



**Strengthening Protected Area Management in Viet Nam
-SPAM Project**



**ASSESSMENT OF THE SPECIAL-USE FOREST SYSTEM
AND ITS MANAGEMENT IN LAO CAI PROVINCE**

**Original written in Vietnamese by
the Lao Cai Provincial Working Group**

Project funded by Danida,
Managed by WWF Denmark and the WWF Indochina Programme
and implemented by the Forest Protection Department,
Ministry of Agriculture and Rural Development

Technical Report No. 5

Hanoi - 2002

ACRONYMS

Danida	Danish International Development Agency
DARD	Provincial Department of Agriculture and Rural Development
DOSTE	Provincial Department of Science, Technology and Environment
FPD	Forest Protection Department
GDP	Gross Domestic Product
MARD	Ministry of Agriculture and Rural Development
MBs	Management Boards
MOSTE	Ministry of Science, Technology and Environment
NR	Nature Reserve
PAs	Protected Areas
PCs	People's Committees
PFPD	Provincial Forest Protection Department
PRA	Participatory Rural Assessment
PWG	Provincial Working Group
SPAM	Strengthening Protected Area Management
WWF	World Wide Fund for Nature
5MHRP	5 Million Hectares Reforestation Program (661 Program)

ACKNOWLEDGEMENTS

Issues related to Hoang Lien Nature Reserve in Lao Cai Province have attracted great interest, not only from the local authority but as well the Government, for the sustainable development strategy formulation process. In an effort to review all the achieved results during 1994-2001, indicate opportunities and challenges confronted by Hoang Lien Nature Reserve and at the same time propose options for better management of this protected area in the coming time, we developed this report on "Assessment of the Special-use Forest System and its management in Lao Cai Province".

First of all, we would like to convey our sincere thanks to Danida for their financial support to the SPAM project in Viet Nam, including the pilot study in Lao Cai Province. We also would like to take this opportunity to express our special thanks to WWF, the SPAM National Project Office, international and national experts from MARD and the Forest Protection Department; Leaders from People's Committees and relevant Departments, sections in Lao Cai Province; Leaders from People's Committee of Sa Pa District and last but not least to local authorized bodies, mass organisations and people of various ethnic groups living in the buffer zone of the protected area who have made great contributions to the completion of this report.

On behalf of the authors

Nguyen Quang Hung

Chairperson

Lao Cai Provincial Working Group

Authors

#	Name	Qualifications	Position	Note
1	Nguyen Quang Hung	B.A. (Econ.)	Director of Lao Cai PFPD	Team Leader
2	Truong Quang Hai	Ass.Prof. - Dr.	Vice Dean of Geography Faculty, Head of Ecology Group - Hanoi National Uni.	Co-Team Leader
3	Duong Ba Truc	B.A. (Biology)	Lao Cai DoSTE Deputy Director	Secretary
4	Hoang Van Chinh	B.A. (Finance & Accounting)	Director of Lao Cai Provincial Finance and Pricing Dept.	Member
5	Pham Van Cuong	B.A. (Agric. Econ.)	Director of Lao Cai Provincial Planning and Investment Dept.	Member
6	Nguyen Ba Viet	B.A. (Econ.)	Deputy Director of Lao Cai PFPD	Member
7	Nguyen Thi Lan	Silviculturist	Head of Forest Protection & Management Section-Lao Cai PFPD	Member
8	Luong Cong Hoan	Silviculturist	Vice Head of Forest Protection & Management Section-Lao Cai PFPD	Member
9	Hoang Van Ha	B.A. (Econ.)	Vice Head of Administration Section - Lao Cai PFPD	Member
10	Nguyen Manh Hung	Silviculturist	Vice Head of Technique Section-Lao Cai DARD	Member
11	Luong Kim Tan	B.A. (Biology)	Lao Cai DoSTE expert	Member
12	Hoang The Hung	Eng. of Mining & Geology	Head of Mapping and Topography Section - Lao Cai Provincial Land Admin. Dept.	Member
13	Dinh Ngoc Cam	B.A. (Agric.)	Head of Agriculture & Rural Development Division-Sa Pa Dist.	Member
14	Pham Van Dang	Silviculturist	Deputy Director of Hoang Lien-Sa Pa NR Management Board	Member

CONTENTS

[Introduction](#)

