The Vietnam-Finland Forestry Sector Co-operation Programme

The Department of Agriculture and Rural Development of Bac Kan Province

TECHNICAL REPORT No. 6

MARKET OPPORTUNITIES, APPROPRIATE TECHNOLOGIES AND FINANCIAL VIABILITY FOR DEMONSTRATION FARMS

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The Vietnam-Finland Forestry Sector Co-operation Programme in brief

The Programme started in March 1996 and the first phase will last three years. The Programme is financed jointly by the Governments of Finland and Vietnam. The geographic coverage of the Programme is concentrated in the mountainous regions of Bac Kan Province where forestry is taken as a key potential activity which could contribute to social and economic development. Local population, mainly people from different ethnic minorities, suffer from social and economic problems due to lack of income generating opportunities. At the same time the mountainous regions are facing severe deforestation and forest degradation due to mismanagement and non-optimal use of the resources. The development objective of the Programme is to contribute to sustainable rural development in the mountainous regions of Vietnam, through the integration of forestry activities in the rural land-use and economy. The target groups of the Programme are rural households, ethnic groups, professional personnel at province, district and commune level and in national forestry administration. The Programme strategy is to introduce and disseminate sustainable forest management and other farm-forestry practices as viable alternatives to shifting cultivation and other forms of unsustainable land use. The Programme implementation will be a continuous process of participatory learning and application. The following Programme components form the implementation strategy (i) community development, (ii) capacity building, (iii) dissemination and (iv) monitoring and evaluation. The immediate objectives respective to the above components are (i) established and tested mechanism to assist farmers/forest owners at the village level, (ii) improved capacity of the existing institutions in providing services for forestry extension, (iii) transferred practical experience from the pilot villages/communes to
neighbouring areas, province level and finally national level and (iv) established monitoring and evaluation system at different levels. The implementing agencies of the Programme are Department of Agriculture and Rural Development in Bac Kan Province and Ministry of Agriculture and Rural Development, while the People’s Committee of Bac Kan Province and the Ministry of Agriculture and Rural Development are the competent authorities of the Programme. The supporting consultant is Indufor Ltd. in partnership with Enso Forest Development Ltd. and FTP International Ltd.

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FOREWORD

The first joint consultancy on marketing of wood & non-wood products and application of appropriate technologies in wood & non-wood processing was carried out from mid September to mid November 1996 principally in the Programme’s pilot area in Cho Don district. The results of the consultancy were analysed in the workshop in Cho Don District on 14 to 15 November and published in the Technical Report No.2. The consultancy gave a general overview of market opportunities and possibilities to apply appropriate technologies in the Programme area.

Since November 1996 the Programme has established 23 demonstration plots in four pilot villages.
Demonstration farms are developed to be examples of sustainable forest land use and tools for extension. Each village will have only a few demonstration farms in which the Programme covers 50% of the costs by grants and 50% by loans. Other farmers are able to receive Programme’s credit in order to develop their activities in forest land.

The second consultancy on marketing and application of appropriate technologies took place from the end of April to the end of May 1997. The starting point for this consultancy was the products produced in the demonstration farms. Majority of the products are non-wood forest products. The consultancy team comprised Mr. Juha Kiuru, Dr. Dao Viet Phu, Dr. Tran Tuan Nghia and Mr. Jukka Tissari.

As the products produced in the demonstration farms are the basis for market research as well as for the appropriate technology study the Programme team felt that a description and an analysis of the demonstration farms has to be included in this report. The Programme staff also carried out a preliminary financial analysis for the demonstration farms.

The consultants together with the Programme staff carried out training on market research, processing technology and financial analysis for the extensionists in Cho Don from 19 to 21 May 1997. The Programme organised a dissemination workshop on 22 May 1997 in Cho Don where the findings and recommendations were analysed.

We wish to thank the consultants and all the participants who have contributed to finalise this report.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY
1 INTRODUCTION
1.1 Objectives
1.2 Scope of the Study
2 DEMONSTRATION FARMS
2.1 Background
2.2 Farm Development Plans
2.3 Current state of the Demonstration Farms
2.4 Financial Support
2.5 Spring Planting Season 1997
3 MARKET OPPORTUNITIES
3.1 Local and Provincial Markets
3.1.1 General
3.1.2 Overview on Non-Wood Forest Products in Vietnam
3.1.3 Harvesting Seasons of Various Non-Wood Forest Products in Cho Don District
3.1.4 Consumption and End-Use Patterns
3.1.4.1 Fruit
3.1.4.2 Handicrafts: Bamboo and Rattan
3.1.4.3 Essential Oils
3.1.4.4 Medicinal Plants
3.1.4.5 Other Non-Wood Forest Products

3.1.5 Quality Requirements of Non-Wood Forest Products

3.1.6 Distribution Channels
   3.1.6.1 Existing Distribution System
   3.1.6.2 Middlemen in Cho Don District
   3.1.6.3 Recommendations

3.1.7 Prices

3.1.8 Price Information System

3.2 National Markets

3.2.1 Overview of the Vietnamese Market

3.2.2 Total National Market Size
   3.2.2.1 Fruit
   3.2.2.2 Handicrafts: Bamboo and Rattan
   3.2.2.3 Essential Oils
   3.2.2.4 Medicinal Plants
   3.2.2.5 Other Non-Wood Forest Products

3.2.3 Distribution Channels
   3.2.3.1 Fruit
   3.2.3.2 Handicrafts: Bamboo and Rattan
   3.2.3.3 Essential Oils
   3.2.3.4 Medicinal Plants

3.2.4 Prices
   3.2.4.1 Sources of Price Information
   3.2.4.2 Prices by Products

3.3 Export Markets

3.3.1 Market Restrictions Faced by Non-Wood Forest Products

3.3.2 International Markets for NWFPs
   3.3.2.1 General
   3.3.2.2 Total World Market Size

3.3.3 Exports of Vietnamese Non-Wood Forest Products to the International Markets
   3.3.3.1 General
   3.3.3.2 Fruit
   3.3.3.3 Handicrafts: Bamboo and Rattan
   3.3.3.4 Essential Oils
   3.3.3.5 Medicinal Plants
   3.3.3.6 Other Non-Wood Forest Products

3.3.4 Export Countries and Prices
   3.3.4.1 Overview
   3.3.4.2 Export Countries by Main Products
   3.3.4.3 Export Prices

3.3.5 Quality Requirements in Exports
   3.3.5.1 Fruit and Juices
   3.3.5.2 Handicrafts: Bamboo and Rattan
3.3.5.3 Essential Oils
3.3.5.4 Medicinal Plants
3.3.5.5 Other Non-Wood Forest Products

3.3.6 Export Companies
3.3.6.1 General
3.3.6.2 Fruit
3.3.6.3 Handicrafts: Bamboo and Rattan
3.3.6.4 Essential Oils
3.3.6.5 Medicinal Plants
3.3.6.6 Other Non-Wood Forest Products

3.4 Conclusions and Recommendations
3.4.1 Opportunities in the Local and Provincial Markets
3.4.2 Opportunities in the National Market
3.4.3 Opportunities in the Export Markets
3.4.4 Recommendations on Distribution Channels
3.4.5 Recommendations on Pricing

4 APPROPRIATE TECHNOLOGIES
4.1 Choice of Appropriate Processing Technologies
4.2 Availability of Labour and Raw Materials
4.3 Existing Technologies
4.3.1 Harvesting of Non-Wood Raw Materials
4.3.2 Extraction and Transportation of Raw Material and Products
4.3.3 Processing of Wood and Non-Wood Forest Products
4.4 Potential Appropriate Technologies
4.5 Tools, Equipment and Machinery
4.6 Training and Extension
4.7 Findings and Recommendations

5 FINANCIAL VIABILITY
5.1 Farmers Cashflow
5.2 Financial analysis

List of tables

Table 1 Summary of Planted Species in the Demonstration Farms, Spring 1997
Table 2 Number of Species Yielding Non-Wood Forest Products in Vietnam
Table 3 Seasonal Calendar of Non-Wood Forest Products in Cho Don District
Table 4 Areas of Main Fruit Trees in Bac Thai (1995)
Table 5 Production of Apricots in Bac Thai Province
Table 6 Planned Production and Processing of Bamboo in State Forest Enterprises of Bac Thai in 1996
Table 7 Consumption of Major Non-Wood Forest Products in the Former Bac Thai Province 1991-1995
Table 8 Middlemen Operating in Cho Don District
Table 9 Local Producer’s and Middleman’s Prices of Fruit and Other Non-Wood Forest Products in
Table 10  Local Producer’s and Middleman’s Prices of Round wood, Bamboo and Rattan in Cho Don District (May 20th, 1997)
Table 11  Price Information System for Cho Don
Table 12  Population Growth and GDP Forecast in Vietnam 1996-2010
Table 13  Production of Essential Oils in Vietnam in 1995
Table 14  Prices of Fruit in Hanoi in May 1997
Table 15  Prices of Round wood Handicrafts in Hanoi in May 1997
Table 16  Prices of Essential Oils in Hanoi in May 1997
Table 17  Prices of Mushroom in Hanoi in May 1997
Table 18  Prices of Spices in Hanoi in May 1997
Table 19  World Imports Value of Selected Non-Wood Forest Products in 1995
Table 20  Exports of Selected Fruit in Vietnam 1990-1996
Table 21  Export Value of Bamboo and Rattan Products in Vietnam 1990-1995
Table 22  Exports of Bamboo and Rattan Handicrafts by Type of Product in Vietnam in 1996
Table 23  Exports of Tea, Mushrooms and Cashew Nuts in Vietnam in 1990-1996
Table 24  Total Exports of Selected Non-Wood Forest Products in Vietnam 1983-1996
Table 25  Export Destinations, Prices and Quality Requirements of Processed Fruit, Spices, Essential Oils and Other NWFPs in Vietnam in 1996 (Hanoi Vegetexco Company)
Table 26  Export Prices of Fruit and Other NWFPs in Vietnam in 1997
Table 27  Quality Requirements of Essential Oils
Table 28  Export Companies of Fruit, Juices and Tea in Vietnam
Table 29  Export Companies of Bamboo and Rattan Handicrafts in Vietnam
Table 30  Export Companies of Essential Oils in Vietnam
Table 31  Export Companies of Traditional Medicine and Medicinal Plants in Vietnam
Table 32  Parameters applied in the financial analysis of the demonstration farms
Table 33  An example of a cash flow table in one demonstration farm in the Programme area
Table 34  Farmers’ cash flows and indicators for financial viability

List of figures

Figure 1  Summary of Seedlings Planted in the Demonstration Farms in the Spring Season 1997. (The figures indicate number of seedlings for each species)
Figure 2  Proposed Distribution Channels of Non-Wood Forest Products from Cho Don to Provincial and Hanoi Markets
Figure 3  Distribution Structure of Handicrafts
Figure 4  Distribution Channels of Bamboo Mats and Handicrafts
Figure 5  Distribution Channels of Medicinal Plants

ANNEXES

Annex 1  Methodology, Organisation and Bibliography
Annex 2  Examples of Farm Plans from Ngoc Phai and Dong Lac Communes and Summary of Seedlings Received by Demonstration Farmers
Annex 3  Potential Appropriate Technologies for Processing Non-wood Forest Products
Annex 4  Checklist of Non-wood Forest Products in Vietnam
Executive Summary

Demonstration Farms

The main purpose of the demonstration farms is to act as "models" for sustainable land use to be used in extension work as the Programme expands. The demonstration farms provide information on species suitability, treatment regimes, production rates and financial viability of production alternatives.

The Programme has financially supported initial investments in 23 demonstration farms during the 1997 spring planting season in Ngoc Phai and Dong Lac communes in Cho Don district. 50% of the costs are financed by grants and the remaining 50% is covered by a credit scheme supported by the Programme.

During the spring 1997 planting season the following problems and risks have been recognised:

i. many of the introduced crops are not financially viable in the short term within a 5 year period;

ii. there is a risk that potentially viable natural forest will be replaced by cash crops, such as cinnamon;

iii. farmers' choice of species is affected by the choice of other farmers in the area and not based on financial analysis of the production alternatives;

iv. insufficient protection of planted seedlings;

v. difficult to obtain locally good varieties of high quality fruit tree seedlings;

vi. long transport distances and high prices of fruit tree seedlings;

vii. lack of information on natural forest management and it's potential; and

viii. a possible negative effect of the ban on exploitation of natural forest on farmers willingness to manage natural forest.

Market Opportunities

The only potential non-wood forest products (NWFP) that could be commercialised in the local and provincial markets in the short term is bamboo mat which enjoys a stable demand among both rural and township households. The mats are still being transported from Hanoi to buyers in Bang Lung town and in surrounding villages. As the district possesses relatively rich reserves of bamboo, it would be appropriate to establish a small manufacturing base (6000 m$^2$ per year, one shift) for bamboo mats to satisfy the local demand. It could be expanded to produce bamboo board in the future. The State Forest Enterprise in Cho Don could be one possible location for such a venture, serving as a nucleus for further development.

In the newly established Bac Kan province, very little processing capacity of non-wood forest products exist. There has reportedly been a project to install an apricot liquor factory in Bac Kan city, but no commitments have been made as yet. The recently attained provincial status may give a boost for consumption of wood products through increased construction activities. It is likely that this will also create some additional demand for edible non-wood forest products from Cho Don such as fruit, mushrooms and bamboo shoots.

The rapidly growing national economy (9-10%) will fuel a steadily growing demand for wood and non-wood forest products in the Vietnamese national market. The country's population is expected to reach 83 million capita in 2000. There is currently a booming construction sector which absorbs growing volumes of not only...
wood but also bamboo products (poles, mats, boards).

In the case of fruit, the average consumption per capita is very low (6 kg), so there is a large potential demand in the national market. A rudimentary estimate puts the total market size at 450 mill. kg. The most popular fruit in Vietnam are banana, orange and sapodilla. Fruit demand exceeds domestic supply e.g. in Hanoi and other big cities. This is visible by the large volumes of imported fruit such as pear, grapes and apples.

For fruit producers in Cho Don, it is necessary to:

- improve the resource base by selecting a wider range of species and varieties and extend the harvest season,
- develop processing techniques and packaging of fruit as long transportation limits the marketability of fresh fruit.

Also other Non-Wood Forest Products, such as essential oils, medicinal plants, dried/canned bamboo shoots and mushrooms would be suitable even for distant national markets due to their low weight and high unit value. Cinnamon and e.g. straw or cat's ear mushrooms can be easily cultivated, while medicinal plants are collected from the natural forest. The farmers of Cho Don district have invested heavily in cinnamon planting and the main harvest starts in the medium term (3-6 yrs.). This means that there still is enough time to develop the primary distillation on the village level.

The main markets for Cho Don's non-wood forest products are found in the processing companies in Hanoi which collect, process and upgrade the products for national consumption or export. Several such companies were visited and comprehensive listings of the contacts to 20 companies are given in this report.

Vietnam used to have a special position as a supplier of non-wood forest products to the export markets especially to Europe before the war-stricken decades in the 1950s-1970s. The main articles were e.g. spices, medicinal plants and fragrances of plant origin. These trade links are now actively being re-established. Today, the main NWFP export items include among others cashew nuts (100 000 t.), bamboo and rattan ware (USD 19 mill.), fruit products (USD 31 mill.), spices, and essential oils.

China and other South-East Asian countries are at the same time (i) competitors in the world markets, and (ii) the closest larger export markets. Western Europe and ASEAN countries are the most important export future markets for NWFPs of Vietnam.

Concerning the NWFPs of Cho Don, very little immediate export potential is available in the current situation when local processing is trivial or non-existent. Essential oils could be indirectly exported through the processing companies in Hanoi. Fruit exports require a lot of improvements in the local processing and can not be considered realistic in the short-medium term. In handicrafts, it takes several years or even decades to establish adequate skills in design and manufacturing for exports.

The search for new natural plant-based medicines could be tapped by Cho Don, as several foreign study groups have already visited the district for medicinal plant prospecting. The remaining natural forests could supply valuable ingredients for new drugs. Among the species available are e.g. *Artemisia annua, Dichroa febrifuga, Eupatorium odoratum* and *Caesalpinia seppan*.

The critical factors for future export performance are (i) meeting the higher quality standards and (ii) the need for efficient, speedy inland transportation.

The distribution system of selected non-wood forest products from Cho Don was studied in the local, provincial and national level. It appeared that a more than 20 individual middlemen are engaged in the trade of various wood and non-wood forest products in Cho Don.

The Programme can support the farmers by increasing the quality of their products (by technology) and by providing price information (through a price information system). This will lead to improvements in pricing and negotiating of their crops, and may result in internal evolution of the distribution system over time. As a result of this, some of the existing middlemen could be replaced or left redundant.

The farmers in Cho Don have a strong desire to establish producer groups for the (i) collection, (ii) processing, and (iii) marketing of non-wood forest products. Organisation of collective groups is preferred over individual risk-taking and entrepreneurship.
In the pricing system it appeared that the local middlemen and retailers add 20-40% in the producer price of fruit when sold at the local marketplace in Bang Lung. The mark-ups were 20-50% in bamboo products and rattan.

It is strongly recommended that a price information system for wood and non-wood forest products should be immediately established along the guidelines given by the Consultants. The main advantages of such system are:

- enabling farmers to be aware of price changes in the distant markets and the general knowledge on markets,
- strengthening the bargaining power of farmers with the middlemen,
- increasing the share of revenue accruing directly to farmers and higher family income and profitability.

