lyonia
a journal of ecology and application

Volume 8(1)

Non-timber forest produces utilization, distribution and status in a trekking corridor of Sikkim, india.

NAKUL CHETTRI, E. SHARMA AND S. D. LAMA

G. B. Pant Institute of Himalayan Environment and Development, Sikkim Unit, P. O. Tadong, Sikkim, Indian - 737 102
Present address: Integrated Natural Resource Management Programme
International Centre for Integrated Mountain Development
G P O Box 3226
Kathmandu, Nepal

July 2005

Non-timber forest produces utilization, distribution and status in a trekking corridor of Sikkim, india.

Sikkim Himalaya is endowed with wide variety of non-timber forest produce (NTFP). The ethno-cultural fabrics of this tiny state are rich in traditional practices. As a result, the people living in the Khangchendzonga complex use these natural resources in various ways for their subsistence. The study recorded 94 odd numbers of NTFPs from the area. Above 50% of these species are marketed in the local Hats with a minimum price, which otherwise have good potential in local economy. Overexploitation of NTFP is bringing some visible threat to these species in these areas. About 10% of the total species distribution was found to be a concern for conservation. Some of the high value medicinal plants have potential for value addition as well as domestication. Therefore, a proper strategic plan is needed for conservation of these valuable resources and for sustainable development.

Introduction

The Himalayan chain that stretches from Indus to Bhramaputra valley is a unique storehouse of precious biotic and abiotic reserves (Sahu 1986). It is not only mammoth of cultural symbol but also an important determinant in shaping the economy, milieu and climate (Pant 1980). The Indian Himalayan region endows with bounties of natural and cultural resources evolved and preserved through process of civilization, and contain some of the most restricted and threatened ecological systems on earth (Myers et al. 2000). Most of the spectacular and rugged mountain range of the Himalaya is biologically unexplored, thus the biological diversity of entire Himalaya is not properly known. The Himalaya offers an array of forest types with diversity in forest produce such as medicine, vegetables, nuts, wild edible fruits and decorative as non-timber forest products (NTFPs) from time immemorial. The folk medicinal practices are quite common among the ethno-cultural groups of this region (Biswas 1956). The knowledge of flora and fauna and their value as NTFP is rich among the ethnic groups of this region. During the course of human civilization nearly 3000 plants species have been used as food but only about 150 species have been cultivated (NRC 1982) and less that 10 plant species are meeting over 90% of the world food demand (Wilkes 1981). Many such food resources and valuable plants are still to be explored (Mohan Ram, 2000). In Sikkim alone, about 175 wild edible plants are available and some of them have high potential for their use as food (Sundriyal & Rai 1996, Sundriyal 1999). But many of these species are threatened and in the verge of extinction due to over extraction (Rai et al. 2000) Therefore, exploration and listing of plants and animals with their ethnobiological value are important for knowing and evaluating human-plant relationship, potential for their use in day-to-day life and for proper management (Alcorn 1981a,b; Bye 1979). The present study is based on the extensive survey of NTFPs and their regular monitoring undertaken by the G.B. Pant Institute of Himalayan Environment and Development, Sikkim Unit as a part of Sikkim Biodiversity and Ecotourism Project.

[[Materials and methods]]

Study area

Yuksam-Dzongri trekking corridor (26 km long) encompasses from 1780 m to 4000 m amsl. The trail passes through Sachen, Bakhim and Tshoka in the southwestern part of Khangchendzonga Biosphere Reserve (KBR) in Sikkim, India. Yuksam is a trailhead for this corridor and leads through Tshoka, Dzongri, Thangsing to the Khangchendzonga Base Camp and Gocha La in West Sikkim. Yuksam (1780 m) has 11 settlements with 274 households comprising 1573 number of individuals. One settlement with 8 households resides inside the Khangchendzonga Biosphere Reserve (KBR) at Tshoka (3000 m) along the trail. (Figure1). The area is rich and pristine in its forests resources and treasured with innumerable non timber forest products (Chettri 2000). Different ethnic groups like Subbas, Bhutias, Lepchas, Nepalis and Tibetan Refugees live at the buffer area of the Reserve. NTFPs available in these forests are important alternative to livihood of the local communities. They consist of house construction materials, edible fruits and vegetables, medicinal plants, fiber, broom grass and natural decorative. Due to the mountainous terrain and difficulties in communication, communities living in the area uses large number of plants as foods, vegetables, ingredients for house construction and medicines to cure serious diseases, sprains, cuts and fractures since ancient time. Disturbances such as firewood extraction, fodder lopping and cattle grazing have increased during the last two decades

due to growth in tourism and rise in population that has affected natural population of these NTFPs. The present study is an attempt to highlight the traditional knowledge on use of NTFPs and reflect their potentials in local economy.

