

## **Midterm Report**

### **Approach to Determine the Diversity and Conservation Status of Bryophytes in Northern Sindhupalchok District of Nepal**

#### **Background**

Nepal is endowed with variation of physical structures by the nature. Thus, this country is divided into three main ecological zones viz. Mountain, Hill and Tarai regions. The mountain region occupies 35.2% of the total area of Nepal consisting altogether 16 districts of the country. Only 2 % of the total area is fertile land fit for cultivation. So only in the lower valleys and river basins, the agricultural practices have been intensified. The hilly region is located between the mountain and Tarai regions. It has fertile land with moderate and mild climatic type. Occupying 42 % of the total area of the country, this region is more populated than the mountain region. The lowland or Tarai is the southern flat land which is in continuation to the alluvial gangetic plain of India. The increasing population pressure mainly by migrants from the hills is imposing serious impact on forest resources of this part.

Sindhupalchok is a potential district for rich biodiversity displaying changing pattern of species composition at different altitudinal pockets of subtropical to the Himalayan bio-climatic zones.

This study as proposed is confined to the northern belt of this district which is also linked to the Nuwakot and Bhaktapur to the south and northwest respectively. Phyto-geography of this district is more diverse corresponding to the changing landscape and variable climatic features.

Sindhupalchok occupies its position at 27°13' N to 85° 27" to 86° 06' E of central Nepal. Presenting interesting ecological zones for flora and fauna, this district also provides popular destinations and accessible routes for visiting tourists and trekkers from the country and abroad.

The highest range of elevation at 4300 m where this study was limited is connected to the First RSG Fund which was funded for the study of the biodiversity of Panch Pokhari, Sindhupalchok district of central Nepal in 2008. This current phase of study which is underway has encompassed many interesting bryo-floral sites where diverse species of this plant with different conservation status have been reported.

The climatic condition of this district go parallel to the altitudinal lift indicating maximum thermal rise of 26°C in May and drops to below 0° C in winter. Rainfall is affected mainly by the south-west monsoon that enters into the country at its eastern boundary. The average temperature and relative humidity during the field visit was 21-23°C and 49% respectively.

#### **Vegetation**

The diversity and distribution of vegetations correspond to the rise in elevation with decreasing species richness comparative to the lower belt. Study made in this part revealed the occurrence of four types of vegetation at different altitudinal zones. Himalayan vegetation occurs above 5000 m of elevation where lichens and bryopfloral components are widely spread. The mountain zone within 4000-4880 m includes diverse bryophyte and lichen species besides *Arundinaria*, *Juniperus*, different medicinal herbs and alpine grasses.

Coniferous forest of this district represents rich *Rhododendron* species, *Juglens regia*, *Betula utilis*, *Quercus*, *Michelia* and *Cinnamomum* species as major vegetation types. The mixed deciduous forest lying below coniferous forest represents rich floral species. This includes *Juniperus* species, *Schima wallichii*, *Castanopsis indica*, *Pinus wallichiana*, *Quercus semicarpifolia*, *Choerospondian axillaris* and *Shorea robusta* at the lower belt.

The total area occupied by this district is about 2, 52, 800 hectares of land, of which 1300 hectares are arable and fit for agriculture while remaining 2, 39, 000, ha includes non usable and waste land mass.

### Ecology

From ecological perspective, this district has interesting profile of sheltering unique, diverse and rare faunal species. The notable species represented here are Barking Deer (*Muntiacus muntjak*), Musk Deer (*Moschus chrysogaster*), Common Leoprad (*Panthera pardus*), Clouded Leopard (*Neofelis nebulosa*), Leopard Cat (*Felis bengalensis*), Thar (*Hemitragus jemlaihcus*), Goral (*Nemodhaedus goral*), Himalayan Palm Civet (*Paguma larvate*)), Sloth Beer (*Malursus ursinus*), Himalayan Beer (*Selenarctos thibetanus*), Red Panda (*Ailurus fulgens*), Pikas (*Ochorona* species), Procupine (*Hystrix indica*) and many rodent species.

Avian diversity is remarkable in this part that includes Danfe pheasant (*Lophophorous impeyanus*), Crimson Horned Pheasant (*Tragopan satyra*), different pheasant species, Finches, Thrushes, Warblers, Choughs, Babblers etc.

