UNEP

GREEN economy

Sectoral Study

BioTrade

Harnessing the potential for transitioning to a green economy – The Case of Medicinal and Aromatic Plants in

Nepal

Citation
UNEP, 2012, Green Economy Sectoral Study: BioTrade – Harnessing the potential for transitioning to a green economy – The Case of Medicinal and Aromatic Plants in Nepal

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Front cover page: Tibetan bowls are used in Buddhist meditation practices. *© Guillermo Garcia.* Essential oil with vanilla and anise seed. *© Hitdelight.* A wooden rope bridge across a green valley in Nepal. *© Walter Quirtmair.* An old woman spinning wool in Kathmandu, Nepal. *© Kaetana.*

Back cover page: The cultivation of spices, such as nutmeg, star anise and saffron, is labour intensive. *© rayjunk.* View of Everest from Gokyo Ri. *© Daniel Prudek.* An old woman spinning wool in Kathmandu, Nepal. *© Kaetana.*

Contents

List of figures

List of tables

List of boxes

List of acronyms

AEC-FNCCI	Agro Enterprise Centre – Federation of Nepalese Chambers of Commerce and Industry (Government of Nepal)
ANSAB	Asia Network for Sustainable Agriculture and Bioresources
BDS-MaPS	Business Development Services-Marketing, Production and Services
BISEP-ST	Biodiversity Sector Programme for the Siwaliks and Terai
CBBT	Capacity Building for BioTrade
CBD	Convention on Biological Diversity
CBS	Central Bureau of Statistics (Government of Nepal)
CBTF	Capacity Building Task Force
CDMA	Code Division Multiple Access
CFUG	Community Forest User Groups
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DDC	District Development Committee
DFID	Department for International Development
DFO	District Forest Office
DFRS	Department of Forest Research and Survey (Government of Nepal)
DoF	Department of Forests
DPR	Department of Plant Resources
FECOFUN	Federation of Community Forest Users of Nepal
FNCCI	Federation of Nepalese Chambers of Commerce and Industry
GACP	Good Agricultural and Collection Practices
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GMP	Good Manufacturing Practice
GoN	Government of Nepal
Ha	Hectares
HACCP	Hazard Analysis and Critical Control Point
HNCC	Herbs and NTFP Coordination Committee
ICIMOD	International Centre for Integrated Mountain Development
IDRC	International Development Research Centre
IMF	International Monetary Fund
INGO	International Non-Governmental Organization
INCLUDE	Inclusive Development of the Economy (GIZ)
IRG	International Resource Group
ITC	International Trade Centre
IUCN	International Union for Conservation of Nature
JABAN	Jaributi Association of Nepal
MAPs	Medicinal and Aromatic Plants
MDGs	Millennium Development Goals
MoCS	Ministry of Commerce and Supplies (Government of Nepal)
MoFSC	Ministry of Forest and Soil Conservation (Government of Nepal)
MT	Metric Tonne
NEHHPA	Nepal Herbs and Herbal Products Association
NFDIN	National Foundation for the Development of Indigenous Nationalities
NGO	Non-Governmental Organization
NPC	National Planning Commission (Government of Nepal)
NPR	Nepali Rupee
NTFPs	Non-Timber Forest Products
OCN	Organic Certification Nepal
PSP	Private Sector Promotion (GIZ)
SAWTEE	South Asia Watch on Trade, Economics and Environment
SDC	Swiss Agency for Development and Cooperation
SNV	Netherlands Development Organisation
SPS	Sanitary and Phytosanitary
TEPC	Nepal Trade and Export Promotion Centre
UK FCO	United Kingdom Foreign and Commonwealth Office
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USD	United States Dollar
USAID	United States Agency for International Development
WB	World Bank
WHO	World Health Organization
WTO	World Trade Organization

Acknowledgements

This report was prepared by the International Centre for Integrated Mountain Development (ICIMOD). Michael Kollmair and Anu Joshi Shrestha served as Study Leaders on behalf of ICIMOD.

Asad Naqvi (UNEP) provided strategic guidance for the preparation of this report and managed the Capacity Building for Biotrade (CBBT) project under the overall guidance of Steven Stone. Doris Günther of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) provided substantive input and guidance to various aspects of the CBBT project, under which this report has been prepared.

Gratitude is extended to the Ministry of Commerce and Supplies, Government of Nepal, for its leadership of the project. The guidance and support provided by the Ministry of Environment, Science and Technology, the National Planning Commission of Nepal, the Ministry of Forestry and Soil Conservation, and the Permanent Mission of Nepal in Geneva is also highly appreciated.

UNEP would like to thank the Federation of Nepalese Chambers of Commerce and Industry (FNCCI), the Trade and Export Promotion Centre (TEPC), the Asia Network for Sustainable Agriculture and Bioresources (ANSAB), the South Asia Watch on Trade, Economics and Environment (SAWTEE), Himalayan BioTrade, Solutions Consultant and other organizations that provided ideas, inputs and support for this project. On behalf of ICIMOD, UNEP would like to thank Puspa Sharma from SAWTEE for helping to gather data; Khilendra Gurung from Himalayan BioTrade for his inputs on opportunities and challenges in the MAPs sector in Nepal; all experts of ICIMOD for vital inputs; and Stephen Keeling for his valuable editing support.

Thanks are due to GIZ and to its country officers and staff. A special appreciation goes out to Philip Kruschel and his team at GIZ's Inclusive Development of the Economy (INCLUDE) programme for their support and worthy contribution.

UNEP would like to acknowledge and appreciate the many organizations and individuals from Nepal, who participated in the consultations and provided valuable time and feedback.

At the UNEP Secretariat, Annie Haakenstad, Carolina Caeiro, Pratyancha Pardeshi, Diwata Hunziker, Ronal Gainza-Carmenates, Azzam Khan and Simon Lobach provided research assistance. Qurratul-Ain Haider edited and proofread the text. Le Cadratin prepared the layout based on the design by Thomas Gianinazzi. Fatma Pandey, Rahila Somra and Désirée Leon provided administrative support for the project. Rafe Dent is the administrator of the CBTF website (www.unep-unctad.org/cbtf).

UNEP would also like to acknowledge the support offered by the International Trade Centre (ITC); the secretariats of the Convention on BioTrade Diversity (CBD); the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); and The Economics of Ecosystems and Biodiversity (TEEB) for the CBBT.

UNEP is grateful for the funding support by the German Federal Ministry for Economic Cooperation and Development through GIZ, without which the project would not have been possible.

Notwithstanding the valuable contributions of those acknowledged here, the responsibility for the content of this report rests fully with the authors.

A wooden rope bridge across a green valley in Nepal. © Walter Quirtmair/Shutterstock.com

Foreword

Nepal is a rich country in South Asia in terms of natural resources. Nepal is also regarded as a rich country in terms of biodiversity, which, if developed properly, could be a major source of income and employment for the large number of people living in rural areas. The growing global demand for natural and environmentally friendly products, today, speaks of the vast potential of BioTrade to contribute to the strengthening of the country's economy and rural livelihoods. Given this background, this document reports the findings of a study on the potential of BioTrade to facilitate Nepal's transition to a green economy, in which goals of social equity and environmental conservation are achieved jointly with economic prosperity.

The growth in production and trade of bioproducts has great potential to reduce poverty, especially among women and disadvantaged. In addition, the prudent use of biodiversity products substantially helps preserve our fragile environment and supports the regeneration of depleting stocks of wild species.

Against this backdrop, considering Nepal's vast potential in biodiversity, the study has prioritised Medicinal and Aromatic Plants (MAPs) as key biodiversity-based products for in-depth analysis. This report catalogues the many opportunities as well as challenges prevalent in the BioTrade sector, which could be equally interesting and insightful for all. Even the challenges associated with this sector could be successfully transformed into opportunities, if addressed with good policy and programme intervention. In order to realise the large potential of this sector, there is an acute need to carry out inventories of available resources, and to introduce appropriate technologies for transforming Nepali raw materials into value-added products. Moreover, there is a need to establish well-equipped laboratories to test plants and products in order to meet SPS requirements and have easy access to highly lucrative international markets. There is also a need for adopting and implementing appropriate policies - that facilitate adequate incentives for entrepreneurs - to promote and encourage formal trade in MAPs. In this context, creating awareness among stakeholders at the grassroots, setting up markets and processing centres, building and strengthening the capacity of government, non-government and private sector institutions, and enhancing coordination among them, are extremely helpful in supporting and promoting all steps of the value chain in MAPs.

I acknowledge the work of UNEP, ICIMOD, their collaborators and the authors for undertaking this important study and for bringing out such a useful report. I urge all policy makers, development agencies, entrepreneurs and stakeholders concerned to use this report while designing and implementing policy and programmes to develop the MAPs sector of Nepal in a sustainable and beneficial manner.

Lal Mani Joshi
Secretary
Ministry of Commerce and Supplies

Key messages

The economy of Nepal has been consistently growing over the past few years.

The country has made significant progress in reducing poverty and improving other social indicators. However, economic growth has not been as high as that of neighbouring countries and poverty is still widespread amongst disadvantaged groups, especially in the remote regions. Limited employment opportunities in the rural areas, and underdeveloped agriculture and BioTrade sectors compel young people from rural areas to leave their villages in search of economic opportunities. This not only causes additional pressure on labour markets and social infrastructure in the cities but leaves women, old men and children to manage labour-intensive agriculture and to take care of the biodiversity and ecosystems.

BioTrade offers many opportunities to Nepal – a higly biodiverse country.

A wide array of different Medicinal and Aromatic Plants (MAPs) are found in Nepal, especially in rural areas in the Far-Western and Mid-Western regions, the areas where the highest poverty rates have been recorded. The export of high-value MAPs offers great potential for reducing poverty and providing livelihoods in these remote areas, whilst contributing to biodiversity conservation and growth of exports. A package of policy reforms and investments from the public and private sector could help advance the development of a BioTrade sector in line with the ideals of a green economy.

Currently, the harvesting of high-value MAPs is largely unregulated, which leads to practices that deplete this biological resource, degrade ecosystems and the environment in general, and risk impoverishment of communities in the long run. Due to a lack of information on market demand and prices, collectors of MAPs in Nepal receive much less than their fair share of the value of their products. Furthermore, the lack of policy support and investment in improving the quality of Nepali BioTrade products makes them less competitive in international markets. Higher import duties levied by India on processed BioTrade products also discourages value-addition in Nepal.