Methods

The methods employed in this study were designed with the purpose of providing baseline information on the use of plants species in the local systems and their status in the study area. Extensive household level surveys were conducted in 14 villages with structured (preset formats) with queries on names of the non-timber forest products (NTFPs) used in their daily life. In each village at least the 10% of the total households were covered. Special emphasis was also given for survey in the local *hats* (markets) for their market prices. This information was then crosschecked through informal but focus group discussion with the communities, specially the elders and local traditional medicine practitioners. The final list of species was then used in the field surveys to crosscheck their altitudinal distribution and status. The altitudinal distribution of the enlisted species and their population were recorded from systematic survey as part of the other studies made in the same study area (see Singh 2000; Chettri et al. 2002; Chettri et al. 2005)

Results and discussion]]

Ninety-four species of NTFPs were recorded from the survey and crosschecked their distribution and status in the study area. All 94 species were categorized into five major categories. Eight species were found to use for construction purposes; 42 species as wild edibles; 31 species as medicinal purpose, eight species as decorative and five species as fiber and incense (see Appendix). Among these, above 50% were found marketed and majority of them were wild edibles and medicinal herbs.

Construction and local handicrafts

Bamboos (*Dendrocalamus* spp) were widely used by the local inhabitants for construction of houses, bridges and fences other that timber and stone. In Yuksam and Khecheopalri Watershed, there are more than eight varieties of bamboos available. Most of the bamboos are cultivated except a few (*Arundanaria intermedia, A. racemosa, Cephalostachium* sp.) and some bamboos (*A. hookerian, Bambusa nutans*) though cultivated by the local people are also found in community as well as government forests. These bamboos are found scattered in steep slopes of community forests in lower elevations and in reserve forests at higher reaches ranging from 1700 m to 2750m. The economic importance of bamboo is very high as they are widely used in different purposes. Leaves are used as excellent fodder for livestock, stems are extensively used for house construction, handicraft preparation (making mats, baskets, decorative pieces) and young shoots are used as vegetables or used in preparation of pickles.

Edible fruits and other produce

Wild edible plants that are found in the forests and in the private lands offer a variety of fruits to the local people as nutritional diet. These fruits are also a good source of fruit for wildlife and birds. Some of the species such as *Rhus semialata, Litsae citrata* and *Juglan regia* happens to be a good medicinal value. The leaves of *Machilus edulis*, *M. odoratissima*, *Basia butyracea* and *Bauhinia variagata* offer a good fodder for cattle. *Machilus edulis*, *M. odoratissima* have also been seen to rehabilitate drier rocky hilly slopes. There are a number of trees in forests, whose young shoots (*Pentapanax leschenaultii*), leaves (*Girardinia palmate, Urtica dioica*)) and flowers (*Tupistra nutans*) are eaten as vegetables or made pickles. Some of them are also source of medicines that are widely used by the local practitioners. About seven edible varieties of mushrooms were recorded from the area and most of them are found on naturally dead woods during the monsoon season. These mushrooms form a part of delicacies in the food of local people, and are also a good source of nutrition.

There are varieties of *Diplazium* spp. (wild ferns) used as vegetables. These species are mostly found in moist and shady places and available in local market during the monsoon seasons. Many local people even directly collect them from the forest and use them as vegetable. Yuksam-Dzongri forests have a number of dioscoreas, which provide food to people through their yams. Among them, only one species *Dioscorea* sp (Ban Tarul) is available in the private forest of some villages. It is most esteemed among wild yams but difficult to dig. However, pits are dug up to 1.2 m deep to extract the tuber.