Building up the system calls for decisions on e.g. the product range, collection method and personnel employed, the frequency of data, as well as the transferring and displaying media in Cho Don. Consultant’s recommendation is:

- to employ a professional price monitoring unit (Vietnam Financial Times) in Hanoi,
- to utilise the Programme staff (extensionists) at the local level, and
- to deliver weekly prices of current season's products to Cho Don by telefax and to display the data on blackboard or by paper handouts to the farmers.

### Appropriate technologies

At household level:

- The main emphasis should be put on the production of good quality non-wood forest products and raw materials to be further processed at village level, in a processing centre or to be marketed through the middlemen to the other provinces for processing.

- Centralised collection and weighing system should be introduced for extraction of raw materials as well as measuring of their volume and weight. This would provide adequate and fair payments for producers.

- If any processing is implemented at the farm or household level, it should mainly concentrate on washing, cleaning and drying of the products. This is because of simple technologies to be applied. After that the products can be delivered to the processing units or middlemen.

- Only primary and basic small scale processing should be developed at the farm level.

Introduction of farm-level activities should begin immediately to achieve the best possible results as soon as the first crops can be harvested.

At village level:

- Small centralised handling and processing units should be established for processing of final forest products such as fruits, essential oils, medicinal plants and other non-wood forest products.

- Handicrafts and bamboo products processing could also be encouraged in some of the pilot villages where the best raw material resources are available.

- When processing bigger quantities of products the above solutions will grant:
  - higher and more uniform quality of products
ii. better hygiene and cleanliness of the process

iii. bigger volumes produced at one season

iv. easier marketing of the products

v. higher prices and better income for farmers

- People from the pilot villages should be trained and employed to operate these small-scale processing units.

- Small-scale processing units can be established with rather small investments, if simple and appropriate methods and materials are used.

- Processing facilities for cleaning, washing, fresh conservation and drying of collected raw materials from the demonstration farms could be constructed under open shed. The drying shelves or stands could be constructed of wood, where the sliding boxes with a wire mesh in the bottom of the box can be fitted.

- Establishment of the processing units could be made through a loan system whereby the households could also buy shares of the processing units (e.g. co-operative, corporation or limited company).

- In the future, if larger scale operations are demanded, these units could easily be expanded with a profit from the processing activities.

Financial viability

The financial analysis was carried out for 22 demonstration farms considering only the investments supported by the Programme. Three indicators, NPV, IRR and NPV (excluding own work) divided by number of man-days needed for production, were calculated to indicate the financial viability of the production activities supported by the Programme in the demonstration farms. The alternative rate for interest was estimated at 6% without inflation.

The NPVs and IRRs show very lucrative returns. All NPVs are positive and IRRs vary from 46 to 119%. The expected salary per man-day varies from 46,000 to 110,000 VND. However, the farmers are estimated to have returns only after 5 years on average. The results should be applied with precaution. Estimated prices will not be necessarily gained or all the products cannot be sold. There was no information as yet on survival rates. If survival rates are low, they might further reduce the profitability. In addition, the labour input is probably underestimated.

The present analysis of the financial viability has to be taken as a preliminary analysis of the demonstration farms. As soon as more reliable information is collected, the financial analysis should be carried out for different kinds of production combinations. All foreseeable risks involved in the indicators should be carefully considered. In this way extensionists could gain useful knowledge on expected returns e.g. by planting some specific species or species combinations and which are the risks involved. In the future a routine financial calculation should be carried out for all the farmers who receive credit. The results should be used in a way that is understandable for the farmers.

1. INTRODUCTION

1.1 Objectives

This report describes and analyses the demonstration farms established in the Programme area in the Spring 1997, summarises the findings of the second market research and appropriate technologies consultancies on wood and non-wood forest products and finally briefly presents the results from the financial analysis carried out for the demonstration farms. The main focus of this report is on market opportunities and appropriate technologies.
Objectives of the two consultancies were:

(1) Market Study
   i. Identified market possibilities for wood and non-wood products produced in demonstration farms at provincial, national and international level.
   ii. Establishment of price information system focusing on products produced in the demonstration farms.
   iii. Improved capacity of the local staff to carry out market studies and disseminate the information to farmers.
   iv. Improved knowledge of farmers of the markets.

(2) Appropriate Processing Technologies
   i. Apply appropriate technical alternatives for wood and non-wood processing in the demonstration farms.
   ii. Improve capacity of local staff and farmers to apply appropriate technology.

1.2 Scope of the Study

(1) Geographic Scope
The second market study covers the market opportunities in the local, provincial, national and international markets, emphasising the choice of appropriate distribution channels and fair pricing of the products produced by the demonstration farmers. The study on appropriate technologies focused on the needs for processing technology in the two Programme communes of Cho Don district.

(2) Products
A wide range of non-wood forest products which will be ready for first harvesting within one to five years time were considered in the market study, i.e. cinnamon, pineapple, manglietia, canarium, rattan, bamboo, pomelo, styx, orange, tea, michelia, anise, chukrasia, apricot, plum and lychee. In addition the farms can produce some very minor amounts of wild products from natural forest such as medicinal plants, mushrooms, spices and other non-wood products. The study reports concentrate on the most relevant products identified for Cho Don.

The methodology, organisation and bibliography of the both works are described in Annex 1. Two fieldwork questionnaires are presented in Annex 4. Listings of people met and the participants of forest extensionist training course are given in Annex 5.

2. DEMONSTRATION FARMS

2.1 Background
The Programme staff has together with farmers, village chiefs and commune leaders selected a total of 23 households in the two pilot communes to act as "demonstration farms". The farms represent a cross-section of typical households for the two pilot communes, covering a variety of farming activities. The selected households vary from poor to well off. Some of the households are headed by women.

The "demonstration plots" represent in some cases only a part of the total land holding of the demonstration farmer. The plots are located on land classified as forest land and all the demonstration areas have been allocated. A completed land allocation has been one of the criteria for the selection of demonstration households.

The demonstration farms provide important information for the development and expansion of the Programme
to other households. The main purpose of the demonstration farms are to act as "models" for sustainable land use to be used in extension work as the programme expands. At the same time they also serve as tools for research on appropriate land-use and to provide information on species suitability, treatment regimes, production rates and financial analysis of production alternatives.

The main functions of the demonstration farms are as follows:

- introduction of sustainable and viable production alternatives for various sites;
- to show alternative models for sustainable land use;
- to provide alternative sources of income for farmers;
- to produce products for consumption, small scale local processing and sale;
- to contribute to the diversification of farming systems;
- provide information on silvicultural treatment, growth rates and species adaptability;
- provide information on farm-level economics and
- to contribute to the reduction of the deforestation rate in the area

Since the demonstration farms had been selected, the owners have received intensive support from the Programme extension staff. In addition to a number of farm visits, training courses, workshops and study tours, the farmers have received assistance in the preparation of a farm development plan for each demonstration household. The farmers have been provided with training and information on forest management, nursery techniques, tree planting and the recently established credit system.

2.2 Farm Development Plans

Farm development plans are operative plans for farmers. The plans are prepared by the farmers themselves with assistance from the extension staff. The plans are simple and easy to understand. They contain only the most vital information about the farm, enabling an analysis of the farmers' resources to carry out the activities. They also give information for the assessment of the financial viability of the proposed activities. The plans cover a period of 1-5 years and they are updated and adjusted annually in co-operation with extension workers to suit the needs of the farmers. Plans are best prepared in the field by the farmer together with an extension officer.

The plans are divided into four sections contain the following:

1. General information about the farm

- date
- location
- farmers name and family situation
- labour force
- land holding according to classes

2. Map

- sketch map over the farm
- division of the farm into areas of different activities (compartments)
3. Information about the plot (demonstration plot)

- land allocation
- a description of the present condition of the farm with proposed activities for each area (compartment)

4. A detailed list of activities with budget (on the reverse of the plan)

- each activity is linked to the map by the "compartment number"

The detailed budget in part four provides some basic information for the financial analysis, where the extension staff together with the farmers analyse the financial viability of the proposed activities. The financial analysis is described in chapter 5.

Planned (and approved) activities can be implemented by support from the extension staff and the credit scheme. An approved farm-level plan is a prerequisite for a household that wishes to receive credit from the Programme. The budget in the farm plan gives the basic information for the credit application to be made by the farmer.

All major activities carried out on the farm are recorded in the plans. There is a column reserved for indication of the date when each planned activity has been carried out. Comments and possible changes to the plan can be recorded in the column for remarks. All demonstration farmers have prepared a farm development plan. Two plans from representing different pilot communes and a summary of seedlings received by 23 farms are presented in Annex 2.

2.3 Current state of the Demonstration Farms

In many cases the farmers had begun to develop their sites already before the start of the Vietnam Finland Forestry Sector Co-operation Programme, although some have been allocated recently and the development has therefore just started.

At the moment there is a variety of products produced in the farms: apricots, pineapple, mandarins, pomelo, cassava, rice, bamboo, animal husbandry and fish, i.e. the production consists almost entirely of non-wood forest products. An analysis of this years species selection by the farmers (Table 3.1 and Figure 3.1), confirm that this will be the case also in the future. In the coming 3-5 years the production of wood will be marginal. The wood produced will mainly be small diameter wood from thinning - suitable for firewood and poles. Now the produced firewood and poles are used mainly for own consumption.

The forest areas consist of secondary forest, which often is in poor condition. The lower slopes of the recently allocated areas have been used as grazing land. This land is also in poor condition. There is a great potential to rehabilitate the existing, degraded natural forest in some of the farms by proper management. However the farmers seem more interested in tree planting and in growing short term crops than in managing the existing natural forest. There is a danger that valuable young natural forest will be replaced by planted cash crop tree species, such as cinnamon. This would lead to the creation of monocultures, which would not be desirable on a large scale. The importance of and the financial and environmental benefits by proper management of the natural forest should be stressed in future extension efforts. Introduction of efficient management of natural forest is hampered by the lack of knowledge on suitable silvicultural treatments for various sites and their production potential. There is clearly a need for research and production of extension materials on this subject.

The effects of the current ban on logging in natural forest should be studied. The ban may have an effect on the farmers willingness to manage natural forests if there will be restrictions on harvesting products from managed natural forests.

In the financial analysis it appears that tree planting/management of natural forest producing long term crops (> 15 years) would give a good return compared with the relatively low investment in work and inputs (seedlings). However the farmers would meanwhile need to finance the establishment costs from other products within the farm. For this they would have to produce short term non-wood crops. A variety of low crops could be grown together with the long term trees (intercropping).

Table 1. Summary of Planted Species in the Demonstration Farms, Spring 1997:
Figure 1: Summary of Seedlings Planted in the Demonstration Farms in the Spring Season 1997. (The figures indicate number of seedlings for each species)

<table>
<thead>
<tr>
<th>Species</th>
<th>Seedlings</th>
<th>Unit cost (VND)</th>
<th>Total investment (VND)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cinnamon</td>
<td>23037</td>
<td>600</td>
<td>13822200</td>
</tr>
<tr>
<td>Manglietia</td>
<td>3290</td>
<td>300</td>
<td>987000</td>
</tr>
<tr>
<td>Canarium</td>
<td>3095</td>
<td>500</td>
<td>1547500</td>
</tr>
<tr>
<td>Pineapple</td>
<td>3000</td>
<td>200</td>
<td>600000</td>
</tr>
<tr>
<td>Rattan</td>
<td>1900</td>
<td>500</td>
<td>950000</td>
</tr>
<tr>
<td>Chukrasia</td>
<td>1225</td>
<td>500</td>
<td>612500</td>
</tr>
<tr>
<td>Orange</td>
<td>802</td>
<td>7000</td>
<td>5614000</td>
</tr>
<tr>
<td>Apricot</td>
<td>600</td>
<td>1000</td>
<td>600000</td>
</tr>
<tr>
<td>Cinnamomum spp.</td>
<td>465</td>
<td>500</td>
<td>232500</td>
</tr>
<tr>
<td>Plum</td>
<td>270</td>
<td>7000</td>
<td>1890000</td>
</tr>
<tr>
<td>Anise</td>
<td>220</td>
<td>2000</td>
<td>440000</td>
</tr>
<tr>
<td>Lychee</td>
<td>150</td>
<td>10000</td>
<td>1500000</td>
</tr>
<tr>
<td>Tea (kg)</td>
<td>280</td>
<td>1500</td>
<td>420000</td>
</tr>
<tr>
<td>Legume (kg)</td>
<td>40</td>
<td>6000</td>
<td>240000</td>
</tr>
</tbody>
</table>

**TOTAL** 38054 Seedlings 29455700

280 kg (tea)

40 kg (legumes)

2.4 Financial Support

The Programme has financially supported the initial investments in the 23 demonstration farms during the spring 1997 planting season by 50% of the costs of inputs procured from outside the farm. The remaining 50% is financed by a credit scheme where the farmers receive a low interest loan from the Programme. There is no
support for own labour costs. As the programme expands, farmers will only receive credit for further activities. Technical assistance (advice, extension) will be given free of charge. Subsidies in the future will be limited only to trials and demonstrations with high financial risks.

The justification for the subsidies is that the demonstration farmers would have certain responsibilities against the programme, such as receiving visitors, bookkeeping, testing of new species and varieties. The risk of trying new species/farming systems is covered by the subsidies.

2.5 Spring Planting Season 1997

The start of tree planting in the demonstration farms was delayed by the prolonged start-up of the credit scheme. Since the planting season was coming to an end it was decided that the Programme would guarantee the payment of the seedlings to the suppliers. In this way the planting could start and the farmers would pay for their share by signing a credit agreement as soon as the credit scheme was in operation.

Many farmers finally changed their plans regarding species selection and the number of seedlings. Especially Canarium was replaced by cinnamon. The changes were frequently made on the basis of what other farmers planted, rather than on financial analysis and the advice from extensionists. At the end of the planting season the programme field staff assisted the farmers in updating the plans and to prepare the credit applications. In the future the plans prepared by the farmers in co-operation with the extensionists should be more rigid regarding the species selection at least for one planting season. This would enable better planning of the seedling production. The plans and credit applications should be made well in advance before the start of the planting season.

The results of this years planting would probably have been slightly better if planting had started earlier. The lesson learnt from this is that farm visits and paperwork has to be completed well in time before the planting season.

The price of the seedlings in the farm plans included transport to the village. The intention is to support the farmers with technical assistance and credit in seedling production, so that the main part of the seedlings could be produced locally in the future. Two demonstration farmers have already started their seedling production for the next season. The farmers have been trained in nursery techniques by the programme extension staff.

During the first Programme’s planting season following problems and risks have been recognised:

- many of the introduced crops are not financially viable within a 5 year period and the longest loan period under the Programme is 5 years;
- there is a risk that potentially viable natural forest will be replaced by cash crops, such as cinnamon;
- farmers’ choice of species is affected by the choice of other farmers in the area and not based on financial analysis of the production alternatives;
- insufficient protection of planted seedlings;
- fluctuating market prices on the main crops;
- difficult to obtain high quality fruit tree seedlings of good varieties locally;
- long transport distances and high prices of fruit tree seedlings;
- lack of information on natural forest management and its potential; and
- possible negative effect of the ban on exploitation of natural forest on farmers willingness to manage natural forest (will this lead to conversion into monocultures?).

3. MARKET OPPORTUNITIES
3.1 Local and Provincial Markets

3.1.1 General

The non-wood forest products are often of heterogeneous nature and therefore their value is often greatest within relatively restricted local economies. The awareness of importance of NWFPs has been increasing as a result of many factors:

1. Their comparatively high unit value per volume/weight has been better acknowledged especially in remote, mountainous areas where transportation remains a major obstacle for trade links with the national and international markets.
2. In many cases, the importance of the income derived from non-wood forest products to local or even national economies can exceed that of wood or wood products.
3. Also concern about the conservation of forests and their biodiversity has contributed to the increasing role of non-wood forest products. The utilisation of non-wood forest products enables people to use forests sustainably, i.e. without endangering their regenerative capacity, while still obtaining secure livelihoods.
4. The new market preference for natural ("green") products has enhanced the cause of non-wood forest products.
5. Wood has become increasingly scarce.

Non-wood forest products can be divided into two groups:

   (1) Traditional non-wood products collected from the wild
   (2) Cultivated non-wood products

The output of traditional NWFPs tends to be sporadic or seasonal. They are harvested manually and processed primarily at home. Traditional products are mainly marketed and consumed locally or for subsistence. Only the most valuable articles are collected for regional trade or exports. Fairly complicated distribution chains are used, employing e.g. village middlemen, transporters and city shopkeepers.

A large number of traditional products can be developed into marketable products thereby enhancing their importance to local communities. From the viewpoint of exports, the size of international markets tends to be limited but offer important niches which can be tapped by individual exporters.

In turn, many cultivated NWFPs are commercially viable, important export crops. They are harvested, extracted and processed with mechanical aids. These products are either sold as primary commodities, or refined into semi-finished or finished products before marketing. The marketing of cultivated non-wood products is often organised in a more sophisticated manner like through larger enterprises or even multinational companies.

It is foreseen that in the long term, cultivated non-wood forest products have growing international market prospects which could be tapped by countries like Vietnam.

3.1.2 Overview on Non-Wood Forest Products in Vietnam

A large variety of NWFPs are being produced in Vietnam. The natural forests in Vietnam possess rich reserves of plants suitable for nutrition, medicine, handicrafts, fuel, fodder and construction materials. NWFPs often play an important role in providing supplement and side dishes to agricultural crops, especially during seasonal shortages.

The diversity of the NWFP resources is evident from the following list of species available in Vietnam (Table 2).

