Essential Oils Sector Study in Nepal: *A Detailed Study of Anthopogon, Juniper and Wintergreen Essential Oils*




A Report Submitted To

GTZ INCLUDE

Narayani Complex, Lalitpur, Nepal

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September, 2010

Acknowledgments

I am deeply indebted to GTZ Nepal for the assignment provided me to conduct this study. I would like to express special thanks to a number of individuals for their support and kind cooperation during the study period.

Firstly, I would like to express my sincere thanks to Mr. Philipp J Kruschel, Ms. Sushmita Pradhan and Ms. Hanna Stahl, GTZ Nepal for their support, cooperation and suggestions during the entire study period and Dr. Oliver J Krueck, ECCOS for his valuable comments and feedback.

I am grateful to Dr. Dinesh Raj Bhuju and Dr. Sajan Lal Shyaula, NAST; Ms. Minoba Yonzon and Ms. Usha Rijal; HPPCL for their kind cooperation, support and provided with the laboratory related information for the testing of essential oils in Nepal.

My special thanks go to Mr. Kanchha Kaji Maharjan, General Mechanical Workshop for supporting me with the information on the distillation units and their associated costs for manufacturing.

My heartfelt thanks go to Mr. Dipesh Pyakurel for the information on the supply situation of distillation units located at Taplejung and Rasuwa districts. Similarly, the thanks are due to Mr. Parbat Gurung, Deudhunga Multipurpose Cooperative Ltd, Dolakha; Mr. Govinda Gurung, distillation units manager of Northern Dolakha; Mr. Ramesh Lama, Mr. Bal Bahadur Shrestha, Mr. Bir Bahadur Thami and Mr. Chhiri Namgel Sherpa, managers of distillation units at various locations of Dolakha and Mr. Gopal Prasad Sharma, ANSAB for providing me with the information on the annual production capacity and the current annual production of essential oils in Dolakha, Sindhupalchok, Ramechhap, Makwanpur, Okhaldhunga and Parbat districts.

At last but not least, I would like to thank the staffs of Ecology, Agriculture and Rural Development Society (ECARDS) for providing the hall for the interaction program in Dolakha and the personnel of various essential oil exporters of Nepal for their valuable information on the export of the selected essential oils.

Khilendra Gurung

September, 2010

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Acronyms and abbreviations

ACA:	Annapurna Conservation Area
APC:	Advance Payment Certificate
BZCF:	Buffer Zone Community Forests
CBBT:	Capacity Building for Bio Trade
CF:	Community Forests
CNI:	Confederation of Nepalese Industries
DCSIB:	Department of Cottage and Small Industries Board
DDC:	District Development Committee
DFO:	District Forest Office/ Officer
DFTQC:	Department of Food Technology and Quality Control
DMC:	Deudhunga Multipurpose Cooperative Ltd
DOC:	Department of Commerce/ Department of Customs
DOF:	Department of Forest
DON:	Department of Narcotic
DPR:	Department of Plant Resources
DU:	Distillation Unit
EC:	European Commission
EIA:	Environmental Impact Assessment
ENPHO:	Environment and Public Health Organization
EU:	European Union
FLO:	Fair Trade Labeling Organization

FNCCI:	Federation of Nepalese Chamber of Commerce and Industries
FSC:	Forest Stewardship Council
FUG:	Forest User Groups
GACP:	Good Agricultural and Collection Practices
GC:	Gas Chromatography
GC-MS:	Gas Chromatography-Mass Spectrometry
GMP:	Good Manufacturing Practices
GSP:	Generalized System of Preference
GTZ:	German Technical Cooperation
HBTL:	Himalayan Bio Trade P. Ltd
HDPE:	High Density Polyethylene
HPLC:	High-Performance Liquid Chromatography
HPPCL:	Herb Production and Processing Company Ltd
HS:	Harmonized System
ICS:	Internal Control System
IEE:	Initial Environmental Examination
IR:	Infrared Spectrophotometry
JAS:	Japanese Agriculture Standards
Kg:	Kilogram
L/C:	Letter of Credit
LF:	Leasehold Forests
M/S:	Mild Steel
M:	Meter

MCA:	Manaslu Conservation Area
MCAP:	Manaslu Conservation Area Project
MOEST:	Ministry of Environment, Science and Technology
MPL:	Multi Pharmaceutical Laboratories P. Ltd
MS:	Mass Spectrometry
MSDS:	Material Safety Data Sheet
NASAA:	National Association for Sustainable Agriculture, Australia
NAST:	Nepal Academy of Science and Technology
NBSM:	Nepal Bureau of Standards and Metrology
NCC:	Nepal Chamber of Commerce
NDRL:	Nepal Drug Research Laboratories
NESS:	Nepal Environment and Scientific Services P. Ltd
NMR:	Nuclear Magnetic Resonance Spectroscopy
NOP:	National Organic Program
NPRL:	Natural Products Research Laboratory
PAN:	Permanent Account Number
REACH:	Registration, Evaluation and Authorization of Chemicals
S/S:	Stainless Steel
SAPTA:	South Asian Preferential Trade Agreement
TDS:	Technical Data Sheet
TLC:	Thin Layer Chromatography
ToR:	Terms of Reference
TPC:	Trade Promotion Center

UN:	United Nations
US:	United States
USDA:	United States Department of Agriculture
UV-VIS:	Ultraviolet and Visible Spectrophotometry
VAT:	Value Added Tax
VDC:	Village Development Committee
WHO:	World Health Organization
WTO:	World Trade Organization
WUPAP:	Western Upland Poverty Alleviation Project
WWF:	World Wildlife Fund

CHAPTER ONE

1. Background

Essential oils are high value and low volume commodities. This makes them attractive crops to grow and process for small holder farmers and remote communities where transport facilities prevent them from marketing high volume cash crops.

Essential oils are one of the most important commodities exported from Nepal that can create a local level opportunity and contribute to economic growth of the country. These value added products are processed from native resources and have growing market demand. The essential oils are used for wide variety application such as perfumes, flavors, medicaments, cosmetics, household products and toiletries.

Essential oil from a particular plant species may vary depending on where it has been grown and how it has been processed. New producers should be prepared to meet with some resistance when attempting to market oils from new sources. They may be offered lower prices than expected and initially sales may be slow. In order to be successful, a new supplier must satisfy the buyers' requirements as uniform good quality, stable price and continuity of supply. Building up buyers' confidence is a necessity and may take some time and new producers of essential oils are encouraged to take this into account when beginning to distill essential oils commercially.

World's total annual production of essential oils ranges from 100,000-110,000 tons. Major producers of essential oils are Brazil, China, USA, Egypt, India, Mexico, Guatemala and Indonesia. By comparison, Nepal produces only a negligible volume (Gurung, 2009). The world market for plant based medicines is estimated at US $ 30 billion, of which world trade of essential oils average over US $ 1.1 billion annually in which principal import markets are USA (40%), EU (30%) and Japan (7%) occupying over 75% of the total import (CBI, 2007).

Nepal exports about 55 tons of essential oils representing 2% of global trade, positioning the country 72 in the list of exporters' category. Similarly, Nepal exports about 29 tons of essential oils to India only (Gurung, 2009).

Despite of the fact that whether the government or trader/exporter or development organizations are willing to work for economic growth and poverty alleviation in Nepal, but both producer and exporters/traders are facing

difficulties in marketing essential oils basically exporting of essential oils from Nepal.

In this background, GTZ is launching the Capacity Building for Bio Trade (CBBT) project aiming to strengthen bio trade related capacities in three pilot countries: Peru, Namibia and Nepal. GTZ Nepal has identified essential oil sector as the potential sector to promote in international market in collaboration with the stakeholders of Nepal. In the preliminary phase, GTZ Nepal is conducting the Sector Study "Essential Oils" in Nepal in order to achieve the in-depth information and experience on the supply potential, marketing activities and documentation of the success cases selecting Wintergreen oil, Juniper oil and Anthopogon oil in this phase.

2. Objectives

The overall objective of this assignment is to provide in-depth information and experience on the sector of "Essential Oils" in Nepal and beyond in terms of the potential quantities, qualities of the selected essential oils, potentials and obstacles they faced in international markets and to feature the success story of one product marketed by a company.

The specific objectives of this study are as follows:

1. To conduct the assessment of the supply side of the "Essential Oil" sector in Nepal for the selected oils
2. To prepare the marketing activities for the selected essential oils
3. To recommend CBBT for the appropriate interventions for the promotion of essential oils sector in Nepal

3. Methodology

1. Literature review and compilation of the related documents

The relevant documents including the reports, research articles, legal/policy related documents, export related documents were collected and reviewed. These documents were analyzed and inferred the rights and limitation of regulatory authorities and frame up appropriate question that cultivates an ambient atmosphere for the respondent/stakeholders to spell out and share their barriers and developed the questionnaires for both group of stakeholders the government offices and office bearer and essential oil exporters.

2. Discussion with Essential oils exporters

The major producers and exporters of essential oils based in Kathmandu was visited and the formal as well as informal interaction was conducted with them regarding the supply side of the selected essential oils, marketing status and the barrier they are facing in this sector.

3. Interaction with quality testing bodies

Essential oils quality testing laboratories such as Herbs Production and Processing Company Ltd (HPPCL), Natural Products Research Laboratory (NPRL) at Department of Plant Resources (DPR), Natural Products Laboratory at Nepal Academy of Science and Technology (NAST), Nepal Forensic Laboratories, Nepal Drug Research Laboratories (NDRL), Department of Food Technology and Quality Control (DFTQC) Laboratories etc were visited and discussion was carried out regarding the available testing services and their planning to launch further tests as per the requisite for export of essential oils. Other private laboratories were consulted via telephone and e-mail.

4. Field visit to distillation unit sites

Distillation unit sites processing Wintergreen, Juniper and Anthopogon oils at various locations of Dolakha and Sindhupalchok districts were visited to verify the supply chain of raw materials, annual production capacity and the current production of the selected essential oils.

Consultations and meetings were also organized with the distillation unit managers and raw material collectors of each unit in the respective districts in order to collect their perceptions for the promotion of essential oils.

CHAPTER TWO

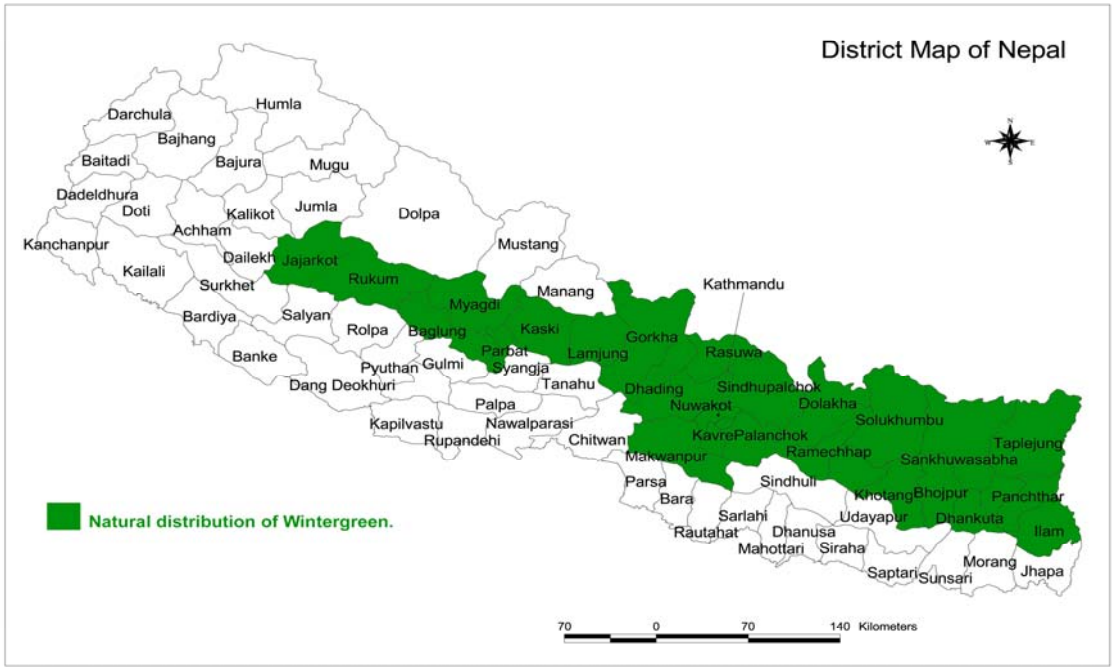
1. Habitat and distribution

1.1 Habitat and distribution of Wintergreen

Wintergreen oil is extracted by steam distillation of the leaves and aerial parts of *Gaultheria fragrantissima* Wall (English name: Wintergreen; Nepali name: Dhasingre; Family: Ericaceae). The average yield of Wintergreen oil is 0.7% commercially.

Habitat and distribution: Distributed throughout Nepal at 1200-2600m on rocky hill sides in forested areas; also found in North India, Bhutan, Sri Lanka and North Myanmar.

In Nepal Wintergreen is naturally distributed in the mid hills of Taplejung, Panchthar, Ilam, Tehrathum, Dhankuta, Sankhuwasabha, Bhojpur, Solukhumbu, Khotang, Okhaldhunga, Ramechhap, Dolakha, Sindhupalchok, Kavrepalanchok, Kathmandu, Lalitpur, Bhaktapur, Nuwakot, Rasuwa, Dhading, Makwanpur, Kaski, Lamjung, Gorkha, Parbat, Myagdi, Baglung, Rukum, and Jajarkot districts.



Map 1: Natural distribution of Wintergreen

Traditional uses

Medicine: Leaves are stimulant and carminative. Juice of the leaves mixed with water is taken for cough. About 2 teaspoons of juice is given as an anthelmintic. Young leaves are also taken as an anthelmintic. Immature fruits are chewed and

their paste is given for stomach troubles. Juice of unripe fruits is taken to treat stomachaches.

Food: Ripe fruits are eaten fresh and also distilled locally for making alcohol.

1.2 Habitat and distribution of Juniper

Juniper oil is extracted by steam distillation of the needle and berries of *Juniperus communis* L., *Juniperus indica* Bertol, *Juniperus recurva* Buch.-Ham. ex D.Don (English name: Juniper; Nepali name: Dhupi; Family: Cupressaceae). The average yield of Juniper needle oil is 0.8% and Juniper berry oil is 0.3% in commercial scale.