Medicinal plants

About 31 species of widely used medicinal plants were recorded from Yuksam, Tshoka, Dzongri and Khecheopalri area. *Artemesia vulgaris, Eupatorium adenophorum* and *Hydrocotyle asiatica* are widely used for different purposes but are not marketed. On the other hand, *Aconitum* sp, *Berginia ligulata*, *Heracleum nepalense*, *Litsae citrata*, *Oroxylum indicum* are openly marketed in

the local markets. *Picrorhiza kurrooa, Piper longum, Orchis latifolia, Rubia cordifolia* are even exported to other states through local agents. Most of these species are also use by local practitioner (Bijuwa and Baidya) as herbal medicines. These plants are found in open areas and some in bushy areas of the forests along the altitudinal range of 1600 to 4500 m. At present, they are found in small quantity due to over exploitation in the past.

Natural decorative

Natural forests are source of varieties of attractive natural plants which are used by locals as decorative. Roots of plants, dry flowers, capsules, dry mushrooms, cones of conifers, leaves of fern, fern shoots and seeds of different plant form the decorative of all designs and types. In Yuksam and Khecheopalri more than eight types of such decorative are found, which are mostly used for only local purposes. Dried *Anophalis contorta*, *A. triplinervis* and *Lycopodium clavatum* are widely used as decorative in different occasions whereas *Pollinium mollis* and *Raphidophora* sp are used as decorative in houses. Cones of *Pinus longifolia, Abies densa* and *Tsuga dumosa* are also found to be use as decorative in different forms.

Broom and fiber plants

Broom grass is of great importance in the mountainous region as it provides good quality fodder, fuel, broomsticks and also acts as a soil stabilizer. Recently government had supported its extension through social forestry scheme and the local people are willing to plant this grass as cash crop for broomstick. This grass grow in the sub-tropical Himalayas from plains to 2000 m altitude and are extensively planted in the hills specially in wasteland and also as inter-cropping in agroforestry systems or on the edges of terraces. Some villagers in Yuksam cultivated Amliso (*Thysanolaena maxima*) since last couple of years in some small areas with government incentives. The inflorescence of the broom grass produces the soft broom for cleaning floors. The sticks are used as firewood after drying and the leaves are good fodder. Argeli (*Edgeworthia gardeneri*) and Lokta (*Daphne cannabina*) are widely used by locals for making fibers, papers and also for tying cattle.

Management implications

In Yuksam, Tshoka, Dzongri and Khecheopalri, a considerable number of families use these NTFPs as food, medicine and house construction. These practices play a major role in the local economy of the people and many of these species are use as substituted for the commercial timber, medicine and even food and vegetables. Some of the family members are also involved in selling these items at local markets as a part of their livelihood. Wide variety of edible fruits, vegetables and berries are used as NTFP. These variations have provided additional charm in the biological diversity of the area. Traditional systems of medicine notably Aurvedic and Tibetan practices from NTFPs are extensively used in the day-to-day life by the people in Sikkim Himalaya (Rai & Sharma 1994). A large number of such plants are collected from the wild even from the protected areas. The exploitation of NTFPs from the Yuksam-Dzongri trekking corridor and Khecheopalri Watershed contribute to the biotic impoverishment of the forest through extraction activities, possibly because extractors do not leave enough seed in the forest for further propagation. Field survey revealed that a wide variety of medicinal plants, incense and decorative are collected from higher elevation, which are still in fragile condition. It was also noted that the use of these NTFPs have decreased drastically due to un-availability of resources. The distributions of about 10% of the total species are quite sparse showing rarity (Appendix).

NTFP collecting activities appear to be compatible with conservation only when supported by careful resource management regulations with wide local community participation. Moreover, human pressure on natural resources like firewood, fodder, cattle grazing, tourism and infrastructure development have been increasing since last few decades, resulting threats to the fragile ecosystems of the region (Rai & Sundriyal 1997, Chettri et al 2002). Unless immediate decisive steps are taken to counter the effects of habitat degradation in the remaining wilderness areas, pragmatic assumption foretell that much of the valuable resources will be lost within a few decades. Poor socio-economic condition of people is directly causing to loss of the valuable resources. Collection of NTFPs such as fruits, nuts, oils, resins and medicinal plants in a sustainable manner is an integrated process for development and conservation (Hall & Bawa 1993). But a real economic potential of extractive activities and their compatibility with conservation of biodiversity should be properly known (Sundriyal & Sundriyal 2001). Therefore, participatory planning with the local people for area specific development and provisions for economic incentives to them seems to be a promising effort for conservation of these valuable resources. *Castanopsis* spp., *Machilus edulis*, etc. are all nutritious fruits that can be use as local product. Young shoots (tama) from *Dendrocalamus* spp. *Arundanaria* spp. for preparation of pickles, *Diplazium* and wild mushroom as vegetables have