<table>
<thead>
<tr>
<th>Type of Non-Wood Forest Product</th>
<th>Number of Species in Vietnam</th>
</tr>
</thead>
</table>

Table 2. Number of Species Yielding Non-Wood Forest Products in Vietnam
Due to the depletion of natural forests, also plantation-based non-wood products have emerged in Vietnam. Sustainable use of these products has proven essential in upland community forestry. In many cases, NWFPs can yield higher economic returns than upland agriculture or forest products on a similar area. It is also important to notice that urbanisation of the population can actually increase the demand for NWFPs, as people moving from rural areas maintain and disseminate their consumption patterns in the city.

In Vietnam, subsistence use and local markets continues to absorb most of the NWFPs, but increasing volumes are sold to international markets, where demand for "green" products of natural origin is rising. Vietnam used to be an important exporter of many non-wood products before the war-period, and has recently re-established its trade relations to e.g. Western Europe.

A list of common Vietnamese non-wood forest products is presented in Annex 4, summarising also their recent production volumes. The most recent statistics are almost impossible to obtain since they are restricted for their strategic importance.

### 3.1.3 Harvesting Seasons of Various Non-Wood Forest Products in Cho Don District

A seasonal calendar on common NWFPs in Cho Don district was produced (Table 2). This information has not been previously reported in the Programme documents. It is essential for planning and analysis of the NWFP sector on the district level. For example, it can be used in estimating the seasonal advantages and disadvantages compared to other producer regions and competitive countries.

<table>
<thead>
<tr>
<th>Product</th>
<th>Harvest Season (Months)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Jan</td>
</tr>
<tr>
<td>Bamboo shoots</td>
<td></td>
</tr>
<tr>
<td>Orange</td>
<td></td>
</tr>
<tr>
<td>Mandarin</td>
<td></td>
</tr>
<tr>
<td>Apricot</td>
<td></td>
</tr>
<tr>
<td>Cinnamon</td>
<td></td>
</tr>
<tr>
<td>Plum</td>
<td></td>
</tr>
<tr>
<td>Mango</td>
<td></td>
</tr>
<tr>
<td>Pineapple</td>
<td></td>
</tr>
<tr>
<td>Lemon</td>
<td></td>
</tr>
<tr>
<td>Jackfruit</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Seasonal Calendar of Non-Wood Forest Products in Cho Don District
3.1.4 Consumption and End-Use Patterns

3.1.4.1 Fruit

During the off-season months of Cho Don fruit, expensive imported (Chinese or from Hanoi) fruit are being sold in the local marketplaces. The consumption of fruit is highly seasonal as e.g. the Buddhists consume larger volumes on every 1st and 5th day of the lunar month for ceremonial purposes. Another example is custard apple which enjoys a heavy demand on the Memorial Day for the Deceased.

According to the Research Institute of Fruit & Vegetables in Hanoi, there are at least 11 species that are being cultivated in former Bac Thai that could be considered in Cho Don district (Table 32).

Apricot has been the most widely cultivated species in former Bac Thai province, covering nearly half of the total area (3 100 ha). Most of the plantations are still young and reach production age only after a few years (Table 33). There appears to be a looming oversupply situation ahead, unless local processing is increased. The project on apricot lacquer factory in Bac Kan would be a welcome addition to the local demand.

<table>
<thead>
<tr>
<th>Fruit Species</th>
<th>Area (ha)</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tropical fruit trees</strong></td>
<td>1 239.5</td>
<td>19.49</td>
</tr>
<tr>
<td>Banana</td>
<td>639.5</td>
<td>10.06</td>
</tr>
<tr>
<td>Pineapple</td>
<td>173.0</td>
<td>2.72</td>
</tr>
<tr>
<td>Custard apple</td>
<td>427.0</td>
<td>6.71</td>
</tr>
<tr>
<td><strong>Asian tropical fruit trees</strong></td>
<td>1541.1</td>
<td>24.23</td>
</tr>
<tr>
<td>Lychee</td>
<td>504.9</td>
<td>2.94</td>
</tr>
<tr>
<td>Orange,Mandarin</td>
<td>398.0</td>
<td>6.26</td>
</tr>
<tr>
<td>Persimmon</td>
<td>300.4</td>
<td>4.59</td>
</tr>
<tr>
<td>Lime</td>
<td>234.7</td>
<td>3.69</td>
</tr>
<tr>
<td>Longan</td>
<td>103.1</td>
<td>1.62</td>
</tr>
<tr>
<td><strong>Temperate fruit trees</strong></td>
<td>3 261.5</td>
<td>51.28</td>
</tr>
<tr>
<td>Apricot</td>
<td>3 136.6</td>
<td>49.32</td>
</tr>
</tbody>
</table>
The selection of fruit species is not optimal in the province or in Cho Don district, as low-priced temperate fruit trees such as mainly apricot and plum are being planted. In terms of market demand, tropical species like lychee, custard apple, longan and persimmon would appear more lucrative. Two practical examples are given here.

(1) Luc Ngan district, around 100 km north of Hanoi in Ha Bac province, has a total area of 101 149 ha, of which 50% is of forest land soils and 30% of bare hills. A total area of 7 000 ha of lychee has been planted, and it gives high average annual income to the farmers. Among the 200 households employed by lychee, 50 earn VND 50 million and some households as much as VND 120 million per year. Average annual income from one hectare is VND 20 million. After five years of planting, one tree can produce 15 kg/season. The farmers can not meet the demand of their customers in the domestic or export markets.

The largest private farms have 5 ha under lychee. The area under lychee is being expanded (10 000 ha in year 2000) and also new fruit trees are being introduced. These include longan from Hung Yen, persimmon from Nhan Han, Hac Tri and mango from China.

(2) Custard apple has challenged rice and maize as a source of income in Chi Lang district in the Northern mountainous province of Lang Son, besides the Chinese border.

Custard apples are grown on stony land and even on top of mountains. It is a highly productive species, bringing around VND 60 mill. for a farmer per year. Around 400 harvestable custard apple trees are sufficient to generating an annual income in the order of VND 40 mill.

The fruit are enjoying the strongest demand on the Memorial Day of the Deceased, when one prime-quality fruit can fetch VND 7 000-8 000. Hotels and restaurants in Hanoi buy large volumes of custard apples from Chi Lang. Export routes to China are also applied.

### 3.1.4.2 Handicrafts: Bamboo and Rattan

The common species include *Arundinaria spp.*, *Neohouzeana duloa*, and *Phyllostachys pubescens*. Altogether, around 150 species are reported to grow in Vietnam. The various bamboo species have different physical properties and are therefore priced differently.

Rattans or climbing palms belong to *Calamoideae* scientific family. Around 30 species of rattans grow in

---

**Table 5: Production of Apricots in Bac Thai Province**

<table>
<thead>
<tr>
<th>Target</th>
<th>Unit</th>
<th>Before 1992</th>
<th>1993</th>
<th>1994</th>
<th>1995</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>ha</td>
<td>374.0</td>
<td>1070.3</td>
<td>1298.9</td>
<td>3136.6</td>
<td>100.0</td>
</tr>
<tr>
<td>- Not harvestable</td>
<td>ha</td>
<td>251.1</td>
<td>937.5</td>
<td>1136.4</td>
<td>2955.6</td>
<td>94.23</td>
</tr>
<tr>
<td>- Harvestable</td>
<td>ha</td>
<td>122.9</td>
<td>132.5</td>
<td>162.5</td>
<td>181.0</td>
<td>5.77</td>
</tr>
<tr>
<td>- Average production</td>
<td>ton/ha</td>
<td>-</td>
<td>5.6</td>
<td>5.8</td>
<td>5.5</td>
<td>-</td>
</tr>
<tr>
<td>- Total harvest</td>
<td>ton</td>
<td>-</td>
<td>742.0</td>
<td>942.5</td>
<td>955.5</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Research Institute for Fruit and Vegetables
Vietnam. Reliable data on rattan production is currently almost non-existent in Vietnam.

Bamboo was the dominant non-wood forest product in the former Bac Thai province due to its multiple applications and relatively rich reserves in the province. However, the DARD-controlled consumption volumes turned to a steep decline after 1991-1992 (Table 35). Around 2 mill. trees of thick bamboo were used in 1995, compared to 31 mill. trees in 1991. Although exact figures are missing for slender bamboo, its consumption declined below 2 mill. trees in 1994. So on the provincial level, there seems to be a severe bamboo shortage.

Cho Don district is an important raw material base for bamboo in the province. In Cho Don district, the planned bamboo utilisation levels are 2 030 tons for paper, 300 tons of thick bamboo and 3 000 tons of slender bamboo (Table 34). This was 43% of the total utilisation in the former Bac Thai province. After the establishment of Bac Kan province, the role of Cho Don is even more pronounced.

The chopsticks factory of Cho Don State Forest Enterprise is the only industrial user of bamboo in the district, consuming 30 000 culms per month. 10 communes are supplying the bamboo by contract. As much as 70% of the raw material is sold as bamboo waste to Hoang Van Thu paper company in Thai Nguyen. The chopsticks production is sold through Thang Long company (Hanoi) to Dong Hoa company in Ho Chi Minh city to be exported to Taiwan.

Table 6: Planned Production and Processing of Bamboo in State Forest Enterprises of Bac Thai in 1996

<table>
<thead>
<tr>
<th>Forest</th>
<th>Production Plan</th>
<th>Paper Processing Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Paper</td>
<td>Thin bamboo</td>
</tr>
<tr>
<td>Total</td>
<td>8 193</td>
<td>4 000</td>
</tr>
<tr>
<td>1. Bach thong</td>
<td>2 900</td>
<td>1 000</td>
</tr>
<tr>
<td>2. Cho don</td>
<td>2 030</td>
<td>3 000</td>
</tr>
<tr>
<td>3. Phu luong</td>
<td>2 140</td>
<td>1 000</td>
</tr>
<tr>
<td>4. Dinh hoa</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>5. Vo nhai</td>
<td>223</td>
<td></td>
</tr>
<tr>
<td>6. Brigade 380</td>
<td>500</td>
<td></td>
</tr>
</tbody>
</table>

Source: Department for Agriculture & Rural Development of Bac Thai Province

Bamboo has numerous applications in Cho Don communes’ everyday life. Houses are partly built of structural poles of bamboo, and splited bamboo is practically the only flooring material in rural houses. It is also used in roofs, partition walls and bamboo mats. Bamboo is widely applied in the transmission of electricity (poles) and water (pipes). Fences are often made of bamboo. A large number of household items and handicrafts are manufactured of bamboo. Bamboo cages and baskets play an important role in the transportation of animals and food.

Bamboo mats are still being imported from Hanoi to Bang Lung. Mats could be the first natural step in introducing new technologies and developing commercial products of bamboo in Cho Don district. Bamboo board processing would be the next step to diversify production. Interviews of the existing bamboo mat and handicraft producers are reviewed in Annex 7.

Sporadic deliveries of natural rattan were observed in Cho Don district. Some rattan is transported to Hanoi for processing into furniture in the Barotex company. Some attempts have been made to establish rattan plantations in the area. *Calamus tetradactylus* and *C. tenuis* are the two planted species.
Table 7: Consumption of Major Non-Wood Forest Products in the Former Bac Thai Province 1991-1995

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Slender bamboo (mill. trees)</td>
<td>4.69</td>
<td>7.47</td>
<td>3.75</td>
<td>1.85</td>
<td>n.a.</td>
</tr>
<tr>
<td>2. Thick bamboo (mill. trees)</td>
<td>31.16</td>
<td>17.21</td>
<td>4.56</td>
<td>1.25</td>
<td>2.0</td>
</tr>
<tr>
<td>3. Fresh bamboo shoots (tons)</td>
<td>200</td>
<td>2000</td>
<td>300</td>
<td>290</td>
<td>1300</td>
</tr>
<tr>
<td>4. Dry bamboo shoots (tons)</td>
<td>20</td>
<td>20</td>
<td>24</td>
<td>24</td>
<td>n.a.</td>
</tr>
<tr>
<td>5. Palm leaves (mill. leaves)</td>
<td>2.55</td>
<td>2.0</td>
<td>2.9</td>
<td>2.8</td>
<td>2.895</td>
</tr>
<tr>
<td>6. Pine resin (tons)</td>
<td>15.5</td>
<td>12.8</td>
<td>15</td>
<td>12.6</td>
<td>11</td>
</tr>
<tr>
<td>7. Rosin (Colophonium) (tons)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>10-15</td>
</tr>
<tr>
<td>8. Tung oil (tons)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>18-20</td>
</tr>
<tr>
<td>9. Mushroom (tons)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>15</td>
</tr>
<tr>
<td>10. Apricot (tons)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>400</td>
</tr>
</tbody>
</table>

Source: Statistical Division, Thai Nguyen

In Cho Don, the production of slender bamboo has varied a lot in the 1990s. The highest output level was attained in 1994 when nearly 2000 tons were produced. However, in 1995 there was a drastic reduction to 255 tons.

0. Essential Oils

Essential oils are volatile mixtures of organic compounds derived from odorous plant materials such as flowers, herbs, fruit, roots and wood. They are used in fragrance and food industries and pharmaceutical products.

Since most of the essential oils is sold for exports, it is not discussed in this part of the report. There are reportedly no provincial or local markets for essential oils in Bac Kan.

1. Medicinal Plants

Plant-derived drugs have an important place in both traditional and modern medicine. It has been estimated that some 80% of the world’s inhabitants rely chiefly on traditional medicines for their primary health care needs. It can safely be assumed that the major part of traditional therapy involves the use of plant extracts or their active compounds. In many areas, especially in the tropics (also in Vietnam), an abundance of medicinal plants offer people access to safe and effective remedies for the prevention and treatment of illnesses through self-medication.

Most medicines prescribed by traditional healers in Vietnam originate from natural forests. Various parts of the plants, which are usually collected from the wild, can be used for medicine: roots, fruit, leaves, seeds, bark, tubers, etc. Among the common species are: Morinda officinalis (root), Cinnamomum spp. and Amomum spp. (fruit), Artemisia annua (leaves), Eucmonia ulmoides (bark), etc. Some species can also be grown in home gardens or planted in mixed stands with forest trees to improve farmers’ income.

Due to the depletion of natural forests in Cho Don district, medicinal plants are merely collected for household use and very seldom for sale. Artemisia annua is reportedly collected also in Cho Don. Other local potential species are Dichroa febrifuga, Eupatorium odoratum and Caesalpinia seppan. There have been several research groups from e.g. the US and France who have visited Cho Don district for the purpose of medicinal plant prospecting.
3.1.4.5 Other Non-Wood Forest Products

Tea

Tea has been widely intercropped with the forest and fruit trees in Vietnam and also in Cho Don. Fresh leaves are collected and dried without any advanced processing. This can hardly bring a proper income for the farmers. When selecting new seedlings to Cho Don district good consideration should be given to the right type of tea variety.

In Cho Don tea is mainly produced for local markets and household use, but sales to other urban markets is likely to expand along with the increasing cultivation areas.

Mushrooms

Mushrooms are commonly grown by rural households, usually on wood poles or rice waste pad, and stored, consumed and traded mostly in dried form. Rural households usually grow or collect mushrooms mainly for subsistence. Wood ear mushroom and Jew’s ear mushroom (*Auricularia auricula, A. polytricha*) are common cultivated species in Vietnam. The only species which is also collected in the natural forest in Northern Vietnam is called perfume mushroom (*Lentinus edodes*) for its distinctive smell. Presumably, the 15 tons annually consumed in Bac Thai refer to this species which is better known as *shiitake* (jap.) in the world markets.

Forest mushrooms are reportedly collected and marketed locally in Cho Don, but the actual quantities remained unknown during the research. The consumption of these mushrooms is only in dry form (sun-dried or artificial drying). New potential species include e.g. oyster mushroom which could be introduced in Cho Don if the processing and sale of mushrooms gains popularity.

Spices

At present in Cho Don district there are no spices which have been exploited from the natural forest. The following spices could be introduced to the demonstration farms: galanga, ginger, saffron. These products can be transported for consumption throughout Vietnam or even sold to exports.

Bamboo Shoots

Bamboo shoots have been exploited only from the natural forest in Cho Don. The official harvest was 1,300 tons in 1995. Restrictions on bamboo shoot harvest have been imposed to sustain regeneration of the stands.

Fresh and dried bamboo shoots have been consumed mainly in the local market and households due to the low quality. However, there is reportedly a thriving business of trading dried bamboo shoots to Thai Nguyen and Hanoi.

New technology should be introduced and applied in order to improve the quality of the products. These products could be exported also to the other countries in Asia.

3.1.4.5 Quality Requirements of Non-Wood Forest Products

Detailed quality requirements on selected non-wood products are given in the export market part of the report. The data has been collected from literature and partly based on interviews of traders and processors.

As a general note, it must be recognised that quality issues tend to cause problems in a country like Vietnam, where the rural producers suffer from:

- poor road connections and seasonal transportation bottlenecks (weather)
- poor knowledge on market requirements
- power failures
- lack of storing facilities
• lack of hygiene in primary processing

3.1.6 Distribution Channels

3.1.6.1 Existing Distribution System

In the case of non-wood forest products, the distribution channels tend to be long, employing several middlemen on the local level. Family ties and official political positions can also determine the structures and players in the distribution of products. The longer the distribution channel is, the smaller share of the final consumer’s price accrues to the farmer. The large number of middlemen also effectively reduces the flow of market information (on prices, buyers, volumes, end-uses, quality, etc.) to the primary producers.

A schematic presentation of the existing distribution structure is given in Figure 3.5.

Figure 2: Proposed Distribution Channels of Non-Wood Forest Products from Cho Don to Provincial and Hanoi Markets

3.1.6.2 Middlemen in Cho Don District

During the training course organised by the Programme, some indicative information of the distribution system was obtained. Analysis of that data revealed some biased reporting of prices and the reliability of the data has been thereafter checked. It also appeared that the middlemen have already established their own market information systems for the transferring of market-related data (prices, buyers, volumes, quality) between Hanoi and Cho Don. One middleman usually deals with one or a few traders in Hanoi and they use telephone for communication during the harvest season.

