

Non-timber Forest Products in Bardiya District of Nepal: Indigenous Use, Trade and Conservation

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ABSTRACT This article scopes the status and potential of non-timber forest products (NTFPs) in community forests and the national forest of Bardiya district in western Nepal. The human ecological approach, participatory rural appraisal, focus group discussions and interviews were used to gather data and information for analysis. The results of the data analysis indicate that the area harbours a high diversity of potential NTFPs. Altogether, 101 species and their traditional uses were recorded. The NTFP species are clustered into first, second, third and fourth categories on the basis of their market value and resource availability. Despite a gradual but systematic socio-cultural transformation of the local communities, they still possess ample knowledge of plants and their uses. It is observed that the proper management of the NTFPs could play a vital role in the improvement of people's livelihood on a sustainable basis.

1. INTRODUCTION

Non-timber Forest Products (NTFPs) are important tools for addressing poverty issues for the marginalised, forest dependant communities, by contributing to livelihoods, including food security, income, health and sustainable human development (FAO 1995; Falconer 1997; Ahenkan and Boon 2008). Globally, an estimated 350 million people mostly in developing countries depend on NTFPs as their primary source of income, food, nutrition, and medicine (Chandrasekharan 1996; Olsen 1998; UNDP 2004; FAO 2005). These products play a vital role in sustaining the lives of local gatherers, who must increasingly adapt to diminishing resources to stay alive.

In Nepal, hundreds of plant species are used as NTFPs (Rawal 1997; Shrestha et al. 2004) and have great conservation and economic value (Gauli and Hauser 2009). These resources are a key source of income and livelihood assists for

many of the poorest people in Nepal. In certain areas, NTFPs provide up to 50 percent of household income (Edwards 1996). The use of NTFPs vary from place to place because of the heterogeneity of the community and different traditional practices by ethnic groups in the country. In recognising this economic value, forest policies of Nepal have recommended sustainable NTFP management for poverty reduction and livelihood improvement by ensuring community participation in forest management (GoN 2004).

2. PROBLEM STATEMENT, OBJECTIVES AND GUIDING HYPOTHESIS

The significance of NTFPs in rural livelihood improvement and for subsistence has been established by a number of studies at the national level in Nepal (Kanel 1999; Shrestha et al. 2003; Gauli and Hauser 2009), but little is known about their collection and marketing dynamics (Bista and Edward 2006). Tracing the history of NTFPs exploitation reveals an over-harvesting of medicinal plants; other items are largely being ignored. The potential uses of many of the NTFPs have not being well-documented in Khata-Katarniaghata Corridor despite their potential in poverty

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reduction and livelihood improvement amongst the indigenous people. The documentation of other uses of NTFPs is essential in the sense that it will provide choices and help the communities to improve their economic conditions by exploring more market values and potentialities. Thus, the specific purpose of this paper was to document the available NTFPs used by indigenous people in Bardiya district of Nepal, their status and contribution towards improving the livelihoods of the local people as well as identification and prioritisation of NTFP species for sustainable management and identify key management challenges. The study was guided by the assumption that the area harbours a high diversity of economic plants but the population is less aware about the potentials of these resources which can significantly contribute towards sustainable livelihood improvement and poverty reduction.

3. CONCEPTUAL FRAMEWORK

The conceptual framework on which this paper is anchored is the role of NTFPs in improving the livelihoods of the poor in forest fringe communities and sustainable forest management (Fig. 1). The principal premise of the paper is that NTFPs play an important role in meeting the needs of rural communities, especially in the areas of food, medicine, poverty reduction, sustainable management of forest resources and livelihoods improvement (FAO 1995; Marshall et al. 2005).

Non-timber forest products are integrated components of the forestry sector and have been widely recognized as potential resources for promoting sustainable livelihoods, conservation and capacitating development organizations (FAO 1995; Hamilton 2004). They play a crucial role in the livelihoods of rural people, especially for those dwelling in the forest and its vicinity (Edwards 1993). Besides medicinal plants the use of diverse groups of NTFPs is largely ignored by the Nepalese community and development organizations. At present, medicinal plants are largely being over-exploited. It is therefore high time to explore and promote other NTFPs by not excluding medicinal plants.

Sustainable collection, use and commercialization are the main drivers in the promotion of NTFPs for community development, poverty reduction and livelihood improvement and sustainable forest management. This requires scientific documentation of these resources, the details

of species-specific information on distribution and availability, their potential use and market frontiers.

4. MATERIALS AND METHODS

4.1 Study Location and Characteristics

The Khata-Katarniaghat Corridor of the Terai Arc-Landscape (TAL) programme in Bardiya district of Western Nepal was the study area. The TAL is one of the 120 eco-regions of the world identified by the World Wildlife Fund (WWF) and jointly managed by the Government of Nepal and WWF Nepal. The TAL encompasses lowland Terai and outer foothills of the Himalayas at 27° 00' 00" N and 80° 03' 00" E, extending from the Bagmati River in the east to the Mahakali River in the west. This Nepalese part of the TAL covers 14 districts and includes 75% of lowland Terai forest and Churiya. The Terai lowland tropical forest of Nepal is characterised by enormous biological wealth of regional and global importance (Chaudhary 1998). It was historically the most diverse of Nepal's ecosystems, but extensive deforestation has greatly reduced the forest area, the population of many species and the variety of ecosystems (GoN 2002).

Khata-Katarniaghat Corridor is trans-boundary and covers an area of 82.62 km² with a forest area of 31.86 km². The corridor connects Bardiya National Park in Nepal with Katarniaghat Wildlife Sanctuary in India (Fig. 2). TAL programme is being implemented in two Village Development Committees (VDCs) of Bardiya district which has a population of 18,300. Thirteen community forests in two VDCs and surrounding national forests were studied.

4.2 Data Collection and Analysis

The study was carried out during March-August, 2006. Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA) following Martin (1995) were conducted on the use of wild plants with focus on the season of availability, mode of harvest, status of the plant, personal and community choices, commercial values, and indigenous conservation approaches. Guidelines for the interviews and group discussions were developed to facilitate the collection of information. Altogether five community-level discussion groups were held in different localities