5

[Chapter I: Overview on Hoang Lien Nature Reserve and relevant issues](#)

7

1.1	General information on Lao Cai Province	7
1.2	General information on Sa Pa district	9
1.3	Overview on Hoang Lien Nature Reserve	11
1.4	Objectives and duties of the pilot study at Lao Cai	13
1.5	Implementation methods	14
	Chapter II: Evaluation on current status of Hoang Lien Nature Reserve system	17
2.1	Evaluation of boundary, area, biodiversity of protected area and its buffer zone	17
2.2.	Assessment on the organization of the protected area system	21
2.3	Assessment on the relationship between the protected area and sectors, districts, communes and village communities	23
2.4.	Assessment on the execution of the forest law	28
2.5	Assessment on level and effectiveness of investments	32
2.6.	Assessment on impacts of socio-economic activities on the protected area	35
2.7.	Assessment on impacts of the ecotourism on the protected area	38
2.8.	Assessment on raising awareness of the communities	41
	Chapter III: Orientations and measures to improve management capacity of the protected area of Lao Cai Province	43
3.1.	Perfecting the protected area system	43
3.2.	Perfecting the management mechanism	45
3.3.	Solutions to investments in the protected area and buffer zone	47
3.4.	Human resource training solutions	49
3.5.	Cooperation solutions	52
3.6.	Priorities for enhancing management capacity of the protected area	53
	Conclusion and Recommendations	55
	Annexes	59

INTRODUCTION

Located within the geographical area characterized by the tropical monsoon, Viet Nam is endowed with a very typical and rich ecological system of evergreen tropical, tropical humid deciduous and sub-merged forests. Our forest is very valuable in terms of biodiversity. According to the latest evaluation made by the World Conservation Monitoring Center, Viet Nam is ranked 16th in relation to the level of biodiversity (WCMC, 1992).

Realizing the important role of biodiversity, the State has set up more than 100 protected areas on mainland, wetland and coastal areas over the last several decades.

The establishment of a protected area system aims to preserve and maintain all typical and valuable ecological systems in terms of scientific and economic values and at the same time to preserve the valuable gene source of wild animals, protect culture-history-environment oriented landscapes so as to partly contribute to sustainable development for the interest of the community. .

In spite of strong efforts made for biodiversity conservation, degradation is still taking place in our country (Forest Protection Department – FPD, 1999). At the present time, forest coverage is only 33,2% (MARD, 2000). Forest coverage proportion of high quality natural forest is only 10%, of which primary forest occupied 1% (Collins et al. 1991). The biological resource is degrading. As described in the two Red Books, 366 species of animals and 350 species of plants are now threatened.

In order to intensify efforts for the conservation of our typical biodiversity system, FPD has implemented a Danida funded project on strengthening protected area management (SPAM) under WWF's execution. The main objective of this project is to formulate a strategy on protected areas management, which aims to encourage the establishment of close workflow/coordination among relevant stakeholders in order to jointly focus the available sources and efforts on biodiversity conservation oriented activities.

Representing different ecological zones of the country four provinces, Lao Cai, Thua Thien Hue, Gia Lai and Ba Ria-Vung Tau

were selected as pilot areas to conduct in-depth study on the current status of protected areas, application of the inter-sectoral accessibility approach on the process of plan formulation, development and management of protected areas.

Hoang Lien Nature Reserve in Lao Cai Province is located on the interface of two geological and three biogeographical zones, where unique animals and plants in the world occur (Frontier - Viet Nam, 1999). Over recent years, the Forest Protection Sub-department in Lao Cai Province and the management board of Hoang Lien Nature Reserve have made untiring efforts to protect and manage a unique mountainous tropical ecological system on Hoang Lien mountain range. Unfortunately, the protected area is seriously threatened by forest fire, illegal forest products exploitation and animal hunting, added to by slash and burn agriculture and inappropriate livestock grazing. The underlying factor leading to this deforestation is miserable living conditions, backward cultivation and low educational levels of ethnic people living inside and adjacent to the protected area. Insufficient planning for ecotourism development is a potential threat to the reserve.

In order to comprehensively assess activities related to organization and management of Hoang Lien NR, a cross-sectional Provincial Working Group (PWG) was set up constituted by representatives from relevant agencies in the province and local community.

