

VALUE-ADDED ASSESSMENT OF NON-TIMBER FOREST PRODUCTS FOR LOCAL COMMUNITY IN THE CONTEXT OF BIODIVERSITY CONSERVATION IN TABHING COMMUNE, VIETNAM

BUI THI HA CHAU

MASTER OF SCIENCE PROGRAM IN NATURAL RESOURCES AND ENVIRONMENTAL MANAGEMENT

MAE FAH LUANG UNIVERSITY

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2009

EXAMINING COMMITTEE	
Sind Comments	AIRPERSO
(Prof. Dr. Siriwat Wongsiri)	
COI	MMITTEE
(Dr. Nguyen Luong Bach) Can Many Kush COI	
COI	MMITTEE
(Asst. Prof. Dr. Khin Maung Nyunt)	
Horra Seymi coi	MMITTEE
(Assoc. Prof. Dr. Hansa Sanguannoi)	
Penpon Tones COI	MMITTEE
(Asst. Prof. Dr. Penporn Janekarnkij)	

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Bui Thi Ha Chau

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Author Bui Thi Ha Chau

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Supervisory committee Dr. Nguyen Luong Bach

Asst. Prof. Dr. Khin Maung Nyunt

Assoc. Prof. Dr. Hansa Sanguannoi

ABSTRACT

Non-timber forest products (NTFPs) have been studied in various contexts related to a particular aspect of villagers' livelihoods: poverty, business or biodiversity conservation. However, past research has yet to integrate analysis of all these aspects of NTFPs at the same time. This research aims to do so, studying in an integrated manner the relationships between these varied aspects of NTFPs in Tabhing Commune, Vietnam. In this study area, NTFPs contribute in important ways to people's livelihoods but ongoing reduction in both quality and quantity which seriously and negatively affects biodiversity conservation. Moreover, local people who engage in excess collection and sale of NTFPs as raw materials receive less benefit from this activity than would be true if they found ways to add other components in the NTFPs value chain.

Market analysis and development methodology helped to identify potential high-value products among the list of available NTFPs in Tabhing Commune. Several key criteria were used to select potential products: market and economy issues, resource management and environmental

(4)

factors, social and institutional elements, and technical or scientific components. By ranking the score of each criterion as a result of discussions with groups of local people, the three products that received the highest scores were chosen for the next step in the study. Calculations of net present value from cost benefit analysis were then used to compare changes in value-added steps between current harvesting and sales practices and new value-added options.

Broom grass, lansat, and rattan were identified that would add the most value. Long term options such as new rattan and lansat planting were considered to add stable sources of raw materials. Short term options include broom making and rattan semi-processing to make broom and rattan peel/core. Comparing the different options showed that although short term activities such as broom making and rattan semi-processing can generate immediate benefits in the first year. In the first year, rattan semi-processing increases incomes by 126%; broom making can increase incomes 193% compared to current harvesting-only efforts. However, these changes remain stable over time for broom making and show only small increases for rattan semi-processing. In contrast, rattan and lansat plantings generate extensive benefits once the payback period has been reached. Value then increases up to 455% by the 20th year.

In addition, the research found by planting rattan and lansat as long term sources can reduce impacts on forests from NTFPs harvesting. Instead of harvesting in the forest, local people can collect NTFPs from their planted areas. From another perspective, if local people were to increase their income from NTFPs to the same level as with proposed options, the extra NTFPs harvesting from forest sources required would range from 6 times to nearly 10 times current harvesting levels. Without processing, the quantity of harvesting needed would be double or three times again. These figures mean that to add the same amounts of value would impose much more impact on local forests in terms of harvesting more.

Keywords: Tabhing Commune/ NTFPs/ value-added forms/cost benefit analysis/ local community/ biodiversity conservation.

TABLE OF CONTENTS

		Page
ACKN	OWLEDGEMENTS	(3)
ABSTI	RACT	(4)
LIST (OF TABLES	(8)
	OF FIGURES	(9)
LIST (OF ABBREVIATIONS	(10)
CHAP'	TFR	
	RODUCTION	1
1.1	Background	1
1.2	Problem statement	3
1.3	Research questions	4
1.4	Objectives	4
1.5	Expected outcomes	5
1.6	Limitations and scope	5
1.7	Conceptual framework	6
2 LITI	ERATURE REVIEW	9
2.1	Role of NTFPs in local livelihood	9
2.2	NTFPs value chains and potential for upgrading	11
2.3	Value addition activities for local people	13
2.4	Value addition in the context of biodiversity conservation	20
2.5	Policies on NTFPs in Vietnam	25
2.6	Lessons learned	27

TABLE OF CONTENTS (continued)

	Page
CHAPTER	
3 METHODOLOGY	29
3.1 Study site	29
3.2 Methodology	33
4 RESULTS AND DISCUSSION	38
4.1 Current situation of NTFPs in Tabhing Commune	38
4.2 Analysis of potential value-added activities	51
4.3 Adding value in the context of biodiversity conservation	83
5 CONCLUSIONS AND RECOMMENDATIONS	88
5.1 Conclusions	88
5.2 Remaining gaps and suggested studies	91
REFERENCES	92
APPENDICES	97
APPENDIX A Questionnaire	98
APPENDIX B Natural condition of Tabhing Commune	106
APPENDIX C Socio-economic conditions of Tabhing Commune	109
APPENDIX D Related results of NTFPs situations and value-added activites	116
CURRICULUM VITAE	124

LIST OF TABLES

Table	Page
4.1 Annual HH Income from NTFPs	42
4.2 Available Quantity Supply and Quantity Demand of NTFPs in Tabhing Commune	51
4.3 Elimination of Non Viable Products in Tabhing Commune	53
4.4 Shortlist of potential products	54
4.5 Criteria for Scoring of Products	55
4.6 Comparison Score of the Different Products in Tabhing Commune Products	56
4.7 Factors for Rattan Planting (Calamus armarus species)	63
4.8 Costs and Benefits of Rattan Planting for Each Average HH	66
4.9 Costs and Benefits of Current Rattan Harvesting for Each Average HH	68
4.10 Costs and Benefits of Lansat Planting	69
4.11 Costs and Benefits of Lansat Harvesting for Each Average HH	70
4.12 Costs and Benefits for each HH from Drying Compared to Collecting Broom Grass	71
4.13 Costs and Benefits from Broom Making for each HH	72
4.14 Rattan Semi Processing Stages (Calamus armarus species)	73
4.15 Rattan Semi Processing Costs	74
4.16 Costs and Benefits of Rattan Semi Processing over 10 years	75
4.17 Summary of Benefits of Value-added Options Compared to Current Harvesting	78
4.18 NPV Changes due to a 20% Change in Factor Costs and Rattan and Lansat Prices	79
4.19 NPVChanges due to a 20% Change in Factor Costs and Prices of Brooms	80
4.20 NPV Changes due to a 20% Change in Factor Costs and Rattan Semi-Processing Prices	81
4.21 Additional NTFPs Harvesting Needed to Match Income Increase from	
Value-added Options	87

LIST OF FIGURES

Fig	ure	Page
1.1	Conceptual Framework	7
1.2	Research Framework	8
2.1	Value-added Forms	14
3.1	Tabhing Commune and the Surrounding Area	30
3.2	The General Value Chain System	34
4.1	Value Chain of Rattan, Broom Grass, and Lansat in Tabhing Commune	60
4.2	Proposed Upgrade Chain	62
4.3	Benefits of New Rattan Plantings and Rattan Semi Processing Compared to	
	Current Rattan Harvesting Alone	76
4.4	Benefits of New Lansat Plantings Compared to Current Lansat Harvesting Alone	77
4.5	Suggested Ways to Increase NTFPs Quantity by Local People	84
4.6	Suggested Ways to Increase NTFPs Quality by Local People	85

LIST OF ABBREVIATIONS

ADB Asian Development Bank

ANSAB Asia Network for Sustainable Agriculture and Bioresources

BCI Biodiversity Conservation Corridor Initiatives

CBE Community-based Enterprise

CIFOR Center for International Forestry Research

EOC Environment Operations Center

FAO Food and Agriculture Organization

FIDR Foundation for International Development / Relief

HH Household

IUCN World Conservation Union

MA&D Market analysis and development

MARD Ministry of Agriculture and Rural Development, Vietnam

MOSAIC Management of Strategic Areas for Integrated Conservation

MFU Mae Fah Luang University

GMS Greater Mekong Sub-region countries

NGOs Non-governmental organizations

NTFPs Non-timber forest products

OECD Organization for Economic Co-operation and Development

OTOP One tambon one product

PRA Participatory rural appraisal

SNV Netherlands Development Organization

VND Vietnam Dong (national currency)

WWF World Wildlife Fund

CHAPTER 1

INTRODUCTION

1.1 Background

All the Greater Mekong Sub-region (GMS) countries (Cambodia, China, Lao PDR, Myanmar, Thailand, and Vietnam) except Myanmar agreed to participate in the Biodiversity Conservation Corridor Initiatives (BCI) project funded by ADB. This project aims to reduce poverty, harmonize land management and governance regimes, restore ecosystem connectivity, and build capacity and sustainable financing. One component of BCI project is "Capacity Building for Natural Resource and Environmental Management and Socio-Economic Benchmarking in the GMS" which implemented by MFU-ADB/EOC. Vienam designated Ngoc Linh-Xesap as its biodiversity conservation corridor, within which Tabhing Commune is the pilot site. The principal characteristics of this area are a population dominated by a minority ethnic group (Katu people), high poverty levels (about 80%), agriculture as the main livelihood activity (contributing 50% of total income), and harvesting of non-timber forest products (NTFPs) as the second important livelihood activity (another 30%-35% of total income). Recognizing the importance of NTFPs in community life as well as constraints of effective management in pursuit of sustainable development, the study is focused on finding those potential products and related actions that can bring more benefit to local community, through value-added activities in the context of biodiversity conservation.

NTFPs are any product or service other than timber that is produced in a forest. Center for International Forestry Research (CIFOR) defines NTFPs including fruits and nuts, vegetables fish and game, medicinal plants, resins, essences, and a range of barks and fibers such as bamboo rattan, and a host of other palms and grasses. They are highly diverse in their ecology, management, use, and marketing. In general around the world NTFPs play an important role in

the livelihoods of the rural poor throughout the world as a source of food, medicine, construction materials, and income. It has been estimated that 60 million indigenous people living in Latin America, West Africa, and Southeast Asia depend very heavily on NTFPs for their survival, with an additional 400 to 500 million people also depending on these natural products. For the poorest households collecting NTFPs can play a critical role in providing both food and income (Warner, 2008).

Although local community forest gatherers and producers have engaged in trading various NTFPs for a long time, for many of these products community groups often remain solely raw materials suppliers in the entire enterprise chain from the origin of the resource to its final market purchaser. They are seldom involved in value-added activities, which are usually assumed by other participants in the overall industry (Aquino, 2008). In practice, an important range of NTFPs value-added actions can be taken at the primary collector level through storage, grading and processing, adoption of appropriate technology, distribution, and packaging (Donovan et al., 2008). Therefore, the lack of business skill to engage effectively with industry, the lack of knowhow to add value to raw materials, or the lack of value-added processing significantly reduces the potential incomes that these villagers could receive from NTFPs.

While NTFPs contribute importantly to the livelihoods of the rural poor, understanding of the roles of these products in conservation and development initiatives is not at all complete. Nearly always, local people just harvest these products without much concern about conservation or sustainability. They only begin to pay attention when products become depleted due to over harvesting, but even then they do not know how to adjust to the situation. Outcomes from many studies about the links between development and conservation showed two very different perspectives. One study found that trade in NTFPs is not likely to reconcile development and conservation of natural forests (Kusters et al., 2006); another study found that biodiversity is negatively affected by markets, leading to unsustainable use and resource degradation (OECD, 2003). Yet another viewpoint is that NTFPs gathering can improve natural resources management, leading to conservation of the ecosystem and biodiversity of an area. Different from other businesses, NTFPs can be linked to biodiversity conservation by creating economic incentives for local people to conserve forest resources while safeguarding their traditional livelihood strategies as well as their cultural values (Subedi, 1999). This study tries to show that

this latter perspective is correct by finding specific ways to create positive links between these two factors.

1.2 Problem statement

In Tabhing Commune, two main points related to NTFPs need to be considered through field observation and survey:

- 1. Reduction of NTFPs' quantity and quality.
- 2. Lack of value-added activities in the Commune related to NTFPs.

The first concern is caused by many factors, such as over harvesting, market demand, unsustainable harvesting, outsider impacts, traders who buy products irrespective of quality, and lack of adequate local management. In general, NTFPs have been harvested here from at least the 1980s. The initial purpose of harvesting was for local villagers' self-sufficiency; when outside demand for these products became higher, local people started to collect them for sale as well. Collection for outside markets grew especially starting in 2000 when the 14D National road was built in this area, making transportation much more convenient. As a result, outsiders come to harvest NTFPs and to do business more and more year by year until reductions of both quality and quantity have become apparent. Greater access by outsiders has added greatly to the potential for these reductions. Therefore, now villagers have to go further into the forest and take longer time to access their preferred harvest places. These results not only in reduced income of local people but also bring potential risk to the forest during exploiting time. The evidence for this situation comes from information provided by villagers as well as traders, and is corroborated by some studies from the World Conservation Union (IUCN), World Wildlife Fund (WWF), and Netherlands Development Organization (SNV).

Related to the second problem, since nowadays villagers just simply sell directly to traders the raw materials they have collected, they only participate in the first step of whole value chain so they get less benefit. In contrast, those who participate in upper levels of the value chain gain more benefit from added value such as semi-processing and making of final products (outside the commune area). After that, some final products return to be consumed by villagers. Therefore, local commune residents miss a chance to get more income from NTFPs. The main

difficulties contributing to this situation are lack of knowledge, technique, and finances to start new activities that require higher skill levels. This marks a question about the potential for local value-added actions to bring more income for villagers.

New plantations and improved management based on the local community can solve the first problem. However, it is needed to study deeper to finalize which species are most suitable to intervene in this regard, based on specific criteria. The same approach applies to proposing value-added activities, identifying species and techniques that would work in this regard.

1.3 Research questions

The general research question is "How can value-added from NTFPs help to improve the livelihood of local people in the context of biodiversity conservation in Tabhing Commune?"

To answer this question, we need to consider the following sub-questions:

- 1.3.1 What is the current situation of NTFPs' collection and use in Tabhing Commune?
- 1.3.2 Which products can best be selected to add value at the local level?
- 1.3.3 What appropriate options can be used to increase the value of NTFPs to local residents?
 - 1.3.4 How can value-added NTFPs contribute to biodiversity conservation?

1.4 Objectives

The general objective of this study is to identify and assess the potential of NTFPs' value-added activities to improve villagers' livelihoods in terms of increased income, within the context of biodiversity conservation. The specific objectives of this study are:

- 1.4.1 To analyze current contributions of NTFPs to the income of local people in Tabhing Commune, and to assess the overall potential for value-added activities related to NTFPs in the context of biodiversity conservation.
- 1.4.2 To identify potential products to which local residents can add value at the local level.

- 1.4.3 To identify all appropriate interventions that can increase the value of NTFPs through plantations, post-harvesting actions, and processing.
 - 1.4.4 To recognize the links between value-added actions and conservation.

1.5 Expected outcomes

The following outcomes are expected from this research:

- 1.5.1 List of potential NTFPs that can add value at the local level to help the local people get more benefit from these products.
- 1.5.2 Proposed appropriate value-added options based on real situation to increase income of local people from NTFPs activities.
- 1.5.3 Proposed potential value which gained from value-added options to support biodiversity conservation.

1.6 Limitations and scope

Villagers from the entire commune are involved in NTFPs harvesting activities. However, based on available time as well as available materials in Tabhing, the study focused on 4 out of the commune's 9 villages - those that are most involved in NTFPs harvesting actions. Those villages are Pa Rong, Pa Xua, Vinh, and Za Ra. Field surveys were conducted from June through October 2009.

Although the research applied Market and Analysis Development methodology (MA&D) as a tool to identify potential products from the whole list and to set up an enterprise plan to examine their economic, social, environmental and technology aspects, this study just used a part of the overall MA&D system to find out the potential products to develop value addition.

The literature review shows some forms of value-added activities that can be applied and the assessment through value chain analysis to identify the lack during the whole chain. However, this study focuses on raw materials improvement and processing activities only, without exploring any other options such as market access, marketing, etc.

1.7 Conceptual framework

The study's conceptual framework is illustrated in Figure 1.1. Value-added of NTFPs is the main element being studied here, with two specific aims: biodiversity conservation and income increases. To support value-added options, stable raw materials supply and new products are potential ways to increase the value gained from NTFPs. The links between value-added actions and conservation are established through plantations. This process helps to increase both quality and quantity of NTFPs.

The study's research framework as outlined in Figure 1.2 shows the steps taken to pursue the objectives through methodology and literature review. Understanding both socio-economic and biodiversity conservation conditions is first necessary step to identify problems at study site. Then we review literature and chose methodology to find out the management approach. Finally, assessment of the feasible options to reach all research objectives is made.



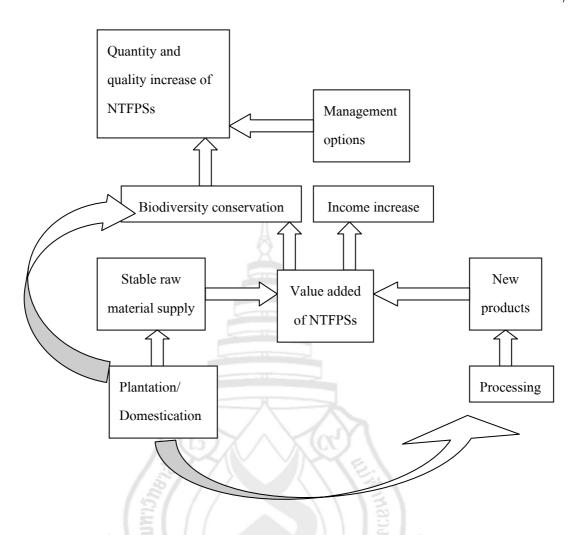


Figure 1.1 Conceptual Framework

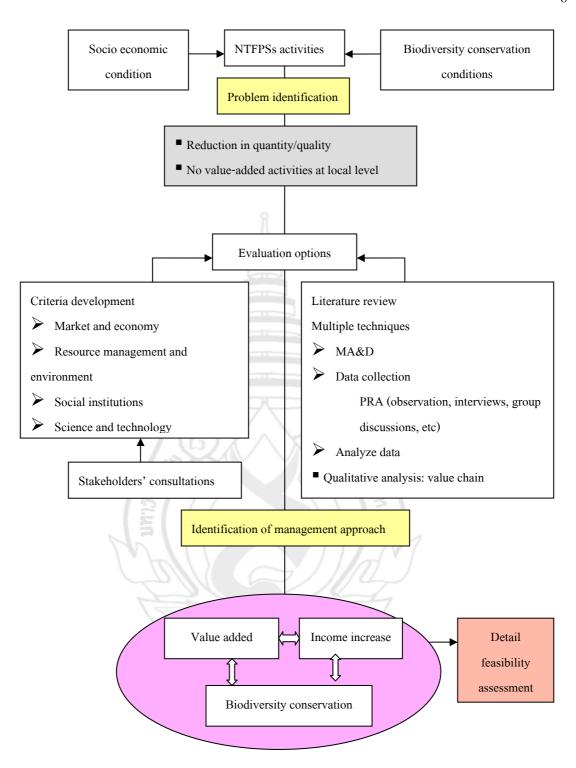


Figure 1.2 Research Framework

CHAPTER 2

LITERATURE REVIEW

The literature review begins with an examination of the role of NTFPs in local livelihood and value chain analysis. The next part explores the types of value-added opportunities related to collection of NTFPs, actions that can help directly improve livelihoods of the poor at the local level. Results of several studies are summarized to provide a basis for comparison with results obtained by the field research conducted in Tabhing Commune. The next part relates value-added activities to biodiversity conservation. Policies on current NTFPs in Vietnam are also briefly mentioned. Finally, lessons learned from literature review are summarized as the way to understand the results of the field research.

2.1 Role of NTFPs in local livelihood

Access to forest resources helps rural households diversify their livelihood base and reduce their exposure to risk (Warner, 2008). In addition to being a vital supplementary source to meet their daily needs, earnings from NTFPs are often an important supplement to other income. A large number of households sell forest products seasonally when their farm production is not enough to provide self-sufficiency year round. For the poorest households in particular, NTFPs can play a critical role in providing both food and income.

Key functions of NTFPs are to provide food security and nutrition, construction materials and implements, and health care medicines (Beer, 1996). Beer cites many studies from the 1970s and 1980s that show the role of NTFPs in subsistence of local people. To meet nutritional needs, for example, the most important staple is wild or semi-wild sago (*Metroxylon* spp.), which is use widely in Borneo, New Guinea, and Sabah; in addition, wild tubers are staple foods in Sumatra and West Malaysia. Neumann and Hirsch (2000) in their review and analysis of research about

commercialization of NTFPs summarized many cases from many authors to show the importance of NTFPs in local life. In Nepal, 800 NTFPs, while not traded, have many subsistence uses as foods, spices, herbal medicines, tannins, dyestuffs, gums, resins, incenses, oils, fibers, and construction materials. Villagers were found to use a wide variety of NTFPs for many purposes in a study of 12 forest protection committees in Midnapore District, India, where over 75 species were used regularly for subsistence needs. Since many NTFPs are seasonal, they are important to household subsistence diets at those times. In Benin, NTFPs are available during the dry season and early rainy season, which is otherwise known as the 'hungry period' when cultivated crops are in short supply.

