Ministry of Forests and Soil Conservation
Kathmandu, Nepal

A SYNTHESIS REPORT ON THE CURRENT STATUS 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

DB✓

Ministry of Forests and Soil Conservation
Kathmandu, Nepal

A SYNTHESIS REPORT ON THE CURRENT STATUS 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

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

AusAID	: Australian AID
CEDA	: Centre for Economic Development and Administration
DFID	: Department for International Development
DFO	: District Forest Office/r
DoF	: Department of Forests
DPR	: Department of Plant Resources
DVN	: Development Vision Nepal
FNCCI	: Nepal Federation of Chamber of Commence and Industries
FUG	: Forest User Group
GTZ	: German Technical Assistance
HMG/N	: His Majesty's Government of Nepal
HPPCL	: Herbs Production and Processing Company Limited
INBAR	: International Network for Bamboo and Rattan
ITTC	: International Tropical Timber Council
ITTO	: International Tropical Timber Organization
MAPs	: Medicinal and Aromatic Plants
MFP	: Minor Forest Products
MFSC	: Ministry of Forests and Soil Conservation
MPFS	: Master Plan for Forestry Sector
NTFP	: Non Timber Forest Products
OP	: Operational Plan
PRA	: Participatory Rural Appraisal
PSC	: Project Steering Committee
RRA	: Rapid Rural Appraisal
SDC	: Swiss Development Cooperation
SNV	: Netherlands Development Agency
USAID	: United States Agency for International Development
DANIDA	: Danish International Development Assistance

Table of Contents

List of Tables in Text

List of Tables in Annex

Chapter 1

Background and the Context

1.1 Definition

Non-Timber Forest Products (NTFPs), also sometimes referred to as Non-Wood Forest Product (NWFPs) or Minor Forest Product (MFPs) are defined as the animal and plant resources other than wood or timber derived from forests or forest tree species. These include: food and food additives such as edible nuts, mushrooms, fruits, herbs, spices, gums, aromatic plants and game, fodder, fibers, turpentine and rosin; plant and animal products for medicinal, cosmetic or cultural uses.

Wickens (1991) defines NTFPs as 'all biological materials (other than industrial round-wood and derived sawn timber, wood chips, wood based panels and pulp) that may be extracted from natural ecosystems, managed plantations etc., and be utilized within the household, be marketed, or have social cultural or religious significance'.

To make the definition simpler to understand, Chandrsekharan (1998) defines NTFPs as:

> "... all goods and services for commercial, industrial or subsistence use derived from forest and allied land uses, other than timber, fuel-wood and fodder".

For the purpose of this paper, timber, fuel-wood, fodder, and wildlife have not been included within the definition of NTFPs.

In Nepal, fuel wood and timber are not regarded as NTFPs (HMG/N, 1988). The NTFPs of Nepal can be broadly grouped according to their use categories such as food, fiber-yielding, dye-yielding, gum-yielding, fatty-oil bearing, essential oil bearing plants, and the most important one, the medicinal plants.

In Nepal, jaributi (herbs) refers to a group of NTFPs cultivated, collected from the wild in the mountains, and traded in India as raw materials for industries related to pharmaceuticals, food, beverages or perfumes.

1.2. Importance of NTFPs

NTFPs form an important part of Nepalese economy. Approximately 800 species of MAPs/NTFPs are used as foodstuffs, flavoring agents and spices, perfumes and cosmetics, pharmaceuticals and biological agents. Local communities on the other hand who also use NTFPs for their subsistence livelihood have identified many species and multiple uses (Gautam and Davoe 2002 quoted by Kristiina 2002). As embodied in the Forest Regulations, the government has so far officially identified 234 valuable NTFPs in the country; whereas locals from a relatively small area under a single forest type identified 436 NTFPs (Gautam and Devoc, 2002).

Awareness about the crucial role that the NTFPs play in supporting the livelihoods of the forest-dependent communities has grown manifolds in the recent years. Policy makers,

development partners, governments and voluntary organizations working in the forestry sector are convinced that sustainable management of NTFPs has a big potential to contribute to poverty reduction which is the main aim of HMGN.

If the total number of plant and animal products of known value of human use are calculated, the items of NTFPs appears to be very large, even if there are many products that are not properly identified and used. NTFPs are of major significance primarily in households and local economies. The reliable quantitative data on the products that are currently collected and used in the household for domestic use are however not available. NTFP data neither on collected nor on sold in small quantities in local markets are adequately recorded. However, an estimated 80 percent (about 3.3 million households) of Nepal's population uses NTFPs to meet their health and nutritional needs for subsistence consumption and income. This number may be much larger if those who are seasonally dependent on forest products such as grass fodder and grazing in the dry season are also to be considered. NTFPs have always been an integral part of the domestic lives and practices of the rural communities in every part of the country. These products have 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 since history, maximizing revenue from timber production has been the focus of forest policy and management practice in Nepal, the management of forests for NTFPs has been one of the major agendas in the recent years.

There are two sets of NTFPs in Nepal; one that is critical to subsistence at rural community level and the other contributing to the government treasury, as well. Although government earnings from NTFPs are not known to have exceeded that of timber, yet it holds a huge potential to do so. Nevertheless, the NTFP business sector has been known for generating employment at local level, as well as creating multiplier effects down the value chain at different times and spaces. A large number of poor people in the rural areas have been generating off-farm employment opportunities through the collection and sale of NTFPs.

Some NTFPs of Nepal are the most valuable products for large scale industrial processing for valuable products of developed countries such as medicines, foods and beverages, confectionery, flavorings, perfumes, quality fiber for special paper making, paints and polishes. However, exports have largely been unprocessed products resulting in minimal benefits to the people and nation as a whole.

In Nepal, India and elsewhere, NTFPs appear to provide a relatively high contribution to household economy – especially to the poor. Olsen (1998) estimates the involvement of about 470,000 Nepali households in the collection of commercial medicinal plants. A study[1] of Indian Institute of Bio-social Research and Development in 1992 estimates that on an average NTFP contributes 15% of the annual income of the households. The same study estimates that generation of each household income from NTFP over a period of 10 years is about three times more than the income from the poles. Whether marketed or not, these products represents an important contribution to nation's economy. However the value of NTFP in most cases is rarely expressed in monetary terms. Therefore, NTFPs contribution in rural and national economy is undervalued.

[1] Malhotra, K.C et al (1992) Role of Non-timber Forest Produce in Village Economy. IBRAD, India

Social dimension of NTFP is its use. NTFPs particularly medicinal herbs are a direct continuation of human tradition, and may therefore serve as a cultural bridge between past and present generations. In addition, NTFPs represents a non-negligible sample of the biodiversity of forests, their proper management also supports conservation related values. Indeed, the contribution of NTFPs to economic, ecological and social sustainability of forestry cannot be regarded as a minor one (Saastamoinen, 1998).

Experiences in Nepal and elsewhere have shown that supporting communities in marketing of bio-resources reinforce incentives to local people, in result, contributes to conserve biological diversity (Subedi and Bhattarai, 1998, Salafsky *et al.*, 1999).

1.3. Policy context

Master Plan for the Forestry Sector (MPFS, 1988), Nepal's contemporary forest policy document, has both social and ecological objectives. To achieve these objectives, there are twelve programmes. Of which the six are the primary programmes and the rest six are the supportive one. Programme related to the promotion of Medicinal and Aromatic Plants (MAPs) and Minor Forest Products is one of the primary programme envisaged in the MPFS. This programme emphasizes the need of promoting value-adding business through MAP in the country. The plan reads as follows:

> "... the establishment of a socially and economically viable and scientifically based development program on MAPs is essential to improve health care, the economy, and the quality of rural life in general" (MPFS, Chapter 2, pp.7).

Similarly, the MPFS aims to contribute in the growth of local and national economies by managing the forest resources, developing the forest-based industries, and creating opportunities of employment for income generation. In addition, the ninth and current tenth five year plans prioritize the NTFP promotion programme as one of the main strategic programme that could potentially contribute to reduce poverty. Similarly, National Biodiversity Conservation Strategy emphasizes the need of NTFP conservation and management to ensure biodiversity conservation in various forest regimes. As enacted in the Forest Act, 1993 and Forest by-laws 1995 administrative, technical and managerial role related to NTFP management, harvesting and marketing of NTFPs from national forests have given largely to the Department of Forests, and local communities have become the main collaborative partners to undertake NTFP protection, harvesting, collection and marketing of the NTFPs. The role of the Department of Plant Resources is more focused on research.

1.4. Legal and regulatory mechanisms

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

Department of Forest (instead of the Department of Plant Resources) has been made responsible to grant permits for processing and value-added production of these banned species. Since 1992/93, additional ban is also imposed on raw material export of eight MAPs species. Table 1 shows the list of these various species.

Table 1.1 NTFP Species with conditional ban

Species with conditional ban (Species that need to be processed for export)
(i) *Nardostachys grandiflora*
(ii) Lichen spp.
(iii) *Valeriana jatamasi*
(iv) Cinnamomum glaucescens
(v) *Rauvolfia serpentina*
(vi) *Taxus wallichiana*
vii) Shilajeet (mineral exudate)
(viii) Abies spectabilis (Talispatra)
(ix) *Cordyceps sinensis*

Source: DOF's circular (2002)

NTFPs from national forests cannot be collected without an official permit from the District Forest Officer. Separate permits are required for having the transit permits of any types of NTFPs. HMGN has fixed up the royalty rates for each NTFP item to be administered by the concerned DFOs. In addition to the collection and transit permits, DFOs are required and authorized to issue export permit ensuring sustainable harvest of NTFPs.

In the case of community forests, FUGs, through their operation plans, can be authorized to grant permits for the collection of NTFPs except in banned species. However, it has not been realized in practice. The current practice is that DFOs grant the transit permits even for community forests. There is multiple taxation system with the involvement of multiple agencies in NTFP trade. For example, the DFO evidently is authorized to collect royalty for NTFPs collected from the national forests as well responsible for the issuing of transit and export permits from both government managed as well as community managed forests. DFOs do not have data either in baseline or in inventory to ensure sustainable harvest of NTFPs. On top of royalty, there is an ad-valorum tax of 0.5 percent on the export of NTFPs administered by the custom offices under the Ministry of Finance. Local bodies also impose tax to NTFP traders.

Regulating the collection, processing, certification and export permit in the domain of a number of agencies mentioned above complicate the marketing of NTFPs (Table 1.2). In result, transaction cost of NTFPs both in terms of time and money substantially increases.