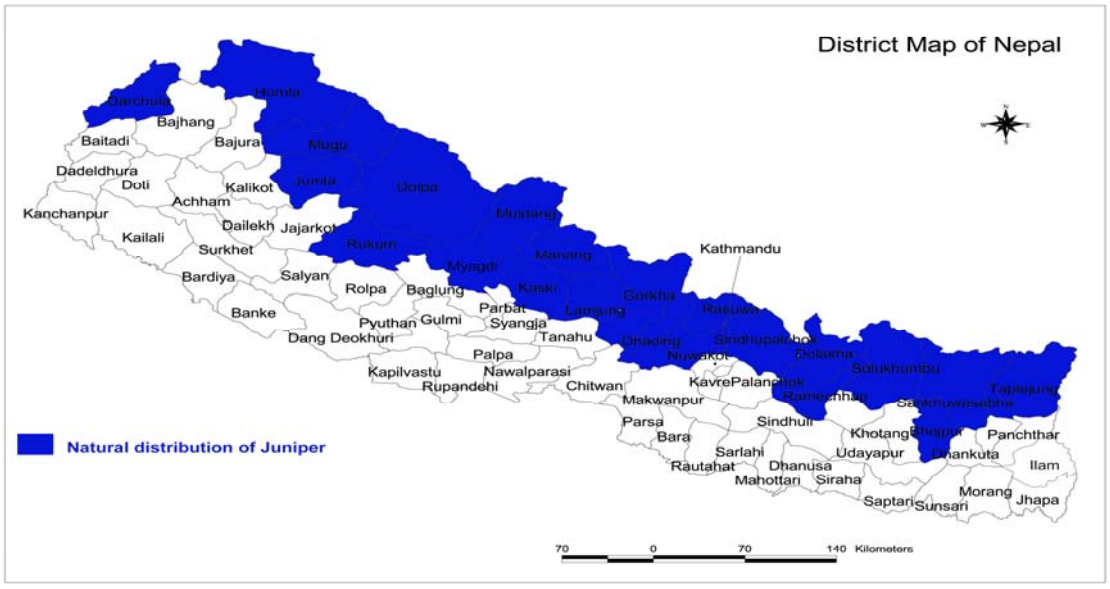
Habitat and distribution

*Juniperus communis***:** Distributed throughout Nepal at 3300-4600m in open, rocky places in alpine regions. Native to the Northern hemisphere: Scandinavia, Siberia, Canada, North Europe and North Asia.

Juniperus indica: Distributed throughout Nepal at 3700-4500m on open slopes, forests, shrubberies; also distributed in Kashmir and West China.

Juniperus recurva: Distributed throughout Nepal at 3600-4600m in open, rocky places in alpine regions; also distributed in North India, West China and Myanmar.

Juniper in Nepal is naturally distributed in Taplejung, Sankhuwasabha, Bhojpur, Solukhumbu, Ramechhap, Dolakha, Sindhupalchok, Nuwakot, Rasuwa, Dhading, Gorkha, Lamjung, Manang, Mustang, Kaski, Myagdi, Dolpa, Rukum, Jumla, Mugu, Humla, and Darchula districts.



Map 2: Natural distribution of Juniper

Traditional uses

Medicine: Juniper berries are used as antiseptic for cystitis. Its bitter action aids digestion and eases flatulent colic. It is used in rheumatism and arthritis. Externally it eases pain in the joints and muscles. Fruits are eaten to cure fever and headaches.
According to British herbal pharmacopoeia, it is used for rheumatic pain and cystitis.
Others: Wood and leaves are used as incense.

1.3 Habitat and distribution of Anthopogon

Anthopogon oil is extracted by steam distillation of the leaves and aerial parts of *Rhododendron anthopogon* D.Don (English name: Anthopogon; Nepali name: Sunpati; Family: Ericaceae). The average yield of Anthopogon oil is 0.3% commercially.

Habitat and distribution: Distributed throughout Nepal at 3500-5100m on open, moist alpine regions; widely distributed in North India, Bhutan and Tibet.
In Nepal, Anthopogon is naturally distributed in Taplejung, Sankhuwasabha, Solukhumbu, Ramechhap, Dolakha, Sindhupalchok, Nuwakot, Rasuwa, Dhading, Gorkha, Lamjung, Manang, Myagdi, Rukum, Dolpa, Jumla, Mugu, Humla, and Darchula
districts.

Map 3: Natural distribution of Anthopogon

Traditional uses

Medicine: Leaves are boiled and the vapor is inhaled to relieve cough and cold. Traditionally, leaves and flowers are used in stomach, liver and lungs disorders, indigestion, sore throat, phlegm diseases, used as appetizer, diuretic and in vomiting.

Others: Flowers are used as substitute of tea and dried leaves are used as incense.

2. Requirements for production of essential oils

2.1 Registration of cottage industry

The basic documents along with application form required for the registration of cottage industry are:

1. Copy of citizenship certificate,
2. Documents on legitimacy of industry such as registration certificate, memorandum and regulation of company or any agreement of joint venture,
3. Permission form (if required),
4. Scheme of industry,
5. Initial Environmental Examination (IEE) report with Terms of Reference (ToR) approved from the concerned authority,
6. Recommendation letter from the concerned Municipality/Village Development Committee (VDC) on IEE and industry,
7. Report of public hearing.

2.2 Collection, transport permit and verification

Forest regulation (1995) rule-11 states that the collectors should acquire a license from District Forest Office (DFO) to collect the forest products from government managed forests.

In the case of Community Forests (CF) or Leasehold Forests (LF) or Buffer Zone Community Forests (BZCF), the concerned committees have the right to collect herbs by themselves from their forests or provide the collection permit to any collectors within the limit preset and approved by the operational plan but the consensus letter of the DFO is necessary.

The Environment Protection Regulation (1997) is also an important law relating to the collection of forest products. In accordance with schedule-1 of the Environment Protection Regulation (1997), if any collector plans to collect 5-50 tons of forest products other than timber per year and commercial collection of non-polluting medicinal and aromatic herbs, it is necessary to prepare an Initial Environmental Examination (IEE) report. In accordance with schedule-2, it is necessary to prepare an Environmental Impact Assessment (EIA) report for the collection of over 50 tons of forest products other than timber per year.

The DFO staff or committee/group can issue only release order/permit for the transport of herbs and are not authorized to issue permits for processed products from any industry.

Table 1: Authorized body for the permit and verification of forest products

Forest management system	Authorized body to issue collection permit	Authorized body to issue transport permit	Authorized body to collect sale price and royalty
Government managed forests	District forest officers (DFO)	DFO for national and Department of Forest (DOF) for export	**Price:** government **Local tax**: local government
Protected forests	DFO	DFO	**Price:** government **Local tax:** local government
Community forests	Forest user groups (FUG)	FUG or FUG committees	**Price:** FUG **Local tax:** local government
Leasehold forests	Licence holders or leasehold groups	DFO	**Price:** license holders **Local tax:** local government
Religious forests	Religious forest holder agency, group or individual	Agency, group or individual	**Price:** owner groups
Conservation areas	User committees or Wardens of protected areas	Transportation not allowed	**Price:** user committees
Buffer zone community forests	User committees or Wardens of protected areas	Wardens	**Price:** user committees **Local tax:** local government
National parks and wildlife reserves	Wardens of national parks or wildlife reserves	Wardens	**Price:** government
Private forests	Forest products can be harvested and sold by owners	DFO issues release orders for transportation	**Price:** owner **Local tax:** local government

2.3 Value added tax

According to annex-1 of Value Added Tax (VAT) Act (1996), VAT is not imperative in case of trade of herbs and aromatic plants and its extracts.

2.4 Processing permit

Any individual, community, government or semi-government, non-governmental agency or institution interested in establishing an enterprise, must undergo IEE or EIA. The Department of Cottage and Small Industries Board (DCSIB) and the Department of Forest (DOF) reserve the right to grant approval for the establishment of herbs processing industries. These approvals apply to all operations that have an investment of total fixed capital exceeding Rupees one million and process only non-polluting medicinal herbs and aromatic plants based on the results of the IEE report.

The EIA of commercial and industrial processing of medicinal herbs and aromatic plants, which emit garbage and pollution, must be approved by the Ministry of Environment, Science and Technology (MOEST).

Thus, any industry can process medicinal herbs and aromatic plants for the production of essential oils only after the approval of IEE or EIA on the basis of capital invested, quantity of herbs and aromatic plants and nature of pollution they will create.

3. Existing management of distillation units

In general the distillation unit buys raw materials from the resourceful CFUGs in their respective districts. The distillation units are operated either by cooperatives (eg Deudhunga Multipurpose Cooperative Ltd (DMC) in Dolakha) or by enterprises managed by community groups or by individual. The purchasing section of each unit carries out the procurement of raw materials, containers and other necessary equipments. The receiving section does the record keeping and storage of the raw materials and other accessories. Whereas, the distillation unit manager conducts the agreement with CFUGs, manages the daily operation of the unit, agreement with buyers and transports essential oils up to the buyer's destinations. Figure 1 shows the existing management of distillation unit's operation for selected essential oils in Nepal.

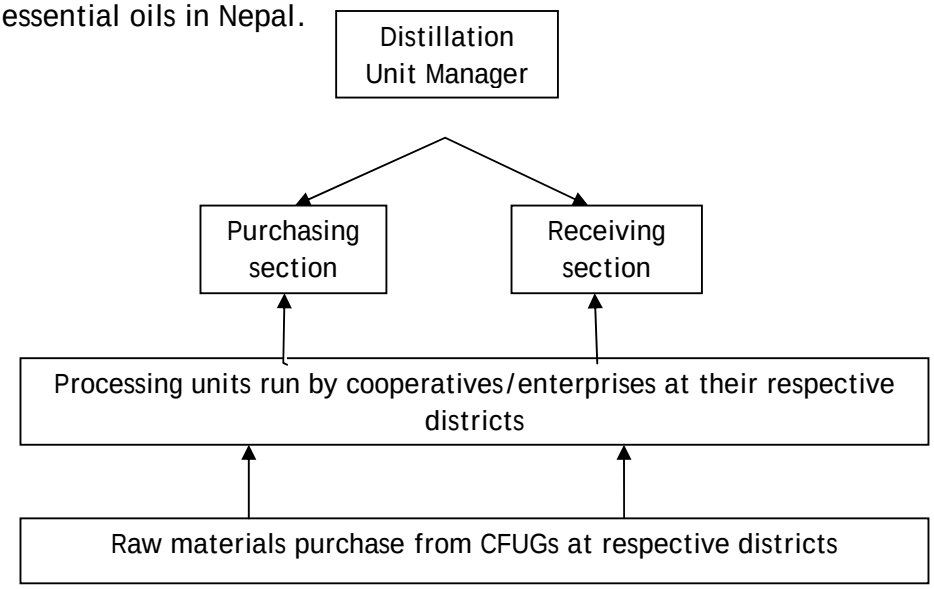


Figure 1: Flow chart of the existing management of distillation units operation

4. Distillation unit's materials

Both Mild steel (M/S) as well as Stainless steel (S/S) distillation units are employed for the processing of Wintergreen, Juniper and Anthopogon oils in Nepal. In Taplejung, Dolakha and Rasuwa districts, the processing enterprises have installed

S/S distillation units; while in other districts, M/S distillation units are in operation. The capacity of the distillation units ranges from 1000 liter to 2400 liter capacity.

Installations of M/S distillation units are cheaper in comparison to S/S distillation units. For example as of July 2010, the factory cost of distillation unit with 1000L is Rs. 150,000 for M/S and Rs 450,000 for S/S. Similarly, the factory cost of distillation unit with 2000L is Rs 250,000 for M/S and Rs 750,000 for S/S and the factory cost of distillation unit with 2400L is Rs 300,000 for M/S and Rs 850,000 for S/S. Table 2 shows the comparison between the efficiency of M/S and S/S units for Wintergreen oil processing.

Table 2: Comparative efficiency between M/S and S/S distillation units

SN	Efficiency measured	M/S distillation units	S/S distillation units
1	Fuel wood consumption	High fuel wood consumption (150kg fuel wood for distilling 300kg of raw materials) per batch	Comparatively low fuel wood consumption (160kg of fuel wood for distilling 500kg of raw materials) per batch
2	Distillation time	Takes more time for distillation (8 hours in the morning and 4 hours in the evening) of 300kg of raw materials per batch	Takes comparatively less time for distillation (7 hours in the morning and 4 hours in the evening) of 500kg raw materials per batch
3	Yield % of essential oils	The average essential oil yield of Wintergreen leaves is 0.5% (300kg Wintergreen leaves yielded 1.5kg of Wintergreen oil)	The average essential oil yield of Wintergreen leaves is 0.7 % (500kg Wintergreen leaves yield 3.5kg of Wintergreen oil)
4	Quality of essential oils	Wintergreen oil retains brown color which needs further treatment to maintain normal color, which consumes both time and loss of oil	Wintergreen oil obtains with normal color (similar to water white or light brown) and does not require further treatment thereby minimizing the time. Furthermore, water white or light brown Wintergreen oil is regarded as export quality oil
5	Handling	Handling of M/S unit is a bit difficult without the chain pulley system in the distillation	Comparatively easy to handle due to the presence of chain pulley system in the S/S unit

5. Traceability of the selected essential oils supply chain

The figure 2 outlines the general procedures for handling raw material, including the documentation trail that traces the material from source to buyers.

Buyers sign yearly buying agreement with supplier (company/exporter) for specified quantities of essential oils

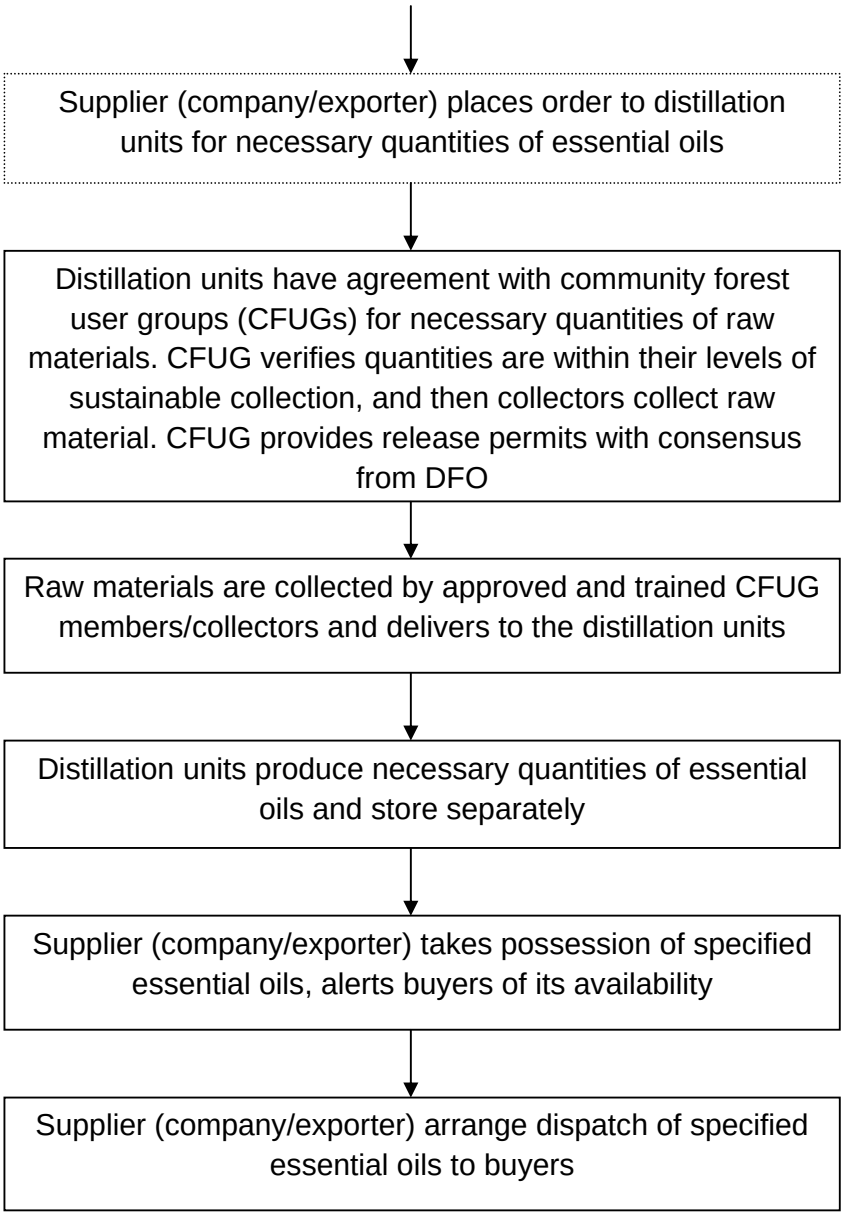


Figure 2: Traceability of the selected essential oils supply chain

Alternatively, the distillation enterprises distill the essential oils and approach to Kathmandu based buyers/exporters without buying agreement. The Kathmandu based buyers then contact domestic consumers and also international buyers for marketing.