A well-managed trade in MAPs in Nepal can overcome the lack of employment opportunities in the rural and remote areas, contribute to the development of the country's export sector, and create incentives for biodiversity conservation in the country.

In order to overcome these challenges, this paper makes a number of recommendations:

(i) Sustainable harvesting can be promoted through raising awareness, the carrying out of regular inventories of MAPs resources and conducting of research leading to the identification of varieties suitable for cultivation.

(ii) A forum could be created to link research, regulatory and development agencies and businesses to share information as well as identify the main challenges to the growth of the BioTrade sector and strategies to overcome them.

(iii) The adoption of international standards by private enterprises, and capacity building to enable producers to meet sanitary, phytosanitary (SPS) and other requirements of importing countries are recommended.

(iv) Improving access to credit and technology can play an important role in meeting quality requirements.

(v) The development of transparent and fair marketing channels is also important.

(vi) Royalties paid to collectors should correspond to market prices.

Towards a green economy
Introduction

1.1 Background study

In 2010, the Capacity Building for BioTrade (CBBT) initiative of the United Nations Environment Programme (UNEP) commissioned studies on the potential of BioTrade in three developing countries: Nepal, Namibia and Peru.

The Nepal study has been carried out by the International Centre for Integrated Mountain Development (ICIMOD) with the support of UNEP. The study shows how the sustainable development of one type of BioTrade – trade in Medicinal and Aromatic Plants (MAPs) – can contribute towards a green economy vision. A green economy is defined as one which results in sustainable economic growth and increased social equity whilst improving environmental conservation and reducing ecological scarcities.

Alongside this study, the CBBT, through the German Development Cooperation (GIZ), supported the Ministry of Commerce and Supplies (MoCS) and other stakeholders to build the capacity of traders and entrepreneurs involved in the BioTrade sector.

1.2 Concept of BioTrade

The concept of BioTrade was introduced by the Secretariat of the United Nations Conference on Trade and Development (UNCTAD) in 1996. BioTrade is defined by UNCTAD as:

Activities of collection, production, transformation and commercialization of goods and services derived from native biodiversity under the criteria of environmental, social and economic sustainability.

The seven principles of BioTrade (Box 1) range from conserving biodiversity, to clarity about land tenure, use and access to natural resources and knowledge.

BioTrade commodities include naturally occurring plant and animal species in raw, processed and manufactured forms; and services that make use of biodiversity. The latter includes ecotourism. Plants that come under BioTrade can be collected from the wild or cultivated. There is an increasing demand in local and international markets for BioTrade commodities, products and services, especially due to the burgeoning demand for organic and natural products.

1.3 Focus, methodology and limitations of the study

In September 2010, a workshop was held for BioTrade stakeholders – from government and non-government organizations and the private sector – to discuss the objectives and focus of this study and to solicit cooperation. The study was then carried out by collecting information from secondary sources (books, reports, periodicals and research publications); consultations and interactions with experts; and from interviewing representatives of stakeholder organizations. The main limitation faced in undertaking this study was finding comprehensive up-to-date data about MAPs resource in Nepal; and trade of MAPs and their products.

There is a wide range of BioTrade products and services in Nepal (Box 4). However, this study specifically focuses on trade in MAPs and products. Therefore, there are limitations on the conclusions that can be drawn for the BioTrade sector in Nepal as a whole. Nonetheless, as a high-priority sector for the Nepali Government, trade in MAPs is representative of the potential that BioTrade holds for implementing a green economy vision. ◗

Box 1. UNCTAD's seven principles of BioTrade

1. Conservation of biodiversity
2. Sustainable use of biodiversity
3. Fair and equitable sharing of benefits derived from the use of biodiversity
4. Socioeconomic sustainability
5. Compliance with national and international regulations
6. Respect for the rights of actors involved in BioTrade activities
7. Clarity about land tenure, use and access to natural resources and knowledge

Source: Kruschel (2010)

Primordial Himalayan sea salt and rosemary. © Isame/Shutterstock.com

2. Country profile

2.1 Geographic, demographic and economic profile of Nepal

Nepal is a landlocked country, bordering with China to the north and India to the west, south and east. Nepal has three main topographic zones that run across the breadth of the country: the southern Terai plains (flanked to the north by the Siwalik Hills), the Mid-hills and the Himalayan mountains (with trans-Himalayan areas to the north). The country has an area of 147,181 km^2, eighty-six per cent of which is hills and high mountains. The remaining 14 per cent is flat land belonging to the southern Terai plains. A June 2011 census recorded a population of 26.6 million and an average annual population growth rate of 1.4 per cent in 2001–2011 (CBS 2011a). According to the census, Nepal remains a predominantly rural society with 83 per cent of the population living in rural areas – a decrease from 86 per cent in 2001.

Considerable progress has been made in reducing the number of people living below the poverty line, from 42 per cent in 1995/96 to 25.2 per cent in 2010/11 (CBS 2011b). This has come about largely due to greatly increased remittances, alongside substantial improvements in key development indicators. On the other hand, there has been a low level of growth in the country's manufacturing industries and trade. Nepal's economic growth has been lower than that of most Asian countries.

Nepal has made good progress in improving levels of human development. Improvements in life expectancy, adult literacy, gender equity and reduction in infant and maternal mortality have come about in spite of the decade-long government–Maoist conflict (1996–2006).

However, more than six million people, mostly from Nepal's disadvantaged caste, ethnic and religious groups, as well as from communities living in remote areas, continue to live in poverty. Most relevant to this study is the persistence of high levels of poverty in the remote Mid-hills and mountainous areas in the west where most high value MAPs are found and collected. Poverty is most pronounced in the hills and mountains of the Far-Western and Mid-Western Development Regions.

Box 2. Economic statistics for Nepal

- GDP: USD 15.1 billion (2011 IMF)
- GDP per head: USD 536 (2011 IMF)
- GDP annual growth: 3% estimate 2010 (IMF)
- Inflation: 10.5% estimate 2011 (IMF)
- Major industries: Tourism; carpets, textiles and handicrafts; small rice, jute, sugar and oilseed mills; cigarettes; cement and brick production.
- Major trading partners: India 64%, EU 11%, US 7%, Bangladesh 7%, China 3% (WTO)
- Agriculture accounts for about 40% of Nepal's GDP, services 41% and industry 22%. (2011 IMF)
- Agriculture employs 76% of the workforce, services 18% and manufacturing/craft-based industry 6%. (2011 IMF)

Nepal's exports remain below USD 1 billion and have declined in recent years from 13 per cent to 7 per cent of GDP (World Bank Database). This is primarily due to the decline in the export of readymade garments, carpets and pashmina – Nepal's former key exports. Nepal's landlocked position, its lack of indigenous sources of fossil fuels and raw materials needed to manufacture goods, coupled with the limited transport-links to the north, make Nepal's economy very closely tied to India. Nepal has an open border with India. Substantial smuggling is reported to take place across the border.

Agriculture is the corner stone of Nepal's economy, employing about three quarters of the national labour force and accounting for about 40 per cent of the GDP. However, Nepal's agricultural sector still uses outdated technology and suffers from a lack of productive capacity.

The economic growth that has taken place in Nepal, with the consequent reduction in poverty, has mostly been due to the large increases in remittances from Nepalis working abroad. Official remittances rose from about 13.8 per cent of GDP in fiscal year 2007 to 22 per cent of GDP in 2009. The actual contribution to GDP is considerably higher, as these figures do not include the large inflows from India through informal channels (World Bank, 2010).

View of Everest from Gokyo Ri. © Daniel Prudek/Shutterstock.com

Persisting high levels of poverty are closely related to the lack of employment opportunities, particularly in the remote rural parts of the country. Providing decent work is one of the main challenges to improving the national economic performance and alleviating poverty. It is unlikely that Nepal will reach the MDG 1B – 'full and productive employment and decent work for all by 2015' (NPC 2010). An estimated 300,000 young people leave education and enter the labour market each year (New Era, 2008). Their inability to find work in their home areas has led to high levels of rural to urban migration, putting more pressure on Nepal's already overburdened urban centres. It has also led to an increasing number of Nepalis leaving the country in search of work.

Nepal's economy suffers from a number of challenges. These include the landlocked position of the country, susceptibility to natural disasters (floods and earthquakes, in particular) political instability and the challenges of conflict, civil strife and labour unrest.

2.2 Nepal's biodiversity

The large range of altitude – from 67 m in the south-eastern Terai, to 8,848 m at the summit of Mount Everest, together with the country's location at the transition zone of six floristic regions – means that Nepal has a rich diversity of plant and animal species. The country's 35 forest types

Box 3. Community Forest User Groups

Although the Nepalese government holds ownership rights for all forestlands, around 15,000 Community Forest User Groups (CFUGs) and other community-based forest management groups exist in the country. These groups, which can comprise members of all social strata and which operate in all kinds of ecosystems, hold forest use rights under contracts with District Forest Offices. These forest use rights encompass the community's rights to extract forest products such as fuel wood, fodder and timber, while an operational plan drawn up between the District Forest Office and the CFUG addresses issues of sustainability and forest management. Furthermore, the CFUGs are regulated with regard to the minimum prices they are allowed to charge to outsiders, and the minimum amount of their income spent on forest management and community development activities. While the forests directly administered by the Department of Forests quickly deteriorate, CFUGs have emerged as a viable alternative to counter deforestation and to improve forest conditions, whilst serving as a tool for livelihood improvement and poverty alleviation (FECOFUN website; Singh & Chapagain, 2006).

and 118 ecosystems are home to over 2 per cent of the world's flowering plants, 9 per cent of the world's bird species, 4 per cent of the world's mammalian species, and an estimated 7,000 species of higher value plants – making Nepal the twenty-fifth most species-rich country in the world (Bhuju et al. 2007; MoFSC 2009).

Nepal's ecosystems provide a host of goods and services critical to local livelihoods and the national economy. The majority of rural Nepali households make a living from farming and gathering firewood, fodder, timber and other products from nearby forests. Many Nepalis are still engaged in subsistence farming, although this is increasingly supplemented by remittances and other sources of income such as government jobs.