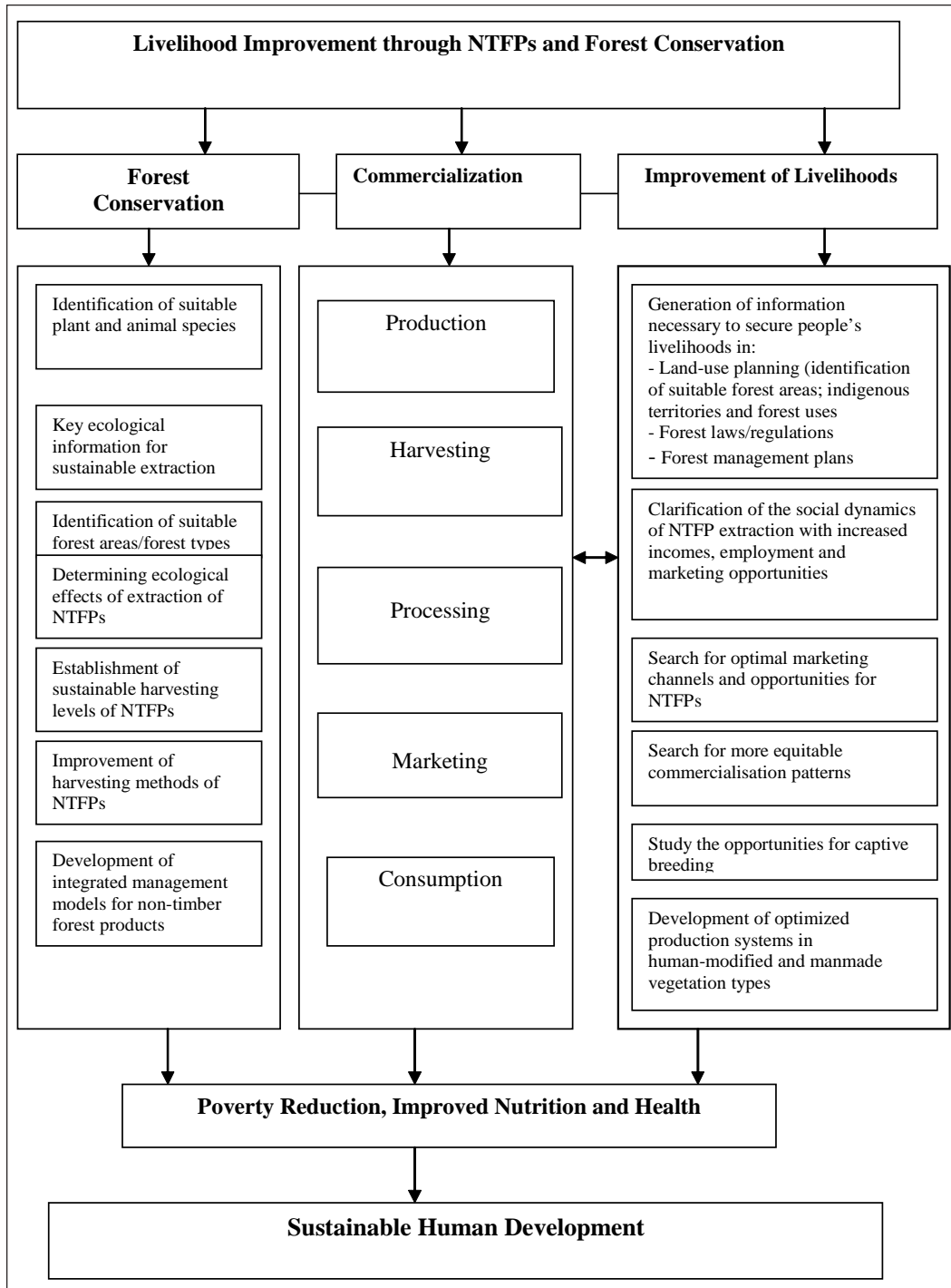


Fig. 1. Livelihood Improvement through NTFPs and Forest Conservation
 Source: Adopted from Ros-Tonen M (Ed.) (1999)

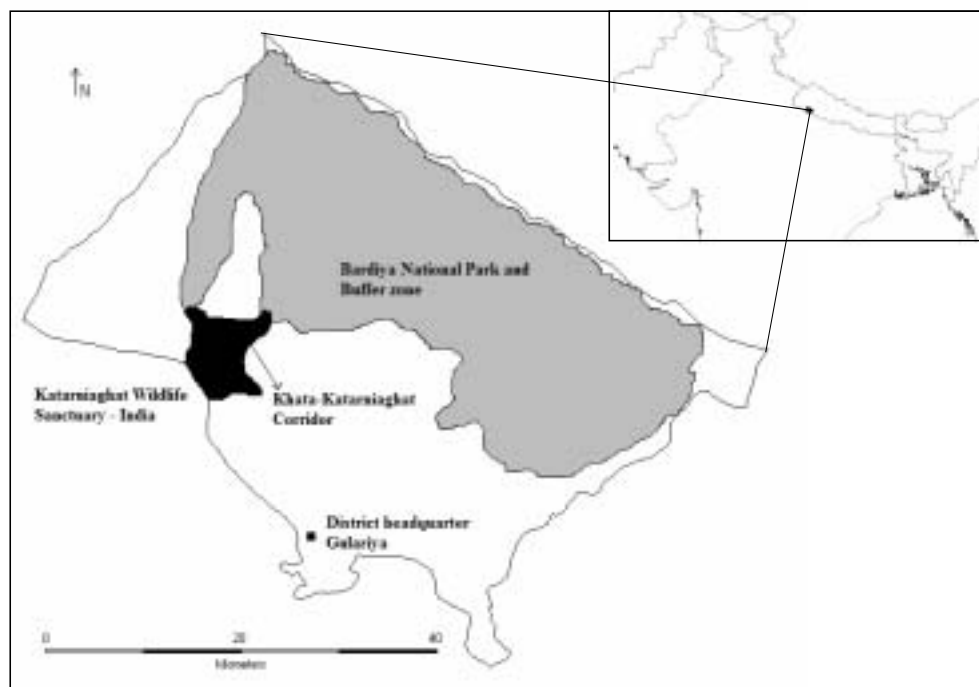


Fig. 2. Bardiya District and the Khata-Katarniaghat Corridor

representing an average of eight persons in each discussion group. Additional 21 key informants like plant collectors, cultivators, traditional healers, traders, community heads and district forest office staffs were purposively selected for interviews (Huntington 2000). Prior informed consent was obtained with the help of community workers (Martin 1995) that facilitated interviews and discussions with the local people. Consent was granted by the local people for the dissemination of their traditional knowledge.

Livelihood assessment was done by investigating the people's engagement in activities like collection, harvesting, processing and packaging of NTFPs in the area, and their overall contribution to the local and national economy. The local and regional market survey was conducted to know the potential species in trade and their price. The abundance of the species was determined based on resource mapping with the community and forest study. Key informants were also requested to walk along the botanical inventory transects and to report different vegetation types and useful species. Cunningham (2001) has stressed the importance of transect walks with key informants in biodiversity and ethno-

botanical studies. These walks also provided an opportunity to valorize the findings of RRA and PRA, and allowed to gather information about the local names of many species. Herbarium specimens were collected for each species and brought back to the lab to facilitate identification using reference collections (Hara and Williams 1979; Hara et al. 1982; Polunin and Stainton 1984; Press et al. 2000) and expert knowledge. The voucher specimens were deposited in Tribhuvan University Central Herbarium (TUCH) Kirtipur, Kathmandu.

5. RESULTS

5.1 Indigenous Use of NTFPs in the Khata - Katarniaghat Corridor

Altogether, 101 species under 48 families and 91 genera were identified as NTFPs, which were commonly used plants by the local people for domestic purposes (Appendix I). Well represented families were Leguminosae (11 species), Gramineae (7), Euphorbiaceae (5), Moraceae (5), Compositae (5), Anacardiaceae (4), Compretaceae (4), and Solanaceae (4). Angiosperms were

distributed into different six life forms, with trees and herbs having the most species (Fig. 3). Plants were used mainly as fruit, vegetables, for fish poisoning, as fermentation material, for thatching, as fibre and medicines. For the different categories, medicinal plants comprised the highest number of 56 species (55%); followed by wild edible 26 (25%) (vegetables 13 and fruits 13); fermentation (15); fish poison (9); fodder (7); agricultural implements (6); rope making (5); plants having religious importance (3); and thatching (2) (Fig. 4).

People in this area were largely marginalised and landless. Dependency on forest was therefore quite high. Seasonal vegetable species such as *Diplazium esculentum* (Kochi sag), *Ophioglossum petiolatum* (Jibre sag), species of mushrooms, *Bauhinia variegata* (Koiralo) and *Dioscorea bulbifera* (Tarul) were regularly consumed and preferred by the local people. Similarly, *Syzygium cumini* (Jamun), *Ficus racemosa* (Gullar), *Aegle marmelos* (Bel), *Schleichera oleosa* (Kusum), *Phyllanthus emblica* (Amala), *Zizyphus mauritiana* (Bayar), *Putranjiva roxburghii* (Pitamari) were seasonal fruits consumed locally.