Table 1.2 Agencies responsible for granting permits

Requirement	Responsible agencies
Collection Permit	DFO/CFUG
Royalty Payment	DFO/CFUG
Release (transit) Permit	DFO
Local Taxes	DDC
Certificate of origin	FNCCI/NCC
Assessment of the product quality	DPR
Product Certification	DPR, DOF, HPPCL
Export License	HPPCL/ Department of Industries
Export Duty	Customs office

Source: Field survey (2003)

1.5. Institutions and agencies that promote NTFPs

In addition to the institutions and organizations mentioned above, there are number of institutions at various levels that are devoted to promote NTFPs. For example, at the international level, International Network for Bamboo and Rattan (INBAR); at donor level DANIDA, DFID, SNV, USAID, SDC, GTZ, AusAID; at government level Forest Department, Department of Plant Resources, Herbs Production and Processing Company Ltd. (HPPCL), Singh Durbar Vaidyakhana; Trade Promotion Centre, from the non-governmental sector at the regional level ANSAB; and in private sector the Dabur-Nepal and Bhrikuti Pulp Industries, Gorkha Ayurved Company, Jaributi Association of Nepal; at local level Community Forest User Groups, and Leasehold Forest User Groups; at project level a number of local initiatives supported by donor supported projects, collectors, processors, local traders and exporters have contributed substantially in the promotion of NTFPs in Nepal.

1.6. Major studies and literature

There seem to be no national level inventory on NTFPs status, their cultivation and management system, trade and marketing. Quantitative estimation of some products of a specific region or area is however available and this is the basis that the estimation should be extrapolated. The major studies and estimation include: the estimation of chiraito (*Swertia chirayita*) in Eastern hills, medicinal plants in Bagmati zone, leaves of Chumlani (*Skimmia anquetilia)* in Khaptad, medicinal and aromatic plants (MAPs) in Manang District, MAP trade in Gorkha and Bajura district, quantitative study of Padamchal (*Rheum australe*) in Langtang valley of Rasuwa and so on.

Similarly, major studies on the management and cultivation systems of NTFPs include: timur (*Zanthoxylum armatum*) production in Nepal, the cost-benefit ratio of Dalchini (*Cinnamomum tamala)* cultivation, general distribution, estimation of leafy biomass and the sustainable harvesting techniques of Lauth salla (*Taxus wallichiana)* needles, growth trial of bamboo species, quantitative study of Padamchal (*Rheum australe*), distribution of Kurilo (*Asparagus racemosus),* jatamanshi *(Nardostachys grandiflora)* in Jumla District, and Chiraita *(Swertia chirayita)* in the Koshi Hills, potential income generating activities from Seabuckthorn (*Hippophae salicifolia*) in Achham and Dailekh Districts, utilization, harvesting and trade patterns of MAPs of Humla, local management of Jatamanshi *(Nardostachys grandiflora)* in Chaudabise Valley of Jumla District.

There are few studies that focus on marketing aspects of NTFPs. Study undertaken by ANSAB (1997) in Banke, Bardiya and Dolpa Districts and the Rapti zone; and trade in MAPs from the rural areas of Gorkha are some examples. Despite the fact that marketed volume of NTFPs in Nepal is enormous, for the most part it remains invisible (Sharma 1995). The officially recorded data is a very small fraction of the actual use and commercialized products because no reliable data exist on household consumption and illegal trade of medicinal plants is also extensive (Aryal 1993 and Yonzon 1993).

Malla (1982) estimated the export of crude herbal medicines worth over NRs. 20 million per annum (US$1.6 million) and mentioned that over 60 percent of the total export of herbs is to India. Edwards (1996) has summarized a list of 39 most important NTFPs at national and international levels. These NTFPs contribute four percent of the total

contribution of forestry sector to the national economy. He 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. This figure does not include the NTFPs that is harvested in Terai and Inner Terai regions of the country. Olsen and Helles (1997) from their study in Gorkha reported that 9 products out of 36 constituted almost 80 percent of the collector value of between NRs.7.6 and NRs. 16.6 million.

NTFP related studies and literature that are found in Nepal can be summarized into the four broad headings that correspond to each chapter of this report. These include the following.

There are literature that focus on the policy context, issues and strategies in the NTFP sector (see for example, Subedi, 1997; Ojha, 2000; Kanel, 1999).

Literature that focus on assessment of NTFPs in Nepal include Acharya (2000); Achet et al. (1993); Bashyal et al. (1994); Bhattarai (1984); Chandrasekharan (1998); Edwards (1993); Edwards (1994); Edwards (1996); Kleinn, Laamanel and Malla (1998); Lafranchi (1998); Malla (1994); Malla (1999); Malla, et al. (1994); Parajuli (2001), Regmi et al. (1999).

The main literature on the cultivation, management, harvesting and processing aspects of NTFPs include Amatya, and Amatya (1995); Bhattarai (1995); Bhattarai and Croucher (1996); Hertog and Wiersum (2000); MFSC (1998); Larsen (1999); Malla (1994); Olsen (1998); Shrestha (2001); Shrestha, Joshi, Amatya, and Sthapit, (1994); Shrestha et al. (1996); Shrestha et al. (1996); Subedi (1998); Thapa et al. (2000); Yonzon (1993).

There are literature on the marketing and trade situation of NTFPs of Nepal (see for example, ANSAB (1997); Bhattarai (1998); Bhattarai and Acharya (1998); Bhattarai and Olsen (2000); Bhattarai and Sukla (2000); Malla (1882); Malla et al. (1995); Olsen (1997); Olsen and Helles (1997); Rawal et al. (1994); Sharma (1995); Shrestha et al. (1994); Shrestha et al. (1996); Shrestha (2001); Subedi (1997); Subedi (1998). Summary of studies and literature related to NTFPs is given in Annex (see Table 1.1, 1.2, 1.3).

Chapter 2

Assessment of the Status of NTFPs

2.1 Nepal's forests and vegetation types

Nepal provides a natural ground for the promotion of a number of natural herbs owing to its unique topography, geography and climatic conditions (DVN 2002). Of the total flowering and non-flowering types of species found in the world, Nepal occupies over 2 percent of flowering and 6.78 percent of non-flowering types of species[2].

Country's area covered by forests is reducing. In 1964 it was 43% (64,000 $km^{2)}$ of the country's area. It is reduced to 37% in 1986 (62,000 $km^{2)}$. It is further reduced 29% in 1998 (Sharma, 1991). Currently, Nepal has 4.27 million hectares forests and 1.56 million hectares shrublands corresponding to 29% and 10.6% of the total land respectively (DFRS 1999).

Nepal is positioned to offer the diversity of 6 phytogeographical provinces, 10 bioclimatic zones, 35 forest types and 75 vegetation types and 118 types of ecosystems represented by about 7000 species of vascular plants including 300 endemic species of flowering plants within 216 families and 1534 genera (Bajracharya *et al.* 1988; Joshi and Joshi 1991, Adhikari, 2000). Similarly, 2000 Nepalese plants reported to have medicinal properties. Among them 1463 are known to be used locally (Shrestha and Shrestha 1999), and many are demanded by Indian manufacturer of Ayurvedic prescription (Shrestha 1994).

Nepal has about 35 major forests and 75 vegetation types. Of which there are more than 700 different MAPs species of medicinal and aromatic plants in Nepal and distributed in all the physiographic regions of the country. The distribution has been found to be approximately 31% in tropical and subtropical zones, 55% in temperate zones, and 14% in alpine regions.

Despite rich in forests and vegetation, NTFPs in Nepal are reported to be overexploited. The main factors identified are urbanization, industrialization, habitat destruction, acculturation and destructive harvesting practices (Malla, 1994). As a result, 13 MAPs species are listed to be either endangered, vulnerable or commercially threatened (see Table 2.1 below).

Table 2.1 Endangered, vulnerable or commercially threatened MAPs

Endangered	*Rauvolfia serpentina* and *Dactylorhiza hatagirea*
Vulnerable	*Podophyllum hexandrum, Swertia chirayita, Paris polyphylla, Picrorhiza scrophulariiflora and Nardostachys grandiflora*
Commercially threatened	*Dioscorea deltoidea, D. prazeri, Aconitum laciniatum, A. spicatum, A. ferox* and *Bergenia ciliata*

Source: Shrestha and Joshi 1996

[2] Herb Production, Collection, Processing and Protection in Nepal, HPPCL, 2055 N.S. quoted by DVN 2002.

2.2 Distribution of NTFPs

Quantitative assessments of NTFPs from the forests of Nepal, their collection, transportation to the processing centers within Nepal and/or export to India or elsewhere tend to be a difficult task. Such situation exists basically because of the following reasons.

- the existing regulatory regime remains complicated;
- there is an open border with India; and
- there has not been any stock inventory and annual collection regime established so far.
- there is lack of NTFP database

It is found that there are very few NTFPs that are strictly tropical in nature. However the following species occur in up to 1000 m altitude. They include: Sikakai *(Acacia rugata),* Simal *(Bombax ceiba),* Bet *(Calamus latifolius),* Sugandhakokila *(Cinnamomum galucescens),* Musli *(Curculigo orchioides),* Tendu *(Diospyros montan),* Pangro *(Entada phaseoloides),* Mahuwa *(Madhuca longifolia),* Bilaune *(Mesua ferrea),* Thakal *(Phoenix humilis),* Pipla *(Piper longum),* Kantakari *(Solanum surattense),* and Gurjo *(Tinospora sinensis).*

Likewise, species such as Amala *(Phyllanthus emblica),* Amriso *(Thysanolaena mexicana),* Bans *(Bambusa nutans),* Barro *(Terminalia bellirica),* Bel (*Aegle marmelos*), Bhorla (*Bauhinia vahlii*), Bisfej (*Polypodium vulgare*), Tejpat (*Cinnamomum tamala*), Harro (*Terminalia chebula*), Kachur (*Curcuma aromatica*), Pakhanbed (*Bergenia ciliata*), Punarnawa (*Boerhaavia diffusa*), Ritha (*Sapindus mukorossi*), Sindure (*Mallotus philippensis*), Sal (*Shorea robusta*), Thakal (*Argemone mexicana*) are found in between 1000m and 2000m.

There are many NTFP species, which are distributed in tropical through temperate regions (1000-3000m). These include: Babiyo (*Eulaliopsis binata*), Bojho (*Acorus calamus*), Chabo (*Piper mullesua),* Gujargano (*Cissempelos pareira*), Jiwanti (*Ephemerantha macraei*), Bhyakur (*Dioscorea deltoidea*), and Kurilo (*Asparagus racemosus*).

Species of lichen, locally known as 'Jhyau' are distributed between tropical (below 1000m) to sub-alpine zone (3000-4000m) of the country. Most of the species, although traded in the tropical region have their distribution in the sub-tropical (1000-2000m) zone and/or above it. Chiraito (*Swertia chirayita*), Chutro/Daruhaldi (*Berberis aristata*), Chutro/Daruhaldi (*Berberis asiatica*), Indreni (*Trichosanthes tricuspidata*), Gamdol (*Brachycorythis obcordata*), Sallo (*Pinus roxburghii*), Majitho (*Rubia manjith*), Sugandhawal (*Valeriana jatamansii*), and Timur (*Zanthoxylum armatum*) are some examples. Many of the NTFP items dealt in the tropical regions have not yet been botanically identified, and hence their distribution range is not ascertained.

