Ministry of Forests and Soil Conservation
Kathmandu, Nepal

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QUANTITATIVE RESOURCE ASSESSMENT OF NON-TIMBER FOREST PRODUCTS IN THE TERAI REGION OF NEPAL

January 2004

ITTO Project No. PPD 6/99 Rev. 3 (M.F.1)
Preparation of Project Proposal for the Promotion of Non-Timber Forest Products in the Terai Region of Nepal

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Project Background

The rich biodiversity of Nepal accommodates a wide range of Non-Timber Forest Products (NTFPs), including Medicinal and Aromatic Plants (MAPs). Rural people have long been involved in the conservation, collection and sale of NTFPs. This has contributed significantly to the rural livelihood. Many of the NTFPs are being exported every year to India and overseas and the revenues are increasing every year. The annual royalty collected by District forest offices ranged from NRs. 16.6 to 21.5 million (US$215,584-279,220) during 1999/2000 and 2001/2002 (DOF, 2002). Commercial extraction for NTFPs and other useful plants is increasing every year but they are being extracted against the principles of sustainable management, which as an effect has caused the depletion of the country's wild resources. Some species are already at the verge of extinction.

Realizing this situation, Ministry of Forests and Soil Conservation (MFSC), His Majesty's Government of Nepal (HMG/N) requested the International Tropical timber Organization (ITTO) to provide funds to undertake a thorough study on the status of NTFPs, its cultivation and marketing practices and prepare a detailed proposal for implementation to promote NTFPs in the Terai region of Nepal. Consequently, the International Tropical Timber Council (ITTC) approved a project entitled "Preparation of a Project Proposal for the Promotion of Non-Timber Forest Products in the Tropical Region of Nepal" to be financed through ITTO. The MFSC entrusted the study upon Centre for Economic Development and Administration (CEDA), a research institute of Tribhuvan University in 2002. CEDA undertook this study by forming a multidisciplinary team of experts from relevant fields. A Project Steering Committee (PSC) was constituted by MFSC that supported, facilitated and coordinated the overall study. With the help and support of all concerned, the team accomplished the study and prepared five documents, three thematic reports, one consolidated report and a project proposal as mentioned below:

i) **Current Status of Marketing of Non-Timber Forest Products in the Terai Region of Nepal.**
ii) **Current Status on Cultivation and Management of Non-Timber Forest Products in the Terai Region of Nepal.**
iii) **Quantitative Resource Assessment of Non-Timber Forest Products in the Terai Region of Nepal.**
iv) **A Synthesis Report on Current Status of NTFPs in the Terai Region of Nepal and**
v) **A Project Proposal on Sustainable Management and Cultivation of Non-Timber Forest Products in the Terai Region of Nepal.**

Above three (i-iii) thematic reports provide background information to formulate a project proposal and provide further reference to future policy dialogues, reforms and program formulation. The project proposal has been prepared to be submited to International Tropical Timber Organization (ITTO) in order to request funds to implement various activities related to the promotion of NTFPs in the Terai region of Nepal.

Acknowledgement

Non-Timber Forest Products (NTFPs) are one of the important sources of government revenue and their contribution to the rural livelihoods is quite significant. A large number of people in the rural areas have been engaged in off- farm employment opportunities and generating income through the collection and sale of NTFPs. I would like to express my gratitude to the Ministry of Forests and Soil Conservation for providing us the opportunity to carry out the task of research and study in such an important topic. In this connection, I would like to thank the Secretary of MFSC, Mr. Chandi Prasad Shrestha and Chief of Foreign Aid Coordination Division, Dr. Damodar Prasad Parajuli for their cooperation.

This report is the outcome of the hard work of many experts who were involved in field survey, data analysis and writing the reports. Altogether three thematic reports, a status report and the end document-a Project Proposal for future implementation have been prepared.

Dr. Nirmal Kumar Bhattarai prepared the report on the Quantitative Resource Assessment of Non Timber Forest Products in the terai Region of Nepal. Dr. Vrigu Rishi Duwadi produced the preliminary draft on Current Status of Cultivation and Management of Non Timber Forest Products in the Terai Region of Nepal. The invaluable inputs of Dr. Annapurna Nanda Das and Dr. Krishna Chandra Paudyal were instrumental in finalising the report. Likwise Mr. Ram Hari Subedi did the preliminary draft on Current Status of Marketing of Non Timber Forest Products in the Terai Region of Nepal and final draft and final reports were prepared with the combined efforts of Mr. Sagendra Tiwari, Mr. Kishore K.C. and Mr. Vijay Kunwar. The Synthesis Report on Current Status of Non Timber Forest Products in the Terai Region of Nepal was solely the contribution of Dr. Bharat Kumar Pokharel. Mr. Man Mohan Dhoj Joshi prepared the preliminary draft of the Project Proposal and the joint efforts of PSC members, Mr. Kishore KC and Mr. Vijay Kunwar did the finalization of the proposal. I would like to extend my sincere thanks to all of them.

All the core members of the study team and other foresters and botanists, who worked as associates namely, Messrs Kuber Junj Malla, Suman Sigdel, Omkar Joshi, Ripu Kunwar, Mohan Kafle and Ram Kumar Deo undertook the field survey. Messrs Kishore K.C, Suman Sigdel and Omkar Joshi did the arduous job of data analysis. Mr. Ripu Kunwar worked out for systematizing and analyzing the information collected from quadrat sampling carried out in Sunsari, Bara and Banke districts. He also visited numerous institutions concerned with NTFPs to collect valuable information, which were used in the three thematic reports. Dr. Bhuvan Bajra Bajracharya did the final editing and Dr. Pushpa Shrestha did some literature review. Thanks are due to all of them. Ms. Subarna Shrestha did the formatting of the reports at various stages. Last but not the least, team leader, Mr. Kishore K.C. deserves special thanks for his untiring efforts and coordinator, Mr. Vijay Kunwar for the backstopping support during the entire study period.

The Project Steering Committee (PSC) of the MFSC provided technical inputs to the study through various meetings and was quite instrumental in improving the quality of the reports. In this connection, I would like to thank Dr. Damodar Prasad Parajuli, Chairman of the PSC, Mr. Harihar Sigdel and Mr. Lokendra Purush Dhakal, Member Secretaries (in two different time phases), Dr. Annapurna Nanda Das, Mr. Gopal Kumar Shrestha, Mr. Rajendra Kafle, Mr. Din Dayal Bhattarai, Mr. Prem Karki, Mr. Purushottam Joshi and Mr. Ananda Bhandari for their hard work and constructive comments.

Abullaish
Executive Director
Centre for Economic Development and Administration (CEDA)

Acronyms

CBO	: Community Based Organization
CEDA	: Centre for Economic Development and Administration
CFUG	: Community Forestry User Group
DFO	: District Forest Officer
DFRS	: Department of Forest Resources
FAO	: Food and Agriculture Organization
GO	: Governmental Organization
HMG/N	: His Majesty's Government of Nepal
INGO	: International Non-Governmental Organization
ITTO	: International Tropical Timber Organization
JABAN	: Jadibuti Association of Nepal
LRMP	: Land Resource Mapping Project
MAP	: Medicinal and Aromatic Plant
MFP	: Minor Forest Product
MFSC	: Ministry of Forests and Soil Conservation
NGO	: Non-Governmental Organization
NTFP	: Non-Timber Forest Product
NWFP	: Non Wood Forest Product

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1. Background of the Study

A pre-project of NTFPs in Terai was agreed with ITTO, with the objectives of formulation of a detailed project proposal for promotion of sustainable development of Non-Timber Forest Products with socio-economic benefits to rural people residing in the tropical region of Nepal. The major objectives of the pre-project were to:

a. Quantitatively assess the NTFP resources of the Terai,
b. Study the markets, marketing channels and market linkages, and
c. Analyze the current status of NTFP management systems

These activities, resulting into the preparation of relevant documents, are meant for the formulation of a project proposal for the development, sustainable management and better utilization of NTFP resources in the Terai region of Nepal. The present document is an attempt to assess the NTFP resources of the Terai region of Nepal so as to prepare a project proposal to address various issues resulting into the overall conservation, development and management of NTFP resources of the Terai region of the country.

2. Introduction

Nepal extends along the great Himalayan range from 81° 15' to 88° 10' E longitudes with an area of 147,181 square kilometers. The altitude ranges from 60m to 8848m above the sea level. Due to its location along the central portion of the Himalayan range, the country is a meeting zone between the flora of east Himalaya containing many Sino-Japanese species and the west Himalaya, with many west Himalayan elements. It also has plants representative of Central Asia (Tibet) in its many northern frontiers, especially in the trans-Himalayan regions. Numerous plants representative of the Indo-Gangetic plain are found in its plain and low altitude regions. Having widest altitudinal range in the world within the narrow width of about 150-200 km, Nepal has about 35 major forest types, 75 vegetation types and 118 types of ecosystems represented by about 7000 species of vascular plants including 250 endemic species (Bajracharya *et al.* 1988; Joshi and Joshi 1991).

About 5.83 million hectares of the country, representing 39.6% of the total land is occupied by the forestland. Of this, forests occupy 4.27 million hectares and shrubs occupy 1.56 million hectares corresponding to 29% and 10.6% of the total land respectively (DFRS 1999). The present document addresses issues related with aspects of tropical NTFPs of Nepal while attempting to initiate their quantitative resource assessment based on available information that could serve as a tool to initiate their conservation, management and development in the future.

3. Non-timber Forest Products (NTFPs), Non-wood Forest Products (NWFPs) and Minor Forest Products (MFPs)

Non-timber forest products (NTFPs), also sometimes referred to as non-wood forest product (NWFPs) or minor forest product (MFPs) include all goods, other than timber or wood, that are produced in forests, pastures and meadows. Prominent examples of NTFPs are: medicinal and aromatic plants and herbs, roots, barks, leaves, fruits and nuts, grasses, bamboo and canes, resins and saps, lac and tasar silk, honey, etc., in their raw form (Bhattarai and Croucher 1996).

The term Minor Forest Product (MFP) was most popular in the days when wood (hard solid substances of a tree below the bark) or timber (modified or processed wood) was considered most valuable forest resource. However the term MFP is no more in vogue as it has been established worldwide that the so-called minor forest products are no more 'minor' as these have been well recognized as important components of rural livelihood strategies in developing countries that can also be easily managed for its sustainability. Basically there is no difference between the terms NTFP and NWFP as far as their coverage is considered. Both the terms denote the products of a forest without threatening the life of the trees in it.

FAO is the most recognized user of the term 'non-wood' having an active component, the 'Wood Division', in its organization. Consequently, its various clients use the term NWFP. FAO also publishes 'Non-wood Forest Product' in series, and a regular Newsletter 'The Non-Wood News'.

Except for FAO, few other organizations and countries, the term NTFP is most popular. International Tropical Timber Organization (ITTO) uses the term NTFP (Byron 1995; Rietbergen and Poore 1991, etc.). The Americans, Canadians, west European countries and prominent wood/timber exporting countries like Finland, Denmark, Netherlands, etc., use the term NTFP. Almost all countries representing south, south-east and east Asian countries use the term NTFP.

In Nepal, the term NTFP is the common term in use to denote forest products except for timber or wood practiced by various donor agencies, INGOs and NGOs. The Ministry of Forests and Soil Conservation and various Departments under it are also using the term NTFP.

4. Medicinal and Aromatic Plants (MAPs)

Any NTFP can be medicinal if it is used in medicine. Any plant that bears volatile oil having aromatic flavor is an aromatic plant. Thus, non-timber forest product is a broad group of plant products that includes but not only limited to, medicinal and aromatic plants.

The NTFPs can be broadly categorized according to their uses such as food, fibre-yielding, dye-yielding, gum-yielding, tannin bearing, fatty-oil bearing, essential oil bearing plants, and the most important one, the medicinal plants.

5. Quantitative Assessment of NTFPs in the wild

The last two decades have witnessed a steep increase in interest and activities concerning NTFPs. The current interest in NTFPs amongst conservationists, foresters, development workers and indigenous peoples' groups has promoted numerous initiatives aimed at promoting NTFP use and commercialization as a means of improving the well being of rural populations and, at the same time, conserving the existing forests.

Rarely are these initiatives linked to studies on the sustainable exploitation of the products that are promoted, and no accurate information is available on the resource abundance, distribution, and reproductive biology, which is necessary for the determination of the biologically sustainable harvest levels of a product.

Although there is often considerable indigenous knowledge for specific NTFPs, formal resource assessment of NTFPs, especially in tropical countries, is relatively new and has received little attention to date. The multitude and variety of NTFPs, the multiplicity of interests and disciplines involved in NTFP assessment, the organizational and financial constraints, the lack of globally, regionally, or even nationally, recognized common terminology and units of measurements - all contribute to make the assessment of NTFPs, and of the resources providing them, a difficult task (Jennifer *et al.* 2001).

6. Inventory and Flow

Regarding quantitative assessment of NTFPs, two types of quantities have been distinguished by the researchers: the inventory (the stock quantity in the forest) and the flow (the quantity actually used by people). Some researchers value the inventory (e.g., Caballero *et al.* 1978; Peters *et al.* 1989; Prance *et al.* 1987; Toledo *et al.* 1978), others the flow (e.g., Godoy and Feaw 1989; Schwartzman 1989), and still others value both (e.g., Padoch and de Jong 1989). The difference between value between the flow and the inventory can be small, moderate or large, depending on factors like magnitude of availability, extent of harvesting, market demand, price and extent of supply areas.

7. Resource Assessment of NTFPs in the Nepali Context

In the Nepali context, NTFP resource assessment has received due priority only recently simply because of the abundance of resources in the wild since long past. While quantitative information on NTFP resources in the wild is important to initiate efforts towards their conservation, development, and management, due to the lack of justified and tested methodology the quantitative assessment of NTFP resources has so far been a challenging effort. Considering the shortage of approved methodology, baseline information, expertise, resource, commitment, and many other constraints, efforts towards quantitative assessment concerning the stock of NTFPs in the wild has not yet been initiated, and is likely to be lacking for years to come. The following are the major technical limitations and practical challenges to materialize the quantitative assessment of NTFP resources:

a. NTFPs are a category of useful plants, their number varying with factors like locality, community, market, etc has inherent assessment constraints.
b. The range of distribution and area of occupancy of almost all NTFPs, particularly the shrub and herb species differ greatly, sometimes coinciding and sometimes contrasting with one another.
c. Most of the NTFPs have different habitat preferences, each having a range of productivity under varied conditions.
d. In the wild, plants of a particular species have different age groups. The productivity and production potential of different age groups of the same species are usually different.
e. Most of the NTFP resources in the accessible forest areas have long been continuously harvested, providing constraints for their capturing for quantitative assessments in the appropriate growing/harvesting periods.
f. Differences between the harvested and non-harvested sites, between the regularly and occasionally harvested sites, between the under- and over- harvested sites, and still between the unmanaged harvesting sites and controlled or managed harvesting sites are the major factors that pose constraints in arriving at meaningful conclusions.

8. NTFPs: Authorities and Regulatory Mechanisms

The Ministry of Forests and Soil Conservation regulates the management of NTFPs including MAPs collected from national forests through various policy instruments including two major ones: regulatory and fiscal.

NTFPs cannot be collected without an official permit. Permits are also needed for the transit of NTFPs. The concerning District Forest Office issues both such permits. The government has fixed the royalty rates for each NTFP item collected from the national forest. This royalty is collected by the concerned DFO before issuing a collection permit. Transit permit for the collected NTFPs is issued by the DFO on the basis of royalty collected for the same. An export permit is also issued by the DFO for the NTFPs. In case of community forests, the concerning CFUG executive committee can issue collection permit if this has been authorized by the DFO and mentioned in their operation plans. The transit permit has to be issued by the concerned DFO for the NTFPs collected even from the community forests.

This is evident therefore, that the DFO is authorized to collect royalty for NTFPs collected from the national forests as well as responsible for the issuing of transit permits for the NTFPs collected from the government managed as well as community managed forests. There is the system of taxation (an ad-valorum tax) of 0.5 percent on the export of NTFPs that is administered by the custom offices under the Ministry of Finance.

9. Major Stakeholders Considered for the Resource Assessment of Tropical NTFPs

In order to identify the commercial NTFPs available in the wild in the tropical region of the country and to estimate their annual transition/flow, data/information obtained from authentic sources like District Forest Offices and Custom Offices of respective terai districts have been principally considered. Also considered are information obtained from NTFP collectors and traders, exporters and processors located at various district headquarters and trade centres of the tropical region. Information on the import of major tropical NTFPs by the traders of major herbal trade centres of northern India has also been considered with due importance.

10. Literature on Resource Assessment of NTFPs in Nepal

A considerably large number of literatures on various aspects of non-timber forest products including medicinal and aromatic plants are available in Nepal. However, most of them are focused on issues like conservation, management, employment opportunities, marketing, trade and processing potentials, ethnobotanical uses, etc.

Recently, quantitative assessment of NTFP resources in the wild has been the prime concern of researchers and authorities. This is chiefly because of the growing shortage of raw materials in the wild accompanied by the need to maintain their sustainability as well as potentialities to provide off-farm employment opportunities to the rural communities. But, despite the importance given to the quantitative assessment of NTFP resources in the wild, no systematic, justified and reliable effort has so far been carried out in this aspect.

The quantitative data in almost all the available literature are associated with words like 'estimated', 'conservative estimates', 'nearly', 'about', 'some', 'more than', 'approximately', 'over', 'well over' and so on, without justifiable verifications for these 'estimates'. At the same time, mostly, no replicable methodologies to arrive at the said conclusions are provided.

Consequently, no quantitative assessment accomplished so far has addressed the available quantity of resource in the wild for even a single species in a particular locality in the country. However, the following literatures have addressed the quantitative aspects of NTFPs, marginally or wholly, in Nepal.

Malla (1982) estimated the export of crude herbal drugs worth over 20 million Nepalese rupees per annum (1.6 million US dollars) and mentioned that over 60 percent of the total export of herbs is made to India.

Bhattarai (1984) conducted quantitative estimation on the leaves of *Skimmia laureola* Sieb. & Zucc. ex Walp. (Rutaceae) available in the Khaptad 'Lekh' and adjoining forest area (Far-western Nepal) covering 208.4 square km by the sampling technique using the quadrate method. Harvesting 60% of the existing leaf biomass with two harvests per annum, the sustainable quantity of harvested leaves was calculated to be 123,300 kg. With 1% essential oil content (w/v), the leaves were calculated to provide 1,233 litre of essential oil per annum.

Edwards (1993) estimated a total of 140 tonnes of chirata (*Swertia chirayita*) passing through the Hille-Basantapur roadhead in east Nepal during the 1992-93 trading season and estimated that 6,900 households were involved in *Swertia chirayita* collection.

Malla (1994) compiled data on traded quantities of medicinal plants in the Bagmati zone from 1979 to 1984 and 1987 to 1990 and based on declining exports in the early 1980s concluded that the resource-base was being overexploited.

Malla *et al.* (1995) surveyed 12 major herb trading centres of the country (Ilam, Basantapur, Hille, Dharan, Gaighat, Lahan, Hetauda, Butwal, Bahadurganj, Ghorai, Chhinchu and Nepalganj in 1993) and recorded the annual quantity traded to be equivalent to 4,383 tons of major herbs belonging to 37 wild species.

Edwards (1996) estimated the harvesting of 10000-15000 tons of NTFPs representing approximately 100 wild species for commercial purposes, from forestland in the Middle Hills and High Mountains of Nepal, the value of the trade estimated to be equivalent to US $ 8.6 million per year. Edwards, however, overlooks the contribution of Terai and low hill regions of the country as well as fails to describe the methodology applied and a justifiable basis for his 'estimation'.

Shrestha *et al.* (1996) reported a case study from Gyasumdo Valley, Manang District involving five high-altitude medicinal and aromatic plants (MAPs) like *Aconitum bisma* (nirmashi), *Dactylorhiza hatagirea* (panchaunle), *Nardostachys grandiflora* (jatamasi), *Picrorhiza scrophulariiflora* (kutki) and *Rheum australe* (padamchal). A total of 17 tonnes of MAPs were collected per annum, and 12.35 tonnes were exported. Jatamasi constituted 51.63% of the amount of MAPs exported to India.

Olsen (1997) estimated the NTFP (MAP) trade in Gorkha district in the period September 1994 to August 1995 at 222,000 kg with a value of 8.3 million Nepali rupees (US $ 166,000).

Olsen and Helles (1997) investigated the trade in medicinal and aromatic products (MAP) from the rural areas of Gorkha district in central Nepal to the wholesale markets in India over a two-year period. They found the annual trade in the district to vary from 180,000 kg to 418,000 kg, composed of 36 products with a value to collectors of between 7.6 and 16.6

million Nepali rupees (US $ 152,000-332,000). Nine products out of 36 constituted almost 80 percent of the collector value.

Bhattarai and Acharya (1998) reported that 34 districts of Nepal contributed in the supply of 'chiraito' (*Swertia* spp.), being traded in 27 major herb trade centres. Among the total trade of Chiraito, more than 50% are traded from east Nepal. The market samples involved 9 species of Swertia, totaling 419,300 kg in trade during 1995/96 but the authors fail to identify the proportion of each species involved.

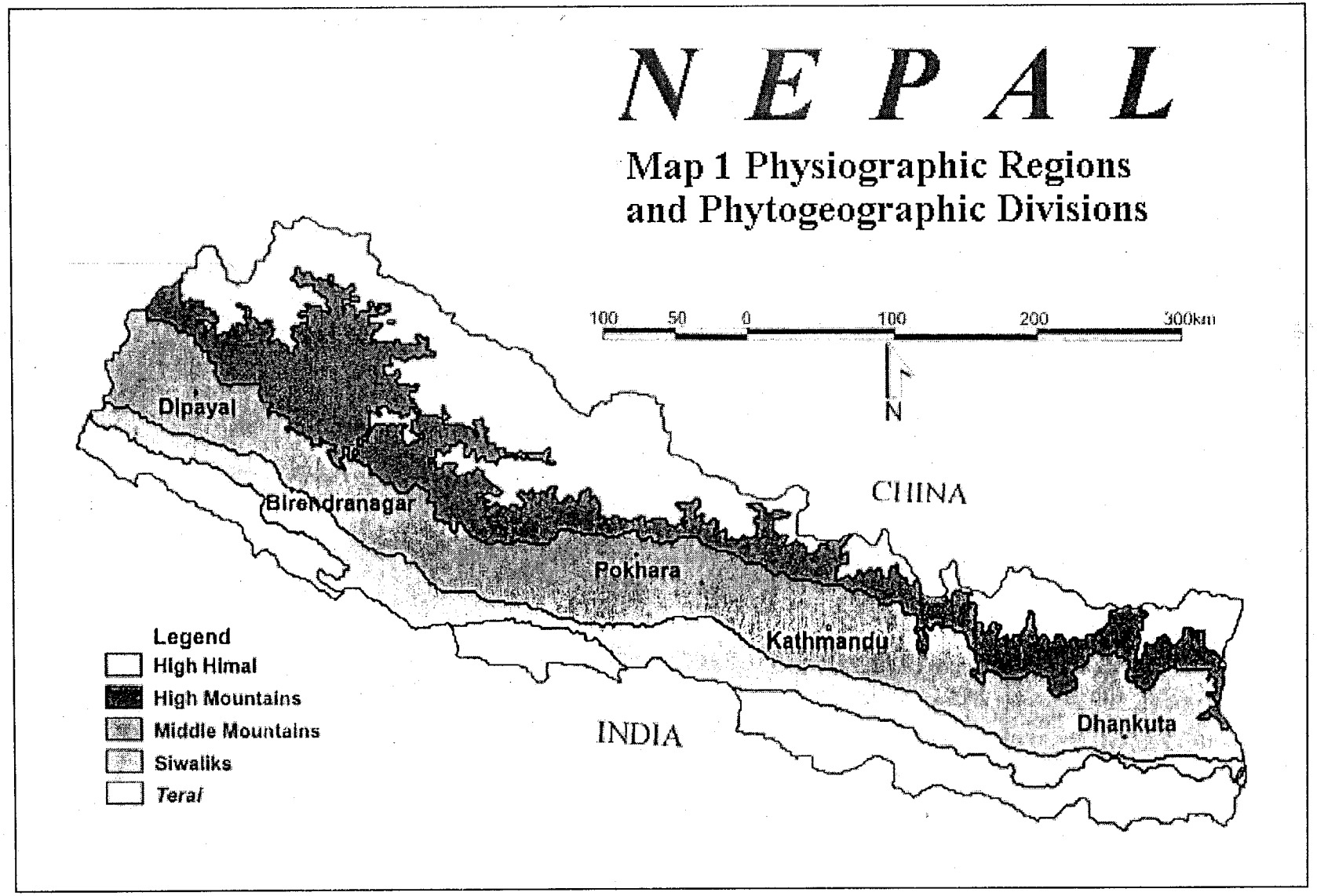
Olsen (1998) estimated that 470,000 households are involved in commercial medicinal plant collection in Nepal with the annual export value estimated at 22-70 million US $. Olsen's estimates are based on his work in Gorkha district accompanied by the 'estimates' provided by others in other localities.