6. Production process of selected essential oil

Generally, steam distillation process is employed for the extraction of essential oils in Nepal. The overall distillation process of the selected essential oils is described as below:

1. Harvesting raw materials: The Collectors use sickle or knife to cut the branchlets for collecting the leaf and aerial parts of Wintergreen, Juniper and Anthopogon.

2. Transportation of the raw materials: The collectors do the preliminary cleaning activities in the raw materials collection areas. Then the collected raw materials are packaged in a bamboo basket or sack and transported to the distillation unit sites.

3. Procurement and storage of the raw materials: The distillation units buy the raw materials from the collectors in the factory site or sometimes send staff to buy the raw materials. While procuring the raw material, the distillation unit pays the conservation premium to the concerned Community Forest User Group and market price rate to the collectors. Procured raw materials are stored in storeroom.

4. Cleaning and grading the raw materials: The distillation unit most often has to clean the raw materials again. Cleaned raw materials are graded to produce high quality essential oils.

5. Weighing and putting into vessel: The raw materials are weighed and put into the distillation apparatus evenly with several layers to avoid channelization of steam.

6. Steam distillation: Water is filled into the bottom chamber of the distillation unit. Cold water circulation is maintained around the condenser of the unit. Firewood is burnt to heat the water in the chamber (boiler in the distillation unit with separate boiler). The steam of the water takes up the essential oil of raw materials into the condenser pipe. In condenser, the steam turns into the liquid form. The raw materials are distilled with low pressure and relatively dry steam for 14 to 24 hours (14 hours for Wintergreen and 24 hours for Juniper and Anthopogon).

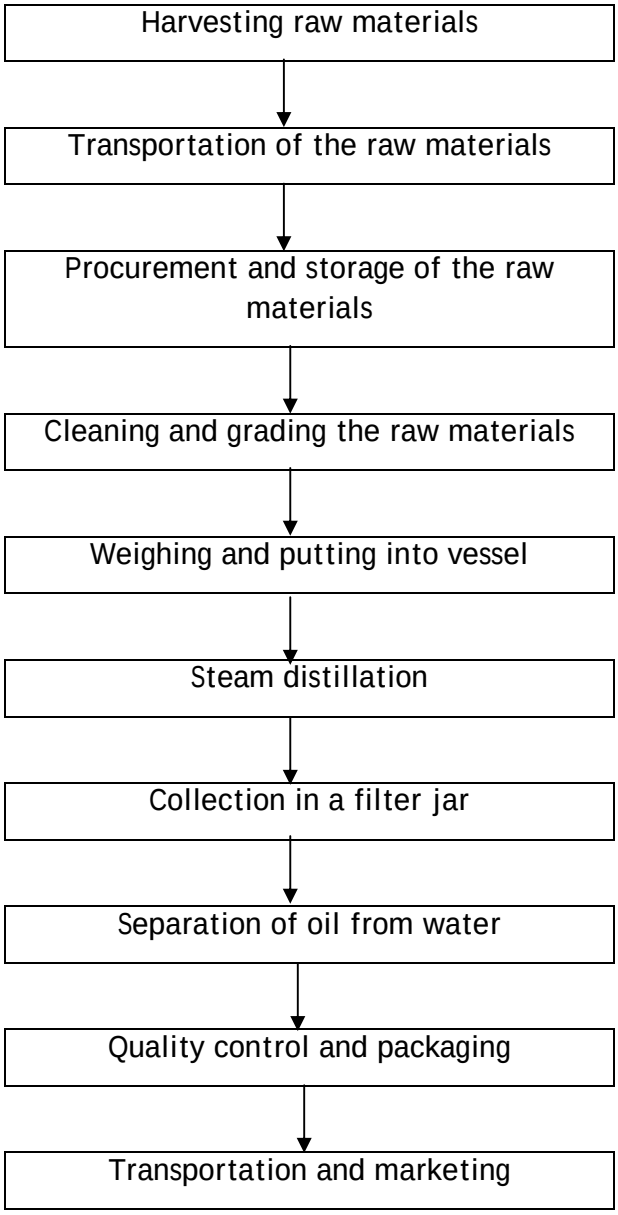
7. Collection in a filter jar: The condenser pipe takes the water and essential oils into the separating jar (oil separator) where the mixture of oil and water are collected.

8. Separation of essential oil: If the specific gravity of the essential oil is lower than water, the oil stays up. While if the specific gravity of oil is higher than that of water, the oils stays below water. With the help of separating jar, the oil is obtained.

9. Filtration of essential oils: The essential oil has some water and particles with it. The water and unwanted particles are removed with the help of the filter paper.

10. Quality control, packaging, and storage: The quality of essential oil is checked, verified and packaged in aluminum/epoxy-coated metal/HDPE containers. The containers are stored in a safe place.

Figure 3: Flow chart of the essential oil production process



7. Current supply channel of selected essential oils

Distillation units owned by Deudhunga Multipurpose Cooperative Ltd (DMC), community shareholders and also individual (proprietorship) in Dolakha distills Wintergreen, Juniper and Anthopogon oils from the raw materials collected from various CFUGs located in different sites of Dolakha. Similarly, distillation units owned by community shareholders and individual in Sindhupalchok, Ramechhap, Okhaldhunga, Makwanpur, Rasuwa, Parbat, Taplejung and other parts of Nepal process Wintergreen, Juniper and Anthopogon oils from raw materials collected from CFUGs in the respective locations of the districts.

Himalayan Bio Trade P. Ltd (HBTL), a retailer and exporter, buys major portion (almost 90%) of the essential oils produced by DMC and other enterprises on the basis of the annual buying agreement. While other retailers and exporters based in Kathmandu buys the remaining portion (about 10%) of the essential oils. There is no evidence of direct export of Wintergreen, Juniper and Anthopogon oils by the distillation units.

The essential oils thus received by the Kathmandu based buyers then does the post filtration, re-packaged and warehouse for marketing in domestic and international markets. The figure 4 shows the supply channel of selected essential oils in Nepal.

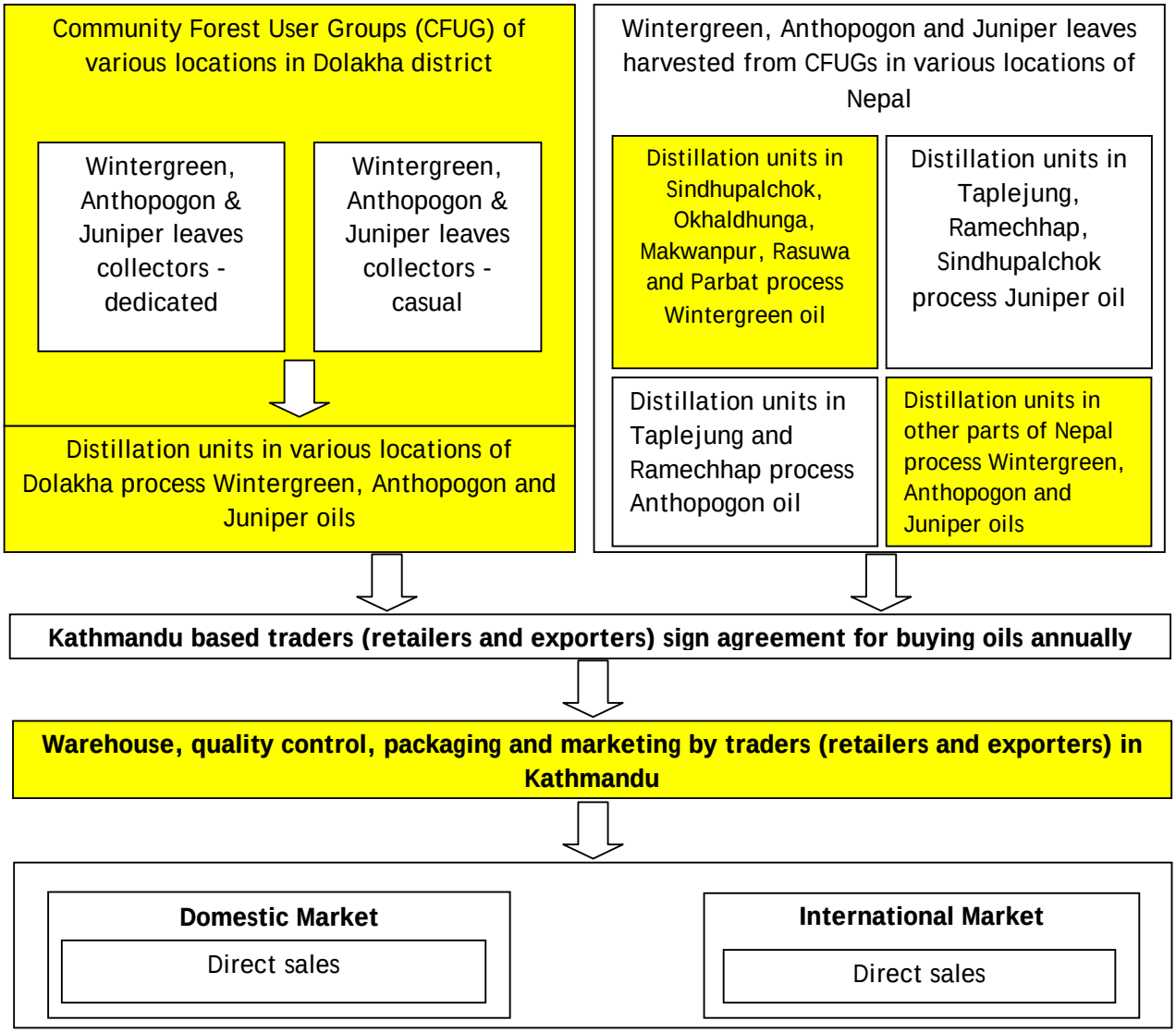


Figure 4: Current supply channel of the selected essential oils

Box 1: Internal control system (ICS) and monitoring methodology

Internal control system and monitoring for organic certification

1. Procedures for performing monitoring of collectors/suppliers:
a) The group manager assesses all collectors at least annually
b) Agreements, procedures and training are revisited annually
c) A record of monitoring visits including dates of visits, member visited and general findings are kept
d) A report of findings and corrective actions are provided to the member if there is any non-compliance
e) Corrective action compliance is verified either by onsite visit or document review as appropriate. A verification report is prepared and is made part of the group manager records.
2. All records and reports maintained are compiled for the preparation of the yearly renewal/audits.

8. Cost factors related to essential oils supply chain

The following are the major steps in which cost factors are involved in the essential oils supply chain of the selected essential oils:

1. Feasibility of processing essential oils: Identification of the resourceful CFUGs who can supply raw materials in sustainable basis.

2. Networking with resourceful CFUGs and DFO: A series of interactions/discussions with CFUGs is needed for the supply of raw materials and their shareholding in the enterprise. Permit from DFO is mandatory for the establishment of forest based enterprises.

3. Registration of enterprise: Prior processing essential oils, registration of the processing enterprise in Office of the Cottage and Small Scale Industries should be conducted.

4. Site selection for distillation unit (DU) installation: Onsite visit at various locations suitable for the installation of DU is needed. The suitable site should be nearby the raw material collection site, accessible, availability of water and enough space for shade house preparation.

5. Manufacturing/fabrication of DU: Visit to DU manufacturers/fabricators and receiving the quotation is necessary. There is an option for the manufacture of M/S or S/S DU. In terms of the cost; M/S DU is cheaper than S/S.

6. Transportation of DU: During the transportation of DU from fabricator to installation site, transportation costs for vehicle and involve manpower is needed.

7. Preparation of shade house and storage area: Preparation of temporary or permanent shade house for DU and store house for raw materials and finished product is needed.

8. Water supply system: The management of continuous water supply system via polythene pipe from water source should be done.

9. Agreement with CFUGs: Before harvesting of raw materials, agreement with CFUGs necessary that can be renewed on yearly basis.

10. Purchasing raw materials: The distillation unit pays the collectors for raw materials as per the market rate (for example Rs 2-2.50/per kg in case of Wintergreen leaves) in weekly or monthly basis or as per the need.

11. Royalty to CFUGs: The distillation has to pay royalty to CFUGs for the harvesting of raw materials (for example Rs 0.25/kg for Wintergreen leaves).

12. Purchasing fuel wood: The distillation unit has to pay royalty to CFUGs for the fire wood and for the transportation up to the distillation unit.

13. Payment to distillation unit workers: The distillation unit pays the full time DU workers as monthly basis.

14. Purchasing containers and other accessories: The distillation unit buys containers for packaging essential oils and other accessories such as funnel, filter paper, muslin cloth for the filtration of oils and other stationery items as per necessity.

15. Agreement with buyers: The distillation unit manager has to visit the buyers based in Kathmandu for the annual buying agreement or sometimes it is optional.

16. Royalty to DFO/DDC/VDC: The distillation unit has to pay royalty to DFO for the release permit of oils, tax to DDC and VDC as well.

17. Transportation up to buyer's: The distillation unit manager does the transportation up to road head using manpower and via vehicle up to the buyer's destination.

18. Post filtration and packaging: The retailers or the exporters of essential oils have to conduct quality control and repackaged the oils in their containers.

19. Warehousing: The essential oil buyers/traders/exporters have to store the received essential oils in warehouse sometimes up to 3-4 years.

20. Communication with buyers: The retailers or exporters approach domestic and international buyers via telephone or e-mail.

21. Agreement with buyers: The traders do the agreement with domestic and international buyers for the annual supply of essential oils or sometimes it is optional.

22. Transportation up to domestic buyer's destination: Sometimes the supplier/trader has to transport essential oils up to domestic buyers as per the agreement or sometimes it is optional.

23. Sampling to international buyers: Before shipment, the exporters have to send samples to buyers for their approval (in Nepal only DHL carries essential oil samples).

24. Tests for technical data sheet (TDS): Several organoleptic, physical, chemical tests and active constituents' analysis tests have to be conducted for the TDS. Sometimes the buyers do the laboratory test for TDS.

