

Market survey

Medicinal and Aromatic Products (MAP)

Nepal

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Abbreviations

EU	European Union
FAO	Food and Agriculture Organization
FDA	Food and Drug Administration
GACP	Good Agricultural and Collection Practice
GMP	Good Manufacturing Practice
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH
HACCP	Hazard Analysis and Critical Control Points
kg	kilogram
M	Meter
MSDS	Material Safety Data Sheets
MT	metric tons
NPR	Nepal Rupie
NTFP	Non-timber Forest Product
Ppm	parts per million
SAARC	South Asian Association for Regional Cooperation
TDS	Technical Data Sheet
UAE	United Arab Emirates
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
UNIDO	United Nations Industrial Development Organization
USA	United States of America
US-Dollar	USD
WTO	World Trade Organization

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Executive Summary

1) General Notes

In general, the market for plant raw material is challenging. Many of the products are practically not known in Europe. Nevertheless most interviewed companies were very interested to learn more about these products and their potential use with the potential to attain a competitive advantage in the near future by importing the products.

The same products may be very well known in the South Asian Association for Regional Cooperation (SAARC) region, but do face large domestic supply from India or elsewhere in Asia. Nepal is considered as a major supplier for some product (ginger, cardamom) for the SAARC region.

However, the fact that export of raw material will **not be the best strategy was to be expected.**

Regardless which products from Nepal will be promoted, value addition in Nepal will be crucial and requires serious consideration.

One possible way of value addition is via certificates (e.g. organic, FairWild or the different fair-trade certification schemes according to buyers requirements), but is by now mainly important regarding the export to western countries.

During the discussions with potential buyers in Europe it became clear that the reputation of Nepalese companies is weak or not known. Therefore it will be important to build trust in terms of e.g. quality, quantity, and service abilities. Seeing this as a challenge rather than a problem may also create good business opportunities.

Especially regarding essential oils most of the interviewed companies in Europe showed high interest in establishing direct access to producers in Nepal. It should be considered to create trustworthy direct relationships from the very beginning of the project.

During Biofach trade fair companies from India and Sri Lanka showed immediate interest in organic certified and conventional raw materials (for example: large cardamom) from Nepal. At present no offers in terms of quality, quantity and price are known from Nepalese companies to facilitate the market entry in SAARC countries and in Europe.

2) Proposed Ranking based mainly on Market Survey

The ranking based on the market survey as basis for this study clearly indicates that for dried raw material little interest is available from Europe. Nepal as an origin for plant raw material available in Europe is known only for ginger.

Future trade development needs to include value addition and product development in Nepal and through Nepalese companies.

#1 Essential Oils

Since the late 1980ies the essential oils from Nepal are introduced in Europe through the earlier work of Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH Protrade. Interested essential oil and aromatherapy companies from Europe have established their supply among others, Primavera Life, Germany, Vossen, Belgium, or S&D Aroma from United Kingdom (UK). The mentioned companies in Europe offer up to 9 Nepalese essential oils have a niche market as (organic certified) speciality products until today.

The priority ranking essential oil includes:

1. Juniper (needles and berries)
2. Himalayan Fir
3. Wintergreen
4. Rhododendron anthopogon

At present the new market entry is hindered because no company and product information is available of producers and exporters of essential oils from Nepal.

#2 Ammomum subulatum Roxb. (Cardamom)

There is need to increase export to Pakistan, Bangladesh, United Arab Emirates, Singapore, Hong Kong and Afghanistan as well as develop markets in other potential countries for which little efforts have been known to structure and promote direct exports to the different national markets in the SAARC region. Even in India, efforts have not been made to export to major markets, like Delhi and Mumbai and Amritsar directly by approaching the buyers there.

In Europe there is currently no demand visible.

#3 Asparagus racemosus Wild (Satavari)

Even though the regional exports for Asparagus racemosus is constantly on the rise; the supply seems to be inadequate and the species is considered to be highly endangered.

Little demand in Europe as Ayurvedic medicine is just a niche.

#4 Sapindus mukorossi Gaertn (Soap nut)

There is established for the raw material in Europe on the basis on the recent market developments as detergent (laundry detergent). Demand in Europe is decreasing. Regarding the export to SAARC countries there is strong competition from producers in India.

#5 *Cinnamomum tamala* (Bay leaf)

Leaves of *Cinnamomum tamala* (tejpat) are widely used in northern India as a spice. The demand in India is visible as a whole, but the origin of supply are not well documented. It is not documented how much of this product origin actually in Nepal. There is no or very little demand in Europe.

There is also a market for the essential oil, though cheap supplies from other sources exist and make it unlikely to find wider international use.

#6 *Zanthoxylum armatum* DC (Timur)

Currently there seems to be no demand for *Zanthoxylum armatum* in Europe. Not enough consolidated research on the raw material and the essential oil of this plant was organised during recent year. The essential oil was introduced to Europe with little success. Today consumer safety considerations are in the forefront of the few discussions about timur in Europe. Little is known about the demand in SAARC countries. The question whether increased production of timur fruit would be endangering the survival of this species should be carefully investigated.

Resume

For all raw materials the ranking above it is important to note that demand for raw material was not visible as part of the discussions and interviews with companies in Europe.

The value addition through extraction of the respective active principles will open market opportunities for Europe, e.g. soap nut.

A) *Amomum subulatum* Roxb.

1) Background information (evaluation of secondary information)

1.1) Species Description

Large Cardamom / *Amomum subulatum* Roxb. / Alaichi

Amomum subulatum is only grown in India, Nepal and Bhutan. Cardamom produced in Burma, Thailand, Vietnam, Cambodia, Laos, Indonesia, Ethiopia Guatemala, Honduras and South India are of different species within the same genera or of another genera.¹

Alainchi is farmed in the Eastern Himalayas in Nepal, Sikkim and Bhutan at an altitude of 500-2000 meter (m), from subtropical to the cool temperate zones (*Sharma, 2000*). This species inhabits cool forest areas near mountain streams and damp forest floors.