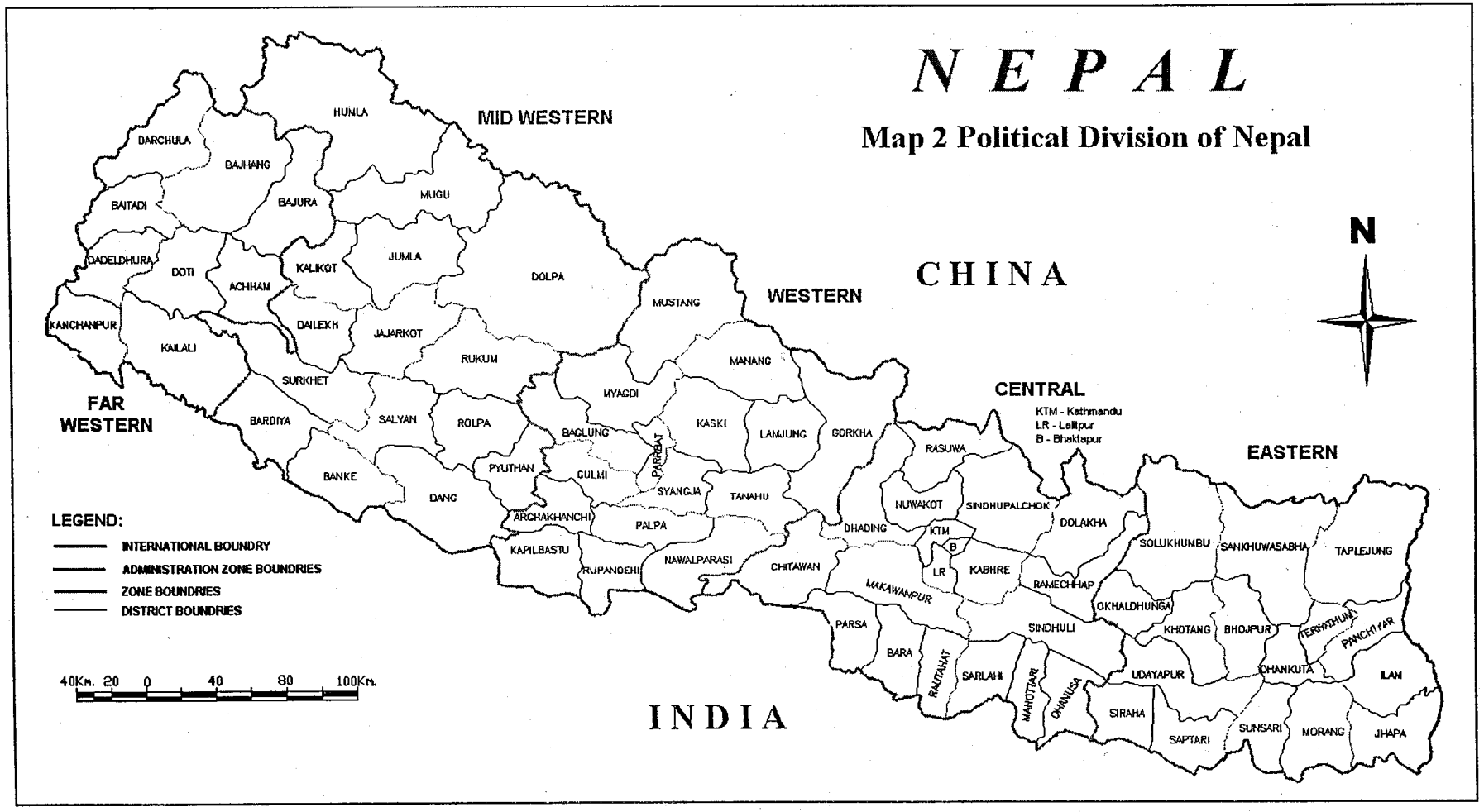
Malla *et al.* (1999) reported 80 species of NTFPs being used in Bajura district including 46 species used in medicine. Among these 16 species are used in trade, having a conservative estimate of annual export of 362 tonnes. The report, however, fails to note the share of each commercial species considered.

Bhattarai and Olsen (2000) mentioned that the annual trade in medicinal plants from the Nepal Himalaya amounts to thousands of tons of roots, rhizomes, tubers, fruits, leaves, etc. The annual value of the trade is worth millions of US dollars.

11. Tropical Regions of Nepal

Nepal's altitude increases gradually from south to north throughout the east-west direction within the country. Despite general assumption, the altitude does not increase from south to north very gradually and systematically with many low-altitude areas between high-altitude ones. Consequently, demarcation of Nepal's tropical regions is a rather difficult task that does not coincide with the political/administrative divisions of the country. Nepal has been classified into five physiographic zones. These more or less horizontal bands stretch in the east-west direction across the country about 800 km length (**Map 1,** LRMP 1986). Generally, Terai and Siwaliks that ascend up to 500m and 1000m respectively constitute the so-called tropical regions of Nepal. Out of the recorded 118 ecosystems identified in different physiographic zones in Nepal, 23 are represented in the tropical zone of the country (Maskey 1995). Therefore, for the present purpose, all areas lying below 1000m and representing the districts adjoined with the Indian plains in the southern side of the country have been considered to be the country's tropical region. In addition, low altitude parts of some districts adjoined to the Terai districts have also been considered the tropical region (**Map 2**). Consequently, the tropical region has been assumed to lie below the elevation of 1,000m and is represented by the humid region of Terai, Bhabar, Churia hills (Siwalik range), Dun valleys and the southern slopes of the Mahabharat range.


NEPAL
Map 1 Physiographic Regions
and Phytogeographic Divisions
100 50 0 100 200 300km
N
Dipayal
Birendranagar
Pokhara
Kathmandu
Dhankuta
CHINA
INDIA
Legend
High Himal
High Mountains
Middle Mountains
Siwaliks
Teral


NEPAL
Map 2 Political Division of Nepal
MID WESTERN
WESTERN
CENTRAL
EASTERN
FAR WESTERN
CHINA
INDIA
N
KTM - Kathmandu
LR - Lalitpur
B - Bhaktapur
HUMLA
DARCHULA
BAJHANG
BAITADI
BAJURA
MUGU
DADELDHURA
DOTI
ACHHAM
KALIKOT
JUMLA
DOLPA
MUSTANG
KANCHANPUR
KAILALI
DAILEKH
JAJARKOT
RUKUM
MANANG
SURKHET
MYAGDI
BARDIYA
SALYAN
ROLPA
BAGLUNG
KASKI
LAMJUNG
GORKHA
PARBAT
BANKE
PYUTHAN
GULMI
SYANGJA
TANAHU
DANG
ARGHAKHANCHI
PALPA
RASUWA
NUWAKOT
SINDHUPALCHOK
DOLAKHA
DHADING
KTM
B
LR
KAPILBASTU
RUPANDEHI
NAWALPARASI
CHITAWAN
KABHRE
SOLUKHUMBU
SANKHUWASABHA
TAPLEJUNG
MAKAWANPUR
RAMECHHAP
OKHALDHUNGA
KHOTANG
BHOJPUR
TERHATHUM
PANCHTHAR
PARSA
SINDHULI
BARA
RAUTAHAT
SARLAHI
UDAYAPUR
DHANKUTA
ILAM
MAHOTTARI
DHANUSA
SIRAHA
SAPTARI
SUNSARI
MORANG
JHAPA
LEGEND:
INTERNATIONAL BOUNDRY
ADMINISTRATION ZONE BOUNDRIES
ZONE BOUNDRIES
DISTRICT BOUNDRIES
40Km. 20 0 40 80 100Km.

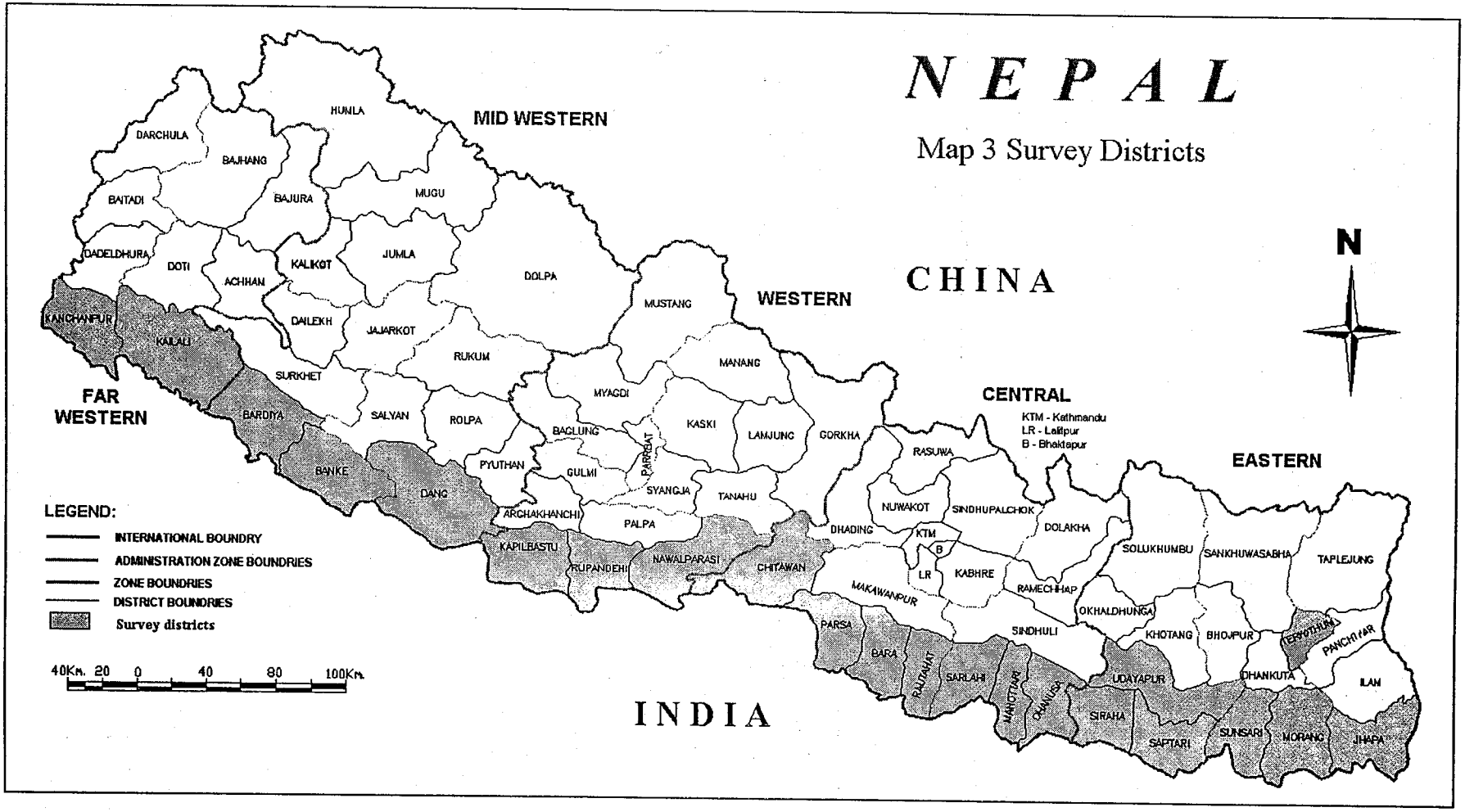
The tropical forest occupies about 1.224 million hectares of the tropical regions of Nepal (DFRS 1999). The major forest trees include many species of deciduous trees dominated by Sal (*Shorea robusta*). The associated tree species are *Adina cordifolia, Aegle marmelos, Anogeissus latifolia, Bombax ceiba, Buchanania lanzan, Butea monosperma, Careya arborea, Cassia fistula, Dillenia pentagyna, Lagerstroemia parviflora, Mallotus philippensis, Schleichera oleosa, Syzygium cumini, Terminalia alata, Terminalia bellirica, Terminalia chebula, Terminalia myriocarpa*, etc., and lianas like *Bauhinia vahlii, Millettia extensa* and *M. fruticosa*. In places where natural sal trees have degraded or absent, the above mentioned trees form mixed forests while *Acacia catechu, Bombax ceiba* and *Dalbergia sissoo* are the common reverian trees. Phytogeographically and floristically this zone is closely related to the Tropical Indian, Southeast Asian and Malaysian regions. This zone is represented by 1,499 species of flowering plants including 29 endemic species.

12. Methods of Study

A pre-test field visit to Makawanpur, Bara and Parsa districts was organized involving the five experts on different disciplines, Ethnobotanist Dr. Nirmal Kumar Bhattarai, Cultivation Management Expert Dr. V. R. Duwadi, NTFPs Marketing Expert Mr, Ram Hari Subedi, Socio-economist Mr. Vijay B. Kunwar and the Team Leader/Socio-economist Mr. Kishore K. C., together with six research associates. Based on the pre-test experience, research tools and questionnaire sets were refined to match the field conditions. Relevant literature related with the NTFPs of Nepal involving resource assessment, conservation, management and use patterns including cultivation, collection, processing and trade were studied. A considerably large number of NTFP-related organizations involving GOs, NGOs, INGOs, CBOs, and trading and processing institutions were surveyed, and the relevant personnel were interacted to build-up realistic concepts on aspects of NTFPs including the on-going activities, efforts and trends.

Three teams consisting of relevant experts and assistants in each surveyed all the southern tropical districts and some adjoining tropical localities of the country that also included almost all the prominent NTFP trade centers and markets (**Map 3**). Each team organized a one-day workshop in their respective Development Regions and interacted with every category of NTFP stakeholders like collectors, traders, processors, exporters, trade and industry personnel, DFO personnel, Custom Office personnel, Quarantine check-post personnel, community forest user group members, NTFP farmers, NGO/INGO personnel, etc. The issues discussed and information and suggestions documented in course of these workshops proved most useful for the fieldwork as these facilitated to familiarize the fieldwork team members with every crucial aspect of NTFP's conservation, use, management and development.

Every category of NTFP stakeholders was approached for the necessary information in every district surveyed. The teams also surveyed the relevant NTFP markets/trade centers of Northern India to have the first-hand information on various aspects of NTFP trade. Interviews were conducted with prominent Indian NTFP traders, especially those importing NTFPs from Nepal helped to understand the problems and potentialities that could assist to formulate policy-level recommendations.


NEPAL
Map 3 Survey Districts
MID WESTERN
WESTERN
CENTRAL
EASTERN
FAR WESTERN
CHINA
INDIA
N
KTM - Kathmandu
LR - Lalitpur
B - Bhaktapur
HUMLA
DARCHULA
BAJHANG
BAITADI
BAJURA
MUGU
DADELDHURA
DOTI
ACHHAM
KALIKOT
JUMLA
DOLPA
KANCHANPUR
KAILALI
DAILEKH
JAJARKOT
RUKUM
MUSTANG
SURKHET
MANANG
MYAGDI
BARDIYA
SALYAN
ROLPA
BAGLUNG
KASKI
LAMJUNG
GORKHA
BANKE
PYUTHAN
GULMI
PARBAT
SYANGJA
TANAHU
DANG
ARGHAKHANCHI
PALPA
RASUWA
NUWAKOT
SINDHUPALCHOK
DOLAKHA
DHADING
KTM
B
LR
KABHRE
RAMECHHAP
SOLUKHUMBU
SANKHUWASABHA
TAPLEJUNG
KAPILBASTU
RUPANDEHI
NAWALPARASI
CHITAWAN
MAKAWANPUR
OKHALDHUNGA
KHOTANG
BHOJPUR
TERHATHUM
PANCHTHAR
PARSA
BARA
SINDHULI
RAUTAHAT
SARLAHI
MAHOTTARI
DHANUSA
UDAYAPUR
DHANKUTA
ILAM
SIRAHA
SAPTARI
SUNSARI
MORANG
JHAPA
LEGEND:
INTERNATIONAL BOUNDRY
ADMINISTRATION ZONE BOUNDRIES
ZONE BOUNDRIES
DISTRICT BOUNDRIES
Survey districts
40Km. 20 0 40 80 100Km.

In order to understand the habitat preference and type and composition of the surrounding vegetation of commercial medicinal plants, sample surveys were carried out in three sites, one each in the three Terai districts (Sunsari district, east Nepal; Bara district, central Nepal; and Banke district, west Nepal). Forest area and habitats facing different levels of disturbances and degradation were considered for the sampling. The sample area surveyed in each district corresponded to 0.16 ha of land using 16 circular quadrats of 5.64 m diameter each. Each circular quadrat also included four small quadrats measuring 1 square meter each, to study the herb flora. The type of vegetation and the plant species recorded in these sample plots have been annexed (Annex 2).

13. Limitations of the Study

The present study has attempted to address various issues related with the quantitative assessment of commercial NTFPs of the tropical region of Nepal. However, due to the absence of a recognized methodology, the quantitative assessment of NTFPs in the wild could not be assessed and information on 'flow' of commercial NTFPs through different marketing channels have been considered. The major constraints for the present study were the limited time devoted in the fieldwork accompanied by shortage of financial and technical resources as well as the security situation, especially in the rural localities of the country. The vegetation sampling efforts carried out in limited area in three districts has been able to demonstrate the floral comparison in different types of forest habitats. This sampling, however, was not conducted to estimate the NTFP resources available in the sampled area or the targeted area.

14. Household Uses of Tropical NTFPs

NTFPs have always been an integral part of the domestic lives and practices of the rural communities in every part of the country. The adjoining forests have long been increasingly fulfilling their local needs like fodder, firewood, construction and thatching materials, manure, etc. These have also been supplementing food, many domestic articles and, the most important one, folk medicine. Many of these uses are, in fact, important economic assistance provided by the forest resources that have never been calculated in the monetary terms although a considerable proportion of their domestic needs are being fulfilled by the NTFPs having commercial values. However, due to time constraints, these resources were not assessed quantitatively.

15. Commercial NTFPs of the Tropical Region

Relevant information were collected from various sources viz. collectors, traders, processors, exporters, DFO personnel, Custom Office personnel and other NTFP stakeholders in almost all the tropical districts of Nepal.

The survey revealed a list of NTFPs that enter the tropical markets for commercial purposes, irrespective of their area of collection/availability. Table 1 provides a list of such NTFPs together with their local names, botanical names, useful parts, altitudinal range of distribution and region/s of occurrence.

It is evident that very few NTFPs in the list are strictly tropical species (i.e. occurring in and restricted to the tropical region, up to 1000m), e.g., *Acacia rugata* (Sikakai), *Bombax ceiba* (Simal), *Calamus latifolius* (Bet), *Cinnamomum galucescens* (Sugandhakokila), *Curculigo orchioides* (Musli), *Diospyros montana* (Tendu), *Entada phaseoloides* (Pangro), *Madhuca longifolia* (Mahuwa), *Mesua ferrea* (Bilaune), *Phoenix humilis* (Thakal), *Piper longum* (Pipla), *Solanum surattense* (Kantakari), and *Tinospora sinensis* (Gurjo) (Table 1).

Likewise, species like *Phyllanthus emblica* (Amala), *Thysanolaena mexicana* (Amriso), *Bambusa nutans* (Bans), *Terminalia bellirica* (Barro), *Aegle marmelos* (Bel), *Bauhinia vahlii* (Bhorla), *Polypodium vulgare* (Bisfej), *Cinnamomum tamala* (Tejpat), *Terminalia chebula* (Harro), *Curcuma aromatica* (Kachur), *Bergenia ciliata* (Pakhanbed), *Boerhaavia diffusa* (Punarnawa), *Sapindus mukorossi* (Ritha), *Mallotus philippensis* (Sindure), *Shorea robusta* (Sal), *Argemone mexicana* (Thakal), etc., start from the tropical zone (below 1000m) and are found up to the sub-tropical zone (below 2000m) (Table 1).

Many NTFP species start from the tropical region (below 1000m) and ascend up to the temperate region (2000-3000m), e.g., *Eulaliopsis binata* (Babiyo), *Acorus calamus* (Bojho), *Piper mullesua* (Chabo), *Cissempelos pareira* (Gujargano), *Ephemerantha macraei* (Jiwanti), *Dioscorea deltoidea* (Bhyakur), and *Asparagus racemosus* (Kurilo) (Table 1).

Species of lichen, locally known as 'Jhyau' are distributed between tropical (below 1000m) to sub-alpine zone (3,000-4,000m) of the country. Most of the species, although traded in the tropical region have their distribution in the sub-tropical (1,000-2,000m) zone and/or above it, e.g., *Swertia chirayita* (Chiraito), *Berberis aristata* (Chutro/Daruhaldi), *Berberis asiatica* (Chutro/Daruhaldi), *Trichosanthes tricuspidata* (Indreni), *Brachycorythis obcordata* (Gamdol), *Pinus roxburghii* (Sallo), *Rubia manjith* (Majitho), *Valeriana jatamansii* (Sugandhawal), and *Zanthoxylum armatum* (Timur) (Table 1). Many of the NTFP items dealt in the tropical regions have not yet been botanically identified, and hence their distribution range is not ascertained.

Table 1. List of NTFPs obtained from Terai region's District Forest Offices, Custom Offices, Community Forests, Collectors, Traders and other Stakeholders

Nepali name	Botanical name	Part Used	Altitudinal range (m)	Regions
Amala	*Phyllanthus emblica*	Fruit	150-1400	TR-ST
Amalbed	*Rheum australe*	Petiole	3200-4200	SA-AL
Amriso	*Thysanolaena maxima*	Fl. stalk	100-2000	TR-ST
Atis	*Aconitum heterophyllum*	Root	3200-3700	SA
0Babiyo	*Eulaliopsis binata*	Leaf	150-2600	TR-TM
Ban lasun	*Allium wallichii*	Leaf	2400-4650	TM-AL
Bans	*Bambusa* spp.	Stem	700-1700	TR-ST
Bans	*Dendrocalamus* spp.	Stem	100-2000	TR-ST
Barro	*Terminalia bellirica*	Fruit	300-1100	TR-ST
Bel	*Aegle marmelos*	Fruit	600-1100	TR-ST
Bet	*Calamus acanthospathus*	Stem	400-1500	TR-ST
Bet	*Calamus latifolius*	Stem	600	TR
Bhorla ko bokra	*Bauhinia vahlii*	Bark	200-1300	TR-ST
Bhorla ko pat	*Bauhinia vahlii*	Leaf	200-1300	TR-ST
Bhutkesh	*Selinum tenuifolium*	Root	2700-4800	TM-AL

Nepali name	Botanical name	Part Used	Altitudinal range (m)	Regions
Bikhma	*Aconitum bisma*	Root	3000-4000	SA
Bilaune	*Mesua ferrea*	Bark	400-900	TR
Bisfej	*Polypodium vulgare*	Rhizome	500-1200	TR-ST
Bish jara	*Aconitum spicatum*	Root	1800-4200	ST-AL
Bojho	*Acorus calamus*	Rhizome	700-2300	TR-TM
Budhani	Lichen spp.	Thallus	600-3200	TR-SA
Bukephul	*Tanacetum dolichophyllum*	Flower	3000-4400	SA-AL
Chabo	*Piper mullesua*	Fruit	400-2500	TR-TM
Chiraito	*Swertia chirayita*	Plant	1500-2500	ST-TM
Chiraito	*Swertia* spp.	Plant	-	-
Chulthi	*Rheum australe*	Petiole	3200-4200	SA-AL
Chutro	*Berberis aristata*	Bark	1800-3000	ST-TR
Chutro	*Berberis asiatica*	Bark	1200-2500	ST-TM
Chyau	*Morchella esculenta*	Thallus	2000-3000	TM
Dalchini	*Cinnamomum tamala*	Bark	450-2000	TR-ST
Daru haldi	*Berberis aristata*	Bark	1800-3000	ST-TM
Dhupi	*Juniperus recurva*	Leaf	3300-4600	SA-AL
Dhupi pat	*Juniperus indica*	Leaf	3700-4100	SA-AL
Gandol	*Brachycorythis obcordata*	Root	1000-2000	ST
Gobresalla ko simta	*Pinus wallichiana*	Fruit	1800-3300	ST-SA
Gucchi chyau/chyau	*Morchella conica* *M. esculenta*	Thallus	2000-3000	TM
Gujargano	*Cissampelos pareira*	Rhizome	150-2200	TR-TM
Gurjo	*Tinospora sinensis*	Stem	300-500	TR
Harro	*Terminalia chebula*	Fruit	150-1100	TR-ST
Indreni	*Trichosanthes tricuspidata*	Seed	1200-2300	ST-TM
Jatamansi	*Nardostachys grandiflora*	Root	3200-5000	SA-AL
Jhyau	Lichen spp.	Thallus	600-3200	TR-SA
Jiwanti	*Ephemerantha macraei*	Plant	500-2400	TR-TM
Kachur	*Curcuma aromatica*	Rhizome	700-1100	TR-ST
Kakadsinge	*Pistacia chinensis*	Insect Gall	2000-2400	TM
Kakoli	*Fritillaria cirrhosa*	Bulb	3000-4600	SA-AL
Kaladana	*Brachycorythis obcordata*	Rhizome	1000-2000	ST
Kantakari	*Solanum khasianum*	Fruit	-	-
Kantakari phal	*Solanum surattense*	Fruit	300-900	TR
Khair	*Acacia catechu*	Wood/extract	200-1400	TR-ST
Khar Dhaddi	*Saccharum spontanum*	Leaf	200-1700	TR-ST
Kukur tarul	*Dioscorea deltoidea*	Rhizome	450-3100	TR-SA
Kumkum dhup	*Didymocarpus albicalyx*	Leaf	1200-1800	ST
Kurilo	*Asparagus racemosus*	Root	200-2100	TR-TM
Kutki	*Neopicrorhiza scrophulariifolia*	Root	3500-4800	SA-AL
Laghupatra	*Podophyllum hexandrum*	Root	3000-4500	SA-AL
Launth salla	*Taxus wallichiana*	Leaf	2300-3400	TM-SA
Lohan	*Pinus roxburghii*	Resin	1100-2100	ST-TM
Mahuwa	*Madhuca longifolia*	Flower	150-300	TR
Majitho	*Rubia manjith*	Root/stem	1200-2100	ST-TM
Masala pat	*Cinnamomum tamala*	Leaf	450-2000	TR-ST
Musli	*Curculigo orchioides*	Root	300-600	TR
Padamchal	*Rheum australe*	Root	3200-4200	SA-AL

Nepali name	Botanical name	Part Used	Altitudinal range (m)	Regions
Pakhanbed	*Bergenia ciliata*	Rhizome	900-1700	TR-ST
Pangro	*Entada phaseoloides*	Seed	300-1000	TR
Pawan	*Ulmus wallichiana*	Bark	2000-3000	TM
Pipla	*Piper longum*	Fruit	200-800	TR
Punarnawa	*Boerhaavia diffusa*	Plant	300-1200	TR-ST
Rasulla	*Acacia rugata*	Fruit	400-800	TR
Ritha	*Sapindus mukorossi*	Fruit	150-1800	TR-ST
Rohini phal	*Mallotus philippensis*	Fruit	150-1800	TR-ST
Rudraksha	*Elaeocarpus sphaericus*	Seed	700-1700	TR-ST
Sal khoto	*Shorea robusta*	Resin	150-1500	TR-ST
Salamdana	*Brachycorythis obcordata*	Root	1000-2000	ST
Salla ko khoto	*Pinus roxburghii*	Resin	1100-2100	ST-TM
Salla ko simta	*Pinus roxburghii*	Seed	1100-2100	ST-TM
Satawari	*Asparagus racemosus*	Root	600-2100	TR-TM
Setakchini	*Rheum australe*	Root	3200-4200	SA-AL
Sikakai	*Acacia rugata*	Fruit	400-800	TR
Simal khoto	*Bombax ceiba*	Resin	200-900	TR
Sitaphal	-	-	-	-
Somlata	*Ephedra gerardiana*	Stem	2300-5200	TM-AL
Sugandhakokila	*Cinnamomum glaucescens*	Fruit	400-800	TR
Sugandhawal	*Valeriana jatamansii*	Root	1500-3300	ST-SA
Tejpat/Masala pat	*Cinnamomum tamala*	Leaf	450-2000	TR-ST
Tendu pat	*Diospyros montana*	Leaf	300-500	TR
Thakal	*Argemone mexicana*	Seed	150-1400	TR-ST
Thakal	*Phoenix humilis*	Leaf	150-900	TR
Tiari	-	-	-	-
Tigedi	-	-	-	-
Timur	*Zanthoxylum armatum*	Fruit	1100-2500	ST-TM
Tuke phul	*Taraxacum eriopodum*	Flower	3300-4600	SA-AL

Abbreviations: TR: Tropical; ST: Sub-tropical; TM: Temperate; SA: Sub-alpine; AL: Alpine.