Essential oil with vanilla and anise seed. © Hitdelight

The condition of Nepal's forests is critical to the conservation of the country's biodiversity. Forests covered an estimated 39.6 per cent of the country when the last detailed survey was carried out in 1994 (DFRS 1999). Since then there has been both considerable forest degradation and clearance in the Terai; and improvements in the Mid-hills forests due to the success of the community forestry programme (Box 3). Definitive up-to-date nationwide data is lacking on forest cover and condition, and also on the status of the country's biodiversity, which explains why the latest MDGs progress report does not give a status indicator for MDG 7 B2 – of reducing biodiversity loss (NPC 2010).

2.3 BioTrade in Nepal

A wide range of BioTrade commodities, products and services are found in Nepal (Box 4), many of which are Non-Timber Forest Products (NTFPs).

Box 4. BioTrade commodities, products and services in Nepal

- Medicinal and aromatic plants
- Essential oils and extracts from medicinal, aromatic and other plants
- Natural ingredients for cosmetics and pharmaceutical products
- Spices and flavours
- Dyes and tans
- Natural pesticides and other natural products used on crops
- Plant fibres (such as allo)
- Native fruits (such as bel, sea buckthorn and ainselu) for juice, wine and jam
- Bamboo products
- Gums and resins
- Wild mushrooms and health foods
- Handicrafts from leaves, wood and sticks
- Handmade paper (from lokta)
- Fats and oils (from churi)
- Farmed wildlife (such as musk deer)
- Ecotourism

This study, however, focuses on trade in MAPs that have made a significant contribution to the economy and local livelihoods of Nepal. MAPs and their manufactured products have the potential to make a much larger contribution to environmentally sustainable 'green' economic development. MAPs are often referred to as medicinal herbs, even though many of them are not 'herbs' as per the definitions in botany ('seed-bearing plants whose aerial parts do not persist above ground') and include perennials and other kinds of plants.

3. Medicinal and Aromatic Plants (MAPs) of Nepal

3.1 Definition

This study takes a wide definition of MAPs – incorporating all the species on the right-hand side of Table 1. This broad definition is used here as many of the 'other' categories in Table 1 include plants used for therapeutic purposes. These plants and their products consist of raw plant products, products after value-added processing, and finished products such as medicines and personal care goods.

There are about 700 species of medicinal plants in Nepal, about 250 of which are endemic to the country (MoFSC 2009). The main traded species are shown in Table 2 (see Annex 2 for scientific names of plants).

It is only in recent times that Western allopathic medicine has become available to the people in Nepal's rural areas. In 1994, it was estimated that 80 per cent of rural Nepal relied on traditional remedies, including plant-based remedies, for treating ailments (Rajbhandari and Bajracharya 1994).

Although the reliance on natural plant remedies has decreased, these remedies are still extensively used because of the widespread belief in their efficacy and the continuing limited availability of allopathic medicines in many rural mountainous regions. The aromatic properties of these plants are used for making incense and for therapeutic effects. A large part of trade in Nepali MAPs goes towards ayurvedic medicine production in India and Nepal.

Table 1. Types of MAPs and their products

Product	Examples of plant species used
A. Raw plant products	
Medicinal and aromatic	Kutki, chiraito, lauth salla, yarchagumba, panchaunle, pakhanved, harro, barro, amala, neem, silajit.
Spices and flavours	Cinnamon, timur, amala, juniper, large cardamom
Wild mushrooms and health foods	Morels, kurilo
Dyes and tans	Padamchal, chutro, majitho, lauth salla, banjh, thingre sallo, okhar
B. Products after value-added processing	
Essential oils and extracts	Jatamansi, sugandhawal, titepati, sunpati, juniper, wintergreen, sugandhakokila, abies, deodar, lauth salla
C. Finished products	
Ayurvedic preparations (medicines, tonic, nutrient supplements)	Kutki, chiraito, lauth salla, yarchagumba, panchaunle, pakhanved, harro, barro, amala, neem, silajit
Traditional medicines	Kutki, chiraito, lauth salla, yarchagumba, panchaunle, pakhanved, harro, barro, amala, neem, silajit
Incense	Jatamansi, juniper, sunpati, mahuwa
Herbal teas	Thyme, gurjo, gandhaino, tulsi, mint, cinnamon
Personal care products (soaps, shampoo, creams)	Pangar, chiuri, ritha, amala, sikakai, naru

Source: Subedi 2006

Table 2. **Priority species for trade in MAPs in Nepal by topographic zone**

Terai Below 1,000 masl	Mid-hills 1,000 to 3,000 masl	Mountains (Himal) Above 3,000 masl
Amala	Timur	Sugandhawal
Chamomile	Tejpat	Padamchal
Pipala	Chiraito	Jatamansi
Mentha	Ritha	Bisjara
Bel	Lauth salla	Guchhichyau
Lemon grass	Pakhanbed	Atis
Sugandha kokila	Dhasingare	Kutki
Neem	Bhyakur	Yarchagumba
Kurilo	Majitho	Panchaule
Bojho	Okhar	Laghupatra
Sayapatri	Jhyau	
Sarpagandha		
Gurjo		

Note: masl = metres above sea level. Source: AEC/FNCCI 2006

3.2 Cultivation and manufacturing

Most of Nepal's high value MAPs, including those in the right hand column of Table 2, grow in the forests and grasslands of the mountains in the northern part of the country. The lower value MAPs are produced below 2,000 m of altitude. In recent years, the market price of most of these plants, especially of high value plants, has increased significantly, leading to over-harvesting of the resource.

GIZ (2011) reports that 85 per cent of Nepal's MAPs are collected from the Far-Western and Mid-West Development Regions – the two regions with the highest levels of poverty. The present trade channels do not provide a fair share of profits to collectors, in spite of the growing trade in MAPs. Most plants are gathered from the wild, although increasing quantities are cultivated. Plants gathered in Nepal are used either for domestic consumption or for sale and manufacture into end products in Nepal, India and third countries.

Individual farmers, private companies and user groups cultivate a growing number of different MAPs in increasing amounts. It is mostly medium-value species such as timur, chiraita, kurilo, and kutki that are grown. A number of the companies (Annex 3) cultivate these plants for their own use alongside buying supplies collected from the wild. Forest user groups carry out enrichment planting in their forests.

However, only limited progress has been made in cultivating MAPs. The few species promoted by the government and cultivated by community forest user groups (CFUGs) and farmers include cardamom and *Swertia chirata,* mainly in the central Terai. This is due in part to the efforts of the Biodiversity Sector Programme for the Siwaliks and Terai regions (BISEP-ST - 2001-2006), supported by SNV, a non-profit organization headquartered in The Hague, the Netherlands. In 2007, under this programme, five species of medicinal plants were cultivated across 679 hectares (ha) yielding around 646 metric tonnes per year (BISEP-ST, 2007). Although there are a few other development organizations working with the government and supporting cultivation of MAPs in Mid-hills and Terai, very little data has been published.

About 10 per cent of all MAPs gathered and harvested in Nepal are used to produce essential oils, medicinal and other products in factories and small handicraft units in Nepal. Some manufacture on a small scale for local markets, while others work on a larger scale for national and international markets. More than 20 domestic manufacturers are registered with the Nepal Herbs and Herbal Products Association (NEHHPA). A 2004 study identified 15 major companies (Annex 3) involved in the processing of 205 NTFPs (plant and other forms) for making ayurvedic preparations and essential oils. These businesses used 1,031 tonnes from among 186 species and extracted about 39 tonnes of essential oil from 19 species (Winrock International et al. 2004).

Herbal tea: processing of collected plants, such as mint, tulsi and gurjo, is undertaken locally by sub-groups of collectors, forest user groups and local traders.

3.2.1 Role of forest user groups in cultivation

Community forest, leasehold forest and buffer zone user groups collect, manage and cultivate MAPs.

- **Community forest user groups (CFUGs) –** Nepal has more than 16,000 community forest user groups that, since the 1980s, have been given the rights to manage and use their local areas of national forest. These groups manage about 25 per cent (1.2 million ha) of the country's forest area. Community forestry has been particularly successful in Nepal's Mid-hills, where user groups manage their forests for conserving biodiversity, improving forest condition and for providing subsistence needs and jobs, incomes and community development. They are entitled to manage and harvest NTFPs. These groups are also involved in cultivating and replanting areas with MAPs.
- **Buffer zone user groups –** Buffer zone user groups manage areas of forests around Nepal's national parks and other protected areas. They plant and cultivate kutki, kurilo and other MAPs in their forests.
- **Leasehold forestry user groups –** As of 2009, Nepal's leasehold forestry programme had leased out 28,000 ha of national forest to 3,417 user groups with 17,244 member households (Adhikari 2009). Leased sections of the forests are used by the poor for purposes of income generation, including cultivating and collecting MAPs.

The local processing of collected plants is usually undertaken by sub-groups of collectors, forest user groups and local traders. They use simple technologies to reduce the weight, volume, and cost of handling and transporting plants. They dry the plants, sort and grade them and, in a few cases, distil plants to extract essential oils.

3.3 Trade and exports

There are varying figures on the amount and value of MAPs (raw and semi-processed products) exported from Nepal. The data given in this section only accounts for plants and products passing through formal channels. In addition, substantial amounts are said to be illegally collected and smuggled across the border into India.

The amount of MAPs exported through legal channels from Nepal increased from around 3,400 tonnes in 1989/90 to about 11,500 tonnes in 1993/4 (Karki et al., 2003). The Department of Forests (2006) estimated that in the fiscal year 2005/06, approximately 33,000 tonnes of MAPs were exported from Nepal.

