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STATUS OF POTENTIAL NON-TIMBER FOREST PRODUCTS FOR WISE USE AND CONSERVATION IN THE LANGTANG NATIONAL PARK'S BUFFER ZONE

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ABSTRACT

Non-timber forest products are non-wooded biological resources derived from both natural and managed forests and other wooded areas. The objective of the study was to perform resource assessment for baseline information on the status and distribution of locally prioritized plant based non-timber forest products in Nuwakot and Sindhupalchok districts of Langtang National Park's buffer zones. Consultative workshops and forest inventory techniques were applied to collect data. From the consultative workshops 133 species of plants having use value were identified. It was identified that *Gaultheria fragrantissima* and *Edgeworthia gardneri* were more potential species for commercial production and utilization. For commercial production and collection of *Gaultheria fragrantissima,* buffer zone areas of Nuwakot district will be the better place. Similarly, the commercial production and collection of *Edgeworthia gardneri* will be better in buffer zone areas of Sindhupalchok district.

Keywords: Langtang National Park, buffer zone, Prominence value, perception

INTRODUCTION

Non-timber forest products (NTFPs) are a collection of biological resources derived from both natural and managed forests and other wooded areas (Peters,1996). NTFPs are culturally important, cheap and accessible biological resources to local people. On the basis of their use, plant based NTFPs can be categorized in different types (Kochhar, 1992; FAO, 2004; Sharma, 2014). In Nepal, the occurrences of NTFPs have been reported from the all altitudinal range and protected areas. There are 3,172 species of plants and animals which are reported as NTFPs in Nepal. Those included 2,349 species of vascular plants, 65 species of mammals and 758 species of birds (Sharma, 2014).

Langtang National Park (LNP) was established in 1976 by covering 1,710 km^2 area of Nuwakot, Rasuwa and Sindhupalchok districts. In 1998, an area of 420 km^2 around the park containing 28 Village Development Committees (VDCs) was declared as its buffer zone (DNPWC, 1999; Myint *et al.,* 2000). There are four distinct vegetation zones in LNP (LNP, 2001): sub-tropical zone (<1,000-2,000 m), temperate zone (2,600-3,000 m), lower sub-alpine zone (3,000-34000 m), and alpine zone (> 4,000 m). Realizing the crucial lack of information about the status of NTFPs, this study was undertaken to better understand about the quantitative status of NTFPs

in the buffer zone of Langtang National Park. The main objective of the study was to perform resource assessment for finding baseline information on the status and distribution of locally prioritized plant based NTFPs in Nuwakot and Sindhupalchok districts of Langtang National Park's Buffer zones.

MATERIALS AND METHODS

Study sites

The study sites were located in the southern part of LNP's buffer zone. They were distributed in the subtropical and temperate vegetation zones of Nuwakot and Sindhupalchok districts. The study sites included thirteen VDCs, eight in Nuwakot district and five in Sindhupalchok district. The studied VDCs of Nuwakot are Urleni, Raluka, Rajang, Gjyangphedi, Sikharbesi, Gaunkharka, Samundratar, and Rautbesi. Similarly, the VDCs of Sindhupalchok district are Helambu, Boruwa, Kiul, Selang, and Syaule. Forest inventory were conducted within the altitudinal range of 1,659 m to 2,412 m in the buffer zone forest of Nuwakot district. In Sindhupalchok district forest inventory were made between 1,882 m to 2,620 m elevation of buffer zone forest.

NTFPs category

Plant based NTFPs were categorized in 14 different types on the basis of their use. They were: fiber and fiber yielding; sugar starch and cellulose products; legume or pulses; vegetable oils and fats; fruits and nuts; vegetable; starch and cellulose products; spices, condiments and other flavourings; fumitory and masticatory; beverages; dyeing and tannins; medicine; insecticides and herbicides; and miscellaneous (Kochhar, 1992; FAO, 2004; FRA/DFRS, 2014; Sharma, 2014).