### Map of the Study Sites

Blue circle indicating areas covered in the First Phase of Study





**Fig. 1. Map showing the Routes Followed during First Phase of Study**

## Objectives

The entire study is divided into two phases. The first phase of study has now been completed and the next phase will commence in March 2012.

This work runs with the following objectives:

- To enumerate bryophyte species occurring at different altitudinal zones of the northern Sindhupalchok district of central Nepal.
- To assess conservation status of the reported species including their threat factors.
- To identify micro and megafauna associated to bryophyte habitats.
- To develop distribution map of bryophytes occurring at different study sites.
- To gather information on traditional uses of this plant in the society.
- To launch door to door awareness program to bring conservation participation of the local peoples and communities.

## Methodology

The following methods were adopted to fulfill the objectives of this work. Some of the objectives still remain to work and will be achieved in the final phase of study in March and June 2012.

### **Enumeration of Bryophytes**

Best effort was carried out to identify the observed species of bryophytes in the field. This was done with the help of magnifying hand lens and consulting books of Gangulee (1969-1980) and Eddy (1988-1996). Not readily identifiable species in the field were collected and placed in paper packets so to bring to the laboratory in Kathmandu and confirm their correct identification. This process is still continuing.

### **Assessment of Conservation Status**

The process on categorizing local status is underway and IUCN Redlist has been consulted for the native status of the species collected during the First Phase of study. Detail account on this aspect will be incorporated in the final report. Assessment of threat factors on bryophyte habitats will continue till the end phase of this study which after completion may help to reveal out more information.

### **Distribution Map**

Mapping will be done on species reported during the entire period of field survey. This will be developed as posters or flex prints that can help for effective publicity linked to conservation. This will be done at the end period of this project work.

### **Traditional Uses**

Questionnaires will be developed for interviewing local peoples on the uses of bryophytes in their society. This work has been scheduled in June which is the end phase of this study.

### **Faunal Association to Bryophyte Habitats**

Various faunal components associated to bryophyte habitats have been identified in the first phase of study. An expert Zoologist who is affiliated to this study team has identified, insects, nematods, mammal, and some bird species which has been mentioned below. Birds and mammals were identified in the field using field guides by Fleming (1976) and Prater (1971) respectively. Field identification of butterflies and moths were done with the help of Khanal and Smith (1997) and Haruta (1995). Other components like beetles, earwigs (Dermaptera) millipedes, molluscans and nematods have been brought to Kathmandu Laboratory to confirm their identification. Ethyl alcohol was used as preservatives for millipedes and nematodes while dry preservative method was adopted for beetles and some molluscans except slug which was preserved in ethyl alcohol as well. This work is still continuing, and the final phase of study has been expected to bring more information on this aspect.

### **First Phase Study**

The first phase of field study was carried out in September 24 to October 12, 2011, a little delay than the schedule period. September – October is the best season for the sporophytic growth in bryofloral species. This study made a round circuit covering various potential sites like Timbu (1300m), Kakani (2050m), Shermathang (2621m), Tarkyghyang (2743m), and Melamchi (846m). This investigation provided interesting findings on the distribution and diversity of bryophytes this part.

## Bryophyte species

Dominant genera of liverworts reported during the first phase of study are *Targionia*, *Frullania*, *Scapania*, and *Porella* spp. These were observed at the elevation of 1300 m to 3000 m. *Asterella*, *Plagiochasma*, *Marchantia* and *Cyathodium* spp. were noticed fairly common in many parts of the study areas. Reported liverworts from Metzgeriales are *Riccardia multifida* and *Metzgeria conjugata* which are rare in status and was collected from 2850 m of elevation. *Cephaloziella* sp. (Cephaloziellaceae) of the order Jungermanniales was found intermingled as epiphytic with *Scapania undulata* (Scapaniaceae) at 2440 m of elevation where moss forest is widely spread.

*Anthoceros punctatus* is the most common Hornwort distributed at 1480-2040 m of elevation. Diverse species of mosses noticed at 1500-2500 m of elevation are *Pogonatum* and *Polytrichum* which are quite prevalent in this part. *Funaria hygrometrica*, *Bryum argenteum*, *Entodontopsis wightii* and *Hypnum pleumaforme* were also reported as fairly common species within the elevations of 1500-2500 m. Two rare *Sphagnum* species were also reported at 2220 m and 3000 m. respectively. Identification work on many bryofloral species brought from the field is still underway.