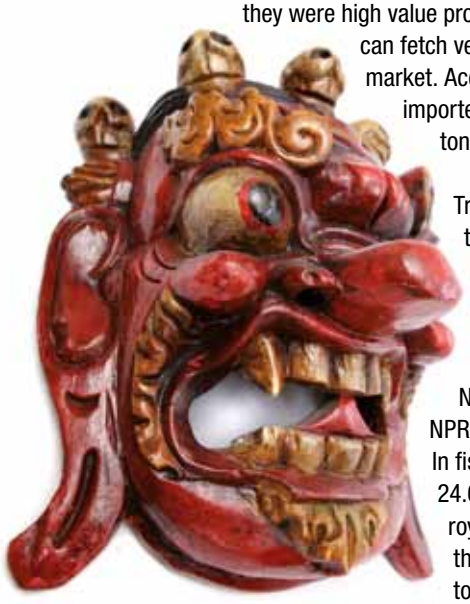
In 2008, the recorded value of the exported MAPs was around USD 3 million, which increased in 2009, to USD 9.8 million (GoN Trade and Export Promotion Centre, GIZ, 2011).

Table 3. **Value of medicinal plants, essential oils and plants (herbs) exported from Nepal by fiscal year 2003–2009 in NPR '000**

	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Medicinal plants (to overseas, excluding India)	13,478	23,078	21,147	47,066	82,589	758,307
Essential oils (to overseas, excluding India)	22,935	15,935	13,745	20,243	34,062	54,928
'Herbs' (to India)	91,500	132,400	133,500	105,600	147,400	na
Total	**127,913**	**171,413**	**168,392**	**172,909**	**264,051**	**813,235**

Source: Trade and Export Promotion Centre 2010

Singapore, as reported by GIZ (2011), imported the highest value of MAPs from Nepal in 2009 and the third highest value in 2010. The fact that Singapore imported only 206 kg of these products in 2009 and 117 kg in 2010 suggests that they were high value products, such as essential oils, that can fetch very high prices on the international market. According to the same report, India imported approximately 4,950 and 6,642 tonnes of MAPs in the same two years.



A traditional mask from Nepal.
© Lebedinski Vladislav

Traders are required to pay royalties to the government on the plants they buy. The Department of Forests (DoF) (2006) reported that the total royalties paid on MAPs declined from 30 million Nepali Rupees (NPR) in 2002/03 to NPR 13.5 million in 2004/05 (Table 4). In fiscal year 2006/07, about NPR 24.6 million (USD 0.34 million) of royalties were collected by the DoF on the 20 most-traded MAPs, increasing to NPR 29.2 million (USD 0.4 million) in 2007/08 (Trade and Export Promotion Centre 2009).

3.3.1 Trade pattern

The market and trade channels for MAPs follow a general pattern of collection in the wild; traded on to villages, roadheads (the farthest point reached by a road under construction) or trade centres; and then traded on to larger centres in Nepal or India. The plants are sold through a long marketing channel, with high transaction costs. AEC/FNCCI (2006) reported that 71 NTFPs were collected in 13 districts of the Mid-Western Development Region. These products included both high and low value species originating from different parts of Nepal. The final destination for most of these products in crude form are the Indian markets of Delhi, Kanpur and Lucknow, with trade chains starting from rural collection to Indian businessmen through a series of middlemen.

Although most of the value-added processes in the production chain occur outside of Nepal, the sale of MAPs gathered from the wild has traditionally made an important contribution to the livelihoods of many people in Nepal's high Mid-hills and mountain areas. One study found that about 80 per cent of households in the Chaudabisa Valley, Jumla, in the western high Mid-hills were involved in collecting jatamansi (a high-value medicinal plant) (AEC/FNCCI 2006). Box 5 shows the importance of MAPs to communities in upper Humla. Local collectors and harvesters are usually the poorer members of communities, such as children, women, the elderly and persons from disadvantaged groups. They work seasonally, collecting and harvesting plants, working from home or from seasonal camps. They harvest from the wild and may undertake preliminary cleaning, drying, and storage before selling the plants and plant parts to local traders. Joshi (2008) reports that about 200,000 people derive their incomes from the harvesting, processing, and trade of MAPs.

Table 4. **Total amount of MAPs declared and royalties paid to government, 2002/03–2004/05 (DoF 2006)**

Fiscal year	Collected quantity (metric tonnes)	Royalties collected (million NPR)
2002/03	4,868	30,37
2003/04	2,857	15,99
2004/05	2,985	13,55

Box 5. Contribution of MAPs to household incomes in upper Humla

In 2008, eight high-altitude settlements in Humla (North west mountain region) were using about 47 NTFPs species for food, medicine and other purposes. They earned NPR 8,858 (USD 123) from selling MAPs and NPR 8,704 (USD 121) from acting as brokers of these plants. This accounted for 41 per cent of their household incomes of about NPR 42,971 (USD 597) (Roy 2010).

More than 100 types of MAPs are harvested in Nepal and traded to international markets. Most of these plants are exported to India in their raw form with only about 10 per cent used in manufacturing enterprises in Nepal. Trade with India is mainly for amala, atis, chiraito, tejpat, guchhi chyau, jatamansi, jhyau, kutki, pipla, ritha, sugandhawal, sugandha kokila and timur (AEC/FNCCI 2006).

Traders who operate at the village, district centre, roadhead, and airport-levels buy the harvested plants in their raw or semi-processed form and sell them on without transforming the product in any way.

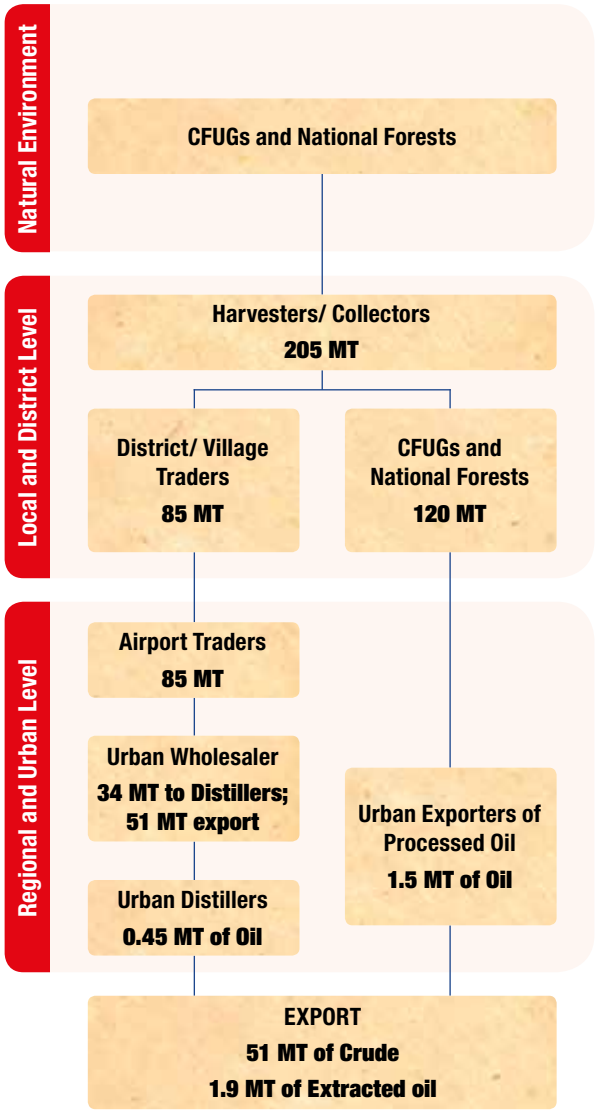
The exporters are the few educated and professional traders with access to international markets, international exposure to market trends and knowledge of export and import regulations. The exporters to India know the markets and have good links with Indian brokers. Most of the members of the NEHHPA are domestic manufacturers and may also export their products. Members of the Jaributi Association of Nepal (JABAN) are mostly exporters of crude plants to India from western Nepal. Although the market has been operating for a long time, it is imperfect, with only a limited number of wholesalers.

3.4 Case study of trade in jatamansi

Jatamansi *(Nardostachys grandiflora)* is a perennial aromatic plant found across Nepal between 3,000 m and 4,000 m. It is collected from pastures, community forests and community land, and sold to village traders. It has many traditional uses including as incense and for treating headaches and wounds. The oil extracted from the rhizomes has a high value in perfumery and as an aromatic adjunct in the preparation of medicinal oils and cosmetic products. It is also used in commercial preparations as a laxative, carminative, antispasmodic, tonic, stimulant, antiseptic and diuretic. The collected rhizomes are cleaned and air-dried. The quality of the essential oil is influenced by the maturity of the rhizomes, their preparation and duration of storage. Rhizomes are graded and packaged for selling.

Farmers and other collectors sell jatamansi directly to local traders and processors. It was estimated in 2005 that about 98 per cent of jatamansi was sourced from community forests, compared to less than 10 per cent a decade ago (Department of Forests, 2005). Figure 1 shows the flow of jatamansi from the collection stage to the key market actors.

Figure 1. Value chain and physical flow of jatamansi



Source: IRG 2006

The export of unprocessed jatamansi from Nepal is disallowed (Annex 4) but processed extracts can be exported with permission from the DoF. It takes about 80 kg of raw jatamansi to produce 1 kg of oil. The government royalty for jatamansi rhizomes is NPR 15 per kg (USD 0.2).
In 2004, about 60 per cent of all essential oil was sold to India (IRG, 2006). Trade is governed by the buyers, who dictate prices based mostly on Indian markets and global prices. Collectors only have the option of either collecting or

Handmade mulberry paper notebooks are popular export attractions. © naipung

not collecting, although mobile phones have increased their access to information regarding market prices in recent years. Alternative markets for jatamansi within Nepal have not been developed and overseas markets (beyond India) are difficult to enter. A decrease in demand for jatamansi oil on the international market usually leads to a decrease in the trade in Nepal, indicating that local consumption of the oil is limited.

The price that collectors receive will vary between NPR 45 and 60 per kg (USD 0.6–0.8), depending on seasonal availability of raw jatamansi. Prices for jatamansi oil will vary between NPR 7,000 and 10,000 per kg (USD 100–139). The oil from local distillation is sold for NPR 7,000 to 10,000 per kg (USD 100 to 139) in Nepal's urban areas.

A total of 204,648 kg of jatamansi was harvested in 2004, of which local and national distillers consumed 153,859 kg. The remaining amount was exported to India through informal channels.

The value chain for jatamansi was mapped in 2006. The mapping found that the harvesters made the largest margins of NPR 50 per kg, with local traders making the lowest margins of NPR 10 per kg (Table 5).