high potential as a part of the menu for the tourists. The area possesses high potential in micro enterprises development for medicinal plants. Market survey revealed that Jatamasi (*Nardostachys jatamasi*), Kutki (*Picrorhiza kurrooa*), Chirata (*Swertia chirata*) and Panch Aunlay (*Orchis latifolia*) have high potential for commercialization. Broom grass (*Thysanolaena maxima*), Bamboo (*Dedrocalamus* spp, *Bambusa* spp, *Arundanaria* spp) cultivations are other means to support local handicraft production that brings economy *vis a vis* control soil erosion. These micro enterprises development can certainly boosts the economy of people if value addition is done to them as being done to some wild plants in other part of the Himalaya (Dhyani & Khali 1993, Maikhuri et al. 1994). However, detailed study of regeneration status and potential in the natural habitat and extraction pressure can bring in understanding in management options.

Acknowledgements

The authors are thankful to the Director, G. B. Pant Institute of Himalayan Environment and Development, and The Mountain Institute, USA for facilities. This research was supported under Sikkim Biodiversity and Ecotourism Project, which received grant from the Biodiversity Conservation Network funded by USAID. IDRC-Canada also provided financial support to Nakul Chettri. Facilities provided by ICIMOD are highly acknowledged.

References

Alcorn, J. B. 1981a. Huastec noncrop resource management. *Human Ecology* 9: 395-417.

Alcorn, J. B. 1981b. Some factors influencing botanical resource perception among the Huastec: suggestion for ethnobotanical inquiry. *Journal of Ethnobiology* 1: 221-230.

Biswas, K. 1956. *Common Medicinal Plants of Darjeeling and Sikkim Himalaya*. M/s Bengal Govt. press, West Bengal.

Bye, R.A. 1979. Incipient domestication of mustards in north-west Mexico, *Kiva* 44: 237-256.

Chettri, N. 2000. *Impact of habitat disturbances on bird and butterfly communities along the Yuksam-Dzongri trail in Khangchendzonga Biosphere Reserve.* Ph.D. thesis. Sivmandir (West Bengal, India): University of North Bengal

Chettri, N., D.C. Deb, E. Sharma, & R. Jackson. 2005. The relationship between bird communities and habitat: A study along a trekking corridor of the Sikkim Himalaya. style='mso-bidi-font-style:normal'>*Mountain Research and Development*25(3): 235-244.

Chettri, N., E. Sharma, D.C. Deb, & R.C. Sundriyal 2002. Effect of firewood extraction on tree structure, regeneration, and woody biomass productivity in a trekking corridor of the Sikkim Himalaya. *Mountain Research and Development.* 22(2):150-158

Dhyani, P. P., & M.P. Khali 1993. Fruit yield and economic of Jelly and Jam production from fruits of some promising *Ficus* (Figs) tree crops. *Ecology of Food and Nutrition* 30: 169-178.

Hall. P., & K. S. Bawa 1993. Methods to assess the impact of extraction of non timber forest products on plant populations. *Economic Botany* 47:234-247.

Maikhuri, R.K., R.L. Semwal, A. Singh, & M.C. Nautiyal. 1994. Wild fruits as a contribution to sustainable rural development: A case study from the Garwal Himalayas. *International Journal of Sustainable development and World Ecology* 1:56-68.

Mohan Ram, H.Y. 2000. *Plant Resources of Indian Himalaya*. 9th G.P. Pant Memorial Lecture, G B Pant Intititute of Himalayan Development, Gangtok, Sikkim.

Myers, N., R.A. Mittermeier, C.G. Mittermeier, Gustava A.B. da Foseca, & J. Kent. 2000. Biodiversity hotspots for conservation priorities. *Nature* 403(24): 853-858.

N.R.C. 1982. *Ecological Aspect Of Development In The Humid Tropics*. National Academy of Sciences, Washington, DC.

Pant, D.D. 1980. Science and rural development. In: Singh, J.S. et al. (Eds.). *Science and rural development in Mountains et al*.) Gyanodaya Prakashan, Nainital.

Rai S.C. & R.C. Sundriyal 1997. Tourism development and biodiversity conservation: A case study from the Sikkim Himalaya. *Ambio* 26(4): 235-242.