Therefore, for our purpose, a list of NTFP species has been extracted from Table 1 that is known to grow in the tropical region but not restricted to it has been presented together with additional details (Table 2).

Table 2. List of important commercial NTFPs of the tropical regions based on information obtained from various stakeholders

Nepali name	Botanical name	Part used	Altitudinal range (m)	Region
Amala	*Phyllanthus emblica*	Fruit	150-1400	TR-ST
Amriso	*Thysanolaena maxima*	Fl. stalk	100-2000	TR-ST
Babiyo	*Eulaliopsis binata*	Leaf	150-2600	TR-TM
Bans	*Bambusa spp.*	Stem	700-1700	TR-ST
Bans	*Dendrocalamus spp.*	Stem	100-2000	TR-ST
Barro	*Terminalia bellirica*	Fruit	300-1100	TR-ST
Bel	*Aegle marmelos*	Fruit	600-1100	TR-ST
Bet	*Calamus acanthospathus*	Stem	400-1500	TR-ST
Bet	*Calamus latifolius*	Stem	600	TR
Bhorla ko bokra	*Bauhinia vahlii*	Bark	200-1300	TR-ST
Bhorla ko pat	*Bauhinia vahlii*	Leaf	200-130	TR-ST
Bilaune	*Mesua ferrea*	Bark	400-900	TR
Bisfej	*Polypodium vulgare*	Rhizome	500-120	TR-ST
Bojho	*Acorus calamus*	Rhizome	700-2300	TR-TM

Nepali name	Botanical name	Part used	Altitudinal range (m)	Region
Budhani	*Lichen spp.*	Thallus	600-3200	TR-SA
Chabo	*Piper mullesua*	Fruit	400-2500	TR-TM
Dalchini	*Cinnamomum tamala*	Bark	450-2000	TR-ST
Gujargano	*Cissampelos pareira*	Rhizome	150-2200	TR-TM
Gurjo	*Tinospora sinensis*	Stem	300-500	TR
Harro	*Terminalia chebula*	Fruit	150-1100	TR-ST
Jiwanti	*Ephemerantha macraei*	Plant	500-2400	TR-TM
Jhyau	*Lichen spp.*	Thallus	600-3200	TR-SA
Kachur	*Curcuma aromatica*	Rhizome	700-1100	TR-ST
Kantakari phal	*Solanum surattense*	Fruit	300-900	TR
Khair	*Acacia catechu*	Wood/extract	200-1400	TR-ST
Khar Dhaddi	*Saccharum spontanum*	Leaf	200-1700	TR-ST
Kukur tarul	*Dioscorea deltoidea*	Rhizome	450-3100	TR-SA
Kurilo	*Asparagus racemosus*	Root	200-2100	TR-TM
Mahuwa	*Madhuca longifolia*	Flower	150-300	TR
Masala pat	*Cinnamomum tamala*	Leaf	450-2000	TR-ST
Musli	*Curculigo orchioides*	Root	300-600	TR
Pakhanbed	*Bergenia ciliata*	Rhizome	900-1700	TR-ST
Pangro	*Entada phaseoloides*	Seed	300-1000	TR
Pipla	*Piper longum*	Fruit	200-800	TR
Punarnawa	*Boerhaavia diffusa*	Plant	300-1200	TR-ST
Rasulla	*Acacia rugata*	Fruit	400-800	TR
Ritha	*Sapindus mukorossi*	Fruit	150-1800	TR-ST
Rohini phal	*Mallotus philippensis*	Fruit	150-1800	TR-ST
Rudraksha	*Elaeocarpus sphaericus*	Seed	700-1700	TR-ST
Sal khoto	*Shorea robusta*	Resin	150-1500	TR-ST
Satawari	*Asparagus racemosus*	Root	600-2100	TR-TM
Sikakai	*Acacia rugata*	Fruit	400-800	TR
Simal khoto	*Bombax ceiba*	Resin	200-900	TR
Sugandhakokila	*Cinnamomum glaucescen*	Fruit	400-800	TR
Tejpat/Masala pat	*Cinnamomum tamala*	Leaf	450-2000	TR-ST
Tendu pat	*Diospyros montana*	Leaf	300-500	TR
Thakal	*Argemone mexicana*	Seed	150-1400	TR-ST
Thakal	*Phoenix humilis*	Leaf	150-900	TR

Abbreviations: TR: Tropical; ST: Sub-tropical; TM: Temperate; SA: Sub-alpine; AL: Alpine.

16. Quantitative Estimation Based on Transaction of Tropical NTFPs

It is clear that the so-called tropical NTFPs include comparatively small number of species restricted to the terai and siwalik regions lying below 1000 m altitude. Majority of the so-called tropical species are not restricted to the altitude limit and may ascend to higher climatic/vegetation zones like sub-tropical, temperate, and some of them available in even higher elevations (Tables 1 and 2). Therefore, what has been considered tropical species in this document is in fact species originating in the tropical regions but having distribution in higher elevations as well. Consequently, NTFP species that are not available in the tropical zone (up to 1000m) have not been considered in the present context (Table 2).

a. Information Obtained from District Forest Offices:

In course of the field works, 22 District Forest Offices stationed in the tropical region were visited. Available data/information were collected and the DFO personnel including District Forest Officer in most cases were interviewed. Tables 1.1-1.22 (Annex 1) provide quantitative data on the collection/ transition permits for NTFPs provided by the concerning DFOs during different fiscal years.

Although data are available from different DFOs covering a range of scattered fiscal years, only data recorded for the latest fiscal year, i.e. Fiscal Year 2058/59 (2001/2002) has been considered for analysis to arrive at a meaningful estimation. The quantitative data for the previous fiscal years were available with very few DFOs, and hence was not considered for the analysis and determination of trends. The collection/transition permits issued by different DFOs during varied fiscal years, however, may provide glimpses regarding the on-going trends in the collection and trade of tropical NTFPs (Tables 1.1-1.22; Annex 1). Tables 1.23 and 1.24 (Annex 1) represents the collection/transition permits issued by DFOs of Dhankuta and Doti districts during the fiscal year 2058/59 (2001/2002) respectively. It is evident that the collection and trade of the so-called tropical NTFP species are restricted not only to the terai districts but are collected also from the middle hill districts of Nepal.

An analysis of the data collected from the 22 District Forest Offices of the tropical region involving the permission for collection/transportation of tropical NTFPs revealed the following facts:

Out of the considered 22 District Forest Offices, quantitative data for the fiscal year 2001/02 was available from only 19 District Forest Offices. Thirty-three types of tropical NTFPs were collected for commercial purposes that accounted for the collection of 3283.8132 ton of dry raw materials (Table 3). The largest quantity of the collection is shared by Babiyo (*Eulaliopsis binata*: 2016.000 ton) succeeded by Bhorla ko pat (*Bauhinia vahlii*: 398.900 ton), Ritha (*Sapindus mukorossi*: 248.595 ton), Satawar/Kurilo (*Asparagus racemosus* 128.213 ton), Jhyau (Lichen spp.: 83.600 ton), Sugandhakokila (*Cinnamomum glaucescens*: 746.688 ton), Bhorla ko bokra (*Bauhinia vahlii*: 613.275 ton), and others (Table 4).

Table 3. List of tropical NTFPs permitted for collection/ transportation by the Tropical DFOs during the fiscal year 2001/02

Nepali name	Botanical name	Part used	Quantity (ton)
Amala	*Phyllanthus emblica*	Fruit	7.290
Amriso	*Thysanolaena maxima*	Inflorescence	1.000
Babiyo	*Eulaliopsia binata*	Leaf	2016.000
Barro	*Terminalia bellirica*	Fruit	3.523
Bel	*Aegle marmelos*	Fruit	0.180
Bhorla ko bokra	*Bauhinia vahlii*	Bark	61.327
Bhorla ko pat	*Bauhinia vahlii*	Leaf	398.900
Bilaune	*Mesua ferrea*	Bark	14.100
Bisfej	*Polypodium vulgare*	Root	0.700
Bojho	*Acorus calamus*	Rhizome	1.025
Chabo	*Piper mullesua*	Fruit	16.650
Dalchini	*Cinnamomum tamala*	Bark	25.730
Gujargano	*Cissampelos pareira*	Rhizome	0.030
Gurjo	*Tinospora sinensis*	Stem	3.765
Harro	*Terminalia chebula*	Fruit	1.367
Jhyau	*Lichen spp.*	Thallus	83.600
Jiwanti	*Ephemerantha macraei*	Pseudo-stem	30.730
Kachur	*Curcuma aromatica*	Root	0.500
Kantakari	*Solanum surattense*	Fruit	5.500
Kurilo/Satawari	*Asparagus racemosus*	Root	128.213
Mahuwa	*Madhuca longifolia*	Flower	0.098
Musli	*Curculigo orchioides*	Root	31.650
Pakhanbed	*Bergenia ciliata*	Root	3.861

Pipla	*Piper longum*	Fruit	1.481
Punarnawa	*Boerhaavia diffusa*	Whole plant	1.000
Ritha	*Sapindus mukorossi*	Fruit	248.595
Rohani phal	*Mallotus philippensis*	Fruit	1.100
Sal khoto	*Shorea robusta*	Sap	0.338
Sikakai	*Acacia rugata*	Fruit	51.968
Simal khoto	*Bombax ceiba*	Sap	1.600
Sugandhakokila	*Cinnamomum glaucescens*	Fruit	74.669
Tejpat/Masalapat	*Cinnamomum tamala*	Leaf	35.824
Tendu pat	*Diospyros montana*	Leaf	31.500
Total			3283.813

Table 4. List of tropical NTFPs permitted for collection / transportation by the tropical region's DFOs during the fiscal year 2001/02

Nepali name	Botanical name	Part	Quantity (ton)
Amala	*Phyllanthus emblica*	Fruit	7.290
Amriso	*Thysanolaena maxima*	Inflorescene	1.000
Babiyo	*Eulaliopsia binata*	Leaf	2016.000
Barro	*Terminalia bellirica*	Fruit	3.523
Bel	*Aegle marmelos*	Fruit	0.180
Bhorla ko bokra	*Bauhinia vahlii*	Bark	61.328
Bhorla ko pat	*Bauhinia vahlii*	Leaf	398.900
Bilaune	*Mesua ferrea*	Bark	14.100
Bisfej	*Polypodium vulgare*	Root	0.700
Bojho	*Acorus calamus*	Rhizome	1.025
Chabo	*Piper mullesua*	Fruit	16.650
Dalchini	*Cinnamomum tamala*	Bark	25.730
Gujargano	*Cissampelos pareira*	Rhizome	0.030
Gurjo	*Tinospora sinensis*	Stem	3.765
Harro	*Terminalia chebula*	Fruit	1.367
Jhyau	*Lichen spp.*	Thallus	3.600
Jiwanti	*Ephemerantha macrae*	Pseudo-stem	30.730
Kachur	*Curcuma aromatica*	Root	0.500
Kantakari	*Solanum surattense*	Fruit	5.500
Mahuwa	*Madhuca longifolia*	Flower	0.098
Musli	*Curculigo orchioides*	Root	31.650
Pakhanbed	*Bergenia ciliata*	Root	3860.6
Pipla	*Piper longum*	Fruit	1.481
Punarnawa	*Boerhaavia diffusa*	Whole plant	1.000
Ritha	*Sapindus mukorossi*	Fruit	248.595
Rohani phal	*Mallotus philippensis*	Fruit	1.100
Sal khoto	*Shorea robusta*	Sap	0.338
Satawari/Kurilo	*Asparagus racemosus*	Root	128.213
Sikakai	*Acacia rugata*	Fruit	51.968
Simal khoto	*Bombax ceiba*	Sap	1.600
Sugandhakokila	*Cinnamomum glaucescens*	Fruit	74.669
Tejpat/Masalapat	*Cinnamomum tamala*	Leaf	35.824
Tendu pat	*Diospyros montana*	Leaf	31.500
Total:			3283.813

b. Information Based on Trade Centres and Traders in the Tropical Region

Majority of the prominent NTFP trade centres of the country lie in the tropical regions. Almost all the commercial NTFPs including MAPs enter the trade centres before export. The major herbal trade centres of the tropical regions including Birtamod (Jhapa district), Dharan (Sunsari district), Kanchanpur (Saptari district), Chandranigahapur (Rautahat district), Hetauda (Makawanpur district), Arunkhola (Nawalparasi district), Butwal (Rupandehi district), Nepalganj (Banke district), Birendranagar (Surkhet district), Ghorai/Tulsipur (Dang district) and Attaria (Kailali district) were surveyed. In these trade centres, prominent traders were interviewed, NTFPs entering into the trade centre were documented and the average annual transactions in the centres were estimated. Tables 1.25-1.37 (Annex 1) provide quantitative information on major NTFPs traded in the corresponding trade centres.

An analysis of the available estimation suggests that 18 major tropical NTFPs were traded in the major tropical trade centres of Nepal. Table 5 suggests that the annual quantity of major tropical NTFPs entering into the major tropical NTFP trade centres of Nepal for commercial purposes (F.Y. 2001/02) is equivalent to 2331.180 ton. Among the NTFPs, Ritha (*Sapindus mukorossi*) occupies the largest quantity entering into the trade centres (857.800 ton), succeeded by Jhyau (Lichen spp.: 443.000 ton), Tejpat (*Cinnamomum tamala*: 292.000 ton), Kurilo (*Asparagus racemosus*: 189.200 ton), Sikakai (*Acacia rugata*: 139.500 ton), Dalchini (*Cinnamomum tamala*: 98.000 ton), and others (Table 6).

Table 5. Quantitative estimation on major tropical NTFPs estimated to enter into trade in the major trade centres of tropical Nepal

Nepali name	Botanical name	Part used	Quantity (ton)
Amala	*Phyllanthus emblica*	Fruit	36.500
Barro	*Terminalia bellirica*	Fruit	13.500
Bhorla ko bokra	*Bauhinia vahlii*	Bark	27.500
Bilaune	*Musea ferrea*	Bark	0.700
Bojho	*Acorus calamus*	Rhizome	23.000
Dalchini	*Cinnamomum tamala*	Bark	98.000
Harro	*Terminalia chebula*	Fruit	9.000
Jiwanti	*Ephemerantha macraei*	Pseudo-stem	21.500
Jhyau/Budhani	*Lichen spp.*	Thallus	443.000
Kurilo/Satawari	*Asparagus racemosus*	Root	189.200
Musli	*Curculigo orchioides*	Root	5.030
Pakhanbed	*Bergenia ciliata*	Root	57.000
Pipla	*Piper longum*	Fruit	41.150
Ritha	*Sapindus mukorossi*	Fruit	857.800
Sikakai	*Acacia rugata*	Fruit	139.500
Simal khoto	*Bombax ceiba*	Sap	1.400
Sugandhakokila	*Cinnamomum glaucescens*	Fruit	75.400
Tejpat/Masalapat	*Cinnamomum tamala*	Leaf	292.000
Total:			2331.180

Table 6. Quantitative estimation of major tropical NTFPs entering into trade in major trade centres of tropical Nepal in the order of decreasing quantities

Nepali name	Botanical name	Part used	Quantity (ton)
Amala	*Phyllanthus emblica*	Fruit	36.500
Barro	*Terminalia bellirica*	Fruit	13.500
Bhorla ko bokra	*Bauhinia vahlii*	Bark	27.500
Bilaune	*Musea ferrea*	Bark	0.700
Bojho	*Acorus calamus*	Rhizome	23.000
Dalchini	*Cinnamomum tamala*	Bark	98.000
Harro	*Terminalia chebula*	Fruit	9.000
Jhyau/Budhani	*Lichen spp.*	Thallus	443.000
Jiwanti	*Ephemerantha macraei*	Pseudo-stem	21.500
Kurilo/Satawari	*Asparagus racemosus*	Root	189.200
Musli	*Curculigo orchioides*	Root	5.030
Pakhanbed	*Bergenia ciliata*	Root	57.000
Pipla	*Piper longum*	Fruit	41.150
Ritha	*Sapindus mukorossi*	Fruit	857.800
Sikakai	*Acacia rugata*	Fruit	139.500
Simal khoto	*Bombax ceiba*	Sap	1.400
Sugandhakokila	*Cinnamomum glaucescens*	Fruit	75.400
Tejpat/Masalapat	*Cinnamomum tamala*	Leaf	292.000
Total:			2331.180

c. Information Based on NTFP-related Organizations

In course of the present fieldwork, information regarding the trade/export of NTFPs from the country were documented, based on the data available with the concerning organizations. These included Nepalganj Chamber of Commerce and Industry (Annex 1; Table 1.38) and Jadibuti Association of Nepal (JABAN; Annex 1; Table 1.39), Department of Custom (Annex 1; Tables 1.54-1.57), Trade Promotion Centre (Annex 1; Table 1.58) and Nepal Rastra Bank (Annex 1; Table 1.59). While this information provides general trends and types of NTFP items used for export, these do not add comprehensively to our knowledge of the total quantity of different NTFPs harvested from the wild.

d. Information Based on Domestic Processors

NTFP (MAP) processing facilities in Nepal is meager. Very few selected facilities process the tropical NTFPs before export. Majority of the processing units is engaged in the processing of high-altitude NTFPs and MAPs, dominated by Jatamansi (*Nardostachys grandiflora*), Sugandhawal (*Valeriana jatamansii*), and others. Among the processors of tropical NTFPs, Natural Products Industries located at Jawabari, Kapilbastu district and Bahubali Herbal Essence Private Limited are the prominent ones. Tables 1.40 and 1.41 (Annex 1) show the processing of tropical NTFPs by these industries during 2058/59.

The NTFP processing activities in Nepal related with tropical NTFPs are restricted to few items like production of essential oil from Sugandhakokila (*Cinnamomum glausescens*) and Bojho (*Acorus calamus*), the extraction of resinoid from Lichens (Lichen spp.).These are producing the semi-processed products to meet the market demand, which is very limited, and hence are not using their production capacities in full swing.

In addition, some Ayurvedic drug manufacturing facilities like Singhadurbar Vaidyakhana, Dabur-Nepal and some other identical ones are also using considerable herbal materials. Although these herbal drug producers use very few 'tropical' species, these could not be assessed quantitatively as the manufacturers were not very willing to share the information.

e. Information Based on Custom Offices' Records in Nepal

It has been realized that about 95 percent of the NTFPs collected from the wild enter into trade, and about 90 percent of the trade are directed towards the Indian markets (Bhattarai, 1997). Custom offices are the final authority to permit the export of NTFPs based on the authenticity of their collection and transportation. The Custom offices charge a custom duty of 0.5 % of the value of the NTFP item intended for export. Thus, the data recorded from the Custom Offices should be authentic as it has been recorded on the basis of revenue officially charged by the Custom Offices and the revenue officially paid by the exporters.

In course of the field survey in the tropical districts of the country 12 major Custom Offices situated in the Indo-Nepal borders namely Kakarbhitta (Jhapa district), Biratnagar (Morang district), Bhantabari (Sunsari district), Malangwa (Sarlahi district), Vittamor (Mahottari district), Gaur (Rautahat district), Birganj (Parsa district), Bhairahawa (Rupandehi district), Krishnanagar (Kapilbastu district), Nepalganj (Banke district), Dhangadi (Kailali district), and Mahendranagar (Kanchanpur district), were surveyed, the officials were interviewed and the data on NTFPs exported from the custom points were collected (Annex 1; Tables 1.42-1.53). Export data are available for a varied number of fiscal years from different Custom offices however, those covering the fiscal year 2001/02 have been considered for the detailed analysis although data for the previous fiscal years may serve the valuable purpose to provide glimpses on the practices and trends.

An analysis of the available data suggests that some 20 NTFP items are exported through these Custom Offices together with many small volume items categorized together as 'Jadibuti' (medicinal herbs) and 'Anya' (others). Table 7 provides the quantities of tropical NTFP items exported to India during the F.Y. 2001/02 through these Custom Offices.

Table 7. List of tropical NTFPs exported through the major Custom Offices of the Terai region (F. Y. 2001/02)

Nepali name	Botanical name	Part Used	Quantity (ton)
Amala	*Phyllanthus emblica*	Fruit	11.873
Amriso	*Thysanolaena maxima*	Inflorescens	101472.062
Anya (others)	-	-	20.575
Babiyo	*Eulaliopsis binata*	Leaf	4.000
Bans	*Bambusa spp./ Dendrocalamus spp.*	Stem	875.000
Bel	*Aegle marmelos*	Fruit	2.000
Bet	*Calamus acanthospathus/ Calamus latifolius*	Stem	8.939
Bhorla ko pat	*Bauhinia vahlii*	Leaf	6.000
Bojho	*Acorus calamus*	Rhizome	1.741
Dalchini	*Cinnamomum tamala*	Bark	40.076
Jadibuti (medicinal herbs)	-	-	1315.553
Kurilo	*Asparagus racemosus*	Root	38.835
Pakhanbed	*Bergenia ciliata*	Root	23.881
Ramdana	*Amaranthus hybridus*	Seed	1.692
Ritha	*Sapindus mukorossi*	Fruit	289.940
Rudraksha	*Elaeocarpus sphaericus*	Seed	51.080
Sikakai	*Acacia rugata*	Fruit	80.301
Sugandhakokila	*Cinnamomum glaucescens*	Oil	2.090
Tejpat	*Cinnamomum tamala*	Leaf	17.561
Tendupat	*Diospyros montana*	Leaf	30.000
Thakal	*Argemonia mexicana*	Seed	5.000
Titepati	*Artemisia dubia*	Leaf	3.220
Total			**104301.419**

Available data for the fiscal year 2001/02 suggests that the total quantity of tropical NTFPs exported through these Custom Offices is equivalent to 104301.419 ton of raw materials dominated by Amriso (*Thysanolaena maxima*; 101472.062 ton) and succeeded by Jadibuti (unidentified medicinal herbs: 1315.553 ton), Bans (*Dendrocalamus/Bambusa* spp.: 875.000 ton), Ritha (*Sapindus mukorossi*: 289.940 ton), Sikakai (*Acacia rugata*: 80.301 ton), and others (Table 8).

Table 8. List of tropical NTFPs exported through the major Custom Offices of the Terai region in the quantitative order (F.Y. 2001/02)

Nepali name	Botanical name	Part Used	Quantity (Kg)
Amriso	*Thysanolaena maxima*	Infloresence	101472062
Jadibuti (medicinal herbs)	-	-	1315553
Bans	*Bambusa spp./ Dendrocalamus spp.*	Stem	875000
Ritha	*Sapindus mukorossi*	Fruit	289940
Sikakai	*Acacia rugata*	Fruit	80301
Rudraksha	*Elaeocarpus sphaericus*	Seed	51080
Dalchini	*Cinnamomum tamala*	Bark	40076
Kurilo	*Asparagus racemosus*	Root	38835
Tendupat	*Diospyros montana*	Leaf	30000
Pakhanbed	*Bergenia ciliata*	Root	23881
Anya (others)	-	-	20575
Tejpat	*Cinnamomum tamala*	Leaf	17561
Amala	*Phyllanthus emblica*	Fruit	11873
Bet	*Calamus acanthospathus Calamus latifolius*	Stem	8939
Bhorla ko pat	*Bauhinia vahlii*	Leaf	6000
Thakal	*Argemonia mexicana Phoenix humilis*	Seed	5000
Babiyo	*Eulaliopsis binata*	Leaf	4000
Titepati	*Artemisia dubia*	Leaf	3220
Sugandhakokila	*Cinnamomum glaucescens*	Oil	2090
Bel	*Aegle marmelos*	Fruit	2000
Bojho	*Acorus calamus*	RhizomeV	1741
Ramdana	*Amaranthus hybridus*	Seed	1692
Total			104301419 kg

f. Information Based on Indian Trade Centres and Traders

In course of the field works, seven major herbal trade centres one each at Delhi, Lucknow, Kanpur, Kannauj, Tanakpur, Siliguri and Calcutta were visited. Prominent traders in these trade centres that import NTFPs and MAPs from Nepal were interviewed. Information on major NTFPs imported into these centres were documented (Table 9) and their annual quantities entering each trade centre, as estimated by the prominent traders, were documented (Annex 1; Tables 1.60-1.68).