There are both legal (registered) and illegal middlemen in Cho Don. Legal actors are subject to a permit from the Department of Agriculture and Rural Development in Bac Kan. Taxes are levied on exploitation of the raw materials. Illegal middlemen do not pay taxes and can therefore afford to pay higher prices for raw material.

Example: bamboo and rattan (taxes levied on selling price)

| Exploitation | ~10% |
| Processing   | ~0% (primary processing tax-free: e.g. chopsticks) |

Some names of the middlemen who operate in the collection and trade of NWFPs in Cho Don district are listed in Table 36. The list is by no means comprehensive, and should be seen merely as an attempt to shed light on the complex local distribution system.

Table 8 Middlemen Operating in Cho Don District
3.1.6.3 Recommendations

As a conclusion, the Programme can support the farmers by increasing the quality of their products (by technology) and amount of price information (through a price information system). This will lead to improvements in pricing and negotiating of their crops, and can result in internal evolution of the distribution system over time. Some of the existing middlemen could be replaced or left redundant, but the entire system can not be revolutionised.

Also producers’ groups could be established who sell their products in a centralised manner to middlemen. Together they would exercise a stronger bargaining power over middlemen.

Based on the workshop response, the farmers in Cho Don have a strong desire to establish producer groups for the (i) collection, (ii) processing, and (iii) marketing of non-wood forest products. Organisation of collective groups is preferred over individual risk-taking and entrepreneurship. This attitude relies also on the existing political structures of the society and rural communes.

If such producer groups are to be established, there are some key factors ensuring their success:

1. Cooperative discipline among members and conflict management.
2. Credible, experienced leadership.
3. Credible and efficient marketing system.

<table>
<thead>
<tr>
<th>Product &amp; Middlemen</th>
<th>Province / city</th>
<th>Product &amp; Middlemen</th>
<th>Province / city</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bamboo:</strong></td>
<td></td>
<td><strong>Wild animals, livestock:</strong></td>
<td></td>
</tr>
<tr>
<td>- Mr. Le Van Manh</td>
<td>Ha Tay</td>
<td>- Mr. Thinh</td>
<td>Bang Lung</td>
</tr>
<tr>
<td>- Mr. Nghiem Dinh Hoat</td>
<td>Ha Tay</td>
<td>- Mr. Thanh Lan (birds)</td>
<td>Bang Lung</td>
</tr>
<tr>
<td>- Mr. Nguyen Van Bao</td>
<td>Ha Tay</td>
<td>- Mr. Mot</td>
<td>Bang Lung</td>
</tr>
<tr>
<td>- Mr. Do Van Phong</td>
<td>Ha Tay</td>
<td>- Mr. Phuc</td>
<td>Bang Lung</td>
</tr>
<tr>
<td>- Mr. Nguyen Ngoc</td>
<td>Ha Tay</td>
<td>- Mr. Hoa</td>
<td>Bang Lung</td>
</tr>
<tr>
<td>- Mr. Nguyen Dinh Chien</td>
<td>Ha Tay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Ms. Tran Thi Huong</td>
<td>Thai Nguyen</td>
<td>Mr. Ma Van Cuong</td>
<td>Bang Lung</td>
</tr>
<tr>
<td><strong>Styrax:</strong></td>
<td></td>
<td><strong>Bark of trees:</strong></td>
<td></td>
</tr>
<tr>
<td>- Mr. Luong Van Cau</td>
<td>match company</td>
<td><strong>Rice, fruit, bamboo shoot:</strong></td>
<td></td>
</tr>
<tr>
<td>- Ms. Dung</td>
<td>Bang Lung</td>
<td>- Mr. Thien</td>
<td>Bang Lung</td>
</tr>
<tr>
<td><strong>Essential oils:</strong></td>
<td></td>
<td>- Ms. Nguyet</td>
<td>Bang Lung</td>
</tr>
<tr>
<td>- Mr. Dinh Ngoc Anh</td>
<td>Bang Lung</td>
<td>- Mr. Tinh</td>
<td>Bang Lung</td>
</tr>
<tr>
<td>- Mr. Thien</td>
<td>Bang Lung</td>
<td>- Mr. Them</td>
<td>Bang Lung</td>
</tr>
<tr>
<td><strong>Mushrooms:</strong></td>
<td></td>
<td>- Mr. Tuoi</td>
<td>Bang Lung</td>
</tr>
<tr>
<td>- Mr. Phuong (cat’s ear)</td>
<td>Ban Ma</td>
<td>- Ms. Cuc (salted apricot)</td>
<td>Bang Lung</td>
</tr>
<tr>
<td>- Ms. Cuc (salted apricot)</td>
<td>Ban Ma</td>
<td>- Ms. Yen (mango)</td>
<td>Thai Nguyen</td>
</tr>
<tr>
<td>- Ms. Yen (mango)</td>
<td>Thai Nguyen</td>
<td>- Mr. Han (plums)</td>
<td>Ngoc Phai</td>
</tr>
</tbody>
</table>
4. Appropriate technical support.

5. Institutional support.


It is possible to incorporate all these factors successfully into the local conditions in Cho Don.

### 3.1.7 Prices

Indicative local prices of non-wood forest products were collected in order to assess their value chain. Price data collected in Bang Lung is compared to the producer price paid for farmers (Table 37-Table 38). Prices in Hanoi and export markets are discussed in the respective chapters of the report.

Many non-wood products are facing large price fluctuations for following reasons:

1. Seasonal harvest and demand (short harvest seasons and special consumption seasons like festivals, Memorial Day of the Deceased, etc.)

2. Quality (perishable products such as fruit)

3. Transportation problems

4. Several middlemen

In Cho Don, the producer price of apricot has reportedly fallen drastically since 1996, when VND 4-5 000/kg was paid to farmers. In 1997 season, merely VND 1 500-2 000/kg has been received.

It appears from the price information collected, that the local middlemen and retailers add 20-40% in the producer price of fruit when sold at the local marketplace in Bang Lung. The mark-ups are 20-50% in bamboo products and rattan.

**Table 9: Local Producer’s and Middleman’s Prices of Fruit and Other Non-Wood Forest Products in Cho Don District (May 20th, 1997)**

<table>
<thead>
<tr>
<th>Products</th>
<th>Price in villages</th>
<th>Price in Bang Lung</th>
<th>Price Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit:</td>
<td>- VND/kg -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh apricot</td>
<td>1 500-2 000</td>
<td>1 800-3 000</td>
<td>1.37</td>
</tr>
<tr>
<td>Fresh apricot (salted in Bang Lung)</td>
<td>1 500-2 000</td>
<td>11 500-13 000</td>
<td>7.00</td>
</tr>
<tr>
<td>Plum</td>
<td>4 500-5 500</td>
<td>6 000</td>
<td>1.20</td>
</tr>
<tr>
<td>Peach</td>
<td>3 000</td>
<td>3 500-4 000</td>
<td>1.25</td>
</tr>
<tr>
<td>Lychee</td>
<td>11 000</td>
<td>13 000</td>
<td>1.18</td>
</tr>
<tr>
<td>Pineapple</td>
<td>2 000</td>
<td>2 500-3 000</td>
<td>1.38</td>
</tr>
<tr>
<td>Jambos fruit</td>
<td>3 000-3 500</td>
<td>4 000</td>
<td>1.23</td>
</tr>
<tr>
<td>Mushrooms:</td>
<td>- VND/kg -</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 10: Local Producer’s and Middleman’s Prices of Roundwood, Bamboo and Rattan in Cho Don District (May 20th, 1997)

<table>
<thead>
<tr>
<th>Products</th>
<th>Price in villages</th>
<th>Price in Bang Lung</th>
<th>Price Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Roundwood:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Styrax spp.</td>
<td>200-250,000</td>
<td>250-300,000</td>
<td>1.22</td>
</tr>
<tr>
<td>Manglietia spp.</td>
<td>180-220,000</td>
<td>200-250,000</td>
<td>1.13</td>
</tr>
<tr>
<td>Species of Group 7-8</td>
<td>350-400,000</td>
<td>400-450,000</td>
<td>1.13</td>
</tr>
<tr>
<td><strong>Bamboo:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thick bamboo (³ 12 cm, 8 m)</td>
<td>6-7,000</td>
<td>7-8,000</td>
<td>1.15</td>
</tr>
<tr>
<td>Thick bamboo (³ 8 cm, 5-6 m)</td>
<td>3-4,000</td>
<td>4-5,000</td>
<td>1.29</td>
</tr>
<tr>
<td>Thin bamboo (splitted)</td>
<td>120-200</td>
<td>200-250</td>
<td>1.41</td>
</tr>
<tr>
<td>Thick rattan</td>
<td>1,000-1,200</td>
<td>1,500</td>
<td>1.36</td>
</tr>
<tr>
<td>Fresh bamboo shoot</td>
<td>1,200-1,500</td>
<td>2,000</td>
<td>1.48</td>
</tr>
<tr>
<td>Dried bamboo shoot</td>
<td>15-16,000</td>
<td>17-18,000</td>
<td>1.13</td>
</tr>
</tbody>
</table>

3.1.8 Price Information System

Definition: price information system (PIS) is a method of organising the collection and transfer of price information from the markets to the producers.

Advantages:

- enable farmers to be aware of price changes in the distant markets
- improves market transparency and the general knowledge on markets
- helps identifying the most lucrative market areas
• strengthens the bargaining power of farmers with the middlemen
• increases the share of revenue accruing directly to farmers δ higher family income and profitability

Establishment of the PIS needs decisions on at least eight matters. The proposed system is described in Table 39.

Table 11: Price Information System for Cho Don

<table>
<thead>
<tr>
<th>DECISION TO BE MADE</th>
<th>DECISION FOR CHO DON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What products?</td>
<td>Products: priority products which will be first produced (cinnamon, apricot, plums, anise, etc.)</td>
</tr>
<tr>
<td>2. Where are prices collected (local market, province, Hanoi, HCM, export market)?</td>
<td>Prices collected on local, Bac Kan and Hanoi markets</td>
</tr>
<tr>
<td>3. What sources of price information are used (magazines, newspapers, marketplaces, processors)?</td>
<td>Sources of information: (both published and self-collected data, consistency is essential)</td>
</tr>
<tr>
<td>4. What is the price basis (consumer, wholesaler, middleman, state/private sector)?</td>
<td>Price basis: consumer &amp; middleman prices (price earned by the producer vs. final end-user price)</td>
</tr>
</tbody>
</table>
| 5. Who collects and transfers data? | Collectors:  
  - Vietnam Financial Times: network of representatives in provinces for collection and reporting of prices δ higher cost, consistent quality, delivered every Monday by fax (last week’s prices), also price forecasts given  
  - Local extension workers (local), Bac Kan field advisors (province) and other Programme staff (Hanoi) δ cheaper, resources may be limited |
| 6. What media is used for transfer & display? | Media: by telefax to Cho Don, by blackboard, paper copies, radio or TV to the farmers in Bang Lung |
| 7. How often are prices updated? | Updated once a week during the harvest season of various products (not necessarily year round) |
| 8. What is the cost of the data and how is it divided? | Costs: depends on collecting method and product range, could be initially covered by the Programme, farmers may later on join with a nominal fee |
3.2 National Markets

3.2.1 Overview of the Vietnamese Market

Vietnam has a large population in the order of 75-76 million people. Population growth is on average 1.7% per annum, resulting in 83 million capita in the year 2000 and 104 million in 2010 (Table 40).

The largest cities in Vietnam are: Ho Chi Minh (5 mill.), Hanoi (2 mill.) Hai Phong, Da Nang, and Can Tho (1 mill. each). The population is quite evenly distributed throughout the country.

In Vietnam’s GDP, the Sector I (agriculture, forestry and fishery) is traditionally very important. In 1994, the Vietnamese GDP amounted to 39 982 bill. dong, of which the output of Sector I accounted for 14 169 bill. dong. (35%).

Vietnam has joined in the group of the fast-growing South-East Asian economies with a constant, 7-8% annual GDP growth. Even higher projections have been presented for the next ten years. Foreign trade and foreign direct investments are gaining more emphasis in the economic policies. As a signal of this, Vietnam joined ASEAN in 1995. The country is likely to apply for WTO membership in late-1997.

**Table 12: Population Growth and GDP Forecast in Vietnam 1996-2010**

<table>
<thead>
<tr>
<th></th>
<th>1996</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Growth (%)</td>
<td>2.3</td>
<td>2.3</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td>Total Population</td>
<td>76</td>
<td>83</td>
<td>94</td>
<td>104</td>
</tr>
<tr>
<td>GDP Growth (%)</td>
<td>8.5</td>
<td>9.3</td>
<td>10.4</td>
<td>12.0</td>
</tr>
</tbody>
</table>

The markets in a centrally-planned economy depended on production, and production was determined by government orders and criteria. In fact, production was geared to drive consumption in those circumstances. This resulted in low overall production levels and a narrow range of often poor-quality commodities. Markets could not give feedback for manufacturing or incentives to develop its processes.

This changed with the *doi moi* policy, as the number of actors in the economy surged. Now markets provide the manufacturing sector with a momentum for improving their performance. The perception of markets has undergone a fundamental change in Vietnam.

As a starting point for the analysis of NWFPs in Vietnam, the domestic market is fairly large but the purchasing power only limited. In many products per capita consumption is low, but can be increased in the future because new commercial and industrial applications for NWFPs can still be found. The favourable economic development is likely to sustain a steady growth of NWFP consumption in Vietnam.

3.2.2 Total National Market Size

3.2.2.1 Fruit

**Fresh Fruit**

The average consumption of fruit per capita is very low (6 kg) in Vietnam. A rudimentary estimate gives a total market size of 450 mill. kg. There is a large domestic potential if the consumption patterns resemble those in the industrialised countries, where 50-100 kg per capita consumption levels are common. Also examples from the neighbouring South-East Asian countries show that a steady economic growth fuels nation’s appetite for fruit.

This national market potential is available in different ways:
1. By increasing total supply, since fruit have a high income elasticity, i.e. consumption tends to increase sharply along with rising income levels.

2. By introducing new species and varieties in order to diversify supply and extend harvest season.

3. By substituting the imported fruit (mainly from China).

The most popular fruit in Vietnam are banana, orange and sapodilla. Fruit consumption tends to be seasonal as the lunar calendar and religious ceremonies dictate the demand peaks. In the rural areas, fruit are seldom consumed as a regular part of nutrition.

The interregional trade on fruit has increased notably during the 1990s, following the deregulation of the agricultural sector. It has been estimated that three quarters of the Vietnamese fruit production is sold to the largest cities and lowland provinces. This leaves only small excess supply to the local communal markets. There are, however, wide regional and product-specific differences. In the provinces bordering China (e.g. Lang Son, Ha Bac), exports to the Chinese markets absorb nearly all bananas. Private middlemen are the organising force in those markets.

Fruit demand exceeds domestic supply e.g. in Hanoi and other big cities. This is visible by the large volumes of imported fruit such as pear, grapes and apples. China is the major import source for the urban Vietnamese markets.

**Processed Fruit**

Drying is one way of extending the marketing season of fruit. Good market opportunities exist in Hanoi and in China for dried fruit. On the other hand South Vietnam appears to prefer fresh fruit because of a wider variety of species available. As a prerequisite for trading of dried fruit, palatable taste, adequate storage and transport facilities are required. Most favoured species for drying are e.g. lychee, longan, persimmon, banana and jackfruit. Apricot and plum are generally inferior by taste and marketability. There are also fruit that can not be dried such as pineapple, mango and sapodilla.

The consumption of unfermented fruit and fruit syrups, which have been preserved in sealed bottles or cans is very popular in Vietnam. Lychees, apricots and mangoes are preserved and bottled as juice.

### 3.2.2.2 Handicrafts: Bamboo and Rattan

Some of the most important handicrafts produced in Vietnam are:

- bamboo and rattan ware
- carpets
- embroidery
- ceramics
- jute items
- garments
- wood carvings
- mother-of-pearl

It has been estimated that the handicraft industries employ at least 2-3 million people in Vietnam. It has a significant meaning as a source of income and primary and secondary employment for rural communities in various parts of the country. This activity is characterised by a large number of geographically scattered, small rural enterprises.

Communes and villages tend to be specialised in certain group of products such as bamboo mats, bamboo and rattan baskets, etc. The most successful communes have a hundreds of years’ tradition on handicraft making and the accumulated skill and technology levels are maintained within the community.

Although handicrafts are mainly produced for exports, also the domestic consumption has increased in most of the important handicraft producing countries. Vietnam is no exception to this rule. The value of rattan production in Vietnam increased fast in the late-1980s, reaching 10 bill. dong in 1990. The favourable economic development is likely to sustain a steady growth in handicraft consumption in Vietnam.
3.2.2.3 Essential Oils

In Northern Vietnam, small cottage distillation units are the primary processors of essential oils, as the products require immediate distillation after harvest. The crude oils are then gathered to Enteroil company and other processors in Hanoi for refining and quality control before exports.

The production mainly consists of three species: sassafras, star anise and citronella oils (Table 41). There is very little domestic market for essential oils so practically all of it is exported, mainly to Western Europe (France, the Netherlands) and Japan.