Data collection

Both the qualitative and quantitative techniques were applied for data collection. The qualitative data were collected from the Focus Group Discussion (FGD). This included the name of plants according to their uses, local distribution and their cultivation as well as collection sites. The quantitative data incorporated the number and coverage of each plant species in quadrat. Two approaches namely social and ecological survey were used to collect those data.

Social survey

This study basically used participatory rapid approach including stakeholder consultation and interaction with focus group discussion (FGD) for data and information collection. The relevant individuals were contacted and uses and distribution of NTFPs in the LNP's buffer zone area were investigated (Mikkelsen, 1995). Informants for the FGD included members of Buffer Zone Users Committees (BZUCs), members of Buffer Zone Users' Groups (BZUGs), members of Buffer zone Community Forests (BZCF), local political leaders, local healers, teachers, and local people. Locations for carrying out FGD and participants from community and local level authorities were identified from prior discussion with LNP officials. The number of participants in one FGD was not exceeded15 personnel.

Prior to the FGD, a checklist regarding use categories of plant was prepared and used during discussion. Name of plant species in each use type were asked and grouped on the specific

categories. They were also asked to prioritize the identified NTFPs on the basis of their commercial and local uses. The local distributions of the available NTFPs were also identified from the discussion and were marked on the available topographical maps.

During FGD local people were also requested to provide best locality for cultivation and collection of prioritized NTFPs. The basis to identify suitable locations was current regeneration scenario and collection practices of NTFPs.

Ecological survey

Immediately after collecting the information from FGD, extensive field visits were made for forest inventory by using quadrat method. The survey was conducted in the specified sites identified from the FGD, by using systematic random sampling techniques along the altitudinal gradient of 100m difference. The recognized NTFPs were either shrub or herb. So, quadrats of 1m *1m and 5m*5m were utilized to collect data about herbaceous plant and understory species respectively.

Geographical location, elevation and distance from cultivated land of each surveyed plot were recorded by using Geographical Positioning System (GPS). Coverage of the species was identified from ocular estimation. Removal of thin layer from top soil was considered as light erosion. The nomenclatures of plants were provided from the published literatures (DPR, 2002, 2010, 2011, 2012; Sharma, 2014).

Data recording and analysis

Both the secondary and primary data and information were the sources for this study. Secondary sources of information were published & unpublished documents and reports. In addition, information from LNP, BZ and local VDCs were also used as the secondary sources of data. The data and information were recorded in data sheets and note books.

Collected data from primary and secondary sources were processed and analyzed. The descriptive statistics such as simple means, frequencies and percentage were used for the analysis of quantitative data. Microsoft excel software was used for data processing.

Local perceptions (%) about the suitable places of NTFPs cultivation and collection were analyzed by using following formula (Tamrakar & Sharma, 2002):

$$\text{Local perception} = \frac{\text{Number of people selected the location}}{\text{Total number of people participated}} * 100$$

The calculated mean was utilized to analyze prominence value. Frequency, density, mean percent cover and prominence value of the species were calculated by using following formula (Zobel *et al.,* 1987, Sharma *et al.,* 2012):

$$\text{Frequency} = \frac{\text{Number of quadrat in which species i occurred}}{\text{Total number of quadrats studied}} * 100$$

$$\text{Density} = \frac{\text{Total number of individuals of species i}}{\text{Total number of quadrats studied} * \text{Area of a quadrat}} * 10000$$

$$\text{Mean Percent Cover} = \frac{\text{Total cover percentage of species i}}{\text{Total number of plot studied}}$$

$$\text{Prominence Value} = \text{Mean percent cover of species i} * \sqrt{\text{Frequency of species i}}$$

RESULTS

Priority

Major NTFPs of the LNP buffer zone in Nuwakot district were classified on the basis of their use categories. Two consultative workshops were organized in Ramati village of Samundratar VDC and Timbu village of Helambu VDC of Nuwakot and Sindhupalchok districts respectively. From the consultative workshops 133 species of plants were identified having use value (annex-1). Local peoples (n = 45) provided their perception, to prioritize those species with their specific location, during consultative workshop.