From China and Vietnam under the synonym: *Amomum costatum* (most probably different species).

Black cardamom (also known as **brown cardamom**, **elaichi**, **thảo quả** and **tsao-ko**) is a plant in the family Zingiberaceae. Its seed pods have a strong camphor-like flavor, with a smoky character derived from the method of drying.²

1.2) Traditional Uses

Large cardamom is used in food preparations mainly in North India, Pakistan and Bangladesh. Large volume of crude Alainchi is traded to the Indian market in Siliguri, which is ultimately sold as a spice. The oil extracted after processing can be used in Ayurvedic medicine.

Locally it is used as a food spice and as a mouth freshener after a meal.³

1.3) Production

It is well established fact that Large Cardamom is a lucrative cash commodity of Nepal.

The produce is grown in the marginal and semi marginal types of land in the mid hill regions of Nepal. It is cultivated in nearly 37 districts of mid hill regions however the leading producers are the mid hills of Eastern Region.

As per the production statistics, more than 97% of the total production is concentrated in seven districts of the Eastern Development Region viz Taplejung, Panchthar, Ilam, Dhankura, Bhojpur, Terhathum and Sankhuwasabha.

¹ Source: International Trade Centre (UNCTAD/ WTO): Sector study on large cardamom 2007

² Source: http://www.uni-graz.at/~katzer/engl/Amom_sub.html

³ Source: <http://www.ansab.org/UserFiles/alainchi.pdf>

Nepal is the leading producer of large cardamom. In the year 2007-08, the total production of large cardamom was recorded as 7087 metric tons (MT).

The numbers of farmer families involved in large cardamom cultivation in Nepal are around 33 thousand.

There is very little value addition on the farmers' level; the plantations are affected by severe diseases like chhirkey, foorkey, kaalo tusaro, and fal napakne. The market promotional activities such as the basic infrastructures like road, collection centers, gowdowns, packaging and branding, exploration of new markets and extension services are lacking. But still, the crop is getting popularity among the mid hill farmers and gaining expansion in other districts too.⁴

Production of large cardamom in India, Bhutan and Nepal from 2000-01 to 2005-06⁵

Year	India	Bhutan	Nepal	Total
2000-01	5200	510	6080	11,790
2001-02	5850	950*	6179	12,979
2002-03	5300	1100*	5880	12,280
2003-04	6154	1200*	5983	13,337
2004-05	5773	811	6083	12,667
2005-06	5185	1000*	6647	12,832

Production in MT

1.4) Traditional Markets

More than 90% of all Nepalese Cardamom is exported.

Nepal's export of large cardamom is very much dependent on India and especially Siliguri market. It is estimated that normally more than 80% of the production goes to Siliguri market.

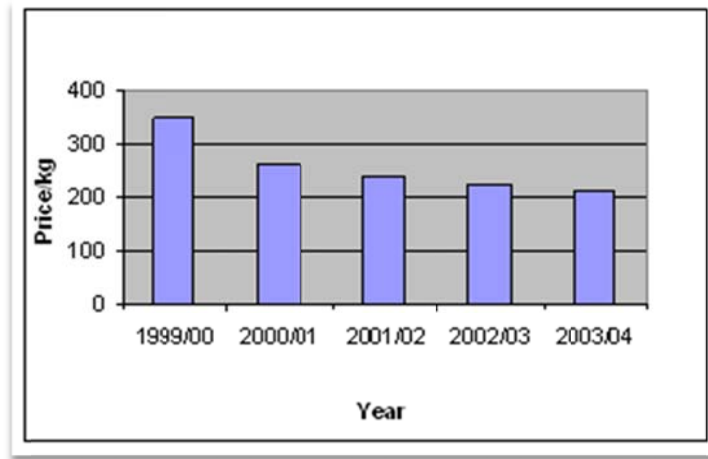
Large cardamom is used in food preparations mainly in North India, Pakistan and Bangladesh and in a small way by the ethnic population in countries like, UAE, UK, United States of America (USA), Canada, Singapore, Hong Kong, etc.

Large cardamom has at present little demand from Western countries and nor from Japan, Australia or New Zealand.⁶

⁴ Source: Price Trend Analysis of Large Cardamom in Nepal

⁵ Source: India-Spices Board, Govt. of India, Cochin, India; Bhutan-R N R Statistics 2004, Ministry of Agriculture, Royal Government of Bhutan and * Estimates by the Spices Board; Nepal- Statistical Information of Nepalese Agriculture, HMG/MOAC, Agri-business Promotion and Statistics Division

⁶ Source: International Trade Centre (UNCTAD/WTO): Sector study on large cardamom (2007)



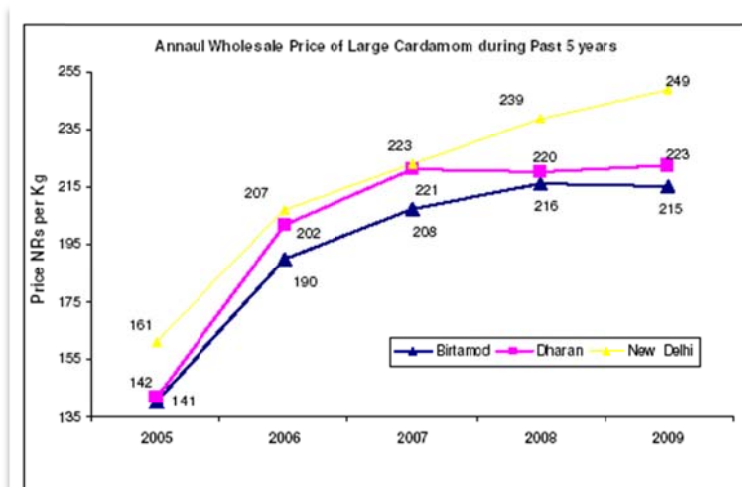
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According to trades' information, a total of 6,014 tons of Cardamom was traded in 2003/04. In monetary terms it was worth of NRs 1.26 billions.

