i>Osbeckia nepalensis</i> Hk. f.	Melastomaceae	As: Phut ki	Sh	100-1500	Twigs, leaves	Fodder
216	<i>Paederia foetida</i> L.	Rubiaceae	A: Sobaji	C	Up to 1500	Leaves	Vegetable., gastric problem, emetic
217	<i>Panax bipinnatifidus</i> Seem.	Araliaceae	M: Gunamanchung	H	2500-3500	Root	Aphrodisiac, increase immunity, amnesia

218	<i>Panax wangianus</i> S.C. Sun	Araliaceae	M: Gunamanchung	H	1400-1600	Root	Aphrodisiac
219	<i>Parmotrema tinctorum</i> (Nyl.) Hale	Permiliaceae	S: Punpun	Sm	1800-3000	Thallus	Dye
220	<i>Pedicularis gracilis</i> Wall	Scrophulariaceae	M: Chongta	H	1800-3000	Leaf	Vegetable.
221	<i>Peltigera polydactyla</i> (Neck.) Hoffm.	Peltigeraceae	S: Punpun	Sm	1800-3000	Thallus	Use in curing rabies, to stop bleeding, antiseptic
222	<i>Perilla frutescens</i> (L.) Britton	Lamiaceae	M: Nam/ Nycum	H	300-3000	Seeds	Blood pressure, Spice
223	<i>Persea fruticosa</i> (Kurz) Kost.	Lauraceae	Ak: Setulje; M: Magu	T	2200-2500	Fruit	Fruits
224	<i>Persea gamblei</i> (King ex Hk.f.) Kost.	Lauraceae	As: Mojil	T	250-1200	Bark	Binder in incense stick
225	<i>Persea globosa</i> (Aubl) Spreng	Lauraceae	Ak, Mj: Kaunla	T	Up to 1500	Bark	As binder in incense sticks
226	<i>Persea robusta</i> (W.W. Sm.) Kosterm.	Lauraceae	Marakpa	T	2200 -2500	Fruit	Fruit and apitiser
227	<i>Phaius tankervilleae</i> (Banks ex L'ttr) Bl.	Orchidaceae	M: Momdang	H	2000-2500	Pseudo bulbs	Swellings and legs; pain of abscess, dye
228	<i>Phoebe lanceolata</i> (Nees.) Nees	Lauraceae	Ak: Munyimu; Ni. Sanchar	T	250-1200	Fruit	Fruit
229	<i>Pholidota imbricate</i> Lindl.	Orchidaceae	M: Momdang	E	300-1200	Pseudo bulbs	Rheumatic pain
230	<i>Phragmites karka</i> (Retz.) Trin. Ex Steud.	Poaceae	As: Nal	H	1200-2000	Whole plant	Paper, pulp, mat, thatching, flute, fodder, bone fracture
231	<i>Phrynium pubinerve</i> Blume	Marantaceae	M:Shyamphi-la Mj, As: Kudali	H	100-800	Leaves	Fodder, wrapping
232	<i>Phyllanthus parvifolius</i> Buch-Ham ex D Don	Euphorbiaceae	M: Chembra sheng	H	Up to 1000	Roots	Blood purifier
233	<i>Phyllostachys bambusoides</i> Siebold and Zucc.	Poaceae	M: Meju	W- g	1000-2000	Culm	House construction, baskets, furniture, incense sticks

234	<i>Phytolacca acinosa</i> Roxb.	Phytolaccaceae	M: Chomche	H	1500-3000	Leaf	Tumer
235	<i>Picrorhiza kurrooa</i> Royle	Scrophulariaceae	M: Kongleng/ Kutki	H	3300-4300	Root stocks	Diarrhoea, stomach trouble, fever
236	<i>Pinanga gracilis</i> Blume	Arecaceae	Ak,Ni: Tama As: Garuka tamul	T-p	300-800	Seed, pith	Masticator, vegetable