The native Tharu inhabitants of this corridor used several species of medicinal plants such as *Acacia rugata* (Sikakai), *Holarrhena pubescens* (Dudhe), *Operculina turpethum* (Nishod), *Piper longum* (Pipla), *Acorus calamus* (Bojho), *Terminalia chebula* (Harro), *Terminalia bellirica*

(Barro), *Tinospora sinensis* (Gurjo), Bel and many more in traditional healing practices (Appendix 1).

5.2 NTFPs Trade and Livelihood

Even though many seasonal vegetables, fruits, medicinal plants and *Dedrocalamus* spp. have a good market value, income through commercialization of such species was very low due to inadequate market information. The local community were unaware about the possibility of selling their forest products. Nevertheless, some of the species such as dried Barro, dried Pipla, fruit of *Ricinus communis* (Renu), pod of *Bauhinia vahlii* (Bhorla) and Koche sag were sold in the local market in small scale. The regional market study showed that there were many species like Bel, Jamun, Koiralo and Tarul that have high market demand and also are available in huge stock in the forest.

The forest comprised considerable number of NTFPs collected and exported from the district such as Bet, Bhorla, Sikakai, *Eulaliopsis binata* (Babiyo), and *Asparagus racemosus* (Kurilo). Among these products, Sikakai was the major income generating NTFP that contributed to the cash income of the local people who were hired for collection and drying processes by the contractors during the collection season. In general, the divers group of NTFPs were used mainly for local subsistence and less used for trade, income generation and livelihood improvement.

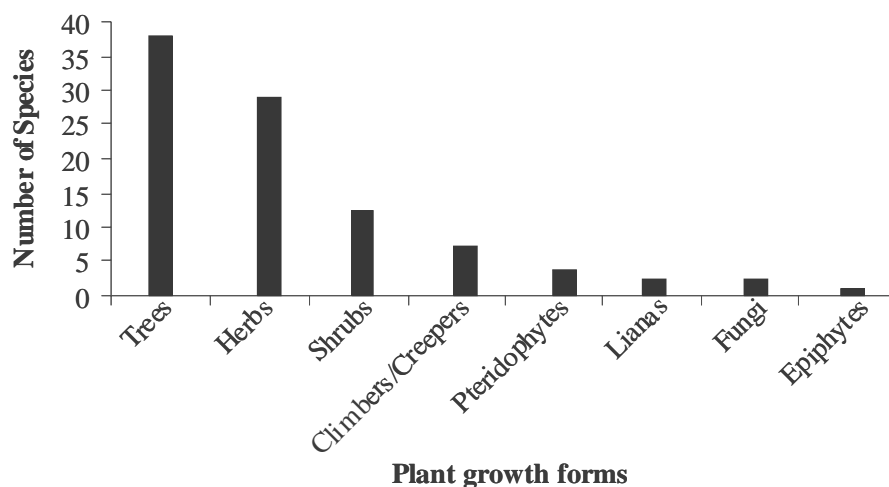


Fig. 3. Growth Forms of Plant Species

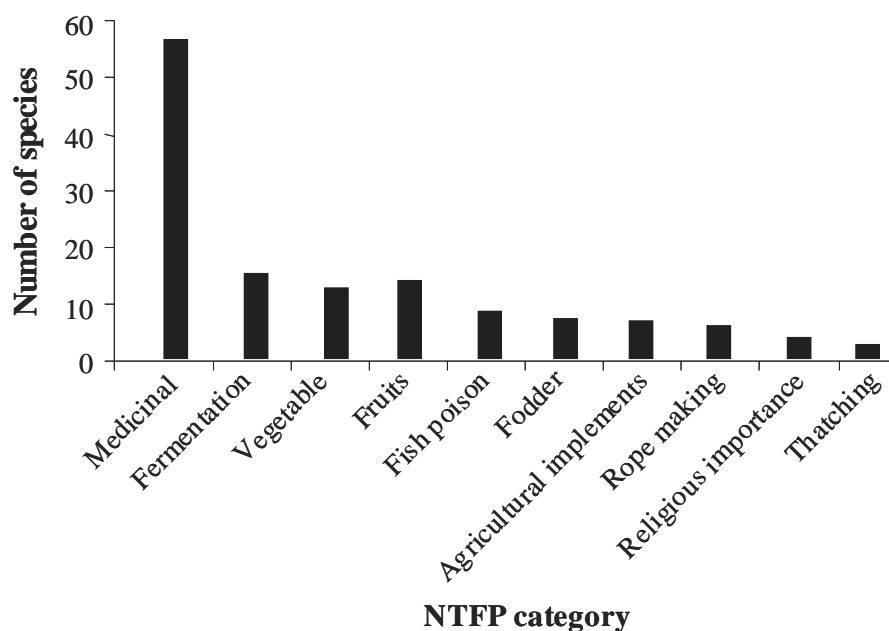


Fig. 4. Categories of NTFPs in Bardiya District

5.3 Identification of High Priority and Potential NTFPs

By employing certain criteria such as species abundance in the surrounding forest, existing indigenous knowledge systems, economic importance, market value and local people's interest including the perspectives and suggestions of management authorities, three categories of NTFPs were classified as first, second and third priority species (Table 1). These 10 species are of high priority for immediate promotion for income generation through collection and commercialization as they possess high market demand and price as well as high abundance in the

surrounding forests. The first priority species included *Acacia rugata* and *Aegle marmelos*. *Calamus tenuis*, *Bambusa arundinacea* and *Buchanania latifolia* are included as second priority species. The third priority species include *Phyllanthus emblica*, *Terminalia chebula*, *T. bellirica*, *Azadirachta indica* and *Piper longum*.

Another twenty-one species of NTFPs have been identified and categorised into four different groups of species that have enormous potentials in the market for long term commercialization together with high priority species (Table 2). However, these species required careful management and treatment. The abundance of the species is ranked from 5 to 1 on a descending

Table 1: High priority species of NTFPs in the corridor

S.No.	Priority Species	Local and scientific name
1	First priority species	<i>Acacia rugata</i> (Lam.) Voigt (Sikakai) <i>Aegle marmelos</i> (L.) Correa (Bel)
2	Second priority species	<i>Calamus tenuis</i> L. (Bet) <i>Bambusa arundinacea</i> Retz. (Bans) <i>Buchanania latifolia</i> Roxb. (Piyari)
3	Third priority species	<i>Phyllanthus emblica</i> L. (Amala) <i>Terminalia chebula</i> Retz. (Harro) <i>Terminalia bellirica</i> (Gaertn.) Roxb. (Barro) <i>Azadirachta indica</i> A. Juss. (Neem) <i>Piper longum</i> L. (Pipla)

Source: Field survey 2006.

order of their availability. Species included in the first group are those plants which are very useful and valuable for trade because they command a high price but are not collected and traded in large scale as they are not in large quantities. These plants therefore need to be conserved. Similarly, species of the second group are commonly available and traded, but not in Nepal. For example, *Murraya koenigii* (Currypatta) is highly demanded spice in South India but unknown about its quality and quantity. These plants need some treatment before they are marketed. Plants for which more information is needed in terms of domestication, utilisation, value addition and trade are included in the third group. For the purposes of domestication, value addition and commercialisation of plants of the fourth group need large-scale cultivation in community forests, marginal and waste land.