Sindhupalchok is a totally unexplored area for bryophytes. Continuation to this study till the end of final phase can be expected to reveal out many interesting or new findings. The next study program has been scheduled in March 2012. The list of identified bryophyte species is provided in Appendix I.

## Threat Factors

Threat factors at different altitudinal habitats were studied which still will be continued to the second phase of study. The detail account on this aspect will be incorporated into the final report which will be submitted to RSG in September 2012.

The major impact assessed in this part is mainly due to high rate of deforestation causing habitat loss of many rare bryophytes occurring here. Extension of agricultural land demolishing natural forests at many places was noticed. This has been investigated that the impact is heavily laid on the bryophyte habitats mainly at Shermatnag (2621 m), Timbu (1300 m) and Melamchi (846 m) areas. Construction of motorable road linking Melamchi, Tarkyghyang and Shermathang is the next adverse effect imposed on the natural habitats of many rare bryophyte species not documented before. So, the loss of these species and their status remained completely unknown for-ever.

Tourism promotion activity in this part without proper management also has left adverse effect though tourism is one of the important income sources for the peoples of this part. Many significant habitats were found demolished for physical constructions, an essential facility for visiting tourists to this part.

Assessing impact factors is still underway and the second phase of study will cover this aspect in greater details. Conservation issues and relevant mitigation measures will also be analyzed for implementation and will be incorporated in the final report.

The proposed community-based awareness program will be launched in June and is expected to bring significant participation of the local inhabitants in conservation campaign.

### **Associated Higher Plants**

Different forest types provide preferable habitats and canopy to various species of bryophytes carrying different conservation values. Epiphytic species like *Frullania* spp. were also reported growing upon the trunks of different tree species. Various species of herbs, shrubs and trees occurring in different forest types within the elevations of 1300 to 3000 m were identified. This exploration is still continuing and the final study in March can be expected to add more species as this study will follow different routes for study.

A list of reported plant species is provided in the Appendix II - IV.

### **Faunal Association to Moss Forests**

Many small invertebrates were found in moss habitats. These forests are located generally at the northern slopes of the mountains where damp and wet condition prevail. Such habitats provide shelter to many invertebrate species. The next or final phase of study has been expected to come with much information on this aspect. In this study many faunal components were reported in moss forest habitats which are provided below.

#### **Fauna located in moss forest habitats**

##### **Annelids**

1. *Pheretima posthuma*
2. *Hirudinaria granulose*

##### **Araneidae**

1. *Araneus* sp.
2. *Gnaphosa* sp.
3. *Cyclosa* sp.
4. *Salticid* sp.

##### **Mollusca**

1. Land Snail (*Helix* sps.)
2. Slug (*Meghimatium* sps.)

##### **Lepidoptera**

##### **Moths**

1. *Deiopia pulchella* (Arctiidae)
2. *Eusemia victrix* (Agaristidae)
3. *Chrysorabdia bivitta* (Arctiidae)
4. *Spilosoma casignatum* (Arctiidae)
5. *Spilosoma casignatum* (Arctiidae).
6. *Xestia aquila* (Noctuidae)
7. *Xestia fakosharga* (Noctuidae)
8. *Epiplima adamantina* (Uranidae)
9. *Dysstroma aquilum* (Geometridae)

**Butterflies**

1. *Callerebia scanda* (Satyridae)
2. *Acraea issoria* (Acreeidae)

**Aves**

1. *Pnoepyga albiventer* (Scaly bellied Wren Babbler) - above 2400 m.
2. White Spotted Laughing Thrush (*Garrulax ocellatus*)-Mossy habitat

**Mammals**

1. *Muntiacus muntjak* (Barking Deer)
2. Rodent species

**Insects****Coleoptera**

1. *Trechus himalayanus* (Carabiidae)
2. *Carabus* sp. (Carabiidae)
3. *Acropteryx* sp. (Chrysomelidae)
4. *Dorcus antaeus* (Lucanidae, at 1600 – 3000 m)
5. *Dorcus lineatopunctatus* (Lucanidae, 1800- 3400 m).
6. *Onthiphagus* sp. (Scarabiidae)

**Dermaptera**

1. *Forficula* sp

**Diplopoda**

1. Millipedes

**Nematoda**

1. *Plectus* sp.
2. *Eudorylaimus* sp.