237	<i>Pinus roxburghii</i> Serg.	Pinaceae	M: Lensung/ Roinang/ chirpine	T	1000-2000	Resin, wood, seeds	Respiratory tract infection, resin, oil, fuel wood, wood dust in incense sticks
238	<i>Pinus wallichiana</i> A.B. Jackson	Pinaceae	M: Lensongsing /Blue pine	T	1800-4300	Wood, seed	Dye, substitute of candle/lamp, fuel wood, Oil
239	<i>Piper betleoides</i> C. DC.	Piperaceae	Mj: Nimiyabo	W-c	500-800	Young leaves	Bone fracture, masticator
240	<i>Piper pedicellatum</i> C. DC.	Piperaceae	Mj: Riyari	S	200-600	Young leaves	Body pain, masticator, Leafy vegetable
241	<i>Piper sylvaticum</i> Roxb.	Piperaceae	Mj: Nimiyabo	C- s	200-300	Fruits	Fruits as spice
242	<i>Plectocomia himalayana</i> Griff.	Arecaceae	N: Dorrey	W-c	1000-2400	Stem	Furniture, fencing
243	<i>Pleurotus ostreatus</i> (Jacquin ex. Fr) Kumm.	Tricholomataceae	M: Jilak bamu B: Kheloy	P	3500-4000	Fruiting body	Vegetable
244	<i>Pleurotus pulmonarius</i> (Fr.) Quel.	Tricholomataceae	M: Foam bamu B: Mangkhanoi	P	1500-1800	Fruiting body	Vegetable
245	<i>Pleurotus sajor-caju</i> (Fr.) Sing.	Tricholomataceae	B: Aphinmau M: Mungnang	P	900-2000	Fruiting body	Vegetable
246	<i>Podophyllum hexandrum</i> Royle	Podophyllaceae	M: Bah nyiolumba Murito	H	2600-4500	Fruit, Rhizome	Hepatic, purgative, vermifuge, cancer
247	<i>Pogostemon elsholtzoides</i> Benth.	Lamiaceae	M: Nakhrang sheng	H	1000-1200	Leaves	Goitre, blood pressure
248	<i>Polygala arillata</i> Buch-Ham. Ex D.Don	Polygalaceae	N: Marcha	T	2000-2500	Leaves	Local drink/wine
249	<i>Polygonum chinense</i> L.	Polygonaceae	N: Kakur thothne,	S	1700-2000	Young Leaves	Leafy vegetable,

250	<i>Polygonum molle</i> D. Don	Polygonaceae	As: Kelnop N: Thothney	S	1700-2000	Young leaves	Leafy vegetable
251	<i>Polygonum nepalense</i> Meissn	Polygonaceae	M: Chomcha	H	1800-2200	Roots	Stomach problem
252	<i>Potentilla fruticosa</i> L.	Rosaceae	M: Borong Sasu	H	3800-4100	Root, leaves	Astringent, antispasmodic, as tea leaf
253	<i>Potentilla lineata</i> Trevir	Rosaceae	M: Sasu	H	2500-4200	Root	gum pain, pyorrhea
254	<i>Potentilla peduncularis</i> D. Don	Rosaceae	M: Sasu	H	3800-4100	Fruit	Fruit
255	<i>Potentilla sundaica</i> Kuntze	Rosaceae	M: Sasu	H	600-1600	Leaves, roots, stem	Astringent, diarrhea, antidote, masticator
256	<i>Pothos roxburghii</i> de Vriese	Araceae	M: Sasu	C	300-1200	Leaves	Bone fracture, ornamental
257	<i>Pouzolzia sanguinea</i> (Blume) Merr.	Urticaceae	Mj: Pamsii; Ni: Oik	S	300-800	Young leaves	Leafy vegetable
258	<i>Prasiola crispa</i> (Lightfoot) Kutzing	Prasiolaceae	M: Ree-mom S: Khodampe	A-p	2000-2800	Whole plant	Vegetable