5.4 NTFPs Conservation and Management Issues and Practices

The communities in Bardiya district have utilised and traded several NTFPs in different

ways but without paying adequate attention to their conservation. The species which are propagated by means of root, rhizomes and seeds need careful attention during harvesting. For example, hazardous collection of the root and rhizome of species such as Bojho, Kurilo and Tarul might have severe conservation threats because the propagation of these species generally happens via the underground parts. Likewise, the inappropriate harvesting of the bark of Bhorla is another sustainability threat. The over-harvesting of fruits and seeds of Amala, Barro, Harro, Sikakai and *Shorea robusta* (Sal) also lead to their depletion and extinction. There was unfair/unhealthy competition for the collection of products bearing in mind that 'if I don't collect now and get the benefits, somebody else will snatch the profit away from me'.

Bhojo, Kurilo and some exotic species like *Mentha arvensis* and *Cymbopogon flexuosus* were under cultivation in the study location. With regard to the conservation practices, some of the community forests have established nurseries for the production of seedlings of medicinal plants. The majority of the forest patches were under the

Table 2: Potential species of NTFPs in Khata-Katarniyaghat corridor

S.No.	Botanical name	Local name (s)*	Abundance*
Group 1			
1	<i>Asparagus racemosus</i> Willd.(LILIACEAE)	Jhirjhire kanda, Kurilo, Kurla (Thr.)	1
2	<i>Eulaliopsis binata</i> (Retz.) C.E. Hubb. (GRAMINEAE)	Bankash, Babiyo, Ranguwa (Thr.)	5
3	<i>Holarrhena pubescens</i> (Buch.-Ham.) Wall. ex G. Don (APOCYNACEAE)	Dudhe, Ban khirro	1
4	<i>Operculina turpethum</i> (L.) Silva(CONVOLVULACEAE)	Nisodh	1
5	<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz(APOCYNACEAE)	Sarpagandha	1
Group 2			
6	<i>Acorus calamus</i> L.	Bojho	1
7	<i>Andrographis paniculata</i> (ACANTHACEAE)	Kalapnath	1
8	<i>Curculigo orchoides</i> Gaertn.(HYPOXIDACEAE)	Kalo Musuli	1
9	<i>Madhuca longifolia</i> (Koenig) Macbride(SAPOTACEAE)	Mahuwa	2
10	<i>Murraya koenigii</i> (L.) Spreng.(RUTACEAE)	Binbinveria, Meetha neem, Currypatta	5
11	<i>Phoenix humilis</i> Royle ex Becc. and Hook.f.(PALMAE)	Thakal, Khajur (Thr.)	3
12	<i>Vetiveria zizanoides</i> L.(GRAMINEAE)	Sikhul (Thr.), Sinkh, Barni	3
Group 3			
13	<i>Butea monosperma</i> (Lam.) Kuntze(LEGUMINOSAE)	Palans, Paras, Parsa	1
14	<i>Ichnocarpus frutescens</i> (L.) R. Br.(APOCYNACEAE)	Chegad duddhi	4
15	<i>Saccharum munja</i> (GRAMINEAE)	Munj, Munje (Thr.)	4
16	<i>Shorea robusta</i> Gaertn.(DIPTEROCARPACEAE)	Sal, Sekhuwa (Thr.)	3
17	<i>Tinospora sinensis</i> (Lour.) Merr.(MENISPERMACEAE)	Gurjo	1
18	<i>Woodfordia fruticosa</i> (L.) Kurz(LYTHRACEAE)	Dhayera, Dhaiyero	2
Group 4			
19	<i>Curcuma angustifolia</i> Roxb.(ZINGIBERACEAE)	Haldi, Besar	2
20	<i>Ricinus communis</i> L.(EUPHORBIACEAE)	Ander , Aril (Thr.), Raine (Thr.)	3
21	<i>Zingiber officinale</i> L.(ZINGIBERACEAE)	Aduwa, Sutho	2

Source: Field survey 2006.

*Thr.=Local Tharu name, rest are common Nepali names

*Abundance: 5 = Dominant, 4 = Common, 3 Less common, 2 = Frequent, 1 = Rare.

'community forestry' and managed by Community Forest User Groups (CFUGs). But there were limited conservation and sustainable management activities conducted for NTFPs. Normally, CFUGs need to incorporate NTFPs in Management Plan but due to technical problems of proper identification they could not include the NTFPs properly in their Management Plan.

5.5 Major Challenges Identified in NTFP Sector of Bardiya District

Many of the local people were found interested to get involved in collection and sale of NTFPs in the study area. However, there were several challenges that were limiting their interests. The following were the main challenges identified by the collectors, traders, and district forest office staffs:

1. Lack of market information: information on price, quality and quantity demanded, market to sell the product, and the market chain,
2. Limited species-specific information such as availability, distribution, productivity, and regeneration potentials,
3. Lack of infrastructure for storage, value addition and grading of products,
4. Threats to NTFPs from over-grazing, deforestation and unsustainable harvesting,
5. Lack of clear policy on collection, trade permits and taxation, and
6. Lack of capacity with the communities for the better management of NTFPs.

6. DISCUSSION

Plants have always been a central part of the life and culture of the Nepalese people (Manandhar 2002), and all aspects of the Nepalese folk-life and beliefs are related to flora (Shrestha et al. 2004; Uprety et al. 2008). The relationship between local people and NTFPs in the present study shows the wealth of indigenous knowledge on the different aspects of plant utilisation in the corridor. Indigenous knowledge plays an important role in the extraction of NTFPs (Narendran et al. 2001). The dependency of the people on the NTFPs ranges from highly preferred fermentable plants to widely used edible plants and medicine. Medicinal and food plants are usually an important category for the native people, as shown in other studies: Rossato (1999) in Atlantic Forest Coast of Brazil; Gemedo-Dalle et al. (2005) in

Ethiopia; and Mbuvi and Boon (2009) in Kenya. Though all the inhabitants of the corridor were dependent on the environmental resources surrounding them, especially the aboriginal settlers, the *Tharu* seemed more knowledgeable on the use of the plant products.

There is no doubt that NTFPs play a critical role in providing subsistence and cash income to a large proportion of the world's population (Pimentel et al. 1997). Studies from all tropical regions indicate that it is often the poorest households in rural communities that are most directly dependent on NTFPs (Falconer 1992; Shiva and Verma 2002; Marshall et al. 2005). In Bardiya district of Nepal, the gathering of NTFPs is a source of employment and livelihood for the local population (Shrestha et al. 2003). But in present study the local people were found less aware about the market value of many species and therefore not able to generate significant income from NTFPs though they offer huge opportunities. Therefore, the identification and prioritization of the species were carried out for the management and commercial purpose. It can guide the NTFP related activities in the region and provide choices to the communities. However, an effective marketing information system is required to motivate and aware NTFP collectors about their products, and also to increase their bargaining power to obtain better prices for their products (Karki 2003; Runwar and Duwadee 2003). Under the right circumstances, these values can be translated into incentives for conservation of the habitats in which NTFPs are found (Hamilton 2004) and thereby ensure ecological sustainability of the resources to some extent (Uprety 2008).

From a marketing point of view, NTFPs represent one of the most challenging groups of products because of their number, versatility, end use variation, dissimilarities of the producer base and resource richness (Lintu 1995). Due to lack of resources in district forest office, the effective monitoring and generating species-specific information is not possible (DFO pers comm). The policy and regulatory environment for conservation and commercialization of NTFPs has been criticized as being ambiguous and ineffective, supporting previous findings (Chaudhary 2000, Larsen et al. 2005, Kunwar et al. 2009). However, in recent years the policy environment is becoming more favourable for the commercialization of the NTFPs after the implementation of Herbs and NTFP Development Policy (GoN 2004).