Local people perceived that the most useful NTFPs for the Nuwakot district were *Gaultheria fragrantissima*, *Edgeworthia gardneri*, *Drepanostachyum falcatum*, *Girardinia diversifolia*, *Swertia chirayita* and *Urtica dioica* respectively. Most of the local people provided their interest to extract essential oil from *Gaultheria fragrantissima*. The buffer zone areas of LNP in Nuwakot district are mostly located below 2200 m elevation which is suitable habitat for *Gaultheria fragrantissima* (Polunin & Stainton, 1984). The prioritized NTFPs were distributed in all buffer zone forest of LNP in Nuwakot district. Although the general distribution of *Edgeworthia gardneri* is ranged between 1500 to 3000 m elevations, it was more abundantly distributed above 2200 m elevation in south-east portion of LNP. So, in the study area the natural habitat of *Edgeworthia gardneri* is above 2200 m elevation. It is mostly distributed in Gaunkharka VDC and some areas of Urleni VDC. It was observed that above 2200m elevation abandoned agricultural land was perfect habitat for *Edgeworthia gardneri*.

According to local people commercially most useful NTFPs in LNPBZ of Sindhupalchok district were *Edgeworthia gardneri*, *Gaultheria fragrantissima*, *Swertia chirayita*, *Juglans regia*, and *Rubia manjith*. In this area people were mostly interested to extract bark of *Edgeworthia gardneri* for making paper. The buffer zone area of LNP in Sindhupalchok is distributed above 2200 m elevation, which is suitable habitat for *Edgeworthia gardneri*. So, there is the potentiality of commercial farming and natural extraction of this species in LNPBZ of Sindhupalchok district. The prioritized NTFPs were distributed in all buffer zone VDCs of LNP in Sindhupalchok district. The natural habitat of *Gaultheria fragrantissima* is below 2200 m elevation. It is mostly found in lower altitudinal ranges of Helambu and Kiul VDCs. Similarly, *Edgeworthia gardneri* is naturally distributed above 2200 m elevation of Helambu, Kiul and other VDCs of LNPBZ. Most of the private lands are remaining uncultivated in the buffer zone areas and there were possibilities of farming *Edgeworthia gardneri* in those spaces.

TABLE 1. Distribution of NTFPs in Langtang National Park's buffer zone VDCs.

Name of potential VDCs	Specific places	District
Urleni VDC	All areas	Nuwakot
Sikharbesi VDC	Ward no 3, 4, 8	Nuwakot
Gaunkharka UC	Ward no. 5, 7, 8	Nuwakot
Boruwa VDC	--	Sindhupalchok
Helambu VDC	Ward no 1-7	Sindhupalchok
Kiul VDC	--	Sindhupalchok
Selang VDC	--	Sindhupalchok
Syaule VDC	--	Sindhupalchok

People were also asked to provide the name of appropriate sites to cultivate and collect the NTFPs from the buffer zone areas. In Nuwakot district, most of the people (65.2%) identified Urleni was quite suitable VDC for farming of commercially important NTFPs. Similarly, other suitable VDCs were Ghyangphedi, Sikharbesi, Gaunkharka and Samundratar (including Rautbesi VDC). Similarly, in Sindhupalchok district most of the people (66.7%) perceived Helambu VDC was quite suitable for cultivation and collection of NTFPs. The other suitable VDCs for the commercial cultivation of NTFPs were Boruwa and Kiul (table 2).

TABLE 2. More suitable places of NTFPs cultivation and collection in LNP's buffer zone forests, outcome of the consultative workshops.