259	<i>Primula kingii</i> Watt	Primulaceae	M: Ringu	H	3800-4100	Root	Dysentery, liver trouble
260	<i>Prunus cerasoides</i> D. Don	Rosaceae	M: Bepsile sheng	T	1200-3100	Flower	Psychiatric
261	<i>Prunus persica</i> (L.) Stokes	Rosaceae	Aru	T	1500-1800	Fruit	Fruit,
262	<i>Pterospermum acerifolium</i> (L.) Willd.	Sterculiaceae	Ak: Hatipaila	T	Up to 900	Bark	As binder in incense sticks
263	<i>Punica granatum</i> L.	Punicaceae	M: Thalem shing	T	500-1700	Seeds	Dye, respiratory tract infections
264	<i>Malus sikkimensis</i> (Wenz.) Koehne	Rosaceae	Thung	T	1500-2000	Fruit	Fruit, colour fixer
265	<i>Pyrus pashia</i> Buch. Ham. ex D. Don	Rosaceae	M. Lito / Lugrang gong	T	1500-1800	Fruit	Fruit
266	<i>Quercus griffithii</i> Hk.f & Th. ex Miq	Fagaceae	M. Beinang- shing, Ak. Sokubun	T	1800-2500	Nut/ Acorns, Leaf, Stem	Wild fruit, litter, fuel wood, Agricultural tools, fodder



267	<i>Quercus lamellosa</i> Sm.	Fagaceae	Fanggoi sing	T	Up to 1800	Nut/ Acorns, Leaf, Stem	Wild fruit, fuel wood, litter, agricultural tools
268	<i>Quercus lanata</i> Sm.	Fagaceae	M: Beisnang- shing	T	1800-2200	Nut/ Acorns, Leaf, Stem	Litter, agricultural tool, fuel wood
269	<i>Quercus semecarpifolia</i> Sm.	Fagaceae	M:Lahgang/ Fagang/ Beinang	T	2000-2500	Nut	Fruit
270	<i>Ramalina himalayensis</i> Rasanen	Ramaliaceae	S: Punpun	Sm	1500-3000	Fruticose Thallus	Edible
271	<i>Ramaria apiculata</i> (Fr.) Donk	Clavariaceae	B: Shashrang mou	P	1800-2200	Fruiting body	Vegetable
272	<i>Rheum nobile</i> Hook. f. & Thoms.	Polygonaceae	N: Tohuka	H	3600-4500	Rhizome, Root, Stem	Vegetable
273	<i>Rhodiola sinuata</i> (Royle ex Edgew.) Fu	Crassulaceae	M: Rib mento	H	3000-4800	Root stock	Emollient and vulnerary
274	<i>Rhododendron arboreum</i> Sm.	Ericaceae	M: Gorus/ Zingnang-shing	T	1500-3600	Shoot, Flower	Throat infection, jely, fuel wood
275	<i>Rhododendron grande</i> Wight	Ericaceae	M: Tama shing/ Takchung sheng	T	2000-2500	Flowers	Kidney
276	<i>Rhus hookeri</i> Sahni & Bahadur	Anacardiaceae	M: Tree-shing	T	1800-2800	Seeds,	Vegetable butter, religious
277	<i>Rhus javanica</i> L.	Anacardiaceae	M. Phoksing As. Naga Tenga Np. Bhakiamlo	T	1500-1800	Seed	Fruits
278	<i>Rhynchoglossum lazulinum</i> Rao & Joseph	Gesneraceae	Mj: Nimiyabu Dhaniya	H	1200-1500	Leaf	Leafy spice
279	<i>Rhynchostylis retusa</i> (L.) Bl.	Orchidaceae	M: Momdang	E	250-900	Roots, whole plant	Rheumatism, asthma and tuberculosis
280	<i>Ricinus communis</i> L.	Euphorbiaceae	As: Arandi	S	500-800	Leaf	Arthrities, body pain,