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## Appendix I

## Vertical Distribution of Bryophytes at 1300-3020 m

Families	Latin names	Elevation (m)	Status
Bryaceae	<i>Anomobryum julaceum</i> (Gaertn <i>et al.</i> ) Schimp.	1420 -1760	FC
Aytoniaceae	<i>Asterella khasiana</i> (Griff.) Pande <i>et al.</i>	1430-1480	FC
Aytoniaceae	<i>Asterella multiflora</i> (Steph.) Pande <i>et al.</i>	1430	R
Aytoniaceae	<i>Asterella wallichiana</i> (Lehm. & Linden.) Grolle	1420 -1530	R
Targioniaceae	<i>Targionia hypophylla</i> L.	1430 - 1840	FC
Frullaniaceae	<i>Frullania tamarisci</i> (L.) Dum.	1480- 1740	FC
Marchantiaceae	<i>Marchantia emarginata</i> Reinw. <i>et al.</i>	1480	FC
Anthocerotaceae	<i>Anthoceros punctatus</i> L.	1480- 1620	C
Fissidentaceae	<i>Fissidens bryoides</i> Hedw.	1480	FC
Pottiaceae	<i>Hydrogonium arcuatum</i> (Griff.) Wijk. & Marg.	1480	FC
Pottiaceae	<i>Hyophila involuta</i> (Hook.) A. Jaeger	1510	R
Bryaceae	<i>Bryum argenteum</i> Hedw.	1510	C
Stereophyllaceae	<i>Entodontopsis tavoyense</i> (Hook. F.) W. R. Buck & Ireland	1540	FC
Stereophyllaceae	<i>Entodontopsis wightii</i> (Mitt.) W. R. Buck & Ireland	1560	FC
Hypnaceae	<i>Ptilium crista castrensis</i> (Hedw.) De Not.	1560	R
Porellaceae	<i>Porella</i> sp.	1610	R
Aytoniaceae	<i>Plagiochasma pterospermum</i> C. Massal.	1650	R
Frullaniaceae	* <i>Frullania delatata</i> (L.) Dum.	1720	Rare
Ricciaceae	* <i>Riccia glauca</i> L.	1720	R
Frullaniaceae	<i>Frullania retusa</i> Mitt.	1720	FC
	<i>Erythrodontium julaceum</i>	1760	R
Frullaniaceae	<i>Frullania muscicola</i> Steph.	1760-1840	FC
Bartramiaceae	<i>Philonotis thwaitesii</i> Mitt.	1850	R
Thuidaceae	<i>Thuidium cambifolium</i> (Dozy & Molk.) Dozy & Molk.	1880	C
Entodontaceae	<i>Entodon flavescens</i> (Hedw.) A. Jaeger	1880	FC
Hypnaceae	<i>Hypnum pleumaforme</i> W. Wilson	2040-2220	C
Entodontaceae	<i>Entodon flavescens</i> (Hedw.) A. Jaeger	2050	FC
Polytrichaceae	<i>Polytrichum</i> sp.	2050	C
Polytrichaceae	<i>Pogonatum microstomum</i> (R. Br.) Brid.	2060	C
Frullaniaceae	* <i>Frullania dalatata</i> (L.) Dumort.	2120	R
Dicranaceae	<i>Trematodon longicolle</i> Michx.	2160	R
Sphagnaceae	<i>Sphagnum junghunianum</i> Dozy & Molk.	2200	R
Targioniaceae	<i>Targionia hypophylla</i> L	2240	C
Funariaceae	<i>Funaria hygrometrica</i> Hedw.	2340	C
Bryaceae	<i>Brachymnium</i> sp.	2340	R
Bryaceae	<i>Bryum argenteum</i> Hedw.	2350	C
Bryaceae	* <i>Pohlia nutans</i> (Hedw.) Lindb	2360	R
Scapaniaceae	<i>Scapania ciliata</i>	2400	R