Nuwakot district		Sindhupalchok district	
VDCs	**Local perception (%)**	**VDCs**	**Local perception (%)**
Urleni (including Raluka & Rajang)	65.2	Helambu	66.7
Gjyangphedi	60.9	Boruwa	50.0
Sikharbesi	43.5	Kiul	22.2
Gaunkharka	26.1	Selang	NA
Samundratar (including Rautbesi)	4.3	Syaule	NA

Inventory

The inventories of NTFPs were conducted within the altitudinal range of 1659 m to 2412 m in the LNP's buffer zone forest of Nuwakot district. The slopes of the sampling area were ranging from 30° to 45° with the average slope 39°. All survey sites were disturbed by the human activities. Average distance of survey sites to cultivated land was 185 m. Most of the survey plots were distributed in north-western aspect (35%). While 25%, 15%, 10%, 10% and 5% plots were distributed in eastern, western, south-western, south-eastern and north-eastern

aspects respectively. All survey sites received light erosion. The average cover of understory vegetation in the survey site was 87.5%. In total 12.5% ground was covered from litters. Lichens were distributed in all survey sites. The data were collected from 63 plots in Nuwakot district.

Inventory in Sindhupalchok district were made between 1882 m to 2620 m elevation. The average slope of the sampling area was 19° and ranging from 5° to 50°. Survey areas were disturbed by the human activities. The average distance from the survey sites to cultivated land was 755 m. Most of the survey plots were distributed in south-eastern aspect (50%). While 22%, 14% and 14% plots were distributed in north-west, south-west and eastern aspect respectively. The survey site received light erosion. Average cover of the understory vegetation in the survey area was 77.5%. In the survey site 45% ground were covered by the litters. In total 86% area included mosses while remaining 14% area included lichens. All together 90 plots were used for data collection in Sindhupalchok district.

In the LNP's buffer zone forests at Nuwakot district, *Gaultheria fragrantissima* was most prominent (PV = 251.40) species in understory layer. Similarly, other more prominent species in this layer were *Berberis asiatica, Lyonia ovalifolia* and *Eurya acuminata* with prominence value of 47.73, 30.52 and 29.58 respectively (table 3). In Sindhupalchok district *Edgeworthia gardneri* was the most prominent (PV = 14.85) species in understory layer. Other prominent species in understory layer were *Gaultheria fragrantissima* (PV = 10.10), *Lyonia ovalifolia* (PV = 3.38) and *Berberis asiatica* (PV = 2.73) respectively (table 3).

TABLE 3. Prominence value of five most abundant shrub species in LNP's buffer zone forests of Nuwakot and Sindhupalchok districts.

SN	Local name	Scientific name	PV	
			Nuwakot	Sindhupalchok
1	Patpate	*Gaultheria fragrantissima*	251.4	10.1
2	Chutro	*Berberis asiatica*	47.73	2.73
3	Angeri	*Lyonia ovalifolia*	30.52	3.38
4	Jhigane	*Eurya acuminate*	29.58	--
5	Setikath	*Myrsine capitellata*	28.76	--
6	Argeli	*Edgeworthia gardneri*	--	14.85
7	Banmara	*Eupatorium adenophorum*	--	2.02

Among the herbaceous species *Eupatorium adenophorum* was the most prominent (PV = 3.80) species in the LNP's buffer zone forests of Nuwakot district. Simlarly, *Polystichium squarrosum* (PV = 0.81), *Imperata cylindrica* (PV = 0.42) and *Aster* sp (PV = 0.41) were other more prominent herbaceous species in this area (table. 4). In Sindhupalchok district *Elsholtzia* sp was the most prominent (PV = 3.78) herbaceous species in the LNP's buffer zone forest. Similarly, *Aster* sp (PV = 3.44), *Potentilla* sp (PV = 2.15) and *Cyperus* sp (PV = 1.34) were more prominent herbaceous species in this area (table 4).

TABLE 4. Prominence value of five most abundant herbaceous species in LNP's buffer zone forests of Nuwakot and Sindhupalchok district of LNPBZ.