The calculations in Table 5 do not reflect the laborious nature of harvesting jatamansi, mostly found far from human settlements. It usually takes two to five days to harvest a full load of 15–20 kg per person. Most collectors make about five to six trips a season. They sell the 90 to 120 kg they collect for NPR 5,000 to 7,500 (USD 70–104) (data collected in 2004) and collect other herbs at the same time. The collection of jatamansi is a difficult undertaking. Sometimes collectors earn little for their hard work.

Table 5. Margins, prices and expenses (in NPR) of major actors in the jatamansi trade

Actor	Margin (per kg)	Selling price (per kg)	Expenses (per kg)*
Harvesters	50*	50	0
Village and district traders	10	60	50, made up of jatamansi (50)
Airport traders	21	150	129, made up of jatamansi (60); government royalty (15); district development committee tax (6); local porter transport (6); handling and packaging (4); storage at district airport (7); other expenses (6); air transport to Nepalganj (21); storage at Nepalganj (4)
Urban wholesalers	25	200	175, made up of jatamansi (150); transport costs to India including costs to get goods across the border (25)
Local processors	23 (return/kg raw jatamansi processed)	8,000 (kg of oil)**	6,427 per kg oil, made up of jatamansi (4,020)**; government royalty (1,005); DDC local tax (402); processing and air freight costs (1,000)

Sources: IRG 2006

* Some harvesters paid NPR 2/kg of jatamansi. Expenses do not include time invested by the actor, with the exception of distillation worker salaries for local processing.

** Change in product from raw jatamansi to oil; assumes 1.5% oil extraction per kg of raw jatamansi.

4. Policy, legislative framework and supporting institutions

The cultivation of spices, such as nutmeg, star anise and saffron, is labour intensive. © rayjunk

4.1 International treaties and government policy

Nepal is signatory to the CBD, CITES and The Plant Protection Agreement for South East Asia and the Pacific Region. The national policies for conservation, sustainable use and trade of biodiversity resources are based on these international commitments.

The Nepal Biodiversity Strategy (2002) is an overall policy framework for the conservation and sustainable use of biodiversity in Nepal. It recognises NTFPs as the wealth of the country and highlights concerns in relation to their collection and marketing, the cultivation of MAPs and the development of industries based upon NTFPs. The 2006–2010 implementation plan for the strategy included projects for the institutionalisation of biodiversity conservation and agro-biodiversity conservation through community participation.

The Ministry of Forest and Soil Conservation (MoFSC) prepared a draft Access to Genetic Resources and Benefit Sharing Policy in 2002. One objective was to manage traditional knowledge in relation to conservation, utilisation, and access to benefit sharing.

In addition, the government introduced its Herbs and NTFP Development Policy in 2004 to conserve 'herbs' and NTFPs so as to contribute to the national economy. This policy calls for encouraging the commercial cultivation of valuable herbs and NTFPs; adding value to herbs and NTFPs through processing; improving access to capital in the trade; and developing necessary infrastructure and building technical knowledge and skills.

Working policy 6.5 of the government's current Three Year Plan (2010 2013) states: "Programs for production and processing of MAPs will be encouraged with public-community-private partnerships, and, a policy of development for special zones for production and management of MAPs will be made" (NPC, 2010).

4.2 Legislation

In spite of the government policy to promote trade in MAPs, the focus has mostly been on controlling trade. The Department of Forests (DoF) of the MoFSC is responsible for regulating trade in NTFPs, including MAPs, by issuing collection permits and collecting royalties. The department operates central, district and range-post forest offices.

- The Forest Act (1993) imposed a licensing system on the removal, sale, transportation and export of NTFPs and penalizes the illegal collection of NTFPs. The Act also established a royalty system with district forest offices as the controlling authorities.
- The Forest Rules (1995) state that species not listed in the Forest Act (1993) cannot be traded unless sanctioned by the Government. The government maintains an official list of protected species (Annex 4). This list makes it illegal to collect and trade three specific species (panchaunle, walnut bark and kutki); bans the export of eight species in raw form; and prohibits the felling of seven tree species for commercial purposes. All other species can be traded.

A Mulberry paper notebook. © naipung

An official permit is required from district forest offices for collecting NTFPs from national forests not managed by forest user groups. Forestry user groups issue permits for collection from their forests. Much illegal collecting persists, especially from national forests not handed over to user groups.

4.3 Supporting institutions

Table 6 outlines the government and trade promotion agencies and trade associations supporting the development of trade in MAPs in Nepal. Section 3.5 of GIZ (2011) lists other organisations involved in supporting and regulating the trade whilst Annex 5 of this report lists the government and non-government agencies responsible for governing and promoting the trade.

Table 6. Government departments, trade promotion agencies and trade associations supporting trade in MAPs

Government Department/ Associations	Function
The Department of Plant Resources of the Ministry of Forest and Soil Conservation	Has the mandate to conduct surveys, identify and preserve herbarium specimens, conserve species and assist with scientific research on the processing, production and use of plant resources. It conducts its conservation and extension activities through botanical gardens, conservatories and nurseries. It has seven district plant resource offices covering the different climatic zones and has conserved 1,500 species of plants and herbs in its botanical conservatories, including 100 species of MAPs. The department has good potential to provide more support to the harvesting, cultivation and inventory of Nepal's MAPs.
The Herbs and NTFP Coordination Committee (HNCC), Department of Plant Resources	Responsible for formulating and helping implement policies for developing NTFPs and MAPs and for coordinating donor support. The committee has prioritised 30 high value commercial MAPs and NTFPs for in situ and ex-situ management for economic benefit based on the list in Annex 2. It helped develop the Herbs and NTFP Development Policy, 2004. It has only made limited achievements on its mandate of linking collectors, producers and traders to government support. This body should play a key role in carrying out the much-needed surveying of plant resource inventories.
The Agro Enterprise Centre (AEC) of the Federation of Nepalese Chambers of Commerce and Industry (FNCCI)	Promotes agro-business development in Nepal. The centre has played a crucial role in developing the trade in NTFPs by carrying out policy advocacy related to royalties, permits, and local taxes; by supporting the running of trade fairs; by promoting SPS and other trade-related issues; and by collecting and disseminating market information.
Nepal Herbs and Herbal Products Association (NEHHPA)	A professional association for herb manufacturers and exporters in Nepal. It provides information to its members and supports them by lobbying for their interests. One of the goals of NEHHPA is to establish a resource centre for the trading and marketing of herbs, whilst also providing information on the technical and legislative aspects of herbal production.
Jaributi Association of Nepal (JABAN)	A professional association based in Nepalganj, a large western Terai town and the focal point of trade in MAPs from western Nepal. It has 1,400 members, almost all of whom are involved in trade with India.

5. Potential of trade in MAPs

There is a growing demand in the Western world and amongst Asia's middle class for natural and organic products, including products made from MAPs. Given the growing demand, NTFPs used for subsistence purposes and small-scale trading are now increasingly sought after by manufacturers and external traders. Conscious consumers are also demanding assurances of environmental sustainability and socioeconomic fairness in the value chains of these products.

Well managed trade in MAPs has a potentially large economic and social impact in Nepal and could play a role in reducing poverty in Nepal's rural areas while improving biodiversity and the environment (Olsen and Larsen, 2003). Even with the current undeveloped trade, NTFPs contribute to about half of household incomes in some of Nepal's rural hill and mountain areas.

The potential of MAPs was recognised by the Government of Nepal's in the 'Nepal Trade Integration Strategy' (MoCS, 2010), which identified medicinal herbs and essential oils as having a medium export potential and a high potential for positive socioeconomic impact. Other BioTrade products amongst the 19 identified include handmade paper, pashmina products, honey, cardamom and tourism (Table 7).

5.1 The importance of processing in the value chain

Most of Nepal's MAPs are exported in a raw state with limited processing. Most plants are sold to India, with large companies and pharmaceutical giants buying the largely unprocessed products from Indian and Nepali middlemen. The result is that collectors and producers receive low prices. More processing and the production of finished products in Nepal would greatly increase the value of the plants to the national economy. An example of this is the case of jatamansi (see Section 3.4). In 2006, local people received NPR 50 (USD 0.7) per kg for unprocessed jatamansi plants whilst jatamansi oil sold for NPR 8,000 to 9,000 (USD 111-125) per kg (Pokharel et al., 2006).

Table 7. Export potential and potential socioeconomic impact of the 19 most-promising goods and services for export from Nepal

Export potential				
Low	Medium	High		
• Handmade paper	• Tea • Woollen products • Medicinal herbs & essential oils	• Tourism • Labour services	High	Potential socio-economic impact
	• Ginger • Pashmina products • Honey • Silver jewellery • IT & business process outsourcing • Hydro-electricity	• Cardamom • Iron & steel • Lentils	Medium	
• Education services • Health services	• Engineering services	• Instant noodles	Low	

Source: UNDP Nepal (2011)

5.2 Biodiversity conservation

The cultivation of MAPs on community and private land is one of the best ways of conserving biodiversity and generating income. An increasing volume and number of species are being cultivated in Nepal. The extension of this trend into the cultivation of high value medicinal plants will help conserve naturally occurring populations. At lower altitudes, farmers can cultivate many types of MAPs on fallow cropping whilst the replanting of depleted natural populations encourages local communities to conserve the environment while generating economic benefits. Atis, keshar and chiraito have been introduced into community forests and can also be grown alongside agricultural crops. Saffron has been succesfully grown under apple trees. One study in Jumla in western Nepal (Bhandari et al., 2006) found saffron cultivation to be more profitable than atis, chiraito and agricultural crops.

5.3 Cost-benefit analysis of cultivation

Only limited information is available on the economics of cultivating MAPs in Nepal. Poudel (2007) conducted a study of the benefit to cost ratio of cultivating various MAPs species on a per hectare basis. The study found that, for instance, kurilo earned a score 3.0, chiraito 2.16 and timur 1.5, where values greater than 1 indicate profit margins. The same study found that after three years of cultivation, chiraito yielded a net annual profit of more than NPR 300,000 per hectare (USD 4,167). However, this study did not incorporate labour costs beyond initial land preparation. Incorporating this variable would still give a benefit to cost ratio of above 1.0, indicating a good return on investment.

Another calculation (based on AEC/FNCCI 2006 data) found the cost benefit ratio for seven commonly traded MAPs to range from 9.84 to 1.14. (Table 8).