Fluctuating prices and uncertainty of market (final) of Cardamom are the major problems facing the farmers. In 1999/00 the price at farmers' level was about NRs. 300 per kilogram (kg), whereas in 2003/04, it became about NRs. 150 per kg.

While looking at the average annual price trend of large cardamom in two major markets, Dharan and Birtamod of Nepal, the trend during last five years shows an annual increment by 13%.

The increase in price compared to previous year was the highest in the year 2006 when the price was higher by 42% than the previous year and in 2008 the average price was not observed higher than previous year. This price trend during last five years indicates that the price of large cardamom seems to be stable since 2007 and there has not been significant rise in its price.



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⁷ Source: ANSAB homepage: <http://www.ansab.org/mis/loadpage.php?type=nrbp&id=2>

⁸ Source: Price Trend Analysis of Large Cardamom in Nepal

Quality of Nepal large cardamom is reported to be better than from the other two countries, India and Bhutan due to large sized capsules. The high priced grade 'Thodey' constitutes capsules of big size. Attention should be drawn to Nepal's larger sized capsules to help marketing with a better price.

The pink large cardamom produced through improved Bhatti should be launched as a special quality product.⁹

Major markets of large cardamom in India¹⁰

Major Distribution / Exporting centre	Estimated arrival in MT	Percentage share
Siliguri and markets in East India	2970	27%
Calcutta and nearby markets	1320	12%
Mumbai and nearby markets	1210	11%
Amritsar and other markets in Punjab	2200	20%
Delhi and other markets in North India	3300	30%

To verify the internal market environment of the cardamom sector in Nepal a national stakeholder workshop is proposed representing the farmers, traders and processing companies in Nepal. The inputs from the Government are required for the formulation of a national and export strategies.

2) Survey

2.1) Market Survey

India has been the sole export destination for Nepal large cardamom until recently. But diversification of markets began with the new millennium. In 2001-02 Pakistan, Singapore and UAE bought some quantity. Another two markets, Hong Kong and Afghanistan were added to this list in 2002-03. Bangladesh and USA became buyers of Nepal large cardamom in 2003-04. Export to Pakistan which stands next to India in consumption, stood at a sizeable quantity of 823 MT in this year as against usual orders of about 200 MT.

The year 2003-04 is important in another way as Nepal could export to a total of seven countries, besides, India. Though Bangladesh, Hong Kong and Afghanistan withdrew from import subsequently their quantities are small, Bangladesh being an exception. It is highly encouraging that export volumes to countries other than India increased steadily. However, export performance in 2005-06 has been poor and the reason for it should be studied.

In general the trend is very positive indicating the capability of Nepal to export large cardamom to various other countries earning US-Dollar (USD).

For many years the entire production was sold in Siliguri market in India. It is more or less a monopoly market and buyers there tend to dictate price. Recently some quantity is being shipped directly to Pakistan, Bangladesh, UAE, Singapore, Hong Kong and Afghanistan. But total export to these countries is not even 20% of the production.

⁹ Source: International Trade Centre (UNCTAD/WTO): Sector study on large cardamom (2007) <http://www.intracen.org/atf/nepal/Docs/cardamom-final.pdf>

¹⁰ Source: Large cardamom and its significance-Perspective of North East India and its assessment Analysis for the benefit of Nepali small holders, Oct-Dec 2004, Lotus Intellect, Katmandu

There is need to increase export to these countries as well as develop markets in other potential countries for which nothing has been done. Even in India, efforts have not been made to export to major markets, like Delhi and Mumbai and Amritsar directly by approaching the buyers there.¹¹

Large Cardamom is little known in Europe. Company and product profile are required to identify new marketing opportunities.

India

Interviewed companies were not interested in large cardamom. There is a high demand, though also large domestic supply.

Sri Lanka

The interviewed company showed high interest in large cardamom. Samples as well as further information on application, use, processing, potential, quantity and quality (organic) are requested.

Europe

There is in general little interest in raw material. Main use is as incense. However, the smell of large cardamom is considered to be unattractive.

Opportunities are based on individual sourcing and processing data. The implementation of the international quality requirements (Good Agricultural and Collection Practice - GACP, Hazard Analysis and Critical Control Points - HACCP and Good Manufacturing Practice - GMP) needs to focus on impact and sustainability of raw material production and value addition.

In the context of value chain management the opportunities for certificate of origin, organic and fair trade certification and ABS mechanisms offer additional forms of branding.

2.2) Conclusion and Ranking

Based on the fact, that Nepalese cardamom represents the best quality on the market, there shall be opportunity to sell additional quantities in the traditional markets.

There is need to increase export to Pakistan, Bangladesh, UAE, Singapore, Hong Kong and Afghanistan as well as develop markets in other potential countries for which nothing has been done. Even in India, efforts have not been made to export to major markets, like Delhi and Mumbai and Amritsar directly by approaching the buyers there.

¹¹ Source: International Trade Centre (UNCTAD/WTO): Sector study on large cardamom (2007)

The pink large cardamom produced through improved Bhatti should be launched as a special quality product.

In Europe there is currently no demand.

B) *Sapindus mukorossi* Gaertn.

1) Background information (evaluation of secondary information)

1.1) Species description

Family: Sapindaceae

Common names: English: Soap-nut
Nepali: Ritha
Hindi: Ritha, Reetha, Aritha, Dodan, Kanmar
Sanskrit: Phenila, Urista

Distribution: Himalaya, North East India, Myanmar, Indo-China, China, Taiwan, Korea, Japan.

Climate/vegetation zone: TR-ST (600 - 1200 m)

Habit: Medium-sized tree

Habitat: Tropical - sub-tropical broad-leaved forests.

Trade name: Ritha

Part used: Fruits

Substitution: Substituted by/with fruits of *Acacia sinuata* (Lour.) Merrill

Methods of harvest: Fruits are usually hand-picked, rarely fruiting branches are cut to harvest.

Primary processing: Freshly picked fruits are sun-dried.

Principal constituents: Pericarp is rich in saponins, Seeds yield a fatty acid.