It is therefore important to develop sound and sustainable strategies to mainstream NTFPs into the modern economy, while guaranteeing their accessibility to local communities. However, as the development of NTFPs increases, there is a danger of unsustainable exploitation; increasing demand can lead people to disregard traditional sustainable harvesting techniques. The management of NTFPs, especially their income and employment generation functions, must not ignore the local indigenous knowledge, the ecological impacts of NTFPs extraction, the development of appropriate small-scale enterprises and cooperatives for collecting, processing, marketing, monitoring, and sharing of rights and benefits. The existing channels for the flow of conservation related information varies from place to place. Integrated forest management and socio-economic development activities as practised by Terai Arc-Landscape programme is becoming a new paradigm of conservation in the region (Shrestha et al. 2003).

A main concern for the conservation and sustainability of these resources is that there exists unsustainable harvesting practices and habitat loss. It is generally argued that Nepalese NTFPs are threatened due to habitat loss and unsustainable harvesting (Chaudhary 1998; Uprety et al. 2010). The roots and seeds which are the propagating materials are being over harvested. The removal of roots can have significant detrimental effects on plant survival and regeneration (Dhillion and Amundsen 2000; Ghimire et al. 2005). Some of the medicinal plants are cultivated in the community forests. Such practice offers the most effective solution for conservation of many species (Schippmann et al. 2002) and also produce significant amount of products that can be supplied to the market. There was a problem in the district that many of the products are collected in small amount and could not be supplied to the market as the market demands huge quantities. These problems can be solved via cooperatives which are also being established for proper networking and effective marketing of NTFPs in the study area.

7. CONCLUSION

This paper reveals that a large number of the poor continue to generate income, food and medicine from the collection and sale of NTFPs. The district harbours an incredible diversity of NTFPs and the population possess a sound

knowledge on plant resources. A number of recorded species with good market potential are abundantly available. Despite their potential, the contribution of NTFPs to local economy is still negligible. The expanding market opportunities for a wide range of NTFPs is not yet a boon to the rural people living close to the resource base. As suggested by Lintu (1995) and realised from the present study, effective marketing of NTFPs should be recognised as a major strategy for the sustainable management and utilization of forest resources. Nevertheless, a holistic approach for the domestication and commercialization of NTFPs should also involve the local community at the grassroots level. The capacity building programmes for the local people and local institutions are very important. The abundance of the species in the forests and their potential in the market offer better opportunity for the development of the NTFPs in the district. They therefore hold a potential for poverty alleviation (FAO 1993). It is urged to grab the opportunities while addressing the challenges for the sustainable management and commercialization of these valuable products.

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REFERENCES

- Ahenkan A, Boon EK 2008. *Enhancing Food Security and Poverty Reduction in Ghana Through Non-timber Forest Products Farming: Case Study of Sefwi Wiawso District*. Munich: GRIN Publishers.
- Bista S, Edward WL 2006. Collection and marketing of non-timber forest products in the far western hills of Nepal. *Environmental Conservation*, 33 (3): 244-255.
- Chandrasekharan D 1996. *NTFPs, Institutions, and Income Generation in Nepal: Lessons for Community Forestry*. Kathmandu: International Centre for Integrated Mountain Development.
- Chaudhary RP 1998. *Biodiversity in Nepal: Status and Conservation*. Bangkok: Craftsman Press.
- Chaudhary RP 2000. Forest conservation and environmental management in Nepal: A review. *Biodiversity and Conservation* 9: 1235-1260.
- Cunningham AB 2001. *Applied Ethnobotany: People, Wild Plant Use and Conservation*. London, Earthscan: People and Plants Conservation Series.
- Dhillion SS, Amundsen C 2000. Bioprospecting and the

- maintenance of biodiversity. In: H Svarstad, SS Dhillon (Eds.): *Responding to Bioprospecting: From Plants in the South to Medicines in North*. Oslo: Spartacus Forlag, pp. 103–131.
- Edwards DM 1993. *The Marketing of Non-timber Forest Products from the Himalayas: The Trade Between East Nepal and India*. Kathmandu: Rural Development Forestry Network.
- Edwards DM 1996. Non-timber Forest Product from Nepal: Aspects of the Trade in Medicinal and Aromatic Plants. *FORESC Monograph No. 1/96*. Kathmandu: Forest Research and Survey Centre.
- Falconer J 1997. *Non-timber Forest Products in Southern Ghana: A Summary Report*. ODA Forestry Series No. 2. Chatham: Natural Resources Institute.
- FAO 1993. *More Than Wood. Forestry Topics Report No. 4*. Rome: FAO.
- FAO 1995. *Non Wood Forest Products for Rural Income and Sustainable Forestry*. Rome: FAO.
- FAO 2005. *The State of Food Insecurity in the World: Eradicating World Hunger Key to Achieving the Millennium Development Goals*. Rome: FAO.
- Gauli K, Hauser M 2009. Pro-poor commercial management of non-timber forest products in Nepal's Community Forest User Groups: Factors and success. *Mountain Research and Development*, 29 (4): 298-307.
- Gemedo-Dalle TB, Maass L, Isselstein J 2005. Plant biodiversity and ethnobotany of Borana Pastoralists in Southern Oromla, Ethiopia. *Economic Botany*, 59: 43–65.
- Ghimire SK, McKey D, Thomas YA 2005. Conservation of Himalayan medicinal plants: Harvesting patterns and ecology of two threatened species, *Nardostachys grandiflora* DC. and *Neopicrorhiza scrophulariiflora* (Pennell) Hong. *Biological Conservation*, 124: 463-475.
- Government of Nepal (GoN) 2002. *Nepal Biodiversity Strategy*. Kathmandu: Government of Nepal, Ministry of Forest and Soil Conservation.
- Government of Nepal (GoN) 2004. *Herbs and Non-timber Forest Product Development Policy* [in Nepali]. Kathmandu, Nepal: Department of Plant Resources.
- Hamilton A 2004. Medicinal plants, conservation and livelihoods. *Biodiversity and Conservation*, 13: 1477–1517.
- Hara H, Charter AH, Williams LHJ 1982. *An Enumeration of the Flowering Plants of Nepal. Vol. III*. London: British Natural History Museum.
- Hara H, Williams LHJ 1979. *An Enumeration of the Flowering Plants of Nepal. Vol. II*. London: British Natural History Museum.
- Huntington HP. 2000. Using traditional ecological knowledge in Science: Methods and applications. *Ecological Application*, 10: 1270-1274.
- Kanel KR 1999. *Analysis of Policy and Regulatory Constraints in the Development of Non-timber Forest Products in Nepal*. A Report. USA: World Wildlife Fund.
- Karki M 2003. Certification and marketing strategies for sustainable commercialization of medicinal and aromatic plants in South Asia. *Paper presented in the International Union of Forest Research Organizations (IUFRO) All Division 5 Conference on Forest Products*, in Rotorua, New Zealand, March 11-15, 2003.
- Kunwar RM, Duwadee NPS 2003. Ecology and economy of NTFPs in Nepal: A case Study from Dolpa and Jumla Districts, Nepal. *Botanica Orientalis*, 3: 89-97.
- Kunwar SC, Ansari AS, Luintel H 2009. *Non-Timber Forest Products Enterprise Development: Regulatory Challenges and Experienced in the Koshi Hills of Nepal*. Discussion Paper. Kathmandu: Forest Action, pp. 15.
- Larsen HO, Smith PD, Olsen CS 2005. Nepal's conservation policy options for commercial medicinal plant harvesting: Stakeholders View. *Oryx*, 39: 435-441.
- Lintu L 1995. Marketing non-wood forest products in developing countries. *Unasylva*, 46: 37-41.
- Manandhar NP 2002. *Plants and People of Nepal*. Oregon: Timber Press.
- Marshall E, Newton AC, Schreckenber K 2005. Commercialization of non-timber forest products: First steps in analysing the factors influencing success. *International Forestry Review*, 5(2): 128-137.
- Martin GJ 1995. *Ethnobotany: A Methods Manual*. London: Chapman and Hall.
- Mbuvi D, Boon E 2009. The livelihood potential of non-wood forest products: The case of Mbooni division in Makueni District, Kenya. *Environment, Development and Sustainability*, 11: 989-1004.
- Narendran K, Murthy IK, Suresh HS, Dattaraja HS, Ravindranath NH, Sukumar R 2001. Non-timber forest product extraction, utilisation and valuation: A case study from the Nilgiri Biosphere Reserve, Southern India. *Economic Botany*, 55(4): 528-538.
- Olsen CS 1998. The trade in medicinal and aromatic plants from central Nepal to northern India. *Economic Botany*, 52(3): 279-292.
- Pimentel D, McNair M, Buck L, Pimentel M, Kamil J 1997. The value of forests to world food security. *Journal of Human Ecology*, 25(1): 91-120.
- Polunin O, Stainton A 1984. *Flowers of the Himalaya*. New Delhi: Oxford University Press.
- Press JR, Shrestha KK, Sutton DA 2000. *Annotated Checklist of Flowering Plants of Nepal*. London: British Natural History Museum.
- Rawal RB 1997. Status of Commercialization of Medicinal and Aromatic Plants of Nepal. In: M Karki, AN Rao, VR Rao, JT Williams (Eds.): *The Role of Bamboo, Rattan and Medicinal Plants in Mountain Development*. Proceedings of a Workshop Held at the Institute of Forestry, Pokhara, Nepal, 15-17, May, 1996. INBAR Technical Report No. 15, New Delhi: International Development Research Centre, pp. 174-188.
- Ros-Tonen M (ed.) 1999. *NTFP Research in the Tropenbos Programme: Results and Perspectives*. Wageningen: The Tropenbos Foundation.
- Rossato SC, Leitao-Filho HF, Begossi A. 1999. Ethnobotany of Caçaras of the Atlantic Forest Coast (Brazil). *Economic Botany*, 53(4): 387-395.
- Schippmann U, Cunningham AB, Leaman DJ 2002. Impact of Cultivation and Gathering of Medicinal Plants on Biodiversity: Global Trends and Issues. In: *Biodiversity and the Ecosystem Approach in Agricul-*