281	<i>Rorippa indica</i> (L.) Hiern	Brassicaceae	M. Simi	H	2200-2500	Leaf	Leafy vegetable
282	<i>Rosa sericea</i> Lindl.	Rosaceae	M: Yakpasu	S	2100-3800	Fruit, leaf	Fruit, aromatic, hedge row

283	<i>Roscoea alpina</i> Royle	Zingiberaceae	M: Pipi/ Bamlakpa	H	2800-3000	Leaf	Leafy vegetable, malaria
284	<i>Rubia cordifolia</i> L.	Rubiaceae	M: Laine/ Tsot	H	1200-2700	Seeds and stems	Dye, against cough
285	<i>Rubia sikkimensis</i> Kurz.	Rubiaceae	M: Laneru	H	800-1200	Seed and stems	Dye
286	<i>Rubus biflorus</i> Buch.-Ham. Ex Sm.	Rosaceae	M: Sher gong	S	3800-4100	Fruits	Fruits
287	<i>Rubus calycinus</i> Wall. ex D.Don	Rosaceae	M: Sher gong	H	2200-2500	Fruits	Fruits
288	<i>Rubus ellipticus</i> Sm.	Rosaceae	M: Sher gong / Rongthang	S	600-1500	Fruit	Fruit
289	<i>Rubus lineatus</i> Reinw.	Rosaceae	M: Thuligong/ cherma	S	2200-2500	Fruits	Fruits
290	<i>Rubus niveus</i> Thunb.	Rosaceae	M: Thelma N: Kalo aselu	S	1500-2500	Fruit	Fruits
291	<i>Rubus paniculatus</i> Sm.	Rosaceae	M: Zoo singh	S	2200-2600	Fruits	Fruits
292	<i>Rumex nepalensis</i> Spreng.	Polygonaceae	M: Shawloma/ Bomla-ppa	H	1200-4300	Whole plant	For generating blood corpuscles, fodder, vegetable
293	<i>Russula emetica</i> (Schaeff. Ex Fr) S.F. Gray	Russulaceae	M: Zee bamu B: Mobachai	P	2000-2800	Fruiting body	Vegetable
294	<i>Salix calyculata</i> Hk.f. ex Anderson.	Salicaceae	M: Glang sheng	S	1500-3600	Leaves and bark	Urinary tract infections
295	<i>Sambucus hookeri</i> Rehder	Caprifoliaceae	M. Chirabeng	S	1500-3700	Fruits, twig	Fruits, carminative
296	<i>Satyrium nepalense</i> D. Don	Orchidaceae	M. Yu-wa	H	1600-2200	Tuber, whole plant	Vegetable. and tonic
297	<i>Saurauia napaulensis</i> DC.	Saurauiaceae	M. Argongma shing	T	300-1200	Fruit, leaf	fruit, cut and wound
298	<i>Saurauia punduana</i> Wall.	Saurauiaceae	M. Rata gagan	S	700-1200	Fruit	Fruit
299	<i>Schima wallichii</i> Choisy	Theaceae	M: Khrong- khrong-shing	T	600-1000	Stem, branch	Fuel wood
300	<i>Schizophyllum commune</i> Fries	Schizophyllaceae	M: Muju bamu Mj: Nimujii;	P	Up to 1500	Fruiting Body	Vegetable

301	<i>Schizostachyum pergracile</i> (Munro) R. B. Majumdar	Poaceae	Ni: Hosh/ Hupsi M. Shee	W- g	150-700	Culm, Shoot	Fencing, roof, young shoot, Incense sticks
302	<i>Senecio raphanifolius</i> Wall. ex DC.	Asteraceae	M: Seri Mento/ Gandang momdang	H	2800-4100	Flower	Gastric
303	<i>Smilacina oleracea</i> (Baker) Hk f	Liliaceae	M: Mom	H	2500-3200	Young shoot	Vegetable
304	<i>Smilax rigida</i> Sol. Ex Sm.	Smilacaceae	M. Daquk-pa- mrep-sheng	W-c	1200-2500	Seeds, root, young leaf	Sinus, blood purifier, skin disease, leafy vegetable