Table 9. List of tropical NTFPs imported by Indian herbal traders from different parts of Nepal. (F.Y. 2001/02)

Nepali name	Trade name	Botanical name	Part used
Amala	Aonla	*Phyllanthus emblica*	Fruit
Amalbed	Chulthi/Amalbed	*Rheum australe*	Petiole
Atis	Atis	*Aconotum heterophyllum*	Root
Bhorla ko bokra	Bhorla Chhal	*Bauhinia vahlii*	Bark
Bish	Bish	*Aconitum spicatum*	Root
Bisphase	Bisphase	*Polypodium vulgare*	Root
Bojho	Dudhiamasi	*Acorus calamus*	Rhizome
Chiraito (Tito)	Chirata (Tita)	*Swertia chirayita*	Plant
Chiraito (Mitho)	Chirata (Mitha)	*Swertia* spp.	Plant
Dalchini	Dalchini	*Cinnamomum tamala*	Bark
Dhasingare	Wintergreen	*Gaultheria fragrantissima*	Ess. oil
Dhupjadi	Dhuplakkad	*Jurinea dolomiaea*	Root
Gamdol	Salamdana	*Brachycorythis obcordata*	Root
Gucchi	Gucchi	*Morchella conica*	Thallus
		Morchella esculenta	Thallus
Jatamasi	Balchhad	*Nardostachys grandiflora*	Root
Jatamasi ko tel	Balchhad	*Nardostachya grandiflora*	Ess. oil
Jhyau	Budhani/Chharila	*Lichen* spp.	Thallus
Jiwanti	Jiwanti	*Ephemerantha macraei*	Plant
Kakadsing	Kakadsinge	*Pistacia chinensis*	Insectgall
Kakoli	Kakoli	*Fritillaria cirrhosa*	Bulb
Kaphal	Kaiphal	*Myrica esculenta*	Bark
Kutki	Kutki	*Neopicrirhiza scrophulariifolia*	Root
Majitho	Majith	*Rubia manjith*	Stem/root
Nepali Atis	Nepali Atis	*Delphinium himalayai*	Root
Okhar ko bokra	Akhrot chhal	*Juglans regia*	Root/bark
Padamchal	Padamchal	*Rheum australe*	Root
Pakhanbed	Pakhanbed	*Bergenia ciliata*	Root
Panchaunle	Salampanja	*Dactylorhiza hatagirea*	Root
Pipla	Pipla	*Piper longum*	Fruit
Pipla ko jara	Pipla mul	*Piper longum*	Root
Ritha	Ritha	*Sapindus mukorossi*	Fruit
Sarpagandha	Sarpagandha	*Rauvolfia serpentina*	Root
Satawari	Satabar	*Asparagus racemosus*	Root
Satuwa	Satwa	*Paris polyphylla*	Root
Sikakai	Rasula	*Acacia rugata*	Fruit
Sugandhawal	Sugandhawala	*Valeriana jatamansii*	Root
Sugandhakokila	Kokila	*Cinnamomum glaucescens*	Fruit
Sugandhakokila oil		*Cinnamomum glaucescens*	Ess. oil
Tejpat	Tejpatta	*Cinnamomum tamala*	Leaf
Timur	Tomar	*Zanthoxylum armatum*	Fruit

Quantitative estimation of different NTFPs imported from Nepal to the corresponding trade centres were done. These included the personnel of registered organizations like Herbs and Kirana Association (Delhi), Parbatiya Sahakari Bheshaj Ebam Krya Bikraya Sangh Limited (Hill Area Cooperative and Trading Association), Tanakpur and identical organizations in other NTFP/herbal trade centres. Suggestions provided by the interviewed Indian NTFP and MAP traders (importers) to develop this sector in Nepal in terms of benefit to every category of stakeholders were also documented.

As Delhi (Khari Baoli market) is the largest NTFP trade centre in south Asia as well as the major destination of Nepalese NTFPs, interviews with the Trade Union personnel also involved estimation of percentage proportion of major NTFPs/herbs arriving the Delhi market from Nepal and other neighbouring countries (Table 10).

Table 10. Percentage proportion of major NTFPs/herbs obtained by the Delhi-based traders from the adjoining countries (2001/02)

Medicinal Herbs	Nepal (%)	Bhutan (%)	India (%)	Pakistan (%)
Atis	5	-	95	-
Atis (Nepali)	100	-	-	-
Bojho	20	10	70	-
Chiraito	60	40	-	-
Dhup Jadi	25	-	75	-
Gucchi	5	-	95	-
Jatamansi	85	5	10	-
Jhyau	15	-	85	-
Jiwanti	85	-	15	-
Kakadsinghi	10	-	20	70
Kakoli	70	-	30	-
Kutki	75	5	20	-
Majitho	5	95	-	-
Okhar bokra	10	5	85	-
Panchaunle	40	20	40	-
Ritha	35	5	60	-
Salamdana	40	10	50	-
Satawar	60	-	40	-
Sugandhakokila	100	-	-	-
Sugandhawal	75	5	20	-
Timur	100	-	-	-

17. Discussion

Lack of justified methodology to quantitatively assess NTFP resources in large areas in the wild involving many species and varied products has ever been the major problem everywhere. Methods used in ecological studies like sampling techniques using quadrat method, information on frequency, abundance, etc., can not be applied exactly to assess the varied products obtained from varied plants. Therefore, search for and development of a tolerable methodology to match the needs seems topical. Assessment of the flow, i.e. the quantity actually used by people, could be an important tool to initiate adequate conservation, management and development planning efforts.

The tropical region of Nepal with high density of population enjoys accessibility and, at the same time, possibly suffers from excessive harvesting and considerable depletion of NTFP resources. Adequate conservation and management planning, therefore, seems urgent. In course of the present investigation, quantitative data on the flow of major NTFPs of the terai districts has been considered using 4 major categories of stakeholders and informants: District Forest Offices, Custom offices, herbal trade centres of tropical Nepal and major herbal trade centres of northern India.

District Forest Offices are the sole authorities to issue collection and transportation permits for NTFPs collected from the national forests and forestland. The Custom Department (Custom Offices), on the other hand, is the final authority to grant the export permission. Information obtained from these sources are authentic as the permissions are granted only after the payment of due royalties. As most of the collections, more particularly those occurring in the tropical regions, are exported, the records of these two institutions could provide an understanding of the total quantity of NTFPs harvested in the entire country for commercial purposes.

An analysis of the quantities of major NTFPs based on DFO records (F.Y. 2058/59; Tables 1.1 - 1.22) and Custom Office records (F.Y. 2058/59; Tables 1.42- 1.53) suggest that the exported quantities of most of the items exceed the quantities permitted by the DFOs. Also, many items recorded in the DFO data are missing in the Custom Office records. These are mainly because of the following situations:

- The Custom Office data reflects the tropical NTFPs collected from other districts which also include tropical regions, not only limited to 22 Districts of Terai (Tables 1.42-1.53).

- Most custom offices have recorded only the major items while categorizing many items collectively as 'Jadibuti' and 'Anya' (Tables 1.42- 1.53).

- Some items could have been collected in earlier FY and exported during commencing fiscal year.

A comparison of the quantities of major NTFPs based on DFO records (F.Y. 2058/59; Tables 1.1- 1.22) and Custom Office records (F.Y. 2058/59; Tables 1.42- 1.53) with those obtained from the major herbal trade centres of Nepal (Tables 1.25- 1.37) suggest that the trade centre quantities are mostly higher. This is because the quantitative information obtained from the herbal trade centres mostly involved multiple entries. A trader of a particular market obtains NTFP raw materials from not only the primary collectors but also from the traders of other trade centres. Mostly, the NTFP items heading for export to India passed through a number of traders before being received by the export trader. Frequently it is also seen that the items either banned or fetching high royalty rates are recorded in fake or different names to avoid high payment of royalty. This is mainly due to lack of expertise in the DFO and Custom Offices on the identification of NTFP raw materials.

Similarly, quantitative information obtained from Indian NTFP traders is also higher than the collected or exported quantities from Nepal. Here too, the possibility of multiple entries cannot be overlooked, for example, when a Tanakpur-based trader sells his purchase from Nepal to a Lucknow or Delhi-based trader as 'Nepali' raw material. The border-based Indian markets are also said to receive considerable quantities of certain NTFP raw materials without any official record, thus saving the royalties payable to both the DFO and the Custom Office.

The data provided by the traders, both Nepali and Indian, cannot be considered highly reliable as these are traders who may have certain business norms. Many traders and processors even did not like to mention the quantity of NTFPs they processed or traded.

The present investigation has not taken into consideration the household consumption of commercial NTFPs that should cover a significant proportion of the total 'flow'. Local consumptive uses are important components of NTFPs harvested and may result in considerable depletion of resources.

Almost all items constituting the commercial NTFP, notably Babiyo (*Eulaliopsis binata*), Amriso (*Thysanolaena maxima*), Bhorla (*Bauhinia vahlii*), Ritha (*Sapindus mukorossi*), Sikakai (*Acacia rugata*), Tejpat (*Cinnamomum tamala*), Dalchini (*Cinnamomum tamala*), Pipla (*Piper longum*), Chabo (*Piper mullesua*), Amala (*Phyllanthus emblica*), Bel (*Aegle marmelos*), Gurjo (*Tinospora sinensis*), Bojho (*Acorus calamus*), etc., to mention some, are regularly used by the rural Nepalese households. The economic assistance provided by the forest resources to the rural households in Nepal have never been calculated in the monetary terms nor in the conservation and management contexts. Browder (1992) and Godoy (1993) have cited many examples, based on their studies in South America, of non-timber forest products used primarily by local communities that are also depleted by unsustainable extraction. Unfortunately, quantitative assessment of NTFPs used by rural households could not be documented due to time and resource factors. However, this part of information is highly desirable for the future endavour.

18. Conclusions

1. Justified methods to quantitatively assess NTFP resources in a geographical area seem lacking. Either an approved methodology has to be traced, or one should be developed. In the absence of a justified methodology, the best approach for the management of NTFPs in the wild appears to be the assessment of flow, especially the commercial flow, and a regular monitoring of the resource bases.

2. The domestic use of NTFPs, especially medicinal plants used in home remedies seems to have little or no impact on the depletion of resource, as the quantities harvested are relatively small and most of them are non-commercial species. Only a few NTFP species are used by the rural households in considerable quantities, e.g. *Eulaliopsis binata* (Babiyo) for the preparation of ropes, *Thysanolaena maxima* (Amriso) for the preparation of broom, *Shorea robusta* (Sal) and *Bauhinia vahlii* (Bhorla) for making plates, etc. Other plant parts used in considerable quantities are the edibles.

3. Almost all NTFPs of commerce come from wild collection. Some commercial species, major proportion of which come from the private land has also been traditionally considered 'NTFPs', both in terms of their definition as well as administration, prominent examples are Ritha (*Sapindus mukorossi*), Sugandhakokila (*Cinnamomum glaucescens*), Tejpat (*Cinnamomum tamala*), etc. A demarcation line needs to be drawn between the state property resource and the private property resource. This would facilitate their subsequent conservation, management and development.

4. Although a large number of NTFP species are used for commercial purposes, only a few species cover the major proportion of the volume and value in trade.

5. Majority of the DFO personnel and most of the Custom Office personnel are not very familiar with the identification of NTFPs in their raw forms. Various other issues related with commercial NTFPs and MAPs like conservation status, threat status, distribution range and productivity status, etc are yet other shortcomings. This seems to have resulted into the inadequate record-keeping practices as well as lack of

justified controlling meachnisms, exerting problems in the sustainable management of resources.

19. Recommendations

1. Quantitative assessment of NTFP resources is important from the viewpoint of planning for their conservation, management, uses and development. Due to lack of justified methodology to assess the resources in the wild, it is necessary that information on their economic flow should be properly and frequently recorded and analysed as an important tool to manage the resources in the wild.
2. Information on the use of commercial NTFPs for household purposes needs to be worked out quantitatively so as to understand the share and contribution of wild plant resources in the rural livelihoods. This would provide additional inputs for planning the management and development of the existing resource base.
3. Existing knowledge regarding the sustainability of NTFP production is inadequate. Too little is known about the levels of sustainable harvest of many of the locally or commercially important non-timber forest products. The productivity and production potentials of every NTFP species in their respective undisturbed habitats should be studied and recorded so as to understand the optimum productivity levels for each species under varied conditions.
4. Out of the large number of commercial NTFP species, only a few species constitute the major proportion in trade both in terms of volume and value. Such species should be prioritized for additional research and development and management practices.
5. Research on optimum harvest levels for every NTFP species should be conducted both *in situ* and *ex situ* so as to generate information both in forestland and farmland. Without this, it is not possible to sustainable harvest the product.
6. While ex-*situ* / in-*situ* management practices are emphasized, some models for different locations for different species should be developed as the demonstration activity.
7. Record keeping systems in both the DFO and Custom Offices needs improvements. Lack of knowledge on identification of NTFPs has been responsible for the inadequate record keeping in transaction. Duly labeled samples of NTFP should be housed in every DFO and Custom Offices to facilitate identification of transacted NTFPs and to improve the record keeping systems with authentic identity.
8. Short-duration training on identification of commercial NTFPs should be frequently organized for the DFO and Custom Office personnel to overcome the existing difficulties created due to lack of knowledge on identification of Spp.

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Annex 1. Additional tables

Table 1.1 NTFP collection permits Issued by District Forest Office, Morang

Name of NTFPs	Quantity (Ton)	Revenue (Rs)
	2001/02	2001/02
Bojho	0.240	1200
Chiriato	0.625	1875
Indriani	1.000	8000
Indriani ful ko ghata	0.550	2750
Kurilo	1.200	2400
Lohan	0.950	4750
Majitho	7.450	14900
Nepali Dalchini	0.100	2000
Pipla	0.901	4505
Ritha	37.580	75160
Tej bokra	0.600	12000
Timur	0.200	600
Total	**51.396**	**130140**

Table 1.2 NTFP collection permits Issued by District Forest Office, Sunsari

Name of NTFPs	Quantity (Ton)			Revenue (Rs.)		
	2000/01	2001/02	2002/03	2000/01	2001/02	2002/03
Anya Phal	0.000	1.500	0.000	0	1500	0
Bis Jara	0.000	0.425	0.000	0	2975	0
Chawo	12.895	16.650	10.900	25790	33000	21800
Chayu	0.000	0.400	0.000	0	400	0
Chiriato	0.240	2.700	1.009	720	8100	3027
Dhupi Pat	0.000	0.700	0.000	0	1400	0
Kaiyoo Phal	0.000	.850	0.000	0	850	0
Kantakari Phal	0.000	5.500	0.000	0	8250	0
Kurilo	0.390	1.230	0.350	780	2460	700
Lohan	0.000	0.200	10.000	0	1000	50000
Majitho	6.180	0.300	0.000	12360	600	0
Pangro	0.050	0.000	0.060	250	0	300
Pipla	2.932	0.030	0.000	19660	150	0
Ritha	14.850	45.800	24.835	29700	91600	49670
Rudrakshya	0.000	0.000	4.700	0	0	0
Satawari	0.000	0.000	0.050	0	0	0
Sitaphal	7.825	12.900	0.000	15650	25800	0
Thigure salla ko Pat	0.000	0.900	0.000	0	1800	0
Timur	3.100	2.780	1.800	9300	8340	5400
Total	**48.462**	**92.865**	**53.704**	**114210**	**184225**	**130897**

Table 1.3 NTFP Collection permits issued by District Forest Office, Saptari

Name of NTFPs	Quantity (Ton)			Revenue (Rs)		
	1999/2000	2000/01	2001/02	1999/2000	2000/01	2001/02
Bhorla Pat	0.000	2.200	0.000	0.000	1100.000	0.000
Khair	0.000	67.300	234.074	0.000	2019.000	7022.220
Total	**0.000**	**69.500**	**234.074**	**0.000**	**3119.000**	**7022.220**

Table 1.4 NTFP collection permits Issued by District Forest Office, Udyapur

Name of NTFPs	Quantity (Ton)
	F.Y. 2001/02
Amala	0.050
Ban Lasun	1.756
Bel	0.180
Chiraito	7.936
Jiwanti	1.650
Kurilo	1.995
Majitha	1.845
Ritha	60.080
Sal khoto	0.098
Satabari	2.181
Sikakai	0.500
Simal	0.500
Tejpat	27.490
Timur	0.500
Total	**106.761**

Table 1.5 NTFP collection permits Issued by District Forest Office, Siraha

Name of NTFPs	Quantity (Ton)			Revenue(Rs)		
	1999/2000	2000/01	2001/02	1999/2000	2000/01	2001/02
Bhorla Pat	0.000	21.000	372.000	0	100500	186000
Kurilo Jara	3.000	31.7505	0.000	6000	6351	0
Sabai Grass	0.000	88.000	0.000	0	44000	0
Tejpat	18.620	16.700	0.000	186200	167000	0
Total	**21.620**	**157.4505**	**372.000**	**192200**	**317851**	**186000**

* Collection permitted on the basis of auction.

Table 1.6 NTFP collection permits Issued by District Forest Office, Dhanusa

NTFPs	Quantity (ton)
	F.Y. 2001/02
Amala	0.150
Jibanti	0.170
Kurilo	0.920
Musli	3.000
Sikakai	0.750
Simal	0.300
Total	**4.990**

Table 1.7 NTFP collection permits Issued by District Forest Office, Mahottari

NTFPs	Quantity (ton)
	F.Y. 2001/02
Chiraito	0.180
Pipla	0.400
Harro	0.055
Kurilo	6.200
Musli	28.500
Jibanti	0.170
Total	**35.505**

Table 1.8 NTFP collection Permits Issued by District Forest Office, Sarlahi

Name of NTFPs	Quantity (Ton)			Revenue (Rs)		
	2000/01	2001/02	2002/03	2000/01	2001/02	2002/03
Bhorla Pat	No record available due to fire casualty on 2059-1-18		0.700			350
Pipla Phal			3.500			10500
Sikakai			0.513			1539
Kurilo			0.800			1600
Musli			0.200			
Total			**5.731**			**13989**

Musli-root, Sikakai-Fruit

Table 1.9 NTFP collection Permits Issued by District Forest Office, Rautahat

Name of NTFPs	Quantity (Ton)			Revenue (Rs)		
	1999/2000	2000/01	2001/02	1999/2000	2000/01	2001/02
Sikakai Phal	2.304	3.820	7.800	6912	11460	23400
Kurilo Jara	1.550	0.350	0.650	2900	700	1300
Simal Khoti	0.850	0.850	0.800	2550	2550	2400
Amla Phal	0.000	0.1	0.850	0	200	1700
Pawan Bokra	0.000	0.000	48.000	0	0	240000
Total	**4.804**	**5.120**	**58.750**	**12362**	**14910**	**268800**

Table 1.10 NTFP collection Permits Issued by District Forest Office, Bara

Name of NTFPs	Quantity (Ton)			Revenue (Rs)		
	1999/2000	2000/01	2001/02	1999/2000	2000/01	2001/02
Bhorla ko Pat	10.500	12.300	3.800	5250	6150	1900
Khar Dhaddi	30.000	27.000	0.000	150	135	0
Bankas babiyo	118.400	5.250	0.000	59200	26250	0
Kurilo Jara	0.200	0.853	0.000	400	1706.4	0
Sikakai Phal	0.000	2.879	0.000	0	8637	0
Pawan Bokra	0.000	0.000	24.000	0	0	120000
Punarjawa Bokra	0.000	0.000	1.000	0	0	8000
Khair	0.000	1185.44cft*	0	0	357000	0
Total	**159.100**	**48.28202**	**28.800**	**65000**	**42878.4**	**129900**

* Khair has been sold in cft for purpose of Katha.

Table 1.11 NTFP collection Permits Issued by District Forest Office, Parsa

Name of NTFPs	Quantity (Ton)			Revenue (Rs)		
	1999/2000	2000/01	2001/02	1999/2000	2000/01	2001/02
Kurilo Jara	6.000	0.000	0.000	12000	0	0
Bhorla bokra	0.000	16.000	14.000	0	8000	12500
Pawan Bokra	0.000	14.000	0.200	0	70000	1000
Total	**3.100**	**30.000**	**23.200**	**12000**	**78000**	**13500**

Table 1.12 NTFP collection Permits Issued by District Forest Office, Makwanpur

Name of NTFPs	Quantity (Ton)			Revenue (Rs)		
	1999/2000	2000/01	2001/02	1999/2000	2000/01	2001/02
Aakdakda	0.000	0.600	0.000	0	3000	0
Amala	0.200	0.070	1.300	400	140	2600
Ban Lasun	0.155	0.000	0.000	1550	0	0
Barro	0.000	0.300	0.000	0	600	0
Bhorla ko bokra	0.500	0.000	5.000	500	0	5000
Bis	0.062	0.000	0.000	434	0	0
Bisfej	3.165	4.274	0.700	22155	29918	4900
Bukephool	6.765	2.820	6.930	13530	5640	13860
Chiriato	2.800	29.280	2.500	7400	87840	7500
Dalchini	0.101	0.300	0.000	2020	6000	0
Daru haldi	1.250	2.000	0.000	2500	4000	0
Gobresalla simta	0.000	12.500	0.000	0	25000	0
Halik	5.640	12.053	31.800	11280	24106	63600
Harro	0.000	0.100	0.000	0	200	0
Jhayoo	137.400	20.000	61.500	1374000	200000	615000
Jibantii	10.487	36.524	18.340	31461	109572	55020
Karatchulti	0.000	1.000	0.000	0	3000	0
Khoto	0.000	17.227	14.000	0	51682.5	42000
Kukur Tarul	1.090	1.200	0.000	3270	3600	0
Kumkum Dhoop	0.000	0.100	0.000	0	400	0
Kurilo Jara	80.963	74.954	54.915	161926	149908	109830
Laghupatra	0.550	0.200	0.000	2750	1000	0
Loothsalla	0.000	0.400	0.500	0	10000	7500
Majitha	17.726	13.700	31.800	35452	27400	63600
Masala	0.000	0.000	2.517	0	0	2517
Pawan Bokra	1.500	4.320	3.600	7500	21600	18000
Ritha	1.920	2.100	0.075	3840	4200	150
Sal ko simta	14.550	0.000	0.000	29100	0	0
Sal dhoop	0.650	0.000	0.240	3250		1200
Setakchini	0.000	3.400	0.700	0	17000	3500
Sikakai	5.800	2.400	1.450	17400	7200	4350
Sugandhawal	0.400	0.000	0.000	6000	0	0
Tigedi	0.000	0.000	5.500	0	0	11000
Tiarri	5.225	11.300	16.000	5225	11300	16000
Timur	0.424	0.000	0.000	1272	0	0
Tukephool	0.052	0.000	0.000	104	0	0
Total	**299.375**	**253.322**	**259.367**	**1744319**	**805306.5**	**1047127**

Table 1.13 NTFP collection Permits Issued by District Forest Office, Chitwan

NTFPs	Quantity (ton)			Revenue (Rs)		
	1999/2000	2000/01	2001/02	1999/2000	2000/01	2001/02
Amla	0.174	0.000	0.339	348	0	678
Barro	2.823	0.000	3.523	5646	0	7046
Chiriato	0.125	0.000	0.000	375	0	0
Gurjoo	1.8725	0.000	3.765	9362.5	0	18825
Harro	0.003	0.000	1.262	6	0	1524
Jiwanti	0.000	0.000	10.400	0	0	31200
Kurilo	11.400	0.000	12.450	22800	0	24900
Pawan bokra	0.000	0.000	4.500	0	0	22500
Ritha	0.000	0.000	0.500	0	0	1000
Setekchini	0.000	0.000	0.200	0	0	400
Sikakai	0.000	0.000	5.000	0	0	15000
Total	**16.3975**	**0**	**41.939**	**38537.5**	**0**	**123073**

Table 1.14 NTFP collection Permits Issued by District Forest Office, Nawalparasi

NTFPs	Quantity (ton)							
	1991/92	1992/93	1993/94	1997/98	1998/99	1999/2000	2000/01	2001/02
Belauni	0.000	0.000	0.500	0.843	0.600	1.600	1.120	0.000
Dalchini	10.450	9.350	4.250	1.225	0.900	3.543	2.730	0.000
Kurilo	0.000	0.000	0.000	19.107	28.200	25.000	22.400	0.000
Ritha	0.000	2.598	0.650	0.000	0.000	0.988	0.000	0.000
Satawari	36.033	11.460	8.815	7.300	0.000	0.000	0.000	0.000
Sikakai	1.705	3.400	32.000	14.296	18.000	23.800	19.800	6.200
Pipla	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150
Total	**48.188**	**26.808**	**46.215**	**42.771**	**47.700**	**54.931**	**46.050**	**6.350**

Table 1.15 NTFP collection Permits Issued by District Forest Office, Rupandehi

NTFPs	Quantity (ton)			Revenue (Rs)		
	1999/2000	2000/01	2001/02	1999/2000	2000/01	2001/02
Amriso	0.800	2.500	0.000	1600	5000	0
Bilaune	46.105	52.455	14.100	161050	224550	49350
Chiriato	0.025	0.000	0.000	75	0	0
Dalchini	46.516	54.816	14.525	930320	1096700	290500
Kurilo	2.221	2.300	0.609	4442	4600	1218
Pipla	0.040	0.000	0.000	200	0	0
Ritha	2.480	0.000	0.000	4960	0	0
Timur	4.272	1.985	0.000	12816	5955	0
Total	**102.459**	**114.056**	**29.234**	**1115463**	**1336805**	**341068**

Table 1.16 NTFP collection permits Issued by District Forest Office, Kapilbastu

NTFPs	Quantity (Kg)			Revenue (Rs)		
	1999/2000	2000/01	2001/02	1999/2000	2000/01	2001/02
Babiyo	0.645	0.566	631.100	644500	566400	631100
Bojho	0.002	0.000	0.000	400	0	0
Kurilo	0.193	0.000	0.000	386	0	0
Thakal	0.000	5.500	0.000	0	5500	0
Total	**644.893**	**571.900**	**631.100**	**645286**	**571900**	**631100**