Rai, L. K., Pankaj Prasad, & E. Sharma 2000. Conservation threats to some important medicinal plantsf Sikkim Himalaya. *Biological Conservation* 93: 27-33.

Rai, L. K., & E. Sharma. 1994. *Medicinal Plants of Sikkim Himalaya. Status, Uses and Potential*. Beshen Singh Mahendra Pal Singh, Dehra Dun.

Singh, H.B. 2000. *Grazing impact on plant diversity and productivity along a tourist trekking*

corridor in the Kanchanjungha biosphere reserve of Sikkim. Unpublished Ph. D. Thesis. The university of North Bengal.
Sahu, K. C. 1986. Himalayan resources for progress or preservation: a dilemma. In: Joshi, S.C., J.H. Martin, Y.P.S. Pangtey, D.R. Joshi & D.D. Dane (Eds.). *Nepal Himalaya: Geoecological prospectives.* Pp. 3-12, H. R. Publisher, Delhi.
Sundriyal, M., & R.C. Sundriyal 2001. Wild edible plants of Sikkim Himalaya: Nutritive values of selective species. *Economic Botany* 55(3): 377-390.
Sundriyal, M., & L. K. Rai 1996. Wild edible plants of Sikkim Himalaya. *Journal of Hill Research* 9: 267-278.
Sundriyal, M. 1999. *Distribution, Propagation and Nutritive value of some wild Edible Plants in the Sikkim Himalaya.* PhD Thesis, High Altitude Physiology Research Centre, H N B Garwal University, Srinagar and G B Pant Institute of Himalayan Environment and Development, Sikkim Unit, Gangtok.
Wilkes, H. G. 1981. *New or potential crop or what to anticipate for the future.* Paper presented at the annual meeting of the American Association for the advancement of Science, January 1981, Toranto, Canada.
[[Appendix]] List of NTFPs with their distribution, status market and uses that were recorded from fringe villages of Khangchendzonga Biosphere Reserve (A = abundant, C = common, D = common but declining, R = rare, MR = marketable, NM = non-marketable, NA = data not available)

Species	Vernacular name	Distribution (m)	Marketable/non marketable	Market rate (Rs)	Uses	Status	Availability
Construction and local handicrafts							
Arundinaria hookeriana Munro	Pareng	1200-2100	MR	40 per bundle Tama 10-15 per kg	Mats, house construction, baskets, young shoots as vegetables etc.	D	Whole year
Arundinaria intermedia Munro	Tite nigalo	1200-2100	MR	40 per bundle Tama 10-15 per kg	Mats, baskets, house construction etc.	C	Whole year
Arundinaria malling Gamble	Maling	1850-2750	MR	40 per bundle	Mats, baskets, fencing, walking sticks, flute etc.	C	Whole year
Bambusa nutans Gamble	Mala bans	300-1550	MR	30/individual	House construction, support for prayer flags by Buddhist	D	Whole year
Cephalostachium sp.	Gopey bans	600-2400	NR	30/individual	Fodder, bow and arrow preparation, flutes and straw for drinking local beer.	R	Whole year
Dendrocalamus hamiltonii Nees & Arn. Ex Munro	Choya bans	Upto 1730	MR	30/individual Tama 10-15 per kg	Water pipes, water vessels, young shoots as vegetables, house construction, local handicrafts, fodder for cattle etc.	C	Whole year
Dendrocalamus hookeri Munro	Chilley bans	Upto 1750	MR	30/individual	House construction, fencings, baskets, etc.	C	Whole year