NTFPs also play an important role in both national and local economies. In some cases, these activities can be seen clearly in national statistics. In rural mountainous areas, farm products are often not enough for households to be self-sufficient year round. NTFPs contribute to their livelihood in terms of both income and consumption.

The first study of the economic role of NTFPs was conducted by the International Tropical Timber organization in 1988 (Panayotou & Ashton, 1992). With only a few alternative sources of income at hand, the small amounts of money gained from NTFPs become valuable. Three activities are involved: collecting, trade and processing (Beer, 1996). In an overview of case studies, Vedeld et al. (2004) found that forests contribute between 20% and 40% of total household income in forest areas.

In Vietnam, similar to other countries, NTFPs have important social and economic values, especially for mountain-dwelling peoples who often depend on NTFPs for income and sustenance. NTFPs create job opportunities for hundreds of thousands of people in mountainous areas and contribute to hunger eradication and poverty alleviation (Morris & Bay, 2002). A case study in Vietnam's northern mountainous region shows that wealthier groups of forest dwellers use forest vegetables for their own consumption or buy them from the poor. The poor sell mushrooms, vegetables, and bamboo shoots from the forest, using the money gained to buy rice. The wealthier families hunt to improve the quality of their meals while poorer families hunt to earn more income (Rijsoort, 2000, quoted in Quang & Anh, 2006).

2.2 NTFPs value chains and potential for upgrading

2.2.1 Value chain analysis of NTFPs

The value chain of NTFPs ranges all the way from primary products to final consumers. It covers the full range of activities required to take a product or service from conception, through intermediary phases of production (transformation and producer services inputs), then to delivery to final consumers, and finally to its disposal after use. A chain consists of a number of different actors each specializing in different functions, but linked in a network through certain ways of cooperation (te Velde et al., 2006).

Value chain analysis is a methodology tool used in many fields and evident through many studies. te Velde et al. (2006) used value chain analysis to determine the importance of key individuals in driving entrepreneurship and innovation in the market for NTFPs, then upgrading their roles in the value chain. There are four types of upgrading: process upgrading, product upgrading, functional upgrading and chain upgrading (Kaplinsky & Morris, 2001, quoted in te Velde et al., 2006). Process upgrading is associated with increases in the efficiency of production processes within or between stages of a value chain. Product upgrading leads to improvement and introduction of products. Functional upgrading changes the mix of activities and functions conducted within the value chain or firm (for example, taking responsibility for marketing and design, improving transactions, and optimal redistribution of activities). Finally, chain upgrading involves moving to a new (presumably more lucrative) value chain.

Jensen (2009) continued the value chain analysis in NTFPs, particularly with respect to agar-wood in Lao PDR, where he looked at the actors involved in different stages from harvesting to retail. He then discussed the patterns and domain of value addition. While he concluded that processing is related to value increase, he failed to study the results after upgrading.

2.2.2 Potential to upgrade a value chain

In a typical value chain, collectors, community firms and exporters gain rather different profits; the exporter always gets the most (te Velde et al., 2006). Value addition at the local level is essential to bring more benefit to the primary producer. Ugrading a value chain can help poor NTFPs collectors, producers, processors and traders increase their share of total process value.

te Velde et al. (2006) studied 10 value chains, finding that processing is a good model to increase value and allow local people to gain more benefit. Their analysis also indicated policies to support commercialization. It showed that collectors, as local people, always get least benefit in this chain while the value to exporters is biggest. Therefore, to ensure better return to primary collectors, local processing is an important factor. This is true both for direct consumption and export markets. With processing, local people get more benefit. Kusters and Belcher (2004) collected studies from 21 cases in Asia to research and document the production—to—consumption system. In this book, many cases showed the importance of post-harvest treatment. For example, in Ba Be, Vietnam, sun-drying cardamom doubled its value. Various forms of processing can also add value and profitability through small-scale producers.

The facts from all these studies prove the important role of value addition in lifting people out of poverty. Although value addition of forest products in general and NTFPs in particular is realized as a potential source of employment and income in industry at national or international levels, local value addition is little considered. NTFPs themselves are often available as de-facto open access resources that can be harvested and used with little processing, using low cost technologies. However, NTFPs can play an important role in lifting people out of poverty by trading. Therefore, development interventions focus on increasing production, sale and capture of value addition (Belcher et al., 2005).

NTFPs collected or produced from forests or cultivated land can be sold in different forms as crude raw materials, improved raw materials or processed raw materials. These sales can occur through different market channels. However, in practice, while the value of NTFPs is large the potential to add significant local value is unrealized. At local level, the implicitly rural focus of NTFPs research has shed little light on extraction and processing of NTFPs (Stoian, 2005). In addition, a survey made by ANSAB (2004) in Nepal shows few local processing and manufacturing industries, with the bulk of NTFPs still leaving the country in raw form. Bhattarai et al. (2003) cited the study of Edward (1996) who found out that NTFPs harvesters receive only 32% of the final price when based on an average for 13 products traded from collection areas in far west, central and east Nepal.

Community control of NTFPs and more equitable returns to their collectors who are the only ones who have a direct impact on resource conservation remains highly underdeveloped at

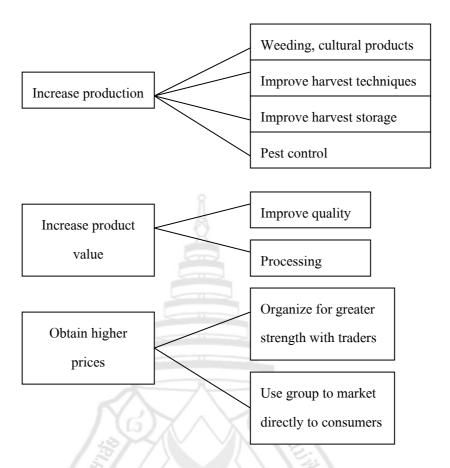
this time. Improved raw materials generally fetch higher prices than crude raw materials; and processed raw materials fetch more than improved raw materials. Improved marketing channels could bring out more value than primitive ones.

Value addition is intended to make the same products more valuable. Therefore, it plays a potentially vital role in the local economy. First, once the products are transformed they can fetch a better price than their crude predecessors. Second, this upgrading process creates employment for local people and helps to uplift their living standards. Employment so generated can add to the income generation opportunities for local people.

2.3 Value addition activities for local people

2.3.1 Value-added forms

Value can be added in a number of ways by increasing efficiency at each stage of the value chain. Improvements to raw materials and to processing are two common examples of value addition that can be done by local communities. These and other forms of value addition are shown in Figure 2.1.



Source. Subedi, 1997

Figure 2.1 Value-added Forms

Value addition at the collector's level is limited due to lack of resources and market knowledge. The extent of collectors' value addition involves cleaning, drying, and sorting of NTFPs, steps that dealers already usually require.

2.3.1.1 Raw materials improvement

When selling raw materials to a trader, a market exists regardless of the quality of the products. Traders typically offer different prices for different grades of materials; the higher the quality, the better the price received. However, quality also affects the characteristics of harvesting – is the supply of this resource remaining sustainable or not? High quality is often important from the point of view of ensuring trade with those partners who demand sustainable performance.

Simple operations such as cleaning and assured grading can add significant value by reducing transportation costs and establishing quality standards in trade. In cleaning, waste materials are separated from raw materials; in grading, the product is divided into grades based on quality as determined by the buyers in the market.

2.3.1.2 Processing

Processing to add value can increase the quantity, diversity and stability of income flows to people living in and near the forest (FAO, 2006) and plays a major role in creating additional employment for the rural poor (Thinh & Percy, 2008). At local levels, processing is an important step to redirect the returns from NTFPs to the people who originated their collection. The processed raw materials are reduced in size and quantity, thus lowering transportation costs. At the same time, processing makes the product many times more valuable. The same quantity of products after processing can fetch far more value than when sold in crude form (Subedi, 1997).

In research by Mahapatra et al. (2005) in India, they mentioned the importance of "value-added" to increase cash income from NTFPs. By selling the final product, households can receive additional income above the value of the raw inputs. In this case study, participating households turned sal leaf into plates, tendu leaf into bidi (with inputs of tobacco from outside producers), and tassar cocoons into lac for shellac. To gain from such value-added production, they needed both labor intensive, traditional processing skills and also marketing skills. Local households studied here have access to these capabilities, enabling them to receive, on average, 16% of their NTFPs cash income from raw and processed lac. Similarly, skilled bidi rollers get much higher incomes than do tendu leaf pluckers. Where bidi-rolling enterprises thrive in a few village clusters, income from bidi averages 50% of their total NTFPs cash income.

In Vietnam's northern mountainous areas medical plants are important NTFPs, not only for household subsistence but also for sale as traditional disease treatment and health care supplements. A case study of bathing medicine in Sapa District by On et al. (2008) proves the role of this NTFP in local livelihood improvement. Value is added first through processing and marketing, then by building brand recognition for this product so that its collectors get direct benefit in both economics and conservation. Bathing medicine is a traditional remedy of the Red Dzao ethnic group, used in their households for many purposes to enhance health. Before undertaking their new model of value addition, local collectors sold herb plants as raw materials

to traders in Sapa Town, who in turn transported the herbs to markets in big cities. For every ton of raw material sold the local community received only 3,000,000 VND. After establishing an integrated company including their own arrangements to transport the product to the big markets, they received nearly 40,000,000 VND. The upgraded approach included raw materials plus valued added community and public welfare services.

To ensure success, they first had to invest labor, land, materials, cash, and other factors. In doing so they were supported by an organization combining four stakeholders: farmers, government officials, scientists, and businessmen. With all those elements, they gained training in sustainable harvesting, medicinal plants cultivation, capacity building, product design, and market access. Although the company model brings many profits to the community, it also challenges the community to provide the needed levels of complicated management. In conclusion, this model can be applied in some specific cases, but given the higher organizational requirements than interest groups or collective action efforts, it often remains quite unfamiliar to and uncomfortable for local people.

2.3.2 Value-added activities through community-based enterprises (CBEs)

2.3.2.1 Overview of CBEs

CBEs organize collectors and producers into a common platform to produce and market value-added products, thereby elevating their participants from subsistence to value-added resource management. Appropriate CBEs structures ensure that producers receive dependable and immediate cash returns for their produce, promote local value addition, and share the profits generated by the business with relevant stakeholders. These activities remove some of the chronic problems like disorganized and secretive supply channels, high-volume and low-return distress sales, and illegal harvesting. In addition to develop long term relationships with buyers, well organized producer enterprises improve the supply of quality raw materials and also command better prices for their produce (Choudhary et al., 2008). Brown and Potess (2008) also identified that well-organized small, medium, and large enterprises based on using NTFPs have the potential to generate economic benefit through local, regional, and international markets.

Following Peredo and Chrisman (2004), a CBE provides a potential strategy for sustainable local development. It reflects a community acting corporately as both entrepreneur and enterprise in pursuit of the common good. The CBE is therefore the result of a process in

which the community acts in a joint and innovative manner to create and operate a new organization embedded in its existing social structure. CBEs are characterized by community skills, a multiplicity of goals (including social, economic, environmental, and cultural goals) and dependence on community participation.

2.3.2.2 The role of CBEs in value addition

Analyzing the value chain, identifying bottlenecks and opportunities, then finding appropriate interventions to increase the value of a community's production are steps that can lead to success and bring benefit to local people. Processing to add value can increase the quantity, diversity and stability of income flows to people living in and near the forest (FAO, 2006).

CBEs can help local people achieve this goal. A study by Choudhary et al. (2008) about medical and aromatic plants in the Greater Himalayan Region showed that 90% of medical plants can be extracted from the wild. Most of the collected plants are exported in raw form with very little processing in their area of origin. Producers and collectors and often disorganized; they have poor access to technology, credit and market information; and have critical disadvantages in terms of quality control and bargaining power. To promote effective commercialization of these products, a CBE was formed to promote local value addition. The new CBE also provided incentives to conserve resources in Chhattisgarh, India, and to establish cooperative endowment funds in West Nepal. The focus here is on quality control, marketing, and mechanisms for local value addition. After selecting 5 species to collect and market out of the initial 11, which were being processed by very crude and mostly non-hygienic methods, they changed their processing a bit to increase the value of their products.

They added value to their products by replacing the earlier practice of using stones to grind Tikhur powder stones with mechanical motorized grinders. This made the grinding process more user-friendly and hygienic. The same approach was taken with *baichandi*; improved machines were introduced to produce clean and uniform sized chips, which are more acceptable in the target markets. Alma is processed in good quality vessels; boiling and drying are conducted under strict hygienic conditions. As a result, product prices as much as doubled in comparison to the pre-project intervention stage. This substantially increased the income of producer groups. In

conclusion, value addition, including semi-processing and processing of raw materials, is a core element of any relevant livelihood improvement strategy.

Institutional mechanisms for local value addition can safeguard the interests of poor collectors and producers. This has been done by setting up self-help groups of selected villagers from within the forest protection committee's members, both males and females. These individuals manage the new medical and aromatic plants processing centers. In order to generate a revolving fund, each member deposits Rupee. 10 per month into the self-help group's funds. Workers in the processing centers are paid based on the quantity of raw materials they process each day.

Another successful case of community-based NTFPs enterprise comes from Thailand. Malva nut is common in Chanthaburi due to the local availability of this tree. Since development of the Thai government's One Tambon One Product (OTOP) policies, which aim to mobilize all available resources to strengthen the grassroots economy, most community enterprises are registered as OTOP groups. Srimongkontip and Dunn (2008) studied the Wan Lueng community enterprise. By introducing malva nut processing, members of an enterprise group can share benefit. The workers, as members, are paid 140-170 baht per day depending on their skills and the length of time they have been in the group. This group has a more communityoriented focus; it tries to employ poor people from local communities. As a result, villagers can earn stable money each month, either as a supplement to their farm income or even as their main source if they are landless. However, to be successful, technical, financial, and marketing support from outside is necessary. To achieve sustainable development as well as ensure the future of the enterprise, harvesting policies and impact aspects are studied to find the best ways to bring the greatest benefit to local people. Success here resides in large part on the well-organized government policy of providing financial support through funding programs such as the Village Fund and the Small and Medium Enterprise Fund.

Bringing benefit to the poor through enterprise development is always each community's actual goal. In fact, typically not all stakeholders involved in NTFPs commercialization processes get equal access and benefit. The poor depend more on NTFPs than do average and better-off households. CARE International studied a bamboo shoots collection project in Cho Don District, Bac Kan Province, Vietnam. Some of the primary collectors, usually

the poorest, sell fresh shoots to primary processors (other households in the community). Other collectors also do their own processing. Then the traders (mostly from the town, plus a few from better-off village households) come to buy the materials for resale to wholesalers in Hanoi. With herbs products, villagers sell the raw materials directly to the market. Transportation and processing activities require investments that are out of reach of the poor. A lack of capital and storage techniques means the poor receive less benefit from the commercialization. For example, villagers sell dried bamboo shoots in the harvest season for low prices. Instead, if they could store these products for sale later in the year, they could receive double the price.

From this view, it is quite clear that improvement of value addition from NTFPs requires enhancement and development of forest use and interest groups for identified products. Initial processing at the primary collector's level through activities such as drying, salting, pickling, and grading would occur once the collectors received the necessary training to maintain quality. These methods/processes help collectors and the poor to become more involved in the value chain and benefit from it. In addition, after processing, the weight of products is reduced, which cuts the costs of transport, storage, packing, etc. (Thinh & Percy, 2008).

Also related to community-based enterprise, in India, there is a project to help people, especially poor tribal people, to get proper prices for the NTFPs that they collect (primarily *mahua*) through exploring the possible value-added options for *mahua* flower and seed. The villagers in this case encountered many problems, storage and value addition being the most important. After studying the business flow to identify the right points to add value, they found the best possible sources of value addition: time utility, form utility and place utility. Time utility focused on harvesting time and price; form utility involved drying, grading, storage, application of preservatives, and preparation of both liquor and edible flowers. Place utility called for them to find markets with greater demand. They set up a micro-enterprise at cluster level as well as a structure for NTFPs business development.

All the above examples lead to the common conclusion that the way to increase direct benefits to the poor from NTFPs is to add value in both primary processing and raw materials management. In Tabhing's case, the first step is to identify the products, then to find the way to add value to get better prices.

2.4 Value addition in the context of biodiversity conservation

2.4.1 Integration of development and conservation

Although NTFPs themselves bring many benefits to rural poor in terms of their livelihoods, understanding the roles of these products in conservation and development initiatives is not yet complete. Outcomes from many studies about the links between development and conservation showed two different perspectives. One view found that NTFPs' trade is not likely to reconcile development with conservation of natural forests (Kusters et al., 2006), or that biodiversity is impacted negatively by markets, leading to unsustainable use and degradation (OECD, 2003). Another viewpoint is that NTFPs can improve natural resources management, leading to conservation of the ecosystem and biodiversity of an area. Unlike most other businesses, NTFPs can be linked to biodiversity conservation by creating economic incentives for local people to conserve while safeguarding their traditional livelihood strategies as well as cultural values (Subedi, 1999).

To reach this link, it is first necessary to recognize NTFPs' potential value. This understanding then inevitably creates a powerful incentive to maintain standing forests and obtain higher prices for the products collected. This requires knowledge of markets and the means to reach them. The foremost factor over time involves conservation of the resource base (both its ecosystem and its biodiversity) from which NTFPs are being harvested. These conservation actions require sustainable harvesting processes and techniques. According to FAO (2006), more and more local people are interested in NTFPs; they have started to domesticate some NTFPs; and some communities have initiated comprehensive sustainable-use systems. In this view, the links between poverty-markets-conservation can be seen clearly in both theory and practice. FAO (2000) has presented methods such as market analysis and development (MA&D) that show this link, in which local people identify potential products and develop markets that will provide income and benefits without degrading the underlying resource base.

This link is just potential, of course; it can be realized only after overcoming tough challenges as well as taking advantage of available opportunities. The meeting *Certification and sustainable marketing of Non-timber forest products* (ANSAB, 2004) was intended to increase income and employment of NTFPs producers and promote sustainable resources management.

Subedi (1999) recommended three options for sustainable NTFPs commercialization in Nepal: conserve and use rich bio-resources sustainably, increase equity in distribution of benefits from their commercial utilization, and pursue overall social and economic development. These actions focus on policy, sustainable resources management and marketing.

Recently, it has been realized that business can play a positive role in biodiversity conservation. The report entitled *Building Biodiversity Business* (Bishop et al., 2008) shows how harnessed market forces can make biodiversity conservation a viable business proposition. They also give a new definition of a biodiversity business, with three components – ecosystems, species and genes – and three objectives – conservation, sustainable use and benefits sharing. In other words, clear links between environment, economics, and social conditions can be generated. As a result, there is growing recognition of the potential to conserve biodiversity as an economic goal. A biodiversity business generates greater motivation to invest more in conservation activities. The business, in turn, invests in biodiversity business in pursuit of profitability that itself depends on biological productivity. In addition, corporate action on biodiversity can help businesses distinguish themselves from competitors while also improving relations with investors, employees, local communities and others.

Several potential sectors emerge in which to develop a biodiversity business (OECD, 2003; Bishop et al., 2008), NTFPs are among them. Specific opportunities include investing in NTFPs enterprises, either a small number of them or a broader "market basket" that promotes best management practices to sustainable harvesting and support for local communities; supporting broader adoption of NTFPs certification; and investing in existing and new small- and medium-sized enterprises (Bishop et al., 2008). Besides supporting NTFPs enterprises with best management practices regarding sustainable harvesting and support for local communities, efforts to address land tenure or NTFPs collectors' access rights will be effective in the long term (IUCN, 2008).

2.4.2 Conservation improvement forms

The purpose of NTFPs trading is to bring benefit directly to local people. In addition, conservation by commercialization hypothesis (Arnold & Pérez, 2001 quoted in Evan, 1993) has led to initiatives to expand and provide markets for NTFPs in order to increase sustainably harvestable wealth in tropical forests. The role of value addition in conservation goes together

with economics. Increased benefit from value addition can create incentives for further biodiversity conservation. In other words, the environment – economic – social link can be generated (Bishop et al., 2008). As a result, there is growing recognition of the economic advantages of conserving biodiversity. From the perspective of conservation, a biodiversity business generates motivation to invest more in conservation activities. From the perspective of business, they invest in biodiversity business due to private profitability that depends in turn on biological productivities.