Table 1.17 NTFP collection permits Issued by District Forest Office, Dang

NTFPs	Quantity (ton) F.Y. 2001/02
Amala	3.106
Amalbed	4.276
Atis	1.897
Bhutkesh	8.100
Bishma	0.019
Bojho	0.120
Chiraito	0.3925
Dalchini	5.678
Kakadsingi	2.1305
Kakoli jara	0.500
Kaladana	0.184
Kurilo jara	14.239
Lohan	0.150
Majitho	0.060
Padamchal	0.200
Pakhanbed	0.040
Ritha	51.520
Salamdana	0.114
Satabar	1.993
Somlata	0.800
Sugandhakokila	74.6688
Tejpat	1.005
Tigedi	4.250
Timur	128.8325
Total	**2867.57.3**

Table 1.18 NTFP collection permits Issued by District Forest Office, Banke

NTFPs	Quantity (ton)		
	2000/01	2001/02	Total
Amala	0.800	0.000	0.800
Amriso	1.000	1.000	2.000
Babiyo	0.000	1384.900	1384.900
Jugargano	0.000	0.030	0.030
Kurilo jara	2.300	0.400	2.700
Maha	0.300	0.000	0.300
Mahuwa (flower)	0.500	0.098	0.598
Pipla	0.080	0.000	0.080
Rohini phal	0.000	1.100	1.100
Satawari	0.160	0.000	0.160
Sikakai	12.700	30.155	42.855
Tendu leaf	0.000	30.155	30.155
Total	**17.840**	**1447.838**	**1465.678**

Table 1.19 NTFP collection permits issued by District Forest Office, Bardia

NTFPs	Quantity (ton)		
	2000/01	1999/2000	1998/1999
Jadibuti	1.100	-	0.000
Kurilo	1.700	8.250	0.000
Rasulla	0.000	9.000	0.000
Sikakai	11.000	-	0.000
Kutki	38.000	-	0.000
Total	**51.800**	**17.250**	**0.000**

Table 1.20 NTFP collection permits Issued by District Forest Office, Surkhet

NTFPs	Quantity (ton)
	F.Y. 2001/02
Amalbed	0.085
Bojho jara	0.250
Chiraito	11.350
Jhyau	12.100
Kakadsingi phal	0.020
Kurilo Jara	26.551
Lohan	2.510
Main	0.200
Masalapat	0.200
Nepali Dalchini	3.965
Padamchal	0.025
Ritha	29.805
Somlata	1.004
Sugandhawal Jara	4.700
Tejpat	0.100
Timur	54.535
Total	**147.400**

Table 1.21 NTFP collection Permits Issued by District Forest Office, Kailali

NTFPs	Quantity (ton)
	F.Y. 2001/02
Amala	1.495
Bhorla ko bokra	42.3275
Bojho	0.4148
Daruhaldi	0.200
Harro	0.050
Kachur Jara	0.500
Kurilo Jara	1.525
Nepali Dalchini	0.812
Pakhanbed Jara	3.8206
Ritha	23.235
Salla ko simta	2.000
Satawari Jara	1.805
Sikakai	0.113
Tejpat	4.3615
Total	**82.6594**

Table 1.22 NTFP collection Permits Issued by District Forest Office Kanchanpur

SN	NTFPs	Quantity (ton.)	Revenue (Rs.)
1.	Vorla Leaf	23.100	23,900
2.	Nepali Dalchini	0.050	1,000
3.	Budhani Phool	10.000	20,000
4.	Cinnamon leaf	0.050	500
Total		**33.200**	**45,400**

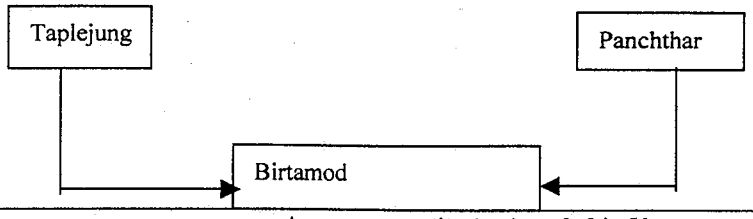
Table 1.23 NTFP collection permits Issued by District Forest Office, Dhankuta

NTFPs	Quantity (ton)
	F.Y. 2001/02
Salla Khoto	299.961
Khair	117.378
Majitha	8.991
Chiraita	4.075
Ritha	2.430
Total	**432.835**

Table 1.24 NTFP collection permits issued by the District Forest Office, Doti

NTFPs	Quantity (ton)
Ritha	37.500
Amala	19.936
Tejpat	15.920
Somlata	2.154
Jhyau	34.356
Bhorla ko bokra	14.302
Chutro ko bokra	1.700
Nepali Dalchini	0.624
Pakhanbed	2.140
Bojho	0.320
Jiwanti Bokra	2.620
Jiwanti (Biruwa)	0.125
Bhyakur Jara	0.200
Kurilo	0.425
Lokta	0.200
Agreli ko bokra	1.007
Daru haldi	0.103

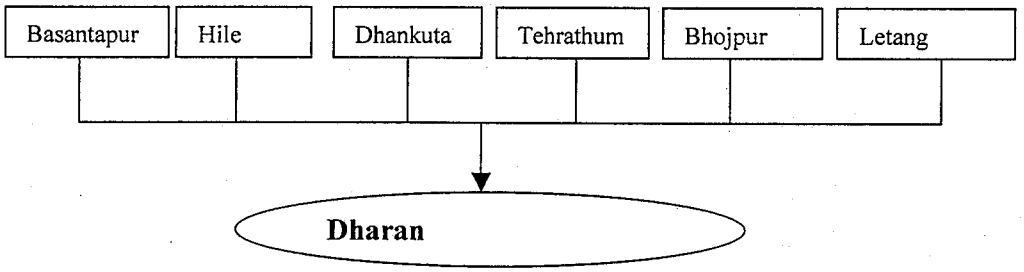
Table 1.25 Quantitative Information on NTFPs Obtained from the Trade Center/Traders: Birtamod, Jhapa district.



Major NTFPs In trade	Average quantity (ton) traded in Year (2000/01)	Buying price/K.g
Chiraito	6.5	100-150
Kurilo Jara	1.2	100-150
Timur	2	50-60
Pawan Bokra	5	70-80
Sikakai	2	40-55
Tejpat	7	20-25

Pakaging cost of these NTFps @ Rs. 20/ 50 kg bundle

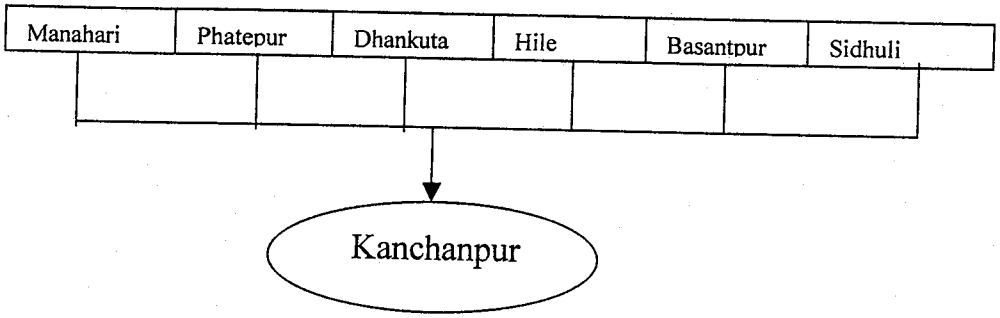
Table 1.26 Quantitative Information on NTFPs Obtained from the Trade Center/Traders: Dharan, Sunsari district



Major NTFPs In trade	Average quantity (ton) traded in Year (2000/01)	Buying price/ K.g
Chiraito	20-50	100-120
Ritha	400	12-15
Majitho	5	28-30
Dalchini	4	20
Sutho	140	15-30
Tejpat	156	15-17
Kurilo Jara	5	100-120
Pipla	650	12-15
Pangra	10	30-35
Indrini ko Biu	0.3	50-70

Processing cost for all NTFPs @ Rs 50/ bora.

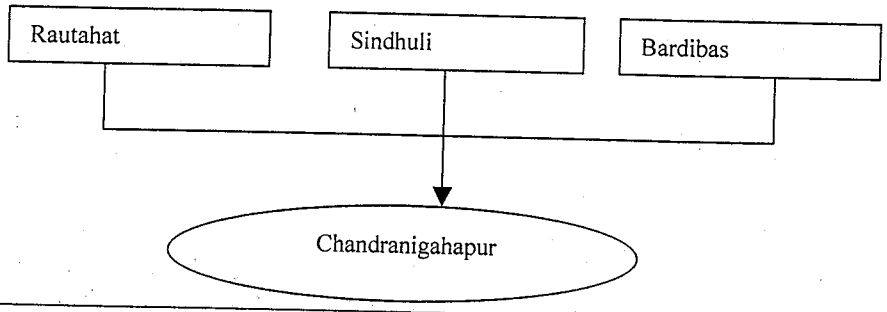
Table 1.27 Quantitative Information on NTFPs Obtained from the Trade Center/Traders: Kanchanpur, Saptari district



Major NTFPs In trade	Average quantity (ton) traded in Year (2001/02)	Buying price/ K.g
Sikakai	40-50	15-30
Kurilo	10	100-150
Majitho	12	28-30
Tejpat	4	25-30
Dalchini	1	40-45
Pipla	2	15-30
Nirmasi	1	300-400

Note: Processing cost @ Rs 50/ Bora

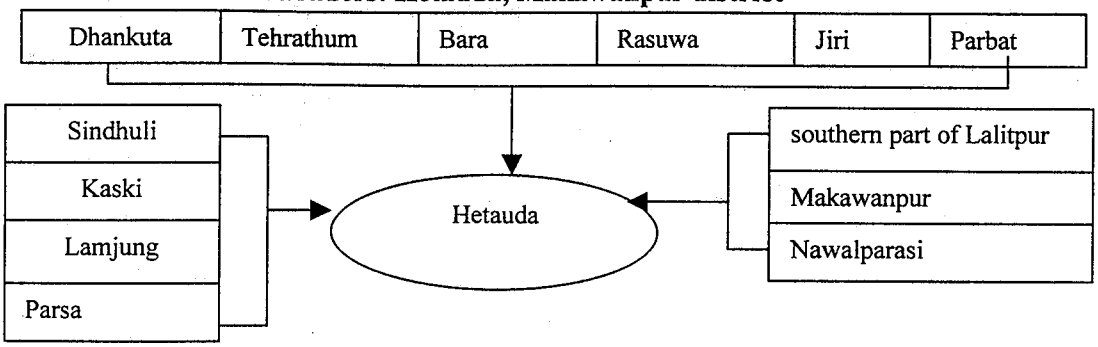
Table 1.28 Quantitative Information on NTFPs Obtained from the Trade Center/Traders: Chandranigahapur, Rautahat district



Major NTFPs In trade	Average quantity (ton) traded in Year (2001/02)	Buying price/ K.g
Sikakai	10	20-30
Kurilo	5	100-150
Pipla	1	15-20

Note: Processing cost @ 50\ Bora

Table 1.29 Quantitative Information on NTFPs Obatined from the Trade Center/Traders: Hetauda, Makawanpur district



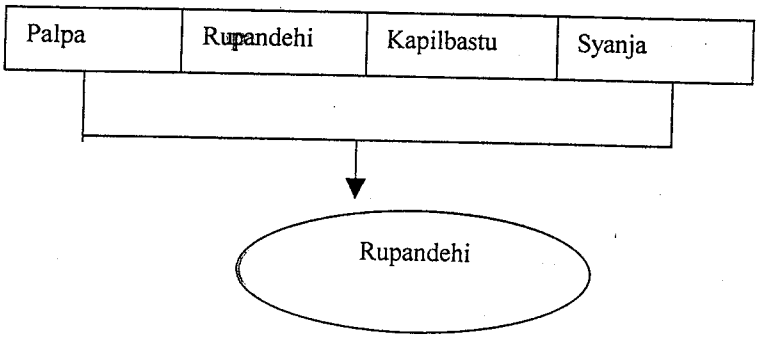
Major NTFPs in Trade	Average Quantity (ton) in Year (2001/02)	Buying price/ K.g
Amala	9.000	70-80
Ban Lasun	0.500	70-75
Bikh	0.400	20-30
Bojho	1.000	20-30
Chiraito	26.000	120
Halik	15.000	27-28
Harro	2.000	40
Jatamasi	8.000	40
Jhyau	68.000	100-160
Jiwanti	11.000	70-80
Kakuli	1.200	60
Kurilo	38.000	100-150
Majitho	35.000	15-20
Musli	5.000	15
Nepali Musali	0.030	30-35
Simal Khoto	1.400	185-200
Tigadi	10.000	100-120

Note: Processing and packaging cost @ Rs 5/kg

Table 1.30 Quantitative Information on NTFPs Obtained from the Trade Centre/Traders: Nawalparasi district

Major NTFPs In trade	Average quantity (ton) traded in Year (2001/02)	Buying price (Rs./kg)	Collection areas
Babiyo	15-20	10	Along the banks of Narayani river, Arun khola (river), Parasi and Palpa
Alainchi	25	20-30	
Dried Ginger	250	20-55	
Kurilo	15-20	100	
Ritha	15-20	10	

Table 1. 31 Quantitative Information on NTFPs Obtained from the Trade Centre/Traders: Rupandehi district



Major NTFPs in Trade	Average Quantity (ton) in year (2001/02)	Buying Price/(Rs/ K.g)
Bilauni Bokra	0.700	30-40
Dalchini	14.000	30-35
Kurilo	4.000	130-150
Timur	4.000	60-70

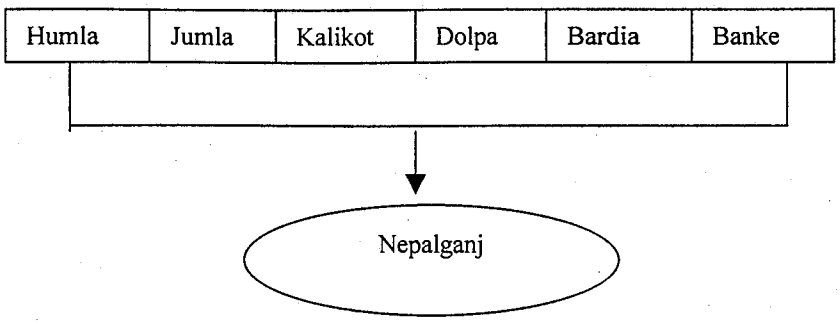
Table 1.32 Quantitative Information on NTFPs Obtained from the Trade Centre/Traders: Tulsipur, Dang district (2001/02)

Major NTFPs in trade	Average quantity Traded year (mt.)	Buying price Rs/kg	Supplying areas
Dalchini	5.000	22	Rolpa
Kurilo	18.000	120-130	Dang, Rolpa, Salyan
Ritha	100.000	8-9	Rolpa, Salyan
Sugandhakokila	10.000	65-70	Rolpa, Salyan
Timur	125.000	85-90	Rolpa, Salyan

Table 1.33 Quantitative Information on NTFPs Obtained from the Trade Centre/Traders: Ghorai, Dang District (2001/02)

Major NTFPs in trade	Average quantity (MT) Traded/year	Buying price Rs/Kg	Supplying areas
Amalbet	1.000	70	Jajarkot, Dolpa
Chiraito	3.000	200	Salyan, Jajarkot
Dalchini	5.000	20	Pyuthan, Salyan
Kurilo	8.000	135	Dang, Pyuthan, Salyan
Ritha	0.800	9	Dang, Rolpa, Pyuthan
Sugandhakokila	0.400	65	Rolpa
Sugandhawal	1.500	80	Salyan, Pyuthan, Jajarkot
Timur	150.000	90	Rolpa, Pyuthan

Table 1.34 Quantitative Information on NTFPs Obtained from the Trade Center/Traders: Nepalganj, Banke district (2001/02)



Major NTFPs In trade	Total quantity traded (MT)	Buying price (Rs. /Kg)
Amala	25-30	28-30
Amalved	35	70-75
Atis	6—7	180-200
Barro	12-15	9--10
Bhorla (Bark)	25-30	10--12
Bhutkesh	80-85	65-70
Bikh	2-2.2	100-120
Bikhma	3-3.2	110-120
Bojho	10-12	24-28
Budhani	350-400	50-55
Chiraito	30-3.2	160-180
Chulthi	4—5	65-70
Dalchini	28-30	30-35
Daruhaldi	2	140-150
Dhupi	30-35	25-35
Dhupjadi	80-85	70-75
Gucchi chyau	3.8-4	4000-4200
Harro	6—8	11--12
Jatamasi	180-200	130-140
Jiwanti	10—11	40-45
Kakadsingi	7—8	150-200
Kakoli	1.2—1.5	70-75
Kurilo	60-65	160
Kutki	55-60	160
Majitho	5—6	25-30
Musli	9—10	40-42
Nirmasi	0.500-0.800	250-130
Okhar bokra	2-2.2	125-130
Padamchal	9—10	40-45

Pakhanbet	22-24	14-15
Panchaunle	0.8-1	1000-1200
Pipla	35-40	110-130
Ritha	300-320	12--14
Salamdana	10	90-110
Satuwa	4-5	160
Sikakai	80-85	13-15
Somlata	15-16	40-45
Sugandhawala	80-100	150
Sugandhakokila	60-70	65-75
Tejpat	80-90	12--14
Tigedi	3	60-70
Timur	140-145	70-75

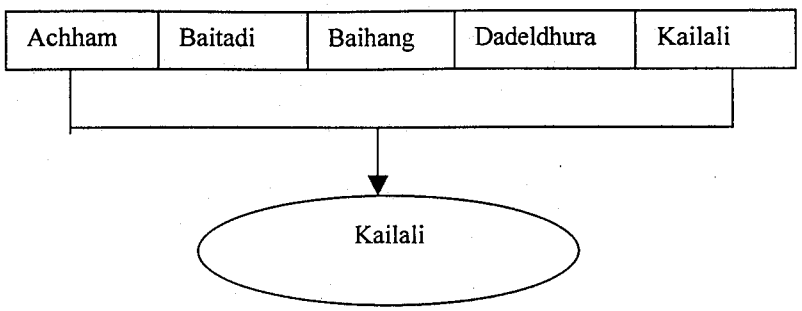
Table 1.35 Quantitative Information on NTFPs obtained from the Trade Centre/Traders, Birendranagar, Surkhet district (2001/02)

Major NTFPs In trade	Total quantity traded (MT)	Buying price Rs. /Kg	Supplying Area
Bojho	3.500	15-18	Surkhet, Salyan
Dalchini	3.000	20-25	Surkhet
Kurilo	12.000	130-140	Surkhet
Pakhanbed	2.000	5—6	Surkhet, Salyan
Ritha	9.000	7—8	Surkhet
Samayo	1.800	50-55	Surkhet, Salyan
Tejpat	1.000	10—11	Surkhet
Timur	10.000	60-65	Salyan

Table 1.36 Quantitative Information on NTFPs from the Trade Center/Traders-Chhinchu, Surkhet district (2001/02) Rs./ Kg.

Major NTFPs In trade	Total quantity traded.(MT)	Buying price Rs. /Kg	Supply Area
Bojho	2.500	15	Surkhet, Salyan
Dalchini	4.000	25	Surkhet
Kurilo	8.000	140	Surkhet
Pakhanbed	1.200	5	Surkhet, Salyan
Ritha	12.000	7	Surkhet
Samayo	1.800	50	Surkhet, Salyan
Tejpat	1.200	10	Surkhet
Timur	13.000	60	Salyan

Table 1.37 Quantitative Information on NTFPs from the Trade Centre/Traders- Attaria, Kailali district (2001/02)



Major NTFPs In trade	Total quantity Traded (MT)	Buying price Rs. /Kg
Bojho	5000	15-20
Chutro	2000	140
Dalchini	8000	45-50
Majitho	300	50-55
Pakhanbed	2000	12-14
Ritha	8500	10
Samayo	8500	80-85
Tejpat	18000	18-22
Total	**52300**	

Table 1.38 Export of tropical NTFPs/MAPs to India from Nepalganj recorded by Nepalganj Chamber of Commerce and Industry

Nepali name	Botanical name	Part	Quantity	
			F.Y. 1998/99	F.Y. 1999/2000
Dalchini	Cinnamomum tamala	Bark		3.050
Jhyau	Lichen spp.	Thallus		14.260
Ritha	Sapindus mukorossi	Fruit	187.561	104.000
Tejpat	Cinnamomum tamala	Leaf	11.650	5.700
Jadibuti	Medicinal herbs	-	852.550	288.110

Table 1.39 Export of tropical NTFPs/MAPs to India from Nepalganj recorded by Jadibuti Association of Nepal (JABAN), Nepalganj, Banke district

Nepali name	*Botanical name*	Part	Quantity (MT)	
			F.Y. 1998/99	F.Y. 1999/2000
Amala	*Phyllanthus emblica*	Fruit	21.45	11.376
Bet ko phul	*Calamus tenuis*	Flower	1.10	
Bhorla ko bokra	*Bauhinia vahlii*	Bark	7.10	-
Bojho	*Acorus calamus*	Rhizome	2.94	2.361
Budhani	*Lichen* spp.	Thallus		11.235
Dalchini	*Cinnamomum tamala*	Bark	1.85	22.097
Ghodbach	*Acorus calamus*	Rhizome	0.20	-
Jiwanti	*Ephemerantha macrae*	Plant	3.10	1.325
Kurilo	*Asparagus racemosus*	Root	39.52	56.837
Musli	*Curculigo orchioides*	Root		7.230
Pakhanbed	*Bergenia ciliata*	Root	198.94	18.690
Ritha	*Sapindus mukorossi*	Fruit	211.49	296.370
Sikakai	*Acacia rugata*	Fruit	22.46	71.950

Table 1.40 Processing of tropical NTFPs by Natural Products Industries, Jawabari, Kapilbastu district during the fiscal year 2001/02

Nepali name	*Botanical name*	Part Used	Quantity Processed (MT)	Product
Bojho	*Acorus calamus*	Rhizome	20.000	Essential oil
Jhyau	*Lichen* spp.	Thallus	40.000	Resinoid
Sugandhakokila	*Cinnamomum glaucescens*	Fruit	50.000	Essential oil

Table 1.41 Processing of tropical NTFPs by Bahubali Herbal Essence Pvt. Ltd, Nepalgunj Banke district during the fiscal year 2001/02

Nepali name	Botanical name	Part used	Quantity processed (MT)	Product
Bojho	Acorus calamus	Rhizone	1.750	Essential oil
Sugandhakokila	Cinnamomum glaucescens	Fruit	1.100	Essential oil

Table 1.42 Export of NTFPs from Kakarvitta Customs Office, Jhapa district

Name of NTFPs	Quantity (ton)				Royalty (Rs)			
	1998/99	1999/2000	2000/01	2001/02	1998/99	1999/2000	2000/01	2001/02
Amriso	5332.000	6183.000	6259.335	5277.000	255382	30932	312736	297278
Bamboo	835.000	345.000	23360.000	0.000	49.75	18	1911	0
Jadibuti	42.912	57.363	68.000	832.558	5279	5847	11752	49635
Resin & Turpentine	0.000	251.266	418.075	628.930	0	36970	56954	103837
Sugandhakokila oil	0.000	0.000	0.000	2.090	0	0	0	3430
Sutho	0.000	0.000	0.000	341.505	0	0	0	41020
Tarpin tel	0.000	0.000	0.000	33.925	0	0	0	3285
Tejpat	0.050	3.300	7.885	10.100	2675	151	391	1010
Total	**6209.962**	**6839.929**	**30113.3**	**7126.108**	**263385.8**	**73918**	**383744**	**499495**

Table 1.43 Export of NTFPs from Biratnagar Customs Office, Morang district

Name of NTFPs	Quantity (ton)			Royalty (Rs)		
	1999/2000	2000/01	2001/02	1999/2000	2000/01	2001/02
Amriso	40.911	47.723	154.612	1161	1398	7602
Chiraito	74.757	54.710	12.632	10261	10029	2170
Jadibuti (including Lohan)	19.205	0.000	0.000	1790	0	0
Jadibuti	0.000	0.650	0.000	0	178	0
Katha	0.000	0.000	12.000	0	0	60000
Majitho	25.145	31.316	16.309	2675	3572	1079
Resin	68.555	204.206	48.316	11800	40416	10364
Ritha	131.737	43.982	0.000	7497	2740	0
Rudraksha	94.615	44.940	51.080	7915	3923	3640
Tejpat	0.000	0.000	4.291	0	0	478
Total	**454.925**	**427.527**	**299.24**	**43099**	**62256**	**85333**

Table 1.44 Export of NTFPs from Bhantabari Customs Office, Sunsari district

Name of NTFPs	Quantity (ton)			Royalty (Rs)		
	1999/2000	2000/01	2001/02	1999/2000	2000/01	2001/02
Amriso	0.000	96040.450	0	0	186000	0
Bamboo	0.000	875.000	0	0	16000	0
Bel	0.000	2.000	0	0	2900	0
Bet	0.000	3.190	0	0	3300	0
Jadibuti	104.129	73.393	0	675750	1093000	0.
Katha	0.000	0.020	0	0	300	0
Pater	2.200	0.000	0	1100	0	0
Ritha	0.000	0.150	0	0	300	0
Tejpat	13.700	1.000	0	1245	3000	0
Total	**120.029**	**96995.200**	**0**	**678095**	**1304800**	**0**

Table 1.45 Export of NTFPs from Sarlahi Customs Office, Sarlahi district (F. Y. 2000/2001)

Name of NTFPs	Quantity (MT)	Royalty
Chiraito	2.036	1100
Haleso	2.500	1200
Halik	2.500	1200
Jiwanti	1.100	500
Kurilo Jara	16.600	9300
Majitha	7.000	3500
Nirmasi	0.026	200
Somlata	1.000	500
Tapari	2.300	1150
Total	**35.062**	**18650**

Table 1.46 Exports of NTFPs from Vittamor Customs office, Mahottari district

	Name of NTFPs	Quantity (MT)			Revenue (Rs.)		
		2000/01	2001/02	2002/03	2000/01	2001/02	2002/03
1	Ritha	26.035	0.320	0	39225	9600	
2	Dried ginger	95.000	5.302	0	218621	2200	
3	Ginger	92.600	9.560	0	82500	128605	
4	Jiwanti	0	0	26035.000	0	0	18800