Dendrocalamus sikkimensis Gamble	Bhalu bans	Upto 1800	MR	30/individual	Water vessel, house construction, local handicrafts etc.	R	Whole year
Edible fruits and other product							
Agapetes serpens (White) Sleumer	Bandare khorsane	1500-2600	NM		Flowers are eaten along with the juice in them	A	February-June
Agaricus silvaticus	Kalunge chew	Upto 1300	MR	40 per kg	Used as vegetables.	C	April-September
Allium wallichii Kunth.	Jungli piyaj	2200-4000	NM		Edible and aromatic	R	June-October
Bassia butyracea Roxb.	Chewri	1200-1775	MR	2 per 5 pieces	Fruits edible, oil is extracted from thee seeds and used. Leaves are good fodder.	R	June-July
Bauhinia variegata L.	Kiorala	Upto 600	NM		Flowers are eaten as curry, good fodder.	R	March-April
Castanopsis hystrix Miq.	Patle katus	1800-2400	MR	15 per kg	Fruits edible, fuelwood, leaves are good ingredients for composts.	A	Feb-April
Castanopsis tribuloides (Smith) A.DC.	Musre katus	1700-2300	MR	60 per kg	Fruits edible, fuelwood, leaves are good ingredients for composts.	C	Feb-April
Cinnamomum impressinervium Meissn.	Sisi	1220-1830	NR		Seeds edible	A	Whole year
Citrullus colocenthus Schrad.	Indrenni	Upto 1900	MR	5 per piece	Fruits edible	D	Jan-March
Dioscorea bulbifera Br.	Ban tarul	Upto 2000	MR	20 per kg	Used as food.	C	Jan-Feb
Diplazium sp.	Sauney ningro	Upto 2000	MR	5 per bundle	Used as vegetables.	C	May-July
Elaeocarpus lanceafolius Roxb.	Bhadrase	1830-2450	MR	18 per kg	Fruits edible	D	April-June
Evodia fraxinifolia Hk.f.	Khanakpa	1200-2100	NM		Fruits used as pickles and as medicine for dysentery	C	Aug-Sep
Ficus infectoria L.	Kabra	Upto 1700	NM		Shoots are edible, good fodder.	C	Feb-March
Myrica gale L.	Kaphal	Upto 1725	MR	NA	Fruits edible, gums and resins are extracted for local use.	R	July-Sep

Girardinia palmate Gand.	Bhangre sisnu	1000-2500	MR	5 per bundle	Young leaves and shoots use as substitute for dal which are good for blood pressure patients.	A	July-Sep
Gaultheria trichophyla Royle		2700-4500	NM		Fruits are eaten by children	A	May-July
Pentapanax leschenaultii Seem.	Chinde	1750-3000	MR	10 per kg	Young shots edible, used as fodder.	D	March-April
Juglans regia L.	Okhar	1000-2000	MR	2 per piece	Fruit edible, bark-anthelminthic and detergent, leaves- astringent and tonic, oil of kernel cures skin diseases etc.	D	April-Sep
Urtica dioica L.	Patle sisnu	Upto 2700	MR	8 per bundle	Young leaves and shoots use as substitute for dal which are good for blood pressure patients.	A	May-Aug
Machilus edulis King.	Lapche kawla	1220-2400	MR	1 per piece	Fruits edible, leaves are good fodder.	C	Nov-Dec
Machilus odoratissima (Nees) Kosterm	Lalikaulo	1500-2150	NM		Fruits edible, leaves are good fodder.	C	Nov-Dec
Mahonia sikkimensis Takeda.	Chutro	1300-2700	NM		Berries edible	A	July-Aug
Pleurotus sp.	Chamrey	NA	NM		Used as vegetables.	C	NA
Pleurotus sp.	Kanney chew	1500-2450	MR	50 per kg	Used as vegetables.	C	Julu-Aug
Prunus nepaulensis (Seringe) Steud.	Arupate	1800-above	NM		Fruits edible, fairly good fodder and fuelwood.	C	March-Aug
Pyrularia edulis A DC.	Amphi	600-1800	MR	NA	Fruits edible, posses wax in kernel and were use this wax for lighting.	D	NA
Pyrus pashia Buch.-Ham. Ex D. Don	Mehel	800-2400	MR	10 per kg	Fruit extracts used for curing blood dysentery	D	Nov-Dec
Quercus sp.	Phalant	1850-2700	NM		Acorns are good food for beer, fuelwood etc.	A	March-May
Quercus sp.	Sungure katus	1830-3000	NM		Nuts edible, bark and acorns used as astringent	D	March-May
Rhus semialata Murr.	Bhakimlo	900-1850	MR	NA	Seeds use as medicine dysentery	A	July-Aug
Rubus ellipticus Smith.	Aselu	1000-2200	MR	40 per kg	Fruits edible	A	March-May