- ture, Forestry and Fisheries. Rome: FAO. From <<http://www.fao.org/DOCREP/005/Y4586E/y4586e08.htm>> (Retrieved October 4, 2007)
- Shiva MP, Verma SK 2002. *Approaches to Sustainable Forest Management and Biodiversity Conservation: With Pivotal Role of Non-timber Forest Products*. Dehra Dun: International Book Distributor.
- Shrestha KK, Tiwari NN, Rajbhandari S, Shrestha S, Uprety Y, Poudel RC 2003. *Non-timber Forest Products (NTFPs) in the Critical Bottlenecks and Corridors of Terai Arc- Landscape Nepal: Documentation, Utilization, Trade and People's Livelihood*. Kathmandu: WWF-Nepal.
- Shrestha KK, Tiwari NN, Rajbhandary S, Poudel RC, Uprety Y 2004. *Ethnobotany in Nepal: Review and Perspectives*. Kathmandu: WWF-Nepal.
- UNDP 2004. *The Equator Initiative: Money Grows on Trees*. Cameroon Series 5, New York: UNDP.
- Uprety Y 2008. *Medicinal and Aromatic Plants in an Alpine Environment: A Case Study of Rasuwa District, Central Nepal*. Master Thesis. Unpublished, Belgium: Vrije Universiteit Brussels, Department of Human Ecology.
- Uprety Y, Boon EK, Poudel RC 2008. *Traditional Use of Plant Resources by Bankariya Ethnic Group in Makwanpur District, Central Nepal*. Germany: GRIN Publisher.
- Uprety Y, Asselin H, Boon EK, Yadav S, Shrestha KK 2010. Indigenous uses and bio-efficacy of medicinal plants in Rasuwa District, Central Nepal. *Journal of Ethnobiology and Ethnomedicine*, 6: 3.

Appendix I: Enumeration of NTFPS in Khata-Katarniaghat Corridor, Bardiya, Nepal

S.No.	Local name(s)*	Latin name	Family	Growth form*	Parts used	Local uses
1.	Khayar	<i>Acacia catechu</i> (L. f.) Willd.	Leguminosae	T	Bark and timber	Bark juice used in <i>Aau</i> (dysentery) and timber for making handles of agricultural utensils.
2.	Babur	<i>Acacia nilotica</i> (L.) Willd. ex Delile	Leguminosae	T	Bark	Bark juice/paste is used to make fermenting material "Marcha".
3.	Lashzur (Thr.), Aila, Sikakai	<i>Acacia rugata</i> (Lam.) Voigt.	Leguminosae	S	Young shoots	Young shoots used as pickle and vegetable.
4.	Ulte kuro	<i>Achyranthes aspera</i> L.	Amaranthaceae	H	Leaf	Paste used in cut.
5.	Karma	<i>Adina cordifolia</i> (Willd. ex Roxb.) Benth. & Hook. f. ex Brandis	Rubiaceae	T	Wood	Kitchen utensil (spoon).
6.	Bel,	<i>Aegle marmelos</i> (L.) Correa	Rutaceae	T	Fruit, Entire plant	Fruit edible, fruit juice used as fish poison. Entire plant has ritual importance.
7.	Jaande (Thr.)	<i>Aerva sanguinolenta</i> (L.) Blume	Amaranthaceae	H	Entire plant	Used to make fermenting material "Marcha".
8.	Raunne	<i>Ageratum conyzoides</i> L.	Compositae	H	Leaf	Leaf juice used in cut and wounds.
9.	Dhouthi (Thr.)	<i>Anogeissus latifolius</i> (Roxb. ex DC.) Bedd.	Combretaceae	T	Wood	Agriculture implements.
10.	Dakhi	<i>Antidesma acidum</i> Retz.	Euphorbiaceae	S	Fruit, Leaves	Fruits edible, young leaves taken as pickles (<i>Chatni</i>) and mature leave as good fodder.
11.	Damarai	<i>Ardisia macrocarpa</i> Wall.	Myrsinaceae	S	Fruit	Fruit.
12.	Kurilo	<i>Asparagus racemosus</i> Willd.	Liliaceae	H	Root	Good fermenting material.
13.	Katahar	<i>Artocarpus integra</i> (Thunb.) Merr.,	Moraceae	T	Leaves	Leaf juice used to make fermenting material "Marcha".
14.	Neem	<i>Azadirachta indica</i> A. Juss.	Meliaceae	T	Leaf	Juice used as refrigerant (<i>Garmi</i>).
15.	Baans	<i>Bambusa arundinacea</i> Willd.	Gramineae	H	Leaf, Young shoot, Root	Leaf juice used in jaundice, young shoots as good vegetable; root juice is used in <i>Outis</i> (<i>Kan Pakne</i>).
16.	Maharain	<i>Bauhinia vahlii</i> Wight & Arn.	Leguminosae	L	Leaf, Stem	Leaf used to make <i>Chhatri</i> (traditional umbrella); stem is used as rope.
17.	Koilar (Thr.), Koitalo	<i>Bauhinia variegata</i> L.	Leguminosae	T	Flower	Vegetable.
18.	Simal	<i>Bombax ceiba</i> L.	Bombacaceae	T	Flower	Calyx used in boils.
19.	Piyari (Thr.)	<i>Buchanania latifolia</i> Roxb.	Anacardiaceae	T	Fruit	Seeds edible.
20.	Palans, Paras, Parsa (Thr.)	<i>Butea monosperma</i> (Lam.) Kuntze	Leguminosae	T	Flower	Flower juice used locally for stomach problems.
21.	Adahar	<i>Cajanus cajan</i> (L.) Huth	Leguminosae	T	Flower	Juice is taken in jaundice.
22.	Bet	<i>Calamus tenuis</i> L.	Palmae	C	Stem	Stems used to make furniture.
23.	Bhang, Saichan (Thr.)	<i>Cannabis sativa</i> L.	Cannabaceae	H	Leaf, Fruit	Leaf juice used in conjunctivitis, fruit and leaf also have stimulant, narcotic property.