2.3 NTFPs of high demand

Edward (1996) in his study in Eastern hills however has identified 39 important NTFP species, of which 17 (44%) are concentrated in the low altitude region. According to Dabur Nepal about 19 types of NTFPs hold high market demand, of which 8 species (42%) are available in the lower hills and Terai, 7 species (37%) in high hills and 4 species (21%) in the mid-hills. In the Inner Terai and Siwalik of eastern region, 11 major NTFPs were ranked in the first choice by the local farmers (Greiler, 2002).

NTFPs that hold high market demand as reported by traders and Dabur Nepal, and species that are preferred by farmers reported by Greiler (2002) are represented in the following table. Shrestha *et al.* (1996) reported that Jatamanasi ((*Nardostachys grandiflora*), the high altitude species indicated in the table, constitutes 51.63% of the amount of MAPs exported to India. Jatamansi (***Nardostachys grandiflora***) and Sugandhawal (*Valeriana jatamansii*), the mid hill species indicated in the table, are also the major two species that are processed in Nepal. The NTFPs that are in the high demand are listed in Table 2.2.

Table 2.2 NTFPs of high demand in various ecological zones

Geographical Location	Traders' priority species Scientific Name	Local Name
High Altitude	*1. Anacyclus pyrethrum*	Akarkarra
	2. Nardostachys grandiflora	Jatamansi
	3. Picrorhiza scrophulariiflora	Kutki
	4. Rheum australe	Padamchal
	5. Saussurea costus	Kuth
	6. Swertia chirayita	Chraito
	7. Taxus wallichiana	Loth Sallo
Mid hills	*1. Asparagus racemosus*	Satawor, Kurilo
	2. Crocus sativus	Saffron
	3. Hypericum perforatum	St. John's Wort
	4. Valeriana wallichii	Sugandhwal
Terai and Inner Terai	*1. Acorus calamus*	Bojho
	2. Asparagus racemosus	Kurilo
	3. Bambusa/Dendrocalamus spp.	Bans
	4. Carthamus tinctorius	Kusumphool
	5. Ephemerantha macraei	Sunakhari
	6. Glycorrhiza glabra	Jethi madhu
	7. Mentha arvensis	Pudina
	8. Phyllanthus emblica	Amala
	9. Piper longum	Long Pipla
	10. Piper peepuloids	Round Pipla
	11. Rauvolfia serpentina	Sarpaganda
	12. Rubia manjith	Majitho
	13. Silybum marianum	Milk thistle
	14. Thysanolaena maxima	Amriso
	15. Withania somnifera	Aswagandha
	16. Zanthoxylum armatum	Timoor

Source: Greiler and Subedi, 2001; Dabur Nepal, 2002

Similarly, Greiler and Subedi (2001), from their study in Ilam, a NTFP rich district located in Siwalik region, reported the most demanded 11 NTFPs which are prioritized and attributed by farmers of Ilam (see Annex Table 1.4).

The important fibres that are extensively used in Nepal for paper and rope making include Sabai grass (*Eulaliopsis binata*), *Daphne* spp, locally known as lokta, *Girardinia diversifolia, Edgeworthia gardeneri, E. papyrifera* and *Agave cantala.*

Almost all items of NTFPs that are of commercial value, notably Babiyo (*Eulaliopsis binata*), Amriso (*Thysanolaena maxima*), Bhorla (*Bauhinia vahlii*), Ritha (*Sapindus*

mukorossi), Sikakai (*Acacia rugata*), Tejpat/Dalchini (*Cinnamomum tamala*), Pipla *Piper longum*) Chabo (*Piper mullesua*), Amala *(Phyllanthus emblica)*, Bel *(Aegle marmelos)*, Gurjo *(Tinospora sinensis),* Bojho *(Acorus calamus)* are used by the rural Nepalese households and are in high demand for domestic purposes. However, their economic values have not been calculated in the monetary terms.

Quantitative data obtained from 19 District Forest Offices for the fiscal year 2001/2002 indicate that there are 33 types of tropical NTFPs that are collected for commercial purposes that accounted for the collection of 3283 ton of dry raw materials. The largest quantity of the collection is shared by (Babiyo-*Eulaliopsis binata*- ; 2016 ton) succeeded by Bhorla ko pat-*Bauhinia vahlii*; 398ton), Ritha-*Sapindus mukorossi*; 248 ton), Satawar/Kurilo-*Asparagus racemosus*; 128 ton), (Jhyau- *Lichen spp.*; 83 ton), (Sugandhakokila-*Cinnamomum glaucescens*; 74 ton), and Bhorla ko bokra-*Bauhinia vahlii* ; 61 ton).

Data for the fiscal year 2001/2002 suggests that the total quantity of tropical NTFPs exported through 12 Custom Offices[3] is equivalent to 104,000 ton of raw materials dominated by Amriso-*Thysanolaena maxima*; 101,000 ton) and succeeded by Jadibuti (unidentified medicinal herbs; 1000 ton), (Bans-*Dendrocalamus/Bambusa* spp.; 875 ton), (Ritha-*Sapindus mukorossi* -; 289 ton), (Sikakai-*Acacia rugata*; 80 ton), and others.

The major NTFPs that generate the highest revenue in some of the District Forest Offices are given in Table 2.3 below. The major contributor NTFPs in the Terai and inner Terai region are found to be as follows.

Table 2.3 NTFPs that generate the highest revenue in the district (as of FY 2001-2002)

Type of NTFPs	Districts
Babiyo	Kapilbastu and Banke
Bhorla leaves	Saptari, Parsa, Kailali and Kanchanpur
Dalchini	Rupandehi
Jhyayu	Makawanpur
Pawan bark	Bara and Rautahat
Ritha	Morang, Sunsari and Udaypur
Timur	Surkhet and Dang

Source: Field visits, 2002

A survey in the current study indicates that NTFPs such as Alaichi, Rudrakshya and Majhitho are concentrated in eastern Nepal and others such as Dalchini, Bojho, Timur and Pakhanbed are found more common in the western region of Nepal. Among the total trade of Chiraito, more than 50% are traded from east Nepal.

[3] 12 major Custom Offices situated in the Indo-Nepal borders include: 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).

Chapter 3

Cultivation, Management, Harvesting and Processing of NTFPs

3.1. Cultivation

Medicinal and Aromatic Plants (MAPs) that are currently cultivated in commercial scale and used in value added productions in Nepal include: *Cymbopogon winterianus* (Citronella), *Cymbopogon flexuosus* (Lemongrass), *Cymbopogon martinii* (Palmarosa), *Matricaria chamomilla* (Chamomile), *Ocimum basilicum* (French basil), *Mentha arvensis, Tagetes glandulifera, Eucalyptus camadulansis,. Tagetes minuta.* Similarly, some of the natural occurring and indigenous aromatic plants that are found in national and community forests and substantially used for commercial products include: *Gaultheria frgrantissima* (Wintergreen), *Nardostachys grandiflora* (Jatamanshi), *Parmelia nepalensis* (Lichens), *Zanthoxylum armatum* (Timoor), *Cinnamomum glaucescens* (Sugandh kokila), *Cinamomum tamala* (Tej pat), *Rhododendron anthopogon* (Sunpati), *Juniperus communis* (Juniper berry and leaves), *Acorus calamus* (Calamus), *Curcuma zedoria* (Kachur), *Artemisea dubia* (Artemesia), and *Taxus baccata (Lauth salla).*

In recent years, cultivation of aromatic plants such as Citronella, Lemongrass, Chiraita, Mentha, Broom grass and Cinnamon has been popular in many community forests of Eastern region. Similarly, Neem (*Azadirachta indica)*, Amala (*Phyllanthus emblica*) Kurilo (*Asparagus racemosus*), Bamboo and Rattan have also found to be widely cultivated in central region. Sarpagandha (*Rauvolfia serpentina*), Babul (*Acacia nilotica*), Pipla (*Piper longum*), Kurilo (*Asparagus racemosus*), Harro (*Terminalia chebula*), Barro (*Terminalia bellirica*), Amala (*Phyllanthus emblica*), Bamboo, Rattan, Satawar (*Asparagus racemosus*), Bakaino (*Melia azadirach*), Kusum and Neem (*Azadirachta indica*) are frequently cultivated in community forests of mid western districts. Ratan (*Calamus* spp.), Pipla (*Piper longum*), Sikakai (*Acacia rugata*), Musli (*Curculigo orchioides*) and Kauso (*Mucuna pruriens*) were widely found in sample community forests visited in far western region. Amliso and bamboo were also found to have been cultivated and were well adopted in leasehold forests. People now have started taking interest in cultivating Sugandha kokila (*Cinnamomum glaucescens)* and Kurilo (*Asparagus racemosus*) in many leasehold forests. During study, cultivation of NTFPs in private land has also been recorded. However, they were confined to subsistence level under homestead garden and on marginal lands.

Since 1980, Tamaghadi farm, a branch office of HPPCL in Bara district has been involved in both research and development of NTFPs. The focus in recent years has been found more on the cultivation of aromatic plants rather than medicinal herbs. The major species include: Palmarosa, Citronella, Lemongrass, *Mentha arvensis, Matricaria,* French basil, *Tagetes,* Holly basil (Ocimum sanctum), Sarpagandha (*Rauvolfia serpentina*), Kurilo (*Asparagus racemosus*), Pipla (*Piper longum*), *Eucalyptus, T*ejpat (*Cinnamomum tamala*), bamboo and rattan, Sikakai (*Acacia rugata*), and Bel (*Aegle marmelos*). Among all, mass cultivation of Palmarosa, Citronella, Lemongrass, *Mentha arvensis, Matricari* and French basil was found prominent. The trend of cultivation of *Mentha* and *Matricaria* has been found to increase. These crops are also to be found more profitable than cultivating rice. Demand of seeds and seedlings of *Matricaria* and *Mentha* for cultivation is very high since HPPCL provides the processing facilities and guarantees the market.

Department of Plant Resources carries out research on the cultivation and processing technology of some species, mainly Amala (*Phyllanthus emblica*), Kurilo (*Asparagus racemosus*), Pipla (*Piper longum*), Gurjo (*Tinospora sinensis*), Bel (*Aegle marmelos*), Sikakai (*Acacia rugata*), Kalmedh (*Andrographis paniculata*). This department has been able to pilot some of the processing technology, which has been adapted by various processing enterprises in the country.

There are various institutions, which are promoting cultivation and harvesting technology of NTFPs and MAPs but in a very limited scale. Majority of the NTFPs collectors and traders of Makawanpur district those having their 60% sources of income from the NTFPs business have realized that cultivation of NTFPs in their private land is a profitable business. As a result, many farmers have already initiated cultivation of kurilo (*Asparagus racemosus*) in their private marginal lands. As a result of this, some of the forest technicians have already established private nursery to support the demands of seed/ seedling to the private growers. It was also learned that, commercial banks are in a position to recognize the importance of NTFPs business and are supporting the growers and traders by providing production and marketing loans.