To assess the economic, ecological and historical-landscapes system, the PWG applied appropriate study approaches such as information collation, PRA, consultation, data analysis, synthesis and processing to assess the following aspects:

1. Boundary, area, biodiversity of protected area and buffer zone.
2. Organizational system of the protected area.
3. Workflow/relation between the protected area and various agencies and sectors at district, commune and village community.
4. Forest law enforcement
5. Investment level and efficiency
6. Impacts of socio-economic activities on the protected area.
7. Impacts of ecotourism on the protected area
8. Local people's awareness improvement.

On the basis of synthesizing all previous study results in addition to that from this survey, the report on analysis of Hoang Lien Nature Reserve system indicated achievements, difficulties, challenges and opportunities on biodiversity conservation and protected areas management in Lao Cai Province providing the practical and theoretical basis for recommendations for formulating a protected area management strategy in Viet Nam.

Due to limited study duration and professional knowledge, oversights are unavoidable and we hope to receive constructive comments from managers, experts and colleagues.

CHAPTER I

OVERVIEW ON HOANG LIEN NATURE RESERVE AND RELEVANT ISSUES

1.1 General information on Lao Cai Province

As a mountainous province, Lao Cai covers a natural area of 8.057 km², next to China on the north and northwest, Ha Giang and Yen Bai Provinces on the east, Lai Chau and Son La Provinces on the West and the South. There are 27 ethnic groups in Lao Cai Province with a total population of 594,600 (1/4/1999).

In terms of administrative structure, Lao Cai consists of nine districts (Si Ma Cai, Bac Ha, Muong Khuong, Bao Thang, Van Ban, Than Uyen, Bat Xat and Sa Pa) and two towns (Lao Cai, Cam Duong) with 180 communes including 138 mountainous communes.

There are many high mountain ranges in Lao Cai, Hoang Lien Son mountain range runs in a Northwest-Southeast direction and is considered as a natural catchment of the Red and Da Rivers. From the Viet Nam-China border, the mountains range through May Pass, reaching the heights of Ngu Chi Son range at heights of 2500-3000 m, to the west of Ta Giang Phin and then slopes to the pass at Hoang Lien varying in height from 2200 - 2400 m and then sharply rises as high as Fansipan Mountain at 3,143 m and finally lowers gradually to the height of 279 m at Minh Luong Pass in the direction of Than Uyen.

Following Hoang Lien Son mountain range, Lang Cung mountain block is the second biggest mountain with the height of 2,913 m, Khao Pha mountain of 2,577 m, Phu Nam Than of 2,132 m and Phu Nam Sap of 1,706 m.

Bordering with Lai Chau is a low mountain range belonging to the basin of Nam Mu River and Kham Pha-Nam Mu Range at the height of 1,823 m, a catchment of the Nam Mu and Da Rivers. Nam So area with the height of 2,630 m is the peak of Phu Sam Range.

Hong and Chay Rivers are surrounded by the Voi (Elephant) Mountain Range that runs in a northwest-southeast direction with the average height from 500-700 m. On the northeast are the Bac Ha-Muong Khuong Mountain Ranges that belong to Chay

River basin with an average height from 1,300 to 1,400 m. Lao Cai topography is strongly divided by river and stream systems resulting in difficult transportation between areas in the province.

Lao Cai is also very rich in terms of minerals with 103 mines, of which Cam Duong Apatit is the unique mine in our country with predicted deposit of 2 billion tons and surveyed deposit of 908 tons. Sinh Quyen copper mine comprising copper-gold mixture with the identified deposit of about 600,000 tons of copper, 120,000 tons of Niken, 20 tons gold and 25 tons of silver. Bao Ha steel mine is also a very promising one.

Lao Cai is characterized by interior tropical monsoons, however, high mountainous topography and Fansipan peak of 3,143 m divide the Lao Cai mountainous area into two parts towards northwest-southeast; east Hoang Lien Son and west Hoang Lien Son resulting in a complicated division vertically and horizontally.

As regard to hydrography: within Lao Cai territory, there are 107 rivers with the length of over 10 km, belonging to 3 branches of Red River: Thao, Chau and Nam Mu rivers basins. Thao and Nam Mu river basin is vulnerable to rock and flash floods and natural calamities as most of the river branches originated from Hoang Lien Son mountain range at the height of over 1,000 m, with steep sides and fan-shaped river bed concentrating water flow and then leading to the creation of such abovementioned floods.