Table 13: Production of Essential Oils in Vietnam in 1995

<table>
<thead>
<tr>
<th>Essential Oil</th>
<th>Production (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cassia oil (Cinnamomum)</td>
<td>10-15</td>
</tr>
<tr>
<td>2. Citronella oil</td>
<td>200-350</td>
</tr>
<tr>
<td>3. Ocimum basilicum oil</td>
<td>10</td>
</tr>
<tr>
<td>4. Peppermint oil</td>
<td>15-20</td>
</tr>
<tr>
<td>5. Star anise seed oil</td>
<td>200-300</td>
</tr>
<tr>
<td>6. Cajeput oil</td>
<td>10-12</td>
</tr>
<tr>
<td>7. Litsea cubeba oil</td>
<td>10-15</td>
</tr>
<tr>
<td>8. Pemou oil</td>
<td>10-15</td>
</tr>
<tr>
<td>9. Sassafras oil</td>
<td>1 000-1 200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1 465-1 937</strong></td>
</tr>
</tbody>
</table>

Source: Enteroil Company, Hanoi

Eucalyptus essential oil can be produced from the leaves of e.g. *Eucalyptus camaldulensis* and *E. exserta*, but the product is suffering low prices in international markets. It may have some domestic market potential in pharmaceutical uses in Vietnam.

*Aleurites montana* seeds are processed for tung oil which is not an essential oil but rather a fast-drying, heat-resistant fatty oil which is applied in varnishes and mixed with lac. Around 18-20 tons of tung oil was produced in Bac Thai in 1995. Other fatty oils produced in Vietnam include e.g. castor oil and cashew oil.

3.2.2.4 Medicinal Plants

The domestic market for medicines is sizable in Vietnam: recent estimates put it in the order of USD 375 mill. In 1996 the Vietnamese spent on average USD 5 per capita on medicines. This amount is expected to double by the year 2000 when the total market size would approach USD 0.8-1.0 billion.

Around 4 000 different types of medicine are being produced, ranging from traditional herbal cures to modern remedies introduced from the West. Low productivity and obsolete technology of the Vietnamese pharmaceutical industry has lead to a high import share in medicinal products. The domestic pharmaceutical industry meets currently only 30% of the total demand, while 70% is supplied by imports.

Contrary to the increasing popularity of natural medicines in the industrialised countries, it is foreseen that a different consumption pattern will emerge in Vietnam. Rising income levels presumably direct domestic demand to synthetic, processed medicines.

Vietnam also imports majority of the raw materials for medicinal industry, such as antibiotics, medicinal plants and packaging. Domestically produced species include: *Morinda officinalis* (root), *Cinnamomum spp.* and *Amomum spp.* (fruit), *Artemisia annua* (leaves), *Eucmonia ulmoides* (bark), *Ligusticum wallichii*, pseudo-ginseng, etc.
There is a continuous search for anti-malaria drugs worldwide. As new resistant malaria types emerge, new natural control agents are being sought. In Vietnam, this work has concentrated around the Medicinal Plants Institute and the Medical Materials Institute, both located in Hanoi. The former carries out research on the cultivation of medical plants, while the latter develops pharmaceutical products of natural ingredients. *Artemisia annua* is gathered and processed into Artemisin, a medicine tested and found very promising as a new anti-malaria drug.

It can be summarised that Vietnam possesses very competent research units in pharmaceuticals field, but the commercialisation of new products is severely hindered by the lack of advanced-technology manufacturing companies.

### 3.2.2.5 Other Non-Wood Forest Products

*Mushrooms*

There are around 100 000 households cultivating straw mushrooms in Vietnam. They employ 300 000 people on a permanent basis, mainly in the South Vietnam. Straw mushrooms can be produced year round but the harvest season is usually only one month at a time for a cultivar. In the South Vietnam, two annual harvests can be gathered, while the producers in the North pick only one harvest.

*Tea*

At present, Vietnam has about 70 000 ha under tea plantations. Around 53 000 are in productive condition and create an annual harvest of 180 000 tons of fresh buds. There are 76 state-owned tea processing plants and several dozen private tea factories. In 1996, around 36000 tons of dry tea were produced.

Black tea (41%) is now the most commonly produced quality before green teas. The Northern midlands are well suitable for export-quality black tea cultivation, while the mountainous (above 1000 m) regions and lower midlands produce special green tea.

The authorities and the Vietnam Tea Corporation have ambitious plans to increase the country’s tea area to 75000 ha and annual output to the level of 290000 tons of fresh buds by the year 2000 and around half a million tons in 2005. New processing technologies and factories are needed, as well as high-yield tea varieties and higher planting densities of tea plants.

The government has acknowledged tea’s importance in creating economic development and preventing erosion in mountainous regions. It is also encouraging ethnic minorities to settle down and to develop tea plantations.

### 3.2.3 Distribution Channels

#### 3.2.3.1 Fruit

Private buyers and middlemen play an elementary role in the distribution of fruit. They usually visit the producer regions before harvest in order to define the supply, quality and price levels beforehand. They also try to strike deals with the farmers and agree upon advance payments. The crop is then collected on a fixed date and price and immediately transported and resold to the urban wholesale markets. There are two major types of retailers in the urban markets; permanent sellers in the marketplaces and shoulder pole sellers who move around the city. In both cases, mainly women do the final selling to the consumers.

#### 3.2.3.2 Handicrafts: Bamboo and Rattan

The distribution channels for handicrafts are often long and cumbersome due to the scattered resources and producers. Long distances and poor road connections to consumption centres necessitate the use of several traders and middlemen. A schematic presentation of the distribution structure and its various actors is in Figure 3.6.
As an example, bamboo mats/handicrafts produced by farmers reach urban end-users through a 6-step distribution chain (Figure 3.5). Some of the middlemen can be by-passed but usually there are several actors involved.

Ethnic and family ties (kinship) often play an important role in the structure of trade and distribution. The longer the distribution channel is, the smaller share of the final consumer's price accrues to the farmer. In addition, the large number of middlemen also effectively reduce the flow of market information (on prices, buyers, volumes, end-uses, quality, etc.) to the primary producers.

### 3.2.3.3 Essential Oils

In Northern Vietnam, small cottage distillation units are the primary processors of essential oils. The crude oils are then gathered by middlemen to the processing companies in Hanoi for refining and quality control before exports.

It is doubtful how much further processing of oils is actually made by the processing companies in Hanoi. Basically, only some refining and quality control is needed if the primary distillation has been properly done. Nevertheless, the processing companies easily multiply the prices of essential oils at the time of exports.

### 3.2.3.4 Medicinal Plants

The distribution channel of medicinal plants is very specific, as one village (Ninh Hiep) near Hanoi dominates the collection, drying, quality grading and transportation of herbs and plants from Northern Vietnam (Figure 3.8).
3.2.4 Prices

3.2.4.1 Sources of Price Information

Price information in Hanoi was collected from various sources. The vice-editor of Vietnam Financial Times, Ministry of Finance, supplied a list of common product prices, based on Hanoi central market retail prices and State Pricing Committee data. In addition, the Consultant Team collected first-hand information from the various marketplaces and processing companies in Hanoi.

3.2.4.2 Prices by Products

The results of the price survey are collected in Table 42-Table 46.

Table 14: Prices of Fruit in Hanoi in May 1997

<table>
<thead>
<tr>
<th>Species</th>
<th>Price in Hanoi (VND, 20.5.1997)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Pineapple</td>
<td>3 500/kg</td>
</tr>
<tr>
<td>- Orange</td>
<td>13 000/kg</td>
</tr>
<tr>
<td>- Apricot</td>
<td>10-12 000/kg</td>
</tr>
<tr>
<td>- Plum</td>
<td>7 000/kg</td>
</tr>
</tbody>
</table>

Table 15: Prices of Round wood Handicrafts in Hanoi in May 1997

<table>
<thead>
<tr>
<th>Product</th>
<th>Price in Hanoi (VND, 20.5.1997)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wood Products:</strong></td>
<td></td>
</tr>
<tr>
<td>- Chukrasia logs</td>
<td>15 mill./m³</td>
</tr>
<tr>
<td>- Michelia logs</td>
<td>8 mill./m³</td>
</tr>
<tr>
<td>- Ironwood logs</td>
<td>0.62 mill./m²</td>
</tr>
<tr>
<td>- Decorative panel (Group 5-7)</td>
<td>3.9 mill./m³</td>
</tr>
</tbody>
</table>
### Table 16: Prices of Essential Oils in Hanoi in May 1997

<table>
<thead>
<tr>
<th>Species</th>
<th>Price in Hanoi (VND, 20.5.1997)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Cinnamon</td>
<td>19 000/kg</td>
</tr>
<tr>
<td>- Citronella</td>
<td>46 540/kg</td>
</tr>
<tr>
<td>- Sassafras</td>
<td>66 320/kg</td>
</tr>
</tbody>
</table>

### Table 17: Prices of Mushroom in Hanoi in May 1997

<table>
<thead>
<tr>
<th>Species</th>
<th>Price in Hanoi (VND, 20.5.1997)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Perfume mushroom</td>
<td>100 000/kg</td>
</tr>
<tr>
<td>- Straw mushroom</td>
<td>16 300/kg</td>
</tr>
</tbody>
</table>
Table 18: Prices of Spices in Hanoi in May 1997

<table>
<thead>
<tr>
<th>Product</th>
<th>Price in Hanoi (VND, 20.5.1997)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat’s mushroom (Quality I)</td>
<td>18 000/kg</td>
</tr>
<tr>
<td>Cat’s mushroom (Quality II)</td>
<td>16 000/kg</td>
</tr>
<tr>
<td>Star anise flowers</td>
<td>22 500/kg</td>
</tr>
<tr>
<td>Cinnamon bark</td>
<td>15 200/kg</td>
</tr>
<tr>
<td>Cinnamon powder</td>
<td>26 000/kg</td>
</tr>
</tbody>
</table>
3.3 Export Markets

3.3.1 Market Restrictions Faced by Non-Wood Forest Products

In the recent years, however, NWFPs have started to draw more attention as a source of export revenue, too. This has been especially true in countries where over-exploitation of timber has eroded the resource base and lead to severe loss of biodiversity and livelihoods of the forest depending communities.

However, there are many obstacles hindering the introduction of non-wood forest products to the world market on a larger scale:

1. Non-wood forest products are usually well-known to the indigenous people but the knowledge tends to be restricted and inventory is generally inadequate.
2. Very little reliable statistics are available on non-wood products, particularly at international level.
3. Furthermore, there is a lack of knowledge on the properties and yield of non-wood forest products, as well as potential market areas and marketing possibilities.
4. Their highly local or seasonal occurrence can cause difficulties in harvesting, storage or delivery.
5. As nature-origin products, the NWFPs have seldom uniform quality.
6. Difficulties in securing steady supplies of these products can jeopardize their market penetration.
7. The products are often outside of established marketing channels, which has further hindered their usage and access to the world market.
8. Transportation to the markets can be costly and difficult.
9. On the demand side, rapid changes in market requirements or consumer fashion increase the risks of the development of non-wood forest products.

As the Vietnamese NWFP exports have experienced a revival in the 1990s, it is appropriate to review the export potential for products available in Chô Don district.

3.3.2 International Markets for NWFPs

3.3.2.1 General

The world trade of most of the non-wood forest products is unstable; both quantities and values of the trade can vary enormously within one year. Reasons for this include:

1. The crops of non-wood forest products can vary from year to year.
2. Seasonal harvest and demand.
3. Transportation, storing and processing problems.
4. The unestablished marketing channels can hinder the access of non-wood forest products to the markets.

Often the price paid for the collectors of non-wood forest products is very low due to the many middlemen involved in getting the products from the forest to the market. Better organised and cooperative processing and commercialization of non-wood forest products would leave a greater proportion of the final product value to the collectors and thus encourage them to more stable harvesting levels.

The statistical recording systems of the three major market areas chosen for this part of the study are not totally consistent. This is why statistics of all products cannot be presented in every market area. There are several reasons why the statistical coverage of NWFPs is lacking worldwide:

1. A very large portion of the NWFPs is traded unregistered.
2. Several products are grouped in the trade statistics among themselves and with other products (mainly agricultural products).
3. Many products fall between the agricultural and forestry production statistics.
4. Many products do not fit in any specific commodity group or heading.

3.3.2.2 Total World Market Size

The total value of registered world trade in NWFPs is in the magnitude of USD 11 billion. The three leading importers of NWFPs are the EU (the European Union 15 member countries), USA and Japan. They collectively account for around 60% of the value of world trade in NWFPs.

Of the total registered imports, the EU accounted 23% (USD 2.6 bill.), USA 19% (USD 2.1 bill.) and Japan 17% (USD 1.9 bill.). A lot of NWFPs are also being exported and imported unregistered or incorrectly reported. Therefore, it is nearly impossible to estimate the true world market size of these products.

The total world imports value of the most important NWFPs for Vietnam have been compiled in Table 47. This data is by no means exhaustive, but summarises the most prominent product groups where Vietnam is a supplier to the world markets. It has to be noted that the HS (Harmonised System) commodity grouping is not very accurate in terms of the various plant species. Only aggregated figures are available on many products.

On the supply side, the South-East Asian countries have remained as the main source of NWFPs to the world markets. China has become the dominating producer and exporter of NWFPs. This is due to its rich flora and strong traditions to use natural products collected from the wild. Other large-scale exporters are India, Indonesia, Malaysia, Thailand and Brazil.

Some of the key products for Vietnam have the following international market size:

- Bamboo USD 37.6 mill.
- Rattan USD 119.0 mill.
- Cinnamon bark & flowers USD 95.6 mill.
- Essential oils USD 312.5 mill.
- Tung oil and its fractions USD 49.6 mill.
- Mushrooms USD 206.5 mill.
- Medicinal plants USD 689.9 mill.

Due to the large variety of edible fruit traded, their exact market value is difficult to estimate without more detailed data. "Other fruit" mentioned in Table 47 refer to species that are not the most commonly traded and cultivated ones. Even this sub-group records a global import value of USD 685.2 mill.

### Table 19: World Imports Value of Selected Non-Wood Forest Products in 1995

<table>
<thead>
<tr>
<th>HS Code</th>
<th>Product</th>
<th>World Imports</th>
<th>Imports by Main Markets</th>
<th>% of World</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>mill. $</td>
<td>EU</td>
<td>USA</td>
</tr>
<tr>
<td>010600</td>
<td>Other live animals</td>
<td>183.9</td>
<td>61.7</td>
<td>43.5</td>
</tr>
<tr>
<td>040900</td>
<td>Natural honey</td>
<td>268.2</td>
<td>143.4</td>
<td>53.9</td>
</tr>
</tbody>
</table>
wood products. The country has a clear cost advantage in export markets in products which are
of export performance are associated with meeting the higher quality standards, and the need for efficient, speedy inland transportation.

Mango (only from the South Vietnam) and banana (mainly from the North to China) are other significant export fruit. Pineapple is sold in small quantities to Russia.

harvest (May-June) in the main producing regions in the South Vietnam. The varieties in the North are ripe only later in June-July and have disadvantage in this respect.

The total export value of fresh and prepared fruit was around USD 31 million in 1995 (Table 48). No detailed breakdown by species was available. However, lychee is the 3.3.3.1 General

3.3.3.2 Fruit

GRAND TOTAL 11 108.7 2 603.6 2 126.4 1 895.4 6 625.3 60


3.3.3 Exports of Vietnamese Non-Wood Forest Products to the International Markets

3.3.3.1 General

Non-wood forest products have been an integrated part of forest utilisation in Vietnam throughout the history. Numerous NWFPs are collected and also cultivated in the country, both for subsistence use, local and domestic markets and for exports. A large part of the trade is not properly recorded. A growing international demand for natural products will help to re-establish export channels of Vietnamese non-wood products. The country has a clear cost advantage in export markets in products which are labour-intensive.

Vietnam used to be an important supplier of certain non-wood forest products to the international, mainly European markets before the war-stricken decades in the 1950s-1970s. The main articles were e.g. spices, medicinal plants and fragrances of plant origin. These trade links are now actively being re-established. There are clear signs of recovery in Vietnamese NWFP exports, mainly as a result of:

1. Opening up of the Vietnamese economy for international trade.
2. Revival of natural plant-based ingredients and herbs in medicine, cosmetics, nutrition and fragrances.
3. Generally lower price levels in Vietnam as a result of low production costs.

The critical factors for Vietnam’s export performance are associated with meeting the higher quality standards, and the need for efficient, speedy inland transportation. These areas need to be emphasised in the future.

In certain products it is difficult to define the exact export volumes at the moment, as divergent estimates circulate in the market. The government also restricts the release of the most recent export data due to its political and strategic value.

3.3.3.2 Fruit

The total export value of fresh and prepared fruit was around USD 31 million in 1995 (Table 48). No detailed breakdown by species was available. However, lychee is the most common fruit exported in fresh form. In exports to Western Europe, Vietnam enjoys a seasonal advantage in lychee over the competitor countries because of early harvest (May-June) in the main producing regions in the South Vietnam. The varieties in the North are ripe only later in June-July and have disadvantage in this respect.

Mango (only from the South Vietnam) and banana (mainly from the North to China) are other significant export fruit. Pineapple is sold in small quantities to Russia.

Table 48: Exports of Selected Fruit in Vietnam 1990-1996

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<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit (fresh &amp; prep.)</td>
<td>USD mill.</td>
<td>62.5</td>
<td>38.4</td>
<td>40.3</td>
<td>28.7</td>
<td>25.8</td>
<td>31.0</td>
<td>-</td>
</tr>
<tr>
<td>Dry longan pulp</td>
<td>t</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>350</td>
<td>-</td>
</tr>
<tr>
<td>Pineapple juice</td>
<td>t</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>650</td>
<td>-</td>
</tr>
<tr>
<td>Lychee juice</td>
<td>t</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>176</td>
<td>242</td>
<td>262</td>
<td>450</td>
</tr>
</tbody>
</table>
3.3.3.3 Handicrafts: Bamboo and Rattan

Bamboo and rattan exports have fluctuated a lot in the 1990s in Vietnam (Table 49). Export value has varied between USD 36 mill. in 1990 and USD 12.6 mill. in the following year. In 1995, products worth USD 18.7 mill. were exported.