Opportunities for value addition provide incentive to carry out sustainable harvesting and conserve the forest; this is simply good economics. Establishing enterprises that process NTFPs and link with biodiversity conservation provide more equitable returns to community groups and hence incentives for conserving the resource base on which they increasingly depend for their economic sustenance. When the community realizes its unique role as the core supplier of raw materials for subsequent processing and sale, they become aware of the importance of ecological conservation of those resources and promote such actions to assure a sustainable supply for their ongoing commercial operations (Subedi, 1997). The case study of Humla Oil Pvt. Ltd. in Nepal makes this point. This enterprise was established to capture additional value for the communities that use and maintain the area's natural resources. They provided specific incentives for sustainable harvesting as well as ways to sustain the long term viability of processing actions, thus managing the raw materials and providing greater economic returns to community members who participate in sustainable harvesting groups.

2.4.2.1 Forest land tenure and allocation

A tenure system sets out rules that govern who gets to harvest the resource, where they can harvest, how much they can harvest, and for whose benefit. Thus, the concept of tenure includes both the notion of ownership and a corresponding parcel of user rights (Neumann & Hirsch, 2000). In practice, most cases concern regulating use of either state-owned or communal forest among four types – state, private, communal and open access. Therefore, local people do not have inherent rights to collect NTFPs in such forests. A case study in Jambi Province, Indonesia, as an example, found out that although local communities encounter no problems collecting NTFPs from the forest, their long term property rights over these resources seem to be unclear and insecure. Outsiders can readily use forest resources existing in defined village areas

(Komarudin et al., 2007). As a result, when provided with clear usufruct rights to an area of land, the extractors will have an incentive to maintain resources, dependent on the maintenance of an intact forest. In other words, much literature views security of tenure as a necessary prerequisite to successful NTFPs commercialization (Neumann & Hirsch, 2000).

In Vietnam, forest allocation to give property rights to local people has not yet been completed in all provinces. However, some cases show the success of this policy. In the Ke Go Nature Reserve Area, for example, 70 households have been allocated forest land. They have a formal certificate for these lands giving them certain rights and assigning them certain responsibilities. They must protect, regenerate and plant trees as required reforestation and agro forestry activities; in exchange, they have the right to collect NTFPs here. For this package of actions, they receive money from the government per ha per year for protecting their designated piece of forestland or plantation (Quang, 2004).

2.4.2.2 Domestication/Plantation

Cultivation of NTFPs provides the only sure way to relieve pressure on natural forest stock since NTFPs face such strong commercial demand (Beer, 1996). This study looked at several forms of NTFPs cultivation. Small scale, smallholder cultivation holds out the most promise to benefit rural people. This suggests that the model of cultivation in traditional farming systems should be studied and built upon, including swidden fallow, home gardens or other forms of agroforestry. Swidden fallow is a form of shifting cultivation. A a case in Indonesia showed their practice of planting rattan in swidden immediately following the cultivation period and replanting food crops after 7-15 years. With home gardens, they transplant wild seedling or plant seeds of wild or semi-domesticated stock. Agroforestry offers a different approach. It is a mixture of wild and planted species in communally-owned plots dispersed throughout the forest. In practice, more locally based forest plantation systems do exist but if they are based on questionable assumptions about growth and without a supply of quality seedlings and sufficient extension services, there is a high risk that the projects will fail.

In Vietnam, by 2005, approximately 30 out of 64 provinces had planted and harvested NTFPs using these modern techniques. Recently, planting of NTFPs has developed strongly due to technical guidance from agricultural and forest expansion organizations, especially socio-economic development projects in mountainous areas. Planting NTFPs species

under the forest canopy has been selected as a strategy to preserve forest resources. A case in Lang Son Province of planting a medical plant under the canopy shows the positive impact in both income and conservation. By planting *sa nhan*, a species of medical plant with high demand and value, with ecological characteristics living under the canopy, local farmers involved in generating income from this cultivation would need to protect the forests to ensure the growth of their *sa nhan* crop. This creates a link between forest protection and income generation, and enables an effective way to support farmers in environmental conservation (IUCN, 2008).

Ke Go Nature Reserve Area in Ha Tinh Province gives another project example. Here collecting rattan is an important contributor to the income of local people; this constitutes 30-50% of total local NTFPs income. Because of high exploitation of forest rattan in recent years, villagers now mostly harvest this crop from their gardens. The trend to grow rattan increases year by year. Selected households received support for seedlings, fertilizers, and technique training; criteria for selection were labor availability, land availability and labor skills; priority was given to the poorest families. An average of 100 rattan seedlings were provided to each supported household in 2000; as a result, the supply of rattan increased significantly from 2004 onwards (Quang, 2004).

2.4.2.3 Community-based management

Most NTFPs in the world are harvested by people from rural communities, of whom a significant proportion are indigenous people. Therefore, identifying all the people involved in the entire NTFPs process is important; this includes NTFPs collectors and users in the community, other local NTFPs stakeholders, and NTFPs users and other stakeholders from outside the community (Stockdale, 2005). She also pointed out that the existing community management system covers all its ecological, social, economic and political aspects. She cites as one example a contemporary management system in Central Sulawesi Province, Indonesia. People here worried about whether a commercial species of rattan was being over harvested. Therefore they developed a rule that harvesters should only harvest a stem of this species if a lot of seedlings were already growing close by (de Beer, 2002, quoted in Stockdale, 2005).

In Bhutan, bamboo and cane also play important roles in villagers' NTFPs incomes.

These products have been intensively exploited and thus are now very scarce, particularly cane.

The community in response has adopted several specific practices. These include managing the

forest to ensure a sustainable supply of bamboo and cane; improving bamboo and cane resource conditions through better protection and planting; minimizing over harvesting through application of a regulated harvesting system; distributing the annual harvest from different collection areas equally to all households; generating better income to participating households by improving the quality of the products being offered to the market; and devising an improved marketing strategy under the Community Forest Management Group (Meijboom et al., 2008). They carry out an annual inventory in which they count the total number of bamboo clumps and identify the number that can be harvested that year. Based on the information gathered in the field, the total number of clumps, the amount to be harvested is calculated and then converted into back-loads, a measurement unit that is familiar to the local villagers. They carry out a similar process for cane. They use a participatory scheme to map out the collection area and then stratify the area according to resource abundance and management objectives. In addition, local rules set out ways to ensure proper decision-making processes, transparent fund mobilization, consideration of gender and equity issues, accountability, etc.

2.5 Policies on NTFPs in Vietnam

Until recently, Vietnam has not had any specific legislative framework for its NTFPs. Due to the increasing need to address this issue; policies on NTFPs have now been mentioned in some legal documents.

2.5.1 Policies on forest land allocation

According to regulations stated in the Land Law (2003) and the Forest Protection and Development Law (2004), the state delivers rights for land use and forest use to organizations, households and individuals for long term and sustainable use of these resources. These regulations on assigning and transferring ownership rights among land and forest holders, as well as the policy on renting land and forest areas, have created favorable conditions to form forest products materials use areas, including collection of NTFPs.

2.5.2 Policies related to exploitation of NTFPs

Decision 200-QĐ/KT of the Ministry of Forestry (now Ministry of Agriculture and Rural Development, [MARD]) (dated 31 March 1993) stipulates that all bamboo forests are to be exploited on the basis of selective trees. Mass exploitation of bamboo forests is allowed only in areas where bamboo has massively deteriorated, or if young trees have already been regenerated. Such massive exploitation may only be done at an interval of 2 - 4 years and at an amount from 1/4 - 2/3 of the forest's total number of trees. Bamboo shoots may be harvested at the end of the shoot-bearing period.

Decision 08/2001/TTg promulgated regulations on management of the nation's three types of forests. These rules provide for exploitation and use of these forests. Policies allow the designated forest owner to use NTFPs from protected natural forests and production forests. households receive contracts to care for protected forests. Besides direct benefits from protection contracts, they are also allowed to collect products from thinning forest; minor forest and agricultural products under shade; and flowers, fruits, resins, oils and bamboo. Exploitation of NTFPs from productive natural forests by natural regeneration exempts households from the natural resources tax.

2.5.3 NTFPs in reforestation and forest conservation

The ongoing reforestation effort in Vietnam entered a new phase with launch of the "national five million hectare reforestation program" (1998-2010). The program has been designed and largely implemented by MARD. The current program contains a substantial NTFPs component, covering about 10% (480,000 ha) of the total land area affected with a total investment of 3,620 billion VND.

Ex-situ cultivation of endangered NTFPs species has also shown encouraging results. Growing of thousands of plants of Ngoc Linh ginseng (*Panax vietnamensis*) in Tra Mi District (Quang Nam Province) and *Fokienia hodginsii* species in Sa Pa (Lao Cai Province); and the raising of spotted dear (*Cervus echini*) in Ha Tinh, 500 sambars in Buon Ma Thuat District (Dak Lak Province), and python (*Python molorus*) and crocodiles (*Crocodyle siamensis*) in the Mekong Delta have contributed significantly to local economies of communities around important forest areas.

In-situ cultivation activities also show good examples of communities managing forests to cultivate *Cinnamomum cassia*, *Amomum aromaticum*, and *Illicium verum*. For example, if *A. aromaticum* had not been grown under forest canopies, thousands of hectares of well-grown forests would have been converted into swidden cultivation lands in Lao Cai and Ha Giang Provinces. As a result, it can help both improve living standards of communities and provide them with incentives for conserving forests (to secure their ongoing source of income), thereby integrating conservation and development objectives.

2.6 Lessons learned

This extensive review of articles and studies has shown clearly the important role of NTFPs in the livelihood of local people who live near forests around the world, and has demonstrated the ways in which value addition can increase their income compared to selling the collected raw materials directly. In theory, based on Subedi (1997), value addition has two main types: raw materials improvement and processing. In practice, many successful case studies focus on the ways in which processing at the local level brings benefits to the poor. Community-based enterprises have been identified as a primary model through which to develop a viable NTFPs-based business. However, most value-added cases start from available activities such as post harvesting efforts or simple processing, then adjust and improve them to better match local conditions.

In the case of Tabhing Commune studied in this research, there are at present no value-added activities. Therefore, learning from successful studies has been very necessary. Although no case applies only to post-harvesting or raw materials improvement in value addition activities, this factor will be considered in the research. While some authors see conservation as contrasting with value-added actions, others agree that business creates specific motivations to carry out enhanced conservation. In this research, the author will prove the correctness of the second perspective. Through identifying clear property rights, use rights, and land allocation for domestication/cultivation, conservation and business go together as one. At present in Tabhing Commune, people have not yet received a certificate of forest land that would identify their property rights and sharing benefits, especially how to use available forest resources sustainably

through community-based action. Therefore, the author recommends that a clear forest land allocation policy is necessary in this area.

Policies on NTPFs in Vietnam on the surface cover all relevant topics; however, many limitations still exist. One important gap involves details on sharing benefits among local people through allocation or management. As a result, the extant policy structure does not create optimal conditions for key institutions and social groups to undertake effective forest protection and management. In addition, some policies emphasize strongly environmental protection objectives but have no solution to improve the livelihoods of local people who live near the forest through NTFPs development. In the case of Tabhing Commune, allocation of forest land and user rights to local people has not been implemented. This causes difficulty in sharing benefits and implementing effective management and techniques, along with the lack of activities to improve livelihoods based on NTFPs.

In conclusion, this research focuses on value-added options at local level which have not considered much from literature review articles. They will also contribute the important role to community's livelihood, and integrate biodiversity conservation.

CHAPTER 3

METHODOLOGY

3.1 Study site

3.1.1 Natural conditions

3.1.1.1 Location

Tabhing Commune is one of nine mountainous communes in Nam Giang District, Quang Nam Province. It covers an area of 22,800 ha. Nine villages here have been identified as BCI target villages. Areas neighboring the commune include Dong Giang District to the north, Phuoc Son District and Dak Pring Commune to the south, Thanh My Town and Ca Dy Commune to the east, and Cha Val and Zuoih Communes to the west.

In the research, 4 villages were selected to study since NTFPs are more readily available here compared to the other 5 villages. These villages are Pa Toih, Pa Xua, Vinh, and Za Ra. Figure 3.1 shows the study area.

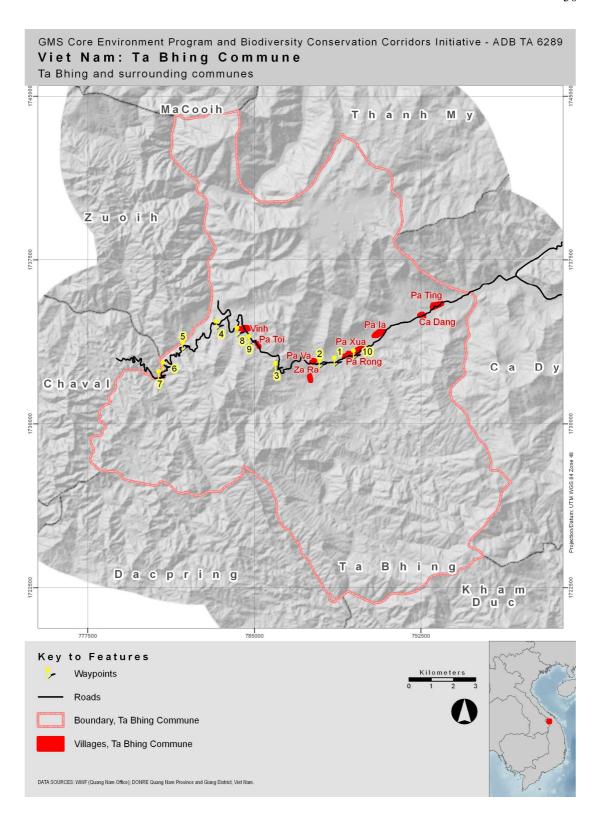


Figure 3.1 Tabhing Commune and the Surrounding Area

3.1.1.2 Climate Conditions

The project area has two main seasons: a rainy season from August to December and a dry season from January to July. Since no meteorology station exists in the pilot site, climate data is based on Song Bung 4 dam station located in nearby Zuoih Commune. Rainfall data has been calculated from 1977 - 2004. The highest mean rainfall is 552 mm in October and least is 19 mm in February.

At the Song Bung 4 dam site daily temperatures were measured in 2003. Data are kept on monthly mean values, together with the highest and lowest recorded daily temperatures each month. According to Mean monthly temperature varies between 19^oC and 28^oC.

Location of Song Bung 4 dam and climate data are presented in Appendix B.

3.1.2 Socio-economic situation

3.1.2.1 Demography

Tabhing Commune has a total of 557 households with a population of about 2,620; thus average household size is 3.5 people. Men account for 50.7% of total population but make up only 43.4% of available labor.

Katu people are the main ethnic group in Tabhing Commune, nearly 90%; other minority groups are Gie Trieng, Hare, and Kinh. Kinh people come from the lowlands and reside in this area to do trading in the community. Population information is presented detail in Table C1 of Appendix C.

3.1.2.2 Livelihood activities

Livelihood activities in Tabhing are quite diverse; they include farm work, livestock husbandry, harvesting of (NTFPs), trading, wage labor, handicraft weaving, and government officer. Among them, all households, from the poor to the well-off group, engage in both farming work and NTFPs harvesting. The percentage of participation in other activities is lower.

While all the villages have the same livelihood activities in general, some differences exist among these four villages with regard to the percentages of households that are active in each activity. In Za Ra Village, for example, some households generate income from traditional handicrafts, whereas households in the other villages do not do so. Although all community households participate in both farming work and NTFPs harvesting, the distribution of each activity is not the same based on wealth ranking. For instance, trading belongs solely to the well-

off group while medium and poor groups perform wage labor work. The poor group does not participate much in livestock husbandry. Moreover, the same percentage of participation in each activity among these groups does not generate the same income. For instance, while all groups participate in farm work but the well-off and medium households get more income from this activity compared with the poor ones.

Comparing between distribution and income from those activities it is clear that, although farming work is certainly the highest percentage, NTFPs bring the villagers the most cash income. However, due to reduced amounts of NTFPs available in recent years, income from this activity has also declined.

Detailed description each livelihood activity is presented in part B of Appendix C.

3.1.2.3 Expenditures

Food is the highest expenditure item for these villagers. Most well-off households can produce enough rice for their own use and plant vegetables in gardens to save money on food expenditures. In contrast, medium and poor groups spend more than 50% of their income for food because they do not grow enough rice for their consumption during the whole year.

To raise livestock, all households use food from nature such as vegetables or agricultural products like corn, or cassava. Cows are just left in the common meadow. Therefore, there is no cost for livestock husbandry. Farming costs here are mostly for industrial plants such as acacia so that well-off and a few medium households are able to buy such items while poor groups just depend on their periodic distribution from the government.

Health is another interesting issue. Although minority group like Katu are eligible to receive free medicine, health insurance and services from the government, serious sickness cannot be cured at the commune clinic. Local residents must go to the hospital in the nearest large town, an event for which they must spend much money. In addition, with the area's rather poor living and sanitary conditions, local people easily get sick, especially the poor. Therefore, the poor expend more money for health services.

3.2 Methodology

3.2.1 Market analysis and development

The market analysis and development (MA&D) methodology developed and promoted by the Food and Agriculture Organization of the United Nations (FAO) provides a framework for planning tree and forest product enterprises. It enables local people to identify potential products and develop markets that will provide income and benefits without degrading their resource base. The focus is mostly on NTFPs. The main strength of the process is its systematic inclusion of social and environmental concerns alongside consideration of relevant technological, commercial and financial aspects of a product. MA&D is a deliberate process that involves changing the attitudes of community members in order to empower them with the skills necessary to control, protect and manage their natural resources and the environment. It also helps communities directly link natural resources management and conservation activities to income-generating opportunities (FAO, 2000).

The MA&D process has three steps:

- 1. Assess existing situation: Learn the livelihood activities of the local community, identify the target group of small entrepreneurs within the community, obtain an overview of the available natural resource and products, define problems and opportunities, and create a shortlist showing the possible range of products.
- Identify products, markets and means of marketing: Gather information to analyze the feasibility of shortlisted products and decide on the most viable enterprises that can be developed.
- 3. Plan enterprises for sustainable development: Organize training to respond to the needs of targeted markets after formulating an enterprise development plan. Implement a pilot phase in which the enterprise is established.

In practice, this process has been implemented in many places to identify potential products, interest groups, and markets and devise appropriate enterprises for sustainable development. In the case of Gambia in 2001 (FAO, 2006), after listing all products and identifying products to be developed, honey was chosen and an enterprise was established. They focused on bee keeping and associated products. Members of the interest group were able to

manage their own hives and reaped substantial benefits. In another case in Bac Kan Province, Vietnam (MARD, 2000), the MA&D process also helped local people identify the right products and increase their value. They selected rattan and honey among the list of NTFPs to develop and started rattan plantations and bee keeping. They also defined their preferred business strategy.

The research reported on in this thesis focused on identifying the existing situation and potential products:

- 1. List the available products and resources: quantity of supply available and quantity sold are two criteria to assess in general.
- 2. Eliminate the non-viable products: based on four aspects together with criteria to eliminate.
- 3. Select the potential products: the highest total score of each product will be selected as a potential product to develop.

3.2.2 Value chain analysis

Value chain analysis was recognized as a methodology tool to identify the relationship between entrepreneur and upgrading ways. Two related approaches are depicted in Figure. 3.2.



Figure 3.2 The General Value Chain System

The value chain analysis in this study comprises three selected products as a result of applying MA&D. The whole chain is analyzed to find out the potential activities that can be implemented at local level to bring the greatest benefit to this area's villagers.

3.2.3 Cost-benefit analysis

Cost-benefit analysis weighs a project's total expected costs against its total expected benefits in order to choose the best or most profitable option. This approach was applied in this

study for the products selected through MA&D. Proposed options to increase value were used to calculate costs and benefits through plantation and processing activities.

To determine the benefits to local people from value-added options, this study used net present value (NPV) as an indicator of how much value an investment or project would add. The result is obtained by subtracting the present value of costs from that of benefits. The NPV is calculated as follows:

$$NPV = \sum_{t=1}^{n} \frac{B_t}{(1+i)^t} - \sum_{t=1}^{n} \frac{C_t}{(1+i)^t}$$

where

 B_t = revenue in year t

 $C_t = cost in year t$

n = number of years being considered

$$t = year t (1, 2, ..., n)$$

i = the discount rate expressed as a decimal fraction

$$\sum_{t=1}^{n}$$
 = the sum of over every from t=1 to t=n

3.2.4 Participatory Rural Appraisal

This method was used to collect information in which the techniques described below were used during data collection.

3.2.4.1 Observation

Each succeeding stakeholder involved in the supply chain was identified from the preceding stakeholder, with the links verified by participant observation. This involved a range of activities including staying, talking and eating with the various stakeholders in the value chain, in their own local settings. Stakeholders included NTFPs harvesters, collectors, traders, processors, and manufacturers. Other local observations included harvesting, management, organization, trading, and planting.

3.2.4.2 Interviews

Interviews were conducted with the full range of people involved in the NTFPs process, from collectors through traders and processors to buyers. The interviews groups were:

- 1. Collectors: choosing random collectors in the four villages. Since almost all villagers participate in NTFPs harvesting, random interviews can bring an unbiased result. In addition, households whose livelihoods were mostly based on NTFPs were identified to get their opinion household interviews were based on a questionnaire.
- 2. Middlemen: Interviews were conducted with all middlemen related to the NTFPs process local people and grocery shop owners (in Tabhing Commune and Thanh My Town).
- 3. Companies: Interviews were conducted with two companies that produce rattan in both semi-processing form and final products in Thanh My Town and Nui Thanh District.