Principal threats: Destruction of trees for other purposes like construction works, preparation of furniture, agricultural implements, etc.¹²

1.2) Traditional Uses

Food: The seed kernel cake of *S. mukorossi* contains 32% crude protein and 7.9% total N. The protein is mainly of the globulin type. Aspartic acid, glutamic acid, lysine, serine, glycine, arginine, alanine, valine, leucine/isoleucine, proline and tryptophan have been identified. However, the kernels lack about 44% of essential amino acids and are thus inadequate for human nutrition but industrial protein could be prepared from the globulin fraction.

Essential oil: Seeds contain 23% oil of which 92% is triglycerides; the triglyceride fraction contained 30% oleo-palmito-arachidin glyceride, 13.3% oleo-diarachidin glyceride and 56.7% di-olein type glycerides such as di-oleo-palmitin, dioleo-stearin and di-oleo-arachidin.

¹² Source: http://mappa.icimod.org/mappa_overview.php?p=cfc

Poison: The fruit pulp is used in northern India and China to control head lice and as fish poison. Powdered seeds are insecticidal.

Medicine: The fruit and seeds are regarded as a cure for epilepsy in northern India. A decoction of the fruit is used as an expectorant. Seeds are used in China to stop dental caries. The fruit is considered to be haemolytic.

Other products: The chief product of the tree is its fruit, the pulp of which is used as a substitute for soap. The active ingredients are saponins which are extracted by boiling the powdered fruits. Soapnuts are used as detergent for polishing jewellery, and for washing and bleaching cardamoms. The saponins are used as a textile auxiliary and as an emulsifier in insecticides.¹³

1.3) Production

About the production of soapnut little is published except by Das (2004) p.64 and documented in:

<http://www.uscollege.edu.np/Lecture/Bhawashwor%20Das/DAS%20Narural%20Prodct%20C hemLecture%201-30-1.pdf>

This publication shows as well that considerable research and teaching has been in Nepal since long. The question is why this has not triggered down into the industry and community levels.

Soapnut in Nepal is procured through wild collection.

1.4) Traditional Markets

Traditional markets are India and China. Europe and here especially Germany started to import in 2003/2004.

2) Survey

2.1) Market Survey

There are different qualities of *Sapindus mukorossi* available. The bigger nuts are from India and Nepal and provide the best available quality of the product

In 2004 until 2008 there was a boom in trading soap nuts as a washing powder. In Europe especially in Germany a big quantity of the “organic Food shops” offered soap nuts mainly from India.

The market in India is broader (as explained above), however sufficient production in the country is able to satisfy the demand easily. Meanwhile the nuts are completely processed, packed and sometimes even labelled in the country of origin.

¹³ Source: AgroForestryTree Database

During the last two years the demand in Europe is decreasing. There are already too much soap nuts on the market. One of the reasons is that the washing abilities are at last not as intensive as the “modern European” is used to, German traders say.

An interviewed company from Sri Lanka was interested in receiving samples, further information on application, use, processing, as well as potential, quantity and quality (organic).

2.2) Conclusion and Ranking

It seems that organic soap nuts have been nothing more than a trend in the western community. Another point is that even if the demand would unexpectedly rise again the Indian producers are able to offer the same quality as the Nepalese but are already much better organized in terms of packing, labelling and exporting.

Developing a new project with a partner of substantial capacity might be a possible option to further develop the Nepalese soap nut export.

Another possibility would be to find additional uses of the product and thereby create new demand.

C) *Zanthoxylum armatum* DC.

1) Background information (evaluation of secondary information)

1.1) Species description

Family: Rutaceae

Synonyms: *Zanthoxylum alatum* Roxb.
Zanthoxylum hostile Wall.
Zanthoxylum violaceum Wall.

Common names: English: Toothache tree, Prickly ash, Nepal pepper
Nepali: Timur
Hindi: Tumra, Tejbal
Sanskrit: Tumburu

Distribution: Kashmir to Bhutan, N. India, China, Taiwan, Philippines.

Climate/vegetation zone: ST-TM (1000 - 2500 m)

Habit: Spiny shrub or small tree

Habitat: Shrubberies, open forests, cultivated areas.

Trade name: Timur, Tomar

Parts used: Bark, leaves, flowers fruit, and seeds¹⁴

Adulteration/substitution/: Often substituted by *Z. acanthopodium* DC., *Z. hamiltonianum* Wall., etc.

Methods of harvest: Fruits are handpicked. Often branches are cut to harvest fruits.

Primary processing: Fruits are shade-dried, occasionally sun-dried.

Principal constituents: Bark contains dictamnine, volatile oil and resin; fruits contain essential oil.

Principal threats: Depleting resources in the wild, commercial collection, household uses, increasing commercial demand, often destructive harvesting, etc.¹⁵

The production, chemistry and pharmacology of timur is described including picture on page 59 ff in:

<http://www.uscollege.edu.np/Lecture/Bhawashwor%20Das/DAS%20Narural%20Prodct%20C hemLecture%201-30-1.pdf>

¹⁴ Source: ICIMOD MAPs net

¹⁵ Source: http://mappa.icimod.org/mappa_overview.php?p=cfc

1.2) Traditional Uses

Timur is used in curing various common ailments such as toothache, common cold, cough, and fever, as it is believed to give warmth to the body.

The pharmaceutical companies generally use timur fruit for making different types of toothpaste.¹⁶

Ayurveda: Plant is considered as digestive, stomachic and used in asthma, bronchitis, and toothache.

Unani: Plant is considered to be useful in diarrhoea, brain disorder, stomachache, liver disorder, foul smell of mouth.

Ethnomedicine: Bark and seeds are considered as a tonic and useful in fever, dyspepsia, cholera, toothache, cough, roundworms and stomach troubles. It is used for constipation, headache and nose block. Seeds are used in helminthiasis, paralysis, gout, leucoderma, convulsions, diabetes, ulcers, cardio- tonic and debility.