25. Preparation of material safety data sheet (MSDS): The exporters have to prepare MSDS prior to approach EU and US markets. The buyers also prepare MSDS as per the request of the exporters/suppliers.

26. Standard labels: Graphic design and printing standard labels is necessary.

27. Preparation of documents: The exporters should prepare mandatory documents for customs clearance and buyers.

28. Analysis and recommendations: The analysis of essential oils and recommendation from DPR is mandatory for the custom clearance at Nepal.

29. Packaging box: The outer packaging box is necessary for the essential oils shipment to international markets before handing over to the cargo.

30. Transportation: Transportation up to cargo/couriers before shipment has to be covered by the exporters.

31. Product certifications: A large amount of fund is required for the products certification and annual audit or sometimes it is voluntary.

32. Other costs: The other costs related to essential oils supply chain would be extra charge to Police posts on the way from DU to Kathmandu; charge to trade unions and *under table* for the customs clearance and the customs clearance tax for export.

9. Current supply situation of selected essential oils

9.1 Supply situation of Wintergreen oil

At present there are altogether 21 processing units of Wintergreen oil established and operating in Dolakha, Sindhupalchok, Okhaldhunga, Makwanpur, Rasuwa and Parbat districts of Nepal. The current production of Wintergreen oil in Nepal is about 3500kg oil per year (the current production of Wintergreen oil was calculated as the average production of each distillation unit from two to five years period). However, the total production capacity of Wintergreen oil by the currently operating distillation units is projected to about 5000kg per year as per the availability of raw materials. The details are presented in Table 3.

Table 3: Wintergreen oil producers/suppliers in Nepal

SN	Name of enterprises/processing units	Locations	Capacity of Production/ year	Current production/ year
1	Wintergreen Processing Enterprise owned by Deudhunga Multipurpose Cooperative Limited (DMC)	Lakuri danda VDC, Kharidhunga, Dolakha	300kg	250kg
2	Wintergreen Processing Enterprise owned by DMC	Lakuri danda VDC, Napkeyanmara, Dolakha	450kg	350kg
3	Wintergreen Processing Enterprise owned by DMC	Suspa Chhemawati VDC, Suspa, Dolakha	350kg	250kg
4	Wintergreen Processing Enterprise owned by DMC	Sundrawati VDC, Dolakha	250kg	150kg
5	Wintergreen Processing Enterprise owned by DMC	Jhyanku VDC, Ward No.: 9; Dolakha	300kg	250kg
6	Wintergreen Processing Enterprise owned by DMC	Jhyanku VDC, Ward No.:1; Dolakha	200kg	150kg
7	Wintergreen Processing Enterprise owned by DMC	Suri VDC, Dolakha	300kg	200kg

8	Wintergreen Processing Enterprise owned by DMC	Hawa VDC, Jormane, Dolakha	200kg	150kg
9	Wintergreen Processing Enterprise owned by DMC	Chankhu VDC, Hulak, Dolakha	100kg	50kg
10	Reymond Essential Oil Industry	Suri VDC, Dolakha	200kg	150kg
11	Wintergreen Processing Enterprise	Jugu VDC, Dolakha	200kg	100kg
12	Wintergreen Processing Enterprise	Mainapokhari, Kabre VDC, Dolakha	200kg	150kg
13	Wintergreen Processing Enterprise	Bulung VDC, Dolakha	250kg	150kg
14	Dhasingre Prasodhan Udhyog	Lakuri danda VDC, Dolakha	100kg	50kg
15	Dhasingre Prosodhan Udhyog	Mali VDC, Dolakha	200kg	150kg
16	Dhaulagiri Essential Oil Industry	Lek phanta VDC, Parbat	100kg	50kg
17	Gauri Ban Paidawar Utpadan Tatha Prasodhan Pvt. Ltd.	Rangani-9, Okhaldhunga	300kg	200kg
18	Shyaubari Sugandhit Tel Prasodhan Kendra	Laharepauwa-9, Rasuwa	400kg	300kg
19	Sikre Wintergreen Processing Enterprise	Sikre, Attarpur Sindhupalchok	300kg	250kg
20	Sugandhit Tel Prashodhan Udhyog	Listikot VDC, Sindhupalchok	200kg	100kg
21	Wintergreen Prasodhan Kendra	Daman VDC, Aghor, Makwanpur	100kg	50kg
	Total		**5000kg**	**3500kg**

9.2 Supply situation of Juniper oil

Around 8 distillation units are working for the production of Juniper oil in Nepal. The distillation units are located basically in Dolakha, Sindhupalchok, Ramechhap and Taplejung districts producing Juniper needle oil to about 1500kg per year (calculated as per the average production per year from two to five years). The total production capacity of Juniper needle oil in those production sites is estimated about 2500kg per year on the basis of the availability of raw materials.

However, there is no production of Juniper berry oil in commercial scale in Nepal to till date. The details of distillation enterprises with the yearly production of Juniper oil are presented in Table 4.

Table 4: Juniper oil producers/suppliers in Nepal

SN	Name of enterprises/processing units	Locations	Production capacity/ year	Current production/ year
1	Juniper Processing Enterprise owned by DMC	Marbu VDC, Dolakha	300kg	250kg
2	Juniper Processing Enterprise owned by DMC	Chankhu VDC, Dolakha	400kg	300kg
3	Juniper Processing Enterprise owned by DMC	Shyama VDC, Dolakha	300kg	150kg
4	Juniper Essential Oil Industry	Lamabagar VDC, Dolakha	400kg	200kg
5	Juniper Essential Oil Industry	Chilankha VDC, Dolakha	100kg	-
6	Ghunsa Sugandhit Tel Udhyog	Lelep-9, Taplejung	200kg	150kg
7	Everest Jadibuti Tel Udhyog Pvt. Ltd.	Gumdel-4, Ramechhap	400kg	250kg
8	Sugandhit Tel Prashodhan Udhyog	Listikot VDC, Sindhupalchok	400kg	200kg
	Total		**2500kg**	**1500kg**

9.3 Supply situation of Anthopogon oil

As of this study, altogether there are 7 distillation enterprises established and operating to process Anthopogon oil in Dolakha, Ramechhap and Taplejung districts of Nepal. The current annual production of Anthopogon oil in Nepal is about 250kg per year (calculated on the basis of the average production of each unit in two to five years time). On the basis of the availability of raw materials, the total production capacity of Anthopogon oil is approximately 450kg per year in Nepal. The details are shown in Table 5.

Table 5: Anthopogon oil producers/suppliers in Nepal

SN	Name of enterprises/processing units	Locations	Production capacity/ year	Current production/ year

1	Sunpati Processing Enterprise owned by DMC	Marbu VDC, Dolakha	75kg	50kg
2	Sunpati Processing Enterprise owned by DMC	Chankhu VDC, Dolakha	75kg	50kg
3	Sunpati Processing Enterprise owned by DMC	Shyama VDC, Dolakha	50kg	50kg
4	Essential Oil Industry	Lamabagar VDC, Dolakha	100kg	50kg
5	Ghunsa Sugandhit Tel Udhyog	Lelep-9, Taplejung	50kg	50kg
6	Essential Oil Processing Enterprise	Chuchure VDC, Ramechhap	50kg	-
7	Everest Jadibuti Tel Udhyog Pvt. Ltd.	Gumdel-4, Ramechhap	50kg	-
	Total		**450kg**	**250kg**

10. Potential sites for the processing of selected essential oils

10.1 Potential sites of Wintergreen oil processing

According to Gurung and Pyakurel (2006), Prok VDC of Gorkha district in Manaslu Conservation Area (MCA) is the potential site for the Processing of Wintergreen as stated in the study report submitted to Manaslu Conservation Area Project (MCAP). Similarly, Gurung (2007) recommended establishing the distillation units for processing Wintergreen in Chaurikharka VDC of Solukhumbu district, Ghyangphedi VDC of Nuwakot district and Helambu VDC of Sindhupalchok district in his report submitted to WWF Nepal program. The potential sites for Wintergreen processing in Nepal are shown in Maps 4(i), 4(j), 4(k) and 4(l).

10.2 Potential sites of Juniper needle/berry oil processing

Gurung and Pyakurel (2006) recommended MCAP for the establishment of Juniper needle oil processing unit at Samagaun VDC of Gorkha in MCA. Similarly, Pyakurel (2009) stated in his report submitted to Western Upland Poverty Alleviation Project (WUPAP) that there is immense potentiality for the establishment of distillation units for the processing of Juniper needle oil in Ghode Mahadev, Tamti and Patrasi VDCs and Juniper berry oil in Tamti and Patrasi VDCs of Jumla district.

Furthermore, Bargaun VDC of Humla district was also identified as the potential site for processing Juniper berry and needle oils as recommended by Gurung (2009) in his report submitted to WUPAP.

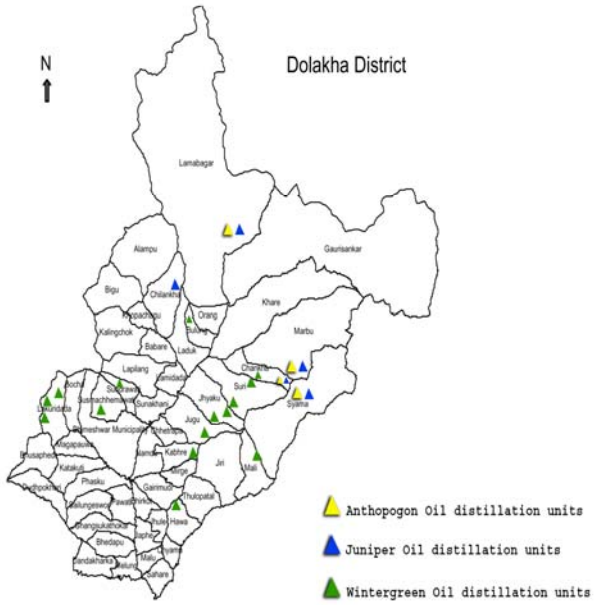
Other potential sites for the processing of Juniper needle and berry oils are Nar and Pisang VDCs of Manang district and Marpha VDC of Mustang district in Annapurna Conservation Area (ACA) as identified by the researcher. The potential

sites for processing of Juniper berry and Juniper needle oils are presented in Maps 4(l), 4(m), 4(n), 4(o) and 4(p).

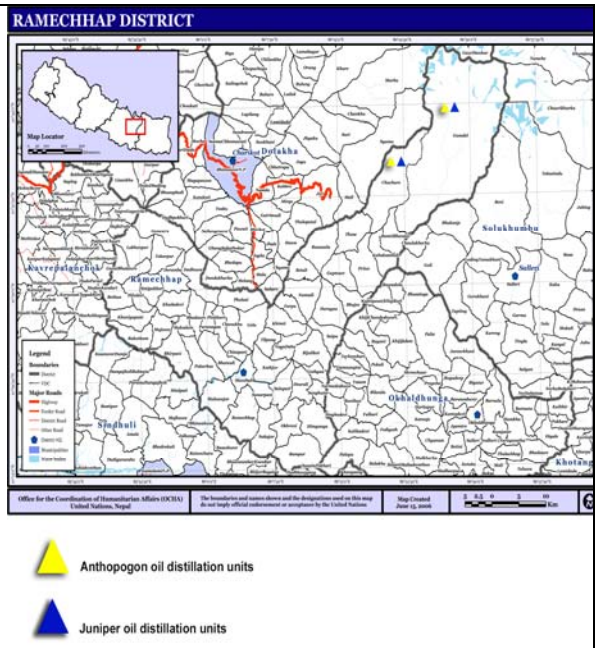
10.3 Potential sites for Anthopogon oil processing

On the basis of the study conducted by Gurung (2009) for WUPAP; Bargaun, Kharpunath and Rodikot VDCs of Humla district are the most potential sites for the processing of Anthopogon oil. Similarly, Pyakurel (2009) identified Patrasi VDC of Jumla district as the potential site for establishing distillation unit for processing Anthopogon oil in Jumla district as according to the report submitted to WUPAP. The potential sites for processing Anthopogon oil in Nepal are presented in Maps 4(o) and 4(p).

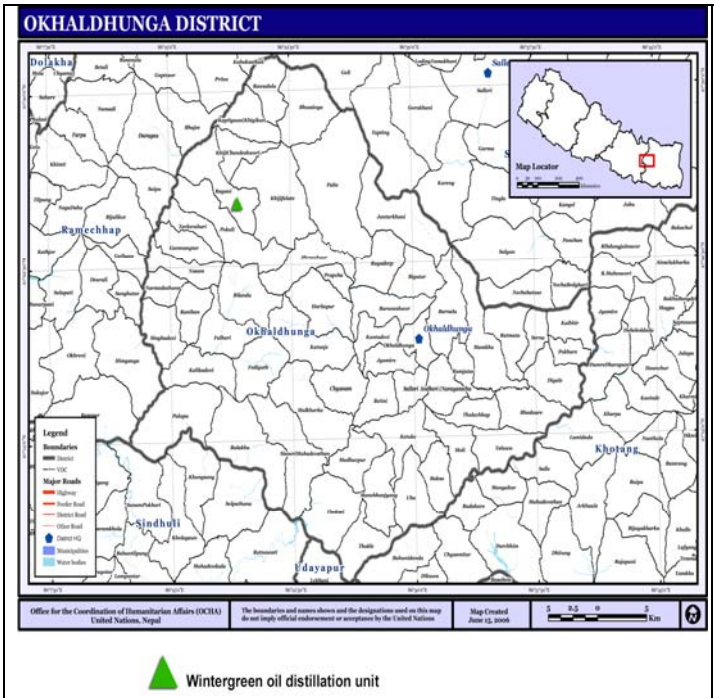
Map 4: Maps of existing distillation unit sites and potential sites for processing selected essential oils