Jungermanniaceae	* <i>Jungermannia pumila</i> With.	2460	R
Brachytheciaceae	<i>Homalothecium nigheriensis</i>	2400	R
Conocephalaceae	<i>Conocephalum conicum</i>	2420	FC
Lejeuneaceae	<i>Lejeunea flava</i> (Sw.) Nees	2420	FC
Lepidoziaceae	<i>Bazzania tridens</i> (Reinw. et al.) Trev.	2440	R
Pellaceae	<i>Pellea epiphylla</i> (L.) Corda	2440	R
Scapaniaceae	* <i>Scapania undulata</i>	2440	FC
Bryaceae	<i>Rhodobryum giganteum</i> (Schwaegr.) Par.	2450	FC
Bryaceae	<i>Pohlia elongata</i> Hedw.	2500	FC
Polytrichaceae	<i>Pogonatum submacrophyllum</i> Herz.	2460-2500	FC
Meteoriaceae	<i>Barbella</i> sp.	2500	C
Plagiochilaceae	* <i>Plagiochila spinulasa</i>	2550	R
Conocephalaceae	<i>Conocephalum conicum</i> (L.) Underw.	2600	FC
Hypnaceae	<i>Taxiphyllum taxirameum</i> (Mitt.) Fleisch.	2600-2700	FC
Mniaceae	<i>Mnium punctatum</i> Hedw.	2800	FC
Pelliaceae	<i>Pellia epiphylla</i> (L.) Corda	2820	R
Aneuraceae	<i>Riccardia multifida</i> (Linn.) Gray	2850	R
Dicranaceae	<i>Dicranum himalayanum</i> Mitt.	2850	R
Fissidentaceae	<i>Fissidens taxifolium</i> Brid.	2900	FC
Funariaceae	<i>Funaria hygrometrica</i> Hedw.	3000	MC
Sphagnaceae	<i>Sphagnum cuspidatum</i> C. Muell.	3000	R
Funariaceae	<i>Funaria hygrometrica</i> Hedw.	3000	C
Bryaceae	<i>Bryum cellular</i> Hedw.	3020	R
Hypnaceae	<i>Hypnum pleumaforme</i>	3020	C
Mniaceae	<i>Mnium punctatum</i> Hedw.	3020	FC
Polytrichaceae	<i>Pogonatum microphyllum</i>	3020	C
Plagiochilaceae	<i>Plagiochila denticulata</i> Mitt.	3020	R
Jungermanniaceae	<i>Jungermannia hyaline</i> Lyell.	3020	R
Bryaceae	<i>Rhodobryum giganteum</i> (Schwaegr.) Par.	3020	C

## Appendix II

### Pteridophytes

S.N.	Latin names	Nepali/Common name	Family	Habit	Altitude (m)	Status
1.	<i>Adiantum</i> sp.	Rani sinki	Pteridaceae	Herb	1440	C
2.	<i>Botrychium</i> sp.		Ophioglossaceae	Herb	1800	R
3.	<i>Cheilanthes</i> sp.	Silver fern	Pteridaceae	Herb	1440	C
4.	<i>Cythea</i> sp.	Tree fern	Cytheaceae	Herb		C
5.	<i>Dicranopteris linearis</i>		Gleicheniaceae	Herb		
6.	<i>Dryopteris</i> sp.		Dryopteridaceae	Herb		
7.	<i>Equisetum palustre</i>	Horse tail	Equisetaceae	Herb	1500	
8.	<i>Gleichenia</i> sp.		Gleicheniaceae	Herb	1770	C
9	<i>Lepisorus nudus</i>		polypodiaceae	Herb		
10.	<i>Loxogramme</i> sp.		Polypodiaceae	Herb		C
11.	<i>Lycopodium clavatum</i>	Nagbeli	Lycopodiaceae	Herb	2100	
12.	<i>Nephrolepis cordata</i>	Pani	Davalliaceae	Herb	1610	C

		amala/Sword fern				
13.	<i>Onychium siliculosum</i>	Golden fern	Pteridaceae	Herb	1610	C
14.	<i>Pteris vitata</i>		Pteridaceae	Herb	1480	
15.	<i>Polystichum</i> sp.		Dryopteridaceae	Herb	2050	R
16.	<i>Selaginella</i> sp.		Selaginellaceae	Herb	1490	C
17.	<i>Tectaria odorata</i>	Kalo Neuro	Dryopteridaceae	Herb	1440	R