3.2.4.3 Focus group discussion

Focus group discussions were used to get information in general about the current situation and ideas of appropriate value-added activities.

3.2.5 Data collection

3.2.5.1 Secondary data collection

Secondary data used in this study focused on the existing status of NTFPs at both regional and local levels, socioeconomic data, and biodiversity conservation activities related to NTFPs.

Data were collected from a wide range of sources, including case studies and definitions of authors through books, scientific articles, conference proceedings, etc. (sources of this information were internet and libraries).

We also contacted with experts in this field to get their comments as well as the right information. Arrange and select related information in literature collection. Read through all articles and concentrate on summary or introduction part to see the main of the research.

Analysis: From the selected information, summarize the useful ideas for literature review and give comments. Based on available research, find out the gaps or potential improvement can be applied in this study.

3.2.5.2 Empirical data collection

Using PRA was used to collect primary data. Sampling calculations were applied to household interviews in 4 of the 9 villages in Tabhing Commune: (Pa Toih, Pa Xua, Vinh, and Za Ra). The sampling is estimated in the following Yamane formula:

$$n = \frac{N}{1 + Ne^2} \qquad \begin{cases} n : \text{Number of sample} \\ N : \text{Total number of HHs} \\ e : \text{Probability of error} \end{cases}$$

With e = 10% (at 90% confidence level)

Total of 160 households was selected for interviews with time for field survey from June to October, 2009. Among those 160 households, Pa Xua accounts 102, Za Ra accounts 54, Pa Toih accounts 28, and Vinh accounts 112.

Data analysis: Using both quantitative and qualitative analysis. Excel spreadsheets were used to analyze data from the interviews, group discussions, etc. All raw data from interviews and discussions, combined with field observations and secondary data were organized and explained. As a result, recommendations, suggestions and solutions were set out to solve the problem and achieve the objective as well as output of the topic.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Current situation of NTFPs in Tabhing Commune

4.1.1 Overview of NTFPs in Tabhing Commune

This part shows briefly the characteristics of popular NTFPs in Tabhing Commune. Specific topics covered include harvesting calendar, market prices at the local level, purpose of harvesting and market information. Among all products, rattan, malva nut, broom grass, lansat, banana flower, honey and wildlife are described in more detail than others since their contributions to income are the largest.

4.1.1.1 Rattan

The villagers here have harvested rattan since about 1990, making it the main income source among all non-timber products. Villagers sell the raw materials that they collect to middlemen or processing companies. Most middlemen are Kinh people who own grocery shops; only two middlemen in Vinh Village are local people. Villagers who collect rattan all pay a fee to the village fund based on the amount of rattan collected: 50,000 VND/1,000 stems.

Rattan is not a seasonal product; it can be harvested all year round. However, January and February comprise the high season for rattan collecting. This time coincides with the New Year holiday (Tet), for which villagers need to earn as much money as possible to spend on this big event and to repay their debts to local store owners. In addition, at this time most villagers are free from farm work, and therefore having more time to collect rattan from the forest.

Market prices for rattan have declined in recent years. Together with the shorter stems being collected, this has reduced income from 1,500 to 2,000 VND/stem to only 1,000 VND/stem last season.

4.1.1.2 Malva nut

This NTFP has a high value; villagers receive about 30,000 to 70,000 VND/kg when they sell it to the middlemen. The final market price of malva nut is much higher, of course. This product is collected during July and August, both from the buffer zone area and the core zone of the nature reserve. The villagers harvest these nuts only once every three years, but they do so in an unsustainable way, chopping down the entire tree because the nuts are high up and difficult to get at without cutting.

All the villagers complain that nowadays the quantity of malva nuts has decreased due to such unsustainable harvesting practices. In addition, outsiders come in and harvest these trees not only for their fruits but also for timber.

4.1.1.3 Broom grass

Almost all household members (even children) harvest broom grass (a kind of grass) from early January to the middle of March. Most of these materials are sold, the rest are for their own home use. It is not necessary to seek broom grass in the core zone of the protected area as it is most common in the buffer zone, especially on the edges of clearings and shifting cultivation plots.

Of all the NTFPs, broom grass appears to offer the greatest opportunity to help villagers increase its value through simple processing. Currently broom grass is sold to middlemen without processing at 1,200 to 1,500 VND/kg. In addition, 2 or 3 villagers produce brooms for sale, making much higher income by doing so. This is a potential sub-occupation for villagers to increase their income.

4.1.1.4 Lansat

Lansat is considered a special good in the mountain areas of Quang Nam; its collection represents another component of villagers' income. The price is about 5,000 VND/kg. This NTFP is harvested in September and October. As with broom grass, the quantity has been decreasing year by year. In response, nowadays some households plant lansat in their gardens.

4.1.1.5 Banana flower

All families collect banana flowers when they are working with shifting cultivation. Most are for sale, with the rest for consumption. At times, households just collect a basket of banana flowers which they show along the street where outsiders from Thanh My Town can buy

them at a cheap price of about 5,000 VND/flower. Some villagers cut down banana trees to collect their flowers, thereby reducing the number of banana flowers in the future. Awareness raising would be the best option to develop sustainable use of available sources of this NTFP.

4.1.1.6 Honey

Collection and sale of wild honey is an important source of income (for some but not for all households). Its livelihood contribution has been declining, however, as the abundance of bees has dropped every year. About 30% of households collects wild honey. They can sell this product for as much as 200,000 VND per liter, more than twice the price paid for commercially produced honey in Vietnam. In the past, it was apparently common to harvest as much as 25 kg of honey from one nest. Nowadays, only 1 to 5 kg is found per nest. The amount of honey has been significantly reduced as collectors have increased in number and the forest has been destroyed. As a result, the price of wild honey has risen.

4.1.1.7 Wildlife (hunting and trapping)

Outsiders from another province or region are responsible for most of the illegal hunting in this area. They typically hire local villagers to work for them. The local workers live in the forest, trap the wild animals, and then provide them to the outsiders for cash. Villagers see this as easier work than farming, yet generating more money. In addition, some wild animal parts are sold in local grocery shops, with the rest transported to other areas such as Da Nang city where they bring a high price in the market.

Although this illegal activity takes place in the nature forest, the small ranger force cannot control it adequately. However, sometimes villagers trap animals in their upland fields and get some money from this activity. In addition, they trap wild animals for their own consumption.

4.1.1.8 Other products

Ta vac trees grow naturally in river valleys, mountain forests, and even in degraded forests. The liquid from this tree is made a lightly alcoholic drink and sold for 5,000 VND/l. Ta vac is usually harvested every day, in the right season, at a rate of 2 to 5 liters per day per tree. The total amount of ta vac wine made is just enough for household consumption and sale within the village. Mushrooms are collected by chance when villagers enter the forest and see them. Other forest products such as bamboo, vegetables, and firewood are mostly used for their own consumption while fish or fan palm leaf contributes a small in local income.

4.1.2 Income from NTFPs

NTFPs harvesting plays an important role in the livelihood of local people in Tabhing Commune. Indeed, it is considered the second-most important source after agriculture, contributing about 30% to 35% of household income. However, over time the contribution to income from NTFPs has been declining.

Although local people harvest many kinds of NTFPs for both subsistence and sale, their products for sale are quite limited. Table 4.1 shows main NTFPs and average income of each household.

Rattan is certainly the most important product, one in which the villagers remain interested in harvesting. Demand for rattan remains high to make handicraft products for export, so traders are asking villagers to collect more and more. This provides an incentive for local people to harvest more rattan, and encourages some of them to do so unsustainably. Lansat and malva nut also make rather high contributions to local income. These two products are not available everywhere, and remain in limited quantities, so they bring a high price. While lansat is harvested from the forest and villagers' home gardens, malva nut is just collected from nature. Recognizing the value of these three products, domesticated and plantation lansat and rattan are starting in Tabhing Commune while malva nut is in danger now from unsustainable harvesting.

Broom grass, banana flowers, honey, and wild animals are secondary income components. Others like bamboo shoots, vegetables, fish, fuel wood, and bamboo mainly contribute to local people's subsistence - some as food and some as necessary daily materials. In other words, NTFPs harvesting is a major activity of local people living near the forest like in Tabhing Commune.

Current income distribution of NTFPs can be changed in the future with an intervention to improve the value of potential products through locally suitable value addition forms.

Table 4.1 Annual HH Income from NTFPs

Product (Unit)	Quantity	Price (VND) per unit	Average HH	Percentage of Cash
		at local level	income (VND)	Income (%)
Rattan (stems)	1,250	1,200	1,500,000	30
Lansat (kg)	220	5,000	1,110,000	22
Malva nut (kg)	15	60,000	900,000	18
Broom grass (kg)	270	1,500	405,000	8
Wild animals ¹			430,000	8
Honey (1)	1.5	200,000	300,000	6
Banana flower	3	50,000	150,000	3
(basket)				
Others ²			250,000	5
	Total	2//	5,045,000	100

4.1.3 Current value-added situation in Tabhing Commune

4.1.3.1 General information

In Tabhing Commune, local people are to some extent able to add value to three of the products that they collect and sell (beyond simply selling raw materials directly to middlemen): rattan, broom grass, and ta vac. However, the extent of value addition presently remains very limited. Most such activity occurs at present to create products for use in their own households.

Among the households interviewed, 29% know how to make brooms; but most simply stop at the most basic level, drying the broom grass and tie the stems together to make a sweeping broom. Only 10% of the households can make a true broom, and only two men in Za Ra Village make high-quality brooms for sale to grocery shops or households within the commune. However, these two men do not make enough brooms to meet demand in the commune as a whole. Both of

¹ Wild animals here is general for all species

² Others here include mushroom, ta vac, fuel wood, bamboo, fish, and fan-palm leaf

them are old and make brooms primarily to keep themselves occupied, so they don't get bored. Sometimes they just give the new brooms to their relatives as a present rather than selling them.

Many other handicraft products can be made from rattan. These include many kinds of baskets such back baskets, large and flat baskets, etc, all of which villagers use daily to carry and store different kinds of agricultural products. An average of 23% of households interviewed in the 4 villages reported that they know how to make such rattan baskets, but only 3 or 4 households presently make them for sale. Selling prices are often high, but at least the villagers who buy these baskets can use them for a long time. Most often this work is done by old persons. Tourists are most interested in buying back baskets as an attractive souvenir of relatively small size. In the Highlands of Vietnam making such baskets offers a potential opportunity to maintain the culture of minority ethnic groups while generating some additional income.

Finally, we note that local people (especially the Katu) make wine from ta vac trees. About half of this product is made for their own consumption and the rest for sale to other villagers at about 5,000 VND/l. About 15% of households know how to make this wine, with average production of 5 liters per day. This wine is especially popular in festivals and other special occasions. It can be considered a potential product in the market. However, it can be stored only for short periods of time (up to about 2 days if kept in a refrigerator). Otherwise its quality does not remain.

With respect to raw materials improvement, in recent years local people have started to plant lansat and rattan in their home gardens and in the forest. Some government development projects have supported this action.

4.1.3.2 Reasons to sell raw materials direct to middlemen

Besides this small amount of value-added activities, villagers all sell to middlemen the NTFPs items they collect solely as raw materials. Local people give six reasons for continuing to do so even though they realize that they could make much more money if they added value first prior to sale.

"No instruction" is by far the main reason given for their present lack of value-added action (nearly 50% of the total). Other important reasons are inadequate finance and not enough time. Although NTFPs harvesting accounts for 30%-35% of their income, local people still considered it as a supplemental occupation on top of their agricultural activities. These are all seasonal products, not available throughout the year. Their approach is to always simply sell the

raw materials they collect directly to middlemen to get immediate money to repay their ongoing debts. Together with their generally difficult lives and their traditional customs, these villagers are focused on fresh cash to pay their debts. In addition, their limited knowledge and tight finances restrict them from taking any higher step in post-harvesting, processing, or marketing to increase the value of the products they collect. Overcoming these constraints requires outside support. In the common idiom, they need not only a fishing rod and bait but also improved fishing technique to catch the larger and higher value fish.

As noted above, the absence of instruction from outsiders is the dominant reason pointed to by households in the interviews; in contrast, lack of interest was just 13%. Nevertheless, this factor plays an important role in encouraging people to participate in value-added activity. Also, many people in group discussions pointed out that local people prefer farming work to creating a new product or new process. They explained that farming is their traditional work; that they are afraid of new things without knowing results in advance. Furthermore, choosing the simplest work is the dominant theme in their lives. In this sense, selling raw materials is easier than adding one or more steps, even if these steps would add considerable value and income. To improve their livelihoods, encouraging them to participate in this activity is very important initial step.

Having enough time is also a factor noted in the household interviews. Diversified livelihood activities occupy them the whole year to earn money. Finding time to join a new activity is quite difficult for them; especially if they are not confident about the benefit of these new value-added activities. However, based on daily routine observations of local people through this village research, time is indeed available to them for new activities. It seems evident that women do more work than do men, both farm work to housework. Therefore, arranging appropriate time and distributing work more equitably are important to help them recognize the role of value addition for the NTFPs that they collect.

In conclusion, value-added activities in Tabhing Commune today focus exclusively on personal use and limited in commune sales. However, this does provide a basic building block on which to orient potential activities to increase the value of products and income of local people. The figure illustrated these perceptions of local people is presented in Figure D1 of Appendix D.

4.1.3.3 Difficulties in adding value to NTFPs

Given their current lack of experience with value-added activities for the NTFPs that they now collect and sell as raw materials, local people worry about many aspects of the proposed process. Their concerns range over technique, finance, time, management, market availability, interest, and policy. Among all these concerns, technique and market are the two issues to which the most attention needs to be paid. Training villagers in a new concept is never easy, especially for indigenous people who start with limited knowledge and awareness. Given this reality, the initial challenge is how to select appropriate techniques for the training. In addition, knowing the market for potential products plays an important role in adding value. The figure illustrated these perceptions of local people is presented in Figure D2 of Appendix D.

4.1.3.4 Advantages in adding value to NTFPs

Although some difficulties are certainly evident in pursuing value-addition activities, there are also some advantages on which one can develop such an intervention. Results from household interview showed that, the most important factor is that raw materials are generally available in Tabhing Commune (74%) and second advantage is the existing skills of local people which accounted 22%. Time is also a factor. The main obstacle is that local villagers do not yet know how to improve these raw materials to increase their market value. Field observations and data collected show that not all raw materials are highly available. Therefore, the first step is to identify the potential products for which value can be added, and to increase the raw materials sources associated with these items.

As mentioned above, some households in Tabhing Commune already can produce some NTFPs-based products for daily use, and some of them can even do so quite well in terms of quality and market attractiveness. This factor provides the base to decide on the next step. While time availability is seen as a constraint today by many villagers, once the process gets underway people will find that they can indeed allocate effort to this goal. Intrinsically, they have enough time to do so. In addition, many of the value-added activities requiring processing may be limited to a small subset of people, such as women or the elderly, who can certainly manage to find the time to join in once the new value-added activities attract them.

4.1.3.5 Perceived benefit from local people

Although there are many different ideas as well as challenges in value-added intervention, a large proportion of the villagers explicitly recognize the potential benefit from this activity. Fully 74% of households think that they could get more income from such an effort. Only 15% do not care and have no idea about this process, preferring to continue to focus on farming work with which they are already familiar. For them, when a new option comes along, it is difficult for them to adapt. Another reason is that some of them do not yet recognize the long term benefits from value addition.

When asking local people about their willingness to participate in value-added activities, 72% answered yes, 18% said no, and 10% were hesitant to decide. Once a serious intervention was to begin, individual households can decide whether to spend 1, 2, 3, 4 days or all week joining in. Others will decide later when they see the positive results starting to emerge.

4.1.4 NTFPs in the context of biodiversity conservation

The NTFPs mentioned here include rattan, broom grass, banana flower, honey, lansat, and malva nut. The results from group discussion showed that rattan and malva nut with strong decrease in term of quantity and quality. While other products keep the same quality, only light change in quantity. The detail about harvesting change in term of time, quantity, and quality together with information about harvester, harvesting technique and key constraints were also collected and presented in Table B2 of Appendix D.

4.1.4.1 Reduction in both quality and quantity

In general both quality and quantity of NTFPs here have diminished year by year; reasons are set out detail in Table D3 of Appendix D. Within this overall situation, high value products such as malva nut and rattan have been reduced most sharply, while broom grass has remained the same or has just slightly diminished.

Three main reasons lie behind quantity reduction: overharvesting (nearly half) plus reduced market needs and unsustainable collection practices. Local people admit that over harvesting is the major reason; however, in their opinion the overharvesting is largely the fault of outsiders. Traders from the lowlands hire people (not local people) to come to the area to harvest NTFPs. The traders pay these collectors based on the amount they collect. These outsiders often

stay in the forest for from a few weeks up to two months. In addition, the traders provide them with machines and techniques to harvest products with no concern whatsoever for sustainability. Since forest land is open access, they can enter it freely. The traders just pay tax to the villages where they harvest and to the district.

Given the lack of competent forest management in these areas and free access to them, unsustainable collection easily happens, accounting for 20% of the cause as reported in interviews.

These factors, although separate, link together through the interplay of demand and supply. When market needs increase, local people will harvest more and more without any external control, resulting in unsustainable harvesting. The new generation of plants has no time to recover and thus quantity diminishes.

In fact, it is difficult to separate the reasons behind reductions in quantity and quality of NTFPs since they are so closely linked, as cause and effect. However, the local people admit that collectors' lack of awareness is the main reason, accounting for 48% of responses. Not only outsiders but also the villagers themselves lack awareness in harvesting. Competition is another important factor. Local people are convinced that if they do not harvest as much as they can, others will do so. As a result, they harvest as much as they can without caring about the quality; for instance, rattan has dropped from 5-meter length in the past to 2 to 3 meters at present; and malva nuts are now being harvested green instead of what was done in the past, when only the ripe nuts were taken.

Two other factors, collection methods and traders not caring about quality, are of secondary significance. The harvesting technique being used is very important in changing quality. People find ways to harvest many NTFPs in a short time; for instance, using a machine saw to chop down a malva nut tree instead of picking off the nuts, or breaking the broom grass. Seeing the benefit immediately, others compete to take the same approach. In addition, traders have become less demanding in selecting products to buy, accepting short rattan stems and green malva nuts.

These many overlapping causes of unsustainable harvesting make the role of local management (or its absence) clearly important. Lacking a management mechanism seems very important to an outside observer.

4.1.4.2 Management mechanisms

Development and National Assembly Law of Forest Protection and Development No. 29/2004/QH11 both allow collection of NTFPs from the forest, with the exception of valuable and rare species and wild animals. However, until now even at the national level, there is no clear overall scheme regarding NTPF collection. No organization has yet investigated, identified and classified collection efforts to make them easier in terms of management. That is, to date exploitation of NTFPs, their production and related biodiversity considerations have not been institutionalized.

In Tabhing Commune, local people collect NTFPs from two forest areas. One belongs to the Song Thanh Nature Reserve and the other to the commune. Here as in similar areas all over the country, the absence of quantifiable information (from inventories or biometric surveys or any kind) on remaining forest resources masks the risks that key resources are about to disappear and makes it difficult if not impossible to devise any sort of local sustainable management plan. Although Tabhing Commune is located right near the Song Thanh Nature Reserve, NTFPs management is not an assigned duty of Reserve officials. They focus solely on forest protection and on preventing illegal timber and wild animal exploiting. No organization or office of any kind is responsible for NTFPs management officially.

Based on applicable laws and regulations, people can harvest NTFPs (except special valuable and rare species) to enhance their livelihoods. In practice, of course, people do not care much about the law when they can benefit from a particular course of action. Moreover, it is not only local people who can access the forest; others from many communes or provinces and districts can also come in to gather NTFPs as they wish. Local communities have insufficient power (social, economic, political or legal) to stop outsiders from carrying out legal and even illegal activities. The fact that the forest is being so obviously stripped by outsiders inevitably generates a local mindset that if others are over-exploiting on such a large scale, they might as well benefit also. Communities rightly assess that the main damage to their local forest is being done by large-scale external illegal activities. Even if they practice local collection constraints themselves, forest resources will still continue to be depleted and they will lose out economically while others get rich. This thinking supports the rapid declines in both the quality and quantity.

The outsiders' only contributions to economic of local economic welfare are the taxes they pay to the village development fund, Commune People's Committee, District People's Committee, District Tax Office and Management Board of Song Thanh Nature Reserve. However, only rattan harvesting is being managed (to some degree) through the fees collected (see Table D1 of Appendix D). Malva nut collection is affected seriously by outsiders but no mechanisms exist to control this problem.

Community-based management is to improve forest protection in general and NFTPs' collection in particular remains weak in Tabhing Commune. In terms of NTFPs trading, local people (Katu in the villages and grocery shops run by Kinh people) also participate in trading by buying NTFPs from villagers in their village. Eight middlemen purchase rattan and broom grass in the four survey villages. In Vinh Village two rattan middlemen have agreements in place under which local villagers sell products only to them; these collectors are not allowed to sell to any other middlemen. These middlemen have to pay a fee to the village fund. Normally, they pay 50,000 VND to the village fund for each 1,000 rattan stems and 10,000 VND per each 100 kg of broom grass bought.