Map 4(a): Distillation unit sites in Dolakha

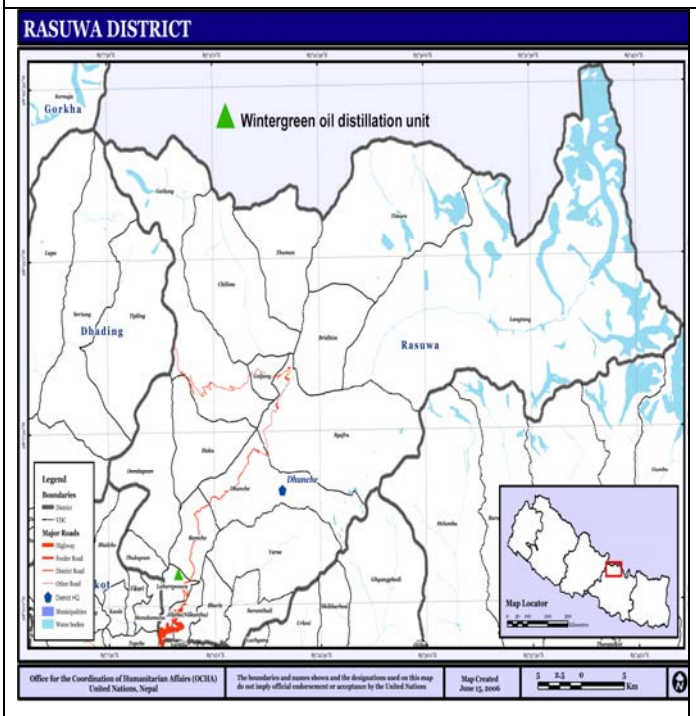


Map 4(b): Distillation unit sites in Ramechhap



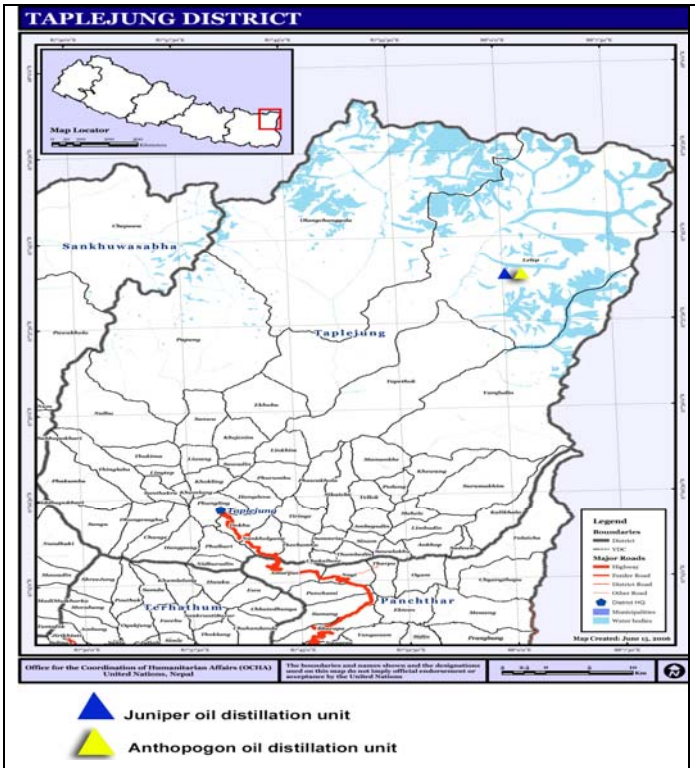
Map 4(c): Distillation unit sites in Okhaldhunga

Map 4(d): Distillation unit sites in Parbat

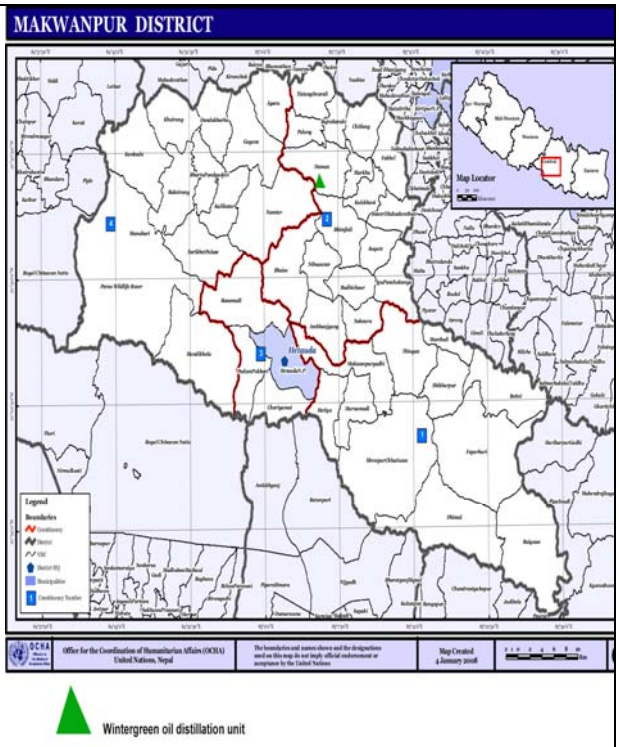


Map 4(e): Distillation unit site in Rasuwa

Map 4(f): Distillation unit sites in Sindhupalchok

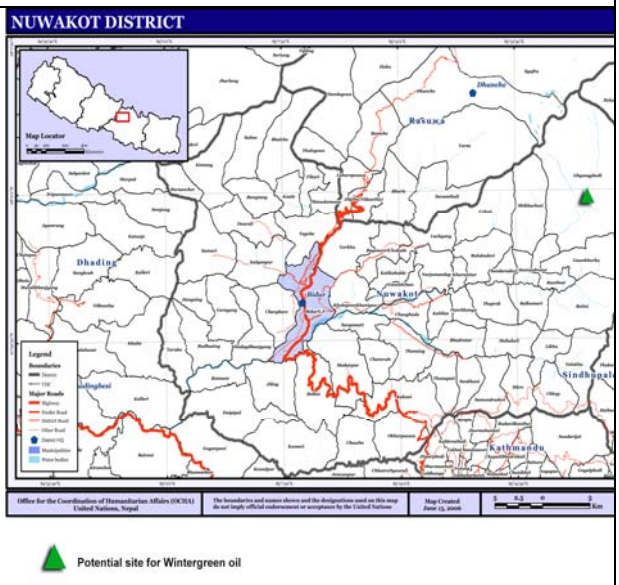


Map 4(g): Distillation unit site in Taplejung

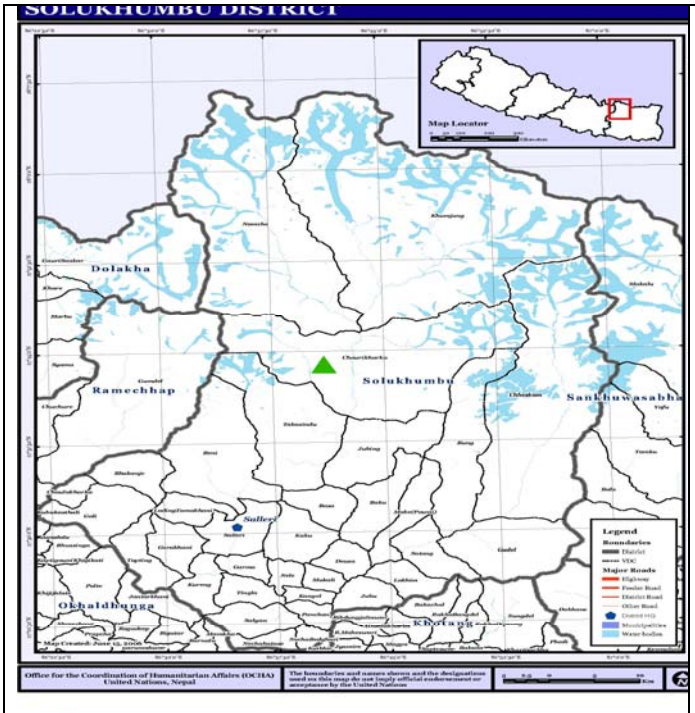


Map 4(h): Distillation unit site in Makwanpur

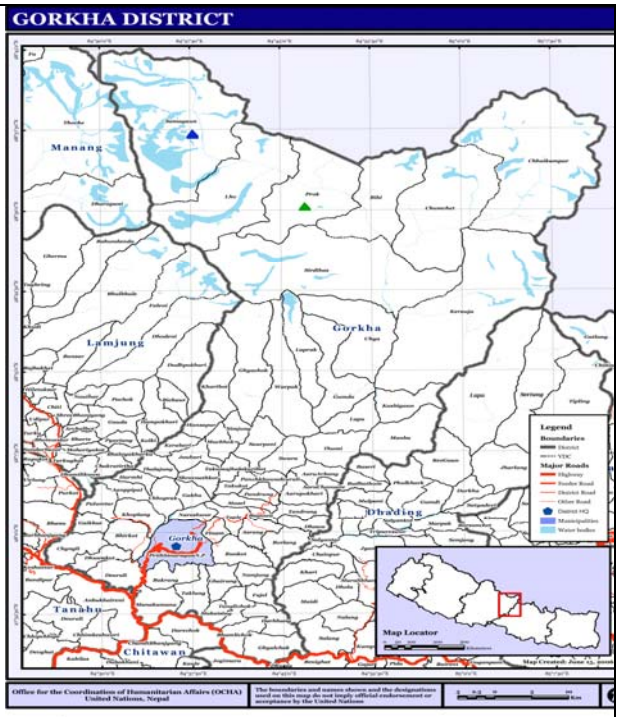
Map 4(i): Potential distillation unit site at



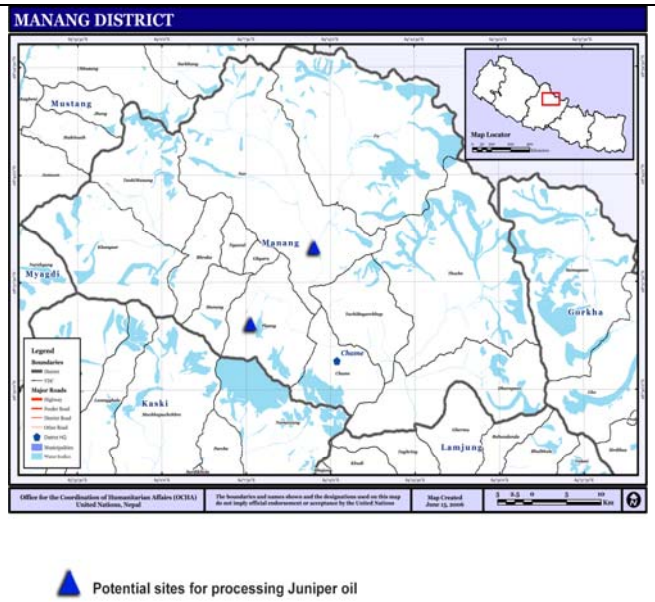
Map 4(j): Potential distillation unit site in Nuwakot



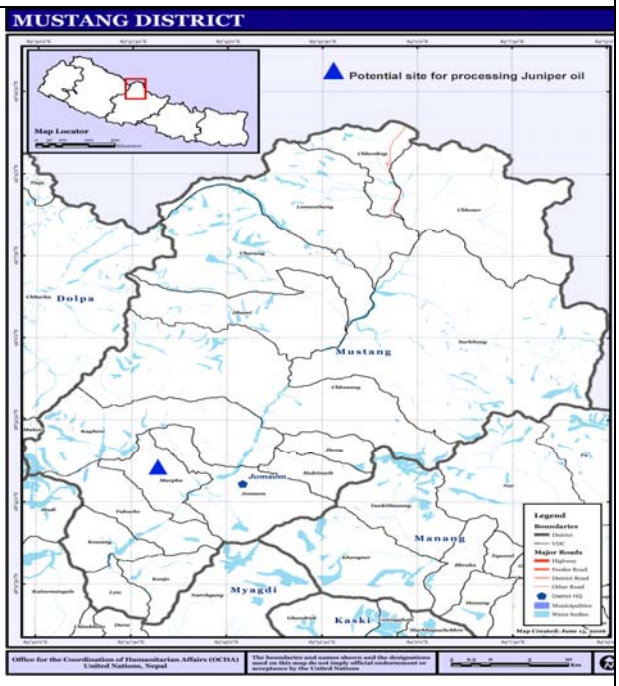
Map 4(k): Potential distillation unit site in Solukhumbu



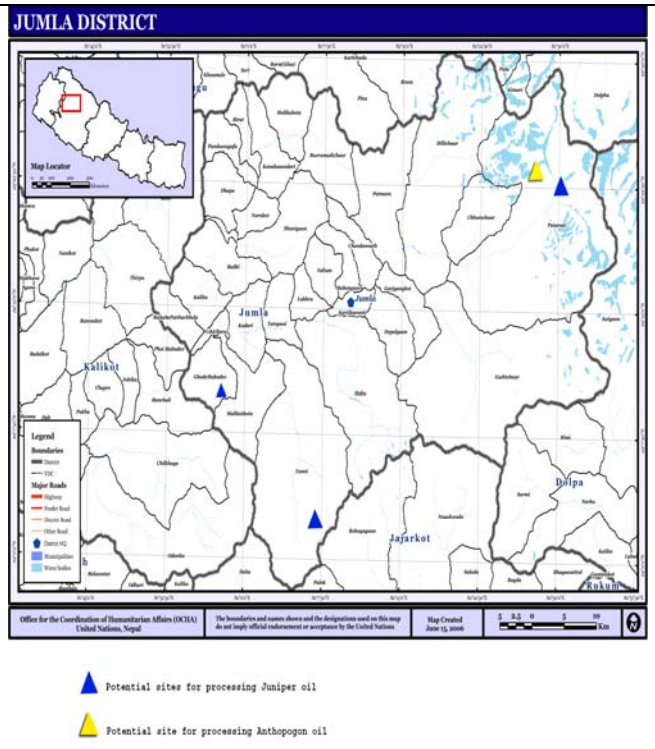
Map 4(l): Potential distillation unit site in Gorkha



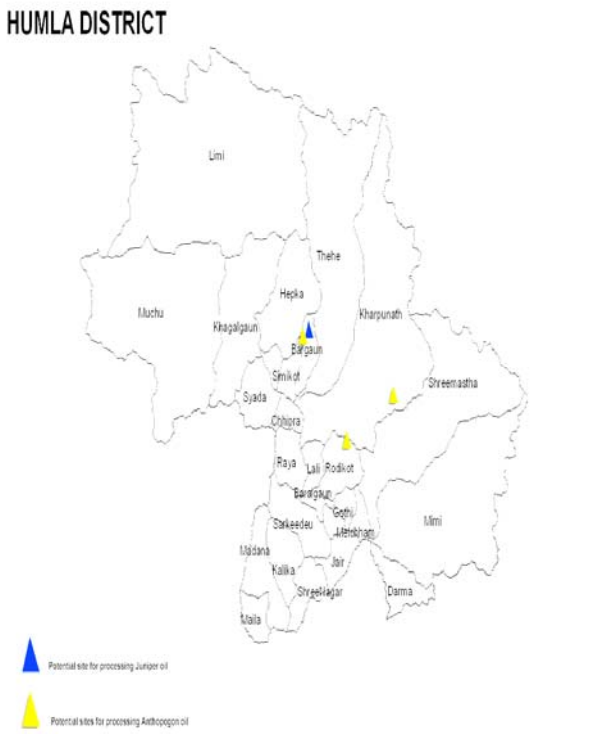
Map 4(m): Potential distillation unit sites in Manang



Map 4(n): Potential distillation unit site in Mustang



Map 4(o): Potential distillation unit sites in Jumla



Map 4(p): Potential distillation unit sites in Humla

CHAPTER THREE

1. Current markets of the selected essential oils

Majority of the selected essential oils produced are exported, while some quantities are consumed in domestic market as well. The current market situations of the selected essential oils are:

1.1 Market analysis of Wintergreen oil

a. Domestic market

It is estimated that about 20% (about 700kg) of the total production of Wintergreen oil in Nepal is consumed in domestic market per year. Himalayan Bio Trade P. Ltd (HBTL) is the major supplier of Wintergreen oil to domestic market. The end products in which Wintergreen oil is used are mainly health care herbal products such as *Sancho* (Soothing product manufactured by Herbs Production and Processing Co. Ltd), *Sanjeevani* (Soothing product manufactured by Siddhartha Herbal Industry), *Bojho Mint* (Soothing product manufactured by Himalayan Special Herbs Industries P. Ltd), *Suvas* (Soothing product manufactured by Blue Bell Herbal Products), Massage Oils such as *Himalayan Massage Oil*, *Aaram Massage Oil*, *Quick Pain Relief* and other Aromatherapy products.

b. International market

Of the total production of Wintergreen oil in Nepal about 71% (about 2500kg) are exported mainly to EU and US based markets per year directly or via India based exporters. Out of total export of Wintergreen oil from Nepal, about 20% (500kg) are directly exported by HBTL. On the other hand, HBTL sells about 48% (1200kg) of Wintergreen oil to Kathmandu based companies/exporters, who then exports upon the receipt. The remaining 32% (about 800kg) Wintergreen oil is supplied by the village level producers from various districts to Kathmandu based companies/exporters which are ultimately exported. However, the worldwide demand of Wintergreen oil is still unknown. Major exporters of Wintergreen oil in Nepal are given in Table 6.