SN	Local name	Scientific name	PV	
			Nuwakot	Sindhupalchok
1	Banmara	*Eupatorium adenophorum*	3.8	--
2	Unau	*Polystichum squarrosum*	0.81	--
3	Siru	*Imperata cylindrica*	0.42	--
4	Buki	*Aster* sp	0.41	3.44
5	Rubia	*Rubia* sp	0.24	--
6	Bansilam	*Elsholtzia sp*	--	3.78
7	Bajradanti	*Potentilla sp*	--	2.15
8	Mothe	*Cyperus sp*	--	1.34
9	Majito	*Rubia manjith*	--	1.29

Natural habitat of *Gaultheria fragrantissima* is at lower elevation than that of *Edgeworthia gardneri.* Buffer zone VDCs of Nuwakot district is mostly located at the lower elevation. So, there are higher density of *Gaultheria fragrantissima* (3140 individuals/ha) than that of *Edgeworthia gardneri* (360 individuals/ha). Similarly, as the buffer zone VDCs in Sindhupalchok district are located at higher elevation, population of *Gaultheria fragrantissima* (1314 individuals/ha) is lower than that of *Edgeworthia gardneri* (3000 individuals/ha) (table 5).

TABLE 5. Density per hector of five most abundant species of understory vegetation in LNP's buffer zone forests of Nuwakot and Sindhupalchok districts.

SN	Local name	Scientific name	Density/ha	
			Nuwakot	Sindhupalchok
1	Patpate	*Gaultheria fragrantissima*	3140	1314
2	Banmara	*Eupatorium adenephorum*	700	1086
3	Argeli	*Edgeworthia gardneri*	360	3000
4	Khareto	*Phyllanthus parvifolius*	360	--
5	Angeri	*Lyonia ovalifolia*	320	--
6	Lokta	*Daphne bholua*	--	1000
7	Gurans	*Rhododendron arboreum*	--	771

DISCUSSION

The commercially important NTFPs were using by the local people for some other traditional purposes. In almost all study area, commercially important *Gaultheria fragrantissima* was utilized for livestock bedding. Langtang National Park established a distillation unit to extract essential oils from Gaultheria in Rasuwa district. After its establishment, Gaunkharka VDC of Nuwakot district banned to collect *Gaultheria fragrantissima* from buffer zone community forest areas.

Some local people collect and sell the bark of *Edgeworthia gardneri* to nearby market. There were some traders, in Chanauta bazaar of Sindhupalchok district, who were collecting those bark from local herders. There was no record of other NTFPs which were commercially traded from this area. The commercial use of these valuable products can also threaten their availability. The collection methods used by the local people can accelerate to reduce the population of NTFPs.

Plants are sensitive to the local climatic condition. Small changes in the microclimate may differs their distribution pattern. The current distribution of *Gaultheria fragrantissima* is between 1200 to 2400 m elevation (Polunin & Stainton, 1984) in moist and open areas. Similarly, current distribution of *Edgeworthia gardneri* is between 1500 to 3000 m elevations (Polunin & Stainton, 1984) in open areas.

All tradable NTFPs play a vital role in the livelihood of local people, although small quantitity of them are commercially used by few people. Among them sporangia of *Lycopodium clavatum*, fruits of *Myrica esculenta*, bark of *Daphne bholua* & *Edgeworthia gardneri*, and extracted fibre from *Girardiana diversifolia* were previously sold by the local people. According to them all these materials were locally sold except the sporangia of *Lycopodium clavatum*, which was used to collect by external mediator.

The preferred and prioritized species by the local people were naturally available in the buffer zone forests of LNP. As there are enough barren private lands in the buffer zone areas, there are also potentialities of their commercial farming. Some people started to plant and preserved them in their private land.

There are markets for the essential oils of *Gaultheria fragrantissima* as it is an important constituent for pain relief massages. The fiber of *Edgeworthia gardneri* is used to make Nepali papers. The Nepali paper is used for all government official processes in Nepal. Similarly, it is used to make different souvenirs and calendars. The semi processed bark of *Edgeworthia gardneri* is also used for Japanese products (Biggs & Messerschmidt, 2005).