Vietnam exported 2 000 tons (6 mill. pieces) of rattan handicrafts worth USD 2.5 million in 1991. Demand for rattan in export markets is very strong and supply shortages are frequently reported. The entire production and trade of rattan originates from Asia and Pacific region.

| Table 21: Export Value of Bamboo and Rattan Products in Vietnam 1990-1995 |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Bamboo and rattan handicrafts | USD mill.     | 36             | 12.6           | 20.7           | 28.6           | 19.5           | 18.7           |

A more detailed picture of exports by type of product is given in Table 50. It appears that baskets of various kind dominate the bamboo exports. These are usually produced in a size range that allows the packaging of several pieces inside each other.

In rattan, plates and baskets form the bulk of exports. Vietnam is the third largest exporter of rattan to the world markets after Malaysia and Indonesia. It held around 14% share of the world’s rattan trade in 1992.

| Table 22: Exports of Bamboo and Rattan Handicrafts by Type of Product in Vietnam in 1996 |
|---------------------------------------------|----------------|----------------|----------------|
| Type of Product                        | Export Quantity |
| Bamboo:                                  |                |
| - baskets                                | 1.2 mill. sets (6 pc.) |
| - blinds                                 | 100 000 pc.    |
| - boxes                                  | 112 000 pc.    |
| - trays                                  | 24 000 sets (3 pc.) |
| - flower baskets                         | 270 000 sets (3 pc.) |
| Rattan:                                  |                |
| - baskets (sets)                         | 513 632 sets   |
| - baskets (pieces)                       | 120 000 pc.    |
| - plates                                 | 500 000 sets (3 pc.) |
| - bicycles                               | 200 pc.        |

3.3.3.4 Essential Oils

Practically all of the essential oils produced in Vietnam is finally sold for exports. Roughly 1 500-1 900 tons were distilled in 1995, according to the industry estimates.

There are also other by-products that are being sold to exports, such as star anise flowers and seeds (200-300 tons/yr.) and benzoin gum from various species (10 tons/yr.). Actually, the anise seeds obtain better economic returns than anise oil. Around 8 kg of seeds are needed to produce one kg of anise oil. However, the price for oil is only double compared to the price for seeds. Vietnamese anise is of superior quality and e.g. China has imported anise seeds from Vietnam in order to upgrade its essential oil quality for the world markets. Most of Vietnam’s anise exports is in seeds and flowers.

3.3.3.5 Medicinal Plants

The total value of Vietnam’s medicinal plants exports has risen to around USD 5.6 mill. by the year 1995. That was roughly three times more than in 1983. The highest export value was recorded, however, already in 1993.

It is estimated that 80-90% of medicinal plants produced in Northern Vietnam are exported in the form of dried plants or extracts. Of special interest is a new anti-malaria drug obtained from Artemisia annua.

Due to their low weight and high value, medicinal plants are easily transported to distant markets. Some medicinal plants are currently enjoying stronger international demand because traditional pharmaceuticals are being rediscovered in Western markets due to their harmless, natural ingredients.

3.3.3.6 Other Non-Wood Forest Products

Vietnam is a large exporter of tea, selling around 35 000 tons for overseas markets in 1996 (Table 51). Black tea accounts for 80% of the export volume. Tea industry has attracted seven joint ventures with foreign companies with USD 21 mill. investment capital.

| Table 51: Exports of Tea, Mushrooms and Cashew Nuts in Vietnam in 1990-1996 |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Tea                        | 1 000 t        | 18.3           | 28.4           | 17.4           | 25.7           | 20.3           | 27.6           | 35.0           |
| Straw mushrooms            | 1              | -              | -              | 300            | 1700           | 2700           | 3200           | 3500           |
| Cashew/ground nuts         | 1 000 t        | 26.8           | 34.6           | 54.7           | 49.6           | 84.3           | 105.0          | 100.0          |

Straw mushrooms have been sold to exports since 1992, and the volumes have grown to the level of 3 500 tons in 1996. Cashew nut is an important export article, but grows only in the South of Vietnam. Around 100 000 tons of cashew nuts are exported annually from Vietnam.

| Table 52: Total Exports of Selected Non-Wood Forest Products in Vietnam 1983-1996 |
|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Tea                           | 1 000 t        | 18.3           | 28.4           | 17.4           | 25.7           | 20.3           | 27.6           | 35.0           | 30.0           | 31.0           | 32.0           | 33.0           | 34.0           | 35.0           | 36.0           | 37.0           |
| Straw mushrooms               | 1              | -              | -              | 300            | 1700           | 2700           | 3200           | 3500           | 3600           | 3700           | 3800           | 3900           | 4000           | 4100           | 4200           | 4300           |
| Cashew/ground nuts            | 1 000 t        | 26.8           | 34.6           | 54.7           | 49.6           | 84.3           | 105.0          | 100.0          | 105.0          | 110.0          | 115.0          | 120.0          | 125.0          | 130.0          | 135.0          | 140.0          |
3.3.4 Export Countries and Prices

### 3.3.4.1 Overview

Although detailed export figures by countries were lacking, the destinations of Vietnamese NWFPs are generally well known.

In the case of Vietnam, the Soviet Union and the Eastern European countries used to be an important market for Vietnam’s NWFPs until the early 1990s. Due to its recent ASEAN membership, Vietnam is now increasing its exports to countries like South Korea, Singapore, Hong Kong, Japan, Taiwan, Thailand. China and other South-East Asian countries are at the same time (i) competitors in the world markets, and (ii) the nearest larger export markets. In many products, the low-price competition from China suppresses the domestic NWFP producers in Vietnam. Also exports to France and the Netherlands have been revived (Table 53).

The trade was earlier dominated by a few large state enterprises and barter trade was a common practice. Low quality requirements were applied. In the recent years, smaller independent trading companies have emerged and the quality of exports has been improved.

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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume:</td>
<td></td>
<td>1000R-</td>
<td>1000R-</td>
<td>1000R-</td>
<td>1000R-</td>
<td>1000R-</td>
<td>1000R-</td>
<td>1000R-</td>
<td>1000R-</td>
<td>1000R-</td>
<td>1000R-</td>
<td>1000R-</td>
<td>1000R-</td>
<td>1000R-</td>
<td></td>
</tr>
<tr>
<td>Cinnamomum bark</td>
<td>t</td>
<td>1008</td>
<td>610</td>
<td>929</td>
<td>1203</td>
<td>1550</td>
<td>1247</td>
<td>1707</td>
<td>2120</td>
<td>3285</td>
<td>2464</td>
<td>2787</td>
<td>2642</td>
<td>2920</td>
<td>3200</td>
</tr>
<tr>
<td>Aloeswood</td>
<td>t</td>
<td>9.1</td>
<td>1032</td>
<td>44.1</td>
<td>3349</td>
<td>78.5</td>
<td>81.7</td>
<td>7615</td>
<td>36.9</td>
<td>3234</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Medicinal plants</td>
<td>1000 $</td>
<td>1748</td>
<td>967</td>
<td>1027</td>
<td>1224</td>
<td>612</td>
<td>1042</td>
<td>356</td>
<td>3500</td>
<td>5600</td>
<td>4700</td>
<td>8600</td>
<td>4200</td>
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<td>-</td>
</tr>
<tr>
<td>Star anise seeds</td>
<td>t</td>
<td>317</td>
<td>537</td>
<td>546</td>
<td>1040</td>
<td>479</td>
<td>620</td>
<td>725</td>
<td>388</td>
<td>4939</td>
<td>720</td>
<td>634</td>
<td>487</td>
<td>402</td>
<td>980</td>
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<tr>
<td>Anis essential</td>
<td>oil</td>
<td>120</td>
<td>1211</td>
<td>79.12</td>
<td>1070</td>
<td>111</td>
<td>84</td>
<td>60</td>
<td>1113</td>
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<td></td>
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<tr>
<td>Castor seeds</td>
<td>t</td>
<td>90</td>
<td>161</td>
<td>129</td>
<td>128</td>
<td>55</td>
<td>135</td>
<td>122</td>
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<tr>
<td>Castor oil</td>
<td>t</td>
<td>31.24</td>
<td>31.25</td>
<td>100</td>
<td>135</td>
<td>80</td>
<td>83</td>
<td>76</td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Cashew nuts</td>
<td>t</td>
<td>200</td>
<td>250</td>
<td>346</td>
<td>115</td>
<td>164</td>
<td>100</td>
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<tr>
<td>Taxcodontrin</td>
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<td>10</td>
<td>60</td>
<td>7.51</td>
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<tr>
<td>Shellac</td>
<td>t</td>
<td>24.20</td>
<td>30.29</td>
<td>18.44</td>
<td>5.4</td>
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<tr>
<td>Tung Oil</td>
<td>t</td>
<td>190</td>
<td>115</td>
<td>113</td>
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<td>15</td>
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<td></td>
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<td></td>
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<tr>
<td>Rosin</td>
<td>t</td>
<td>135</td>
<td>400</td>
<td>336</td>
<td>611</td>
<td>351</td>
<td>52</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Turpentine</td>
<td>t</td>
<td>10.3</td>
<td>40.15</td>
<td>20.15</td>
<td>40.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>Mint oil</td>
<td>t</td>
<td>20.17</td>
<td>10.114</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citronella oil</td>
<td>t</td>
<td>46.172</td>
<td>61.227</td>
<td>19.83</td>
<td>10.40</td>
<td>15.101</td>
<td>43.234</td>
<td>11.52</td>
<td></td>
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<td></td>
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<tr>
<td>Basil oil</td>
<td>t</td>
<td>0.417</td>
<td>1.775</td>
<td>0.29</td>
<td>1.58</td>
<td>1.46</td>
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<tr>
<td>Eugenol</td>
<td>t</td>
<td>3.28</td>
<td>2.16</td>
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<td>Cajeput oil</td>
<td>t</td>
<td>6.55</td>
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<tr>
<td>Sk</td>
<td>t</td>
<td>44.37</td>
<td>199.173</td>
<td>123.36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Animal products  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Monkeys          | pcs  | 205.87 | 181.77 | 470.118 | 350.147 | 150.64 |      |      |      |      |      |      |      |      |      |
| Gibbons          | pcs  | 2.7   | 11.38 | 7.2  | 10.38 |      |      |      |      |      |      |      |      |      |      |
| Bears            | pcs  | 5.13  | 6.16  | 6.1  | 4.11  |      |      |      |      |      |      |      |      |      |      |
| Birds            | 1000 | 6.16  | 98.56 | 45.2 | 29.82 |      |      |      |      |      |      |      |      |      |      |
| Python skins     | 1000 | 13.106 | 36.399 | 52.590 |      |      |      |      |      |      |      |      |      |      |      |
| Other snake skin | 1000 | 2.93  | 7.8  | 4.8  | 19.242 |      |      |      |      |      |      |      |      |      |      |
| Buffalo hides    | t    | 516.370 | 911.718 |      |      |      |      |      |      |      |      |      |      |      |      |
| Other NWFPs      | 1000 | 1    | 1    | 104  | 56   | 64   |      |      |      |      |      |      |      |      |      |
| Grand Total      | 1000 | 821.4 | 7838 | 10933 | 15495 | 18097 | 13912 | 13600 |      |      |      |      |      |      |      |

Source: Customs General Office, Hanoi

Note: 1990-1996 data largely not available.
3.3.4.2 Export Countries by Main Products

In the regional South-East Asian market, Singapore, Hong Kong and Japan offer potential for fruit exports, especially for lychee. Snap-freezing or other post-harvest treatments are, however, required. Also grading and export packaging needs to be improved, as 2-3 weeks shelf-life is necessary for exports. Only around 25% of the fruit produced in Vietnam meet the export quality standards at the moment.

In certain products, e.g. aloeswood (Aquilaria crassna) Vietnam is actually re-exporting supplies from the neighbouring Laos and Cambodia. Due to the high quality of Vietnamese anise seeds, the Chinese producers first buy Vietnamese anise in order to upgrade their quality and then re-export the blended anise to the international markets. This leaves of course only a small part of the export value for the Vietnamese producers.

In tea exports, the main buyers are Iraq, the UK, Belgium, Taiwan and Russia. The current export prices of black tea are in the range of USD 1.8-1.9/kg. Diversification of tea qualities and improved packaging are hoped to raise the export value of Vietnamese tea.

In mushrooms, main export outlets are Germany, Italy, the UK, Switzerland, Malaysia, Singapore, Japan, Hong Kong.

3.3.4.3 Export Prices

Indicative prices for some NWFPs were collected from a Hanoi-based processing and export company Vegetexco in the mid-May 1997 (Table 53). There are no significant price variations between the various export countries. The price for fresh lychee, the most important export fruit, has been fairly constant at the level of VND 12 000/kg (Table 54).

| Table 25: Export Destinations, Prices and Quality Requirements of Processed Fruit, Spices, Essential Oils and Other NWFPs in Vietnam in 1996 (Hanoi Vegetexco Company) |
|---|---|---|---|
| Product | Destination | Price (USD/kg) | Quantity (t/month) | Quality Requirement |
| Fruit: | | | | |
| 1. Dried lychee | France | 6.5 | 30 | humidity 15% |
| | China | 6.5 | 75 | |
| 2. Dried longan | North Europe | 9.0 | 18 | humidity 15% |
| 3. Salted apricot | Japan | 1.75 | 5 | humidity 18% |
| Spices: | | | | |
| 4. Dried ginger: | | | | |
| - slices | South Korea | 7.5 | 20 | humidity 8% |
| - roots | South Korea | 5.5 | 20 | humidity 15% |
| 5. Dried curcuma | South Korea | 4.5 | 45 | humidity 15% |
| Essential oils: | | | | |
| 6. Anise oil | the Netherlands | 8.5 | 15 | 85% anethol |
| 7. Sassafras oil | the Netherlands, South Korea | 5.6 | 20 | - |
| 8. Citronella oil | the Netherlands | 8.5 | 15 | 32% citronella |
| 9. Cinnamon bark: | | | | |
| - small pieces | the Netherlands | 1.2 | 20 | - 2% ess. oil |
| - large pieces | | 1.4 | 30 | - 2% ess. oil |
| - powder | | 1.65 | - 2% ess. oil, humidity 8% |
| 10. Anise flower | the Netherlands | 2.0 | 30-45 | - main season |
| Other NWFPs: | | | | |
| 11. Lingzhi mushroom | Japan | 85.0 | 2 | humidity 8% |
| 12. Dried orchid (medicinal plant) | South Korea | 0.65 | 15 | - humidity 8-12% |

Source: Vegetexco Company, Hanoi

| Table 26: Export Prices of Fruit and Other NWFPs in Vietnam in 1997 |
|---|---|
| Product | Export Price |
| Coconut | 1 500 USD/t |
| Lychee | 12 000 VND/kg |
| Dry longan pulp | 70 000 VND/kg |
| Mango | 12-15 000 VND/kg |
| Jasmin tea | 7 500 VND/ 25 bags |
| Baby cucumber | 10-14 000 VND/bottle |
3.3.5 Quality Requirements in Exports

3.3.5.1 Fruit and Juices

Summary of quality requirements for fresh lychee exports:
- post-harvest treatment: washing, hot water benlate dipping, waxing, drying, size-grading
- polyethylene plastic packaging
- air cooling during storing and transport
- snap-freezing especially for the Japanese market

The following quality standards are applied both in exports and in the domestic market:

**Standard for fresh pineapple**
- This standard applies to commercial varieties of pineapple, supplied fresh to the consumers after preparation and packaging.
- Preservatives: benzoic acid, sodium, calcium, potassium, salt: 1 000 mg/kg.

**Standard for pineapple juice**
- Preserved exclusively by physical means.
- Mechanical process which may include centrifuging but not filtering from the flesh or parts thereof with or without core material of sound, ripe pineapple.
- Sugar contents nor exceeding 25 g/kg.
- Ethanol max. 3 g/kg.
- Food additives: dimethyl polisiloxane (anti-foaming agent) max. 10 mg/kg.
- citric acid max. 5 mg/kg.
- malic acid max. 3 mg/kg.

**Standard for orange juice**
- Preserved exclusively by physical means.
- Unfermented but fermentable juice, intended for direct consumption, obtained by mechanical process from the endocarp of sound, ripe oranges (*Citrus sinensis*), preserved exclusively by physical means.
- The juice may have been concentrated and later reconstituted with water suitable for the purpose of maintaining the essential composition and quality factors of the juice.
- The soluble orange solids content of orange juice (exclusively of added sugar) shall be not less than 10%.
- Sugar max. 50g/kg
- Ethanol max. 3g/kg
- Volatile acids: only traces
- Essential oil max. 0.4 ml/kg

3.3.5.2 Handicrafts: Bamboo and Rattan

No specific quality requirements can be established for the wide variety of items produced of bamboo and rattan. Based on the interviews with the handicraft producers and exporters, the key areas are:
- drying of the raw materials,
- quality of varnishing or other finishing, and
- proper export packaging of the products.

Regarding the export packaging of bamboo and rattan products, the following guidelines can be given:
- packaging is a "silent salesman" for the product
- packaging should provide protection against: physical damage, moisture, insects, fungi, discoloration by light

3.3.5.3 Essential Oils

The key requirement in essential oils is the concentration of active compound found in the oil and the purity of the product. This is determined by e.g. the plant species available, harvest time, quality of primary processing and transportation. The active compound concentrations required in export trade are listed in (Table 55).