Table 1.47 Export of NTFPs from Gaur Customs Office, Rhutahat district

Name of NTFPs	Quantity (MT)		Royalty (Rs)	
	1999/2000	2000/01	1999/2000	2000/01
0Jiwanti	5.200	1.500	15600	45000
Babiyo	4.00	13.000	160000	130000
Bhorla ko Bark	0.000	0.500	0	5000
Bish jara	0.128	0.000	7040	0
Bisfej	0.100	0.000	20000	0
Bisfej & Kurilo jara	2.500	0.000	8200	0
Chiraito	11.655	1.000	136400	30000
Chiraito & nirmasi	0.000	1.080	0	11540
Jadibuti	4.142	0.250	35420	7500
Katha	2.220	0.000	518900	0
Khas, Chulthya & Nirmasi	0.000	0.365	0	1500
Kurilo jara	17.462	2.375	221070	63000
Musli & Yaklyabir	0	3.70	0	11100
Nepali Jadibuti	31.348	0.700	17457	2100
Nirmasi	1.298	7.880	40928	23660
Nirmasi,Chiraito & Amalbed	0.389	0.000	7700	0
Pawan bark	0.000	1.500	0	15000
Pawan bark & Kurilo jara	0.000	1.500	0	4500
Sikakai	18.029	0.000	52360	0
Simal ko Khoto	3.400	0.000	17275	0
Total	**101.871**	**35.35**	**1258350**	**349900**

Table 1.48 Export of NTFPs from Birgunj Customs Office, Parsa district

Export to India

Name of NTFPs	Quantity (MT)				Royalty(Rs)			
	1998/99	1999/2000	2000/01	2001/02	1998/99	1999/2000	2000/01	2001/02
Jadibuti	236.000	176.636	68.081	0.000	3733000	3948000	1814000	0
Kutch	145.300	170.275	3.000	184.960	16005000	6177000	504000	79407000
Katha	117.700	173.288	193.300	104.445	51439000	132173000	67662000	5417000
Resin	0.000	17.600	0.000	0.000	0	12640000	0	0
Total	**499.000**	**537.799**	**264.381**	**289.405**	**71177000**	**154938000**	**69980000**	**84824000**

Export to Overseas

NTFPs	Quantity (ton)/ Revenue (Rs)					
	1999/2000		2000/01		2001/02	
Chiraito	4.500	2949750	11.520	4561816	4.000	2193801
Rudrakcha	3.859	551.87	0	0	0	0
Others	0	0	0	0	5.000	1053241
Total	**8.359**	**3501437**	**11.520**	**4561816**	**9.000**	**3247042**

Table 1.49 Export of NTFPs from Bhairahawa Customs Office, Rupandehi district

NTFPs	Quantity (ton)			Revenue (Rs '000')		
	1999/2000	2000/01	2001/02	1999/2000	2000/01	2001/02
Cardamom	0	14.105	403.623	0	9844	199076
Dalchini	78.094	34.920	18.960	8606	3830	2086
Jadibuti	158.724	194.732	0.018	10765	18220	5363
Timur	54.360	1.210	0.018	2734	67	536
Total	**291.178**	**244.967**	**422.691**	**22105**	**31961**	**207016**

Table 1.50 Export of NTFPs from Krishnanagar Customs Office, Kapilbastu district

Name Of NTFPs	Quantity (MT)					Revenue (Rs)				
	1997/98	1998/99	1999/ 2000	2000/01	2001/02	1997/98	1998/99	1999/ 2000	2000/01	2001/02
Babiyo	0	0	0	0	4	0	0	0	0	20
Bhorla pat	0	0	0	0	6	0	0	0	0	30
Jadibuti	93.792	148.911	164.359	157.482	87.454	3009826	4692000	7641000	6124000	3592000
Tendu Leaf	0	0	0	0	30	0	0	0	0	150
Thakal	0	0	0	0	5	0	0	0	0	25
Total	**93.792**	**148.911**	**164.359**	**157.482**	**132.454**	**3009826**	**4692000**	**7641000**	**6124000**	**3592225**

Note: Jadibuti include Chiraito, Kurilo jara, Titepati, Timur, Dalchini, Ritha, Amalbed, Pakan bed, Padmachal, Jiwanti, Majitho, and Kaladana

Table 1.51 Export of NTFPs from Nepalgunj Customs Office, Banke district

NTFPs	Quantity MT)						
	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	Total
Amala	33.638	28.750	25.000	22.500	17.800	11.873	**139.561**
Amalbed	30.267	46.267	33.048	30.555	35.158	25.113	**200.408**
Atis	9.960	9.309	6.206	7.053	7.759	3.291	**43.578**
Bhutkesh	51.650	64.563	43.042	48.911	53.756	27.348	**289.270**
Bojho	4.144	64.563	2.832	3.255	3.611	1.741	**80.146**
Chiraito	52.113	49.632	33.088	37.600	30.672	19.720	**222.825**
Chyau	9.582	11.375	3.900	4.840	4.980	3.379	**38.056**
Dalchini	57.550	54.810	45.676	51.905	41.953	21.116	**273.010**
Jatamasi	57.336	88.210	66.315	75.358	85.452	56.968	**429.639**
Jatamasi ko tel (litre)	0.620	1.433	1.113	7.544	2.641	1.481	**14.832**
Kakadsinghi	12.124	10.010	7.700	8.850	10.055	5.077	**53.816**
Kaladana	0.375	0.452	0.340	0.825	1.233	0.725	**3.950**
Kurilo	59.162	71.280	53.594	60.905	60.252	38.835	**344.028**
Others	10.736	26.374	31.111	36.704	26.064	15.575	**146.564**
Padamchal	6.244	6.938	5.216	5.892	8.710	3.941	**36.941**
Pakhanbed	44.320	40.291	26.861	30.524	33.433	23.881	**199.310**
Ritha	214.293	370.705	354.551	37.4197	397.525	238.350	**1949.621**
Satuwa	9.802	11.810	8.748	10.055	8.340	3.560	**52.315**
Sikakai	123.744	112.494	83.329	95.781	100.376	80.301	**596.025**
Tejpat	4.063	8.808	6.525	11.680	5.425	2.170	**38.671**
Timur	44.149	237.867	176.198	200.255	193.231	138.821	**990.521**
Titepati	2.860	2.288	1.720	2.355	4.220	3.220	**16.663**
Total	**838.732**	**1318.229**	**1016.113**	**1127.544**	**1132.646**	**726.486**	**6159.750**

Table 1.52 Export of NTFPs to India from Dhangadi Customs Office, Kailali district

NTFPs	Quantity (MT)	
	2000/01	2001/02
Bet	6.700	4.980
Jadibuti	0.000	3.925
Kubhindo	0.000	18.050
Ramdana	42.512	1.692
Ritha	55.960	51.120
Sallako Khoto	2551.146	2299.388
Tejpat	12.250	0
Total	**2668.568**	**2424.155**

Table 1.53 Export of NTFPs from Manendranagar Customs Office, Kanchanpur district

NTFPs	Quantity (MT)		
	2000/01	2001/02	Total
Bet	140.165	0.769	140.934
Jadibuti	231.000	318.205	549.205
Total	**371.165**	**318.974**	**690.139**

Table 1.54 Information on export of NTFPs obtained from the Custom Department (FY 1997/1998)

NTFPs	Value Rs in '000'	Country
Bamboos	857	India
Betel leaves	2	India
Derivatives of rosin and resin acid	102516	India
Gum, wood or sulphate turpentine oils	20576	India
Lac, natural gums, resin, gum resin and balsams	599	India
Mahuwa	6	India
Pine oil containing alpha- turpined	28	India
Rosin	13	Srilanka
Rosin	272728	India
Sabai Grass	256	India
Vegetable materials of a kind used for painting	685	India

Table 1.55 Information on export of NTFPs obtained from the Custom Department (FY 1998/1999)

NTFPs	Value in Rs '000'	Country
Bamboos	334	India
Lac, natural gums, resin, resin gums, and balsams	22018	India
Natural gum Arabic	1514	India
Other plant or parts, of a kind used in perfumery, pharmacy	191	India
Other plant or parts, of a kind used in perfumery, pharmacy	2028	France
Other plant or parts, of a kind used in perfumery, pharmacy	1201	Italy
Other plant or parts, of a kind used in perfumery, pharmacy	4369	Germany
Other plant or parts, of a kind used in perfumery, pharmacy	58103	India
Other plant or parts, of a kind used in perfumery, pharmacy	498	Pakistan
Other plant or parts, of a kind used in perfumery, pharmacy	1537	Japan
Other plant or parts, of a kind used in perfumery, pharmacy	8	Korea
Other plant or parts, of a kind used in perfumery, pharmacy	10	Australia
Rattans	111	India
Vegetable materials for painting (Bamboo, Rattans)	2296	India

Table 1.56 Information on export of NTFPs obtained from the Customs Department (F.Y. 1999/2000)

SN	NTFPs	Value in Rs '000'	Country
1.	Bamboos	645	India
2.	Lac	802	India
3.	Lac, natural gums, resin, gum resin, and balsams	4401	India
4.	Other plant or parts, of a kind used in perfumery, pharmacy	359	Norway
5.	Other plant or parts, of a kind used in perfumery, pharmacy	3152	Germany
6.	Other plant or parts, of a kind used in perfumery, pharmacy	655	U. K
7.	Other plant or parts, of a kind used in perfumery, pharmacy	212	Sweden
8.	Other plant or parts, of a kind used in perfumery, pharmacy	32781	India
9.	Other plant or parts, of a kind used in perfumery, pharmacy	3288	Pakistan
10.	Other plant or parts, of a kind used in perfumery, pharmacy	2090	Tibet
11.	Other plant or parts, of a kind used in perfumery, pharmacy	640	Bangladesh
12.	Other plant or parts, of a kind used in perfumery, pharmacy	265	China
13.	Other plant or parts, of a kind used in perfumery, pharmacy	1822	Japan
14.	Other plant or parts, of a kind used in perfumery, pharmacy	22	Australia
15.	Other plant or parts, of a kind used in perfumery, pharmacy	14	Taiwan
16.	Sabai grass (Babiyo or Bankas)	31	India
17.	Vegetable materials for painting (Bamboos and Rattans)	895	India

Table 1.57 Information on export of NTFPs from the Customs Department (F.Y. 2000/2001)

NTFPs	Value in Rs '000'	Country
Bamboos	605	India
Bee wax, other insect waxes and spermaceti	495	India
Cinnamon and Cinnamon-tree flower, neither crushed and grounded	167	India
Cinnamon and Cinnamon-tree flower, neither crushed and grounded	12	India
Lac	67	India
Liquorices roots, of a kind used in perfumery, pharmacy etc.	843	China
Mosses and lichens for ornamental purposes	1099	Japan
Natural gums, resins, gum-resin, natural oleoresesins & balsams	5316	India
Opium	356	India
Other plants or parts, of a kind used in perfumery, pharmacy etc.	293	France
Other plants or parts, of a kind used in perfumery, pharmacy etc.	1664	U.S.A.
Other plants or parts, of a kind used in perfumery, pharmacy etc.	8	Taiwan
Other plants or parts, of a kind used in perfumery, pharmacy etc.	3940	Tibet
Other plants or parts, of a kind used in perfumery, pharmacy etc.	904	Singapore
Other plants or parts, of a kind used in perfumery, pharmacy etc.	156	Sweden
Other plants or parts, of a kind used in perfumery, pharmacy etc.	679	Pakistan
Other plants or parts, of a kind used in perfumery, pharmacy etc.	9	S. Korea
Other plants or parts, of a kind used in perfumery, pharmacy etc.	68510	India
Other plants or parts, of a kind used in perfumery, pharmacy etc.	9338	Germany
Other plants or parts, of a kind used in perfumery, pharmacy etc.	1588	China
Other plants or parts, of a kind used in perfumery, pharmacy etc.	181	Italy
Rattans	16	India
Vegetable materials for painting (bamboos and rattans)	2481	India

Table 1.58 Information on export of NTFPs to Overseas Countries based on Trade Promotion Centre (TPC) records

S.N.	Name of NTFPs	Quantity (kg)				Value (Rs)			
		2001/2002	2000/2001	1999/2000	1998/1999	2001/2002	2000/2001	1999/2000	1998/1999
1	Mosses & Lichens		3.000	0	0		1099561	0	0
2	Cinnamon		10.000		0		2637039	0	0
3	Spices		---	---	0	254541	1158803	9862	0
4	Plant and plant Parts (Seeds & Fruits)		---	---		16224986	10494027	6663176	12523509
5	Natural Gums & Resin		---	0	---		19354	0	12369717
6	Tanning/ Dying Extract		---	0	0		66485		00
7	Essential oil & Resinoids		---	---	0	27611405	26913119	57789310	0
8	Essential oil	0.163	0.077	1.032	0	587023	390338	3116147	0
9	Lemongrass oil	3.800	0.296	0.161	1.040	1030552	352203	377638	913999
10	Wintergreen oil	0.225	0.724	0.012	0.805	320530	1175842	14000	1303858
11	Citronella oil	0.100	0.125	0.210	0.497	89125	98107	109498	381485
12	Palmarosa oil	0.055	0.427	0.289	0.468	44095	731991	423994	980068
13	Camomile oil	0.033	0.099	0.713	0.065	143263	1165866	4405534	1068185
14	French Basil oil	0.060	0.030	0.010	0.030	76896	187180	57830	170611
15	Mentha oil	0.005	0.115	0	0	22010	567024	0	0
16	Rhododendron oil		0.494	0	0.200		1727796	0	2278200
17	Artemisia oil		0.085	0	0		245276	0	0
18	Honey		0	---	0		0	16610109	0
19	Lycopodium powder	9.350	0	5.140	9.624	3852453	0	2848447	3625172
20	Juniper oil	0.135	0	0.005	0	923056	0	15601	0
21	Zanthoxylum oil	0.030	0	0.002	0.040	47859	0	3500	180649
22	Dry Mushroom & truffles		0	0	0.074		0	0	551278
23	Chirata		0	0	4.000		0	0	1047293
24	Mentha arvensis oil	0.275	0	0	0.065	178321	0	0	130487
25	Abies oil		0	0	0.150		0	0	988227
26	Lac		0	0	---		0	0	443361
27	Rattan		0	0	---		0	0	1453267
28	Lac, Gums & Resin		---	---	---	3852453	1780617	2848407	64269431

Note: The Overseas Countries includes: Japan, Bangladesh, Hong Kong, Korea, Pakistan, Singapore, Taiwan, United State of America, French, Germany, Italy, Sweden, Switzerland, Spain, Czech- Republic, Australia, Austria, New Zealand, and Hungary

Table 1.59 Information on export of NTFPs to India based on Nepal Rastra Bank (NRB) records (F.Y. 1999/2000) Quantity in MT

Trade name	1998/99	1999/00	% Change in value
Broom	51. 400	48. 800	-5.1
Cardamom	233. 400	207. 200	-11.2
Catechu	117. 300	199. 000	-69.7
Cinnamomum	1. 400	0	-100.0
Dried ginger	41. 100	58. 800	38.2
Ginger	151. 700	139. 600	-8.0
Herbs	31.400	43. 100	37.3
Rosin	92. 700	173. 900	87.6
Turpentine	40. 700	13. 000	-68.1

Source: Nepal Rastra Bank (2000)

Table 1.60 Estimated annual import of NTFPs/herbs from Nepal by the Delhi Market (F.Y.2001/02)

Major NTFPs imported from Nepal		Buying rate (IRs/kg)	Annual Import from Nepal (MT)
Amala	*Phyllanthus emblica*	30-35	200
Amalbed	*Rheum australe* (petiole)	90	40
Atis	*Aconitum heterophyllum*	1000	12
Atis Nepali	*Delphinium himalayai*	250	15
Bhorla	*Bauhinia vahlii* (bark)	20-22	250
Bish (Mitha jahar)	*Aconitum ferox*	100	8
Bisphase	*Popypodium vulgare*	54	55
Bojho	*Acorus calamus*	25	120
Chiraito (Mitha)	*Swertia* spp.	30-35	400
Chiraito (Tita)	*Swertia chirayita*	150-160	225
Dalchini	*Cinnamomum tamala* (bark)	28-30	220
Dhup lakad	*Jurinea dolomiaea*	70	300
Gucchi	*Morchella conica/ M. esculenta*	3400	7
Jatamansi	*Nardostachys grandiflora*	100-110	180
Jhyau	*Lichen sp.*	40-50	300
Jiwanti	*Ephemerantha macraei*	65	350
Kakadsingi	*Pistacia chinensis*	125	8
Kakoli	*Fritillaria cirrhosa*	55	12
Kaphal	*Myrica esculenta* (bark)	20	50
Kutki	Picrorhiza scrophulariiflora	160-180	400
Majitho	*Rubia manjith*	35	325
Okhar bokra	*Juglans regia*	100-150	225
Padamchal	*Rheum australe*	35-40	15
Pakhanbed	*Bergenia ciliata*	17	300
Panchaunle	*Dactylorhiza hatagirea*	1200	1
Pipla	*Piper longum* (Fruit)	85	10
Pipla mul	*Piper longum* (Root)	120-125	15
Ritha	*Sapindus mukorossi*	10-11	700
Salamdana	*Brachycorythis obcordata*	90	8
Sarpagandha	*Rauvolfia serpentina*	200-225	50
Satawar	*Asparagus racemosus*	100-160	300
Satuwa	*Paris polyphylla*	160-200	16
Sikakai	*Acacia rugata*	30	300
Sugandhakokila	*Cinnamomum glaucescens*	60-65	150
Sugandhawal	*Valeriana jatamansii*	90-95	120
Tejpat	*Cinnamomum tamala* (leaf)	24	350
Timur	*Zanthoxylum armatum*	60-70	75

Table 1.61 Estimated Annual Import of NTFPs from Nepal by the Indian Trade Center, Lucknow, India

NTFPs	Quantity Imported (ton)	Total Demand (ton)
Dalchini	100.000	
Dried Genger	100.000	
Ginger oil	---	500
Jatamasi oil	70.000	---
Lemongrass oil	---	600
Lichen	10.000	
Pakhanbed	70.000	
Palmarosa oil	40.000	---
Ritha	120.000	
Satawari	7.000	
Sikakai	15.000	
Timur	30.000	
Total	552.000	

Source: Trade Centre Survey Record, 2002

Table 1.62 Estimated Annual Import of NTFPs from Nepal by the Indian Trade Center, Kanpur, India

NTFPs	Quantity (ton)	Route
Dalchini	25.000	Via Krishana Nager
Dried Ginger	40.000	Via Krishana Nager
Jatamasi	7.000	Via Krishana Nager
Jatamasi oil	3.000	Via Krishana Nager
Satawari	20.000	Via Krishana Nager
Sugandha Kokila	6.000	Via Krishana Nager
Timur	30.000	Via Krishana Nager
Wintergreen oil	0.600	Via Krishana Nager
Total	**131.600**	

Source: Trade Centre Survey Record, 2002

Table 1.63 Annual Import of NTFPs from Nepal by Indian Trade Center, Kannauj, India

NTFPs	Quantity Imported (ton)	Total Demand (ton)
Jatamasi	20.000	---
Jatamasi oil	0.250	---
Lichen	10.000	100.000
Sugandha kokila oil	0.200	---
Sugandhakokila (fruit)	6.000	100.000

Source: Trade Centre Survey Record, 2002

Table 1.64 Estimated annual import of NTFPs/herbs from Nepal by Tanakpur Traders, India

Major NTFPs imported froms Nepal		Buying rate (Irs/kg)	Annual Import from Nepal (MT)
Amala	*Phyllanthus emblica*	30	90
Atis	*Aconitum heterophyllum*	850	5
Bhorla	*Bauhinia vahlii* (bark)	15-18	200
Bojho	*Acorus calamus*	20	20
Chiraito (Mitha)	*Swertia* spp.	20-25	80
Chiraito (Tita)	*Swertia chirayita*	100-120	30
Dalchini	*Cinnamomum tamala* (bark)	30-35	50
Dhup lakad	*Jurinea dolomiaea*	55-60	50
Jatamansi	*Nardostachys grandiflora*	100	80
Jhyau	Lichen spp.	50	140
Kakadsingi	*Pistacia chinensis*	110-120	4
Kutki	*Neopicrorhize scrophulariifolia*	100-125	80
Majitho	*Rubia manjith*	28-30	80
Okhar bokra	*Juglans regia*	110	50
Padamchal	*Rheum australe*	30-35	8
Pakhanbed	*Bergenia ciliata*	13-15	120
Pipla	*Piper longum* (Fruit)	70-80	3
Pipla mul	*Piper longum* (Root)	100	6
Ritha	*Sapindus mukorossi*	10	350
Salamdana	*Brachycorythis obcordata*	75-80	2.5
Sarpagandha	*Rauvolfia serpentina*	190-210	15
Satawar	*Asparagus racemosus*	100-125	80
Satuwa	*Paris polyphylla*	120-150	5
Sikakai	*Acacia rugata*	20-25	60
Sugandhawal	*Valeriana jatamansii*	60-65	90
Tejpat	*Cinnamomum tamala* (leaf)	20	120
Timur	*Zanthoxylum armatum*	55-60	10

Source: Trade Centre Survey Record, 2002

Table 1.65 Estimated Annual Import of NTFPs/herbs from Nepal by the Kolkotta Traders, India (F. Y. 2000/01)

Name of NTFPs	Quantity sold (Tons)	Rate Rs./Kg	Rate Rs./Kg
Alainchi *(Amomum subulatum)*	60	250	260
Amala *(Phyllanthus emblica)*	100	40	48
Chiraita *(Swertia chirayita)*	30	300	250
Kurilo *(Asparagus racemosus)*	1	150	200
Majitho *(Rubia manjith)*	100	33	36
Ritha *(Sapindus mukurossi)*	100	12	13
Timur (Zanthoxylum armatum)	60	90	95

Source: Trade Centre Survey Record, 2002

Table 1.66 Estimated Import of NTFPs/herbs from Nepal by Kolkotta Traders, India (F. Y. 2001/02)

S.No.	Products	Latin Name	Parts used	Market Price NRs./Kg	Qty. traded (Tons)
1	Alainchi	*Amomum subulatum*	Fruit, seed	400	20
2	Amala	*Phyllanthus emblica*	Dried fruit	60	30
3	Atis	*Aconitum heterophyllum*	Root	560	2
4	Bojho	*Acorus calamus*	Root	48	10
5	Chiraita	*Swertia chiraiyta*	Whole plant	272	10
6	Jatamansi	*Nardostachys grandiflora*	Rhizome	168	5
7	Kakarsinghi	*Pistacia chinensis*	Gull	208	2
8	Majitho	*Rubia cordifolia*	Stem, root	48	-
9	Rittha	*Sapindus mukorossi*	Fruit	16	50
10	Satawari	*Asparagus racemosus*	Root, Shoot	112-208	20
11	Satuwa	*Paris polyphylla*	Tuber & root	-	10
12	Sikakai	*Acacia rugata*	Dried fruit	36.8	35
13	Silajit	-	Rock exude	240	2
14	Sugandwal	*Valeriana jatamansii*	Root	160	5
15	Suntho	*Zingiber officinale*	Rhizome	48	50
16	Timur	*Zanthoxylum armatum*	Fruit	140	20

Table 1.67 Estimated Import of NTFPs/herbs from Nepal by Siliguri Traders, India (F.Y. 2000/01)

Name of NTFPs	Quantity sold (tons)	Rate Rs./Kg
Alainchi *(Amomum subulatum)*	60	232-250
Chiraita (Swertia chirayita)	30	250-300
Kurilo (*Asparagus racemosus*)	1	150-200
Majitho *(Rubia manjith)*	100	32-35
Ritha (Sapindus mukurossi)	20	10

Source: Various traders

Table 1.68 Estimated Import of NTFPs/herbs from Nepal by the Siliguri Traders, India (F. Y. 2001/02)

Products	Latin Name	Parts used	Market Price NRs./Kg	Qty. traded (Tons)
Alainchi	*Amomum subulatum*	Fruit, seed	230	100-150
Chiraita	*Swertia chirayita*	Whole plant	240	35
Majitho	*Rubia manjith*	Stem, root	45	60-120
Pipla	*Piper longum*	Fruits	90	10-20
Rittha	*Sapindus mukorossi*	Fruit	16	100-180
Satawari	*Asparagus racemosus*	Root, Shoot	125-200	20-25
Timur	*Zanthoxylum armatum*	Fruit	130	25-30

P/s: Prices indicated above are for dried parts. * Ban on export in crude form

Annex 2

NTFPs in Sunsari District, Eastern Nepal

1. Disturbed forest site

Macroplot I. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Anogeissus latifolia	Banjhi	4	132	
Cassia fistula	Rajbriksha	3	21	
Cordia oblique	Auiliya	20		
Dalbergia latifolia	Sati sal	2	78	
Duabanga grandiflora	Ban khirro	1	45	
Ehretia laevis	Daturango	3		
Myrisine semiserrata	Kali kath	4	23	
Shorea robusta	Sal	5	57	
Terminalia bellirica	Barro	1	68	Dominant

Microplot: 1 (1 cm^2)

Botanical Name	Local Name	Stand density/m^2
Bidens biternata	Late kuro	3
Caesalpinia decapitala	Areli kanda	1
Cordia oblique	Auiliya	7
Dalbergia latifolia	Sati sal	1
Desmodium laxiflorum	Vatte	3
Eupatorium odoratum	Ban mara	13
Mimosa pudica	Lajjabati	1
Saccharum spontaneum	Siru khar	40
Shorea robusta	Sal	2
Terminalia bellirica	Barro	2

Microplot: 2 (1 cm^2)

Botanical Name	Local Name	Stand density/m^2
Bidens biternata	Late kuro	3
Cordia oblique	Auiliya	5
Dalbergia latifolia	Sati sal	1
Desmodium laxiflorum	Vatte	5
Eupatorium odoratum	Ban mara	3
Saccharum spontaneum	Siru khar	20
Smilax racemosus	Kukurdaino	1
Terminalia bellirica	Barro	5
Unidentified I		1