Buffer zone forest areas of Langtang National Park at Nuwakot and Sindhupalchok districts were quite favourable for NTFPs production. The local people showed their interest for conservation and sustainable use of commercial species. Current study indicated that *Gaultheria fragrantissima* and *Edgeworthia gardneri* were more potential species for commercial production and utilization in the study area. For commercial production and collection of *Gaultheria fragrantissima,* buffer zone areas of Nuwakot district will be the better place. Similarly, the commercial production and collection of *Edgeworthia gardneri* will be better in Sindhupalchok district as this area incorporated natural habitat of this species.

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ABBREVIATIONS USED

BZ – Buffer zone, BZCF – Buffer zone community forest, BZUG – Buffer zone users' group, DNPWC – Department of National Parks and Wildlife Conservation, FGD – Focus Group Discussion, LNP – Langtang National Park, LNPBZ – Langtang National Park's Buffer zone, NTFPs – Non-timber Forest Products, PV – Prominence value, VDC – Village Development Committee.

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Annex 1. Outcomes of the stakeholder consultation to identify and prioritize NTFPs in Lantang National Park's buffer zone area.

Local name and use categories	Scientific name
Fiber and fiber yielding	
Kettuke	*Agave americana*
Lokta	*Daphne bholua*
Allo	*Girardiana diversifolia*
Argeli	*Edgeworthia gardneri*
Babiyo	*Eulaliopsis binata*
Sugar starch and cellulose products	
Bantarul	*Dioscorea sp*
Gittha	*Dioscorea bulbifera*
Bhyakur	*Dioscorea deltoidea*
Legume or pulses	
Tanki	*Bauhinia purpurea*
Bhorla	*Bauhinia vahlii*
Vegetable oils and fats	
Okhar	*Juglan regia*
Chiuri	*Aesandra butyracea*
Bolung (Bansilam)	*Elsholtzia sp*
Silam	*Perilla frutescens*
Fruits and nuts	
Kaphal	*Myrica esculanta*
Chutro	*Berberis asiatica*
Bhakiamilo	*Rhus javanica*
Malayo	*Viburnum mullaha*
Ainselu	*Rubus ellipticus*
Aanp	*Mangifera indica*

Aalubakhara	*Prunus domestica*
Aaru	*Prunus persica*
Lauth salla	*Taxus wallichiana*
Lapsi	*Choerospondias axillaris*
Amala	*Phyllanthus emblica*
Khurpani	*Prunus cornuta*
Bankera	*Musa sp*
Singato	*Schisandra grandiflora*
Guphla	*Holboellia latifolia*
Golkankri	*Coccinia grandis*
Kalo ainselu	*Rubus foliolosus*
Rato Ainselu	*Rubus* sp
Bhuin ainselu	*Fragaria nubicola*
Patpate	*Gaultheria fragrantissima*
Jamanemandro	*Mahonia napaulensis*
Muslindi	*Elaeagnus parvifolius*
Vegetable	
Nyuro	*Dryopteris sp*
Sisnu	*Urtica dioica*
Padamchal	*Rheum emodi*
Thotne	*Aconogonum molle*
Chyau	*Mushroom*
Halhale	*Rumex crispus*
Koiralo	*Bauhinia variegata*
Siplikan (Chiniya)	*Crateva unilocularis*
Tusa	*Dendracalamus falcata*
Dundu	*Allium tuberosum*
Banlasun	*Allium sp*

Kalonyuro	*Dryopteris concolor*
Jirenyuro	*Actiniopteris sp*
Kurilo	*Asparagus racemosus*
Tama	*Dendracalamus sp*
Spices, condiments and other flavorings	
Tejpat	*Cinnamomum tamala*
Timbur	*Zanthoxylum armatum*
Jimbu	*Allium hyposistum*
Silam	*Perilla frutescens*
Siltimbur	*Lindera neesiana*
Jangali timbur	*Zanthoxylum acanthopodium*
Fumitory and masticatory	
Dhairo	*Woodfordia fruticosa*
Khasru	*Quercus semicarpifolia*
Kuro	*Bidens pilosa*
Pashanbet	*Bergenia ciliata*
Saur (Chipsing)	*Betula alnoides*
Thulo okhati	*Astible rivularis*
Kanchopat	*Nicotiana tabacum*
Beverages	
Gurans	*Rhododendron arboreum*
Malayo	*Viburnum mullaha*
Chutro	*Barberis asiatica*
Ainselu	*Rubus ellipticus*
Jamanemandro (Kerpa)	*Mahonia napaulensis*
Kaphal	*Myrica esculenta*
Dyeing and tannins	
Titepati	*Artemisia vulgaris*