305	<i>Solanum erianthum</i> D. Don	Solanaceae	M: Khalang jing man	S	1000-1200	Root, Leaves	Body pain and urinary trouble, vaginal discharge
306	<i>Solanum ferox</i> L.	Solanaceae	M. Khalang jing	S	600-800	Fruits, leaves, roots, seed	Vegetable, throat or mouth sore, asthma, apitite
307	<i>Solanum torvum</i> Sw.	Solanaceae	M. Khalangjing	S	Up to 1000	Fruit	Vegetable
308	<i>Sorbus foliolosa</i> (Wall.) Spach	Rosaceae	N: Tengra	T	3000-4000	Fruit	Fruit
309	<i>Sorbus insignis</i> (Hk.f.) Hedl.	Rosaceae	N: Tengra	T	1200-1500	Fruits	Fruits
310	<i>Spilanthes paniculata</i> Wall. ex DC.	Asteraceae	N: Sikia pan	H	Up to 1500	Young shoots	Vegetable.
311	<i>Spondias axillaries</i> Roxb.	Anacardiaceae	N: Lapsi	T	1000-1200	Fruit, leaves	Wild fruit, fodder
312	<i>Stephania japonica</i> (Thunb.) Miers	Menispermaceae	Mj: Okaji	C	300-700	Tuberous root, stem , leave	Chicken disease, dysentery, malaria
313	<i>Sterculia guttata</i> Roxb.	Sterculiaceae	As. Sirikh	T	500-1300	Seeds, fruit	Vegetable.
314	<i>Strobilanthes multidentis</i> Clarke	Acanthaceae	M: Hangmento sheng	S	700-1000	Leaf and flower	Bone fracture
315	<i>Swertia angustifolia</i> Buch.-Ham ex D.Don	Gentianaceae	M: Jala Pangduk man	H	2000-2800	Root	Stomach problem, fiver
316	<i>Swertia chirayita</i> (Roxb.)	Gentianaceae	M: Pangduk man	H	1400-3270	Whole plant	Asthma, liver

Karst.			B: Bahua				disorder and stomach ache
317	<i>Swertia hookeri</i> Clarke	Gentianaceae	M: Serkuto/ thokwon	Yu H	4000-4300	Root stock, Whole plant	Bloody flux, painful delivery, syphillis
318	<i>Swertia kingii</i> Hk.f	Gentianaceae	M: Cibikholo	H	3800-4100	Root stock	Cough, asthma
319	<i>Symplocos racemosa</i> Roxb.	Symplocaceae	As: Kavirang	T	2800-3200	Bark, leaves	Dye, biomordant, dysentery
320	<i>Syzygium aborensense</i> (Dunn) Rathakr. & Nair	Myrtaceae	Np: Kalajam	T	600-900	Fruits	Fruits
321	<i>Syzygium cumini</i> Skeels	Myrtaceae	M: Kaang-mrephsheng	T	Up to 900	Fruit, seed, bark	Wild fruit, diabetes, gargles, vomiting
322	<i>Syzygium praecox</i> (Roxb.) Rathakr. & Nair	Myrtaceae	As. Boga Jamu	T	200-1200	Fruit	Fruits
323	<i>Tacca integrifolia</i> Ker.-Gawl	Taccaceae	As: Vrahikanda	H	300-500	young leaf, rootstock,	Vegetable, ornamental
324	<i>Taxus wallichiana</i> Zucc.	Taxaceae	M: Kitangma	T	2100-3400	Leaves, bark	Fodder, hysteria, epilepsy and as fish poison
325	<i>Terminalia citrina</i> Roxb. Flem.	Combretaceae	M: Baruah shing; As. Hilikha	T	1000-1200	Leaves, Bark and fruits	Cough, headache, dye, fever, blood purier, agriculture tools