### Appendix III

#### Gymnosperms

S.N.	Latin names	Common Name	Family	Habit	Altitude (m)	Status
1.	<i>Abies spectabilis</i>	Fir	Pinaceae	Tree	2400	
2.	<i>Cedrus deodara</i>	deodar	Pinaceae	Tree	2350	
3.	<i>Juniperus</i> sp.	cedar	Cupressaceae	Tree	2200	
4.	<i>Pinus roxburghii</i>	Chir pine	Pinaceae	Tree	1780	C
5.	<i>Pinus wallichiana</i>	Blue pine	Pinaceae	Tree	1880	C
6.	<i>Tsuga dumosa</i>		Pinaceae	Tree	2180	

### Appendix IV

#### Angiosperms

SN.	Latin names	Nepali/Common name	Family	Habit	Altitude (m)	status
1.	<i>Alnus nepalensis</i>	Uttis	Betulaceae	Tree	1400	C
2.	<i>Allium wallichii</i>	Ban lasun	Amaryllidaceae	Herb	1800	R
3.	<i>Artemisia</i> sp.	Titepate	Compositae	Herb	1420	C
4.	<i>Arisaema erubescens</i>	Sarpako makai	Araceae	Herb	2000	C
5.	<i>Aster</i> sp.		Compositae	Herb	1500	C
6.	<i>Anaphalis contorta</i>		Compositae	Herb	2000	
7.	<i>Anaphalis triplinervis</i>		Compositae	Herb		
8.	<i>Ageratum conizoides</i>	Gannamane jhar	Compositae	Herb	1480	
9.	<i>Begonia</i> sp.		Begoniaceae	Herb		
10.	<i>Berberis aristata</i>	Chutro	Berberidaceae	shrub		
11.	<i>Bidens pilosa</i>	Kuro	Asteraceae	Herb		
12.	<i>Bistorta amplexicaulis</i>		Polygonaceae	Herb		
13.	<i>Bistorta</i> sp.		Polygonaceae	Herb		I
14.	<i>Buddleja asiatica</i>	Bhimsen pate	Loganiaceae	Shrub	1980	
15.	<i>Castanopsis indica</i>	katush	Fagaceae	Tree		
16.	<i>Callistemon citrinus</i>	krishnakali	Myrtaceae	Tree		
17.	<i>Carex</i> sp.		Cyperaceae	Herb		
18.	<i>Commelina</i> sp.		Commelinaceae	Herb		
19.	<i>Corybalis</i> sp.		Papaveraceae	Herb		
20.	<i>Conyza japonica</i>		Compositae	Herb		
21.	<i>Cuscuta reflexa</i>	Hawajadi	Convolvulaceae	Climber		R
22.	<i>Cryptococcum</i> sp.		Poaceae	Herb		