Well-developed forest protection activities like the MOSAIC project implemented by WWF incorporate a regulation to strengthen forest protection, management, sustainable use and development of forest resources through enforcement of local village rules. Tabhing in the past had active Village Patrol Teams responsible for patrolling in the forest weekly along with officers from the commune or rangers from Song Thanh Natural Reserve to pursue illegal activities. Members of this team were to receive support from projects and government policies when forest land was being allocated to local people for self-management. However, the members of this team now are not interested in this work anymore due to its sponsor dropping the project. Vinh Village, for instance, does not maintain this group any more. In the other villages the teams still formally exist but weak management is evident. The local regulation also had language about ways to collect forest resources, including all kinds of NTFPs. All villagers agreed to this idea and signed on to that regulation. However, in reality, they do not implement those requirements and no one follows up to check and punish the violators.

4.1.4.3 Plantation/domestication of NTFPs

NTFPs plantations were started in this area about 3 or 4 years ago. In one case, this idea was initiated by an NGO; in another case the villagers themselves did so in response to recognition of the value of the NTFPs.

In 2007, IUCN supported a project to develop a new rattan plantation in Pa Rong and Vinh Villages. Also in early 2009, the BCI project supported planting 50,000 rattan shoots. However, for several reasons the results have not been very successful. At the start up stage, they chose the species named *May nep (Calamus tetradactylus)*, then trained the farmers in correct planting techniques. However, the villagers decided not to attend this course to its conclusion, largely because they did not recognize the role of training course. In addition, during the planting stage no one from the NGO followed up to supervise. As a result, rattan grew very slowly and only 40% of the plants lived. The clear lesson here is that projects like this cannot stand alone, the awareness and involvement of local people are critical to their success. As long as the villagers are interested in planting, they will take care and learn from experience to get the best results.

Lansat and malva nut are also currently planted. In the past lansat was planted in a few places, especially in a common area in Vinh Village 30 or so years ago. Presently villagers here are able to inherit the results from their previous generation, with different households getting fruit from different amounts of plants. Having seen the potential, in 2006 they planted more trees. In this sense, lansat interests the local villagers more than the other species. About 10 households started to plant malva nut from 2007 with seedlings from the forest. The number of these malva nut plants remaining (60%) is higher for rattan and lansat.

These current plantations can be a basic step for further study. Among these three kinds of NTFPs, local people prefer lansat most, the next is rattan and malva nut is the last. To most villagers, lansat is easy to harvest and get more income than rattan and malva nut takes a longer time to produce the first harvest. Although local people have started planting some species of NTFPs in their home gardens, rattan has received the most attention from outside NGO projects. Since Quang Nam Province in general is proposed as a main source of supply of rattan to the market, many programs and projects have focused on this species. Rattan is identified as specific species, but just started with home garden model. Deeper study about the potential of other kinds of rattan under the canopy is examined in the main study and result.

4.2 Analysis of potential value-added activities

4.2.1 Identification of potential products

The purpose of this step is to develop a list of existing resources and products from which products will be selected in the MA&D process. Details of the quantity supply available and quantity demand of available NTFPs in Tabhing Commune are provided in Table 4.2.

Table 4.2 Available Quantity Supply and Quantity Demand of NTFPs in Tabhing Commune

Products	roducts Quantity supply			Quantity demand					
	High	Moderate	Limited	High	Moderate	Limited			
Rattan			X	X					
Broom grass	X			X					
Banana flower		x				X			
Honey	120		x	X					
Lansat	\$ x		7 / /	X					
Malva nut			x	$\frac{\partial}{\partial x}$					
Ta vac		x		X					
Palm leaves		x				X			
Wild animal		x		\mathbf{x}					
Fish			X			X			
Mushroom			X	X					
Fuel wood	X	X				X			
Orchid			x			X			
Bamboo		X				X			
Bamboo shot	X					X			
Vegetable			x			X			
Medical plant			X			X			

Information was gathered through observation and direct interviews with local people, especially through focus group discussions with local informants such as collectors and middlemen. The results showed that most high demand products faced supply shortage problems, particularly rattan, honey, malva nuts, and mushrooms. In contrast, products such as broom grass have the potential to be developed to create both high demand and high supply.

The next step is to eliminate those that do not meet one or more criteria, as shown in Table 4.3. Elimination criteria fell into four basic categories:

- i. Market/Economy: Low market demand.
- ii. Resources management/Environmental: Unsustainable harvesting.
- iii. Social/Institutional: Policy and legislation do not allow the product to be legally collected. In Vietnam, wild animals have good potential market. However, government policy does not allow communities to collect them from the forest, and therefore these products cannot be considered for future development. No one should be encouraged to collect an illegal product, even if the laws or regulations are not effectively enforced
- iv. Technical/Scientific: Requires a level of expertise or equipment that is not available locally.

In addition, the shortlist of potential products is also identified in Table 4.4. Mostly they are high market demand in Market/Economy criterion and have potential for further study in other criteria such Resource management/Environment, Social/Institutional, and Technique/Science.

Based on the criteria identified above, palm leaves, wild animals, fish, mushrooms, fuel wood, bamboo, bamboo shoots, vegetables, and medical plants have been eliminated. The main reasons for elimination are low market value and risk of depletion. The policy bans collection of wild animals in the forest even though they have high market value. The products remaining all have high market demand. Although some products such as rattan or lansat face high depletion, they can be planted or domesticated in home gardens or in the forest.

 Table 4.3 Elimination of Non Viable Products in Tabhing Commune

Criteria for elimination, or area where more information is needed							
Products	Market/	Resource	Social/	Technique/Science			
Froducts	Economy management/ Environment		Institutional				
Palm		Rare					
leaves		2					
Wild		Depleted	Banned				
animal							
Fish	No market	Depleted	No income for				
			self sufficiency				
Mushroom		Rare		No plantation			
Fuel wood	5	Risk of depletion	Kin				
Bamboo	No market	Rare, depleted	YE.\				
Bamboo	Low market		131	Additional			
shot	value		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	investigation required			
Vegetable	WI	Rare	No income for				
	(10)		self sufficiency				
Medical	1	Rare	No income for				
plant	7		self sufficiency				

Table 4.4 Shortlist of potential products

	Criteria for further study					
Products	Market/ Economy	Resource management/ Environment	Social/Institutional	Technique/ Science		
Rattan	High market demand	Potential for new plantation	Potential for higher income and job creation	Potential for processing		
Broom grass	High demand		Potential for higher income and job creation	Potential for processing		
Banana	Potential for higher market demand					
Honey	High market demand		VCBN CHI	Potential for bee keeping		
Lansat	High market demand	Potential for new plantation				
Malva nut	High demand	Potential for new plantation	37			
Ta vac				Potential for longer shelf life		

These products were then taken to the next stage of analysis to identify the most promising ones for intervention. The assessment was by local people opinions in group discussions and based on criteria used and available scores as presented detail in Table 4.5.

Discussions were conducted with village groups to instruct them on how to score each element, with the results in Table 4.6 indicating the most promising products for further study.

 Table 4.5 Criteria for Scoring of Products

Criteria	Scale				
MARKET/ECONOMIC					
Raw material supply	Large: 3, Moderate: 2, Limited: 1				
Market potential	Large: 3, Moderate: 2, Limited: 1				
Competition (for finding a market niche)	Weak: 3, Moderate: 2, Strong: 1				
Constraints to business entry (market channels,	High: 3, Moderate: 2, Low: 1				
policies expertise, financial needs)					
RESOURCE MANAGEMENT/ENVIRONMEN	NT				
Availability (in time): seasonality	Almost always: 3, Occasionally: 2,				
	Rarely/seasonally: 1				
Availability (in space): time needed to find and	Widespread: 3, Moderate: 2, Rare: 1				
harvest					
Regenerative potential	High: 3, Moderate: 2, Low: 1				
Impact of harvesting on survival of the species	Positive: 3, Neutral: 2, Negative: 1				
SOCIAL/INSTITUTIONAL					
Indirect benefits for the community	High: 3, Moderate: 2, Limited: 1				
Contribute to income	High: 4, Moderate: 2, Low: 0				
Potential for creating employment	High: 4, Moderate: 2, Low: 0				
Gender impact	Women: 3, Both men and women: 2, Only				
	men: 1				
TECHNIQUE/SCIENCE					
Human resources/skills expertise	Available: 3, Moderate: 2, Limited: 1				
Human resources/Number	Available: 3, Moderate: 2, Limited: 1				
Infrastructure status	High: 3, Moderate: 2, Low: 1				
Processing location	Village: 3, District: 2, Province: 1				

Source. FAO, 2000

 Table 4.6 Comparison Score of the Different Products in Tabhing Commune Products

	Criteria -		Products							
	Criteria	A	В	C	D	E	F	G	Н	
Market/	Raw materials supply	3	2	3	2	1	1	3	2	
Economy	Market potential	3	3	3	1	3	3	2	3	
	Competition	1	1	1	3	3	1	3	1	
	Constraints to business entry	2	2	2	3	3		2	2	
Resource	Availability (in time):	2	3	2	1	2	3	3	1	
management/	seasonality									
Environment	Availability (in space): time to	2	3	2	2	1	3	3	1	
	find and harvest									
	Regenerative potential	3	2	2	2	1	2	3	1	
	Impact of harvesting on survival	3	3	3	3	3	3	3	1	
	of the species									
Social/	Indirect benefits for the	3	3	3	3	3	3	3	3	
Institutional	community			793						
	Contribute to income	2	3	3	0	0	0	2	2	
	Potential for creating	2	0	0	2	0	0	0	0	
	employment									
	Gender impact	3	3	43	3	1	2	1	1	
Technique/	Human resources/skills expertise	2	1	1	1	1		3	1	
Science	Human resources/Number	3	3	3	3	3	3		3	
	Infrastructure status	3	3	3	3	3	3	3	3	
	Processing location	3	3	3	3	3	3	3	3	
	Total	40	38	37	35	31	30	30	28	

Note. Broom grass (A), Rattan (B), Lansat (C), Bamboo shot (D), Honey (E), Banana flower (F), Ta vac (G), and Malva nut (H)

Based on criteria in the four areas above, three potential products received the highest scores: rattan, broom grass, and lansat. Although bamboo shoots ranked fourth with a score similar to lansat, it received low scores in both market and resources management. The high market demand for honey cannot be a good enough reason to select this product since other factors such as resources management and social impact were not strong points.

Given these limitations, only the three highest scoring products were chosen. All three have high market demand and offer potential ways to maintain and increase both their quality and quantity. Lansat and rattan can be planted as a way to add value while broom grass can be made into brooms as a final product. The result also reflects the current value-added situation offering a base on which to build. Lansat and rattan now have basic and potential activities to improve quantity and quality as a way to bring more benefit. Broom grass is used for broom making at some households.

The final step is to study the three selected products' value chains, from harvesting to consumption in order to choose the most appropriate value addition methods.

4.2.2 Value chain analysis of selected products in Tabhing Commune

4.2.3.1 Rattan value chain

1. Harvesters/Planters

About 90% of households in Tabhing Commune harvest rattan during the high season in January and February. The Kinh households are the exception; their main occupations are government officers, teachers or shop owners. Rattan harvest involves both males and females, with different gender roles in the harvesting process. Men generally use machetes to clear the forests to find rattan, while women concentrate on cutting the rattan stems. Men then carry the cut rattan out of the forest. Exploitation of natural resources is done by outsiders as well as by local villagers. On average, one harvester collects about 30-40 *Calmus armarus* species stems per day, earning about 30,000-40,000 VND/day. However, when compared to the past, harvesters have to spend more time in the forest in order to obtain the same amount of stems due to depletion of rattan over time. About 10% of village collectors stay in the forest from a few days to 2 weeks to collect rattan, as opposed to staying there only 2 to 3 days 10 years ago.

In general, collectors who are not from local villages require permits to harvest rattan, but these rules are often flexible. For instance, a few trading companies or shops in Nam

Giang have hired Hre people from Quang Ngai Province to collect rattan from the forest. This has resulted in depletion of young rattan that is less than 4 meters tall. Hired collectors usually spend long periods of time in the forest and are paid wages by traders after their harvesting has been completed.

In recent years, villagers have also started to plant rattan. However, in general, this activity is quite new and has not to date produced good results, but does contain potential for further study.

2. Commune rattan collectors/ Rattan collecting agents

The rattan middlemen are mostly Kinh ethnic people who own grocery shops in the commune, and who also buy agricultural products and other NTFPs to sell to the local people for their daily needs. There are about 3 or 4 middleman in each village, depending on the product volume present. Some local villagers become middlemen themselves by purchasing rattan from other villagers. This practice is seen in Vinh and Za Ra Villages. Normally the middlemen have contracts with the processing companies.

In theory, villagers can select the middlemen, usually shop owners, to whom they want to sell to the rattan they have collected. However, if these villagers purchased goods on credit from a local shop during the preceding year, they are obligated to sell their rattan only to that shop. Otherwise the shop owner will not sell goods to them on credit in the future.

4.2.3.2 Broom grass value chain

1. Harvesters

Broom grass is easier to harvest than is rattan, both in terms of harvesting techniques and locations. Therefore even children can help their parents in the collect it. Normally broom grass is collected during a brief "high season" of only about two weeks in January. On average, one person can harvest around 30-40 kgs at that time. These collectors sell their raw materials to village middlemen without any value-added actions (even simple techniques such as drying). A few households keep some broom grass to make brooms for their own personal use, while two local villagers make brooms for sale in limited quantities.

2. Commune broom grass middlemen

Like rattan, there are two kinds of middlemen in the commune: shopkeepers and ordinary villagers. In addition, outside traders come to the area to acquire broom grass directly from

households. Although broom grass trading is similar to rattan, it is not strict in term of management like rattan. No tax for outside traders is levied by the Commune Committee or District Tax Office. The local middlemen just pay a small fee of around 10,000 VND/100 kg of broom grass to support the village fund.

3. Broom making

In the commune, two men make brooms for sale in limited quantities. In 2007, an NGO trained a group of seven women in broom making techniques. However, the project stopped at that stage so they had no chance to practice and develop this model to add value to broom grass collection.

All raw materials are transported to other places for production. These include Da Nang city, Hoi An Town, and Dai Loc District.

4.2.3.3 Lansat value chain

1. Harvesters/Planters

Compared to rattan and broom grass, lansat is limited in spatial availability. It is concentrated mostly in Pa Toih and Vinh Villages. Lansat used to be planted in home gardens in Vinh for a few decades, but most of this product has been harvested already. In the forest, Vinh villagers can identify their property rights to each lansat tree that they have inherited from their ancestors. In general, all villagers have the right to access the forest to harvest lansat, even if they do not have inherited property rights like in Vinh. Nowadays, villagers prefer to plant lansat due to its value and market potential. Therefore, this product offers a chance for value-addition in terms of sale quality and quantity.

Figure 4.1 shows briefly the current value chain of rattan, broom grass, and lansat in Tabhing Commune.

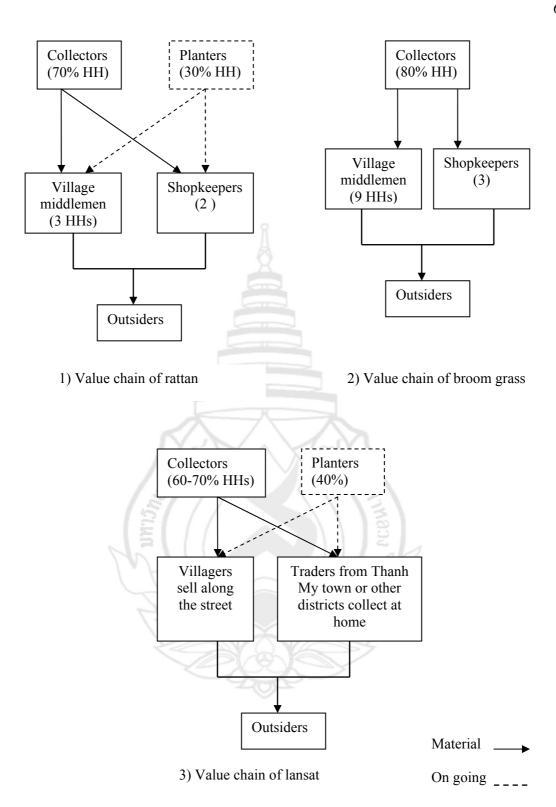


Figure 4.1 Value Chain of Rattan, Broom Grass, and Lansat in Tabhing Commune

4.2.3 Proposed value-added options

4.2.3.1 Description

In all three current value chains, the participation of local people is almost exclusively as raw materials collectors. As a result, only very limited benefits are being gained from NTFPs at the local level. Most local people are just responsible for the first step in the value chain stage, while a few local middlemen (from well-off households) gain the most benefits from buying raw materials from villagers. Through value chain analysis as well as assessment of the current situation of value-added activities in Tabhing Commune, including difficulties, advantages, and perceived benefit from value addition, opportunities can be found to increase income and employment for the local people. This can be accomplished through increasing the participation of locals in the value chain, especially in processing of raw materials. Since benefits accrue more and more up the various levels of the chain, proposed interventions to upgrade the value chain are necessary.

For the three selected products - rattan, broom grass and lansat, this study's analysis considered two options, plantation and processing. It was concluded that the best approach involves lansat and rattan plantations as well as broom making and rattan semi-processing. Depending on each option, different input and output values have been calculated. Figure 4.2 depicts the proposed upgrading chain.

To determine the benefits of various value-added options to local people, this study has calculated net present values to compare the current situation with proposed options to see the amount of value added change.

Collect from the forest Collect from home gardens Plant/domesticate selected plants Establish interested groups/households to participate in processing Produce final products/semi-processed products Lansat Rattan Broom grass Processors Planters Processors

Lansat and Rattan

Plantation

Domestication

Upgrade chain part

Broom grass

- Broom grass drying

- Broom making

Figure 4.2 Proposed Upgrade Chain

Rattan

processing

Semi

4.2.3.2 Ways to support raw materials stability

The current situation reflects reductions in quality and quantity of NTFPs due to high market demand. As a result, improving the stability of raw materials sources is necessary through plantation and domestication. These actions are expected to raise the productivity of NTFPs far higher than that obtained in natural forests. General requirements for successful plantation are:

- 1. Community with land available for cultivation.
- 2. Availability of seedlings of suitable tree species.
- 3. A small amount of startup capital.
- 4. Access to expert advice and assistance in the early stages.
- 5. Carefully thought—out plan to accommodate demands from downstream processing industries with supplies from plantations, based on the harvesting characteristics and uses of different species.

Rattan plantations:As mentioned above, local people are presently planting *Calamus tetradactylus (May nep)* in their home gardens, through support from previous projects. Around 10 households have planted *Calamus armarus (May nuoc)* that they collected from the forest. In this proposed option, *May nuoc* is selected to plant under the forest canopy. The reasons to choose this species over the other one are presented in Table 4.7.

Table 4.7 Factors for Rattan Planting (Calamus armarus species)

Factor	Calamus armarus (May nuoc) – Under forest canopy					
Land available	1. At present, forest lands are managed by communities					
WI	primarily for protection. They receive funding based on the					
	amount of area protected.					
	2. Forest land will be allocated to local people and they ha					
	the right to manage, protect, plant and receive benefit fr					
	these lands (notice that forest lands still belong to the state).					
	3. Each HH will own at least 0.5 ha in the forest to manage					
	and protect so that they can use this area to plant rattan.					
Suitable species	1. Calamus armarus is suited to forest areas, which provide it					
	the high moisture and shade it requires. Short growing					
	duration and minimal care requirements are selection					
	strengths for this plant.					
	2. Important role in conservation and forest protection since it					
	is part of the natural ecosystem.					

Table 4.7 (continued)

Factor Calamus armarus (May nuoc) – Under forest canop					
Accommodating processing	Demand for this species in this area is high. Current supplies				
industries' demand with	cannot meet demand due to over-harvesting.				
supplies					
Small startup capital	With special support from the Bank for the Poor, villagers will				
	have advantage during the startup period in terms of capit				
	They can borrow loans with a repayment periods of either less				
	than or longer than 5 years. With rattan, harvesting time begins				
	during the 4 th year, so the payback period will not be lengthy.				
Access to expert advice and	This factor needs to be taken into account because of lack of				
assistance in the early stages	assistance and lack of villagers' awareness of previous projects.				
	From previous experience, access to expert advice and				
	assistance in planting significantly increases chances of				
182	success.				

4.2.3.3 Post harvesting and processing

As presented above, broom grass and rattan were selected to increase value during their processing stage. With broom grass, the study results call for adding two steps: grass drying and broom making. With rattan, semi-processing is suggested to produce rattan peels and rattan cores. Similar to previous calculations, this calculation maximizes benefits for an average household in the four studied villages.

4.2.4 Cost benefit analysis for selected value-added options

This study used an interest rate of 0.9%, a special rate available to poor communities in remote and mountainous areas, such as the Tabhing Commune, from the Vietnam Bank for Social Policies. Poor people can receive long term loans of more than 5 years. However, calculations did not allow the discount factor to be calculated when a 0.9% interest rate was applied; therefore the researcher used 1% instead.