Microplot: 3 (1 cm^2)

Botanical Name	Local Name	Stand density/m^2
Bidens biternata	Late kuro	2
Cordia oblique	Auiliya	7
Cornus oblonga	Lati kath	1
Desmodium laxiflorum	Vatte	7
Eupatorium odoratum	Ban mara	6
Lippia nudiflora	Kurkure jhar	1
Mimosa pudica	Lajjabati	1
Mucuna pruriens	Kauso	1
Paris polyphylla	Satuwa	2
Saccharum spontaneum	Siru khar	70
Shorea robusta	Sal	2

Microplot: 4 (1 cm^2)

Botanical Name	Local Name	Stand density/m^2
Bidens biternata	Late kuro	4
Cordia oblique	Auiliya	6
Eupatorium odoratum	Ban mara	10
Leea robusta	Galeni	1
Saccharum spontaneum	Siru khar	64
Shorea robusta	Sal	4
Unidentified I		1

Macroplot II. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Adina cordifolia	Karma	1	89	Dominant
Cassia fistula	Raj briksha	2	21	
Lagerstroema parviflora	Bot dhayaro	1	23	
Mallotus Philippensis	Sindhure	2	44	
Myrisine semiserrata	Kali kath	3		
Oroxylum indicum	Tatari	1		
Schleichera oleosa	Kusum	1	54	
Shorea robusta	Sal	7	89	
Toddalia asiatica	Mainkanda	1		
Viburnum sp.	Aasare	4		

Microplot: 1 (1 cm^2)

Botanical Name	Local Name	Stand density/m^2
Bidens biternata	Late kuro	1
Eupatorium odoratum	Ban mara	6
Mallotus Philippensis	Sindhure	2
Marsdenia tinctoria	Dudhe lahara	3
Saccharum spontaneum	Siru khar	22
Smilax racemosus	Kukurdaino	1
Toddalia asiatica	Mainkanda	3

Microplot: 2 (1 cm^2)

Botanical Name	Local Name	Stand density/m^2
Bidens biternata	Late kuro	9
Cordia obliqua	Auiliya	1
Curcuma angustifolia	Ban besar	1
Desmodium laxiflorum	Vatte	3
Dioscorea sp.	Ban tarul	1
Eupatorium odoratum	Ban mara	2
Hade /Nepali name		2
Leea robusta	Galeni	1
Lippia nudiflora	Kurkure jhar	1
Marsdenia tinctoria	Dudhe lahara	2
Myrisine semiserrata	Kali kath	2
Shorea robusta	Sal	3

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bidens biternata	Late kuro	5
Cordia obliqua	Auiliya	8
Desmodium laxiflorum	Vatte	1
Duabanga grandilora	Ban khirro, Lampate	1
Eupatorium odoratum	Ban mara	10
Persea odoratissima	Kaulo	1

Microplot: 4 (1 cm^2)

Botanical Name	Local Name	Stand density/m^2
Bidens biternata	Late kuro	3
Cordia obliqua	Auiliya	5
Eupatorium odoratum	Ban mara	2
Leea robusta	Galeni	4
Lippia nudiflora	Kurkure jhar	6
Myrisine semiserrata	Kali kath	1
Phoenix humilis	Thakal	2
Schleichera oleosa	Kusum	1
Shorea robusta	Sal	9
Tetrastigma serulatum	Pani lahara	1

Macroplot III. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Aegle marmelos	Bel	1	77	
Anogeissus latifolia	Banjhi	4	56	
Shorea robusta	Sal	13	289	Dominant

Microplot: 1 (1 cm2)

Botanical Name	*Local Name*	Stand density/m^2
Barleria cristata	Bhende kuro	1
Cordia obliqua	Auiliya	1
Dubanga grandiflora	Ban Khirro	1
Eupatorium odoratum	Ban mara	8
Leea robusta	Galeni	1
Myrisine semiserrata	Kali kath	1
Phyllanthus mimosoides	Amala jhar	2
Shorea robusta	Sal	6

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Aegle marmelos	Bel	1
Bidens biternata	Late kuro	3
Caesalpinia decapitala	Areli kanda	1
Eupatorium odoratum	Ban mara	2
Neolitsea umbrosa	Putali kath	1
Phyllanthus mimosoides	Amala jhar	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Anogeissus latifolia	Banjhi	1
Caesalpinia decapitala	Areli kanda	1
Cordia obliqua	Auiliya	1
Cyanotis cristata	Kane jhar	2
Dalbergia latifolia	Sati sal	1
Eupatorium odoratum	Ban mara	20
Leea robusta	Galeni	2
Shorea robusa	Sal	9

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Barleria cristata	Bhende kuro	1
Caesalpinia decapitala	Areli kanda	1
Cordia obliqua	Auiliya	3
Desmodium laxiflorum	Vatte	1
Eupatorium odoratum	Ban mara	22
Phyllanthus mimosoides	Amala jhar	1
Shorea robusta	Sal	8

2. Riverine site

Macroplot I. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Acacia rugata	Sikakai	2	32	
Adina cordifolia	Karma	5	87	
Cordia obliqu	Auiliya	4		
Hymenodictyon excelsum	Badkaulo	1		
Lagerstroemia parviflora	Sindhure	3	56	Co-dominant
Oroxylum indicum	Tatari	1	26	Dominant
Shorea robusta	Sal	2	32	

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Colebrookea oppositifolia	Dhursul	1
Desmodium laxiflorum	Vatte	3
Dioscorea sp.	Ban tarul	1
Eupatorium adenophorum	Kalo ban mara	1
Hymenodictyon excelsum	***Badkaulo***	1
Leea robusta	Galeni	1
Mimosa rubicaulis	Boksi ghans	1
Premna barbata	Ginneri	1
Shorea robusta	Sal	5

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Cochlianthus gracilis	Bhatmasi lahara	2
Cordia obliqu	Auiliya	2
Cornus oblonga	Latikath	1
Cyperus rotundus	Mothe	2
Desmodium laxiflorum	Vatte	2
Eupatorium odoratum	Ban mara	14
Grewia disperma	Syal phusre	1
Symplocus crataegoides	Kharani	6
Syzygium cumini	Jamun	5

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Desmodium laxiflorum	Vatte	2
Duabanga grandiflora	Ban khirro	1
Ehretia laevis	Daturango	1
Eupatorium adenophorum	Kalo ban mara	1
Hymenodictyon excelsum	Badkaulo	1
Schleichera oleosa	Kusum	1
Symplocus crataegoides	Kharani	12
Syzygium cumini	Jamun	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Acacia rugata	Sikakai	1
Barleria cristata	Bhende kuro	1
Bauhinia variegata	Tanki	1
Cordia obliqu	Auiliya	2
Desmodium laxiflorum	Vatte	7
Grewia disperma	Syal phusre	1
Piper longum	Pipla	10
Sapium insigne	Khirro	1
Shorea robusta	Sal	9

Macroplot II. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Albizzia chinensis	Siris	2	23	
Cordia dichotoma	Bohori	2	22	
Cordia obliqua	Auiliya	1		
Dalbergia latifolia	Sati sal	2	56	Co dominant
Myrisine semiserrata	Kali kath	2	54	
Terminalia tomentosa	Asna	1	105	Dominant
Viburnum sp.	Aasare	1		

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Cochlianthus gracilis	Bhatmasi lahara	1
Cordia obliqua	Auiliya	3
Desmodium laxiflorum	Vatte	4
Eupatorium odoratum	Ban mara	2
Hedychium sp.	Pani saro	1
Leea robusta	Galeni	3
Trichilia connaroides	Aankhtaruwa	2
Woodfordia fruticosa	Dhayaro	1

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bamboo grass	Bamboo grass	4
Cochlianthus gracilis	Bhatmasi lahara	2
Desmodium laxiflorum	Vatte	6
Eupatorium odoratum	Ban mara	6
Grewia disperma	Syal phusre	3
Leea robusta	Galeni	3
Saccharum spontaneum	Siru khar	5
Unidentified I		1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Anogeissus latifolia	Banjhi	2
Cochlianthus gracilis	Bhatmasi lahara	4
Cordia obliqua	Auiliya	2
Desmodium laxiflorum	Vatte	4
Ehretia laevis	Daturango	1
Eupatorium odoratum	Ban mara	2
Hymenodictyon exelsum	Badkaulo	2
Myrisine semiserrata	Kali kath	2
Schleichera oleosa	Kusum	2
Viburnum spp.	Aasare	2

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Antidesma diandrum	Archal	1
Cochlianthus gracilis	Bhatmasi lahara	4
Cordia dichotoma	Bohori	1
Desmodium laxiflorum	Vatte	15
Dioscorea spp.	Ban tarul	2
Eupatorium odoratum	Ban mara	10
Lagerstroemia parviflora	Botdhainyaro	2
Leea robusta	Galeni	1
Myrisine semiserrata	Kali kath	1
Piper longum	Pipla	7
Schleichera oleosa	Kusum	4
Syzygium cumini	Jamun	1
Viburnum spp.	Aasare	1

Macroplot III. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Acacia catechu	Khair	3	65	Dominant
Cassia fistula	Rajbriksha	1	32	
Colebrookea oppositifolia	Dhursul	10	13	
Origanum vulgare	Sjiuwan	2		Suppressed
Sapium insigne	Khirro	1	23	
Symplocus crataegoides	Kharani	11		

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Origanum vulgare	Sajiwan	14
Calamus tenius	Bet	2

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Colebrookea oppositifolia	Dhursul	5
Cordia obliqua	Auiliya	1
Equisetum arvensis	kurkure ghans	4
Eupatorium odoratum	Ban mara	2
Grewia disperma	Syalphusre	1
Leea robusta	Galeni	1
Mallotus Philippensis	Sindhure	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bamboo grass	Bamboo grass	14
Bidens biternata	Late kuro	12
Colebrookea oppositifolia	Dhursul	1
Eupatorium odoratum	Ban mara	2
Symplocus crataegoides	Kharane	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Eupatorium odoratum	Ban mara	1
Myrisine semiserrata	Kali kath	1
Premna barbata	Ginneri	1
Symplocus crataegoides	Kharane	12

Macroplot IV (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Acacia catechu	Khair	3	63	Dominant
Colebrookea oppositifolia	Dhursul	2	15	
Cordia obliqua	Auiliya	3		
Lagerstroemia parviflora	Bot dhayanro	5	66	
Marsdenia tinctoria	Dudhe lahara	1		
Trewia nudiflora	Pithara	2	98	

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bidens biternata	Late kuro	1
Cordia obliqua	Auiliya	1
Cornus oblonga	Lati kath	1
Cyperus rotundus	Mothe	12
Elsholzia sp.	Ban silam	26
Eragrostis tenella	Banso	12
Leea robusta	Galeni	2
Saccaharum spontaneum	Siru khar	12

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bidens biternata	Late kuro	23
Cochlianthus gracilis	Bhatmasi lahara	12
Cordia obliqua	Auiliya	3
Elsholzia sp.	Ban silam	4
Saccaharum spontaneum	Siru khar	21

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Adina cordifolia	Karma	2
Anogeissus latifolia	Banjhi	1
Bidens biternata	Late kuro	14
Elsholzia sp.	Ban silam	21
Eragrostis tenella	Banso	29
Eupatorium odoratum	Ban mara	5
Mimosa pudica	Lajjabati	4
Saccaharum spontaneum	Siru khar	15
Schleichera oleosa	Kusum	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Acacia catechu	Khair	1
Bidens biternata	Late kuro	3
Cordia obliqua	Auiliya	4
Elsholzia sp.	Ban silam	7
Eupatorium odoratum	Ban mara	3
Lagerstroemia parviflora	Bot dhayanro	1
Marsdenia tinctoria	Dudhe lahara	1
Mimosa pudica	Lajjabati	3
Saccaharum spontaneum	Siru khar	9

3. Undisturbed forest site

Macroplot I. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Cassia fistula	Raj briksha	1	54	
Gynocardia odorata	Bandre	1	58	
Mallotus Philippensis	Sindhure	3	87	
Phyllanthus emblica	Amala	2	32	
Shorea robusta	Sal	4	148	Dominant
Terminalia tomentosa	Asna	1	102	Co dominant

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Asparagus racemosus	Kurilo	2
Dalbergia latifolia	Sati sal	1
Hedychium sp.	Pani saro	2
Leea robusta	Galeni	1
Phyllanthus emblica	Amala	3
Pueraria phaseoloides	Bidari lahara	2
Saccharum spontaneum	Siru khar	14
Shorea robusta	Sal	5
Syzygium cumini	Jamun	1
Terminalia tomentosa	Asna	1

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Achyranthes aspera	Datiwan	1
Ammania auriculata	Jaruwa	3
Ardisia solanacea	Damai phal	3
Asparagus racemosus	Kurilo	1
Phyllanthus emblica	Amala	1
Pueraria phaseoloides	Bidari lahara	1
Shorea robusta	Sal	2
Terminalia tomentosa	Asna	2
Zingiber cassumunar	Ban aduwa	4

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Asparagus racemosus	Kurilo	1
Curcuma angustifolia	Ban besar	2
Dioscorea sp.	Ban tarul	4
Lagerstroemia parviflora	Bot dhanyaro	1
Leea robusta	Gale	1
Mallotus Philippensis	Sindhure	1
Saccharum spontaneum	Siru khar	2
Shorea robusta	Sal	2

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Acacia rugata	Sikakai	2
Curcuma angustifolia	Ban besar	2
Dioscorea sp.	Ban tarul	1
Phyllanthus emblica	Amala	1
Shorea robusta	Sal	2
Zingiber cassumunar	Ban aduwa	1

Macroplot II. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Anogeissus latifolius	Banjhi	2	36	
Duabanga grandiflora	Ban khirro	1	87	
Mallotus Philippensis	Sindhure	3	66	
Phyllanthus emblica	Amala	1	32	
Shorea robusta	Sal	4	96	Dominant
Viburnum sp.	Asare	1	12	

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Anogeissus latifolius	Banjhi	1
Asparagus racemosus	Kurilo	1
Dioscorea sp.	Ban tarul	2
Hedychium sp.	Pani saro	1
Mallotus Philippensis	Sindhure	1
Phyllanthus emblica	Amala	1
Saccharum spontaneum	Siru khar	7
Shorea robusta	Sal	5
Smilax ferox	Kukurdaino	2

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Desmodium laxiflorum	Vatte	2
Dioscorea sp.	Ban tarul	1
Phyllanthus emblica	Amala	1
Piper longum	Pipla	1
Saccharum spontaneum	Siru khar	12
Shorea robusta	Sal	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Asparagus racemosus	Kurilo	1
Desmodium laxiflorum	Vatte	3
Dioscorea sp.	Ban tarul	1
Hedychium sp.	Pani saro	1
Mallotus Philippensis	Sindhure	1
Myrisine semiserrata	Kalikath	1
Phyllanthus emblica	Amala	1
Sapium insigne	Khirro	1
Sachharum spontaneum	Siru khar	2
Shorea robusta	Sal	5
Syzygium cumini	Jamun	1
Terminalia tomentosa	Asna	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Acacia rugata	Sikakai	1
Asparagus racemosus	Kurilo	1
Desmodium laxiflorum	Vatte	1
Dioscorea sp.	Ban tarul	1
Hedychium *sp.*	Pani saro	1
Lagerstroemia parviflora	Bot dhayaro	1
Leea robusta	Galeni	2
Mucuna pruriens	Kauso	1
Phyllanthus emblica	Amala	1
Sachharum spontaneum .	Siru khar	5
Shorea robusta	Sal	1
Syzygium cumuni	Jamun	1
Terminalia tomentosa	Asna	2

Macroplot III. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Acacia rugata	Sikakai	10		
Dioscorea sp.	Ban tarul	1		
Ficus racemosa	Dumri	1	23	
Hedychium sp.	Pani saro	1		
Lagerstroemia parviflora	Bot dhayanro	4	54	
Myrisine semiserrata	Kalikath	3	62	
Pueraria phaseoloides	Bidari lahara	1		
Sapium insigne	Khirro	2	23	
Shorea robusta	Sal	9	212	Dominant
Viburnum sp.	Aasare	2		

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Acacia rugata	Sikakai	1
Cocculus hirsutus	Kanse lahara	4
Cordia oblique	Auiliya	2
Desmodium laxiflorum	Vatte	3
Dioscorea sp.	Ban tarul	2
Eupatorium odoratum	Ban mara	4
Lippia nudiflora	Kurkure jhar	2
Mallotus Philippensis	Sindhure	2
Myrisine semiserrata	Kalikath	1

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Asparagus racemosus	Kurilo	1
Cochlianthus gracilis	Bhatmase lahara	3
Desmodium laxiflorum	Vatte	5
Leea robusta	Galeni	2
Myrisine semiserrata	Kalikath	1
Sapium insigne	Khirro	4
Schleichera oleosa	Kusum	1
Shorea robusta	Sal	2
Trichilia connaroides	Aankhtaruwa	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Asparagus racemosus	Kurilo	1
Cochlianthus gracilis	Bhatmase lahara	8
Desmodium laxiflorum	Vatte	3
Grewia disperma	Shyalphusare	1
Phyllanthus emblica	Amala	1
Shorea robusta	Sal	2
Solanum xanthocarpum	Kantakari	1
Viburnum sp.	Aasare	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bridelia retusa	Gayo	4
Cassia fistula	Raj briksha	2
Dioscorea sp.	Ban tarul	1
Leea robusta	Gale	12
Lippia nudiflora	Kurkure jhar	2
Mallotus Philippensis	Sindhure	4
Persea odoratissima	Kaulo	1
Sapium insigne	Khirro	1
Shorea robusta	Sal	5
Trichilia connaroides	Aankhtaruwa	2

Macroplot IV. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Adina cordifolia	Karma	1	98	Co dominant
Cassia fistula	Raj briksha	1	31	
Dioscorea sp.	Ban tarul	1		
Hollarena pubscens	Indrajau	2		
Lagerstroemia parviflora	Bot dhayanro	2	54	
Leea robusta.	Galeni	5		
Mallotus Philippensis	Sindhure	1	82	
Pueraria phaseoloides	Bidari lahara	2		
Shorea robusta	Sal	6	136	Suppressed
Terminalia tomentosa	Asna	1	157	Dominant
Trichilia connaroides	Aankhtaruwa	2		
Viburnum sp.	Aasare	3		

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Asparagus racemosus	Kurilo	1
Combretum roxburghii	Thakauli	1
Cordia oblique	Auiliya	2
Eupatorium odoratum	Ban mara	1
Ophiglossum petiolatum	Jibre sag	1
Pueraria phaseoloides	Bidari lahara	1
Shorea robusta	Sal	2
Smilax ferox	Kukurdaino	1
Thespesia lampas	Ban kapas	2
Zingiber cassumunar	Ban aduwa	2

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Cordia obliqua	Auiliya	2
Desmodium laxiflorum	Vatte	2
Eupatorium odoratum	Ban mara	2
Leea robusta	Galeni	2
Shorea robusta	Sal	2
Trichilia connaroides	Aankhtaruwa	2
Viburnum sp.	Aasare	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Asparagus racemosus	Kurilo	1
Combretum roxburghii	Thakauli	2
Cordia obliqua	Auiliya	4
Desmodium laxiflorum	Vatte	9
Holarrhena pubescens	Indrajau	1
Phyllanthus emblica	Amala	1
Schleichera oleosa	Kusum	2
Shorea robusta	Sal	1
Terminalia tomentosa	Asna	1
Trichilia connaroides	Aankhtaruwa	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Antidesma diandrum	Archal	1
Combretum roxburghii	Thakauli	2
Cordia obliqua	Auiliya	2
Cornus oblonga	Latikath	3
Eupatoruim odoratum	Ban mara	2
Schleichera oleosa	Kusum	2
Shorea robusta	Sal	15

NTFPs in Bara District, Central Nepal

1. Disturbed forest site

Macroplot I. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Lagerstroemia parviflora	Bot dhanyaro	2	143	
Mallotus Philippensis	Sindhure	2	75	
Syzygium cumini	Jamun	1	135	Dominant

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Ardisia solanacea	Damai phal	1
Bridelia retusa	Gayo	3
Clerodendron viscosum	Vant	1
Piper longum	Pipla	5
Syzygium cumini	Jamun	1

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Achyranthes aspera	Datiwan	1
Ammania auriculata	Jaruwa	1
Ardisia solanacea	Damai phal	4
Marsdenia tinctoria	Dudhe lahara	1
Zingiber cassumunar	Ban aduwa	3

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Achyranthes aspera	Datiwan	3
Amaranthus spinosus	Khathayan	1
Curcuma angustifolia	Ban besar	1
Zingiber cassumunar	Ban aduwa	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Curcuma angustifolia	Ban besher	5
Curcuma zedoaria	Kachur	1
Zingiber cassumunar	Ban aduwa	5
Zyzyphus recurva	Bayar	2

Macroplot II. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Anogeissus latifolius	Banjhi	1	107	Co-dominant
Ceropegia pubescens	Marke lahara			Climber
Mallotus Philippensis	Sindhure	1	45	Supressed
Terminalia tomentosa	Asna	1	161	Dominant

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Buddleja asiatica	Bhimsenpati	6
Clerodendron viscosum	Vant	2
Dillenia pentagyna	Tantari	1
Litsea monopetala	Kutmiro	2
Piper longum	Pipla	10
Zingiber cassumunar	Ban aduwa	1

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Achyranthes aspera	Datiwan	6
Clerodendron viscosum	Vant	2
Curcuma zedoaria	Kachur	1
Ficus roxburghii	Newaro	1
Piper longum	Pipla	5
Syzygium cumini	Jamun	7
Zingiber cassumunar	Ban aduwa	4

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Achyranthes aspera	Datiwan	3
Clerodendron viscosum	Vant	6
Dioscorea sp.	Ban tarul	2
Ophioglossum petiolatum	Jibre sag	3
Piper longum	Pipla	10
Zingiber cassumunar	Ban aduwa	4

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Ardisia solanacea	Damai phal	1
Dioscorea sp.	Ban tarul	3
Piper longum	Pipla	11

Macroplot III. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Mallotus Philippensis	Sindhure	5	74	Co-dominant
Myrisine semiserrata	Kali kath	1	32	
Schleichera oleosa	Kusum	1	133	Dominant

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Desmodium laxiflorum	Bhatte	1
Dioscorea sp.	Ban tarul	3
Holarrena pubescens	Ban khiro	1
Mallotus Philippensis	Sindhure	2
Piper longum	Pipla	3
Zingiber cassumunar	Ban aduwa	6

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Amaranthus spinosus	Kathayan	1
Bridelia retusa	Gayo	1
Clerodendron viscosum	Vant	6
Piper longum	Pipla	3
Trachelospmum lucidum	Dhude lahara	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Ardisia solanacea	Damai phal	1
Clerodendron viscosum	Vant	2
Lantana camara	Banphanda	2
Piper longum	Pipla	3
Syzygium cumini	Jamun	1
Tinospora sinenssis	Gurjo	1
Zingiber cassumunar	Ban aduwa	9

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Ardisia solanacea	Damai phal	1
Clerodendron viscosum	Vant	2
Curcuma zedoaria	Kachur	2
Dioscorea sp.	Ban tarul	1
Mallotus Philippensis	Sindhure	2
Piper longum	Pipla	7
Tinospora cordifolia	Gurjo	2
Zingiber cassumunar	Ban aduwa	1

2. Riverine site

Macroplot I. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Adina cordifolia	*Karma*	2	52	
Ardisia solanacea	*Damai phal*	1	21	Dominant
Eurya accuminata	Jhingad	2	65	
Mallotus Philippensis	*Sindhure*	3	49	

Microplot: 1(100 cm^2)

Botanical Name	Local Name	Stand density/m^2
Clerodendron viscosum	Vant	1
Commelina paludosa	Kane	2
Curcuma angustifolia	Ban beshar	3
Hymenodictyon excelsum	Bakaulo	1
Litsea monopetala	Kutmiro	3
Shorea robusta	Sal	4
Zingiber cassumunar	Ban aduwa	9

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Curcuma angustifolia	Ban besar	4
Desmodium laxiflorum	Bhatte	1
Mallotus Philippensis	Sindhure	6
Phoenix sylvestris	Khajure	1
Syzygium cumini	Jamun	1
Zingiber cassumunar	Ban aduwa	18

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Ophioglossum petiolatum	Jibre sag	8
Zingiber cassumunar	Ban aduwa	3

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Commelina paludosa	Kane	2
Curcuma angustifolia	Ban besar	2
Hymenodictyon excelsum	Badkaulo	1
Mallotus Philippensis	Sindhure	2
Ophioglossum petiolatum	Jibre sag	1
Piper longum	Pipla	4
Syzygium cumini	Jamun	2
Trachelospmum lucidum	Dhudhe lahara	2

Macroplot II. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Derris ecllipta	Daire	1	52	
Ehretia laevis	Daturungo	1		
Eurya accuminata	Jhingad	2	140	
Holarrhena pubescens	Ban Khirro	3	77	
Mitragyna parvifolia	Tikul	1	100	Codominant
Syzygium cumini	Jamun	1	77	Dominant

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Clerodendron viscosum	Vant	5
Clerodendron infortunatum		2
Cyanotis cristata	Kane Jhar	4
Dioscorea sp.	Ban tarul	4
Saccharum munja		43
Syzygium cumini	Jamun	2
Zingiber cassumunar	Ban aduwa	1

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Cocculus hirsutus	Karse lahara	1
Commelina paludosa	Kane	1
Curcuma angustifolia	Ban besar	1
Hedychium sp.	Pani saro	1
Mallotus Philippensis	Sindhure	1
Syzygium cumini	Jamun	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bidens biternata	Late kuro	1
Curcuma angustifolia	Ban besar	3
Desmodium laxiflorum	Bhatte	1
Dioscorea sp.	Ban tarul	2
Hedyotus scandens		2
Hymenodictyon exelsum	Badkaulo	3
Sapium insigne	Khirro	2
Syzygium cumini	Jamun	8
Trachelospmum lucidum	Dudhe lahara	2
Zingiber cassumunar	Ban aduwa	3