Of Nepal's hundreds of MAPs, only a few have been promoted by the Government and cultivated by community forest user groups. In 2006, 34 species (almost all MAPs) were identified as having a good potential for commercial cultivation and market promotion (see Annex 2). Table 9 shows 12 species which were identified as the potentially most remunerative species for private sector investors:

Table 9. Potentially most remunerative species for private sector investors

Region	Species (local names)
Terai and Siwalik Hills	Amala, chamomile, pipala, menthe
Mid-hills	Timur, tejpat, chiraito, ritha
Mountains	Sugandhawal, padamchal, jatamansi and bisjara

5.4 The Indian connection

In 2005, it was estimated that Indian manufacturers had an unmet supply gap of about 152,000 metric tonnes of MAPs, representing a three-fold growth in this demand between 1999 and 2005 or 15 per cent per year. The Indian market promises much potential; even though Nepal exports 90 per cent of its medicinal plants to India, supplies from Nepal only account for a small part of the demand (Table 10).

Table 8. Cost-benefit analysis of seven MAPs on a per hectare basis

NTFPs	Crop cycle/ period	Input/production costs (NPR)	Revenue (NPR)	Benefit to cost ratio
Satawari/kurilo*	2 years	34,600	340,400[1]	9.84
Tejpat	4 years (perennial)	43,200	114,700	2.66
Ritha	4 years (perennial)	38,100	81,900	2.15
Amala	4 years (perennial)	41,300	65,500	1.59
Chamomilla matricaria	seasonal crop	15,170	20,830	1.37
Lemon grass	4 years	57,550	68,500	1.19
Metha arvensis	seasonal crop	23,400	26,600	1.14

Source: AEC/FNCCI 2006 (cost-benefit ratio figures added)

Table 10. Annual exports from Nepal and supply gaps in India for five medicinal plants

Scientific name	Average annual supply from Nepal to India (MT)	Unmet demand in India (MT)	Percentage of supply gap
Swertia chiraita	25	487	95.1%
Rauwolfia serpentine	10	248	96.0%
Aconitum heterophyllum	4	255	98.4%
Asparagus racemosus	56	8,412	99.3%
Piper longum	4	3,328	99.9%

Source: ANSAB and IDRC, 2004

5.5 Trade and traditional knowledge preservation

Many people in Nepal's rural areas know of plant-based cures. Baidhyas, amchis and other traditional healers use plants to treat their patients. The extension of the market for MAPs and their products will help preserve this knowledge. The commercial use of medicinal plants will help prevent the loss of generations of knowledge of medicinal plants.

Trade of essential oils (above); and herbs and herbal tablets (right) have potential for a positive socioeconomic impact.

6. Challenges to developing trade in MAPs

The key challenges hindering the development of Nepal's trade in MAPs are: over-harvesting of plant resources, information gaps, lack of value-added activity, and tariff and non-tariff barriers, amongst other market challenges. Overcoming these constraints will facilitate the realisation of the large potential of MAPs trade, as detailed in the earlier chapter.

6.1 Over-harvesting

6.1.1 Over-exploitation of resources

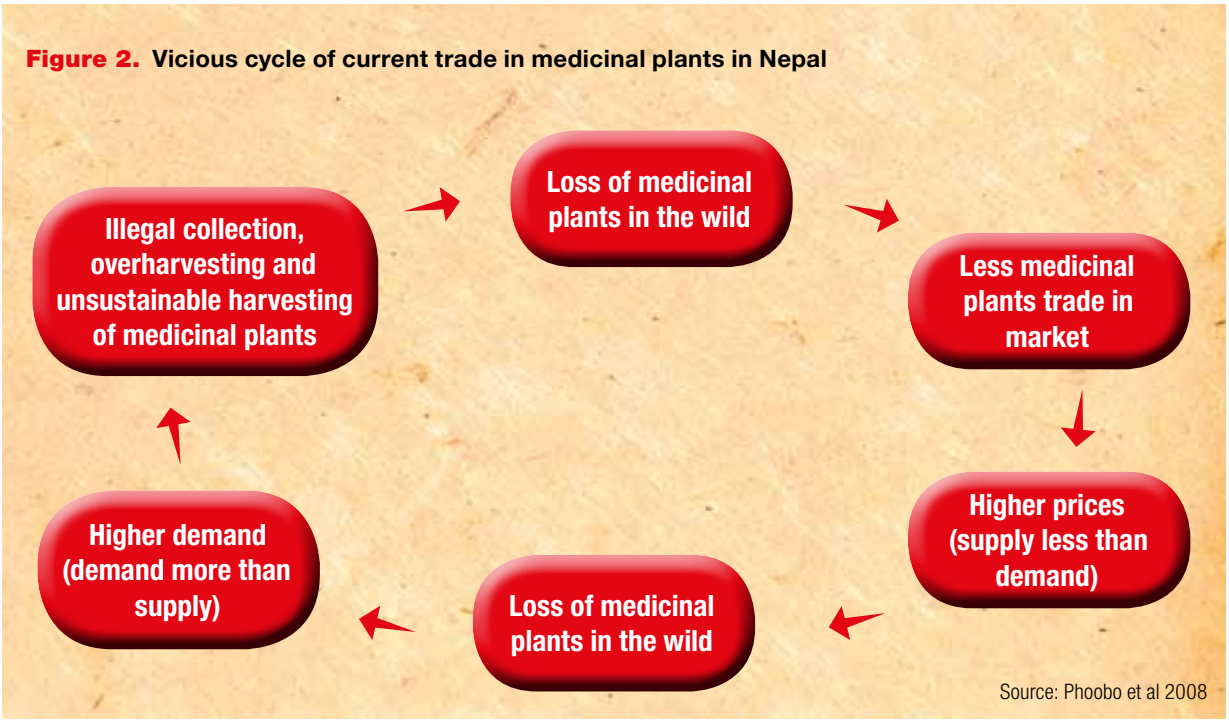
Despite the absence of systematic research on MAPs populations in Nepal, it is well known that their populations in the wild are being heavily depleted. The impact of the depletion and over-exploitation intensifies with factors such as: limited cultivation for regeneration; a growing domestic and international demand; demand outstripping supply; escalating prices; and slow maturity of high-value plants. The vicious cycle of escalating prices leads to over-exploitation of resources and even higher prices (Figure 2). One of the species harvested at a greater rate than is regenerated is yarchagumba, a Himalayan aphrodisiac. In June 2011, it was reported from Rukum in Mid-west Nepal that:

> "Old-timers say yarchagumba harvests are declining and there will come a time soon when the caterpillar-fungus and butterflies that they metamorphose from will be extinct in these mountains"
> (*Nepali Times*, 2011).

6.1.2 Bad harvesting practices

Strong competition for harvesting high-value plants results in immature and low-quality harvests, thus jeopardising future harvests. Furthermore, collectors often destroy other plants or entire plants when they need only gather one part (AEC/FNCCI 2006). Those harvesting illegally without permits tend to cause more damage as they hurry for fear of being caught. These problems are less severe in community-managed forests, where users restrict frequency and methods of harvesting.

Figure 2. **Vicious cycle of current trade in medicinal plants in Nepal**



Source: Phoobo et al 2008

6.1.3 Inadequate monitoring

The current permit system for non-user group national forest areas fails to regulate trade. Widespread harvesting occurs without permits, as does the harvest of banned species. The open border with India encourages smuggling of plants into India (Ojha 2001). Unregulated access to the resources leads to their depletion and to serious conflicts such as the Manang murders that hit the international headlines (Box 6).

Box 6. The Manang murders

In November 2011, nineteen people from the remote village of Nar in Manang district, in Nepal's central mountains, were convicted for murdering seven collectors of the aphrodisiac fungus, yarchagumba. The outsiders were lynched and thrown over a cliff by the Nar people, after trying to collect the high-value fungus from the area where the people of Nar traditionally gather the fungus.

Source: BBC 2011

6.2 Information gaps

6.2.1 Lack of resource mapping for regulating collection

Nepal does not maintain an official record of MAPs species collection, local market consumption, or exports, making it difficult to calculate the financial value of the trade. Lack of data on species, potential, volume harvested, and potential and actual harvests make it difficult to estimate the sustainability of volumes harvested; or the sustainability of the supply volume. Even the collection of the most valuable species, such as yarchagumba, is undocumented. Relevant data could help plan rotational-based harvesting.

6.2.2 Lack of awareness amongst harvesters

As the value chain for NTFPs in Nepal is unorganized, harvesters at the bottom of the chain are usually unaware of the quality standards followed by exporters and end markets. Thus, they maintain traditional practices with little incentive to adopt new methods of harvesting and processing. In many cases, traders are unable to obtain desired quality and quantity of NTFPs from collectors and cultivators.

6.2.3 Lack of information amongst local traders

Harvesters and collectors are often unaware of market demands in terms of volume, quality, and pricing. Information collected tends to stay with the agencies that collected it. The rapid spread of the mobile phone network across Nepal may have partially addressed this information gap although no study has been carried out in this regard. CDMA (Code Division Multiple Access) phones can be used with more reliability across mountainous and rural terrain of the country.

6.2.4 Lack of knowledge-sharing

Absence of a common platform for the sharing of information between the many actors involved in harvesting, trade, manufacture and regulating MAPs curbs the development of the trade. There are limited extension services to disseminate the research findings of the Department of Plant Resources (DPR) amongst local people. There is insufficient knowledge and skills for awareness raising and sustainable cultivation and harvesting of many NTFPs at the community level.

6.3 Lack of value-added activity and quality control mechanisms

Export earnings from MAPs are negatively impacted by the poor processing methods adopted. Modern processing of MAPs adds value to products, diversifies production, secures international product certification, translates into international market demand and results in higher profits. However, in the absence of technological investment, most processing of MAPs in Nepal is traditional and of poor quality. Most of the country's MAPs are sent to India for processing. Local populations engaged in gathering and harvesting MAPs receive relatively low prices for sale of plants compared to the amounts earned further along the value chain.