**Table 27: Quality Requirements of Essential Oils**

<table>
<thead>
<tr>
<th>Type of Essential Oil</th>
<th>Active Compound Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bamboo chopsticks</td>
<td>10.5 USD/ 1 000 pc.</td>
</tr>
</tbody>
</table>
More detailed quality specifications are given for cassia oil (of *Cinnamomum cassia*) and elemi oil (of *Canarium album*) below.

**Standard for *Cinnamomum cassia* oil**

- Density $d_{20} = 1.052-1.070$
- Indice of refraction: 1.6-1.614
- Indice of acids: 15-17
- Number of carbonyl: min. 339.5
- Active compounds:

<table>
<thead>
<tr>
<th>Compound</th>
<th>Min (%)</th>
<th>Max (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Trans-cinnamaldehyde</td>
<td>70</td>
<td>80</td>
</tr>
<tr>
<td>- Eugenol</td>
<td>-</td>
<td>0.5</td>
</tr>
<tr>
<td>- Coumarine</td>
<td>1.5</td>
<td>4</td>
</tr>
<tr>
<td>- Trans-Omethoxy cinnamaldehyde</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>- Acetate Omethoxy cinnamyle</td>
<td>-</td>
<td>2</td>
</tr>
</tbody>
</table>

**Standard for *Canarium album* oil**

- Density $d_{20} = 0.85-0.89$
- Indice of refraction: 1.472-1.485
- Active compounds:

<table>
<thead>
<tr>
<th>Compound</th>
<th>Min (%)</th>
<th>Max (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Sabinene</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>- Alpha phellandrene</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>- Limonen</td>
<td>45</td>
<td>72</td>
</tr>
<tr>
<td>- Alpha terpineol</td>
<td>0.4</td>
<td>2</td>
</tr>
<tr>
<td>- Elenol</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>- Elemicle</td>
<td>0.5</td>
<td>8</td>
</tr>
</tbody>
</table>

### 3.3.5.4 Medicinal Plants

Some requirements for dried medicinal plants for exports include the following:

- humidity 10-12%
- dried medicinal plants must be contained in polyethylene bags and sprayed with fungicide in order to prevent enzymatic reactions and kill some micro-organisms
- the bags containing dried medicinal plants must be stored in a cool place to avoid the deterioration of active compounds

In the case of medicinal plants, the collecting time, weather and after-harvest storing are usually crucial for the quality of the product. No general quality requirements can be given for the wide group of plants.

### 3.3.5.5 Other Non-Wood Forest Products

**Dried Mushrooms**

- humidity 10-12%
- chemical treatment against fungi (the same chemicals as for fruit)
3.3.6 Export Companies

3.3.6.1 General

Majority of the large foreign-trade companies are located in Ho Chi Minh city. The big general export-import companies are often the dominant export outlets for a large variety of non-wood forest products. The same companies appear among the most prominent exporters in numerous products. So the trade and distribution of NWFPs is not very specialised in Vietnam. The exporting companies were obtained from the Vietnam Business Directory 1995-1996. The contact data of the various companies is given in Annex 6.

3.3.6.2 Fruit

There are around 53 companies who export fresh or frozen fruit and vegetables and additionally 22 companies who specialise in exporting canned fruit and vegetables. Some examples of the companies located in Hanoi are collected in Table 56.

<table>
<thead>
<tr>
<th>Product</th>
<th>Export Companies (Trade Name)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit (fresh &amp; prep.)</td>
<td>Vegetable and Fruit Export Import Co. No. 1, Hanoi (Vegetexco)</td>
</tr>
<tr>
<td></td>
<td>Hanoi Union of Foodstuff and Biotechnology Enterprises (Hallimex)</td>
</tr>
<tr>
<td>Dry longan pulp</td>
<td>Unimex Hanoi, Arexfor</td>
</tr>
<tr>
<td>Fruit juices</td>
<td>Vietnam National Vegetables and Fruit Import Export Co. No. 3</td>
</tr>
<tr>
<td>Lychee juice</td>
<td>Vegetexco</td>
</tr>
<tr>
<td>Tea</td>
<td>Unimex Hanoi, Arexfor</td>
</tr>
<tr>
<td></td>
<td>Vietnam Nat. Tea Import Export and Devel. Investm. Co. (Vinatea)</td>
</tr>
<tr>
<td></td>
<td>Production Service and Import Export for Small Industry and Handicraft Company (Haprostimex)</td>
</tr>
<tr>
<td>Cashew/ground nuts</td>
<td>Unimex Hanoi</td>
</tr>
</tbody>
</table>

3.3.6.3 Handicrafts: Bamboo and Rattan

The specialised, export-licensed companies control the foreign trade of handicrafts in Vietnam. Export-import companies are abbreviated with XNK in the company directories. Based on the data obtained from the Customs Office in Hanoi, the major exporters by type of bamboo and rattan products are given in Table 57.

<table>
<thead>
<tr>
<th>Type of Product</th>
<th>Export Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bamboo:</td>
<td></td>
</tr>
<tr>
<td>- baskets</td>
<td>Artex Thang Long, Unimex Hanoi, Hokimex, Barotex, Thai Thinh, XNK Lam Tue</td>
</tr>
<tr>
<td>- blinds</td>
<td>Artex Thang Long, Hokimex</td>
</tr>
<tr>
<td>- boxes</td>
<td>Artex Thang Long, XNK May Tre</td>
</tr>
<tr>
<td>- trays</td>
<td>Artex Thang Long</td>
</tr>
<tr>
<td>- flower baskets</td>
<td>Artex Thang Long</td>
</tr>
<tr>
<td>Rattan:</td>
<td></td>
</tr>
<tr>
<td>- baskets (sets)</td>
<td>Artex Thang Long, Pomapaco, Thai Thinh, Lam Tue</td>
</tr>
<tr>
<td>- baskets (pieces)</td>
<td>Thai Thinh</td>
</tr>
<tr>
<td>- plates</td>
<td>Unimex Hanoi, Arexfor</td>
</tr>
<tr>
<td>- bicycles</td>
<td>Lixeha</td>
</tr>
</tbody>
</table>

According to the Vietnam Business Directory 1995-1996, there are around 60 larger companies who process and sell bamboo and rattan wares for exports.

3.3.6.4 Essential Oils

Nine larger essential oils companies are collecting, processing and exporting essential oils of plant origin in Vietnam. They are evenly distributed between Hanoi and Ho Chi Minh (Table 58).

<table>
<thead>
<tr>
<th>Name of Company (Trade Name)</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural, Forestry, Sea Products Import Export Co. (Agrimexco)</td>
<td>Ho Chi Minh</td>
</tr>
</tbody>
</table>
3.3.6.5 Medicinal Plants

There are 23 specialised companies processing and exporting traditional medicine. They purchase medicinal plants for processing.

Table 31: Export Companies of Traditional Medicine and Medicinal Plants in Vietnam

<table>
<thead>
<tr>
<th>Name of Company (Trade Name)</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Medicinal Plants Co. No. 1</td>
<td>Hanoi</td>
</tr>
<tr>
<td>National Pharmaceutical Enterprise No. 26 (OPC)</td>
<td>Ho Chi Minh</td>
</tr>
<tr>
<td>Essential Oils Enterprise (Enteroil)</td>
<td>Hanoi</td>
</tr>
<tr>
<td>Vietnam Medical Products Import Export Co. No. 1 (Vimedimex)</td>
<td>Hanoi</td>
</tr>
<tr>
<td>Vietnam Medical Products Import Export Co. No. 2 (Vimedimex)</td>
<td>Ho Chi Minh</td>
</tr>
<tr>
<td>Vietnam National Medical Materials Co. No. 2 (Phytopharco)</td>
<td>Ho Chi Minh</td>
</tr>
<tr>
<td>Vietnam National Vegetables and Fruit Corp. (Vegetexco)</td>
<td>Ho Chi Minh</td>
</tr>
<tr>
<td>Production Service and Import Export for Small Industry and Handicraft Company (Haprosimex)</td>
<td>Hanoi</td>
</tr>
</tbody>
</table>

3.3.6.6 Other Non-Wood Forest Products

Mushrooms

There are at least 17 companies engaged in the exports of mushrooms in Vietnam. Those in Hanoi are the following:

- Hanoi Mushroom Spawn Production, Processing and Export Co. (Hamuspex)
- Vietnam National Vegetables and Fruit Corp. (Vegetexco)
- Vietnam National Forest Products Import-Export Service and Production Co. (Naforimex)

Cinnamon: 18 companies, of which in Hanoi e.g.:

- Vietnam National Vegetables and Fruit Corp. (Vegetexco)
- Vietnam National Forest Products Import-Export Service and Production Co. (Naforimex)
- Vietnam National Coffee Corp. (Vinacafe)

Star anise seeds: 10 companies, of which in Hanoi e.g.:

- Vietnam Medical Products Import Export Co. No. 1 (Vimedimex)
- Vietnam National Vegetables and Fruit Corp. (Vegetexco)
- Essential Oils Enterprise (Enteroil)
3.4 Conclusions and Recommendations

3.4.1 Opportunities in the Local and Provincial Markets

With its small population (around 50,000), Cho Don district is a very small local market for any wood or non-wood forest product venture. Although much efforts have been made in fruit cultivation in Cho Don, the local consumption is very low and it is largely supplied by imported fruit (from China or Hanoi). In addition, the selection of species (apricot, plum) and varieties is not optimal to meet market preferences. These fruit are seldom consumed as a regular part of nutrition. Due to the intensive planting of apricot, low prices have started to affect farmers.

The only potential non-wood forest products that could be commercialised in Cho Don in the short term is bamboo mat which enjoys stable demand among both rural and township households. The mats are still being transported from Hanoi to buyers in Bang Lung town and in surrounding villages. As the district possesses relatively rich reserves of bamboo, it would be only appropriate to establish a small manufacturing base (6,000 m² per year, one shift) for bamboo mats to satisfy the local demand. It could be expanded to produce bamboo board in the future. The State Forest Enterprise in Cho Don could be one possible location for such a venture, serving as a nucleus for further development.

In the newly established Bac Kan province, very little processing capacity of non-wood forest products exist. There has reportedly been a project to install an apricot liquor factory in Bac Kan city, but no commitments have been made as yet. The recently attained provincial status has given a boost for consumption of wood products in the capital. It is likely that this will also create some additional demand for edible non-wood forest products from Cho Don such as fruit, mushrooms and bamboo shoots.

3.4.2 Opportunities in the National Market

The briskly growing national economy (9-10%) will fuel a steadily growing demand for wood and non-wood forest products in the Vietnamese market. Country’s population is expected to reach 83 million capita in 2000. There is currently a booming construction sector which absorbs growing volumes of not only wood but also bamboo products (poles, mats, boards).

In the case of fruit, the average consumption per capita is very low (6 kg), so there is a large potential demand in the national market. A rudimentary estimate puts the total market size at 450 mill. kg. The most popular fruit in Vietnam are banana, orange and sapodilla. Fruit demand exceeds domestic supply e.g. in Hanoi and other big cities. This is visible by the large volumes of imported fruit such as pear, grapes and apples.

For fruit producers in Cho Don, it is necessary to:

- improve the resource base by selecting a wider range of species and varieties and extend the harvest season,
- develop processing techniques and packaging of fruit as long transportation limits the marketability of fresh fruit.

Regarding the other NWFPs, essential oils, medicinal plants, dried or canned bamboo shoots and mushrooms would be suitable even for distant national markets due to their low weight and attractive unit value. Cinnamon and e.g. straw or cat's ear mushrooms can be easily cultivated, while medicinal plants are collected from the natural forest. The farmers of Cho Don district have invested heavily in cinnamon planting and the main harvest starts in the medium term (3-6 yrs.) There is plenty of time to develop the primary distillation on the village level.

The main markets for Cho Don's non-wood forest products are found in the processing companies in Hanoi who collect, process and upgrade the products for the national consumption or export markets. Several such companies were visited and comprehensive listings of the contacts to 20 companies are given in the Annex 6 of this report.

New commercial and industrial uses for NWFPs can still be discovered both in the national and international markets.

3.4.3 Opportunities in the Export Markets

Vietnam used to have a special position as a supplier of non-wood forest products to the European markets before the war-stricken decades in the 1950s-1970s. The main articles were e.g. spices, medicinal plants and fragrances of plant origin. These trade links are now actively being re-established. Today, the main NWFP export items include e.g. cashew nuts (100,000 t), bamboo and rattan ware (USD 19 mill.), fruit products (USD 31 mill.), spices, and essential oils.
China and other South-East Asian countries are at the same time (i) competitors in the world markets, and (ii) the nearest larger export markets. Western Europe and ASEAN countries are the most important export future markets for NWFPs of Vietnam.

Concerning the NWFPs of Cho Don, very little immediate export potential is available in the current situation when local processing is trivial or non-existent. Essential oils could be indirectly exported through the processing companies in Hanoi. Fruit exports require a lot of improvements in the local processing and can not be considered realistic in the short-medium term. In handicrafts, it takes several years or even decades to establish adequate skills in design and manufacturing for exports.

The search for new natural plant-based medicines could be tapped by Cho Don, as several foreign study groups have already visited the district for medicinal plant prospecting. The remaining natural forests could supply valuable ingredients for new drugs. Among the species available are e.g. *Artemisia annua*, *Dichroa febrifuga*, *Eupatorium odoratum* and *Caesalpinia seppan*.

The critical factors for future export performance are (i) meeting the higher quality standards and (ii) the need for efficient, speedy inland transportation.

3.4.4 Recommendations on Distribution Channels

Distribution system of selected non-wood forest products from Cho Don was studied in the local, provincial and national level. It appeared that:

- more than 20 individual middlemen are engaged in the trade of various wood and non-wood forest products in Cho Don,
- family ties and official political positions play an important role in the distribution of products from and within the district,

Due to the sensitivity of the issue, a full presentation of the distribution system may cause confusion and even disturbance in the Cho Don district.

As a conclusion, the Programme can support the farmers by increasing the quality of their products (by technology) and amount of price information (through a price information system). This will lead to improvements in pricing and negotiating of their crops, and can result in internal evolution of the distribution system over time. As a result of this some of the existing middlemen could be replaced or left redundant.

The farmers in Cho Don have a strong desire to establish producer groups for the (i) collection, (ii) processing, and (iii) marketing of non-wood forest products. Organisation of collective groups is preferred over individual risk-taking and entrepreneurship.

3.4.5 Recommendations on Pricing

It appeared that the local middlemen and retailers add 20-40% in the producer price of fruit when sold at the local marketplace in Bang Lung. The mark-ups were 20-50% in bamboo products and rattan.

It is strongly recommended that a price information system for wood and non-wood forest products should be immediately established along the guidelines given by the Consultants. The main advantages of such system are:

- enable farmers to be aware of price changes in the distant markets δ improves market transparency and the general knowledge on markets,
- strengthens the bargaining power of farmers with the middlemen,
- increases the share of revenue accruing directly to farmers δ higher family income and profitability.

Building up the system calls for decisions on e.g. product range, collection method and personnel employed, the frequency of data, as well as the transferring and displaying media in Cho Don. Consultant’s recommendation is:

- to employ a professional price monitoring unit (Vietnam Financial Times) in Hanoi,
- to utilise the Programme staff (extensionists) in the local level, and
to deliver weekly prices of current season’s products to Cho Don by telefax and to display the data on blackboard or by paper handouts to the farmers.

4. APPROPRIATE TECHNOLOGIES

4.1 Choice of Appropriate Processing Technologies

When applying appropriate processing technologies for wood and non-wood forest products there are certain preconditions and requirements that need to be considered for their successful implementation:

- Farm forest management has to be implemented in a sustainable manner.
- Processing operations must be introduced and implemented by considering the environmental aspects and their contribution to the social welfare of rural people.
- Availability of raw material at the time of planning, utilisation and processing.
- It has to be recognised that also non-wood forest products such as bamboo, rattan, fruits, medicinal plants, essential oils etc. have a significant economic value for rural people.

When speaking about technology, we usually mean tools, machines, techniques, and methods. Broadly it may be understood as a combination of knowledge, skills, organisation, equipment, and machines.

Appropriate technology needs to be suitable for the prevailing economic, social and environmental conditions in the community. Therefore, appropriate processing technologies should minimise costs, as well as environmental impacts. Appropriate technology is based on qualitative and quantitative needs of production and employment, and on availability of energy and human skills. It must be applied according to the requirements of ergonomics, occupational safety and health, and national legislation.

Highly mechanised, capital-intensive processing technologies and systems do not allow participation of rural people who live within or near the forests. It is thus important to introduce small scale appropriate processing technologies and systems that rely on basic or intermediate technology suitable for the prevailing local conditions.

In Cho Don district manpower for processing operations is easily available and labour costs are moderate. Therefore, it is encouraged to use labour-intensive instead of capital-intensive technology. This way employment opportunities for the pilot village people can be created.

Appropriate technology is often associated with small-scale production, labour-intensity, low product quality, rural-based operations, the use of second hand and locally manufactured machinery, etc. versus the application of modern and advanced techniques. When using labour-intensive processing methods, less technical skill and training are needed. In most cases, labour-intensive methods are also less harmful to the environment.

Development of the technologies should begin from the primary technologies in order to build up a firm foundation for the further development of the sector. Later on, processing - the transformation of forest product raw materials into industrial and consumer products - is an area in which would provide many opportunities for increased economic activity.

4.2 Availability of Labour and Raw Materials

Employment of rural people in processing of wood and non-wood products is low due to the fact that sources of raw materials are limited. Therefore, neither processing technologies exist on a large scale. Only little processing of non-wood forest products is made, mainly on the household commodity level, i.e. food and beverages. These activities do not increase employment on the commune level but offer livelihoods for the individual households.