Wintergreen oil is a widely used product in both food and in many other products over the counter products such as liniments, ointments, lotions and medicated oils. It has also been used for many traditional purposes including: amenorrhea, acute breathing disorders, backache, colds, earache, fevers, gout, hangover, headaches, kidney ailments, lumbago, muscle, joint, and nerve pain, rheumatism, sciatica, sore throat, stomach aches.

Experimentally, Wintergreen oil is the main source of Methyl salicylate which is analgesic, carminative, anti-inflammatory and anti-septic. With so many potential health benefits, Wintergreen oil may be used in an extremely wide array of products. Some of the products include: toothpaste, candies, chewing gum and aromatherapy oil blends.

1.2 Market analysis of Juniper oil

a. Domestic market

About 7% (around 100kg) of the total production of Juniper needle oil is estimated to be consumed in domestic market per year. HBTL supplies the major portion of Juniper oil in domestic market. Juniper needle oil is mostly employed in massage oils, pain relief products, cosmetics and toiletry items and for aromatherapy products in Nepal.

b. International market

As per the consultation with major exporters of essential oils in Nepal, about 47% (about 700kg) of total production of Juniper needle oil is exported per year. The major export markets for Juniper needle oil are EU, US and India. HBTL exports about 29% (near about 200kg) of the total export quantity of Juniper needle oil per year. HBTL also supplies about 400kg of Juniper needle oil per year to exporters of Nepal who then supplies to export markets, comprising about 57% of the total export. While the remaining 100kg of Juniper needle oil is supplied by village level producers to exporters per year, which comprises about 14% of the total export. Exporters also revealed that there is a demand for Juniper berry oil in EU markets. However, to till date there is no commercial production of pure Juniper berry oil in Nepal.

The ultimate end markets for Juniper needle oil are: aromatherapy products, flavor and fragrances, perfumery, and pharmaceutical products.

1.3 Market analysis of Anthopogon oil

a. Domestic market

The domestic consumption for Anthopogon oil is minimal. Only about 4% (10kg) of the total production of Anthopogon oil is marketed domestically per year. HBTL is the only supplier for Anthopogon oil to domestic market. It has a very limited end use in the herbal care products such as *Sanjeevani* (Soothing product manufactured by Siddhartha Herbal Industry) despite its sweet essence. It may be due to the high price of Anthopogon oil.

b. International market

Out of the total production of Anthopogon oil in Nepal, majority is exported mainly to EU and US based markets. As per the information provided by the exporters based in Kathmandu, about 80% (200kg) of the total production of Anthopogon oil is exported per year. HBTL directly exports about 25kg Anthopogon oil per year, contributing 25% of the total export from Nepal. The remaining 75% (150kg) of the total export are done by other exporters of Kathmandu. HBTL also supplies about 75kg of Anthopogon oil to other exporters per year which covers almost 50% of the volume supplied by other Kathmandu based exporters. Approximately 75kg Anthopogon oil is supplied by village level producers to exporters of Kathmandu per year which is 50% of the export volume done by the other exporters of Kathmandu.

2. Major exporters of selected essential oils

Altogether 11 companies have been identified as the major exporters of the selected essential oils in Nepal. The lists of exporters along with their address and contact details are presented in table 6.

Table 6: Major exporter of the selected essential oils

SN	Name and address	Tel/Fax	E-mail/Website	Certification status
1	**Aarya Aroma** P O Box: 4035, Kamaladi, Kathmandu **Contact:** Mr. Kailash Dixit	Tel: +977-1- 4427133 Fax: 4224237	sales@essencenepal.com, info@essencenepal.com www.essencenepal.com	Not available
2	**Chaudhary Biosys (Nepal) Pvt. Ltd** P O Box No.: 8975 EPC 1352, Khumaltar-15, Lalitpur **Contact:** Mr. Abinash Pant	Tel: +977-1-5535448 Fax: 5535753	info@biosysnepal.com.np www.biosysnepal.com	Certified Organic by ECOCERT
3	**Gorkha Exim Pvt. Ltd** Balaju-16, Kathmandu **Contact:** Mr. Ram H Subedi	Tel: +977-1-4357717, 4357716 Fax: 4357716	info@gorkhaexim.com www.gorkhaexim.com	Not available
4	**Herbs Production and Processing Co. Ltd** Koteswor, Kathmandu **Contact:** Mr. Jawahar M Bajracharya	Tel: +977-1-4992152	hppcl@wlink.com.np	Not available

5	**Himalayan Bio Trade Pvt. Ltd** P O Box: 8941, Dhapasi-7, Block No.: 108, Kathmandu **Contact:** Mr. Parbat Gurung	Tel: +977-1-2083309, 4386690	hbtlp@wlink.com.np www.himalayanbiotrade.com	Certified Organic by OneCert, Certified FSC/COC by SmartWood, Certified Wildlife Friendly by Wildlife Friendly Enterprise Network
6	**Khaptar Aroma Industries** P O Box: 3149, Putali sadak, Kathmandu **Contact:** Mr. Sameer Dhungel	Tel: +977-1-4414052, 4441320 Fax: 4422904	khaptar@wlink.com.np	Certified Organic by ECOCERT
7	**Male' International Pvt. Ltd** P O Box: 20279, Kusunti, Lalitpur **Contact:** Rameshwor Pant	Tel: +977-1-5001802, 5001803 Fax: 5001801	maleint@wlink.com.np, info@male.com.np www.male.com.np	Certified Organic by ECOCERT, CERES CERT
8	**Natural Products Industries** Jawabhari-3, Kapilbastu **Contact:** Mr. Ahsan Khan	Tel: +977-76-520149, 520188	Not available	Not available
9	**Natural Resource Industries Pvt. Ltd** P O Box: 410, Purano Baneswor, Kathmandu **Contact:** Mr. Parikshit Khemka	Tel: +977-1-4461847, 4461848 Fax: 4461948	pkhemka@msi.com.np, info@essentialoil.com.np, info@msinp.com www.essentialoil.com.np	Certified Organic by OneCert
10	**Shambhala Herbal and Aromatic Industry Pvt. Ltd** P O Box: 4794, Boudha Mahankal, Kathmandu **Contact:** Mr. Krishna R Amatya	Tel: +977-1-4478359, 5522382 Fax: 4227229	amatya@sambhala.wlink.com.np www.shambhala.com.np www.fondnepal.com/herbal	Certified Organic by NASAA
11	**Unique Himalayan Herbs International Pvt. Ltd** P O Box: 23162, Mitranagar, Bauddha, Kathmandu **Contact:** Mr. Rana B Rawal	Tel: +977-1-4494514 Fax: 4494514	ribdrawal@wlink.com.np, info@herbsonweb.com www.herbsonweb.com	Not available

3. Possible branding of essential oils

The template for the possible branding of Nepali essential oils is presented in box 2.

Box 2: Template for possible branding of Nepali essential oils

Background

Nepal, the country of highly diverse cultures and religions; the famous Mount Everest; and the pride of Gurkhas and Lord Buddha is geographically rich holding 2% of the world's biodiversity within its landscape of a mere 0.01% of the world's land area. We hereby, approach you to present a story of the Nepali peoples' initiative to conserve the unique forest biodiversity while improving the economic and social conditions of the culturally rich local stewards of the forests. The key to the initiative has been community enterprises that distill the high quality wild-crafted essential oils, combined with scientific and culturally appropriate natural resource management practices that fulfill the international standards.

Wild crafted essential oils: The fragrance of the Himalayas

Forest based community enterprises in remote parts of Nepal distill essential oils from the aromatic herbs of the Himalayas which are of the highest quality and purity. These enterprises have received FSC, Organic and Wildlife Friendly certifications for the wild crafted essential oils. The wild plants are harvested from responsibly managed forests by villagers, distilled by local communities and quality controlled and re-packaged by the Kathmandu based exporters for sale to national and international markets.

Promoting these certified essential oils from Nepal Himalaya, benefits rural poor by empowering them to fight poverty and improve their living standard, while protecting globally significant biodiversity and taking positive action in addressing global climate change. But this initiative has much greater potential for expansion and sustainable growth, so we are trying to expand the customer base to market our products which are responsibly crafted, caring for the environment and people. We would be highly obliged if you could bring or recommend the Nepali essential oils for use with new international customers. The customers will be treated to the highest quality essential oils from Nepal Himalaya while generating a wider benefit for the rural poor of Nepal and the global environment.

Box 3: International market trends

International market trends of essential oils

General growth has occurred in the essential oil and oleoresin markets over the past 7-8 years. While products for flavorings have been used in food products for many years, there is an increasing use of essential oils globally with a greater diversity of essential oils, greater diversity of usage (with an increasing popularity in aromatherapy) and also a larger

quantity used. Growth in demand for essential oils is being led by the pharmaceutical, cosmetic and nutrition segments.

A trend that favors small producers is the growth in niche markets where quality is more important than price. In addition, consumer preference has shown an increasing interest in natural products over synthetic products, which will favor producers of Nepal which not only promote natural essential oils, but offer Organic and FSC certification which satisfies "traceability" requirements of buyers.

According to CBI (2007 and 2008), there is limited information on demand for essential oils, but certain oils have seen an overall decline in demand while others remain high due to chronically limited production or weather related limitations on crop production.

One important trend is that Organic essential oils continue to have high demand and as such can result in high price premiums than conventional oils.

Box 4: Major international players

Major international players

The major international players of essential oils can be broken down into a few categories which include: Cosmetics/Perfume/Beauty Care Industry, Flavoring/Food Industry, Pharmaceutical Industry and Aromatherapy. The size of the players can range significantly between major multinational corporations with US$1 billion in sales and up to smaller aromatherapy companies that specialize in Organic essential oil blends.

Companies also range in geography from the European Union countries to North America. It is primarily in these areas where efforts to identify companies has been made, although there may be significant companies that may be present in South America, Oceania and Asia.

CHAPTER FOUR

1. Mandatory requirements for essential oils export

2.

1.1 Mandatory documentation requirement

The documents listed in Table 7 are obligatory for the customs clearance in Nepal as well as in the buyer's destinations. These documents are also the basic requirements of the buyers.

Table 7: Mandatory documentations required for export of essential oils

Documents for export to overseas	Documents for export to India
➢ Certificate of industry registration/export firm ➢ Tax: Permanent Account Number (PAN) or VAT registration certificate ➢ Commercial invoice ➢ Payment certificate: Letter of Credit (L/C) or Advance Payment Certificate (APC) ➢ Certificate of origin ➢ Generalized System of Preference (GSP) form or form A ➢ Type copy of formatted application stating name and address of importer and exporter ➢ Packing lists ➢ Means of transportation and route ➢ Bio-safety statement/Material safety data sheet (MSDS)	➢ Certificate of industry registration/export firm ➢ Tax: Permanent Account Number (PAN) or VAT registration certificate ➢ Annual production capacity ➢ Production flow chart and description of articles ➢ Transaction of raw materials (if imported) ➢ Item number (HS Tariff Code) ➢ Cost sheet ➢ Means of transportation and route ➢ Commercial invoice ➢ Packing lists ➢ Payment Certificate (L/C or APC) ➢ Royalty payment of herbs

The lists of compulsory documents, certificates and recommendations needed for the export of essential oils and their issuing institutions are presented in Table 8.

Table 8: List of mandatory certificates and issuing institutions

SN	Certificates/Documents	Authorized Issuing Institutions
1	Release permit	District Forest Office (DFO)
2	Certificate of advance payment of L/C	Commercial Banks
3	Firm registration	Department of Commerce (DOC), Department of Cottage and Small Industries Board (DCSIB), Office of Company Registrar
4	PAN/VAT registration	Department of Inland Revenue
5	Generalized system preference	Trade Promotion Center (TPC)

	(GSP) form	
6	Certificate of origin	Federation of Nepalese Chamber of Commerce and Industries (FNCCI), Confederation of Nepalese Industries (CNI)
7	Non-hazardous/Non-explosive	Exporting companies/ firms
8	Recommendation letter to Customs	Department of Plant Resources (DPR)

Under the terms of bilateral treaty of trade (Article-V) signed between Nepal and India in 1991 and the letter of exchange in 1996, the export of Nepali manufactured products (other than negative listed) is given duty free preferential market access in India. Such products must be manufactured in Nepal and accompanied with a Certificate of origin issued by authorized district chamber of commerce in the format prescribed by the treaty.

A technical committee headed by the Director General of the Department of Industry and consisting of public and private sector representatives examine in detail, the application form and supporting documents submitted by an exporter for export to India. This provision is applicable for preferential market access to India for the primary product, which is manufactured in Nepal.

According to the report of the working party on the accession of Nepal to the World Trade Organization (WTO), FNCCI is the only agency authorized to issues the certificate of origin for certifying the export of Nepali origin goods. FNCCI, however, does not issue the certificate of origin by itself for Nepali origin goods for export to South Asian Preferential Trade Agreement (SAPTA) and overseas countries. In this situation, the authority to issues the certificate of origin is delegated to Nepal Chamber of Commerce (NCC), who is the member of FNCCI.

According to the rule established by FNCCI, the certificate of origin can be provided only to the industries that have been registered under the Industrial enterprise act (1992). Private exporters who purchase oils from local industries are facing difficulty in obtaining the certificate of origin as FNCCI looks for, a permanent agreement between exporters and distillers which limits the exporter's freedom and is counter to a free market.

Similarly, Community forest user groups and cooperatives are required to register as the industries for the fulfillment of requirement to obtain the certificate of origin.

1.2 Recommendation and export permit

According to the provision of Custom directive (2000), for the export of extract and by-products of herbs and aromatic plants (includes essential oils), a recommendation letter from the Department of Plant Resources (DPR) is

mandatory. DPR has prescribed a format of application to be submitted by the exporter.

After receiving an application, the staff of DPR draws 2 simulation samples from each container of essential oil according to the direction of section head. After drawing sample, the container is to be sealed by fixing the metallic seal of DPR. After receiving the sample, the public analysis section analyzes on the basis of the nature of oil and obtains the result.