6.4 Market challenges

Inadequate infrastructure, such as limited access to electricity, transportation facilities, water and technology, hampers the development of the trade, especially in remote areas where the potential for biodiversity-based products is greatest. Nepal's hilly and mountainous terrain makes access difficult to many of the areas where the high value MAPs grow. The mountain regions of Nepal had a mere 1.4 km of road per 100 km^2 area in 2002 (Department of Roads 2002). Although the road network in these areas has considerably extended since, the nearest roadhead is still usually far away from the mountainsides where the high value MAPs are found. In highland areas the plants are traditionally transported by air to major trade centres in the Terai or by porter and mules to roadheads, from where they are brought to the Terai markets on vehicles. Bulky materials such as jatamansi, jhyau, lauth salla, padamchal, and chiraito are generally brought down to southern lowland markets on mules. Such methods are costly, inconvenient and slow.

Singing bowls are used in Buddhist meditation practices, both in Tibet and Nepal. © Guillermo Garcia

Another market hindrance is the state-led system of royalty payments, taxes, and transport permits. The bureaucratic requirements of this permit and royalty system, the banning of the export of some unprocessed plants and the lack of legal knowledge amongst collectors contributes to 'rent seeking' by government officials and illegal collection and smuggling. For many MAPs enterprises and activities taking place in remote rural areas, where access to formal financial services is poor, access to credit is a challenge. Small and community-based enterprises are confronted with the difficulty of having to raise their own capital for buying processing equipment or instead limit the scope of their activities to mere collection of raw materials.

Worsening the prospects of BioTrade and those dependent on it is the fact that Nepal lacks a well-developed, transparent market mechanism (distribution and trade channels) to link cultivators and collectors of bioresources with end-users and institutional purchasers; and detailed community forest guidelines. The scope and opportunities for NTFP management within community forests is not clearly spelt out in the Forest Rules act (1995).[1]

6.5 Tariff and non-tariff barriers

Nepal's trade in MAPs faces tariff and non-tariff barriers from India and international markets. Tariffs mostly affect trade to India whilst non-tariff barriers affect the more high-value and profitable trade to Western countries.

6.5.1 Tariff barriers

Nepali medicinal plants face high tariffs (custom duties) in India and Bangladesh, and low or no tariffs in the markets of the European Union, Canada, Australia, and the United States. Tariffs hinder the development of BioTrade in relation to product identification and maximizing benefits by value addition. Export tariffs impose higher rates with increasing

levels of processing (e.g. 5 per cent for raw goods, 15 per cent for semi-finished, and 25 per cent for finished goods – SAWTEE 2010). This reduces incentives for processing and value addition and is part of the reason why MAPs are exported to India in a raw state. Consequently, low returns are received by all actors – from harvesters, to traders, to wholesalers, to retailers, right down to the exporters. Higher tariffs levied encourage smuggling and have an adverse impact on the legal trade to India.

6.5.2 Non-tariff barriers

Non-tariff barriers to trade have become more prominent, as tariffs have been reduced to low levels in many countries through the World Trade Organization (WTO). The export of MAPs and derived products from Nepal face substantial non-tariff barriers including the stringent food safety and other requirements of many importing countries. Demonstrating compliance with these standards has become more complicated because of a shift from product standards – largely enforced through testing at the borders of exporting and importing countries – to process standards (the way products are grown, harvested, processed, and transported). The type of import regulations and quality standards put in place in European countries are very hard to meet for Nepali products, given the lack of trade infrastructure and technical services (such as a laboratory and certification facilities). As a result, Nepali traders are forced to export unprocessed plants. Unsystematic and un-standardized harvesting and processing; and lack of quality control make obtaining international certification difficult.

The absence of laboratories in Nepal means that Nepali products are unable to comply with Sanitary and Phytosanitary (SPS) Measures or meet the import regulations of many international markets. The lack of testing laboratories and certification bodies means that many plants and products are first exported to India where tests and certification checks are done. For example, Nepal has no laboratories to test if essential oils can be safely applied to human skin. Oils are, therefore, sent to India for testing.

The EU, Switzerland, Japan and Singapore are the most profitable markets for Nepali medicinal plants and essential oils. However, strict phytosanitary and other regulations limit what Nepal can export to these countries (Box 7). Their extensive food safety and medical regulations, designed to ensure products are not harmful to consumers, require adherence to guidelines such as the following:

- **Documentation –** Unlike the case of manufacturers in the food industry, the European Directives on medicinal products specify that manufacturers of medicinal products, including herbal medicinal products, provide detailed documentation on origin, cultivation or wild crafting, harvesting, use of pesticides, drying, further processing, and manufacturing.
- **The Good Manufacturing Practice** (GMP) directive for medicinal products of the EU obliges manufacturers to follow quality assurance systems that evaluate and approve all suppliers, although herbal substances and preparations are excluded from this to a certain degree of processing.
- **The Good Agricultural and Collection Practice** (GACP) recommendations of the World Health Organization **(WHO)** are often applied when GMP rules do not apply (WHO 2003). These recommendations are important within the quality assurance system of importing companies. However, a legal basis does not exist under GMP for certifying cultivated medicinal plants. Medicinal plant growing and processing industries have so far had good experiences with the 'voluntary' implementation of GACP principles based on mutual confidence.

Box 7. Key import requirements of Western countries

- Microbiological testing
- Restrictions on the use of pesticides and heavy metals
- Strict laws on packaging and labelling of products
- Hazard Analysis and Critical Control Point (HACCP) certification mandatory for all agro-based imports to the European Union.
- New herbs and their extracts to be rigorously tested by the Food and Drug Administration in the US; and by the European Medicines Agency in the European Union before gaining entry into these markets.

With regards to organic testing, the Nepali organic certification body, Organic Certification Nepal (OCN), is not internationally recognised.

Almost all of Nepal's trade in MAPs is via India. Traders face many issues in transit. India does not open all border crossing points and there are limitations on the seaports available to Nepal. Trucks from Nepal often have to unload goods and reload them onto Indian trucks, thereby increasing costs substantially.

7. Recommendations and conclusion

BioTrade contributes substantially to the local and national economy of Nepal. It can contribute to an environmentally-friendly, high growth, socially inclusive and equitable, green economy. Preserving and promoting the biodiversity of Nepal is critical to reaping the benefits of the full range of products and services that ecosystems and ecosystem services offer for improving human well-being and economic development.

The following sections outline the recommendations and enabling conditions needed to make the BioTrade sector in Nepal an example of a green economic transformation.

7.1 Sustainable harvesting and cultivation

There is an urgent need to introduce more sustainable harvesting practices and promote cultivation to conserve Nepal's wealth of naturally occurring MAPs.

Recommendations

- **Sustainable harvesting –** Promote the sustainable harvesting of MAPs from the wild by building the awareness of harvesters and forest user groups about the long-term benefits of not picking young plants, only taking the parts of plants needed, and of practising rotational harvesting at certain times and in certain years. There is also an urgent need to support government and user group officials to promote and, where necessary, enforce sustainable harvesting practices.
- **Resource inventory –** Support the appropriate government agencies to develop an inventory system for Nepal's MAPs and for the regular updating of this information. This would provide much needed information on the stock of resource and the amount that can be sustainably harvested.
- **Cultivation –** Identify the most suitable varieties for cultivating, carry out more research on how to cultivate the high potential species and establish more demonstration plots.
- **Forest user group guidelines –** Provide community forest and other types of user groups with technical guidelines and other support to manage the MAPs and other NTFPs in their forests.

7.2 Trade and market development

Improved access to information, support and more organized marketing channels are needed for systematic and profitable trade in MAPs in Nepal.

- **Collection centres –** Establish collection centres at strategic locations with facilities for cleaning, drying and grading in order to improve the quality of products and sale value.
- **Organised marketing channels –** Establish more organized and transparent marketing channels and wholesale markets to promote product variety, quantity, quality and information on product origin. More organized market channels will encourage the establishment of higher-level processing enterprises and more contract farming to give collectors and farmers secure incomes.
- **Access to information –** Set up systems for providing information to harvesters and traders that will allow them to match production with market demand, thereby ensuring higher prices for harvesters and traders and to promote sustainable harvesting of the resource. New mobile phone technologies could be used for this. The need here is to provide information on market prices, to put buyers in contact with suppliers and to link collectors to buyers.
- **Technical support –** Improve access to technical support for collectors, traders and cultivators by strengthening and enabling the Herbs and NTFP Coordination Committee, forest rangers and businesses to provide this support.
- **Improve infrastructure –** Extend the road network in remote areas to enable harvesting, processing and access to markets; and improve access to electricity for processing MAPs.
- **Access to credit –** Improve access to credit for community-based enterprises to set up processing units and cultivate MAPs. Many investment opportunities exist at the community level in basic processing, including plant drying.

Enabling environment

Many actors are involved in the supply chains of MAPs and in supporting and regulating them. However, there is a lack of coordination between them in responding to challenges. There is also a lack of access to information on markets and demand for products. The current legislation focuses almost exclusively on regulatory mechanisms; using 'punishment' and 'fines' to conserve biodiversity. This has resulted in illegal harvesting and smuggling. The following recommendations are expected to establish a more enabling environment for the trade in MAPs:

- **Coordinated platform –** Establish a forum for linking research, regulatory and development agencies and businesses to share information and identify challenges for developing the trade in MAPs and other NTFPs.
- **Policy-making –** Establish a coordinated policy-making framework and increase the involvement of the private sector in formulating and implementing policies and processes to promote sustainable use and trade of biodiversity-based products. Shift to a promotional focus in legislation and policies by providing incentives to the trade and by promoting sustainable harvesting by local user groups.
- **Royalties –** Adjust the rates of royalties from time to time in line with changes in market prices of BioTrade products.
- **Adopt international standards –** Private enterprises and the government need to adopt international standards to enable the trade to meet SPS and other requirements of importing countries. This involves establishing testing laboratories and certification facilities.
- **Research –** Carry out studies on harvesting, domestication, quality assurance, and enterprise development. More enterprise-level studies and up-to-date studies are needed.
- **Encourage investment –** Overall, the government needs to promote and enable investment by the private sector in improving marketing channels, in the cultivation of MAPs and in more in-country processing.

A package of public and private investments and policy reforms – aimed at building production and trade capacity of the BioTrade sector, while ensuring sustainability of bioresources – can lead to higher returns in terms of access to international markets, poverty reduction and catalyzing economic growth in rural Nepal.