Since these interventions are intended to allow local people to increase their incomes, labor costs were calculated based on the average income of each household laborer (10,000 VND). The labor here is understood that if they do not join the proposed value-added activities, they can do other work instead.

To support calculations, information about plantation density, productivity, price and cost of fertilizers and pesticides was obtained in 2009 from the Luc Dong Rattan Company, the Center for Application and Science Technology Information, Quang Nam Soils and Fertilizers Institute, Nam Giang Agriculture Office, and local people. Both input and output values are based on market prices. Monetary values are expressed in VND. Value-added taxes are not considered. In a sensitivity analysis, the researcher varied input and output prices by 20% change to observe the impact of price changes on total product values. Detail calculations are presented in the following parts.

Each proposed intervention to add value was compared with the current income being obtained from the same NTFPs. Depending on the characteristics of each option in terms of time, the comparison is divided into two periods: long term (20 years) and short term (1 year). However, the calculation is set at the optimization level to gain the highest benefits to each household, such that each receives the same benefit. In practice, of course, these benefits would differ from one household to the next since the condition of each household is not the same in terms of available resources (land, labor), capital and capacity. Therefore, organization and management will be discussed in next section to propose an appropriate direction for benefit allocation.

4.2.4.1 New plantation

1. Rattan planting

For *Calamus armarus*, harvesting begins in the fourth years. During the first three years, investments in labor, fertilizer, and lime are required, but from then on labor will be the main cost, as workers are required to care for and harvest the rattan. First year labor costs include rattan planting and care, while second and third year labor costs include only care. From the fourth year on, labor costs for harvesting are added to the calculations. Forest lands allocated to local people have high potential to serve as areas for rattan planting since the canopy cover provides shade required for the rattan plants' survival. Therefore, the calculation allocates 0.5 ha

to allow each household to receive maximized benefits. To compare the value-added change between current harvesting and proposed options, net present value is used as an indicator. The study period is 20 years to show changes over time since rattan planting is a long term intervention.

Costs benefit calculations between two options are shown in Tables 4.8 and 4.9. Costs include seedling, NPK, manure, lime, labor, and others. The output results are NPV for both cases. NPV is calculated in 20 years to see the change since an average rattan plant can be harvested for that period of time. The result shows that NPV is positive from the 5th year on, meaning that 5th year is the first pay back year. Then it increases over time until the 20th year since ongoing costs are only for labor.

Table 4.8 Costs and Benefits of Rattan Planting for Each Average HH

Units of price, cost, output value, and NPV: 1,000 VND

14 (IL.º)		(8)	Year		
Item (Unit)	1	5	10	15	20
Seedling		10000	200		
Quantity (tree)	625	0	0	0	0
Price	2				
Cost (1)	1,250	0	7 0	0	0
NPK					
Quantity (kg)	300	0	0	0	0
Price	10				
Cost (2)	3,000	0	0	0	0
Manure					
Quantity (ton)	3	0	0	0	0
Price	200				
Cost (3)	600	0	0	0	0

Table 4.8 (continued)

Idam (III.:A)			Year		
Item (Unit)	1	5	10	15	20
Lime					
Quantity (kg)	200	0	0	0	0
Price	6				
Cost (4)	1,200	0	0	0	0
Labor					
Quantity (labor)	45	45	45	45	45
Price					
Cost (5)	450	450	450	450	450
Others					
Cost (6)	100	100	100	100	100
Total cost	6,500	450	450	450	450
(=1+2+3+4+5+6)					
Product (ton)		2)]]	Vasy		
Productivity (7)	0	2	2	2	2
Price (8)	2.5	2.5	2.5	2.5	2.5
Output value (=7 x 8)	0	5,000	5,000	5,000	5,000
Interest rate	1%		>		
NPV	-6,435	110	21,117	43,123	64,024

Note. Rattan planting calculation for 0.5 ha per each HH

Cost (1); ..., Cost (5) = quantity x price

Table 4.9 Costs and Benefits of Current Rattan Harvesting for Each Average HH

Units of price, cost, output value, and NPV: 1,000 VND

Item	Price	Quantity	Total cost/price		Year			
	(1)	(2)	(1 x 2)	1	5	10	20	
Labor	10	90	900					
Output value	1.2	1,250	1,500					
Interest rate			1 %					
NPV				594	2,912	5,682	10,832	

2. Lansat planting (Lansium domesticum)

Similar to rattan planting, lansat planting requires higher labor costs during the first two years and during harvesting years than during the years in between. Each household has a home garden sized on average between 0.5 and 0.7 hectares. However, these gardens include a fish pond, livestock raising place and tree planting area. As a result, only a small part is still available as bare land or an area with plants of low economic value. Therefore, based on estimates from the local people, an average household has about 0.2 ha available for new planting. The cost-benefit calculations of new planting for each household are shown on. Table 4.10 and current harvesting is shown in Table 4.11. Costs include seedling, NPK, manure, labor, and others. Similar to rattan, lansat planting bring benefits in the long term, therefore a 20-year period was selected for analysis. Since the payback time for lansat planting occurs within 8 years, the calculations reflect the 8th, 10th, and 20th years. As a result, from 8th year, the results show positive figures.

 Table 4.10 Costs and Benefits of Lansat Planting

Units of price, cost, output value, and NPV: 1,000 VND

Item	II:4			Year		
rtem	Unit -	1	5	8	10	20
Seedling	tree					
Quantity		50	0	0	0	0
Price		15				
Cost (1)		750	0	0	0	0
NPK	kg					
Quantity		48	168	280	320	320
Price		10				
Cost (2)		480	1,680	1,680	3,200	3,200
Manure	ton					
Quantity		0.4	0.8	0.2	0.2	0.2
Price		200				
Cost (3)	E / /	80	160	40	160	160
Labor	labor			14		
Quantity		12	4	6	6	6
Price		10				
Cost (4)		120	40	60	60	60
Others						
Cost (5)		100	100	100	100	100
Total cost (=1+2+3	3+4+5)	1,530	1,980	3,000	3,400	3,400

Table 4.10 (continued)

Item	Unit					
nem	UIII	1	5	8	10	20
Product	kg/tree					
Productivity (6)		0	0	0	0	0
Price (7)		5	5	5	5	5
Quantity (8)	tree	50	50	50	50	50
Output value (=6 x 7 x 8)		0	0	12,500	12,500	12,500
Interest rate		1%				
NPV		-1,515	-7,141	4,146	21,065	99,170

Note. Calculation for 0.2 ha per HH

Cost(1),...,Cost(4) = quantity x price

Table 4.11 Costs and Benefits of Lansat Harvesting for Each Average HH

Units of price, cost, output value, and NPV: 1,000 VND

Item	Price	Quantity	Total cost/price	1	Year		
	(1)	(2)	(1 x 2)	1 /	8	10	20
Labor	10	10	100	100	100	100	100
Output value	5	220	1,110	1,110	1,110	1,110	1,110
Interest rate	1%						
NPV				1,000	7,728	9,565	18,234

4.2.4.2 Post harvesting and processing

1. Drying broom grass

On average, 1 kg of dried broom grass is made from 3 kg of fresh broom grass. Both collecting and drying require only labor costs without further investments. Table 4.12 shows

cost and benefit calculations for 270 kg of broom grass, the average amount a household collects each year.

Since the broom grass harvesting period is short (within 2 weeks), and since each household spends an average of 10 days collecting broom grass with 2 people participating in the activity, total labor to collect raw materials is 20. Adding the step of drying broom grass will require another 10. This intervention is a low cost investment that will provide benefits from the first year on (calculations below are for the first year only).

Table 4.12 Costs and Benefits for each HH from Drying Compared to Collecting Broom Grass

Units of price, cost, output value, and NPV: 1,000 VND

Item	Collecting broom grass	Collecting & drying broom grass
Labor		
Price (1)	10	10
Quantity (2)	20	30
Total cost (= 1 x 2)	cost (= 1 x 2) 200 300	
Products		NCB.
Unit	kg	kg
Price (3)	1.5	6
Quantity (4)	270	90
Output value (=3 x 4)	405	540
Interest rate		1%
NPV	203	237

2. Broom grass production

The drying process converts 270 kg of fresh broom grass into 90 kg of dried broom grass. Each broom needs 0.5 kg of dried grass and supplemental materials. Thus the average household can produce 180 brooms. In one day, 5 brooms have a labor cost of 36. Adding collecting and drying labor yields a total labor cost of 66 for the entire broom making process. Additionally,

unlike collecting or drying that requires just labor cost, broom making needs some investment in supplemental materials, such as broom handles, plus expenses for transportation and market fees. The total costs and benefits from making brooms are presented in Table 4.13. This calculation is again for first year since the costs and output value of broom making every year is the same so that NPV of each year does not change.

Table 4.13 Costs and Benefits from Broom Making for each HH

Units of price, cost, output value, and NPV: 1,000 VND Grass **Broom** Other **Transportation** Labor **(1)** handle (2) materials (3) and market (4) **(5)** Unit Item Labor Kg Price (6) 0 1 1 1 Quantity (7) 90 180 180 180 66 $Cost (= 6 \times 7)$ 0 180 180 180 660 Total cost (= 1+2+3+4+5)1,200 Total produced broom (8) 180 Price per broom (9) 10 Output value (=8 x 9) 1,800 1% Interest rate NPV 594

3. Rattan semi-processing

Generally, rattan semi-processing is different for each kind of rattan species and utilization purpose. The following stages are for semi-processing of *Calamus armarus* (May nuoc) that is now popular in Tabhing Commune and it main sales crop. Other *Calamus* varieties such as *Calamus dioicus* (May cam) or *Calamus tetradactylus* (May nep) are just for villagers' daily use, such as in making baskets or brooms or building houses. For "May nuoc", semi-processing includes the stages shown in Table 4.14.

As mentioned earlier, each household harvests 1,250 stems per year. Therefore, the total harvested amount for the 4 studied villages is 370,000 stems, equal to 444,000 kg (1stem fresh rattan=1.2kg fresh rattan). Since the startup cost for semi-processing is quite high and cannot be conducted at the household level, total benefits are calculated for all four villages and total costs are also shared by all. The costs of semi-processing are presented in Table 4.15, dividing into start up cost and operating cost.

Table 4.14 Rattan Semi Processing Stages (Calamus armarus species)

G 1.4		Investment
General stage	Summary	(Machine and firm)
Grading and	1. Raw rattan of different sizes and quality are all	1. Raw material storehouse
selecting raw	mixed and have to be sorted	
rattan	2. Criteria for grading rattan include diameter,	
	appearance of the poles, and length	
Oil curing	1. Boil in diesel for 10-20 minutes	1. Tank for oil curing
	2. Cleaning with pressurized water or sawdust	2. Oil boiling house
	3. Air drying	3. Drying yard
	4. Fungicide and insecticide treatment	
Splitting	1. Using splitting machine to remove nodes	1. Splitting machine
	before further processing	2. Node removal machine
Preservation	1. Store after treating or splitting in bundles	

 Table 4.15
 Rattan Semi Processing Costs

Units of price and cost: 1,000 VND

Item		Price	Unit	Cost
	Splitting machine	35,000	2	70,000
Start up	Removing node machine	5,000	1	5,000
investment cost	Tank for oil curing and oil boiling house	25,000	1	25,000
mvestment cost	Raw material store house	30,000	1	30,000
	Drying yard	20,000	1	20,000
	Total			150,000
	Oil	1,500	444	666,000
	Labor	500	444	222,000
Operating cost	Maintenance	50	444	22,200
(for 1 ton)	Depreciation	50	444	22,200
	Electricity	80	444	35,520
	Small equipment: knives	9 50	444	22,200
	Total annual costs	M		990,120

After processing, 1 ton of fresh rattan yields 220 kg of total processed products, comprised of 150 kg of rattan core and 70 kg of rattan peel. With annual rattan raw material usage of 444 tons, total products are about 97,680 kg, comprised of 66,600 kg of rattan core and 31,080 kg of rattan peel. Benefits from processing are:

- 1) Rattan core: 66,600 x 18,000 = 1,198,800,000 VND
- 2) Rattan peel: 31,080 x 11,000 = 341,880,000 VND

Costs and benefits calculations for 444 tons of raw rattan over 10 years are presented in Table 4.16. Since this option requires a high investment cost, the calculation is for available raw materials from all four studied villages. In total, villagers harvest 444 tons of rattan with a total of 26,640 labor/days (296 households with 90 labor/days).

Table 4.16 Costs and Benefits of Rattan Semi Processing over 10 years

Units of cost, output value, PVB, and NPV: 1,000 VND

Item			Yea	ar			
Hem	1	2	3	4	5	10	
Start up cost	150,000						
Annual cost	990,120	990,120	990,120	990,120	990,120	990,120	
Total cost	1,140,120	990,120	990,120	990,120	990,120	990,120	
Output value	1,540,680	1,540,680	1,540,680	1,540,680	1,540,680	1,540,680	
Interest rate	1%						
NPV	396,554	936,103	1,470,697	1,999,785	2,523,368	5,065,303	

4.2.5 Benefit of carrying out value-added changes

This part aims to compare the value change of current NTFPs harvesting to value-added options. In detail, current rattan harvesting will be compared to new planting and semi processing; lansat harvesting and new planting; and broom grass harvesting and broom making. To see the change between the current activities and proposed options, current value added is 0% the whole period as a base figure to compare with suggested interventions. Depend on each option, long term or short term, the period time is chosen different to see the whole picture.

4.2.5.1 Rattan

The benefits of the proposed value-added options related to rattan are illustrated in Figure 4.3. The results show that semi-processing can bring benefits starting in the first year and rising steadily thereafter, from 126% in the first year to 205% in the 20th year. In contrast, new planting achieves its initial payback in the 5th year; during the first 5 years it cannot bring add any value. The new rattan plants need more time to balance out the costs and benefits and more time to get net positive value since the plants take time to grow up and be harvested. As a result, in these early years harvesting from the forest alone can earn more money than the cost of the new plants. However, after the payback year is reached, the value changes positively from 26% in the 6th year to the huge sum of 455% in the 20th year.

Although the time frame differs to gain benefit from the two different values added options, both contribute big changes to the incomes of local people. Over time, the rate of increase from value-added activities rises steadily, indicating that local people can get more and more benefit as the years go by.

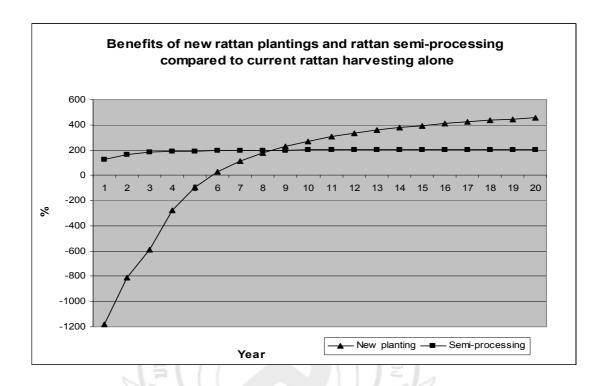


Figure 4. 3 Benefits of New Rattan Plantings and Rattan Semi Processing Compared to Current Rattan Harvesting Alone

4.2.5.2 Lansat

Similarly to rattan, lansat planting also takes time to start to generate tangible benefits; and its payback time is 8th year. The comparison with current harvesting alone shows that the new plantings add significant value to the community from the 9th year on. The value-added increases very rapidly (48% to 444%). These changes over time are shown in Figure 4.4.

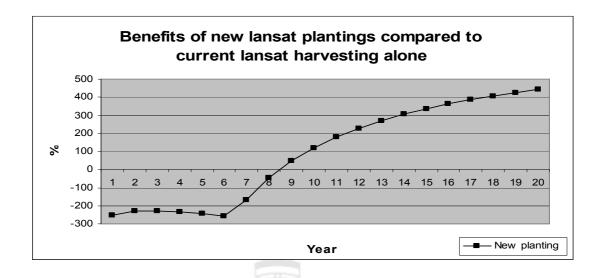


Figure 4.4 Benefits of New Lansat Plantings Compared to Current Lansat Harvesting Alone

4.2.5.3 Broom grass

The comparison for broom grass between harvesting and broom making shows broom making increases household incomes by 193% each year. Costs and benefits of this activity are the same year after year.

4.2.6 Summary of comparisons of all value-added forms

Benefits from these actions are summarized in Table 4.17. As shown, among the several value-added options examined, processing options start to create profits in the first year, but have a low rate of increase thereafter; they contribute less than do plantings over the long term. In detail, comparison all proposed options over 20 years to see easily the change both long term and short term options. With planting options, the first few years not yet got benefit; therefore, the figures show negative results while processing options can get benefit at the first year. An interesting point here is that although the benefits from planting come later than processing, they increase so fast from first year to 20th year (from -1,183% to 455% with rattan and 252% to 444% with lansat) while processing's benefit change is quite lightly or keep constantly (126% to 189% with rattan semi processing and 193% with broom making).

In the table, we also summarize the characteristic of each option. Among those, rattan is suggested planting under canopy in the garden, which average area of each household is 0.5 ha; while we proposed 0.2 ha in home garden per household to domesticate lansat. Further step to add value is

for processing. Villagers just need simple technique and low investment to make broom, but they need more invest in rattan semi processing since one by handmade and one using machine.

All four suggested options add value, showing high percentage changes in benefits to total household income. However, many other factors determine their true benefits. Market prices and market demand for each product will undoubtedly change over time. As a result, studying uncertainty and sensitivity is necessary to understand changes in benefits from changes in investment costs or product demand over time.

Table 4.17 Summary of Benefits of Value-added Options Compared to Current Harvesting

Product	Options	Year			
		1	5	10	20
		Benefits change (%)			
Rattan	New plantings	-1,183	-96	272	455
	1. Under forest canopy	E.\			
	2. 0.5 ha per household	131			
	Semi processing	rcearth a			
	1. From rattan stem to rattan peel/core				
	2. Using machine (for splitting,)	126	168	182	189
Lansat	New plantings				
	1. Home garden				
	2. 0.2 ha per household	-252	-246	120	444
Broom grass	Broom making	193	193	193	193
	1. From fresh broom grass to broom				
	2. Handmade				

4.2.7 Uncertainties and sensitivity analysis

The quantitative results of this analysis are subject to some uncertainty. The study used average prices for materials and products. In fact, of course, prices can change regularly. For example, the price of rattan stems is different due to different stem quality and different market conditions throughout the year. Similarly, the price of fertilizer varies depending on market demand and supply as well as the costs of raw materials. In addition, the quantity of each product demanded by the market will vary depending on its price and perceived social utility. Not only the investment cost and the price of products but also the productivity from new plantings can change over time.

Therefore, the goal of this section is not to understand the causes and effects of these many variations but to explore the different potential changes to price on each product option. To determine the sensitivity of different products to changes in raw materials prices, the researcher conducted a simplified sensitivity analysis. Tables 4.18 to 4.20 show the NPV changes in added value resulting from a 20% increase or decrease in price. In this analysis, market demand was not considered, with the assumption that all products or raw materials were sold due to high demand by markets. The studied factors include investment cost items, product prices and productivity from new plantings.

Table 4.18 NPV Changes due to a 20% Change in Factor Costs and Rattan and Lansat Prices

Factor	NPV change for	NPV change for
Factor	rattan planting	lansat planting
Seedling	-/+ 1.2%	-/+ 0.7%
NPK	-/+ 4.3%	-/+ 16 . 0%
Manure	-/+ 0.8%	-/+ 0.8%
Lime	-/+ 1.2%	
Labor	-/+ 3.7%	-/+ 0.6%
Others	-/+0.5%	-/+ 0.9%
Price of products	+/-31.7%	+/-39.2%
Productivity	+/-31.7%	+/-39.2%

Rattan and lansat plantings require similar inputs, including seedlings, NPK, manure, lime and labor. The results of sensitivity factors are quite similar for both cases. Product prices and productivity exhibit by far the highest sensitivity, at 31.7% for rattan plantings and 39.2% for lansat plantings. In addition, value added for both products (but lansat in particular) is highly sensitive to a 20% change in NPK costs. In contrast, changes in costs for manure and other inputs show very low impact.

Broom making benefits are affected most by broom prices in the market, which can change income benefits by up to 60%. Changes in labor costs can impact incomes by up to 21%. Other factors all have limited influence on benefits.

Table 4.19 NPVChanges due to a 20% Change in Factor Costs and Prices of Brooms

Factor	NPV change for broom making			
Broom handles cost	-/+ 6%			
Labor cost	-/+ 21%			
Other materials cost	-/+ 6%			
Transportation and market cost	-/+ 6%			
Broom selling price	+/- 60%			

Similar to the other three options, rattan semi-processing is also affected by changes in cost and market prices. Among those factors altered market prices for processed rattan have the most significant impact (37%); changes in oil cost are second (11.5%). The other factors make less difference to total NPV.