326	<i>Terminalia myriocarpa</i> Heurck. & Muell	Combretaceae	As: Holok; Adi. Siluk	T	400-900	Bark, Stem	Cardiac stimulant, tanning, agricultural tool
327	<i>Termitomyces clypeatus</i> Heim	Amanitaceae	B: Molaii	P	200-1000	Fruiting body	Vegetable
328	<i>Thalictrum foliolosum</i> DC.	Ranunculaceae	M: Ruserbu/Rongsheng	H	1300-3400	Root	Gastric problem
329	<i>Thysanolaena maxima</i> (Roxb.) Kuntze	Poaceae	M: Chakoo sha Ni: Tajee	H	1200-1500	Rhizome Panicle, leaves	Backache, broom, fodder
330	<i>Trichosanthes tricuspidata</i> Lour.	Cucurbitaceae	M: Pampego	H	600-2100	Fruit, seed, root	Gastritis, ulcers, liver trouble

331	<i>Tsuga dumosa</i> (D.Don) Eichler	Pinaceae	M: Tangsing	T	2500-3500	Roots	Liver disorder
332	<i>Uraria rufescens</i> (DC.) Schindl.	Fabaceae	As: Mirongrondai	S	600-2000	Leaves	Against fever
333	<i>Urtica mairei</i> H. Lev.	Urticaceae	N. Shishnu	S	1800-2000	Young Leaves	Vegetable
334	<i>Usnea baileyi</i> (Stirt.) Zahlbr.	Usneaceae	M: Punpu	E	2000-3500	Pendulous fruticose thallus	Antibiotic property
335	<i>Valeriana jatamansi</i> Jones	Valerianaceae	M: Pangposs	H	1800-2000	Rhizome oil, Roots	Insect repellent, hysteria, fragrance, Incense sticks
336	<i>Viburnum erubescens</i> Wall	Caprifoliaceae	M: Blagar shing	S	1800-3300	Seeds	As massage oil and cancer
337	<i>Viburnum foetidum</i> Wall	Caprifoliaceae	Np: Gannee	S	2000-3000	Leaves	Beverages, menorrhagia,
338	<i>Viola diffusa</i> Ging.	Violaceae	As: Banafshah	H	1500-3000	flower	Chest pain,
339	<i>Wallichia densiflora</i> Mart	Arecaceae	Mj: Niyuk/ Ak: Rongbong	T	Upto 900	Pith, Leaf	Pith starch as stable food
340	<i>Woodfordia fruticosa</i> (L.) Kurz	Lythraceae	M: Chot tingba	S	700-900	Flower	Dye
341	<i>Zanthoxylum armatum</i> DC.	Rutaceae	M: Khagi Np: Timur	T	300-800	Bark, Fruits and seeds	Spice, stomachic, scabies, throat problem, fish poison
342	<i>Zanthoxylum oxyphyllum</i> Edgew.	Rutaceae	M. Yer ; Np. Timur	C-s	1500-2000	Fruits, leaves	Spice, vegetable, medicine , fish poison
343	<i>Zizyphus mauritiana</i> Lam.	Rhamnaceae	Adi: Gange-asing As. Bogori	T	500-800	Fruit	Fruits, vomiting, diarrhea

\*M= Monpa, Mj=Miji, Ak= Aka, B=Bugun, S= Sherdukpen, Ni=Nyishi, Np=Nepali, As=Assamese, E=English ; C= climber, C-s= Creeping shrub, E= Epiphytes, H= Herb, A-p= Aquatic plant, P= Parasite, S= Shrub, S(p)=Prostrate shrub, Sm= Symbiont, T= Tree, T-f= Tree fern, T-h= Tree herb, T(s) = Small tree, T-g= Tree grass, T-p= Tall palm, W-c= Woody climber, W-g= Woody grass