At the moment, most of the 23 demonstration farms are already planting new wood and non-wood species to be harvested after 1-20 years growing period. Based on this notion, the products can be divided into three different groups depending on the time their harvest. The following is the proposed timeframe for the products:

- **Short term products (1 - 2 years):**
  - fruits; apricot, plum, pineapple
  - others: mushrooms, bamboo shoot, products from natural forest (medicinal plants, etc.)
4.3 Existing Technologies

4.3.1 Harvesting of Non-Wood Raw Materials

Non-wood materials such as bamboo and rattan are harvested manually by locally manufactured knives and wooden framed bow saws. Other non-wood forest products are not so widely harvested, collected or recovered due to the low existence and recognition of the products.

Harvesting technologies can be developed and improved as discussed and described in the Technical report No. 2.

4.3.2 Extraction and Transportation of Raw Material and Products

Extraction of bamboo and rattan from the forest to the roadside is made manually by pulling and carrying. Transport from the roadside to manufacturers, dealers and customers is made by local trucks and tractors with rather low capacity and efficiency.

These technologies can be developed and improved as discussed and described in the Technical report No. 2.

4.3.3 Processing of Wood and Non-Wood Forest Products

Of non-wood materials, only bamboo is processed for local construction, household and irrigation purposes. There is only one factory processing bamboo products, i.e. a chopsticks manufacturing mill at Bang Lung town. It is the only commercial unit using and selling bamboo products in the district.

At the village level bamboo is used as building material for flooring, walling, fencing etc. The processing technology is very simple. The bamboo is manually cut, splitted and opened. The products are used as a mat or board. Some households were making bamboo baskets and other household items and handicrafts for their own uses.

Other non-wood forest products, mainly fruits were processed in a very small scale for the household purposes only.

4.4 Potential Appropriate Technologies

It appears that there are several forms of potential processing technologies that could be applied in Cho Don district. The following technologies are described and analysed in detail in Annex 3:

- Fruit processing
  - conservation of fresh fruits
  - drying of fruits
  - processing of unfermented fruit juices and fruit syrups
  - fruit wines
- Handicraft processing
  - bamboo products
  - rattan products

| Medium term products (3 - 6 years): products as above, orange, lychee, mandarin, essential oils; cinnamon, anise, bamboo and rattan products, pine and cannarium resins. |
| Long term products (7 years and above) products as above, several bamboo and rattan products on large scale, wood products |
- Medicinal plant processing
- Essential oil processing
- Processing of other non-wood forest products
  - tea, mushroom, spices, bamboo shoots

In the descriptions and analysis of processing technologies the following topics have been explained and described:

- collection of raw materials
- cleaning and preservation of raw materials
- processing procedures
- finishing, packing and storing
- other special considerations in processing of non-wood forest products.

4.5 Tools, Equipment and Machinery

One important aspect of processing technology is the development of new working techniques, machinery, equipment and tools as well as improvement of the existing ones.

In Cho Don district and particularly in Ban Chang village there are several blacksmith’s workshops and machine manufacturers who can be well used in the development of new tools and equipment. Within the Programme one of the key areas should be the development of machinery, equipment and tools suitable for the pilot village conditions and Cho Don district as a whole.

If the proposed non-wood processing technologies will be applied, it will become necessary to either locally manufacture or purchase, or in some cases import the appropriate machinery, equipment and tools for the successful implementation of the Programme.

It is also recommended that some of the most important items should be purchased as examples and demonstration objects. They could also be used when implementing training and extension programmes for the farmers.

The following describes the machinery, equipment and tools to be developed, manufactured or purchased.

Non-Wood Processing Tools

- Hand tools for processing of handicrafts
- Harvesting knives and saws
- Transport equipment

Maintenance Tools and Equipment

- Development of maintenance tools and equipment for maintenance of non-wood processing tools and knives should be established.

4.6 Training and Extension

The key aspect of transferring the appropriate technologies is to develop and implement appropriate training and extension programmes for both Programme forest extensionists and farmers of the demonstration farms. These training programmes will enable the rural people to accumulate necessary knowledge, skills and information for the successful use of appropriate processing technologies. When implementing these training programmes a lot of emphasis should be put on the practical aspects.
The best way of transferring the knowledge and skills of appropriate technologies is to establish and develop model processing units for different processing alternatives. They would be used both on commercial basis by the Cho Don farmers and in transferring the technologies for the other areas and target groups of the Programme.

The consultancy team recommends the following approach in the development and implementation of the training activities, divided into immediate and long term training activities:

Immediate activities:

- Development of an appropriate training curriculum for the forest extensionists who will further train the pilot village people in wood and non-wood processing and in other related areas. This training curriculum should be established on the basis analysing the feedback from the forest extensionist’s training course (19-21.5.1997) and the dissemination workshop for farmers (22.5.1997).

- Establishment of co-operation between forest extensionists of the Programme and the existing training institutions in wood and non-wood processing technologies in Vietnam.

- Training of forest extensionists in pedagogic and teaching methods to be used during the extension and training courses.

- Further training of Forest Extensionists in the technical aspects of wood and non-wood processing and in the field of their expertise.

- Arranging of study visits for the key persons of the Programme to familiarise them with appropriate processing technologies for wood and non-wood products in Vietnam.

Long-term activities:

- Development of a comprehensive training and extension curriculum for training of pilot village and rural people of Cho Don district in wood and non-wood processing technologies. These curriculum can only be established after analysing feedback from farmer’s dissemination workshop and particularly from the pilot village people themselves.

- Development of a training programme whereby new wood and non-wood processing technologies, working methods and techniques can be introduced.

As a part of appropriate processing technology a continuous extension programme should be established and developed for training of farmers in appropriate wood and non-wood processing technologies.

4.7 Findings and Recommendations

The following are the findings and conclusions from the appropriate processing technology study:

- The existing processing technologies in the pilot villages are in very small scale and only at household level, where only products for domestic uses are produced.

- At the moment agriculture is the main source of income for the households in the pilot area and due to lack of information and knowledge, farmers do not have good understanding how to use forest resources for better income generation, creation of new employment opportunities and as an alternative for agriculture activities.

- There is a general lack of know-how and skills in wood and non-wood processing technologies.

- Workforce at village level is abundant and a big advantage in the development of wood and non-wood processing technologies, but possibilities to employ people in processing of non-wood products are low due to the absence of processing units and facilities.

- In the pilot villages, there is a high demand for appropriate training and extension services for the improvement of knowledge and skills of rural people.

- Non-wood raw materials such as bamboo and rattan are existing in rather wide scale, but processing of them into valuable products is still very limited.

- Other non-wood forest products like fruits, mushrooms, essential oils, medicinal plants etc. are not processed.
In the farms, only bamboo is processed, mainly for local construction, household and irrigation purposes.

One important aspect is to introduce new working techniques, machinery, equipment and tools suitable for the prevailing pilot village conditions.

The results of the study show quite clearly that there are many possibilities for the development of appropriate processing technologies for wood and non-wood forest products both on the pilot village and household levels.

When introducing the processing technologies the following considerations should be well studied:

- Which activities can be implemented at village level?
- Which activities can be implemented at household level?
- What is the appropriate level of technologies?
- How to transfer the technologies to the farmers?

By considering the above mentioned requirements, the consultancy team recommends the following approach:

**Processing of raw materials and products at the household level:**

- Main emphasis should be put on the production of good quality non-wood forest products and raw materials to be further processed at the village level, in a processing centre or to be marketed through the middlemen to the other provinces for processing.

- Centralised collection and weighing system should be introduced for extraction of raw materials as well as measuring of their volume and weight. This would provide adequate and fair payments producers.

- If any processing will be implemented on the farm or household level, it should mainly concentrate on washing, cleaning and drying of the products. This is because of simple technologies to be applied. After that the products can be delivered to the processing units or middlemen.

- Only primary and basic small scale processing should be developed at the farm level.

Introduction of farm-level activities should begin immediately in order to achieve the best possible results as soon as the first crops can be harvested.

**Processing of raw materials and products at the pilot village level:**

- Small centralised handling and processing units should be established for processing of the final forest products such as fruits, essential oils, medicinal plants and other non-wood forest products.

- Handicrafts and bamboo products processing could also be encouraged in some of the pilot villages where the best raw material resources are available.

- When processing bigger quantities of products the above solutions will grant the following advantages:
  - Higher and more uniform quality of products.
  - Better hygiene and cleanliness of the process.
  - Bigger volumes produced at one season.
  - Easier marketing of the products.
  - Higher prices and better income for farmers

- People from the pilot villages should be trained and employed for running of these small scale processing units.

- Small-scale processing units can be established with rather small investment, if simple and appropriate methods and materials are used.
Processing facilities for cleaning, washing, fresh conservation and drying of collected raw materials from the demonstration farms could be constructed under the open shed. The drying shelves or stands could be constructed of wood, where the sliding boxes with a wire mesh in the bottom of the box can be fitted.

Establishment of the processing units could be made through a loan system whereby the households could also buy shares of the processing units (e.g. co-operative, corporation or limited company).

In the future, if larger scale operations are demanded, these units could easily be expanded with a profit from the processing activities.

Other recommendations:

- In planting and producing of lychee and longan trees and their products it is very important to choose the right seedling provenance.

- Establishment of model processing units during the training and extension activities should be considered. They could be used by the farmers as commercial processing units. Investment costs could be shared between the Programme and farmers.

- Standards and quality requirements for processing of the wood and non-wood forest products should be developed to guide them in processing higher quality products.

- Small-scale apricot and plum fruit processing, in terms of fresh conservation and dry pressing, should be started immediately in order to achieve the best possible utilisation of existing raw materials and mature fruits.

- Distillation of leaf, branches, wood and stem bark of cinnamon tree for essential oils should be introduced and developed.

- Extraction of pine resin for pine oil and colophonium should be introduced in small scale.

- Artificial culture of some mushroom species (cat’s ear, oyster) should be introduced, based on wood and agricultural residues.

- Development of mat-woven handicraft making and bamboo and rattan products should be introduced.

- Processing of pressed bamboo mats and boards should be initiated as substitutes for solid wood products.

- Simple wood and bamboo preservation technologies should be introduced for better durability of materials.

- Appropriate extraction and transport methods for wood and non-wood products should be developed.

- New product design of furniture, bamboo products, bamboo boards, bamboo mats, rattan handicrafts, fruit products, essential oils, medical plants etc. should be started immediately.

- A monitoring and evaluation programme for the follow-up of the development of appropriate processing technologies and needs for further development of them should be established.

5. FINANCIAL VIABILITY

5.1 Farmers Cashflow

The Programme supports farmers to implement ways of production within their forest land that are ecologically sustainable and financially viable. The financial viability is crucial for farmers as they receive loans that have to be paid back after one to five years. It appears that farmers have good knowledge when it comes to traditional short term production investments such as animal grazing that can bring rapid profits or crops that can be harvested during the same year.

The Programme’s demonstration farms are described in chapter 3. Forest land has been allocated to the farmers mostly during last year (1996). The farmers have faced a new situation when seeking alternatives for shifting cultivation. Fortunately they have been willing to try new crops, especially fruit and timber trees. However, there is little actual information on expected returns. The decisions on choices are based rather on examples what other farmers are doing (see Chapter 3) than on actual knowledge of real viability of production alternatives.
A prerequisite for the financial analysis is knowledge on market opportunities to identify what products can be sold and what is the price of different products (chapter 4). With appropriate processing technologies farmers’ returns can be increased and in some cases products can be sold only after processing, e.g. some fruits like apricot (chapter 5).

A preliminary financial analysis was carried out for all the demonstration farms. At present no processing technologies are applied for the products. In a financial analysis all the inputs needed for production and then all the produced outputs are collected in a systematic way. The principal task is to calculate a cash flow that farmers receive in a certain time period.

The principal data on seedling or seed quantities and prices was collected when farmers received the seedlings (Annex 2). In addition, the Programme team collected separately data of materials such as fences and tools needed for production as well as labour input. Labour input was considered separately as hired labour and own labour. The farmers estimated how many man-days for different stages of production are used. Product prices were taken from the market study (chapter 4 and Technical Report Nr. 3) and checked with the extension staff. Other needed parameters such as expected quantities of production and needed inputs for harvesting were estimated together with the Programme staff and market/technology consultants (Table 6.1). The collected data is not complete and some production parameters are only good guesses. The prices will probably fluctuate a lot in the future, which makes it difficult to estimate future returns.

An example of a cash flow table is presented in Table 6.2. All the material costs as well as revenues are presented in monetary values. The labour input is presented also as number of man-days. The price for labour in Cho Don district is 20 000 VND per man-day. The cash flow indicates when farmers will receive actual revenues for their investments.

<table>
<thead>
<tr>
<th>Species</th>
<th>Seedlings/seeds</th>
<th>Production</th>
<th>Harvesting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Species</td>
<td></td>
<td>Product</td>
</tr>
<tr>
<td>Apricot</td>
<td>Nr 1000</td>
<td>Fruits</td>
<td>Kg 1500</td>
</tr>
<tr>
<td>Anise</td>
<td>Nr 2000</td>
<td>Dried seeds, flowers</td>
<td>Kg 20000</td>
</tr>
<tr>
<td>Canarium</td>
<td>Nr 500</td>
<td>Fruits</td>
<td>Kg 3000</td>
</tr>
<tr>
<td>Chukrasia</td>
<td>Nr 500</td>
<td>Timber</td>
<td>m³ 2000000</td>
</tr>
<tr>
<td>Cinnamon</td>
<td>Nr 600</td>
<td>Leaves</td>
<td>Kg 200</td>
</tr>
<tr>
<td>Cinnamomum spp.</td>
<td>Nr 500</td>
<td>Timber</td>
<td>m³ 1000000</td>
</tr>
<tr>
<td>Legumes</td>
<td>Kg 6000</td>
<td>Nutrition</td>
<td>-</td>
</tr>
<tr>
<td>Lychee</td>
<td>Nr 10000</td>
<td>Fruits</td>
<td>Kg 12000</td>
</tr>
<tr>
<td>Manglietia</td>
<td>Nr 300</td>
<td>Timber</td>
<td>m³ 240000</td>
</tr>
<tr>
<td>Orange</td>
<td>Nr 7000</td>
<td>Fruits</td>
<td>Kg 3000</td>
</tr>
<tr>
<td>Plum</td>
<td>Nr 7000</td>
<td>Fruits</td>
<td>Kg 2500</td>
</tr>
<tr>
<td>Rattan</td>
<td>Nr 500</td>
<td>Rattan</td>
<td>Kg 1200</td>
</tr>
<tr>
<td>Tea</td>
<td>Kg 1500</td>
<td>Leaves</td>
<td>Kg 2000</td>
</tr>
</tbody>
</table>
5.2 Financial analysis

Cashflow table is a basis to calculate different indicators for financial viability. The most commonly used indicators are Net Present Value (NPV) and Internal Rate of Return (IRR). Net Present Value is the cash flow discounted with alternative rate of interest, for example using the rate of bank’s savings account. If the NPV is positive it shows the surplus that could be received above the selected alternative rate of interest. IRR shows rate of return for the investment. If IRR is chosen as an alternative rate of interest for NPV, NPV equals zero.

Cost of family labour is difficult to determine especially when there are no alternative employment. The production alternatives might also need some additional labour from time to time. Useful indicator to measure the value of own labour is difficult to determine especially when there are no alternative employment. The production alternatives might also need some additional labour from time to time. Useful indicator to measure the value of own labour.
work is to calculate NPV without the cost of family labour and then divide NPV by estimated man-days. This indicator can be easily understood as it shows how much money could be earned in the selected period on average during one working day.

In the table 6.3 are presented 22 farmers’ cashflows. The number of farmer (first column in the table) refers to farmers (Annex 2). In one case data was not available. In 14 cases the cashflows were calculated for a 10 year period. In the remaining 8 cases the cashflows were calculated for a 20 year period. The reason for 20 year period in the latter cases was that these farms have planted some timber species such as Chukrasia and Cinnamomum spp which give returns only in the long term.

In almost all the demonstration farms the farmers are estimated to have returns only after 5 years on average. This means that the received loans have to be paid back by other sources of income such as with cultivation in other areas of the farm and animal husbandry. New farmers who are entering Programme’s credit scheme should take the expected cashflows into consideration. Probably more diversified production alternatives where more short-term returns are expected should be recommended.

Three indicators, NPV, IRR and NPV (excluding own work) divided by number of man-days needed for production, were calculated to indicate financial viability of the demonstration farms’ chosen production. The alternative rate for interest was estimated at 6% without inflation. The chosen production alternatives can be seen in the farm plans (Annex 2).

The NPVs and IRRs show very lucrative returns. All NPV’s are positive and IRRs vary from 46 to 119%. On one hand probably all the costs are not considered and on the other hand estimated prices will not be necessarily gained or all the products cannot be sold. In addition there was no information yet on survival rates which also might reduce the profitability. NPV/labour input gives interesting results. The expected salary per man-day varies from $46,000 to $110,000 VND. This indicator gives also very high values compared with the salary paid for rural worker which is $11,000 VND. It is possible that the labour input is underestimated.
This analysis of financial viability has to be taken as preliminary analysis of the demonstration farms. Once more reliable information is collected financial analysis should be carried out for different kind of production combinations. The risk involved in the indicators should be carefully considered. This way extensionists could gain useful knowledge how much returns are expected e.g. by planting some specific species or species combinations and what are the risks involved. In the future a routine financial calculation should be carried out for all the farmers who receive credit. The results should be used in a way that is understandable for the farmers.