Chutro	*Berberis asiatica*
Musurekatush	*Castanopsis tribuloides*
Jamanemandro (Kerpa)	*Mahonia napaulensis*
Majito	*Rubia manjith*
Kaphal	*Myrica esculenta*
Aanp (leaf)	*Mangifera indica*
Phalant	*Quarcus glauca*
Okhar	*Juglan regia*
Medicine	
Akashbeli	*Cuscuta reflexa*
Akashbeli	*Lycopodium clavatum*
Amala	*Phyllanthus emblica*
Bankapas	*Thespesia lampas*
Bantulsi	*Rabdosia sp*
Barro	*Terminalia bellirica*
Batulpate	*Stephania elegans*
Chirayto	*Swertia chirayita*
Chutro	*Berberis asiatica*
Dhasingare (Patpate)	*Gaultheria fragrantissima*
Ghiyaukumari	*Aloe vera*
Ghodtapre	*Centella asiatica*
Golkankri	*Coccinia grandis*
Gurjo	*Tinospora cordifolia*
Halhale	*Rumex crispus*
Harro	*Terminalia chebula*
Indreni	*Trichosanthes wallichiana*
Jibanti	*Desmotrichum fimbriatum*
Jugargano	*Cissampelos pareira*

Kurilo	*Asparagus racemosus*
Kutki	*Neopicrorhiza scrophulariiflora*
Lajjabati	*Mimosa pudica*
Lankuri	*Fraxinus floribunda*
Malati	*Mirabilis jalapa*
Neem	*Azadirachta indica*
Padamchal	*Rheum emodi*
Panchaunle	*Dactylorhiza hatagirea*
Parijat	*Nyctanthes arbor-tritis*
Pashanbhed	*Bergenia ciliata*
Pyauli	*Reinwardtia indica*
Sisnu	*Urtica dioica*
Taxus	*Taxus wallichiana*
Thulo aushadhi	*Astible rivularis*
Timur	*Zanthoxylum armatum*
Tite Nigalo	*Arundinaria sp*
Titepati	*Artemisia indica*
Insecticides and herbicides	
Aarubakhara	*Prunus domistica*
Bakaina (leaf)	*Melia azederach*
Khirro (leaf)	*Sapium insigne*
Mauwa	*Engelhardia spicata*
Neem	*Azadirachta indica*
Timur	*Zanthoxylum armatum*
Titepati	*Artemisia vulgaris*
Bojho	*Acorus calamus*

Miscellaneous		
Local name	**Scientific name**	**Local use**
Banmara	*Eupatorium adenophorum*	Fodder
Dhupi	*Juniperus sp*	Religious
Gurans	*Rhododendron arboreum*	Ornamental, Religious
Khanayo	*Ficus semicordata*	Fodder
Khasru	*Quercus semicarpifolia*	Fodder
Maharangi	*Maharanga emodi*	Religious, Medicinal
Musurekatush	*Castanopsis tribuloides*	Fodder
Nagbeli	*Lycopodium clavatum*	Gun powder, Ornamental
Nigalo	*Dendrophthoe falcata*	Fodder
Rittha	*Sapindus mukorossi*	Soap
Sungava	*Orchids*	Ornamental
Sunpate	*Rhoodendron anthopogon*	Religious
Tatelo	*Oroxylum indicum*	Religious
Titepati	*Artemisia indica*	Religious