Rubus hypargyrus Edgew.	Kalo aselu		MR	40 per kg	Fruits edible	C	March-May
Spondias axillaries Roxb.	Lapsi	300-1400	MR	20 per kg	Fruits edible, pickles are also prepared.	D	May-Oct
Symplocos theifolia D.Don	Kharanay	1800-3000	NM		In the past, people use to extract oil from the seeds for cooking.	A	July-Aug
Tupistra nutans Wall.	Nakima	1800-3000	MR	60 per kg	Flower are taken as curry	D	Sep-Oct
Utica dioica L.	Gharia sisnu	1000-2500	MR	5 per bundle	Dried plants are use to prepare paste and applied on minor fractures. Leaves and shoots use as substitute for dal.	A	April-July
	Kali ningro	Above 1750	NM		Used dysentery.	C	May-Sep
	Jhari chew	1800-2000	NM		Used as vegetables.	C	May-Sep
	Hieun chew	Above 2500	NM		Used as vegetables.	C	May-Sep
	Katuse chew	Upto 1800	NM		Used as vegetables.	C	May-Sep
	Kalamen uneu	1650-2450	NM		Used as vegetables.	C	May-Sep
Medicinal							
Abies densa Griffith ex R. Parker	Gobrey salla	2550-3700	NM		Leaf extracts use in repeated doses for asthma, bronchitis and stomach trouble.	A	Whole year
Aconitum ferox Wall.	Bikhuma	2100-4000	MR	1350/kg	High medicinal value, use in diaphoretic, diuretic, expectorant, febrifuge, diabetes,	D	July-Sep
Acorus calamus Linn.	Bonjho	1000-2000	MR	NA	Paste prepared from rhizome used in skin diseases, powder taken orally for cough, malaria and asthma	D	Whole year
Artemisia vulgaris Linn.	Titepate	800-2000	NM		Use in different medication as deobstruent, antispasmodic, obstructed menses and hysteria.	A	Whole year

Astilbe rivularis Ham.	Buro okhati	1200-2100	MR	NA	Rhizomes chewed as areca nut and used as pain relief.	D	July-Aug
Bergenia ciliata (Haw.) Stenb.	Pakhan bet	Upto 3000	MR	75 per kg	Roots use in analgesic, tridosha, piles, heart diseases, spleen enlargement and many other diseases.	D	Whole year
Bergenia purpurascens (Hook. F. & Thoms.) Engl.	Khokim	3400-4200	NM		Dried roots use in as substitute for tea and believe to give relief from body ache.		
Clematis buchananiana DC.	Pinasay lahara	1800-2800	NM		Fresh roots are mashed and the effluvium is drawn through nose to cure sinusitis and nose-blocks.	D	Whole year
Dichroa febrifuga Lour.	Basak	900-2400	NM		Dried leaves orally taken in fever	C	July-Aug
Drymaria cordata Wild.	Abijalo	1000-2000	NM		Used in nose dysentery.	C	Whole year
Eupatorium canabinum Linn.	Banmara, kalijhar	1000-2000	NM		Crushed juice from leaves are applied in cuts and bleeding spots immediately	A	Whole year
Heracleum nepalense D.Don	Chimphing	1550-3600	MR	3 per packet	Fruits are used as pickles, used as anti-typhoid, nausea and vomiting	D	Aug-Oct
Hydrocotyle asiatica Linn.	Golpatta	1300-2000	NM		Fresh leaves are crushed and administered orally to relieve blood pressure and throat pain.	C	Whole year
Holboellia latifolia Wallich.		2400-3200	NM	NA	Fruits edible, stem used to make bangles, which are believe to give relief from orthopedic problems.	R	Whole year
Kaempfera rotunda Linn.	Bhuin champa	1300-2000	MR	NA	Tubers used as poultice in fracture, healing fresh woods and removes coagulated bloods from the body.	R	NA
Litsae citrata Bl	Siltimur	Upto-2700	MR	NA	Dried fruits are used as medicine for nausea and giddiness, fresh fruits used as pickles.	D	Aug-Sep