Table 4.20 NPV Changes due to a 20% Change in Factor Costs and Rattan Semi Processing Prices

Frater	NPV change for rattan semi
Factor	processing
Start up cost	-/+ 0.3%
Oil cost	- /+11.5%
Labor cost	-/+ 3.8%
Maintenance cost	-/+ 0.4%
Depreciation cost	-/+ 0.4%
Electricity cost	-/+0.6%
Small equipment: knivescost	-/+ 0.4%
Prices of rattan peel and rattan core	+/- 37%

In conclusion, the most influential variable affecting the projected improvements in income among all four value-added options is the price of these products in the market. Although the analysis does not mention market factors, the results show clearly the role of the market, using price as an indicator. Market demand will be taken into account in future studies during the implementation stage.

4.2.8 Implementation of value-added activities

All four proposed interventions can be implemented in various ways. The proposed interventions were calculated to bring maximum income to each household equally, on the assumption that all would participate. However, in practice, not all households have the same ability to implement those options or the same interest in doing so. Available land, labor, time, capability and startup capital of each household will vary considerably. Some household s may participate in all four options while others might just select one or two; a few might out of entirely. Therefore, the benefit to income from these value-added actions will differ for each household. Some may get no benefit at all; others can increase their income enormously by taking advantage of all four of these opportunities to add value. This part of the study recommends some implementation forms suitable

for the varied situations of each household or characteristics of each option. Two forms of implementation are examined and contrasted: short term/long term and household level/interest group. The detail of this recommendation is presented in Tables D4 and D5 of Appendix D.

4.2.8.1 Time-sensitive implementation

Broom making and rattan semi processing are considered short term options due to short pay back year, at first year of process while long term options include rattan and lansat planting. Since broom making is not only short pay back time but also low investment cost, this option is advised to implement as priority, suitable especially for poor households and women group. In contrast, rattan semi processing requires high investment cost, therefore, it needs to be supported by outsider or local government. In addition, studying more about the feasibility of this option is very necessary.

Related to long term options, rattan planting is priority to implement due too sharply decrease of quality and quantity as well as high market demand. Lansat planting is also important at present to provide fruits to markets. However, a common remark here is following up actions after planting to get highest productivity.

4.2.8.2 Implementation of value added by households or groups

Rattan planting and broom making can organized in two different ways, by individual households or by interest groups. Since rattan is proposed to be planted in the forest, it is certainly feasible for each household to can plant in its own allocated forest land or to cooperate with their immediate land neighbors or even larger groups. Similarly, brooms can be made in individual households due to the low investment required. In addition, establishing a broom making group is another choice, especially useful if training and support are to be provided to the broom makers.

In contrast, lansat is to be planted in small areas within home gardens, so implementation here is driven towards the individual household. It is easier for them to manage the process and care for the trees once planted. Implementing this option at household level is good because it can bring direct benefit to each participating household. However, for rattan semi-processing a community-based enterprise is suggested due to this option's high startup costs. Community-based enterprises offer a good model to apply in Tabhing Commune for both rattan semi-processing and broom making.

4.3 Adding value in the context of biodiversity conservation

4.3.1 Local perceptions of way to increase quantity and quality of NTFPs

Faced with sharp reductions in both the quantity and quality of their NTFPs, local people recognize the effects of this situation on their livelihoods, especially on their cash incomes. For instance, they now have to spend more time accessing the forest in order to seek out and collect NTFPs due to quantity reductions. Local people realize the apparent causes of these reductions and were willing to share their opinions on how to increase the quality and quantity of NTFPs.

To increase the quantity of NTFPs, ideas are summarized in Figure 4.5. Some local people (27%) believe it would be essential to reduce or even cease collection for a few years to restore the productivity of NTFPs. This was the largest single category of actions suggested. It is certainly a good recommendation in concept to deal with the current situation, similar to a temporary park closure. However, it is just a temporary solution when the level of reduction is as high as it is now. In addition, this idea would require strong enforcement to stop outsiders (and some local residents, too) from defying the ban. Other solutions were offered: more planting, better management, and increasing the awareness of collectors of the need for long term sustainable measures, each accounting for 18% of suggested solutions in interviews. Raising awareness allows local people to identify and solve problems more effectively, in addition to improving implementation of proposed options in the future. The remaining options include collection method improvement, banning outsiders from harvesting, and combining all solutions round out the range of measures put forth by locals to increase the quantity of NTFPs.

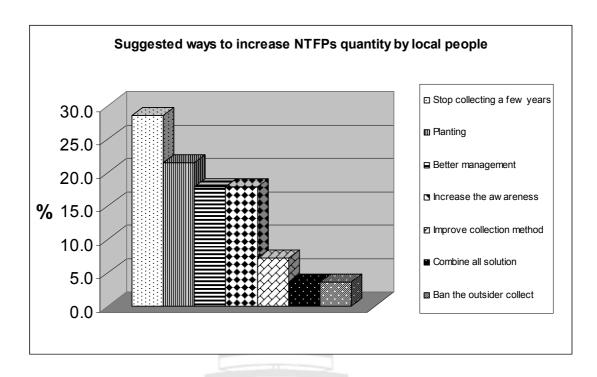


Figure 4.5 Suggested Ways to Increase NTFPs Quantity by Local People

Increases in quality and quantity sometimes cannot be distinguished among proposed solutions. Quantity and quality certainly interact, so solutions are also linked together. Suggested steps to deal with the quality issue are set out in Figure 4.6.

Based on the perceptions of local people, improving the harvesting methods is the best way to maintain the quality of NTFPs. Clearly, better collection methods would allow restoration of trees. The lack of concern for product quality among some NTFPs traders has resulted in harvesters being free to select substandard products; many traders simply do not pay significantly more for quality products. Without a price incentive, people cannot be encouraged to select the best quality product. As a result, cooperation of traders in dealing with this issue is essential. Economic incentives are suggested for collectors, through setting higher prices for better quality products. Recognition and rewards for good collectors can also be provided. Over harvesting and lack of management mechanisms are the main causes of limitations in forest protection.

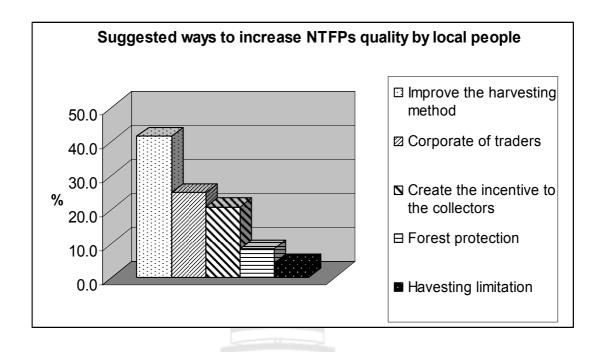


Figure 4.6 Suggested Ways to Increase NTFPs Quality by Local People

4.3.2 Role of value-added actions in biodiversity conservation

The results of this study show that ways to increase the quality and quantity of NTFPs can be fully consistent with resource conservation and improved biodiversity. Planting rattan and lansat and forestry management with improved collection techniques, for example, require the cooperation of all related stakeholders. Planting anew is very important to conservation. Instead of harvesting from the forest itself (until supplies run out!), rattan and lansat can then be harvested in home gardens or under the forest canopy. This would greatly lessen the impact on the forest. With new plantings, once the payback point has been reached on average each household can harvest 2,000 kg of rattan instead of 1,500 kg as at present; and each one can greatly increase its collection of lansat for sale, from 220 kg at present to fully 2,500 kg in the future. As these figures point out, products from the new plantings will replace current harvesting from the natural forest. Since each planted area belongs to a household or interest group, depending on the implementation approach chosen, they will have high incentive and responsibility to take care by using sustainable harvesting techniques. This is clear evidence of role of new planting in conservation. In other words, adding value added in the right way contributes directly to biodiversity conservation.

Besides helping to provide raw materials for direct sale, planting also increases the supply of rattan available for local semi-processing, another recommended way to add value and increase incomes. The right combination of planting and processing will bring higher incomes to local people as well as decrease pressure on the forest. Without implementing one or more of the recommended value-added options, to create anywhere near the same increase in income based on NTFPs, local people would need to vastly increase their collection of raw materials from the forest. This of course would have devastating impacts on the local ecology.

Detailed calculations of the amount of extra harvesting of raw materials from the forest needed to equal the proposed income increase from the value-added alternatives are presented in Table 4.21. The calculations compare current harvesting with the proposed value-added options. To see a clear picture of this issue, a time frame of 20 years was used. From the 10th year to the 20th year, the need for extra harvesting remains constant. With new plantings, the early years show no benefit so the results are in negative figures.

In general, one difference emerges here among the four proposed options. Without new plantings, the extra amount of NTFPs needed ranges from 6 to nearly 10 times current harvesting levels. Without rattan semi-processing and broom making the quantity of harvesting needed is double or three times current levels. These figures show the huge impact on the impact on the forest from all the extra harvesting needed to achieve the same income growth. Obviously, in practice it is not even conceivable that these vast amounts of NTFPs could be collected. Therefore, the proposed ways to add value are really the only appropriate and sustainable approach to achieve the mutual goals of increased income and conservation in this area of Vietnam.

Table 4.21 Additional NTFPs Harvesting Needed to Match Income Increase from Value-added Options

		Year			
Products	Options	1	5	10	20
		Quantity of harvesting			
Rattan	Current harvesting	1,250	1,250	1,250	1,250
(stems)	Without new plantings	-9,028	6,319	6,319	6,319
	Without semi- processing	1,880	2,583	2,583	2,583
Lansat	Current harvesting	220	220	220	220
(kg)	Without new plantings	-3,396	-4,396	20,202	20,202
Broom grass	Current harvesting	270	270	270	270
(kg)	Without broom making	810	810	810	810

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

The recommended value-added actions can bring more income to local people in two ways: by providing a stable supply of NTFPS raw materials, and by moving the community towards creation of semi-processed rattan products and brooms. These activities link directly to forest conservation and improved biodiversity. The research enables various conclusions to be reached. First, conclusions are made regarding research objectives. Then, this study is discussed in terms of the literature gaps filled or not filled and further studies are suggested accordingly.

5.1 Conclusions

Tabhing Commune is in a remote mountainous area; its majority population is Katu people, one of Vietnam's many minority ethnic groups. As a result, the study site has remained relatively undeveloped with high poverty rates and low per capita incomes. Slope lands render agriculture a difficult task. The economy here is heavily dependent on natural resources because other opportunities have not developed in this area.

Collecting NTFPs is the second main source of income in Tabhing Commune (after agriculture), contributing 30% to 35% of total income. Their village collectors consume some of these forest products: medical plants, wild vegetables, bamboo, etc. Local people mostly trade the other kinds of NTFPs that they collect, typically receiving very little cash for them at the bottom of the value chain. Among those products, rattan accounts for 30% of income, followed closely by lansat and malva nuts. With high market demand, these products play significant role in household income. Broom grass, wild animals, honey, banana flowers and other NTFPs contribute around 3% to 8% each. Although depending heavily on natural resources, local villagers benefit simply from selling their raw materials directly to middlemen or traders without any value-added steps. A few

Tabhing households gain by adding some value prior to sale of their NTFPs. These actions involve processing. Some local people make brooms from broom grass, wine from the ta vac tree, or handicraft products from rattan. However, most of these products are made for personal use, not for trade. Over the past few years a number of projects have been funded to try to stabilize the area's raw materials supply. With incomplete and discontinuous support, the results have been neither successful nor sustainable.

This research obtained the opinions of local people in terms of their interest in trying new value-added activities and the challenges and benefits anticipated from doing so. The study found that both the quality and quantity of NTFPs in this area had declined sharply in recent years. In quantitative terms, current availability of NTFPs has decreased considerably over the past 10 years. As a result, local people need more time in the forest to harvest the products they want. Quality reduction is seen through the lengths of rattan now being collected and the fact that villagers now collect unripe malva nut; only ripe ones were collected in the past. Overharvesting is a primary reason for these decreases

The analysis then focused on four main criteria with which to judge alternative approaches: markets and economic factors, resources management and environmental factors, social and institutional issues, and technical and scientific components. After careful study of a broad range of available forest products against these four issues, broom grass, lansat, and rattan were selected as potential products to add value and generate more income for local villagers. Entire value chains were identified for each of these three selected products, all the way from initial harvesters to final consumers. This pointed out the activities in which local people currently participate and helped identify the potential activities in which local people can become involved and thereby gain more economic benefit. This analysis identified two main ways (planting and processing) to increase local incomes in a sustainable manner. As a result, the detail value-added forms selected for cost benefit analysis include (1) rattan planting (under the forest canopy); (2) lansat panting (in home gardens) to ensure a stable supply of these important raw materials into the future; (3) processing of NTFPs to make final products (brooms from broom grass); and (4) semi-processing to make dried rattan (from rattan as collected).

All four of these proposed interventions were then examined in detail to pinpoint ways to bring maximum benefit to local people. The study recognized that the conditions and capabilities of local households differ considerably in terms of available resources, finance, and labor. Net present value calculations helped compare different implementation options to see the extent of income generation from various value-added alternatives in comparison with current NTFPs harvesting actions. The results identified specific long term and short term options. Rattan semi-processing and broom making were shown to be appropriate short term interventions since they accrue benefits quickly, within the first year after initial implementation. In contrast, planting rattan and lansat were proven to be relevant long term activities since their investment requirements are substantial and their initial positive results occur only in the fifth year (for rattan) or the eighth year (for lansat).

Considerable income is generated by all four recommended policy options. For the short term programs, added value is constant for broom making (193% per year) and grows steadily for rattan semi-processing (from 106% in the first year to 205% in the 20th year. In contrast, the long term programs show negative results in the early years but thereafter generate major income benefits that increase quickly, from 26% in the 6th year to 455% in the 20th year for new rattan plantings and from 48% in the 9th year to 444% in the 20th year for lansat plantings. Once the payback year is reach results remain positive ever after.

All these results show the potential income that local people can gain by adding value to their NTFPs collection efforts. However, depending on the specific characteristics of various households, implementation is applied differently. In some cases, households are the preferred focus for implementation; in other cases, interest groups will work better. Interest groups or community-based enterprises should be used to carry out the processing options, especially given the high startup investment costs for rattan semi-processing. With two planting options, the story is more complex, depending on households' capacity to decide how much they can participate. In addition, effective planting requires some technical expertise and lessons learned from previous projects. In conclusion, huge potential exists to add value from NTFPs and bring sizeable benefits to local people; the primary challenge lies in effective implementation.

The last objective called for integrating conservation and income increases gained through value-added NTFPs actions. Household interviews showed that planting rattan and lansat offers an impressive way to increase both quality and quantity of NTFPs. Overall impacts on the forest will be reduced since villagers can now get their raw materials from their planted areas

instead of from the natural forest; and they can even get considerably greater total amounts of these NTFPs. For example, an average household can harvest 2,000 kg rattan from its under the forest canopy plantings instead of 1,500 kg as at present. Even more impressive, they can harvest fully 2,500 kg of lansat from their own home gardens instead of the 220 kg they can collect at present from the forest. To obtain the same amount of added value and income from continuing to collect raw materials rather than implementing the proposed options, local villagers would have to collect far more than is conceivably possible. The extra amounts of NTFPs needed ranges from 6 to nearly 10 times current harvesting levels to get the same benefits equal to that available from the new plantings. Without rattan semi-processing and broom making the quantity of harvesting is double or three times current collection levels. Such huge efforts are not possible given household labor and time constraints; value-added options are the only true way forward.

5.2 Remaining gaps and suggested studies

This research also identified a number of important remaining gaps in knowledge, limitations of the study, and suggestions for future research. While the research was quite successful in covering its entire initial objectives, during the research some gaps were seen that can be filled in by further study. Further attention is needed to ensure that the potential value-added options from NTFPs are fully integrated with conservation measures. Moreover, the implementation analysis covered some basic recommendations, not in detail, leaving a number of important issues to be studied further to answer the question of how much and who actually get benefits in practice. In addition, optimization options can be established and tested to be closer to reality. The influential factors include time, labor, financial ability, available land, techniques and interest to run all options suitable with each household condition.



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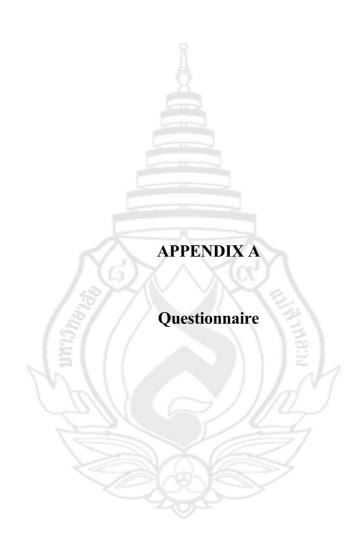
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QUESTIONNAIRE

Household Interview in Tabhing Commune, Nam Giang District Quang Nam Province, Vietnam

Na	me of head	d of household:
Vi	llage:	
1.	General	household information
	1.1. Nan	ne of responder
	1.2. Mal	e/FemaleAge:
	Ethnic §	group:
		Cotu
		Kinh
		Others ()
	1.3. Edu	cation level
		Illiterate
		Primary
		Secondary
		Higher
	1.4. Hov	v long have you lived here?year
	Are	you the original resident here? \square Yes \square No ()
	1.5. Hov	w many members are in your household?
Th	e age distr	ibution in your household:
	<18	:Male/Female
	19-6	0 :Male/Female
	>60:	Male/Female

1.6. How many people in your fam	nily work outside the Commune?
What are their jobs?	
1.7. Who is the main family me	ember who makes decisions in your family (farming work,
housework, and others)?	
☐ Husband	
☐ Wife	
Parent	
☐ Varies	
1.8. What is the main occupation of	of your family?
Farmer	
☐ Trader	
Officer	
Others	
1.9. The income distribution in you	ur family
Farming work	
NTFPs collection	
Gold mining))] = 1
Handicraft weaving	
Trading	
Others ()	
1.10. Do you think you can earn n	nore money from other alternatives?(from new options or new,
improved alternatives)	
☐ Yes	□ No
If yes, what is it?	

1.11. The expenditure of your household

Expenditure	Amount	Percentage
Food		
Education		
Heath care		
Farming cost (equipment, seeds, y	oung	
trees,)		
Social cost (wedding, ceremony,)		
2. Non-timber forest products in the so	ocio-economic aspect	
2.1. Which kinds of households usual	lly collect NTFPs?	
All households		
☐ Well-off household		
☐ Medium household		3
Poor households		
☐ Very poor households		
2.2. Which members of the family ma	ainly collect NTFPs?	
☐ Men		
Women		
Children		
Elder		
☐ Varies		

2.3. Information of harvesting and using NTFPs

Species		Rattan	Broom	Malva	Banana	Lansat	Honey		
			grass	nut	flower				
Quantity									
Quality									
Importance									
Harvesting t	ime/area								
Amount (at	present)								
Amount (10	years ago)								
Times/year									
Purpose									
Income									
Sold to who	m								
Current valu	ie added								
Value added	l suggestion				.\				
Harvesting 1	method			1 13	4				
	()				CBV				
2.4. Wha	at are the reaso	ons that ma	kes you sell	NTFPs dire	ectly to middle	emen?			
	No instruction	n							
	Lack of techr	niques to a	dd value						
	Lack of finan	cial means	s to sell to ot	hers					
	Unavailable t	ime							
	Middlemen p	ay money	directly						
	Not interested	d							
2.5. Wha	at difficulties/o	challenges	do you thin	k limits the	e ability of vi	llagers to a	dd value t		
NTI	FPs?								
	Technique								
	Financial								
	Available tin	ne							

	Management
	Market
	Interest
	Policy
	No idea
2.6. Whi	ch strong points/advantages do you think will add value to NTFPs?
	Skill of villagers
	Available raw material
	Time
2.7. Whi	ch benefits do you think villagers will receive after adding value to NTFPs?
	More income
	Farming work reduction
	NTFP collection reduction
	Improved forest protection
	Improved local management
	Stronger relationships among villagers
	Stronger relationships among villagers More experience and knowledge Don't care
	Don't care
2.8. Are	you willing to participate in value addition activities?
	☐ Yes ☐ No
Reason:	
2.9. Day	s per week to participate in value added activities
	Whole week
	4
	3
	2
	1
	Depends on time available

2.10. Ha	ave you ever done any value addition activity for NTFPs?
	□ Yes □ No
If yes, what i	is it?
When did yo	ou conduct the activity?
Do you still o	do it?
(If not) Why	did you stop?
2.11. W	That is your opinion about the feasibility of NTFP value added activities in the future?
3. Non-tim	ber forest products in the context of biodiversity
3.1. Do	you think the quantity of NTFPs are reduced year by year? Why?
	□ Yes □ No
If yes, the rea	asons are:
	Over - harvesting
	Market demand
	Outsiders
	Unsustainable harvesting
	Others
3.2. Hov	w do you think NTFP quantity can be increased?
	Improve the method of harvesting
	Domestication/plantation
	Better management
	Stop collection for a few years
	Ban collection by outsiders