Fruit is considered as carminative and useful in toothache, paste of immature fruits is applied to cuts and wounds and also taken in cases of cough, fever and dyspepsia and cholera. Fruit and seeds are useful in colic, asthma, indigestion, diarrhoea, tumours, skin diseases, leprosy, for scabies and as insect repellent, stomach disorders, cut and wounds.

Root is anthelmintic, and branches are used for brushing teeth in cases of toothache. Stem is used as tooth brush and mouth purifiers. Leaf juice is taken to treat abdominal pains and paste is applied for leucoderma, and leaves and fruits are chewed in teeth enamel disease.

Ayurvedic products: S. V. Dantamanjan; Tejovatyadya Ghrita; Tumarvadi Churna¹⁷

1.3) Production

Timur is not a fast-growing species and has low population sizes. The proliferation of woody weeds such as Lantana in timur-growing areas is creating problems for the survival of this native species. Some of the mechanisms of collection adopted by the local people are harmful to existing populations. However, the main question is whether timur shrubs can be conserved when the race for commercial tapping of its fruit is escalating, and when maximising income is the chief concern of local harvesters. Recognising the current demand, timur plantations can be developed as a viable source of income for resource-poor villagers. Timur can be grown on marginal and unproductive land, and also in forested land as an understory shrub.¹⁸

¹⁶ Source: Kala Chandra Prakash, Farooquee Nehal A, Dhar Uppeandra; Conservaion & Society. 2005; 3:224-230)

¹⁷ Source: ICIMOD MAPs net

¹⁸ Source: (Kala Chandra Prakash, Farooquee Nehal A, Dhar Uppeandra; Conservaion & Society. 2005; 3:224-230)

In contrary a GTZ study comes to the conclusion that Timur can be purchased in any quantity.¹⁹

1.4) Traditional Markets

Products of this medicinal plant are regularly traded with India.²⁰

With the entry of pharmaceutical companies in the timur business, it has become a profitable non-timber forest product (NTFP). The pharmaceutical companies generally use timur fruit for making different types of toothpaste.

Prior to commercial tapping, timur was sold at Rs12 to 15 per kg in villages and in local markets. In the year 2000, the price in the local market was Rs 45 per kg, whereas the prices of timur in the plains during the same year increased to Rs150 - Rs 200 per kg.²¹

Form: Crude fruit, essential oil²²

Export quantity: 506,452.77 kg

Annual industrial demand in Kathmandu: 5,500 kg of fruits p.a.²³

Annual demand in Kathmandu Valley is 4,000 kg fruit and 1,500 kg essential oil.²⁴

2) Survey

2.1) Market Survey

None of the interviewed companies in Europe is currently trading *Zanthoxylum armatum*. However, in the SAARC area pharmaceutical companies generally use timur fruit for making different types of toothpaste. Nepalese timur is facing strong competition from other major herb exporting countries like India and China.

2.2) Conclusion and Ranking

Currently there seems to be no demand for *Zanthoxylum armatum* in Europe. Many of the interviewed companies showed a general interest in learning more about MAPs from Nepal and possible uses. About the demand from SAARC countries little information could be made available in the company interviews at Biofach and In-Cosmetics trade fairs in Europe.

¹⁹ Source: GTZ: Medicinal and aromatic plants in Nepal, 2005

²⁰ Source: W. H. den Hertog and K. F. Wiersum. Mountain Research and Development, Vol. 20, No. 2 (May, 2000), pp. 136-145

²¹ Source: Kala Chandra Prakash, Farooquee Nehal A, Dhar Uppeandra; Conservation & Society. 2005; 3:224-230

²² Source: ICIMOD MAPs net

²³ Source: GTZ: Medicinal and aromatic plants in Nepal, 2005

²⁴ Source: ANSAB: Study on Domestic Market of Medicinal and Aromatic Plants (MAPs) in Kathmandu Valley, 2004

D) *Cinnamomum tamala* (Buch.-Ham.) T. Nees & Eberm.

1) Background information (evaluation of secondary information)

1.1) Species Description

Family: Lauraceae

Synonym: *Cinnamomum tejpata*

Common names: English: Indian Bay-leaf
Hindi: Tej-patta, Tejpat
Latin: Malabathrum
Sanskrit: Tamala-pattra

Origin: South slopes of the Himalayas. Mid hills of Nepal and India

Used plant part: Leaves (Tejpatta) and bark (Dalchini) are widely used as spice and essential oils for flavouring food and formulating traditional medicines. The bark may be used as an inferior sub-stitute of cinna-mon or cassia.

Main constituents: In the essential oil from the leaves, mostly mono-terpenoides were found: Linalool (50%) is the major compound, whereas α -pinene, p-cymene, β -pinene and limonene range around 5 to 10% each. Phenylpropanoids appear only in traces: Newer work reports 1% cinnamic aldehyde and no eugenol, whereas older literature speaks of traces of both compounds.

Sensory quality: Strongly aromatic, somewhat reminiscent to cinnamon or cloves.

Gernot Katzer's Spice Pages: <http://www.uni-graz.at/~katzer/engl/index.html>

ICIMOD: <http://www.icimod.org/?page=144>

1.2) Traditional Uses

The tough, three-veined leaves are very popular in Northern India, but are little known else-where — at least, today. They were well known to the Romans under the name malo-bathrum (also spelt mala-bathrum) and used both for perfumery and in cooking; later they fell victim to the multitude of new spices available, and were forgotten.

Today, Indian bay-leaves are a spice used almost exclusively in the kitchens of Northern India, especially in the famous Moghul cuisine that was developed at the Imperial courts in Delhi and Agra. Since Indian bay leaves are hardly available in the West, most cooking books encourage the use of laurel (the Mediterranean bay leaf) instead.²⁵

²⁵ Source: Gernot Katzer's Spice Pages: <http://www.uni-graz.at/~katzer/engl/index.html>

Food: The leaves are used extensively in northern India as a spice - Tejpat. In Kashmir they are used as a substitute for paan (betel leaves).