Dactylorhiza hatagirea (D.Don) Soo	Panch aunle	3000-4000	MR	80/kg	Paste made out of the tubers is applied over cuts and bruises. It is also used orally for body ache	R	Aug-Sep
Oroxylum indicum Vent.	Totala	Upto 1000	MR	10 per garland	Flower edible, root bark improves appetite, use in vomiting, asthma, bronchitis etc.	R	Aug-Dec
Picrorhiza kurrooa Royle ex Benth.	Kutki	3000-5000	MR	210/kg	Dried roots are used orally in malarial fever. It is also used as cathartic, purgative and dyspepsia.	D	Whole year
Piper longum Linn.	Pipla	Upto 1700	MR	60 per kg	Roots use in anthelminthic, improves appetite, abdominal pain. Fruits use for anti-diarrhoeatic, anti-dysenteric, piles, leprosy etc.	C	Whole year
Plantago sp.	Isabgol	Upto 1750	NM		Plant use as medicine for rheumatism, roots as astringent and fever, and seed in dysentery.	C	Whole year
Polygala arillata Buch.-Ham ex D.Don	Marcha	600-1800	MR	NA	Roots use for preparation of yeasts.	D	NA
Rheum australe D.Don	Padamchal	3600-4500	MR		Dried roots use as tea.	D	July-Sep
Rheum nobile Hook.f.& Thoms.	Kenjo	3600-4500	NM	60/kg	Whole plant is eaten, used as pickles, have medicinal value.	R	July-Sep
Rhododendron arboreum Smith	Lali guras	1500-3300	NM		Dried flowers use for curing dysentery	A	Jan-March
Rubia manjith Roxb. Ex Fleming	Majhito	1000-2000	MR	650 per ton	Color extracts are used in dying. Roots have medicinal value.	C	Whole year
Rumex nepalensis Sprengel	Halhalay	1800-3000	NM		Dried root is use in preparation of paste and taken orally in hepatistis. It is also applied during loss of hairs.	A	Whole year

Solanum sp.	Jungli bihin	Upto 1800	NM		Root use in bronchitis, asthma, fever, pains. Piles etc. Fruits increase appetite and good for heart diseases and fever. Fruits are burnt and use its smoke for relief from toothache.	C	Whole year
Swertia chirata Ham.	Chirato	1225-3000	MR	20-30/kg	Medicinal use for anthelmintic, antipyretic, antiperiodic, laxative, leucoderma, inflammation, ulcer, asthma piles etc.	D	May-Oct
Viscum articulatum Burn.f.	Harchur	300-2000	MR	80 per kg	Dried plants are use to prepare paste and applied on minor fractures.	R	Whole year
Zanthoxylum acanthopodium DC.	Boke timur	Upto-2250	MR	40 per kg	Medicine for ear diseases, headache, leucoderma, asthma and good appetizer	D	May-Sep
Natural decorative							
Abies densa Griffith ex R. Parker	Gobre salla	2800-4000	NM		Cones are used as decorative		April-May
Anaphalis sp.	Bukiphul	1700-2750	NM		Dried flowers are decorative and also used for preparation of pillow	A	July-Sep
Anaphalis sp.	Bukiphul	1850-2750	NM		Dried flowers are decorative and also used for preparation of pillow.	A	July-Sep
Pinus longifolia Roxb.	Salla	500-2000	NM		Cones are used as decorative		Feb-April
Lycopodeum sp.	Nagbelli	1850-2750	NM		Entire plant is decorative and pollen is used as gunpowder.	C	Whole year
Pollinia mollis (Griseb.) Hack.	Memkesh	1550-2450	NM		Flowers spikes are decorative	R	Whole year
Raphidophora sp.	Kanchirna	Upto-2000	NM		Planted as decorative, leaves good fodder, stems used as feed for pig and cattle.	A	Whole year
Tsuga dumosa (D Don) Eichler		2100-3500	NM		Cones are used as decorative		May-June

Fiber, broom and incense species							
Daphne cannabina var. bholua (Buch.-Ham. ex D. Don) Keissl.	Kagatay	1850-3000	MR	NA	Bark is used as ropes but also have potential for preparation of paper.	C	Whole year
Edgeworthia gardneri (Wall.) Meisner	Argeli	Upto 1850	MR	NA	Bark is used for preparation of paper, making ropes and even tying cattle.	C	Whole year
Thysanolaena maxima Kuntze.	Amliso	Upto-2000	MR	Broom 1000 per ton.	Broom are prepared from the inflorescence,, fodder, soil binder and fuelwood after drying the sticks.	A	Whole year
Juniperus recurva Buch-Ham. ex D. Don	Bhairun patay	3600 above	MR	NA	Local Buddhist uses leaves as incense.	C	Whole year
Rhododendron setosum D. Don.	Sunpatay	3600 above	MR	NA	Local Buddhist uses leaves as incense.	C	Whole year