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bidens biternata	Late kuro	2
Curcuma angustifolia	Ban besar	2
Desmodium laxiflorum	Bhatte	3
Dioscorea sp.	Ban tarul	6
Eryngium foetidum	Dainiya	7
Saccharum munja		21
Syzygium cumini	Jamun	2

Macroplot III. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Acacia catechu	Khair	1	102	Codominant
Dalbergia sissoo	Sisso	2	114	Dominant
Ficus recemosus	Dumri	1		
Mitragyna parvifolia	Tikul	3		
Persea duthiei	Boukuwala	1		
Syzygium cumini	Jamun	2	52	
Woodfordia fruticosa	Dhayero	3		

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bridelia retusa	Gayo	1
Casia tora	Tapre	1
Cassia fistula	Rajbrikcha	2
Dalbergia sissoo	Sisoo	1
Wendlandia sp.	Kanyi	1

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bidens biternata	Late kuro	1
Dioscorea sp.	Ban tarul	1
Mitragyna parvifolia	Tikul	1
Syzygium cumini	Jamun	1
Zizyphus mauritiana	Bayar	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Inula sp.	Kaile ghans	1
Mitragyna parvifolia	Tikul	2

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Achyranthes aspera	Datiwan	2
Amaranthus spinosus	Kathayan	3
Bidens biternata	Late kuro	7
Piper longum	Pipla	4

Macroplot IV. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Acacia catechu	Khair	1	75	Codominant
Adina cordifolia	Karma	3	36	Surpressed
Clerodendron viscosum	Vant	6		
Dalbergia latifolia	Sati sal	2		
Litsea monopetala	Kutmiro	1		
Trewia nudiflora	Pithara	1		
Viburnum punctatum	Mahelo	1	98	Dominant

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bidens biternata	Late kuro	6
Bridelia retusa	Gayo	1
Clerodendron viscosum	Vant	3
Eupatorium odoratum	Ban mara	40
Ficus semicordata	Khaneyu	1
Litsea monopetala	Kutmiro	1
Saccharum munja		30

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Aegle marmelos	Bel	1
Bidens biternata	Late kuro	2
Clerodendron viscosum	Vant	1
Dioscorea sp.	Ban tarul	1
Saccharum munja		40
Thespesia lampas	Ban Kapas	3

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Clerodendron viscosum	Vant	8
Derris ecllipta	Daire	1
Dioscorea sp.	Ban tarul	1
Eupatorium odoratum	Ban mara	5
Saccharum munja		30
Trachelospmum lucidum	Dudhe lahara	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bridelia retusa	Gayo	1
Carissa carondas	Karona	1
Citrulus lanatus	Tarbuja	1
Colebrookea oppositifolia	Dhursul	2
Eupatorium odoratum	Ban mara	2
Ficus roxburghii	Newaro	8
Saccarum munja		20

3. Undisturbed forest site

Macroplot I. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Adina cordifolia	Karma	1	226	Dominant
Lagerstroemia parviflora	Bote dhanyero	1	41	
Litsea monopetala	Kutmiro	8		
Mallotus Philippensis	Sindhure	7		
Ougeinia oojeinensis	Sadan	1	74	
Phyllanthus emblica	Amala	2		
Rhus parviflora	Bhalayo	1	71	
Ricinus communis	Ader	2		
Shorea robusta	Sal	11		
Terminalia bellirica	Barro	4		
Terminalia chebula	Harro	3		
Terminalia tomentosa	Asna	1	142	Dominant

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Commelina paludosa	Kane	1
Eryngium foetidum	Dainiya	1
Saccarum munja		12
Shorea robusta	Sal	4

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Curcuma angustifolia	Ban besar	5
Polypodium amoenum	Hadjor	2
Ricinus communis	Ader	1
Saccharum munja		5
Shorea robusta	Sal	3

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Curcuma angustifolia	Ban besar	1
Elephantopus scaber	Hatikanne	1
Eryngium foetidum	Dainiya	2
Eurya accuminata	Ghingad	1
Shorea robusta	Sal	3
Smilax ferox	Kukurdaino	1
Stereospermum tetragonum	Padari	1
Toddalia asiatica	Mainkanda	1
Trachelospmum lucidum	Dudhe lahara	2
Zingiber cassumunar	Ban aduwa	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Curcuma angustifolia	Ban besar	1
Litsea monopetala	Kutmiro	1
Parsilatiya	Parsilatiya	1
Ricinus communis	Ader	2
Shorea robusta	Sal	5
Terminalia bellirica	Barro	1
Zingiber cassumunar	Ban aduwa	1

Macroplot II. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Hymenodictyon exelsum	Badkaulo	1	73	
Lagerstroemia parviflora	Bot dhanyaro	1	39	Co-dominant
Oroxylum indicum	Tatari	1	39	Co-dominant
Phyllanthus emblica	Amala	2	17	
Shorea robusta	Sal	3	93	Dominant

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Amaranthus spinosus	Khatayan	1
Curcuma zedoaria	Kachur	4
Eryngium foetidum	Dainiya	1
Ricinus communis	Ader	2
Saccharum munja		4
Shorea robusta	Sal	4

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Curcuma zedoaria	Kachur	4
Mallotus Philippensis	Sindhure	2
Ricinus communis	Ader	1
Shorea robusta	Sal	5

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Amaranthus spinosus	Khathayan	1
Curcuma zedoaria	Kachur	5
Mallotus Philippensis	Sindhure	1
Ricinus communis	Ader	1
Saccarum munja		5
Shorea robusta	Sal	5
Terminalia tomentosa	Asna	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Curcuma zedoaria	Kachur	4
Eryngium foetidum	Dainiya	4
Mallotus Philippensis	Sindhure	1
Phyllanthus emblica	Amala	1
Shorea robusta	Sal	1
Smilax ferox	Kukurdaino	11
Terminalia tomentosa	Asna	1

Macroplot III. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Dalbergia latifolia	Sati sal	9	42	Codominat
Phyllanthus emblica	Amala	3		
Shorea robusta	Sal	3		
Syzygium operculata	Kyamuna	2		
Terminalia tomentosa	Asna	10		

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Dalbergia latifolia	Sati sal	3
Dioscorea sp.	Ban tarul	1
Eryngium foetidum	Dainiya	1
Saccarum munja	kans	6
Shorea robusta	Sal	11
Terminalia tomentosa	Asna	3
Zyzyphus recurva	Bayer	4

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bridelia retusa	Gayo	1
Dioscorea deltoidea	Vaykur	2
Eryngium foetidum	Dainiya	1
Saccarum munja		14
Shorea robusta	Sal	2
Stereospermum tetragonum	Padari	1
Terminalia tomentosa	Asna	1
Toddalia asiatica	Mainkada	2

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Dalbergia latifolia	Sati sal	2
Dioscorea deltoidea	Vyakur	2
Eryngium foetidum	Dainiya	8
Saccarum munja	kans	18
Shorea robusta	Sal	6
Syzygium cumini	Jamun	1
Terminalia tomentosa	Asna	1
Zyzyphus recurva	Bayar	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Amaranthus spinosus	Kathayan	2
Asparagus racemosus	Kurilo	1
Dalbergia latifolia	Sati sal	1
Ougenia oojeinense	Sadan	1
Eryngium foetidum	Dainiya	2
Ammania auriculata	Jaruwa	1
Saccarum munja	kans	15
Shorea robusta	Sal	1
Toddalia asiatica	Mainkanda	1
Zyzyphus recurva	Bayar	1

4. Moderately Disturbed forest site

Macroplot I. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Cassia fistula	Raj briksha	1	13	
Myrisine semiserrata	Kali kath	3	63	Co-dominant
Phyllanthus emblica	Amala	4	22	
Shorea robusta	Sal	6	178	Dominant

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Amaranthus spinosus	Kathayan	1
Asparagus racemosus	Kurilo	1
Clerodendron viscosum	Vant	2
Curcuma zedoaria	Kachur	9
Eryngium foetidum	Dainiya	1
Ophioglossun petiolatum	Jibre sag	2
Shorea robusta	Sal	2
Smilax ferox	Kukurdaino	1

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Curcuma zedoaria	Kachur	2
Eryngium foetidum	Dainiya	8
Mallotus philippensis	Sindhure	1
Saccarum munja	kans	2
Shorea robusta	Sal	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Commelina paludosa	Kane	8
Curcuma zedoaria	Kachur	1
Eryngium foetidum	Dainiya	2
Saccarum munja	kans	7
Shorea robusta	Sal	1
Smilax ferox	Kukurdaino	1
Terminalia tomentosa	Asna	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Asparagus racemosus	Kurilo	1
Curcuma zedoaria	Kachur	1
Stereospermum tetragonum	Padari	1
Toddalia asiatica	Mainkanda	1
Zingiber cassumunar	Ban aduwa	4

Macroplot II. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Adina cordifolia	Haldu	7	43	Suppressed
Hymenodictyon exelsum	Badkaulo	1		
Myrisine semiserrata	Kali kath	3		
Phyllanthus emblica	Amala	2	301	
Pieris formosa	Pohore	2	242	Suppressed
Shorea robusta	Sal	1	195	Dominant
Stereospermum tetragonum	Pader	1	76	Co-dominant
Syzygium operculata	Kyamuna	2	44	
Terminalia tomentosa	Asna	5		
Zyzyphus recurva	Bayer	1		

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Amaranthus spinosus	Khathayan	1
Eryngium foetidum	Dainiya	5
Shorea robusta	Sal	7
Terminalia tomentosa	Asna	4
Zyzyphus recurva	Bayer	2

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Amaranthus spinosus	Kathayan	1
Cornus oblonga	Latikath	3
Eryngium foetidum	Dainiya	9
Shorea robusta	Sal	13

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Amaranthus spinosus	Kathayan	2
Eryngium foetidum	Dainiya	3
Shorea robusta	Sal	9
Zyzyphus recurva	Bayer	3

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Eryngium foetidum	Dainiya	4
Hadwickia binata	Taki jasto leaf vayako	1
Shorea robusta	Sal	12
Terminalia tomentosa	Asna	1
Zyzyphus recurva	Bayer	2

Macroplot III. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Litsea monopetala	Kutmiro	1	15	
Mallotus philippensis	Sindhure	3	114	Dominant
Myrisine semiserrata	Kali kath	1	47	
Phyllanthus emblica	Amala	1	21	
Terminalia bellirica	Barro	1	57	

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Curcuma zedoaria	Kachur	9
Eurya accuminata	Jhingad	1
Litsea monopetala	Kutmiro	2
Myrisine semiserrata	Kali kath	1
Shorea robusta	Sal	2

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Curcuma zedoaria	Kachur	4
Eryngium foetidum	Dainiya	3
Ricinus communis	Ader	1
Zingiber cassumunar	Ban aduwa	2

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Amaranthus spinosus	Kathayan	2
Curcuma zedoaria	Kachur	2
Cyanotis cristata	Kane jhar	3
Saccharum munja	kans	6
Thespesia lampas	Ban kapas	1

icroplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Asparagus racemosus	Kurilo	1
Bidens biternata	Late kuro	1
Curcuma zedoaria	Kachur	2
Cyanotis cristata	Kane Jhar	5
Dioscorea sp.	Ban tarul	3
Saccharum munja		1
Smilax ferox	Kukurdaino	1

NTFPs in Banke District, Mid-western Nepal

1. Disturbed forest site

Macroplot I. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Mallotus Philippensis	Sindure	2	14	Suppressed
Shorea robusta	Sal	1	19	Suppressed
Syzygium operculata	Kyamuna	1	152	
Terminalia tomentosa	Asna	2	107	Co- dominant

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Kyllinga sp.	Kyllinga	4
Murraya koenigii	Mithonim	1
Ophioglossum nudicaule	Jibre Sag	1
Phoenix humilis	Thakal	2
Trachelospmum lucidum	Dhude Lahara	3
Unidentified II		

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Cynodon dactylon	Dubo	1
Kyllinga sp.	Kyllinga	10
Phoenix humilis	Thakal	2
Terminalia tomentosa	Asna	1
Trachelospmum lucidum	Dudhe lahara	2
Unidentified II		2

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Mallotus Philippensis	Sindhure	3
Murraya koenigii	Mithonim	1
Phoenix humilis	Thakal	2
Randia sp.		1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Kyllinga sp.	Killinga	5
Lagerstroemia parviflora	Botdhayanro	1
Murraya koenigii	Mithonim	1
Phoenix humilis	Thakal	1
Terminalia tomentosa	Asna	1

Macroplot II. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Garuga pinnata	Dabdabe	1	36	
Mallotus Philippensis	Sindhure	1		Suppressed
Shorea robusta	Sal	4	45	Dominant
Terminalia tomentosa	Asna	2	54	Co-dominant

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Diospyrus melanoxylon	Tendu	1
Kyllinga sp.	Kyllinga	2
Phoenix humilis	Thakal	1

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Holoptelia integrifolia	Pipiri	2
Murraya koenigii	Mithanim	1
Phoenix humilis	Thakal	2

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Cyperus rotundus	Mothe	2
Flemingia strobilifera		1
Holoptelia integrifolia	Pipiri	2
Mallotus Philipensis	Sindhure	1
Phoenix humilis	Thakal	2

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bauhinia vahlii	Bhorla	1
Cyperus rotundus	Mothe	2
Kyllinga sp.	Kyllinga	3
Ophioglossum nudicaule	Jibre sag	1

Macroplot III. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Diospyrus melanoxylon	Tendu	4	11	
Mallotus philinpensis	Sindhure	3		
Shorea robusta	Sal	2	31	Dominant
Terminalia tomentosa	Asna	2	13	

Microplot: 1 (1 cm2)

Botanical Name	*Local Name*	Stand density/m^2
Bauhinia vahlii	Bhorla	1
Casia fistula	Rajbriksha	1
Cyperus rotundus	Mothe	20
Kyllinga sp.	Kyllinga	2
Woodfordia fruticosa	Dhanyaro	1

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Cynodon dactylon	Dubo	2
Cyperus rotundus	Mothe	4
Murraya koenigii	Mithanim	2
Paspalum sp.		5
Schleichera oleosa	Kusum	5
Terminalia tomentosa	Asna	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Dillenia pentagyna	Tantari	2
Imperata cylindrica	Siru	4
Phoenix humilis	Thakal	1
Scutelaria discolor		1
Terminalia tomentosa	Asna	1
Truimphetta bartramia		1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Cyperus rotundus	Mothe	4
Paspalum sp.		5
Phoenix humilis	Thakal	2

2. Riverine site

Macroplot I. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Ficus nemoralis	Dudhilo	1	103	
Mallotus Philippensis	Sindhure	3	28	Dominant

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Cassia fistula	Rajbriksha	1
Cynodon dactylon	Dubo	3
Lindsea odorata		2
Murraya koenigii	Mithanim	2
Woodfordia fruticosa	Dhayaro	1

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Clerodendron viscosum	Vant	2
Ficus racemosus	Gular	1
Mallotus Philippensis	Sindhure	1
Piper longum	Pipla	5
Scirpus kysoor		6

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Mallotus Philippensis	Sindhure	1
Murraya koenigii	Mithanim	1
Zyzyphus recurva	Bayar	2

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Mallotus Philippensis	Sindhure	2
Murraya koenigii	Mithanim	6

Macroplot II. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Holarrhena pubescens	Indrajau	2		
Mallotus Philippensis	Sindhure	1	29	Dominant
Murraya koenigii	Mithanim	1		
Zyzyphus recurva	Bayar	5		

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Holarrhena pubescens	Indrajau	1
Imperata cylindrica	Siru	15
Mallotus Philippensis	Sindhure	1
Murraya koenigii	Mitha nim	2
Zizypus mauritiana	Bayar	1

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Mallotus Philippensis	Sindhure	1
Murraya koenigii	Mithanim	3
Zizypus mauritiana	Bayar	16

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Imperata cylindrica	Siru	1
Murraya koenigii	Mithanim	1
Woodfordia fruticosa	Dhanyaro	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Imperata cylindrica	Siru	15
Marsdenia tinctoria	Kali Lahara	2
Murraya koenigii	Mithanim	1
Pouzolzia zeylanica		2
Zizyphus mauritiana	Bayar	3

Macroplot III. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Mallotus Philippensis	Sindhure	10	20	Dominant
Pyrus sp.		1	22	
Syzygium cumini	Jamun	1	170	

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Clerodendron viscosum	Vant	1
Cyperus rotundus	Mothe	1
Mallotus Philippensis	Sindhure	2
Murraya koenigii	Mithanim	5
Zizypus mauritiana	Bayar	2

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Imperata cylindrica	Siru	4
Mallotus Philippensis	Sindhure	2
Phoenix humilis	Thakal	1
Siegesbeckia orientalis		2

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Clerodendron viscosum	Vant	1
Cyperus rotundus	Mothe	7
Cythocline sp.		1
Piper longum	Pipla	1
Trachelospmum lucidum	Dudhe lahara	2

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Mallotus Philippensis	Sindhure	1
Murraya koenigii	Mithanim	2
Pogonatherum crinatum	Kharuki	4
Terminalia tomentosa	Asna	1
Thespesia lampas	Ban kapas	1
Woodfordia fruticosa	Dhayanro	1

3. Undisturbed forest site

Macroplot I. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Anogeissus latifolius	Banjhi	1	99	
Diospyrus melanoxylon	Tendu	4	23	Dominant
Lagerstroemia parviflora	Botdhayero	2	37	
Shorea robusta	Sal	2	85	Dominant

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bauhinia vahlii	Bhorla	3
Desmodium laxiflorum	Bhatte	1
Diospyrus melanoxylon	Tendu	1
Lygodium flexuosum		1
Piper longum	Pipla	1
Shorea robusta	Sal	2
Terminalia tomentosa	Asna	2
Woodfordia fruticosa	Dhanyaro	2

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Asparagus racemosus	Kurilo	1
Desmodium laxiflorum	Bhatte	1
Diospyrus melanoxylon	Tendu	1
Phoenix humilis	Thakal	1
Shorea robusta	Sal	3
Terminalia tomentosa	Asna	1
Vetivera brachipoda	Kush	1
Zizypus mauritiana	Bayar	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Diospyrus melanoxylon	Tendu	2
Grewia disperma	Shyalphusare	1
Holoptelia integrifolia	Pipare	2
Leea robusta	Galeni	1
Phoenix humilis	Thakal	4
Reinwardtia indica	Piyari (pyauli)	1
Shorea robusta	Sal	2

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Buchnania latifolius	Chiraunji	1
Grewia disperma	Shyalphusare	3
Holoptelia integrifolia	Pipare	1
Leea robusta	Galeni	1
Stereospermum tetragonum	Padari	1
Smilax aspera	Kukurdainao	2
Vitis sp.		1

Macroplot II. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Anogeissus latifolius	Banjhi	1	88	Dominant
Dillenia pentagyna	Tantari	1	101	
Symplocus sp.	Kharane	1	25	
Stereospermum tetragonum	Padari	1	88	
Semecarpus anacardium	Bhalayo	2	33	
Shorea robusta	Sal	3	23	

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Anogeissus latifolius	Banjhi	1
Desmodium laxiflorum	Bhatte	1
Grewia disperma	Shyalphusare	1
Lygodium flexuosum		1
Randia dumetorum	Mainphal	1
Phoenix humilis	Thakal	1
Shorea robusta	Sal	6
Terminalia tomentosa	Asna	2

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Grewia disperma	Shyalphusare	1
Leea robusta	Gale	1
Paspalum sp.		1
Phoenix humilis	Thakal	2
Phyllanthus emblica	Amala	1
Randia dumetorum	Mainphal	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Desmostachys bipinnata	Kush	7
Flemingia strobilifera		2
Grewia disperma	Shyalphusare	7
Paspalum sp.		5
Saccharum spontaneum	Siru khar	2
Shorea robusta	Sal	5

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bauhinia vahlii	Bhorla	2
Desmodium sp.		1
Grewia disperma	Shyalphusare	3
Murraya Koenigii	Karipatta	4
Phoenix humilis	Thakal	4
Shorea robusta	Sal	13

Macroplot III. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Diospyrus melanoxylon	Tendu	2	25	
Holoptelia integrifolia	Pipire	1	22	
Myrisine semiserrata	Kalikath	1	77	
Semecarpus anacardium	Bhalayo	4	40	
Shorea robusta	Sal	2	95	Dominant
Terminalia tomentosa	Asna	2	41	

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Asparagus racemosus	Kurilo	1
Desmodium laxiflorum	Bhatte	3
Dryopteris cochleata	Unyu	2
Phoenix humilis	Thakal	1
Polygala sp.		1
Shorea robusta	Sal	10

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Cissampelos pareira	Batulpate	1
Desmodium sp.		13
Diospyrus melanoxylon	Tendu	2
Grewia disperma	Shyalphusare	4
Sachharum spontaneum	Siru khar	6
Shorea robusta	Sal	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Anogeissus latifolius	Banjhi	4
Grewia disperma	Shyalphusare	1
Ougenia oogenesis	Sadan	1
Phoenix humilis	Thakal	1
Phyllanthus emblica	Amala	2
Polygala sp.		1
Randia dumetorum	Mainphal	1
Shorea robusta	Sal	2
Smilax racemosus	Kukurdaino	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Anogeissus latifolius	Banjhi	6
Fleminiga strobilifera		2
Murraya Koenigii	Karipatta	2
Leea robusta	Gale	2
Phoenix humilis	Thakal	3
Saccharum spontaneum	Siru khar	20
Shorea robusta	Sal	1

4. Moderately disturbed forest site

Macroplot I. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Diospyrus melanoxylon	Tendu	1	31	
Lagerstroemia parviflora	Botdhayaro	1	15	
Myrisine semiserrata	Kalikath	1	53	
Shorea robusta	Sal	4	23	
Terminalia tomentosa	Asna	1	86	Dominant

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Anogeissus latifolius	Banjhi	4
Bauhinia variegata	Tanki	1
Diospyrus melanoxylon	Tendu	2
Flemingia strobilifera		1
Paspalum sp.		1
Saccharum spontaneum	Siru khar	12
Shorea robusta	Sal	1
Tamarindus dioica	Imili	1
Terminalia chebula	Harro	7
Trachelospmum lucidum	Dudhe lahara	1

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Dhudhe	Dhudhe	3
Murraya Koenigii	Karipatta	1
Phoenix humilis	Thakal	2
Sachharum spontaneum	Siru khar	4
Shorea robusta	Sal	3
Terminalia tomentosa	Asna	3
Trachelospmum lucidum	Dudhe lahara	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Anogeissus latifolius	Banjhi	1
Asparagus racemosus	Kurilo	1
Dioscorea sp.	Ban tarul	2
Murraya Koenigii	Karipatta	1
Shorea robusta	Sal	12
Terminalia chebula	Harro	1

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bauhinia vahlii	Bhorla	2
Flemingia strobilifera		5
Murraya Koenigii	Karipatta	1
Pouzolzia zeylanica		2
Rhus parviflora	Satibayer	1
Saccharum spontaneum	Siru khar	18
Smilax aspera	Kukurdaino	1

Macroplot II. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Buchnania latifolia	Chiraunji	1	91	
Randia sp.		1	75	
Rhus parviflora	Satibayer	1	24	
Shorea robusta	Sal	1	114	Dominant
Symplocus sp.	Kharane	1	11	
Terminalia bellirica	Barro	1	92	
Terminalia tomentosa	Asna	1	59	

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bauhinia vahlii	Bhorla	1
Leea robusta	Galeni	6
Lygodium flexiosum		1
Phoenix humilis	Thakal	2
Sachharum spontaneum	Siru khar	5
Shorea robusta	Sal	4
Terminalia bellirica	Barro	2

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Diospyrus melanoxylon	Tendu	3
Phoenix humilis	Thakal	2
Phyllanthus emblica	Amala	1
Randia dumetorum	Mainphal	1
Sagitaria sagitifolia	Dudhe	1
Shorea robusta	Sal	1
Symplocus sp.	Laundh	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bauhinia vahlii	Bhorla	1
Grewia disperma	Shyalphusare	4
Leea robusta	Galeni	1
Phoenix humilis	Thakal	1
Polygala sp.		1
Saccharum spontaneum	Siru khar	5
Schleichera oleosa	Kusum	2
Symplocus sp.	Kharane	2

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Anogeissus latifolius	Banjhi	2
Bauhinia vahlii	Bhorla	1
Polygala sp.		1
Saccharum spontaneum	Siru khar	18
Shorea robusta	Sal	9
Symplocus sp.	Kharane	2

Macroplot III. (100 m^2)

Botanical Name	Local Name	Stand density/100 m^2	M. gbh (cm)	Status
Anogeissus latifolius	Banjhi	4	83	Dominant
Holoptelia integrifolia	Pipire	1	17	
Lagerstroemia parviflora	Botdhayaro	2	32	
Shorea robusta	Sal	2	35	
Terminalia tomentosa	Asna	1	15	

Microplot: 1 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Carex sp.	Hat katuwa	
Grewia disperma	Shyalphusare	3
Leea robusta	Galeni	1
Phoenix humilis	Thakal	1
Saccharum spontaneum	Siru khar	9
Terminalia tomentosa	Asna	1

Microplot: 2 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Grewia disperma	Shyalphusare	1
Leea robusta	Galeni	2
Saccharum spontaneum	Siru khar	7
Shorea robusta	Sal	2
Smilax aspera	Kukurdaino	1
Trachelospmum lucidum	Dudhe lahara	1

Microplot: 3 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Bauhinia vahlii	Bhorla	2
Grewia disperma	Shyalphusare	1
Leea robusta	Galeni	3
Phoenix humilis	Thakal	2
Saccharum spontaneum	Siru khar	9
Shorea robusta	Sal	4

Microplot: 4 (1 cm2)

Botanical Name	Local Name	Stand density/m^2
Asparagus racemosus	Kurilo	1
Bauhinia vahlii	Bhorla	3
Grewia disperma	Shyalphusare	2
Holoptelia integrifolia	Pipiri	1
Leea robusta	Galeni	2