Essential oil: Leaves yield an essential oil with a specific gravity of 1.025, it is soluble in 1.2 volume of 70% alcohol. The oil resembles cinnamon leaf oil and contains phellandrene and 78% eugenol. The essential oil from the bark is pale yellow, and contains 70 - 85% cinnamic aldehyde. The oil is used in perfuming soap and in medicine. However, trade in cassia oil has declined appreciably with the advent of synthetic cinnamic aldehyde.

Poison: Four essential oils of *Cinnamomum tamala* screened for fungicidal activity against *F. moniliforme* [*Gibberella fujikuroi*], a postharvest fungal pathogen of cereal crops were effective in inhibiting fungal growth. Activity of the four oils increased with concentration. *Cinnamomum tamala* essential oil exhibited fungitoxicity against *A. flavus* and *A. parasiticus* at 3000 parts per million (ppm) and 1000 ppm, respectively. The fungitoxic property of the oil was not affected by temperature, autoclaving or storage.

Medicine: Leaves of *Cinnamomum tamala* are used in colic and diarrhoeal preparations. *Cinnamomum tamala* leaf extracts produce a hypoglycaemic effect in experimental rats. Hydrodistilled essential oils of *Cinnamomum tamala* screened for their anti-fungal activity against *Trichophyton mentagrophytes* and *Microsporum microsporum* causing ring worm diseases in animals and humans exhibited fungicidal or fungi-static toxicity and were more effective than the synthetic antifungal agents, clotrimazole, griseofulvin or nystatin. Plant parts are used in many ayurvedic preparations e.g. sudarshan, choorna and chanderprabhavati.

Other products: The leaf extracts are used as clarifiers in dyeing procedures with myrobalans or kamala.²⁶

1.3) Production

Since the early 1960s, farmers of different middle hills districts of Nepal have been planting, protecting and harvesting *Cinnamomum tamala*. In areas with marketing facilities, local people sell raw or processed cinnamon products including leaf and bark for cash income to fulfil their household needs in several mountainous districts including Palpa. Exports of these products to India and other neighbouring countries has continued to increase for the last two decades, indicating that the species has great potential for income generation for poor and disadvantaged people.²⁷

1.4) Traditional Markets

Traditional markets for *Cinnamomum tamala* are India and other neighbouring countries.

Annual demand in Kathmandu Valley is 16,000 kg of leaves and 600 kg essential oil.²⁸

²⁶ Source: AgroForestryTree Database

²⁷ Source: Parajuli, 1998; Maharjan, 2002

²⁸ Source: ANSAB: Study on Domestic Market of Medicinal and Aromatic Plants (MAPs) in Kathmandu Valley, 2004

Selling in crude form

Collectors have three choices of selling crude cinnamon leaf (Tejpat). They can sell either to road-head traders or to wholesalers and or to Indian traders.

Selling in processed (essential oil) form

The existing trade situation shows that Nepal can hardly compete with international markets for marketing of essential oil of different species.²⁹

2) Survey

2.1) Market Survey

The bay leaf products trade and marketing systems, as with other MAPs, are disorganised and secretive, and collectors receive a meagre share of the final value of products.³⁰

Daichini (*Cinnamomum tamala* bark) have been traded from Palpa district since decades. The product is mostly traded in the Butwal market. The rate quoted by the Butwal trader on July 24th was NRs 90/- per dharni (approximately 2.5 kg). On July 23rd the price for Dalchini in Indore (India) was IRs. 82/- (NRs. 131.2) per kg.

When inquired, the Nepalese trader was convinced that the Dalchini of Indian origin was of higher quality evidenced by comparatively sweeter and stronger taste and flavor, and hence the price was higher. The trader also attributed quality to harvesting and post harvest techniques. The trader added that in India, the product is harvested from plants of definite age, in definite season, dry it properly and store at better condition. Therefore the product has better quality.

The demand for raw materials from *Cinnamomum tamala* is global in character. The price trend for both leaf and bark is favourable.³¹

Leaves of *Cinnamomum tamala* (tejpat) are widely used in northern India as a spice but also furnish an essential oil on distillation and this finds some local use. Several chemo-types exist, producing oils rich in cinnamaldehyde or eugenol, but the existence of cheap supplies of these chemicals from other sources (eugenol-rich clove leaf oil from Indonesia, for example) means that *Cinnamomum tamala* oil is unlikely to find wider international use.³²

Two interviewed companies from India were interested in *Cinnamomum tamala* from Nepal, one in leaves, the other in essential oil.

²⁹ Source: PROMOTING MARKETING OF CINNAMON TREE PRODUCTS IN PALPADISTRICT OF NEPAL. By Bishnu Hari Pandit, Gopal B. Thapa and Michael Zoebisch)

³⁰ Source: (ICIMOD: <http://www.icimod.org/?page=144>)

³¹ Source: Local Experience-based National Strategy for Organic Production and Management of MAPS/N TFPs in Nepal

³² Source: (FAO: Flavours and fragrances of plant origin. 1995)

2.2) Conclusion and Ranking

Leaves of *Cinnamomum tamala* (tejpat) are widely used in northern India as a spice. There is no or very little demand in Europe. No additional information was generated through company interviews at Biofach and In-Cosmetic trade fairs in Europe.

There is also a market for the essential oil, though cheap supplies from other sources exist and make it unlikely to find wider international use.

E) *Asparagus racemosus* Willd.

1) Background information (evaluation of secondary information)

1.1) Species Description

Family: Liliaceae

Synonym: *Asparagus volubilis* Buch.-Ham.

Common names: English: Wild asparagus
Nepali: Satawari, Kurilo
Hindi: Satawar
Sanskrit: Shatamuli

Distribution: Himalaya, India, Malaysia, Australia, Africa
Climate/vegetation zone: TR-TM (100 – 2100 m)

Habit: A tall, much branched climbing shrub with spiny stem
Habitat: Open shrubberies, forest

Trade name: Satawari, Satawar, Kuril, Kurilo
Part used: Tubers

Primary processing: Tubers are washed, boiled in water, peeled the skin and sun-dried.

Principal constituents: Tubers contain sarsapogenin and glycoside.