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S.No.	Local name(s)*	Latin name	Family	Growth form*	Parts used	Local uses
24.	Khursani	<i>Capsicum annuum</i> L.	Solanaceae	H	Stem	Stem juice used to make fermenting material "Marcha".
25.	Ban Karauda	<i>Carissa carandas</i> L.	Apocynaceae	H	Root	Dry root used in wound for cattle.
26.	Ghol Tapre	<i>Centella asiatica</i> (L.) Urb.	Umbelliferae	H	Entire plant	Entire plant juice used in diarrhoea, fever and obstruction in urinary tract.
27.	Batul pate	<i>Cissampelos pareira</i> L.	Menispermaceae	H	Leaf, Root	Leaf juice used in fever and urine with blood.
28.	Gabda	<i>Colocasia fallax</i> Schott.	Araceae	H	Tuber, Leaf	Vegetable.
29.	Kabaliik (Thr.), Pharsi	<i>Cucurbita maxima</i> Duch.	Cucurbitaceae	C	Root	Root juice used in making fermenting material "Marcha".
30.	Haldi (Thr.), Besar	<i>Curcuma angustifolia</i> (L.) Kurtz	Zingiberaceae	H	Root	Root juice taken during common cold, clean throat. Root powder used to color food.
31.	Kalo musali (Thr.)	<i>Curculigo orchitoides</i> Gaertn.	Hypoxidiaceae	H	Root	Root used as aphrodisiac both for human and cattle.
32.	Akasbeli	<i>Cuscuta reflexa</i> Roxb.	Convolvulaceae	C	Whole plant	Plant juice used in jaundice.
33.	Sisau, Sisam	<i>Dalbergia sissoo</i> Roxb. ex DC.	Leguminosae	T	Root, Wood	Root used in swelling problem. Wood used to make handle of axe and plough.
34.	Dhaturo	<i>Datura metel</i> L.	Solanaceae	S	Fruit	Narcotic property.
35.	Panan	<i>Desmodium oojimense</i> (Roxb.) H. Ohashi	Leguminosae	T	Wood	Axe handle.
36.	Tarul	<i>Dioscorea bulbifera</i> L.	Dioscoreaceae	C	Tuberous root	Cooked as vegetable.
37.	Tend	<i>Diospyros melanoxylon</i> Roxb.	Ebenaceae	T	Fruit	Raw fruits edible.
38.	Kochiya (Thr.), Koche Sag, Neuro	<i>Diplazium esculentum</i> (Retz.) Sw.	Woodsiaceae	P	Whole plant	Eaten as highly preferred vegetable.
39.	Dadari	<i>Elephantopus scaber</i> L.	Compositae	H	Entire plant	Root juice used in abdominal pain and diarrhoea.
40.	Barmeli dhaniya	<i>Eryngium foetidum</i> L.	Compositae	H	Leaf	Entire plant juice used to make fermenting material "Marcha" but the best part is the root.
41.	Babiyo, Bankash	<i>Eulaliopsis binata</i> (Retz.) C. E. Hubb.	Gramineae	H	Aerial part	Used in constipation.
42.	Khashre	<i>Ficus hispida</i> L. f.	Moraceae	T	Leaves	Fodder.
43.	Pakadia (Thr.)	<i>Ficus lacor</i> Buch.-Ham.	Moraceae	T	Young shoot	Eaten as vegetable.
44.	Gullar, Dumri	<i>Ficus racemosa</i> L.	Moraceae	T	Leaf, Fruit	Leaves are good fodder. Fruits edible.
45.	Phursa (Thr.)	<i>Grewia optiva</i> J. R. Drumm. ex Burret	Tiliaceae	T	Fruit	Raw fruits edible
46.	Ben (Thr.), Bend	<i>Helicteres isora</i> L.	Sterculiaceae	S	Fruit, Stem	Fruit used for constipation for children. Right-coiled fruit used for the boy and left-coiled fruit used for the girl. Stem bark used to make rope.

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S.No.	Local name(s)*	Latin name	Family	Growth form*	Parts used	Local uses
47.	Kachari	<i>Holarrhena pubescens</i> (Buch.-Ham.) Wall. ex G. Don	Apocynaceae	T	LateX, Bark	Latex used in cut. Bark juice used in diarrhoea. Bark juice with lemon juice used for abortion.
48.	Chegad dudddhi	<i>Ichnocarpus frutescens</i> (L.) R. Br.	Apocynaceae	C	Stem	Used to make rope. Leaves as fodder.
49.	Siru	<i>Imperata cylindrica</i> (L.) P. Beauv.	Gramineae	H	Aerial part	Used in swelling problem. Good fodder.
50.	Ninjat (Thr.)	<i>Jatropha curcas</i> L.	Euphorbiaceae	S	Fruit	Narcotic property.
51.	Ashuro, Rusha (Thr.)	<i>Justicia adhatoda</i> L.	Acanthaceae	S	Whole plant	Plant juice used in cough.
52.	Asare	<i>Lagerstroemia reginae</i> Roxb.	Lythraceae	T	Twig	Twig used to avoid stomach disorder (<i>Sutisule</i>).
53.	Dabdabe, Jengra	<i>Lannea coromandelica</i> (Houtt.) Merr.	Anacardiaceae	T	Leaf, Fruit	Leaves juice used in cut. Fruits edible.
54.	Gum	<i>Leucas cephalotes</i> (Roth) Spreng.	Labiatae	H	Leaf	Few drops used in headache.
55.	Mahuwa	<i>Madhuca longifolia</i> (Koenig) Macbride	Sapotaceae	T	Flower, Fruit, Seed	Seed cake used as fish poison, flower used to make local wine. Fruit edible.
56.	Aamp	<i>Mangifera indica</i> L.	Anacardiaceae	T	Bark	Juice used in diarrhoea, dysentery.
57.	Gorari Goriyari	<i>Millettia extensa</i> (Benth.) Baker	Leguminosae	C	Root	Root paste used as fish poisoning, and as fermenting agent.
58.	Binbinveria, Meetha neem, Currypatta	<i>Murraya koenigii</i> (L.) Spreng.	Rutaceae	S	Leaves, Plant twigs	Leaves used to seasoning food. Leaves twigs used as insect repellent.
59.	Kera	<i>Musa paradisiaca</i> L.	Musaceae	H	Stem, Fruit	Fruits edible. Stem juice used in diarrhoea and also used to make fermenting material "Marcha"
60.	Kamal	<i>Nelumbo nucifera</i> Gaertn.	Nymphaeaceae	H	Flower	Juice taken during jaundice.
61.	Nisoht	<i>Operculina turpethum</i> (L.) Silva Manso	Convolvulaceae	H	Fruit	Plant juice used in stomach problem. Commonly used as laxative.
62.	Jibre Saag (Thr.)	<i>Ophioglossum petiolatum</i> Hook.	Ophioglossaceae	P	Whole part	Good vegetable.
63.	Ek patiya (Thr.)	<i>Ophioglossum reticulatum</i> L.	Ophioglossaceae	P	Whole part	Good vegetable.
64.	Biriya	<i>Persicaria hydropiper</i> (L.) Spach	Polygonaceae	H	Entire plant	Juice used as fish poisoning and also to kill crab.
65.	Seto dubo	<i>Phalaris</i> sp.	Gramineae	C	Entire plant	Plant juice used in jaundice.
66.	Amala, Aurai Amalosa (Thr.)	<i>Phyllanthus emblica</i>	L. Euphorbiaceae	T	Fruit	Fruits edible, also used as pickles.
67.	Pipla	<i>Piper longum</i> L.	Piperaceae	C	Fruit	Fruit edible, Green fruit or dried fruit powder used in cough and cold.
68.	Ashok	<i>Polyalthia longifolia</i> (Sonn.) Thwaites	Annonaceae	T	Leaf	Paste applied in eye problem of cattle.