If the analysis report proves that the essential oil is according to the claim or declaration of the applicant or the exporter, DPR issues the recommendation letter to export essential oils. For export permission of essential oil of banned and CITES species, according to the gazette notification (2001), DPR is required to forward the recommendation letter to the Department of Forest (DOF) and the DOF then issues the export permit letter to the concerned Customs Offices.

1.3 Taxation

Every export enterprise or company is required to register for taxation according to the provision of concerned laws. Only these registered entities have rights to export. Registration for VAT and obtaining the PAN is also required for these entities.

1.4 Authority of Narcotic Drug Inspector

The Gazette notification of May 1994 has classified the Narcotics and Psychotropic substances. According to the provisions of Narcotic Drug (Control) Act 1979, the Narcotic Drug Inspector has authority as a Police Officer, Customs Officer and Postal Officer during the investigation of Narcotic Drug production and abuse. The Narcotic Drug Inspector has authority and obligation to use the scientific instruments for the examination of Narcotic Drug. However they have no scientific instruments for the examination of any items of Narcotics and Psychotropic substances. Therefore Narcotic Drug Inspectors are using only their discretion and rods for the examination of Narcotics and Psychotropic substances. They also impose this rule to essential oil as investigation at the time of customs clearance and it has been creating hassles to exporter of essential oil from Nepal.

2. Quality tests requirements of buyers

2.1 WHO certification

Various standards or quality tests are required for the compliance of World Health Organization (WHO) certification, mostly required by the overseas buyers. The quality tests and the laboratories performing the tests in Nepal are shown in Table 9.

Table 9: Tests required for WHO certification for essential oils

SN	Quality Tests	Laboratories in Nepal
1	Determination of foreign matter	Natural Product Research Laboratory (NPRL), Herb Production and Processing Company Limited (HPPCL)
2	Thin layer chromatography	NPRL, HPPCL
3	Determination of Pesticides residue	Nepal Bureau of Standards and Metrology (NBSM), Nepal Environment and Scientific Services (P.) Ltd (NESS), CEMAT Water Laboratories, Environment and Public Health Organization (ENPHO)
4	Determination of arsenic and heavy metals	NBSM, NESS, CEMAT, ENPHO
5	Antimicrobial tests	Multi Pharmaceutical Laboratories P. Ltd (MPL), CEMAT, Nepal Academy of Science and Technology (NAST), NPRL
6	Determination of radioactive contamination	NBSM, NESS, CEMAT, ENPHO

2.2 Test for the preparation of technical data sheet

The quality tests for each item of essential oils need to be conducted prior sampling to buyers and export markets. The tests include organoleptic properties, physical properties, chemical properties, Gas Chromatography-Mass Spectrometry (GC-MS) etc used to prepare the technical data sheet (TDS) for each item of essential oils. Table 10 provides the details of the tests to prepare the technical data sheet required by buyers and the testing laboratories available in Nepal.

Table 10: Tests for the preparation of TDS and testing laboratories

SN	Tests for TDS	Laboratories in Nepal
1	**Organoleptic properties**	
	Color	NPRL, HPPCL, FDC Laboratories P. Ltd, MPL, NESS
	Odor	NPRL, HPPCL, FDC, MPL, NESS
	Appearance	NPRL, HPPCL, FDC, MPL, NESS
2	**Physical properties**	
	Specific Gravity	NPRL, HPPCL, FDC, MPL, NESS
	Optical Rotation	NPRL, HPPCL, FDC, MPL, NESS
	Refractive Index	NPRL, HPPCL, FDC, MPL, NESS
	Solubility	NPRL, HPPCL, FDC, MPL, NESS
	Flash Point	NBSM, Department of Food Technology and Quality Control (DFTQC)
3	**Chemical properties**	
	Saponification	NPRL, HPPCL, FDC, MPL, NESS
	Acid number	NPRL, HPPCL, FDC, MPL, NESS
	Aldehyde content	NPRL, HPPCL, FDC, MPL, NESS
	Ester value	NPRL, HPPCL, FDC, MPL, NESS

	Ester value after acetylation	NPRL, HPPCL, FDC, MPL, NESS
4	**Gas Chromatography (GC)/ (GC-Infrared Spectrophotometry (IR), GC-Mass Spectrometry (MS)**	Water Engineering and Training Centre P. Ltd

2.3 Test for identifying the marker compound

In order to identify the marker compound in essential oils, a series of tests have to be conducted. The tests required for identifying pure chemicals in essential oils and the availability of the laboratories performing those tests in Nepal are presented in Table 11.

Table 11: List of tests required for identifying the marker compound

SN	Pure chemicals	Laboratories in Nepal
1	Structure	NAST
2	Melting point	NPRL, HPPCL, FDC, MPL, NESS
3	Boiling point	NPRL, HPPCL, FDC, MPL, NESS
4	Solubility	NPRL, HPPCL, FDC, MPL, NESS
5	Ultraviolet and Visible Spectrophotometry (UV-VIS)	NPRL, FDC, MPL, NESS
6	IR	NPRL, FDC
7	Nuclear Magnetic Resonance Spectroscopy (NMR)	Not available
8	MS	Water Engineering and Training Centre P. Ltd

2.4 Material safety data sheet

The importing country often asks Material Safety Data Sheet (MSDS) as accordance to the European Commission (EC) Legislation Directive 91/155/EEC & 2001/58/EC or OSHA: CFR 1910: 1200 (US) generally required with delivered goods, which is now the essential requirement for entry to EU markets. A similar legislation exists in US also. To till date only basic tests have been done for the essential oil produced in Nepal and only limited literature based information are available to fulfill the MSDS of essential oils. Details of the obligatory 16-point information system template for MSDS sheets are set out in 91/155/EEC is presented in Box 5.

Box 5: Requirements for material safety data sheet

Section 1: General Identification
Product Name: **Other Names:** **Contact Information:**
Section 2: Product Identification
Botanical Name: **CAS No.:** **EINECS No.:** **NAFTA H#:**
Section 3: Hazards Identification
Potential Acute Health Effects: **Potential Chronic Health Effects:** Carcinogenic Effects: Mutagenic Effects: Teratogenic Effects: Developmental Toxicity:

Section 4: First Aid Measures
Eye Contact: **Skin Contact:** **Serious Skin Contact:** **Inhalation:** **Serious Inhalation:** **Ingestion:** **Serious Ingestion:**
Section 5: Fire and Explosion Data
Flammability of the Product: **Auto-Ignition Temperature:** **Flash Points:** **Flammable Limits:** **Products of Combustion:** **Fire Hazards in Presence of Various Substances:** **Explosion Hazards in Presence of Various Substances:** **Fire Fighting Media and Instructions:** Small Fire: Large Fire: **Special Remarks on Fire Hazards:** **Special Remarks on Explosion Hazards:**
Section 6: Accidental Release Measures
Small Spill: **Large Spill:** **Personal Protection:** **Environmental Protection:** **Methods of Cleaning/Disposal:**
Section 7: Handling and Storage
Precautions: **Storage:**
Section 8: Exposure Controls/Personal Protection
Engineering Controls: **Personal Protection:** **Personal Protection in Case of a Large Spill:** **Respiratory Protection:** **Hand Protection:** **Eye Protection:**
Section 9: Physical and Chemical Properties
Physical State and Appearance: **Odor:** **Taste:** **Molecular Weight:** **Color:** **Boiling Point:** **Melting Point:** **Critical Temperature:** **Specific Gravity:** **Vapor Pressure:** **Vapor Density:** **Volatility:** **Odor Threshold:** **Ionicity (in Water):** **Dispersion Properties:** **Solubility:**
Section 10: Stability and Reactivity Data
Stability: **Corrosivity:** **Polymerization:**

Thermal Decomposition:
Hazardous Reactions:
Hazardous Decomposition Products:
Materials to Avoid:

Section 11: Toxicological Information

Routes of Entry:
Toxicity to Animals:
Acute Oral Toxicity (LD50):
Acute Dermal Toxicity (LD50):
Chronic Effects on Humans:
Mutagenic Effects:
Teratogenic Effects:
Developmental Toxicity:
Other Toxic Effects on Humans:
Special Remarks on Toxicity to Animals:
TDL (Rat) - Route:
TDL (Human) - Route:

Section 12: Ecological Information

Eco-toxicity:
BOD5 and COD:
Products of Biodegradation:
Toxicity of the Products of Biodegradation:
Special Remarks on the Products of Biodegradation:

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

UN Classification
Shipping Name
Hazard Label
Packing Instructions
DOT Hazard Classification:
Special Provisions for Transport:

Section 15: Other Regulatory Information

Federal and State Regulations:
Other Regulations:
Health Hazard:
Fire Hazard:
Reactivity:
Personal Protection:
Protective Equipment:
Symbols:
Risks Phrases:
Safety Phrases:

Section 16: Other Information

References:
Other Special Considerations:
Created:
Last Updated:

The information in this safety data sheet is correct to the best of our knowledge. We do not accept liability for loss, injury or damage that may result from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.

Please ensure that this safety data sheet is passed to the appropriate person(s) in your company, who is capable of acting on the information.

3. General requirements of buyers

3.1 Warehousing

A separate warehouse should be designated for storing essential oils. The warehouse should have well-covered and closed with shutter doors and there should not be any chance of entry of birds, insects and vermin. Rooms should be labeled as store number and name of products stored inside.

There should be a separate record for regularly cleaning and inspection so that to avoid the chance of any visible materials or residue contamination. No any synthetic fungicide, pesticide, preservatives and fumigation for packing material and storage container and bins should be used.

3.2 Quality

Quality can greatly affect the ability to market products internationally. In terms of the product quality, Nepali essential oils are recognized as the highest quality oils in international markets. However, international buyers expect a high level of quality and this may entail more than simply a good quality product. The aspects of high level quality includes: timeliness and an ability to meet deadlines, the traceability of a product (knowing where the product is at all times during the value chain process), compliance with industry standards, labeling and packaging that includes all pertinent information (MSDS, weight, volume, technical specifications), environmental integrity (i.e. does the product minimize the impact on the environment through the value chain), social integrity (i.e. does the product benefit the livelihood of people in the rural communities of Nepal), and overall customer satisfaction (is the buyer satisfied with the overall transaction).

Certification has been an important step in the assurance of a quality product as well as assurance of traceability, environmental integrity, social integrity, labeling and packaging.

3.3 Product quality control

The producer/exporter should adhere to the principles set out in the WHO Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants and should follow WHO Good Manufacturing Practices (GMP). The quality control system for production should be in place. The implementation of a credible concept of quality assurance (for example identifying and eliminating potential sources of contamination) should be a primary goal of the manufacturers rather than the implementation of all individual technical aspects. The following areas should be considered while studying the WHO guidelines:

- Control of raw materials;
- Control of starting materials and intermediate substances;
- In-process control;
- Finished product control.

The purpose of quality control is to ensure quality of the products by adhering to appropriate specifications and standards. Information on appropriate standards can be found in official pharmacopoeias, monographs, handbooks, etc.
In choosing analytical methods, the availability, robustness and validity of the methods must be considered, such as microscopic identification, thin layer chromatography (TLC), titration of active substance and, if possible, a full validation of more sophisticated methods, such as high-performance liquid chromatography (HPLC), gas chromatography (GC), and gas chromatography-mass spectrometry (GC-MS). If such advanced methods are used, a full validation for each test would be necessary.

This should include all necessary information on the proper use of the product. The detailed information of the product should include the following requirements:
- Name of items;
- Plant names and plant parts used;
- Labels;
- Particulars of manufacturer(s) and exporter(s);
- Warnings and precautions, if possible;
- Lot/Batch number;
- Storage condition.

3.4 Packaging

Essential oils should be packaged using permitted containers such as glass, stainless steel, epoxy coated drums, food grade HDPE and aluminum that are clean, unused and strong enough to protect the products during transport and storage. Any other materials that are standard practice for the storage and transport of essential oils that may not affect the organoleptic character of the products can be used.

All packaging materials should be stored off the floor, away from walls and ceilings in clean, dry, hygienic conditions. Before being shipped out, it is necessary to verify that essential oils are in appropriate containers in the correct quantities and free from threat of contamination.

3.5 Labelling

A label should be developed for the essential oils packaging and would be affixed to the package/container. The label should contain clear and accurate information of the product as: name of product, botanical species, date of production, region of origin, lot number, name of certifier (if any), volume of oil (net mass), tare, gross weight (gross mass), drum number (for example drum 1 of 5). Products sold as certified should be labeled with the processor's name, the Certification body's logo and Certification code number.

3.6 Product certifications

There is no real requirement for certifications in the trade of essential oil, although there is an increasing need for safety documentation, traceability and assurance of quality. Certification is a way of ensuring buyers that certain standards have been maintained. In an increasingly competitive market,

certification may provide an advantage in consumer choice, as Organic certified, FSC certified, Fair trade certified, etc may prove a tipping point in a consumers mind to purchase the product. The only stipulation is the cost to maintain the certification may outweigh the benefits in sales. Sale price premium is a good way to identify whether certification has a positive cost-benefit ratio.

From the marketing perspective, there is a greater emphasis on Organic certification for essential oils and it has been proved to be a useful tool to approach international buyers. The well-known Organic certification bodies in Nepal are ECOCERT (France), NASAA (Australia), OneCert (USA), SGS (Netherlands) and LACON GmbH (Germany). Different Organic standards need to be fulfilled for the access to various markets. For example, European Organic Standards (Council Regulation EEC No: 2092/91) needs to comply for the access to markets within the European Union. For those wishing to access the Japanese market needs to comply with all aspects of Japanese Agriculture Standards (JAS). Similarly, for the access to US markets, the suppliers must comply with USDA-NOP Standards of Organic Food Products Act of 1990.

There is also an established market in EU and US for the Fair trade certified essential oils over the conventional oils. Some well known Fair trade certification bodies are FLO CERT (Germany), ECOCERT (France) and IMO (Institute of Marketecology, Switzerland). However, in Nepal FLO CERT is the only certification body for Fair trade certification for the producers/traders/organizations and the products.

Furthermore, some environmentally conscious buyers also preferred FSC certified essential oils sourced from well managed forests. SmartWood (USA) and SGS are the FSC accredited certification body in South Asia Region. In case of Nepal, SmartWood has certified 21 community forests and 8 enterprises have been awarded FSC COC certification.