Principal threats: Commercial harvesting, increasing demand, destructive harvesting, reducing resource base, habitat destruction, etc.³³

1.2) Traditional Uses

Shatawari is considered to be the main Ayurvedic rejuvenating female tonic for overall health and vitality.³⁴

It is widely used for multiple purposes and its medicinal importance has been recognized by Ayurveda for centuries. Although almost all parts of this plant have some medicinal properties, roots and young shoots are of higher significance. Young spears are consumed as vegetable or salad and are considered as a balanced health food with many essential nutrients. Traditionally the roots are used mainly to promote milk secretion and as a demulcent, diuretic, aphrodisiac, tonic, alterative, antiseptic, antidiarrheal, galactagogue and antispasmodic. It is also used to treat debility, especially in women and infertility, impotence, menopause, stomach ulcers, hyperacidity, dehydration, lung abscess, haematemesis, cough,

³³ Source: http://mappa.icimod.org/mappa_overview.php?p=cfc

³⁴ Source: Goyal RK, Singh J, Lal H. *Asparagus racemosus*--an update. Indian J Med Sci 2003;57:408

herpes, leucorrhoea and chronic fevers, delay ageing process and form health food ingredients in several Ayurvedic formulations.

Using the modern scientific tools many active compounds like several steroidal saponins, aglycones, alkaloids like asparagin-an anticancer agent and many other active pharmacologically important compounds have already been isolated from the roots of this species. Leaves contain rutin, diosgenin and a flavonoid glycoside identified as quercetin-3-glucuronide.

Flowers contain quercetin hyperoside and rutin. Fruits contain glycosides of quercetin, rutin and hyperoside and steroidal saponins while fully ripe fruits contain cyanidin-3-galactoside and cyanidin-3-glucorhamnoside. These studies have further strengthened the traditional medical knowledge with scientific bases.³⁵

1.3) Production

Kurilo is cultivated on private and community forest land and also collected from the wild.³⁶

Asparagus racemosus is considered to be endangered because it has a high demand at markets, but is mostly (and often excessively) gathered from its natural habitat.³⁷

Due to its multiple uses, the demand for *Asparagus racemosus* is constantly on the rise; however, the supply is rather erratic and inadequate. Destructive harvesting, combined with habitat destruction in the form of deforestation has aggravated the problem. The plant is now considered 'endangered' in its natural habitat. Therefore, the need for conservation of this plant is crucial.³⁸

Production quantity: 34,168 kg³⁹

Export quantity: 92,460 kg (average from the fiscal year 2001/2 to 2003/04 as shown by the annual reports of DoF)

1.4) Traditional Markets

Export quantity: 127,683.67 kg⁴⁰

India is the traditional market.

Annual industrial demand in Kathmandu: 1,200 kg p.a.

Price: 170 nepal rupie (NPR)/kg⁴¹

³⁵ Source: Krishna Kumar Pant; Sanu Devi Joshi. Botany Research International 2 (2): 88-93, 2009

³⁶ Source: GTZ: Medicinal and aromatic plants in Nepal, 2005

³⁷ Source: N Joshia, K Kehlenbeckb, BL Maass. Traditional, neglected vegetables of Nepal: Their sustainable utilization for meeting human needs. Tropentag 2007

³⁸ Source: N Bopana, S Saxena: *Asparagus racemosus*—Ethnopharmacological evaluation and conservation needs. Journal of Ethnopharmacology 110 (2007) 1–15

³⁹ Source: GTZ: Medicinal and aromatic plants in Nepal, 2005

⁴⁰ Source: GTZ: Medicinal and aromatic plants in Nepal, 2005

⁴¹ Source: GTZ: Medicinal and aromatic plants in Nepal, 2005

There is limited market and constant price for *Asparagus* hybrid while the price for the wild form is increasing.

Annual demand in Kathmandu Valley is 1,200 kg⁴²

2) Survey

2.1) Market Survey

The World Health Organization (2003) has estimated that 80% of the population of developing countries being unable to afford pharmaceutical drugs rely on traditional medicines, mainly plant based, to sustain their primary health care needs.

The increasing global acceptance of complementary and alternative medicine has been the major reason for the steep rise in the demand for medicinal plants.

Projections of global trade in medicinal plants indicate a steep upward trend for the future. According to the World Bank report of 1998, world trade in medicinal plants and related products is expected to touch USD 5 trillion by 2050.

In *Asparagus racemosus*, there is an almost 100% mark up in price from the collector level to the user. The demand for *Asparagus racemosus* in 2001 - 2002 was 10,924.7 tonnes which rose to 16,658.5 tonnes in 2004 - 2005 suggesting an annual growth rate of 15%.⁴³

Herbal medicines continue to be a major market in U.S. pharmaceuticals and constitute a multi-billion dollar business. Approximately 1500 botanicals are sold as dietary supplements; formulations are not subject to Food and Drug Administration (FDA) clinical toxicity testing to assure their safety and efficacy.

The Indian herbal drug market size is about USD 1 billion and the export of plant based crude drug is around USD 100 million. The current market potential of herbal medicine is estimated about USD 80 - 250 billion in Europe and USA.

The current market size of the herbs and natural health products in China is about USD 650 million, of which imported herbal medicines account for USD 15 million.

In response to the expected improvement in modern herbal medicine and reflective of their growing demand for natural medicines, 73% of the respondents to a consumer survey indicated they would depend more on herbal medicine in the future.

Imports of herbs into Hong Kong in 2003 amounted to USD 166.4 million, a 6.8% decrease over the 2002's imports. This reflects less imports of liquorice roots of USD 0.2 (-23.8%) and ginseng root of USD 123.2 (-8.8%).⁴⁴

⁴² Source: ANSAB: Study on Domestic Market of Medicinal and Aromatic Plants (MAPs) in Kathmandu Valley, 2004)

⁴³ Source: National Medicinal Plants Board, 2003; N Bopana, S Saxena: *Asparagus racemosus*— Ethnopharmacological evaluation and conservation needs. *Journal of Ethnopharmacology* 110 (2007) 1–15

⁴⁴ Source: RP Samy, PN Pushparaj, P Gopalakrishnakone: A compilation of Bioactive Compounds from Ayurveda. *Bioinformation*. 2008; 3(3): 100–110.