3.2 Conservation and management

There are few literature that specifically focus on the management[4] aspect of NTFPs in Nepal. Conservation status of NTFPs in leasehold forests of Chitawan and Makawanpur districts, which were surveyed during the study period reveal that *in situ* (on site) conservation of Amriso, Bamboo, Barro, Harro, Kurilo, Nigalo, Sugandhakokila and Sarpagandha has been practiced by forest users. Similarly, Lemon grass, Molasis, Nepier and Stylo are the major species conserved in *ex situ* (off site).

Similarly, a survey of community forests in five Terai and Inner Terai districts namely Makawanpur, Bara, Parsa, Nawalparasi and Rautahat reveals that many NTFP species have been managed in community forests (table 3.1). The major species managed under *in situ* conservation include Asuro, Amliso, Ameri grass, Amala, Bamboo, Barro, Bet, Chiuri, Harro, Kalomusle, Kurilo, Nigalo, Pipla, Ritha, Rattan, Sarpagandha, Sikakai, and Thakal. Similarly *ex situ* conservation, which are recorded in community forests include Amriso, Bamboo, Bet, Kurilo, Nigalo, Pipla, Rattan and Sarpagandha.

Table 3.1 Species conserved (in-*situ* **and** ex-*situ)* **in community and leasehold forests**

Common species that are conserved in **community and leasehold** forests both under **in-*situ* and ex-*situ***	Amriso, Bamboo, Kurilo, Nigalo, Sarpagandha
Species that are found only in **leasehold** forests under **ex-*situ***	Lemon grass, Molasis, Nepair and Stylo
Species that are found only in leasehold forests under **in-*situ***	Sugandhakokila
Species that are found only in **community** forests under **ex-*situ***	Bet, Pipla, Rattan
Species that are found only in **community** forests under **in-*situ***	Asuro, Ameri grass, Amala, Chiuri, Kalo musle, Ritha, Sikakai, Thakal

Source: Field survey 2003

[4] The term management here refers to the protection, conservation and manipulation of NTFPs occurant forest areas for sustained-yield, watershed protection, scientific research and the conservation of biodiversity (modified and adapted from EC1996:189).

3.3 Collection and harvesting

There are three main channels of NTFP through which NTFPs are collected and harvested. These include broadly: village/local level collectors, road-head middle man cum Nepali traders and Indian traders. District Forest Offices are the main authority that grant permits for collection, harvest and transport for all the channels mentioned above.

Records of District Forest Offices indicate that Babiyo generates the highest revenue (27% of the total annual revenue of twenty Terai districts), the major share of which comes from Banke district. *Bhorla ko pat* from Kailali is the second highest revenue generator that shares about 18% of the total revenue generated from twenty Terai districts. Khair, Resin, Jhyau, Timur, Ritha, Dalchini, Pawan bark, Sugandhakokila, Kurilo are other products that generate significant amount of revenue in the district (Table 3.2). These products however are not distributed in all districts. *Bhorla ko pat* and Ritha are the two products that are distributed in more than three districts.

Table 3.2 Major NTFPs that generate revenue

S.N	NTFPs	Annual Revenue Rs. (' 000')	% Of total revenue of 20 Terai districts
1	Babiyo	3400	27.19
2	Bhorla ko Pat	2304	18.42
3	Khair	1180	9.44
4	Salla Khoto (Resin)	899	7.19
5	Jhyau	736	5.88
6	Timur	560	4.48
7	Ritha	442	3.53
8	Dalchini	439	3.51
9	Pawan bark	401	3.21
10	Sugandhakokila	373	2.98
11	Kurilo	262	2.09
12	Musli	157	1.25
13	Sikakai	155	1.24
	Total products	12657	100.00

Source: DOF (2002)

Official records of the Department of Forests based on the royalty collection of 2002 indicate that the country produces about 2,100-3,000 tons of NTFPs annually. The Mid-western Region of Nepal produces the maximum quantity of NTFPs (43%) followed by Western (19%), Central (16%), and Far- western (16%) and Eastern (5.52%), respectively.

3.4. NTFP processing and enterprises

There are very few NTFP enterprises in Nepal comparing with its potentiality. Value addition within Nepal is, therefore extremely limited. Processing is limited to traditional oil extraction from Chiuri, a large unit for pine resin processing, production of paper from Lokta fiber, experimental grinding of Timur and a few menthol oil distillation units. In

addition, as important commercial products, Jatamansi (*Nardostachys grandiflora*) and Sugandhawal (*Valeriana jatamansii*) are the two major items that are processed in Nepal.

Among the processing enterprises of tropical NTFPs, Natural Products Industries located at Jawabari, Kapilbastu district and Bahubali Herbal Essence Private Limited, Nepalgunj are the prominent ones. Similarly, the Bhrikuti Pulp and Paper Industry is one of the biggest paper factories that consume thousands of metric tons of sabai grass *(Eulaliopsis binata)* annually for high quality paper production. *Daphne* spp., locally known as lokta, is used as raw material for hand-made paper, which is based on local technology and flourishing enterprises in Nepal. It is one of the expanding cottage industries of the country with an annual turnover of around NR10 million. The industry provides direct employment for about 1500 families (Khatri 1994).

Bamboo and cane are other important products that are used extensively by the Nepalese small entrepreneurs to make traditional baskets, mats and furniture, and for building material in rural areas. *Calamus tenuis* is the most valuable rattan, which is used most widely for furniture. The monthly turnover of rattan industries is estimated to be upto US$107.

Industrial utilization of MAPs has been made by the HPPCL at government level. About 30 value added MAP industries are operational at private level too. Major industries are still at the secondary stage. Nevertheless, some of the multinational companies like, Dabur Nepal Private Limited, Nepal Liver Ltd. Balsara Herbals, Cosmos Herbal Private Limited are attracted in Nepal in utilizing NTFPs. These companies are producing intermediary to final consumer products ranging from health care products to soap, detergents and cosmetics.

Chapter 4

Marketing and Trade of NTFPs

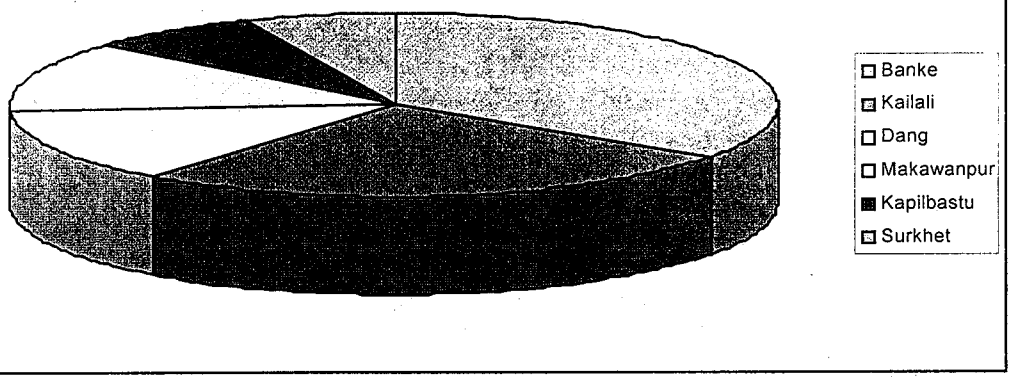
4.1. NTFP producing districts

Banke, Kailali, Dang and Makawanpur are the main NTFP districts in terms of the amount of revenue that these districts generate. Banke and Kailali are the two districts that share almost half of the total revenue generated in twenty Terai districts. Makawanpur, Kapilbastu, Surkhet, Rupandehi, Rautahat and Udaypur district altogether contributes three fourths of the amount that the two district (Banke and Kailali) generates. The rest 11 districts share only about 11 % of the total annual revenue generated in 20 Terai districts.

Table 4.1 Share of Revenue by sample districts in Terai and inner Terai district of year 2001/2002

District	Revenue Rs. ('000)	% of the revenue of 20 Terai districts
Banke	2928	27.70
Kailali	2266	21.44
Dang	1119	10.58
Makawanpur	1047	9.90
Kapilbastu	631	5.97
Surkhet	531	5.04
Rupandehi	341	3.24
Rautahat	268	2.54
Udayapur	218	2.06
Dhanusha, Saptari, Sunsari, Mahottari, Morang, Bara, Chitwan, Kanchanpur, Bardia, Nawalparasi, Parsa,	1220	11.53
Total districts (20)	10569	100.00

Fig. 1 DFOs that generate highest revenue from NTFPs



Source: DFO Records, 2002.

In terms of the species that contribute the highest government revenue in the district are Babiyo (from Kapilbastu and Banke), Bhorla leaf (from Siraha, Kailali and Kanchanpur), Jhayoo (from Makawanpur), Ritha (from Morang, Sunsari and Udaypur), Khair (from Saptari), Musli (from Dhanusha and Mahotari), Pawan bark (from Rautahat and Bara), Bhorla bark (from Parsa), , Jiwanti (from Chitwan), Sikakai (from Nawalparasi), Dalchini (from Rupandehi), Timur (from Dang and Surkhet), and Kurilo (from Bardia). Similarly, the choice of NTFP species which are of high importance from the perception of people in the eastern Siwalik documented by Greiler and Subedi (2001) is shown in Annex Table 1.4. The details of the share of revenue from the species are tabulated in Annex Table 1.5.

4.2. Scale of NTFP trade

NTFP trade is a very crucial element to motivate farmers and resource managers in the cultivation and management of NTFP species. There are about 150 species of NTFPs that are traded. About 95 percent of the NTFPs is estimated to be collected from the wild enter into trade, and about 90 percent of the trade are directed towards the Indian markets. The number of traded species could be even higher as the government estimation is based on the formal market demand that tends to be conservative. District Forest Office records on the revenue collection give some indications on the trend of NTFPs exploitation and trade but often confusion is created as the existing recording systems adopted by custom officials as all NTFPs are placed on one heading or classified as miscellaneous item. The current recorded percentage figure of earnings from NTFP represents very insignificant in the household and national economy.

The official statistics shows that the trend of total traded value of NTFP since 1991/1992 indicates that there is a gradual rise of the traded items except in the year 1999/2000. Aromatic products are receiving increasing attention worldwide. However these traded items of Nepal are largely as dried herbs in "crude" and "unprocessed" forms.

The Customs offices charge a custom duty of 0.5 % of the value of the NTFP item intended for export. Data suggests that Custom Offices keep records of individual species of only 20 NTFP items; the majority of medicinal herb species are categorized vaguely as '*Jadibuti*' (medicinal herbs) and '*Anya*', a miscellaneous item head.