CHAPTER FIVE

1. Market barrier analysis

The major barriers for the smooth supply of essential oils to domestic and international markets are described under the following headings:

1.1 Existing barriers

a. Distribution of raw materials in remote areas

Some wild crafted raw materials (such as Anthopogon, Jatamansi, Juniper, etc) are naturally distributed in remote mountainous and even alpine regions of Nepal. Therefore, the collection, transportation and processing of essential oils is difficult. Sometimes, if there is early snowfall in alpine regions (during October-November) it hampers the collection and ultimately there is no production of essential oils such as Anthopogon oil. Further, the transportation of essential oils from processing unit sites up to the road head and to Kathmandu based market is a tedious task.

b. Lack of trained manpower

In the remote areas of Nepal where there is collection of raw materials and distillation of essential oils, the trained manpower for the collection and processing of aromatic herbs are lacking. Trained and semi-trained youths are temporarily migrated for the foreign jobs mostly in Gulf countries due to the unfair wages that they are paid for the collection and processing of herbs.

c. Multiple taxation system

There is a provision in the operational plan of Community forest user groups (CFUGs) that the collectors/producers/traders have to pay royalty to concerned CFUGs for the collection of raw materials. DFO of the concerned district charge the royalty for the release permit of essential oils. Village development committee (VDC) and District development committee (DDC) impose surcharges on the movement of essential oils from their territories, which restricts free flow of product from site of distillation to market points, adding additional cost to the product. On the other hand, the traders are compelled to pay extra charges as *Under Table* at different Police Check Posts, Range Posts and at the Customs Office during customs clearance while exporting essential oils.

d. Lack of market price data

There is a general lack of information on essential oil prices and as such it is difficult for producers to know if they are getting a fair market price. In addition,

large scale essential oil producers/exporters tend to set the price for the industry regardless of what might be considered "fair value". Larger operations will also tend to have lower cost production per unit of volume.

e. Transportation

Transportation is a major barrier in the further growth of the essential oil business in Nepal. While it is possible to reduce transportation costs through the collection, processing and distillation of essential oils in rural parts of Nepal where the raw materials are harvested, transportation still remains a major cost to essential oil producers in Nepal. Nepal's landlocked geographic location makes exportation of product less efficient than major producers in other countries such as India or China. Essential oils must be shipped via air versus ship thus creating a cost disadvantage for Nepali producers/exporters.

f. Difficulty to source packaging materials in domestic market

Traders or exporters of essential oils in Nepal often face difficulties to source the packaging materials/containers for packaging various quantities of essential oils. The exporters have to depend on the supplier based in India for the packaging materials which is lengthy process.

g. Testing services

Testing is a major issue in Nepal, as only basic laboratory testing can be conducted. There is no authorized institution in Nepal for the certification and quality tests of essential oils as per WHO requirements. Some tests cannot be done because related instruments, reference literature, and reference compounds are not yet identified or are not available in the existing facilities.

Knowledge and information, which has to be, generated within the country, regarding products of unique advantages can be related research gaps in essential oils sector.

Further, several queries in the MSDS table cannot be addressed because of the fact that the concerned institution does not realize the need of pharmacological research on essential oils.

Academic institutions are not focused on research related to medicinal and aromatic plants to provide sufficient back up for the trade and industrialization of essential oils.

This has implications when trying to further develop new essential oils for commercial purposes. With ever increasing responsibility of essential oil producers to provide quality control and verification of chemical properties, this will have implications on growth of essential oil products in Nepal. Until such time that well

equipped laboratory services can be established in Nepal, product development will be slower and costlier than in other more developed countries such as India.

h. Safety standards

The standard safety information required by buyers and for general international export is Material Safety Data Sheet (MSDS) which not only outline the physical and chemical properties of the oils, but toxicological data and safety handling data as well. Beyond this, there may be some additional considerations for export to individual countries, which include the REACH (Registration, Evaluation and Authorization of Chemicals) legislation set forth by the European Union. This legislation puts the responsibility on industry to report the potential risk of chemicals to human health.

i. Harsh business environment

General harsh business environment beyond the other barriers that exist that may be attributed to geography, or the essential oil business sector, there are aspects of doing business in Nepal that can be major barriers to business. Electricity supply and ongoing load shedding is a barrier to meeting business demands, such as timely delivery of orders, timely communication with international clients. Ongoing strikes in Nepal are also a barrier to business, in particular, meeting deadlines and timely delivery of orders. Uncertain government tariff structures and varying tariffs based upon differing custom officers.

j. Volume demand

Volume demand of major buyers is a barrier to market entry as many large international buyers may demand more than a small essential oil producer can deliver. As many buyers like to deal with the smallest number of suppliers possible, therefore volume of supply could be a barrier in establishing an ongoing trading relationship. On the other hand traders/exporters of Nepal are unable to stock the quantity of oils in their warehouse may be due to uncertainty of market or due to financial crisis.

k. Lack of coordination between government agencies

There is a gap of understanding between government agencies/departments. For example Department of Customs (DOC) along with Department of Narcotic (DON) harass exporter even if the products are having metal seal of DPR. DOC/DON sometime break the seal and start there trivial tool of inserting wooden stick/ metallic rods to essential oil containers which contaminate oils resulting the rejection by buyers.

I. Knowledge gaps and communication with buyers

Timely, clear and effective communication with buyers is crucial factor for the export market of essential oils. Ambiguous communication and late response hinder the business. The exporter or the person responsible for communication with overseas buyers should have the adequate knowledge on Botany, Microbiology, Chemistry, Pharmacology, Environment issues and social factors in order to properly address the buyers need. However, there are knowledge gaps among majority of exporters and the person involved in the communication in context to Nepal.

1.2 Potential barriers

a. Vulnerability of raw materials

High altitude raw materials such Juniper and Anthopogon twigs take about 5-7 years time period for the natural regeneration. Therefore, if the raw materials are not harvested in sustainable basis (block rotation wise collection ensuring total regeneration) and overexploited, there is a possibility of the vulnerability of high altitude raw materials after 10-12 years which will lead to the limited production of essential oils like Juniper and Anthopogon oils.

b. Declaration of new protected areas

In the recent years, the government are declaring the new protected areas (such as Gaurishankar conservation area covering the northern high altitude areas of Sindhupalchok, Dolakha and Ramechhap districts) mainly focusing the high altitude areas of Nepal. The regulations of protected areas may restrict the production of essential oils in those areas.

c. Availability of manpower

If the raw materials collectors and distillation unit workers are not paid fair wages then there will be crisis of man power for the operation of distillation units in the near future. The increment of the wages is only possible, if the essential oils are marketed in premium prices.

2. Requirement for technology innovation

To enable the essential oils producer for the effective production to increase yield of oils, effective quality control methods, cost effective packaging for exporters and to domesticate the raw materials, the following interventions are needed:

1. Improved cooking stoves

The existing traditional cooking stoves use for firing during the distillation process needs lots of firewood and up to date attention for maintaining the temperature.

Moreover, the time for the distillation has always been long. Therefore, in order to overcome such a problem, the introduction of improved cooking stoves is of urgent need in all the operating distillation units.

2. Improved yield of oil

The research work as to verify the improve yield of essential oil needs to be conducted. The increase in the yield of essential oils depends upon the proper size of the raw materials harvested, the season of harvest, altitude and aspect in which the plant grows, distillation equipments used and the uniformity of the temperature. The tests have to be conducted taking into account all the parameters responsible for improve yield of oils and the best results have to be adopted.

3. Efficient cleaning methods

The distillation unit equipments have to be cleaned before starting the distillation process and after each production batch. Normally, the cleaning is carried out manually using spring water at first followed by steaming from the boiler and finally the purging with raw materials. The process is tedious, time consuming and loss of raw materials use as purging. Thus, for the efficient cleaning of distillation unit equipments, improved technology has to be identified and implement.

4. Reduce the weight of packaging box

For the export of essential oils, a well packaging in a standard container coupled with outer packaging is the mandatory requirement. So, before handing over the essential oils to cargo, normally wooden boxes are used for the outer packaging purpose. However, sometimes the weight of wooden box exceeds the weight of oil especially in case of small quantity shipment. Moreover, the buyers often complain about the weight of wooden boxes because they have to pay more amounts for the freight charge. Hence, in order to reduce the weight of packaging box and to meet the standard requirement of particular country, appropriate material for making wooden box has to be chosen.

5. Domestication of aromatic plants

Large areas of marginal lands are available in the mid hills and high mountains of Nepal. Those areas can be utilized for the domestication and semi domestication of aromatic plants like Wintergreen, Juniper and Anthopogon. Therefore, for the semi/ domestication of such aromatic plants in community forests and even in the national forest lands technology has to be developed for the treatment of seeds, stem and root cuttings for the viability of the plant.

CHAPTER SIX

1. Conclusion

Essential oils are among the low volume and high valued goods exported from Nepal. Rural communities have been collecting raw materials from community forests and distilling essential oils via cooperative or establishing community based enterprises in their respective localities. Collection of raw materials from community forests and distillation of essential oils locally, has generated employment and income generating opportunities at the local level in one hand and while on the other hand the resources which were underutilized are now been best utilized locally. The local communities are now more aware on the conservation and sustainable utilization of the resources and community forest user groups are discussing as how to transform themselves into commercial entity for the effective management of forests.

The detailed study of the essential oils sector in Nepal selecting three essential oils viz. Wintergreen oil, Juniper oil and Anthopogon oil revealed that the producers have the strong supply potential for supply to the Kathmandu based buyers. Deudhunga Multipurpose Cooperative Ltd (DMC), distilling essential oils in Dolakha was identified as the major producer of the selected essential oils in Nepal that owned 12 distillation units in Dolakha. DMC supply essential oils to Himalayan Bio Trade P. Ltd (HBTL) as per the annual agreement between the two parties. While other producers supply the selected essential oils to HBTL or other Kathmandu based buyers. The study also identified the potential sites for the detailed study on the potentiality of establishing distillation units for processing Wintergreen, Juniper and Anthopogon oils for increasing the production and supply sides at various locations of Solukhumbu, Sindhupalchok, Nuwakot, Gorkha, Manang, Mustang, Jumla and Humla districts of Nepal.

The selected essential oils are marketed both in domestic and international markets. HBTL is the major supplier of the selected essential oils in domestic and international markets. The domestic consumption of the selected essential oils is minimal comparison to export. There are several standards, requirements and guidelines for the export of essential oils basically to EU, US and other North American market. On the other hand, the testing services/laboratories services in Nepal have not been well equipped in order to fulfill the standards and requirements for export. Therefore, there are still more efforts to be made for fulfilling the standards and requirements for overseas market. The collaborative effort among the producers, exporters, government agencies and development organization is needed in order to strengthen the trade related capacities and to ease the export of essential oils.

2. Recommendations

The conservation and responsible management of the resources, efficient production along with continuous supply and marketing of essential oils are the raised issues challenging ever for the sustainable promotion of essential oils in international markets. The community forest users groups, village level cooperatives/enterprises, exporting companies, concerned government agencies and GTZ have the key role in addressing such issues. The following are some recommendations for all the concerned stakeholders involved in the promotion of essential oils that can be implemented for the immediate actions:

1. Forward linkage activities

Marketing has always been the greatest challenge for the producers as well as exporters. To approach new buyers and building trusts is difficult task and time consuming. Therefore, GTZ should link the essential oils exporters of Nepal with the European buyers (mostly German based buyers) and facilitate in recommending the potential buyers about the supply scenario of essential oils of Nepal. Reference marketing has been the effective tool and proved to be successful.

Similarly, GTZ should assist in conducting the laboratory tests (such as organoleptic, physico-chemical, GC-MS, NMR, structure, melting point, boiling point, solubility, UV-VIS, IR, etc) require to prepare the technical data sheet (technical specifications). Furthermore, GTZ should also support in the laboratory testing of hazards identification test (such as toxicity test, carcinogenic test, mutagenic test, teratogenic test, etc) and fire and explosion test (such as flammability, flash point, flammable limits, etc) and fulfilling other requirements as first aid measures, accidental release measures, handling and storage, personal protection, stability and reactivity data, ecological information, disposal considerations, transport information, other regulatory information, etc from the literatures for preparing the material safety data sheet. Both technical data sheet and material safety data sheet are the basic requirements for the buyers of EU and US as well.

The promotional materials (such as brochure, product catalog, flex, documentary, etc) are the first hand information for the buyers as well as for the users of essential oils. Thus, the careful preparation of promotional materials is the basic and initial tasks to reach the markets. The content of the promotional material for Nepali wild crafted essential oils should have: uniqueness of the products, sustainability story, traceability information, specifications of the products, communities and their livelihood support and the overall supply scenario of the products etc.

Finally, trade fair/trade shows, basically the international trade fairs are the best medium and opportunity for the exporters to approach the buyers and sample their products. For the preparation of promotional materials and the participation in international trade fairs, financial support from GTZ is needed.

2. Strengthen backward linkage

The exporters and distillation unit managers should conduct the onsite training to the raw materials collectors, especially for the new collectors adopting doing by learning methods with support from GTZ, as per necessity. The training should focus on the responsible harvesting practices of raw materials, appropriate size of the raw materials to be harvested for the improved yield of essential oils and the sanitary issues that needs to be followed as per the organic standards. On the other hand, the distillation unit managers and workers have to be trained on the sanitary issue that needs to be adopted as per the organic standards. They should also be trained on the quality production of essential oils and the standard quality control procedures for handling of essential oils.

Essential oils may be hazardous to human health if the safety measures are not followed. Therefore, the distillation unit managers and workers should be trained regarding the personal safety measures that they need to adopt right from cleaning equipments, loading raw materials to the entire distillation process and transportation up to the Kathmandu based buyers.

The distillation unit managers and workers should be knowledgeable on the Good Manufacturing Practices (GMP), so that they can adopt the GMP procedures during handling, processing, storing and transportation of essential oils. Therefore, the aforementioned comprehensive trainings should be conducted to the distillation unit managers and workers. The exporters of essential oils could conduct the trainings with support from GTZ.

3. Hardware support

It is urgent need that the improved cooking stoves are to be introduced and replace the existing traditional stoves, used for firing the distillation units. The replacement with improved cooking stoves would certainly result to decrease firewood consumption, distillation hours and increase yield of essential oils. Moreover, the distillation unit workers should be provided with necessary tools that ease the production work and be provided with safety materials such as heat resistant gloves, goggles, boots, and set of clothes for personal safety measures. This basic hardware support for distillation unit workers should be provided by the exporters of essential oils and/ or GTZ.

4. Nursery management and plantation of aromatic plants

It is necessary to establish multipurpose nursery for the management of seedlings and saplings of wild crafted aromatic plants such as Abies, Anthopogon, Juniper, Wintergreen, Valerian and Zanthoxylum near to their natural habitats, for the sustainability of raw materials. Both seeds as well as stem/root cuttings can be used for the nursery purpose. After the seedlings or saplings attain the required size/maturity, it can be planted in the community forest lands or in the government managed forests. The nursery management and plantation of aromatic plants can be conducted in collaboration with the concerned community forests user groups and District Forest Office with financial support from the GTZ.

5. Annual harvestable stock analysis in potential sites

The annual harvestable stock of Wintergreen leaves in Helambu (Sindhupalchok), Ghyangphedi (Nuwakot) and Prok (Gorkha) should be conducted in collaboration with WWF Nepal and MCAP respectively for the feasibility of the establishment of distillation units. Similarly, the annual harvestable stock of Juniper needles /berries and Anthopogon leaves need to be conducted in the identified locations of Jumla and Humla districts in collaboration with WUPAP, DFO and concerned CFUGs of both the districts for the viability of distillation units. The essential oils exporters can conduct this study with support from GTZ and other organizations working in those areas.

6. Policy simplifications

The exporters have to identify the policies, regulations and procedures that impede the essential oils marketing. Then onwards, the exporters in collaboration with GTZ have to lobby government agencies to simplify the organizational and procedural rules and regulations and to create the Conducive environment for the promotion of essential oils in international markets.

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