Interviewed Indian companies reported a high demand, though also a large domestic supply.

2.2) Conclusion and Ranking

There is high commercial demand for *Asparagus racemosus* due to its use in ayurvedic medicine. A steep upward trend for herbal medicines is expected.

Even though the demand for *Asparagus racemosus* is constantly on the rise; the supply seems to be inadequate and the species is considered to be highly endangered. Little qualified information is available on page 76 ff of:

'<http://www.uscollege.edu.np/Lecture/Bhawashwor%20Das/DAS%20Narural%20Prodct%20ChemLecture%201-30-1.pdf>' showing the little scientific information available.

F) Essential oils

1) Background information (evaluation of secondary information)

1.1) Species description

In an recent account on essential oils from Nepal the essential oil plants and the essential oil industry is described under: Essential Oils in Nepal : A Practical Guide to Essential Oils and Aromatherapy, Khilendra Gurung, Himalayan Bio Trade Private Limited (HBTL), 2009, x, 148 p, illus, ISBN : 9937-2-1872-6. To describe the different species and essential oils goes beyond the scope of this studies, but is expected as specific focus in the course of the forthcoming project.

1.2) Traditional Uses

In Nepal the industrial production of essential oils started through United Nations Development Program (UNDP)/ Food and Agriculture Organization (FAO)/ United Nations Industrial Development Organization (UNIDO) projects in the 80ies. There was no traditional use of essential oils in Nepal before

1.3) Production

A recent insider account on the production of essential oils is given on page 53 ff in a lecture of Prof Das:

<http://www.uscollege.edu.np/Lecture/Bhawashwor%20Das/DAS%20Narural%20Prodct%20C hemLecture%201-30-1.pdf>

The account of individual essential oils with quality description and background of the essential oil production in Nepal is explained in detail for example through the following sites: <http://www.essencenepal.com/products.html>; <http://www.biosysnepal.com.np/product/>

Listings of producer and trading companies of essential oils in Nepal are for example available at:

<http://nepal.yoolk.com/industry-agricultural-and-garment/essential-oil/>;
<http://www.eson.org.np/Processor.pdf>

1.4) Traditional Markets

Traditional markets for Nepalese essential oils are in India, a country which depends on the MAPs from Nepal as strategic raw materials after own resources in the Himalayas had been depleted. Normally the production of essential oils was done with companies in India.

2) Survey

2.1) Market Survey

The market survey started with selected companies of India at Biofach to explore the actual importance of Nepalese essential oil raw materials and essential oils in today's world. In general the company representatives from India at Biofach had little knowledge about the origins of the mentioned raw materials. Some of them thought the mentioned 5 plant species of this survey are coming from production in northern India.

India

Interviewed companies spoke from high demand, but also large domestic supplies. Interesting oils would be Rose, Palmarosa, Rosmary, Sandalwood. Essential oils are mainly used in cosmetics and Ayurveda. Market is growing.

Sri Lanka

The interview company had a high demand for essential oils, preferably in organic quality.

Europe

The cosmetics industry is interested in many different, often very specific, essential oils, many of them of tropical origin. A number of raw materials is not produced in the European Union (EU) as they require considerable (expensive) labour input or require a tropical climate. Therefore, the EU is highly dependent on supplies from developing countries for the majority of these raw materials. Taking the competition from EU production into account, developing country exporters may find the best opportunities in the supply of exotic oils, or their (semi-processed) raw materials, for which the production conditions are not favourable in the EU. Furthermore, a potential opportunity for developing country producers of essential oils lies in supplying the EU market with organically certified essential oils. Opportunities exist especially for ingredients with properties which allow cosmetic products to be made fully organic.

The demand for organic essential oils is increasing.

There is high interest in having direct access to producers and exporters of essential oils from Nepal throughout all interviewed companies in Europe.

Some few companies from Europe offer up to nine essential oils from production in Nepal. The most prominent offers of Nepalese essential oils are coming from direct project community projects and their decentralized distillation. Interesting to note that the essential oils offered from Nepal do not include ginger and large cardamom the two most important essential oil plants and raw material exports to regional and international markets (ginger). The most important export item for international market (ginger) is not included in the present survey.

The top four essential oils for sales in Europe are from:

1. Juniper (needles and berries)
2. Himalayan Fir
3. Wintergreen
4. Rhododendron anthopogon.

The marketing partner companies in Europe have a long standing working experience with their partners in Nepal. At present they report of no obstacles of trade in Nepal. The technical information available to them they consider as very solid.

2.2) Conclusion and Ranking

Just a few of the interviewed companies, especially those in Europe, are already trading essential oils from Nepal. Most of the products are relatively easy available from other countries where business relations have already been developed.

However speciality oils, organic certified oils etc. would doubtlessly have there chances to enter the market. Almost every interviewed company was interested to establish direct contacts to Nepalese producers and exporters.

Potential buyers expect to get a complete offer in terms of product documentation (Material Safety Data Sheets (MSDS), Technical Data Sheet (TDS), certificates, available quantities) followed by samples and prices. Concerning speciality products it is useful to provide ideas which kind of end product could be developed (e.g. basic material for a new cosmetic line).

If possible it would be helpful to create the whole story behind it (e.g. social impact of the product). A priority list for essential oils from Nepal could include:

1. Juniper (needles and berries)
2. Himalayan Fir
3. Wintergreen
4. Rhododendron anthopogon.

As future challenges they identify:

1. Registration as Chemicals (REACH), cosmetics, food, pharmaceuticals in Europe.
2. Support in Public Relation and consumer education in Europe about the variety of natural ingredients from Nepal and their opportunities of use.
3. Publication of scientific information to support application of Nepalese ingredients
4. Support of development of final consumer products with Nepalese ingredients for applications in food, cosmetics and pharmaceuticals for European consumers.