23.	<i>Cyanodon dactylon</i>	Dubo	Gramineae	Herb	1450	C
24.	<i>Choerospondias axillaris</i>	Lapsi	Anacardiaceae	Tree	1480-1740	
25.	<i>Dalbergia sisso</i>	Sisso	Leguminosae	Tree	1480	
26.	<i>Desmodium confertum</i>		Leguminosae	Climber	1420	
27.	<i>Desmodium multiflorum</i>		Leguminosae	Climber		
28.	<i>Dioscorea deltoides</i>	Byakur	Dioscoreaceae	Climber		
29.	<i>Erigeron sp.</i>		Compositae	Herb		
30.	<i>Eupatorium adenophorum</i>	Ban Mara	Compositae	Herb		
31.	<i>Eurya ceracifolia</i>		Theaceae	Tree	2200	
32.	<i>Ficus semicordata</i>		Moraceae	Tree	1440	
33.	<i>Ficus bengalensis</i>	Bar	Moraceae	Tree		
34.	<i>Ficus religiosa</i>	Peepal	Moraceae	Tree		
35.	<i>Fragraria nubicola</i>	Bhui kaphal	Rosaceae	Herb		
36.	<i>Gaultheria fragrantissima</i>	Ghasingrey	Ericaceae	Shrub	2000	
37.	<i>Galinsoga parviflora</i>		Compositae	Herb	2000	
38.	<i>Girardinia diversifolia</i>	Allo	Urticaceae	Herb		
39.	<i>Hedychium sp.</i>	Besar	Zingiberaceae	Herb	1860	
40.	<i>Heracleum sp.</i>		Umbelliferae	Herb		
41.	<i>Hypechusa hybrida</i>		Fabaceae	Climber	1430	
42.	<i>Hypestrum hybrid</i>			Herb	1420	
43.	<i>Gnaphalium affine</i>		Compositae	Herb		
44.	<i>Imperata sp.</i>		Gramineae	Herb	2000	
45.	<i>Juglans regia</i>	Okhar	Juglandaceae	Tree	2100	
46.	<i>Lobelia pyramidalis</i>		Lobeliaceae	Herb		
47.	<i>Litsea monopelata</i>	Kutmero	Lauraceae		1800	
48.	<i>Melastoma melabathricum</i>	Angeri	Melastomaceae	Shrub		
49.	<i>Mahonia acanthifolia</i>	Chutro	Berberidaceae	Shrub		
50.	<i>Mahonia nepaulensis</i>	Jamane mandro	Berberidaceae	Tree		R
51.	<i>Mucuna pruriens</i>		Leguminosae	Climber		
52.	<i>Nepeta sp.</i>					
53.	<i>Oxyspora peduncularis</i>			Shrub	2200	R
54.	<i>Ocimum sp.</i>	Tulsi	Labiatae	Herb	1980	
55.	<i>Osbeckia sp.</i>	Chultho	Melastomaceae	Shrub	1780	
56.	<i>Oxalis sp.</i>	Chari Amilo	Oxalidaceae	Herb	1850	C
57.	<i>Persicaria nepalensis</i>		Polygonaceae	Shrub		I
58.	<i>Primula sp.</i>		Primulaceae	Herb	3000	
59.	<i>Potentilla peduncularis</i>	Bajradanti	Rosaceae	Herb		
60.	<i>Prinsepia sp.</i>		Rosaceae	Shrub	2200	
61.	<i>Phyllanthus niruri</i>		Euphorbiaceae	Herb	1760	C
62.	<i>Phragmites karka</i>	Narkat	Gramineae	Shrub		
63.	<i>Quercus semicarpifolia</i>	Oak	Fagaceae	Tree	1900	
64.	<i>Rhododendron arborium</i>	Gurans	Ericaceae	Shrub	2800	
65.	<i>Rumex sp.</i>	Halhale	Polygonaceae	Herb		C
66.	<i>Rubus ellipticus</i>	Ainselu	Rosaceae	Shrub		
67.	<i>Saccharum sp.</i>	Kharu	Gramineae	Herb	1440	

68.	<i>Schima wallichii</i>	Chilaune	Theaceae	Tree	1560	
69.	<i>Sapium insigne</i>	Khirro	Euphorbiaceae	Shrub		
70.	<i>Satyrium nepalense</i>		Orchidaceae	Herb		T
71.	<i>Scutellaria discolor</i>		Labiatae	Herb		
72.	<i>Selenium tenuifolium</i>		Umbelliferae	Herb		
73.	<i>Swertia</i> sp.	Chiraito	Gentianaceae	Herb		
74.	<i>Senecio</i> sp.		Compositae	Herb	2520	
75.	<i>Saxifraga</i> sp.					
76.	<i>Sunchus</i> sp.	Dandelion		Herb		
77.	<i>Scircium wallichii</i>		Orchidaceae	Herb		V
78.	<i>Tanacetum</i> sp.		Compositae	Herb		
79.	<i>Torenia</i> sp.			Herb	1610	
80.	<i>Thalictrum</i> sp.		Ranunculaceae	Shrub	2100	
81.	<i>Terexacum</i> sp. cf.			Herb	2500	
82.	<i>Viburnum</i> sp.		Sambucaceae	Shrub	2560	
83.	<i>Zanthoxylem armantum</i>	Timur	Rutaceae	Tree	1600	
84.	<i>Daphne bholuaa</i>	Lokta	Thymelaceae	shrub		

**Status index:**

- C Common  
 FC Fairly Common  
 I Indeterminate  
 R Rare  
 T Threatened  
 V Vulnerable  
 \* New Record