In Nepal, the annual harvest and trade of commercial NTFPs from legal and illegal sources is roughly estimated to be between 10,000-15,000 metric tons with a value of US $ 8.6 million in Indian boarder (Rawal and Paudyal, 1999). The scope of trade of NTFPs has been growing worldwide. The official data of the Ministry of Finance on the collection and trade of NTFPs from Nepal reveals that in 2000/2001 medicinal herbs worth of NRs. 71.5 million have been exported to India. Similarly, a total worth of NRs. 25.9 million have been generated from the trade of NTFP herbs from the countries other than India in the year 2000/01 alone. The Customs Department records indicate that about 135,000 metric tons of NTFP have been exported to India in the fiscal year 2000/2001. Ten years' official data of the Ministry of Finance indicates that India contributed 73-89 % of the total NTFP traded value from Nepal (Economic Survey 2001/2002).

Official records of the Department of Forests based on the royalty collection indicate that the government collects annual revenue between Rs 13.90 million to 21.41 million by granting permission for the annual collection of about 2,100-2,900 metric tons of NTFPs. The annual revenue from NTFPs was worth NRs. 16.6 million in the Fiscal year 1999/2000, NRs. 21.5 million in 2000/01 and NRs. 13.9 in 2001/02.

4.3 Major traded items

Nepali hand made paper made from *Daphne* spp., locally known as lokta, is a flourishing business in Nepal. Nepalese hand-made paper is consumed at local as well as international markets. The total domestic consumption of hand made Nepali paper is estimated to be 7.4 million sheets annually. This is equivalent to 185 tones. The remaining 115 tones is consumed by others.

Nepalese essential oils have been well received in the regional and European markets. The conventional oils such as Palmarosa, Citronella, Lemon grass and tagetes have a growing demand from foreign customers. The case is similar with certain newly introduced unconventional items such as *Rhododendron anthopogon* oil. Jatamansi oil *(Nardostachys grandiflora)* and Timur oil (*Zanthoxylum armatum*) require greater efforts for successful export. The future of the essential oil industry looks promising, with foreign firms entering Nepal for the manufacture of soaps and detergents (Rawal 1995). It has been estimated that about 39300 kg of dried jatamanshi have been marketed annually whereas its potential annual production could be more than 100 000 kg (New Era 2001). It is estimated that 90 percent of the jatamanshi in the Indian market originates from Nepal.

Nepalgunj is the biggest trading center for NTFPs in Nepal. There are more than 20 established NTFP traders in Nepalgunj. Out of them, 3 relatively big traders capture almost 75 percent of NTFP business. NTFPs landed at Nepalgunj are further exported to north Indian cities of Lucknow and Delhi. According to Jaributi Association of Nepal (JABAN), 796 metric tones of NTFPs were exported from Nepalganj in FY 2001/2002. Major NTFPs traded in big volume were found to be Amala, Bhutkesh, Chiraito, Dalchini, Dhupi, Dhupjadi, Jatamansi, Ritha, Sikakai, Sugandhawal, Tejpat and Timur of which latter five are widely found in the siwaliks and Terai.

India remains to be the major market for Nepalese NTFPs. The official custom records indicate that more than 134, 000 metric tons of NTFP was exported to India in 2001/2002. This figure, however, varies considerably from one year to other. Parsa, Kapilbastu and Sunsari are the main custom points that share the highest revenue (Table 4.2).

Table 4.2 NTFPs to Indian Market from Different Customs Points (2001/2002)

Customs Points	Export Quantity (MT)	Royalty (NRs)
1. Kakarvitta (Jhapa)	7,126	499,495
2. Bhantabari (Sunsari)	96,995	1,304,800
3. Jogabani (Morang)	299	85,333
4. Malangwa (Sarlahi)	35	18,650
5. Vittamor (Mahotari)	26,035	18,800
6. Gaur (Rautahat)	35	349,900
7. Birgunj (Parsa)	289	84,824,000
8. Sunauli (Rupandehi)	423	207,016
9. Krisnanagar (Kapilbastu)	132	3,592,225
10. Rupaidiha (Banke)	727	NA
11. Kailali	2,424	NA
12. Kanchanpur	319	NA
Total	134,839	90,900,219

Source: District Customs Department Offices (2002)

Amongst the six market places in India, Delhi was found to be the biggest market for Nepali NTFPs. The relatively high demand in the Delhi market for NTFPs is met by supply from Nepal, followed by India's own supply and that from Bhutan and Pakistan respectively.

There exists a long tradition of Nepali traders supplying a range of NTFPs to Indian traders. Different species of Nepalese NTFPs absorbed in Delhi market. Besides India, the market for NTFPs from Nepal exists in 19 other countries from around the world. They are - Pakistan, Bangladesh, Hong Kong, Korea, Taiwan, Singapore, Japan, USA, France, Germany, Italy, Sweden, Switzerland, Spain, Czech-Republic, Australia, Austria, New Zealand and Hungary. Some 28 types of species have been exported to these countries in the past, mostly in the processed form. The quantity of export ranges between 8 to 17 metric tons per year.

Among various species of NTFPs, Chiraito (*Swertia* spp.) occupies major position in the trade of wild medicinal plants. Thirty-four districts of Nepal have been found to contribute in the supply of Chiraito. It is traded in 27 major herb trade centers of Nepal from east to west. Comparatively, it is traded as one of the commonest commodities in the herbs trade. Nine different species of *Swertia* spp. have been identified from the trade samples of Chiraito. About 419,300 kg of Chiraito has been estimated in the trade during 1995/96. Out of the total trade of Chiraito, more than 50% is traded from east Nepal (Bhattarai and Acharya 1998).

4.4 Major trade centres

Kathmandu and Birgunj are the major NTFP trading hubs in the Central and Western Region. The traders at Birgunj and Janakpur export their collection to India (Delhi, Kolkata, Kanpur etc) whereas Kathmandu traders undertake processing and/or export to USA, Italy, France and other European countries besides India.

The major herbal trade centres surveyed in the Terai and Inner Terai region include: 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).

The seven major herbal trade centres of Delhi, Lucknow, Kanpur, Kannauj, Tanakpur, Siliguri and Calcutta consume Nepal's major medicinal herbs. The major product that are consumed by these trade centre include: Gucchhi chau, Atis, Okhar bokra, Jhayu, Dhup jadi, Salamdana and Ritha.

Chapter 5

Issues, Challenges and Recommendations

5.1. Issues and challenges

Despite increased recognition of the contribution of NTFPs to both household and national economy, there is the lack of accurate and consistent data on production and trade of NTFPs that undermines its contribution. Moreover the economic importance of NTFPs is generally underestimated because much of the production and consumption is at subsistence level, and thus, data are rarely collected or published regularly. When data are recorded, incomplete reporting, double counting, grouping of NTFPs at different stages of processing or together with other products, and the use of unrealistic prices, are systematic shortcomings of such statistics. There are no reliable time series data of NTFP production and trade.

The challenge is to satisfy increasing demands of NTFPs while respecting ecological sustainability and in a socially responsible way.

Policy issues are clustered around 'inappropriate regulatory control' and 'inadequate enabling environment' regarding sustainable NTFP management and trade (Ojha, 2000).

Involvement of multiple authorities (for example DOF, DPR, custom, FNCCI, HPPCL and so on), lengthy and complex permit procedures, *ad hoc* directives and circulars, inadequate institutional support and limited interventions to transform the prevailing imperfect marketing structure are the main challenges to promote NTFPs in Nepal. Above all, the local collectors tend to be paid a labor charge only and not a value of the resource in a socially just manner.

There are some species of NTFPs banned for collection, while others are banned for export in crude form (HMG, 1995). The ban was imposed to conserve such bio-resources/species from extreme pressure and the threat of extinction. However, such ban has not been able to enhance conservation rather illegal trade and smuggling is reported to have taken place through various ways. For example, out of the nine species currently banned for exports in their crude form, the study found the four species traded illegally. These include: Jatamansi (*Nardostachys grandiflora*), Sugandhawal (*Valeriana jatamansii*), Jhyau (Lichen spp.), and Sugandhkokila (*Cinnamomum glaucescens*). Moreover, despite the legal requirement for Jatamansi and Sugandhawal to be processed for export, these products are found to be traded to India each year in significant quantities without processing (CBED, 1999). In fact definition of processing is not clearly defined and even the trivial changes in appearance are justified as having been processed for export purposes. The trade in reality of both the banned as well as restricted NTFPs is continuing with increased distortions in legal provisions, resulting in decreased benefits at the local level. Only a few influential traders/contractors are benefited out of such provisions.

Department of Forests grant license for several years for the purpose of collecting and marketing of NTFP products such as resins and lokta (*Daphne* species) to various contractors and companies. Several patches of potential community forests in the middle

and upper hills of the country are provided license for NTFP without having a proper strategic plan that delineate the area for potential community forests or national forests to be retained. Confusions occur when the patch of national forest is handed over to FUGs without clarifying and defining the rights and responsibilities of collectors, contractors, DFOs and FUGs. In many cases, private collector parties are given exclusive collection rights in handed over community forests that has reduced the motivation of FUGs and has hampered in the effectiveness of the management of NTFPs.

Several management constraints are reported that are hampering NTFP promotional activities. Lack of favourable national policies, long term vision, effective demonstration of commercial cultivation and marketing facilities of MAPs, practically at the grassroots level, awareness about commercial cultivation and processing facilities post-harvest technology including temporary storage of produces, processing and marketing of MAPs are the key ones (Shrestha et al., 1994).

Commercial cultivation of NTFPs, entrepreneurship and trading by growing NTFPs in private forests are not adequately encouraged. There is lack of conducive industrial policy that encourages private growers to invest for long-term management and utilization of NTFPs. The same complex official procedures apply for private growers for the collection and marketing of NTFPs, which come even from private lands.

The export formalities are controlled by a number of agencies. For example, product certification is to be performed by the Department of Plant Resources whereas Certificate of Origin has to be produced by the Federation of Nepal Chamber of Commerce and Industry. Income tax certificate is administered by the Department of VAT, and the collection, transport and export permits are to be issued by the District Forest Offices. Provision of this multiple compliance does discourage entrepreneurs severely to undertake export business in the NTFPs sector.

Department of Forests is responsible for collecting royalty from the NTFPs as per the rates specified in the Forest Regulations (2051). This means royalty rates cannot be reviewed and change until the rules are changed. Practically, the royalty rate has to be regularly reviewed on the basis of market demand, the condition and stock of the resources. The current practice of determining royalty rates by the government is however said to be arbitrary. This practice should be changed and fixing royalty should be made on the basis of market, resource availability and management objectives.

5.2. Recommendations

Local people should be encouraged to manage and cultivate NTFPs through providing knowledge, skills, required seedlings and assuring market and market links.

In order to free the traders from all the hassles of complex official procedures and multiple compliances responsible agencies should coordinate to develop a single door system and NTFPs should be allowed for free trade.