Lighting butter lamps has a religious significance in Nepal. © filmlandscape

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Notes

1 Production costs for kurilo are primarily labour costs, which have increased greatly in recent years while market prices have stayed relatively stable. Thus, the profitability of kurilo may now be less, in comparison to 2006.

2 Forest Regulation 2051 (1995); official translation available at: www.forestrynepal.org/images/Forest_Act_of_Nepal_1993.pdf.

Annexes

Annex 1: Plant-based NTFPs and their products in Nepal (Subedi 2006)

Product	Examples of plant species used
A. Raw plant products	
Medicinal and aromatic plants	Kutki, chiraito, louth sallo, yarchagumba, panchaunle, pakhanved, harro, barro, amala, neem, silajit
Spices and flavours	Cinnamon, timur, amala, juniper, large cardamom
Wild mushrooms and health foods	Morels, kurilo
Dyes and tans	Padamchal, chutro, majitho, louthsallo, banjh, thingre sallo, okhar
Plant fibres	Lokta, allo, argeli, hemp, bhimal, ketuke
Gums and resins	Chir pine, blue pine, sal
Handicrafts (leaves, woods, sticks)	Sal, pipal, bhorla, firfire, bamboo, nigalo, rattan
B. Products after value-added processing	
Lokta handmade paper	Lokta
Argeli whiteskin	Argeli
Other plant fibres (threads, ropes, fabric)	Allo, hemp, bhimal, bhorla, argeli, sabai grass, ketuke
Fats and oils	Chiuri
Essential oils and extracts	Jatamansi, sugandhawal, titepati, sunpati, juniper, wintergreen, sugandhakokila, abies, deodar, lauth salla
C. Finished products	
Ayurvedic preparations (medicines, tonic, nutrient supplements)	Kutki, chiraito, lauth sallo, yarchagumba, panchaunle, pakhanved, harro, barro, amala, neem, silajit
Traditional medicines	Kutki, chiraito, louth sallo, yarchagumba, panchaunle, pakhanved, harro, barro, amala, neem, silajit
Handmade paper products	Lokta, argeli
Wild fibre cloth	Allo, hemp
Incense	Jatamansi, juniper, sunpati, mahuwa
Herbal teas	Thyme, gurjo, gandhaino, tulsi, mint, cinnamon
Herbal drinks, juices	Bel, rhododendron, seabuckthorn
Brooms (amriso, sabai grass)	Amriso, sabai grass
Bamboo and rattan products	Bamboo, nigalo, rattan
Wood handicrafts (phuru)	Firfire
Leaf products (sal leaf plates, handicrafts)	Sal, pipal, bhorla
Edible fats and oils	Dhatelo, chiuri, khamu, walnut
Rosin, turpentine and gums	Chir pine, blue pine, sal
Personal care products (soaps, shampoo, creams)	Pangar, chiuri, ritha, amala, sikakai, naru

Annex 2: Priority species for trade in MAPs (AEC/FNCCI 2006)

	Species		Species
1	*Phyllanthus emblica* (amala)	18	*Nardostachys grandiflora* (jatamansi)
2	*Zanthoxylum armatum* (timur)	19	*Tagetes minuta* (sayapatri)
3	*Cinnamomum tamala* (tejpat)	20	*Bergenia ciliata* (pakhanbed)
4	*Chammomila matricaria* (chamomile)	21	*Gaultheria fragrantissima* (dhasingre)
5	*Piper longum* (pipla)	22	*Rauvolfia serpentina* (sarpagandha)
6	*Mentha arvensis* (mentha)	23	*Dioscorea deltoidea* (bhyakur)
7	*Swertia chirayita* (chiraito)	24	*Rubia majith* (majitho)
8	*Aegle marmelos* (bel)	25	*Tinospora sinensis* (gurjo)
9	*Sapindus mukorossi* (ritha)	26	*Aconitum spicatum* (bisjara)
10	*Cymbopogon flexuosus* (lemon grass)	27	*Morchella conica* (gucchi chyau)
11	*Cinnamomum glaucescens* (sugandha kokila)	28	*Juglans regia* (okhar)
12	*Azadirachta indica* (neem)	29	*Aconitum heterophyllum* (atis)
13	*Asparagus racemosus* (kurilo)	30	*Neopicrorhiza scrophulariiflora* (kutki)
14	*Taxus baccata* (lauth salla)	31	*Cordyceps sinensis* (yarchagumba)
15	*Valeriana Jatamansi* (sugandhawal)	32	*Dactylorhiza hatagirea* (panchaunle)
16	*Rheum australe* (padamchal)	33	*Parmellia species* (jhyau)
17	*Acorus calamus* (bojho)	34	*Podophyllum hexandrum* (laghupatra)

Note: See Table 2 for priority species by Nepal's three main topographic zones.

Annex 3: **Major Kathmandu-registered processing centres for MAPs (AEC/FNCCI 2006)**

	Processing centre	No. of medicinal and aromatic species used
1.	Alternative Herbal Products Pvt. Ltd	6
2.	Singh Durbar Baidhyakhana Bikas Samiti	164
3.	Dabur Nepal Pvt. Ltd	12
4.	Gorkha Ayurved Company	86
5.	Natural Resources Industry	18
6.	Male International Pvt. Ltd	20
7.	Everest Herbs Processing Pvt. Ltd	21
8.	Cosmos Herbal products Pvt. Ltd	10
9.	Traditional Himalayan Herbs	189
10.	Suri Herbal Products Industry	134
11.	Krishna Aushadhalaya	121
12.	Piyusbarshi Aushadhalaya	72
13.	Siddhartha Herbal Industry	7
14.	Kunfen/other Tibetan Aushadhalaya	30
15.	Aarogya Bhawan Works	137

Other current processing businesses not on the above list include Wild Earth Pvt Ltd

Annex 4: **Plants on Government of Nepal's protected species list**

SN	Scientific name	Nepali name	English name	Use
1. Plants banned for collection, use, sale, distribution, transportation and export				
1.	*Dactylorhiza hatagirea*	panchaunle	orchid	medicine and tonic
2.	*Juglans regia*	okhar bark	walnut	dye
3.	*Neopicrorhiza scrophulariiflora*	kutki	gentian	medicine
2. Plants banned for export outside the country in unprocessed form				
4.	*Nardostachys grandiflora*	jatamansi	spikenard	medicine and incense
5.	*Rauvolfia serpentina*	sarpagandha	serpentine	medicine
6.	*Cinnamomum glaucescens*	sugandhakokila	Nepali sassafras	aromatic
7.	*Valeriana Jatamansi*	sugandhwal	valerian	medicine and incense
8.	*Parmelia spp.*	jhyau	lichen	medicine
9.	*Abies spectabilis*	talis patra	fir	incense
10.	*Taxus bacata*	lauth salla	Himalayan yew	medicine
11.	*Rock exudates*	silajeet	rock exudate	medicine
3. Plants banned for transportation, export and felling for commercial purpose				
12.	*Michelia champaca*	chanp	magnolia	timber
13.	*Acacia catechu*	khayar	cutch tree	medicine
14.	*Shorea robusta*	sal	common sal	timber
15.	*Bombax ceiba*	simal	silk cotton tree	timber
16.	*Dalbergia latifolia*	satisal	rosewood	timber
17.	*Pterocarpus marsupium*	bijaya sal	Indian keno tree	timber
18.	*Juglans regia*	okhar	walnut	timber

Source: AEC/FNCCI, 2006

Annex 5: Organizations governing and supporting trade in NTFPs, including MAPs, in Nepal

Activity	Responsible organization
1. Company establishment	Department of Cottage and Small Industries (under the Ministry of Industry, Commerce and Supplies)
2. Issuing licences and collection permits	District forest offices and community forest user groups
3. Collecting royalties	District forest offices (DFO) and community forest user groups
4. Checking and verification of harvested plants	DFO range posts and check posts
5. Release order	District forest offices
6. Setting and collecting local taxes	District development committees (DDCs)
7. Product verification and export permission	Department of Plant Resources
8. Import and export (checking documentation)	Customs offices
9. Market information	Trade and Export Promotion Centre (TEPC), FNCCI, NGOs, INGOs,
10. Development financing	Asian Development Bank, commercial banks, The World Bank
11. Processing	Herbs Production and Processing Company Limited, Gorkha Ayurved, Dabur Nepal, other private companies, (see Annex 3) and NGOs Department of Industries, Department of Cottage and Small Industries
12. Research and inventory	ANSAB, GIZ-PSP, DPR, DFO, community forest and other forest user groups, SDC, UNDP, UNEP, ICIMOD, IUCN, SNV, DFID, BDS-MaPS, USAID, universities, the ayurvedic hospital and other NGOs and INGOs

Source: Poudel 2007

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In the poor, rural Far-Western and Mid-Western regions of Nepal grows the secret resource that can significantly contribute to Nepal's prosperity and employment.

Endowed with a very high degree of biological diversity, Nepal can avail of the benefits of BioTrade, in line with the ideals of a green economy. As also recognized by the Government of Nepal in the 'Nepal Trade Integration Strategy' (Ministry of Commerce and Supplies, 2010), the export of high-value MAPs offers great potential for reducing poverty and providing livelihoods in remote areas, whilst contributing to biodiversity conservation and growth of exports.

Yet, despite the obvious advantages of the development of this particular aspect of BioTrade, the harvesting and trade of high-value MAPs is largely unregulated, leading to practices that degrade ecosystems; and risk impoverishment of communities. Furthermore, with the lack of information of market demand and prices, collectors of MAPs receive much less than their fair share of the value of their products. Public and private investments and policy reforms directed at improving the capacity of production, sustainable use and trade of biodiversity-based products can catalyze economic growth in rural areas of Nepal.

This study is part of the Capacity Building for BioTrade (CBBT) project implemented by UNEP, with financial support from GIZ, in three countries: Nepal, Peru and Namibia. The Nepal study, carried out by the International Centre for Integrated Mountain Development (ICIMOD) with the support of UNEP, shows how the sustainable development of one type of BioTrade – trade in Medicinal and Aromatic Plants (MAPs) – can contribute towards a green economy vision.

Job Number: DTI/1556/GE