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S.No.	Local name(s)*	Latin name	Family	Growth form*	Parts used	Local uses
69.	Belauti, Amba, Amrud (Thr.)	<i>Psidium guajava</i> L.	Myrtaceae	T	Young shoots, Leaf	Young shoot juice taken during diarrhoea. Leaf juice used to make fermenting material "marcha".
70.	Pitmari, Pajji (Thr.)	<i>Putranjiva roxburghii</i> Wall.	Euphorbiaceae	T	Leaf, Fruit	Good fodder; garland of fruits are used in boils.
71.	Aril (Thr.), Ander,	<i>Ricinus communis</i> L.	Euphorbiaceae	S	Leaf, Fruit	Leaf juice used to treat swelling, in jaundice; fruit juice used as fish poison.
72.	Gulab	<i>Rosa alba</i> L.	Rosaceae	S	Flower	Flower juice applied in cut.
73.	Ainselu	<i>Rubus ellipticus</i> Sm.	Rosaceae	S	Root	Bark juice/paste used to make fermenting material "Marcha".
74.	Panchumiya	<i>Rungia parviflora</i> Nees.	Acanthaceae	H	Entire plant	Plant juice applied in cut.
75.	Munj, Munje (Thr.)	<i>Saccharum munja</i> Roxb.	Gramineae	H	Entire plant	Used as thatching material.
76.	Rittha	<i>Sapindus mukorossi</i> Gaertn.	Sapindaceae	T	Fruit	Juice applied in earache.
77.	Kusum, Kosam (Thr.)	<i>Schleicheria oleosa</i> (Lour.) Oken	Sapindaceae	T	Fruit, Leaf	Fruits edible. Leaves as fodder.
78.	Byamti (Thr.), Chayu	<i>Schleroderma</i> sp.	Sclerodermataceae	F	Whole plant	Vegetable.
79.	Phutki (Thr.), Chayu	<i>Schleroderma</i> sp.	Sclerodermataceae	F	Whole plant	Vegetable.
80.	Bhela, Bheli (Thr.)	<i>Semecarpus anacardium</i> L. f.	Anacardiaceae	T	Leaf, Bark, Seed	Leaf juice used in cut; bark used to make fermenting material "Marcha"; seed used to cure cut and wounds.
81.	Sal, Shakuwa (Thr.)	<i>Shorea robusta</i> Gaertn.	Dipterocarpaceae	T	Young shoots, Bark	A young shoot juice used to make fermenting material "Marcha", Bark juice and young shoot juice also used as fish poison.
82.	Balu	<i>Sida cordifolia</i> L.	Malvaceae	H	Fruit	Juice used as fish poison.
83.	Bhamara (Thr.)	<i>Solanum nigrum</i> L.	Solanaceae	H	Leaf	Leaf juice applied in earache.
84.	Kantakari	<i>Solanum surattense</i> Burm. f.	Solanaceae	H	Fruit	Paste applied on ringworm "Dad".
85.	Moay	<i>Spatholobus parviflorus</i> (Roxb.) Kuntze	Leguminosae	L	Leaf	Fodder.
86.	Odar	<i>Sterculia villosa</i> Roxb. ex Sm.	Sterculiaceae	T	Stem	Used to make rope or cordage.
87.	Saebar, Sihor	<i>Streblus asper</i> Lour.	Moraceae	T	Latex, Leaf	Latex applied on the eye of the cattle during eye problem (<i>Ankha Bigriyama</i>). Leaves as fodder.
88.	Jamun	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	T	Fruit, Bark	Fruit edible. Bark juice used in diarrhoea.
89.	Genda, Hajari	<i>Tagetes erecta</i> L.	Compositae	H	Entire plant, Flower	Flower juice taken in diarrhoea.
90.	Sej	<i>Terminalia alata</i> Heyne ex Roth	Combretaceae	T	Leaf, Wood	Good fodder. Wood used in construction.
91.	Barro	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Combretaceae	T	Fruit	Fruit powder used in cough. Seed pulp edible.
92.	Harro	<i>Terminalia chebula</i> Retz.	Combretaceae	T	Fruit	Fruit pulp and dried powder taken orally to treat constipation
93.	Khar	<i>Themeda triandra</i> Forssk.	Gramineae	H	Aerial part	Aerial part used as thatching material.

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S.No.	Local name(s)*	Latin name	Family	Growth form*	Parts used	Local uses
94.	Karuat	<i>Tiliacora acuminata</i> (Lam.) Hook. f. & Thomson	Menispermaceae	C	Leaf	Juice used in bodyache.
95.	Hadjor	<i>Vanda</i> sp.	Orchidaceae	E	Entire plant	Entire plant paste used in fracture.
96.	Titiya, Tutiya (Thr.)	<i>Vernonia cinerea</i> (L.) Less.	Compositae	H	Entire plant	Whole plant used to prepare "Marcha".
97.	Sikhul (Thr.)	<i>Vetiveria zizanioides</i> L.	Gramineae	H	Root	Root paste used as medicine locally for stomach problems.
98.	Dhayera (Thr.), Dhaiyero	<i>Woodfordia fruticosa</i> (L.) Kurz	Lythraceae	S	Flower	Flower juice taken during diarrhoea.
99.	Maen	<i>Xeromphis spinosa</i> (Thunb.) Keay	Rubiaceae	T	Fruit	Juice used as fish poison
100.	Aduwa, Sutho	<i>Zingiber officinale</i> L.	Zingiberaceae	H	Root	Root powder used to clear throat. Both dried and fresh root used as spice in curry.
101.	Bayar	<i>Zizyphus mauritiana</i> Lam.	Rhamnaceae	S	Root, Fruit	Bark juice and stem nodule used in dysentery, fruit-edible. Root used to make fermenting material. Fruit used as fish poisoning.

*Thr. in parenthesis=Tharu names, rest are common Nepali names.

*Growth form: H=Herb; S=Shrub; T=Tree; L=Liana; C=Climber/Creeper; E= Epiphyte; P=Pteridophyte; F=Fungi.