The scope and opportunities for NTFP management within community forests could be widened if some specific provisions are included in the forest rules.

FUGs need technical support to prepare sound operational plans that has estimation of the inventory and the stock of NTFP resources. There is a need to devise various tools and techniques through action research for the development of methodology of resource inventory, forecasting the yield, determining sustainable harvesting thresholds and quality of products. For which joint monitoring and working in action research mode in close collaboration with local communities to have interface between formal and local knowledge is necessary.

NTFPs should be a major course in the curricula of the Institute of Forestry, Botany and Ecology and interested should have opportunity to choose NTFPs as the major subject for Intermediate, Bachelor and Masters' course. In addition, short-term training, study tours and exchange visits on NTFPs and MAPs for all types of stakeholders and agencies at all levels including people from the Department of Customs, FNCCI, Ministry and Department of Forests and user groups is necessary.

Regular interaction between functional networks of service providing organizations and FUGs would be effective mechanism to share knowledge and experience and to collectively approach for policy reforms. For this to happen, the MFSC has to realize the importance of continuous and effective dialogue and collaboration with concerned stakeholders (NGOs, local bodies and private entrepreneurs), line agencies and the traders involved in NTFPs cultivation, management, marketing, trade and processing.

A minimum standard on quality of NTFP should be maintained by standardizing the practices such as labeling the products, mentioning moisture content, appropriate packet size, active ingredient per cent and so on. To ensure the good quality and the price of the products, concerned authorities should also provide forest certificates and monitor the products especially while exporting.

In order to avoid confusion on the roles and responsibilities over resources (particularly for NTFP collection) in the community forest areas where private contractors are interested to obtain permits for NTFP collection, FUGs' Operational Plan should guide the contractual provisions made between District Forest Office and undertaking contractors/ companies. Arrangement should be made in such a way that FUGs will be consulted and have full responsibilities and authorities to cultivate, manage, collect, harvest, market and trade NTFPs for the benefit of both the resource and its members. Moreover, where such contractual agreements have been made between the DOF/DFO and the contractors prior to handing over of the Community Forests, arrangement should be such that administration and management responsibilities of the DFOs should shift to FUGs once such contract expires. New contractual arrangement will have to be made in FUGs' Operational Plans while revising the plan in close collaboration with the DFOs.

5.3. Possible areas of intervention and way forward

Sustainable management and utilisation of NTFPs and improvement of poor people's livelihoods must be the goal of intervention. To achieve the same, following areas of intervention should be aimed at by undertaking the relevant set of activities.

At policy and program level

- Develop a common vision among stakeholders for the promotion of NTFP sector in Nepal
- Identify policy and regulatory constraints, and initiate action for their resolution through consultation
- Establish a regulatory framework supporting the principle that NTFP based enterprises could be established in public-private-community partnership
- Strengthen established structure responsible for policy formulation and ensure inter and intra-sectoral coordination and public participation in policy making on NTFPs and provide them sufficient autonomy to deal with NTFP related matters
- Where relevant, mainstream NTFP component into forestry related projects right from the design phase.
- Ensure adequate investments and budget for the promotion of NTFP
- Strengthen the capacity of the Department of Plant Resources and High Level NTFP Promotion Coordination Committee to carry out action research, extension, policy formulation and monitoring and evaluation of NTFP promotion.

At the district level

- Like at the centre, establish district and local level mechanisms for the co-ordination of NTFP sectoral development that bring synergy and avoid duplication
- Establish NTFP networks, associations, interest groups and other representative structures which will be able to bring field based experience and knowledge in the development of NTFP sector
- Based on action research and locally developed process, develop and implement guidelines for cultivation technology, sustainable management, harvesting techniques, quality production and trade
- Increase knowledge and skills of government and non-government forest sector agencies in technical information and monitoring, and ensure that they are utilized properly

At community level

- Facilitate communities to form NTFP User Group and begin to provide support to establish NTFP networks, associations, interest groups and other representative structures at community level and link them with district and national level network
- Train agencies and community members in the use of appropriate methods and technology to cultivate, manage and harvesting of important species of NTFPs
- Develop methodology to integrate indigenous and scientific knowledge concerning conservation, management, and utilization.
- Ensure that poorest members of the communities participate in, and benefit from any type of intervention related to NTFP
- Encourage community and private sector to develop NTFP based enterprise
- Develop training materials adapted to local conditions and building on both local and formal knowledge and practice

At household level

- Encourage and support individual households to establish kitchen nursery of important NTFP species
- Provide information and technical support for the cultivation and management of commercially important NTFP species that have adequate market
- Facilitate individual household to join in NTFP based User Group, NTFP networks, associations, interest groups and other representative structures that are established at community level
- Select and train progressive members of the group for NTFP related training in the use of appropriate methods and technology to cultivate, manage and harvesting of important species of NTFPs
- Make use of user member as resource person in training and demonstration programme related to NTFP conservation, management, and utilization.
- Identify the poorest households in communities by well being ranking exercise and ensure that the poorest members of the community get opportunities of employment, participation, land as part of community forests or leasehold forests for cultivation, management and harvesting of NTFP for their livelihoods
- Provide financial, technical support, subsidy, compensation of their voluntary labour and share holding rights to the poorest households traditionally engaged in NTFP collection in order to develop their entrepreneurial skill so that they also become a potential shareholder of NTFP based enterprises to be established under state-community-private partnership

At resource level

- Create additional resources through both natural regeneration systems and new planting on state and community forests, private and wastelands
- Develop and apply innovative silvicultural and forest management system with user-friendly technical prescriptions in order to promote the use of indigenous valuable species and natural regeneration systems
- In close consultation with communities and stakeholders, develop and apply technical standards for quality control of NTFP products
- Document the best practices and lesson learnt from any of NTFP related intervention and practices

Bibliography and References

Acharya, T.P. 2000. Conservation of non-timber forest products (NTFPs) in Humla, Nepal: a case study of Rudikot (Margor) region for biodiversity conservation. In: Proceedings of the Third Regional Workshop on Community Based NTFP Management, Kathmandu, Nepal. South and East Asian Countries NTFP Network (SEANN). pp. 264-271.

Achet, S. H., Amatya, K. R., Bajracharya, P., Sheak, A. and Sinha, S. 1993. *Non-timber Forest Products in Nepal: The Scope for Sustainable Commercialization.* Appropriate Technology International (ATI), Washington DC, USA. 77p.

Amatya, K.R. and Amatya, G., 1995. Medicinal plants in Gorkha District. *In*: Yadav, S.K. and Stoian, D. (eds.), Proceedings of the seminar on medicinal and aromatic plants in Gorkha District: how to promote their utilisation and marketing. District Forest Office, Gorkha bazaar. pp. 17-24.

Amatya, S.M. and Stoian, D. (eds.), 1995. Proceedings of the seminar on medicinal and aromatic plants in Gorkha District: how to promote their utilization and marketing. German Development Service, District Forest Office, Gorkha bazaar. 28 pp.

ANSAB and EWW. 1999. Enterprise development for natural products: a focus on non-timber forest products. A draft manual, 16 September 1999. Asia Network for Small-Scale Bioresearches and Enterprises Works Worldwide. Kathmandu. 41 pp.

ANSAB, 1997. Environment and forest enterprise activity: forest products market/enterprise options study. Asia Network for Small-scale Agricultural Bio-resources, Kathmandu. 107 pp.

Aryal, M. 1993. Diverted wealth: the trade in Himalayan herbs. *Himal* Jan/Feb: 9-18.

Bashyal, B. P., Bhattarai, N. K. and Pradhan, J. 1994. Role of research and development in commercial utilization of non-timber forest products : medicinal and aromatic plants. *In* J. Pradhan and P. Maharjan (Eds.), Proceedings of the National Seminar on NTFPs: Medicinal and Aromatic Plants. September 11-12. Ministry of Forest and Soil Conservation and Herbs Production and Processing Company Limited, Kathmandu, Nepal. pp. 27-34.

Bhattarai, K.R. and Acharya, N. 1998. *Swertia* species (Chiraito) in commerce in Nepal. *Plant Research* 1(1): 48-55.

Bhattarai, N. K. 1995. Prospects of community based NTFP enterprise development for promoting biodiversity conservation and economic development in Gorkha district, Nepal. *In* S. M. Amatya and D. Stoian (Eds.), Proceedings of the Seminar on Medicinal and Aromatic Plants in Gorkha district: How to promote their utilization and marketing. District Forest Office, Gorkha/German Development Service, Kathmandu, Nepal. pp. 14-18.

Bhattarai, N. K. and Croucher, J. 1996. Viability of local commercialization of non-timber forest products as a strategy for promoting biodiversity conservation. In: P.k. Jha,

G.P.S.Ghimire, S.B. Karmacharya, S.R.Baral and P. Lacoul (Eds.). *Environment and Biodiversity : In the Context of South Asia.* Ecological Society (ECOS), Kathmandu, Nepal. pp. 346-353.

Bhattarai, N. K. and Croucher, J. 1996. Viability of local commercialization of non-timber forest products as a strategy for promoting biodiversity conservation. In: P. K. Jha, G. P. S. Ghimire, S. B. Karmacharya, S. R. Baral and P. Lacoul (Eds.). *Environment and Biodiversity in the Context of South Asia.* Ecological Society, Kathmandu, Nepal. pp. 346-353.

Bhattarai, N.K. 1984. Economic mapping of *Skimmia laureola* Sieb. & Zucc. ex Walp. in the Khaptad 'Lekh' and adjoining forests. Journal of Natural History Museum **8** (1-4): 55-66.

Bhattarai, N.K. and Olsen, C.S. 2000. Towards a generic framework for investigating national importance of medicinal plant trade. In: Proceedings of the Third Regional Workshop on Community Based NTFP Management, Kathmandu, Nepal. South and East Asian Countries NTFP Network (SEANN). pp. 336-346.

Bhattarai, N.K. and Shukla, R.N. 2000. Potentials of NTFP processing and marketing assistance in the resource conservation and economic development in the Mid-western Development Region of Nepal. In: Proceedings of the Third Regional Workshop on Community Based NTFP Management, Kathmandu, Nepal. South and East Asian Countries NTFP Network (SEANN). pp. 206-215.

CBED 1999. Sub-sector Analysis of high-altitude NTFPs in the Karnali zones. Community Based Economic Development Project, Canadian Centre for International Studies and Cooperation, Kathamndu.

Chandrasekharan D. (1998): NTFPs, Institutions, and Income Generation in Nepal-Lessons for Community Forestry. International Center for Integrated Mountain Development. G.P.O. Box 3226, Kathmandu Nepal, Pages: 48, ISSN Number: 1024 - 7556

Edwards, D. M. 1993. *The marketing of non-timber forest products from the Himalayas: The trade between east Nepal and India.* Rural Development Forestry Network Paper 15b. Overseas Development Institute, London, U.K.