	Combine all solutions					
3.3. Do y	you think the quality of NTFPs are reduced	year by year? Why?				
	□ Yes □ 1	No				
If yes, the rea	asons are:					
	Harvesting method					
	Trader purchasing all NTFPs, irrespective	e of quality				
	Lack of management at local level					
	Over - harvesting					
	Awareness of collectors					
	Lack of local management					
3.4. How	v do you think NTFP quality can increase?					
	Improve the harvesting method					
	Create incentives for the collectors					
	Cooperation of traders					
	Forest protection					
	Harvesting limitation.					
3.5. Are	you willing to follow solutions that can inc	crease the quantity and quality of NTFPs?				
	☐ Yes	□ No				
3.6. If yo	rou choose to follow solutions to increase to	the quality and quantity of NTFPs, which				
resu	ults do you think will affect your livelihood	4-7				
	More benefits to villagers in terms of incr	eased income				
	Improvement in the knowledge of village	ers				
	No results					
	Waste more time to wait until NTFPs are	harvestable				
	Others					

4. Recommendations



Natural conditions of Tabhing Commune



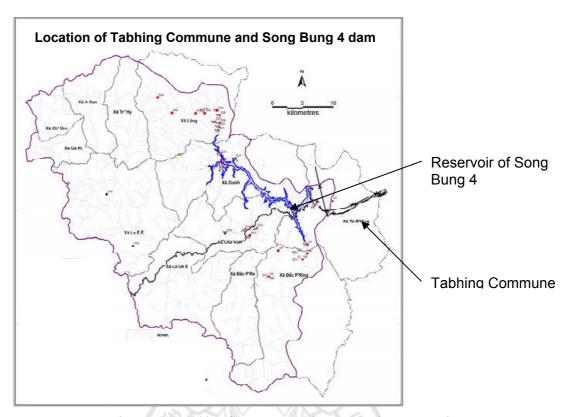


Figure B1 Tabhing Commune and Song Bung 4 Dam Locations

Table B1 Mean Monthly Rainfall and Mean Annual Rainfall (mm) at Song Bung 4 Dam Site

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
36	19	37	86	205	183	132	181	313	552	400	128	2271

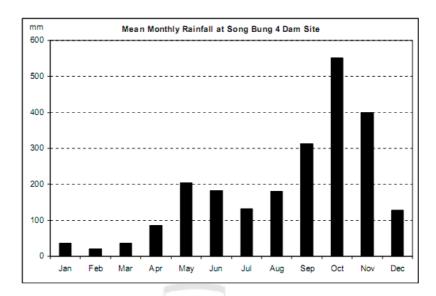


Figure B2 Mean Monthly Rainfall at Song Bung 4 Site

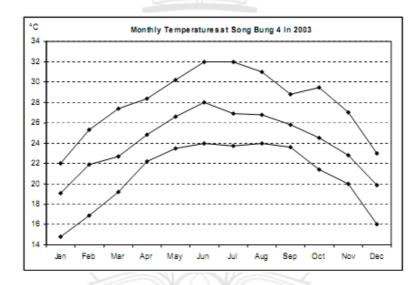


Figure B3 Monthly Temperatures (Mean, Maximum and Minimum) at Song Bung 4 Dam Site in 2003



Socio-economic conditions of Tabhing Commune

A. Population of Tabhing Commune

Table C1 Demographic Profile of Tabhing Commune (2009)

Village	HHs (all	Population	Men	Women	HHs (other	Labor	
ethnic					ethnic groups		
	groups)	Å			than Katu)		
Four studied villages							
Pa Xua	102	461	221	240		190	
Za Ra	54	250	127	123		110	
Pa Toih	28	119	59	60		35	
Vinh	112	575	290	285	1-Hare	285	
Other village	es (in the commu	ne)					
Ca Dang	78	347	208	139	1-Ve (Gie Trieng)	134	
Pa Ia	35	159	80	79		78	
Pa Rong	34	182	89	93	1-Tarieng	88	
Pa Va	46	210	95	115	2-Ve	109	
Total	Total						
(whole	557	2,620					
villages)	LE.			3	1		

Source. Tabhing Commune Peoples Committee, 2009

B. Livelihood activities

1. Agricultural Activities

Agricultural activities include farm work and livestock husbandry. Although overall these form the main livelihood activities of households, they are not the only source of income. Thus, in determining wealth ranks we need to look at the extent of participation of households in each activity. In light of this, shifting cultivation can be seen as the single most important source

of cultivated food. Estimating the exact income associated with each crop consumed is difficult, since the villagers harvest similar crops at different times of the year.

According to discussions with the villagers and our observations in the field, taking into account the commune's topography, we divide the area's main agricultural livelihood activities into three components.

1) Upland Field Cultivation

Shifting cultivation is the traditional farming method here, covering all crops grown on slope lands. No fertilizers are applied on upland fields, nor are these lands plowed. The upland fields have no irrigation system, and thus depend heavily on natural rainfall. Crops in these fields are regularly damaged by wild animals and insects, often limiting their productivity. Mostly, villagers plant maize, upland rice, beans, and cassava on their upland fields.

Average each household possesses up to 2 ha of upland field, with details varying by the capacity of households in terms of labor. A household with a large labor force is more likely to be able to expand their land area.

The livelihoods of all three lower poverty groups are based mainly on upland agriculture, significantly more so than the well-off group.

2) Lowland Field Cultivation

Activities in the lowlands mainly comprise paddy rice cultivation. Only about 28.5 ha (0.12%) of Tabhing Commune's natural land is used for paddy rice, a very small number when compared to the whole area.

3) Livestock Husbandry

Generally, three animal species are bred here: cows, pigs, and chickens. Cows do not appear numerous. Villagers reported that this reflects their lack of capital to breed and take care of such large animals. Moreover, villagers felt that they do not have the necessary skills and knowledge to effectively manage livestock for economic purposes. Villagers generally leave their cattle to graze in common pastures. This has led to problems in the past, specifically in the floods of late November 2007 when many cattle drifted away or drowned.

As high as 70-80% of cows and pigs are sold to outsiders (through middlemen). This trade is generally carried out by the well-off groups who have a lot of livestock. Chickens are

generally used for subsistence consumption. The poor households generally only have a few livestock and use them mostly for consumption.

2. NTFPs harvesting

The villagers gather NTFPs mostly for trade, using only a marginal part for subsistence consumption. Main NTFPs are rattan, malva nut, broom grass, honey and lon bon (fruit). Depending on the season the villagers go to the forest to harvest these specific NTFPs. All the villagers said to have the right to harvest NTFPs.

The extent to which households generate income from NTFPs depends on the amounts of NTFPs they collect in the forest. This, in turn, depends on two main factors: (i) labor applied and (ii) the abundance of NTFPs around each village. As these factors were difficult to measure, the exact income from NTFPs of each household can only be estimated through percentages.

3. Gold Mining

Along the river beds of the Thanh River, especially after floods, villagers often mine for gold, by sieving through sediment deposits. Although such activity is strictly prohibited in the Song Thanh Nature Reserve core zone and buffer zone, these gold mining operations are widely carried out. The villagers especially engage in this activity in the 1-2 months before traditional New Year. During this period a lot of villagers concentrate their efforts on this activity (second only to their ongoing farm work). Most of the villagers, ranging from children or the elder community members, participate in this work as a temporary 'sub-job', generally after they are free from farm work. With simple mining tools, a day's mining labor can earn them between \$1 and \$7. Money earned from this activity is often used to pay off outstanding debts. Each village has 3 or 4 grocery shops at which villagers can buy on credit; they are expected to pay their debts back within a year. Since many villagers have overdue debts, the majority of the gold obtained by their mining efforts is handed to the grocery store owners to cover the debt (and thus to be able to apply for new credit in the following year).

4. Trading

Trading here in Tabhing mostly belongs to Kinh people who run the grocery shops at which the villagers buy items to meet their daily needs. These traders also act as middlemen,

buying agricultural products and NTFPs from villagers. The villagers can buy on credit and, after they harvest each crop they can repay their loan. Such financial arrangements between villagers and shop owners implicitly bind those villagers to do their trading exclusively with that particular grocery shop. Interestingly, some of these shops are also places where illegal wild animals and illegal timber are stored before being traded further outside the commune.

Some of local people also act as middlemen in their own village, collecting NTFPs from community residents for resale to outside traders. When doing so they have to pay taxes to the village fund based on the amount of products traded; in exchange, they have a right to collect these products locally. Villagers are not allowed to sell to other middlemen, thus ensuring a stable supply of raw materials to the designated traders. All trading activities are carried out by well-off families since only they have the capital needed to invest in such businesses.

5. Wage Labor

Wage labor does not form a major income source for households in this area. Only during harvesting, when there is demand for labor, do households hire labor from their village. On average labor wages amount to \$1.25 to \$1.80 per day, per person. In some cases arrangements are made whereby labor is exchanged without cash. For instance, on some day a particular household may need help from their neighbor, whose labor gets repaid on another day when that neighbor requires extra labor. Such arrangements are common and do not involve a financial transaction. In some exceptional cases, a well-off household may employ the poor to carry out labor tasks regularly, especially farming work.

6. Traditional Handicrafts

In the past, this area was known for its traditional weaving handicrafts. Nowadays, however, such activity is no longer is a main source of income for the communities. In 2001, Found of Foundation for International Development / Relief (FIDR) implemented a project in Za Ra to re-engage people in handicraft making. This project still continues to operate today. An association was established with a designated leader and 26 household participants, consisting mainly of women aged between 18 and 50. The total income from this activity in 2007 was more than 50,000,000 VND (approximately \$3,125). The main market for these handicrafts runs through a system of order placement, whereby demand comes from Hoi An (Quang Nam

Province) and Da Nang. The project also has exhibitions in Hanoi and Ho Chi Minh City. If they can develop their product and expand this model, local households may gain more income. However, this is generally not a full-time job, with women spending only 3 days per week on this activity. The rest of their time is spent on farm work. This livelihood activity has potential to upscale to households from other villages, since they all have similar skills.

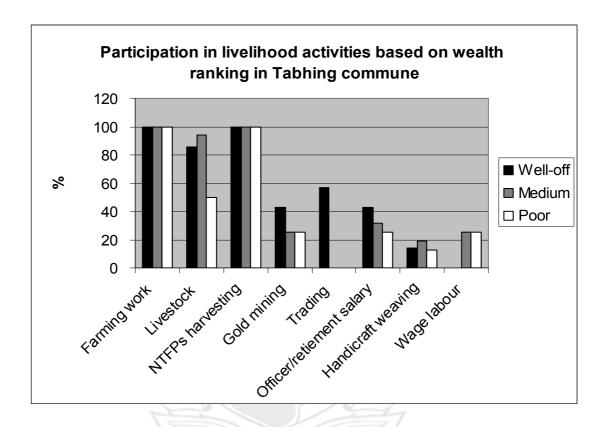


Figure C1 Participation in Livelihood Activities Based on Wealth Ranking in Tabhing Commune

C. Expenditures

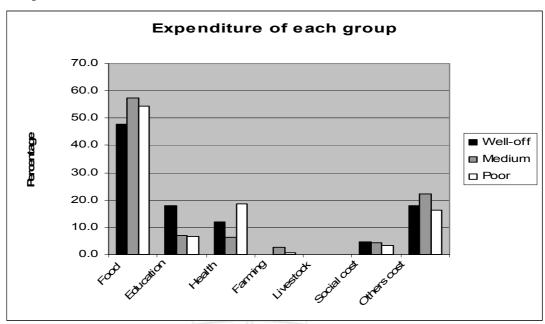


Figure C2 Expenditures Based on Wealth Ranking

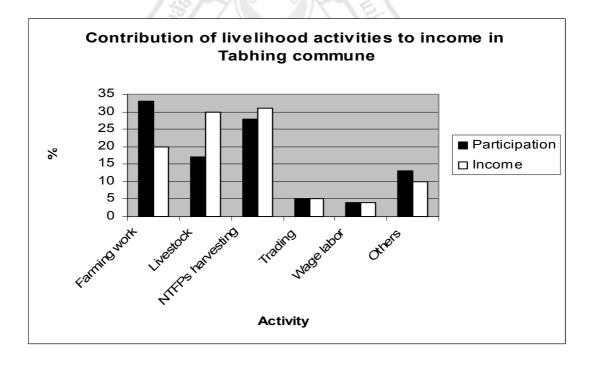
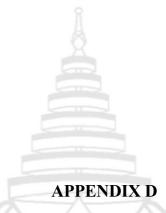


Figure C3 Contribution of Livelihood Activities to Income in Tabhing Commune



Related results of NTFPs situation and value-added activites

Table D1 Fee of Rattan Collection from outsider

Fee reportedly paid by	Fee paid to	Type of fee paid	Amount paid
Rattan Company	Management Board	Facilitation fee	300,000 VND/mt
	of Song Thanh		(\$18.75/mt)
	Nature Reserve		
Luc Dong Company	Vinh VMB, for the	Fee per 4 mt trucks of	300,000 VND/4
	VDF	rattan collected in Vinh	mt load
		buffer zone	(\$18.75/truck)
Any licensed Rattan	Commune People's	Harvesting fee per ton	300,000 VND/mt
company	Committee		
	District People's	Harvesting fee per ton	250,000 VND/mt
	Committee		
	District Tax Office	Harvesting fee per ton	170,000 VND/mt

Source. IUCN, 2007

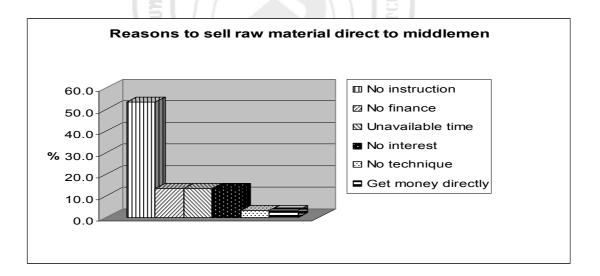


Figure D1 Reasons to Sell Raw Materials Direct to Middlemen

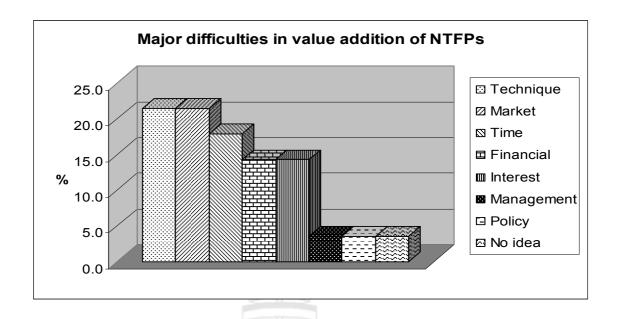


Figure D2 Major Difficulties in Adding Value to NTFPs

Table D2 Overview of NTFPs in terms of Biodiversity Conservation

Product/	Harvesting change*	Harvester	Harvesting	Key
Season	(time,		technique	constraints
	quality/quantity)		1 2	
Rattan	Time: 30 min to 2-3 hrs	- Local villagers	- Remove the outside	- Forest far away
(All year,	Quantity: 5 to 2-3 m	- Hired people	of stem	- Monkeys
but	Quality: 2,500 to 1,250	from Quang	- Chop the stem, even	destroy the plants
mostly in	stems	Ngai Province	the young ones	when they eat the
Jan-Feb)		- Villagers from		young shoots
		Ca Dy		- Over harvesting
		Commune		and unsustainable
				process
Broom	Time: 10 min-1 hr	- Local villagers	Pull on the whole bush,	- Lass land
grass	Quantity: light decrease	and those from	use feet to lay it on the	available
(Feb-	Quality: No	another	ground, and remove	- An animal eats
Mar)		commune	the grass to be used	the blades of grass

Table D2 (continued)

Product	Harvesting change*	Harvester	Harvesting	Key
/Season	(time,		technique	constraints
	quality/quantity)			
Banana	Time: 30 min-1 hr	Whoever	Chop down the banana tree and	Cut down the
flower	Quantity: light decrease		take the flower	tree when doing
(All	Quality: No			shifting
year)				cultivation
Honey	<u>Time</u> : 3-4 hrs(1975)	- Those few	Climb up high in the tree and use	- Difficult
(Mar)	Quantity: decrease	villagers who	fire to chase the bees out of their	technique to
	Quality: No	know the right	hive and take the honey	learn and follow
		technique to get		successfully
		the honey		
Lansat	<u>Time</u> : Nearby – 1 hr	Local villagers	Most HH allow traders to harvest,	- Some animals
(Sept-	Quantity: increase		only cut from the tree	such as bats,
Oct)	Quality: No		Nan Nan	monkeys, and
	Wil		71112	squirrels eat the
				fruit
				- Climate also
				affects fruit,
				such as high sun
Malva	Time: 30 min to 5-6 hrs	- From Dai Loc	Many ways to harvest:	- The location
nut	Quantity: strong	District using a	+ collect on the ground when it	of malva nut and
(Jul-	decrease	machine saw	drops down	its height cause
Aug,	Quality: Ripe nut to	- Villagers from	+ chop the tree by the ax or saw	difficulties to
every 4	green nut	other communes	+ be hired by outsiders to collect	harvesters
years)			malva nut and get daily wage	

Note. * Change from the past to present (over the recent 20 years or so)

Table D3 Reasons for Reduction in Quality and Quantity of NTFPs

	Reasons for reduction	Percentage
	Overharvesting	47%
Quantity	High market demand	33%
	Unsustainable collection practices	20%
	Total	100%
	Lack of awareness by collectors	48%
	Carelessness about product quality by traders	24%
Quality	Unsuitable collection methods	20%
	Overharvesting	4%
	Lack of local management	4%
	Total	100%

Table D4 Implementation of Value-added Activities Based on Level Management Level

Value- added options	Organization & management	Advantages	Difficulties
Rattan	HH Level		
planting	- HH management	- Easier to manage at HH level	- Requires more
	with local government	- More responsibility to take care	time to carry out the
	technical support	of new plants	planting in the forest
	- Investment funds	- Sizeable experience in planting	& care for the plants
	borrowed from the		- New techniques
	bank		are required for
			effective planting in
			the forest

Table D4 (continued)

Value-			
added	Organization & management	Advantages	Difficulties
options			
Rattan	Group Level	- Cooperation in	
planting	- Sharing work and benefit among groups	sharing work and	- Management
	of rattan planters	benefits	mechanisms
		- Members can help	needed among
		each other spend	members of group
		time and labor to care	
		for plants	
Lansat	HH Level	- High levels of	
planting	- HH management with local government	interest from local	- Knowledge of
	technical support	people	techniques to care
	- Investment funds borrowed from the bank	- Basic planting	for plants &
		skills at present	prevent disease
	HH Level	- Easier	
	- Final products made by each interested	management and	- Lower overall
	family, including all processes: collecting	direct benefit to those	productivity and
	raw materials, drying raw materials, buying	who do the actual	risk of less
	materials & equipment, making brooms	work	professional
Broom	- Sell final products directly or through		products
	middlemen		
making	Group Level		
	- Divide work into component processes:	- Specific and more	- Good leaders
	collecting group, drying group, broom	professional on each	are essential
	making group and marketing group.	element of the whole	- Needs strong
	- Share benefits based on each group's	process	management
	contribution to the whole value chain	-	_

Table D4 (continued)

Value- added options	Organization & management	Advantages	Difficulties
Rattan	Group Level		
semi-	- Similar to broom making: dividing up	- Creates more	- High startup
processing	the work: raw materials collection team,	employment in	investment costs
	processing team, & marketing team.	the village	- Strong management
	- Sharing benefits based on each team's		& operational control
	contribution to the whole value chain		essential

 Table D5
 Implementation of Value-added Activities based on Time Frames

Activity	Implementation consideration	Remarks
	Short term	Jan Comment
Broom	- Villagers can undertake this activity first	- Villagers should be trained
making	due to its low investment costs for all	carefully in broom-making
	interested HHs or groups	techniques
	- Suitable for poor HHs and participation	- Skills in management and
	by elderly people or women	production must be developed
Rattan semi-	- With financial support from outside this	- Need to get outside support
processing	options can be started early due to the huge	from government or NGO due to
	opportunity it offers to add value and	high investment costs
	increase villagers' incomes	- Study more about the feasibility
	- In case finance needs to be assembled	to implement this option regarding
	solely within the local community, it takes	both finance and technical issues
	time to start up this operation	

Table D5 (continued)

Activity	Implementation consideration	Remarks
	Long term	
Rattan	- Priority for rattan planting as soon as	- Planting techniques need
plantings	possible due to sharp declines in quality and	careful attention as an important
	quantity at present, high market demand,	factor in ensuring high plant
	available land under the forest canopy, and	survival
	potential to move to the next step in the value	
	chain (semi-processing)	
	- Payback time is shorter than lansat	
	plantings	
Lansat	- HHs with large home garden areas and	- Planting techniques need
plantings	suitable conditions should apply this option	careful attention as an important
	as a high priority	factor in ensuring high plant
		survival



CURRICULUM VITAE

NAME Ms. Bui Thi Ha Chau

DATE OF BIRTH 18 May 1984

ADDRESS 20/21/1 Nui Thanh Str, Tan Binh Dist

Ho Chi Minh City, Vietnam

EDUCATIONAL BACKGROUND

2006 Bachelor of Science

in Environmental Sciences

Department of Environment

University of Natural Sciences, Ho Chi Minh City

WORK EXPERIENCE

2007-2009 Research assistant

"Capacity Building for Natural Resources

Management and Socio-economic Benchmarking in

the GMS" project

2006-2007 Officer

Institute for Technology, Management and

Environmental Resources, Ho Chi Minh City