Edwards, D. M. 1996. *Non-timber forest products from Nepal: aspects of trade in medicinal and aromatic plants.* FORESC Monograph No. 1/96. Forest Research and Survey Centre, Ministry of Forest and Soil Conservation, Kathmandu, Nepal. 134 pp.

Edwards, D. M. 1996. Non-timber forest products from Nepal: aspects of the trade in medicinal and aromatic plants. *FORESC Monograph* no. 1/96, Forest Research and Survey Centre, Ministry of Forest and Soil Conservation, Kathmandu. 134 pp.

Gautam K. H and Devoc, N. N 2002. Conflicts between Policy and Local People Valuing Non-timber Forest Products: Perspective for Nepal; Journal of Forest and Livelihood Vol 2 (1), Forest Action.

Greiler, Yuka and Subedi, Ujjwal, 2002; The Economy of the Four major Non-timber Forest Products in the Siwalik Area of Ilam Siwalik, Practical Training Report.

Hertog W. H. & Wiersum K. F. 2000. Timur *(Zanthoxylum armatum)* Production in Nepal: Dynamics in Non-timber Forest Resource Management, Mountain Research and Development Vol. 20.2, 136-145.

His Majesty's Government of Nepal 1995. Forest Rules 1995, the Ministry of Forests and Soil Conservation, Kathmandu, Nepal.

His Majesty's Government of Nepal 1998. Master Plan for the Forestry Sector, Executive summary, the Ministry of Forests and Soil Conservation, Kathmandu, Nepal. Pp146, 174.

HMG, 1988. Forest-based industries development plans, part II: medicinal and aromatic plants and other minor forest products. Master Plan for the Forestry Sector Nepal, Ministry of Forest and Soil Conservation, Kathmandu. 82 + 146 pp.

International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal. 85p.

Kanel K. R. 1999. Policy related Issues in Non-Timber Forest Product Business; Workshop Proceedings: Non-Timber Forest Products: Production, Collection and trade in MWDR of Nepal, July 11-12, 1999 Nepalganja; Ban Udhyam-BSP/New ERA and JABAN.

Khatri, D.B. 1994. *Non-wood forest products in Asia,* P.B. Durst, W. Ulrich & M. Kashio, eds. Bangkok, Thailand, FAO Regional Office for Asia and the Pacific.

Kleinn C., Laamanen R. Malla S. B.1998 Integrating the assessment of non-wood forest products into the forest inventory of a large area: experiences from Nepal Domestication and Commercialization of Non-timber Forest Products in Agroforestry System. Nonwood Forest Products Food and Agriculture Organization of the United Nations, ISBN 92-5-10371-9.

Lafranchi, S. 1998. Non-timber forest products and income generating opportunities in the Achham and Dailekh Districts: market potentialities and resource management aspects. HELVETAS/Nepal, Kathmandu. 49pp.

Larsen, H.O., 1999. Commercial collection of *Nardostachys grandiflora* D.C. in Chaudabise Valley, Jumla District, Nepal: local management systems and sustainability. MSc thesis, Royal Veterinary and Agricultural University, Copenhagen. 135 pp.

Malla, S. B. 1994. Medicinal herbs in the Bagmati zone. ADPI Series no. 8. International Center for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal. 85p.

Malla, S.B. 1982. *Medicinal Plants of Nepal.* FAO Regular programme No. RAPA 64. Food and Agriculture Organization of the United Nations (FAO), Regional Office for Asia and the Pacific, Bangkok, Thailand.

Malla, S.B. 1994. *Medicinal herbs in the Bagmati zone.* ADPI Series No. 8.

Malla, S.B., Shakya, P.R., Rajbhandari, K.R., Bhattarai, N.K. and Subedi, M. N. 1995. *Minor Forest Products of Nepal: General Status and Trade.* Forest Resource Information System Project Paper No. 4. Finnish Forest and Park Service. His Majesty's Government of Nepal/FINNIDA, Kathmandu, Nepal.

Malla, S.B., Shakya, P.R., Rajbhandari, K.R., Subedi, M.N. and Shrestha, B.L., 1997. Identification manual for some non-timber forestry products of Nepal. *FRIS Project Paper no. 9*, Ministry of Forests and Soil Conservation, Forest Resource Information System Project, Kathmandu. 280 pp.

Ministry Forest and Soil Conservation 1988. Master Plan for the Forestry Sector, Nepal. His Majesty's Government of Nepal.

New Era Ltd. 2001. A study on non-timber forest products of Bagmati Integrated Watershed Management Program. Kathmandu, Nepal, Bagmati Integrated Watershed Management Program.

Ojha, H.R. 2000. Current Policy Issues in NTFP Development in Nepal, Asia Network for Small-scale Bio-resources. Kathmandu.

Olsen, C. S. 1997. Making the poorest poorer: Policies, laws and trade in medicinal plants in Nepal. *Journal of World Forest Resource Management* 8(2): 137-158.

Olsen, C.S. 1998. The trade in medicinal plants from Nepal: Status and possible improvements. In: *Medicinal Plants: A Global Heritage*. Proceedings of the International Conference on Medicinal Plants for Survival. 16-19 February, Bangalore, India. International Development Research Centre (IDRC), South Asia Regional Office, New Delhi, India. pp. 131-141.

Olsen, C.S. and Helles, F. 1997. Medicinal plants, markets, and margins in the Nepal Himalaya: Trouble in paradise. *Mountain Research and Development* 17(4): 363-374.

Parajuli D. P. 2001. A PhD thesis on Prospects and Problems in Managing *Taxus baccata* L (Sub. *wallichiana*) for Maximum Biomass (Needle) Production in the Central Himalaya of Nepal submitted to Department of Forestry, Kumaun University, Naini Tal-263002, India

Parajuli, D.P.; Gyanwali, A.R.; Shresta, B.M. 1998. Manual of important non-timber forest products in Nepal. Institute of Forestry/International Tropical Timber Organization. Pokhara. 74 pp.

Parajuli D. P. (1998). Cultivation of Cinnamomum tamala in marginal lands for greater income at Palpa District. Banko Janakari Vol.8 No.1.

Rawal R.B, Bhatta, B. & Paudyal A. (Editors 1999). In Work-shop Proceedings Non Timber Forest Products: Production, Collection and Trade in Mid -Western Development Region of Nepal, Jointly Organized by Ban Udhyam-BSP/New ERA (Forest Based Micro-Enterprise Project, Environment and Forest Enterprise Activities and Jadibuti Association of Nepal (JABAN). HMG, USAID, WWF, BSP and New ERA. Ban Udhyam -BSP-New ERA EFEA, P O Box 31, Santinagar, Nepaljunj, Banke.

Rawal R. B. and Paudyal, A. K. 1999. Marketing of Non-Timber Forest Products in Nepal; Workshop Proceedings: Non-Timber Forest Products: Production, Collection and trade in MWDR of Nepal, July 11-12, 1999 Nepalganja; Ban Udhyam-BSP/New ERA and JABAN.

Rawal, R.B. 1995. Commercialization of aromatic plants and medical plants in Nepal. *In Beyond timber: social, economic and cultural dimensions of non-wood forest products in Asia and the Pacific.* RAP Publication 1995/13. Bangkok, Thailand, FAO Regional Office for Asia and the Pacific.

Rawal, R.B., Prasad, R.R. and Adhikary, S.R., 1994. A review and analysis of national policy in the development of NTFPs: medicinal and aromatic plants. *In* Pradhan J. and Maharjan P. (eds.), Proceedings of the national seminar on non-timber forest products: medicinal and aromatic plants, Kathmandu, September 11-12, 1994. Ministry of Forests and Soil Conservation, and Herbs Production and Processing Co. Ltd., Kathmandu, pp. 49-54.

Regmi, S., Bergeron, J. and MacIssac, N. 1999. *Opportunities for leveraged interventions in high altitude NTFPs in the Karnali zone.* Canadian Center for International Studies and Co-operation (CECI), Kathmandu, Nepal.

Saastamoinen, O. 1998. Non-wood Goods and Benefits of Boreal Forests: Concepts and Issues; Sustainable Development of Non-Wood Goods and Benefits from Boreal and Cold Temperate Forests; EFI Proceedings No.23.

Salafsky, N; Cordes, B; Parks, J; Hochman, C. 1999. Evaluating Linkages Between Business, the Environment and Local Communities: Final Analytical Results from the Biodiversity Conservation Network. Bio-diversity Support program, Washington, D.C.

Sharma, P., 1995. Non-wood forest products and integrated mountain development: observations from Nepal. *Non-Wood Forest Products* 3: 157-166.

Shrestha S. 2001. NTFPs, Economic Incentives and Sustainable Management: An Initiative by Janaki-FUG, Development Project Service Centre (DEPROSC), Thapathali, Kathmandu, Nepal (CBED Project)

Shrestha T B and Joshi R M 1996. Rare Endemic and Endangered Plants of Nepal. WWF, Kathmandu.

Shrestha TB 1994. Utilization of Non-Timber Forest Products: Medicinal and aromatic plants. In Pradhan J. and Maharjan P. (eds), National Seminar on NTFPs, Medicinal and aromatic plants, Kathmandu (September 1-12 1994) Ministry of Forest and Soil Conservation and Herbs Production and Processing Co. Ltd, Kathmandu.

Shrestha, G. L., Joshi, R. B., Amatya, G. and Stapit, V. M. 1994. Domestication and commercial cultivation of medicinal and aromatic plants (MAPs) in Nepal. In: J. Pradhan and P. Maharjan (Eds.). *Proceedings of the National Seminar on NTFPs: Medicinal and Aromatic Plants.* September 11-12. Ministry of Forest and Soil Conservation and Herbs Production and Processing Company Limited, Kathmandu, Nepal. pp. 35-41.

Shrestha, K.K., Sah, J.P. and Ghimire, S.K., 1996. *Diversity and conservation strategy of potential medicinal plants in Manang (Gyasumdo valley).* King Mahendra Trust for Nature Conservation, Kathmandu, 35 pp.

Shrestha, K.K., Sah, J.P. and Ghimire, S.K., 1996. Diversity and conservation strategy of potential medicinal plants in Manang (Gyasumdo valley). King Mahendra Trust for Nature Conservation, Kathmandu, 35 pp.

Subedi, B. P; Bhattarai, N. K. 1998. Community Managed Enterprise: Participation of Rural People in Medicinal and Aromatic.

Subedi, B.P. 1997. Utilization of non-timber forest products: issues and strategies for environmental conservation & economic development. Workshop theme paper for the Workshop on the Utilization of NTFPs for Environmental Conservation and Economic Development in Nepal, March 29, Nepal. Asia Network for Small Scale Bioresources. Kathmandu.11pp

Subedi, B.P. 1998. Participatory utilization and conservation of medicinal and aromatic plants: a case from Western Himalaya. Paper presented at the International Conference on Medicinal Plants, February 16-19, 1998, Bangalore, India. 13 pp.

Subedi, B.P.; Ojha, H.R.; Biayee, S.B.; Nicholson, K. 1999. Identification of NTFP based micro-enterprises in Parbat: opportunities, constraints and strategies for development. A workshop report Kushma and Milanchowk, Parbat December 4-6, 1999. Prepared for Micro-Enterprise Development Program, UNDP Nepal. Asia Network for Small Scale Bioresources. Kathmandu. 29 pp.

Thapa H.B, Das, A.N.and Oli, B.N. 2000. Growth Performance and Culm Production of bamboo at the eastern Terai Nepal. Banko Janakari Vol. 8 No. 1

Wickens, G.E. 1991. Management issues for development of non-timner forest products. Unasylva 165, Vol. 42: 3-8.

Yadav, S.K. and Stoian, D. (eds.), 1995. Medicinal and aromatic plants in Gorkha District: how to promote their utilisation and marketing. District Forest Office, Gorkha. 42 pp.

Yonzon, P. 1993. Raiders of the Park. *Himal* January-February 1993.

Annex

Table 1.1 Assessment of NTFPs

Studied species	Study Area	Author
General	Rapti Zone	Achet et al. (1993)
General	General	Bashyal et al. (1994)
Skimmia lalureola (Narapati)	Khaptad Lekh and adjoining forest area (Far Western Nepal)	Bhattarai (1984)
General	General	Chandrasekharan (1998)
Swertia chirayita (Chirata)	Hille, Basantapur	Edwards (1993), Edwards (1994)
39 NTFPs	East Nepal	Edwards (1996)
	Nepal	Kleinn et al. (1998)
	Accham and Dailekh	Lafranchi (1998)
	Bagmiti Zone	Malla (1994)
Medicinal species	Bajura	Malla (1999)
NTFPs	Dhading district	Malla et al (1994)
Taxus wallichiana	Bagmati Zone, Karnali Zone	Parajuli (2001), Regmi et al (1999)

Table 1.2 NTFP cultivation, management, harvesting and processing

Studied species	Study Area	Author
Jatamansi, Kutki, Atis	Humla District	Aharya, (2000)
Chiuri, pine resin, Lokta, Timur	Rapti Zone	Achet et al. (1993)
	Gorkha	Amatya and Amatya (1995)
Skimmia lalureola (Narapati)	Khaptad Lekh and adjoining forest area (Far Western Nepal)	Bhattarai (1984)
	Ghorkha	Bhattarai 1995,
	General	Bhattarai and Croucher (1996)
Swertia chirayita (Chirata)	Hille, Basantapur	Edwards (1993)
	Dhankuta and Tehrathum Districts	Edwards (1996)
100 wild species	Middle Hills and High Mountains	Edwards (1996)
Zanthoxylum armatum (Timur)		Hertog and Wiersum (2000)
Medicinal and aromatic plants, lokta paper, pine resin, Sal seeds, Katha and cutch		MFSC (1998)
Medicinal and aromatic plants	General	Kleinn et al. (1998)
	Acham and Dailekh	Lafranchi (1998)
Nardostachys grandiflora	Jumla District	Larsen (1999)
	Sub alpine and alpine regions	Malla S.B. (1994)
	Gorkha and Nepal as a whole	Olsen (1998)
Cinnamomum tamala	Palpa	Parajuli (1998)
Taxus wallichiana	Bagmati zone	Parajuli (2001)

Studied species	Study Area	Author
	Karnali Zone	Regmi et al. (1999)
Sungandhawal, Pakhanbed, Timur and Jhyau	Dadeldhura	Shrestha (2001)
	General	Shrestha et al. (1994)
Nirmashi, *Dactylorhiza hatagirea* (Panchaunle) *Nardostachys grandiflora* (Jatamanshi), *Picrorhiza scrophulariiflora* (Kutki), *Rheum australe* (Padamchal)	Gyasumdo Valley, Manang	Shrestha et al. (1996)
Nirmashi *Dactylorhiza hatagirea* (panchaunle) *Nardostachys grandiflora* (jatamanshi), *Picrorhiza scrophulariiflora* (kutki), *Rheum australe* (padamchal)	Manang District Humla	Shrestha et al. (1996) Subedi (1998)
Five bamboo species namely *Bambusa nutans* subsp. *cupulata*, *Bambusa nutans* subsp. *nutans*, *Bambusa tulda*, *Bambusa balcooa* and *Dendrocalamus giganteus*	Morang district of Eastern Nepal	Thapa et al. (2000)
General	Langtang National Park	Yonzon, P. (1993)

Table 1.3 Resource marketing and trade

Studied species	Study Area	Author
Jatamanshi, Kutki, Atis	Humla District	Aharya (2000)
		Amatya and Amatya (1995)
NTFP enterprises	Ghorkha	Bhattarai 1995
	Banke, Bardia and Dolpa	ANSAB (1997)
Medicinal plants		Bhattarai (1998)
Swertia spp. *(Chiraito)*	34 districts of Nepal	Bhattarai and Acharya (1998)
NTFP and biodiversity		Bhattarai and Croucher (1996)
Medicinal plants	Nepal Himalaya	Bhattarai and Olsen (2000)
	Mid western Region	Bhattarai and Sukla (2000)
	Dhankuta and Tehrathum Districts	Edwards (1996)
	Country as a whole	Malla (1882)
Medicinal Plants	Bagmiti Zone	Malla (1994)
Major herbs including 37 wild species	Ilam, Basantapur, Hille, Dharan, Gaighta, Lahan, Hetauda, Butwal, Bahadurganj, Ghorai, Chhinchu and Nepalganj	Malla et al. (1995)
Medicinal species	Bajura	Malla (1999)
MAPs	Gorkha	Olsen (1997)
MAPs	Gorkha	Olsen and Helles (1997)
MAPs		Rawal et al. (1994)
	Karnali Zone	Regmi et al. (1999
Nardostachys grandiflora (jatamanshi), *Swertia chirayita* (Chiraito)	Jumla and Koshi Districts	Sharma (1995)
MAPs		Shrestha et al. (1994)
Aconitum bisma (nirmashi) *Dactylorhiza hatagirea* (panchaunle) *Nardostachys grandiflora (jatamanshi), Picrorhiza scrophulariiflora (kutki), Rheum australe (padamchal)*	Gyasumdo Valley, Manang	Shrestha et al. (1996)
Sungandhawal, Pakhanbed, Bhojo, Timur and Jhyau	Dadeldhura	Shrestha (2001)
General	General	Subedi (1997)
MAPs	Humla	Subedi (1998)
Workshop Proceedings		
1. Amatya and Stoian (1995) 2. Rawal et al. eds. (1999) 3. Yadav and Stoian eds. (1995) 4. Subedi et al. (1999)		
Manuals		
Malla et al. (1997) Parajuli et al. (1998) ANSAB and EWW (1999)		

Table 1.4 NTFPs of high importance in eastern Siwaliks

Name	Significance/attributes
Asparagus racemosus (Kurilo)	• High demand in local, national and international markets. • High interest of local people in cultivation. • Major export species from Nepal. • Several companies trading with MAPs in Nepal and India have given this species a priority for cultivation project. • Abundant in the past and very much traded in Ilam Siwalik
Rauvolfia serpentina (Sarpagandha, Chandmarua)	• Banned for export in raw form. • High demand at local level for illegal trade, Demand at the international market. • Major exported species from Nepal in the past. • Facing difficulty in propagation • Abundant in the past and very much traded in Ilam Siwalik.
Demotrichum fimbriatum (Sunakhari, Jivanti)	• Local demand for the trade to India • Illegal trade: Orchids are banned for export. • Widely available in Ilam Siwalik.
Piper longum (Pipla, Chabo)	• High demand in local, national and international market. • Imported in Nepal for processing. • Several companies trading in MAPs in Nepal and India have given this species a priority for cultivation project. • Low local knowledge about the species.
Rubia majith (Majitho)	• High demand in local, national and international market. • Major exported species from Nepal. • Available in the Ilam Siwaliks at the frontier with the mid-hills.
Phyllanthus emblica (Amala)	• High demand in the local, national and international market. • Several companies trading with MAP in Nepal and India have given this species a priority for cultivation project. • Market value only if harvested in big quantity and transported in a short period of time for the extraction of the pulp (low value plant). • Needs high investment. The first fruits can be collected 6 years after planting of seedlings. • Low interest of local people in the cultivation and collection.
Glyeyrrhiza glabra (Jethi madhu)	• Relatively low demand for trade in India. • Widely available in the Siwalik
Zanthoxylum armatum (Timur)	• High demand in the local, national and international market. • Major exported species from Nepal. • Only available in the Ilam Siwalik bordering mid-hills.
Acrous calamus (Bojho)	• High demand in the local, national and international market. • Major exported species from Nepal. • Only available in the Ilam Siwalik bordering mid-hills.
Thysanolaena maxima (Amriso)	• Very important for the people living in Ilam Siwalik and cultivated all over the area. • At present relatively in low quantity collected due to its decrease in forests. • Can help reclaim degraded area. • High quality is found in the mid-hills not in the Siwalik range.
Bambusa arundinacea (Bans)	• Play an important role in the economy of Ilam Siwalik • Highly demanded in the Bhutanese Camp (also as construction material).

Source: Greiler and Subedi, 2001

Table 1.5 NTFPs that generate the highest revenue in the district (FY 2001-2002)

District	NTFPs	Revenue (Rs) '000	Total Revenue '000	% share of the district	% Share of the total 20 Terai districts
Morang	Ritha	75	130	57.69	0.6
Sunsari	Ritha	91	184	49.45	0.5
Udayapur	Ritha	120	218	55.04	0.9
Siraha	Bhorla Leaf	186	186	100.00	1.4
Saptari	Khair	7	7	100.00	0.05
Dhanusha	Musli	15	208	72.11	0.1
Mahottari	Musli	142	158	89.87	1.1
Rautahat	Pawan bark	240	268	89.55	1.8
Bara	Pawan bark	120	129	93.02	0.9
Parsa	Bhorla Bark	12	13	92.30	0.09
Makawanpur	Jhayoo	615	1047	58.73	4.8
Chitwan	Jiwanti	31	123	25.20	0.2
Nawalparasi	Sikakai	18	19	94.73	0.1
Rupandehi	Dalchini	290	341	85.04	2.2
Kapilbastu	Babiyo	631	631	100.00	4.9
Dang	Timur	386	1119	34.49	3.0
Banke	Babiyo	2769	2928	94.56	21.9
Surkhet	Timur	163	531	30.69	1.2
Bardia	Kurilo	16	25	64.00	0.12
Kailali	Bhorla Leaf	2116	2266	93.38	16.7
Kanchanpur	Bhorla Leaf	23	45	51.11	0.18

Source: DFO Records, 2002.