Being endowed with such a diversified rock layer, the soil layer is also very rich in terms of quantity with 20 different types of soil distributed on 4 different areas. Tropical Feralit soil exists in areas below 900 m height; humus feralit in the area from 900-1800 m; feralit process gradually reduces and finally stops with the presence of humus alit and from the height of 1,800 m onwards, rough humus is dominant.

Vegetation is very luxuriant in mountainous area of Lao Cai, comprising two main zones, tropical vegetation from the height below 700 m and sub-tropical vegetation from 700 m upwards.

In terms of socio-economic status, Lao Cai is known as an agricultural province. According to the population investigation data on 1/9/1999, 492,700 out of the total population of 596,400 people are farmers, accounting for 83% of the entire population. Urban population only makes up 17%. Total agriculture production value, according to estimates in 2000, is about 501.3 billion VND, average income of rural farmer is 1,035.721 d/capita/year (equivalent to 70 USD/capita/year).

Lao Cai has great potential in terms of land, particularly forestland. According to statistical data in December 2000, Lao Cai covers an area of 805,700 ha of which:

Agriculture land: 89,272 ha

- cultivated area: 63,927 ha
- mixed garden: 6,455 ha
- perennial trees plantation area: 7,904 ha
- grazing land: 9,633 ha
- Water surface land for aquaculture production: 1,353 ha

Forested area: 249,440 ha:

- Natural forest: 204,834 ha
- Planted forest: 44,606 ha

Used land: 11,380 ha

Living land: 3,118 ha

Unused land: 452,490 ha

As forest land, the total forest land area of 543,982 ha is divided into three types of forest: protection forest of 341,335 ha, production forest of 182,656 ha and special-use forest of 19,991 ha. As estimated, forest deposit is over 17.2 million m³ of wood and 170,390,000 bamboo stems. Furthermore, Lao Cai is also endowed with various kinds of valuable trees and diversified flora and fauna. (Source: *Forest Inventory 1998*).

In the past, Lao Cai has made considerable changes in agricultural production. Up to 1999, there were 210 farms in the whole province, of which two farms were involved in annual crop plantation, 21 are engaged in perennial crops plantation while the remaining 187 farms invest in agroforestry businesses. Under the socialist-oriented market mechanism, luckier than other provinces, Lao Cai is bestowed with significant advantages of international trade and tourism potential of which international and ecotourism is dominant. Lao Cai is famous for its beautiful ecological landscapes such as Sa Pa, Bac Ha etc. with cultural traditions of various ethnic groups and last but not least an international door with Yunnan Province in China. Lao Cai already developed its socio-economic development strategy to 2005, in which income generated from tourism is planned to occupy 30% of the total commercial services income and to 7-8% of the total provincial GDP.

The development and strengthening of tourism potential and strength, nevertheless depends on the protection, restoration and development of Sa Pa protection area, in a fully sustainable way as it is an area of national and international importance.

1.2 General information on SaPa District

Sa Pa is a mountainous district located on the west of Lao Cai Province. French people first came to this district in 1903 and in 1932 the first structure was constructed in Sa Pa town as a tourist spot for high ranking officials at that time.

Population: 38,136 people (Population census in 1999)

Ethnic groups:

- H'mong: 54.22 %;
- Dao: 17.1 %;
- Kinh: 16.11 %;
- Tay: 8.06 %;
- Day: 2.07 %;
- and other groups of 2.44%.
- Total natural area: 67,864 ha

Sa Pa District is situated on steep topography with sub-tropical climate.

Sa Pa is also bestowed with various kinds of minerals (gold, dolomite, etc.) (Dang Van Bat, Do Dinh Toat et al., 1998).

Sa Pa climate is characterized as sub-tropical regime with the annual average temperature of 15.9 °C, hottest in July of about 29.4 °C and coldest in November with 3.2 °C. It sometimes falls below 0 °C with the appearance of snow. Annual average rainfall is 2,796 mm, average humidity is 85-88%, wettest in October and November. Besides, Sa Pa also experiences O Quy Ho wind (hot wind) flowing from Binh Lu, Lai Chau in late spring.

The fauna and flora system in the Sa Pa District can be assessed as one of the most diversified and richest in our country with a large number of endemic species that cannot be seen anywhere else. In terms of flora Le Tran Chan et al., 1995 found more than 1195 species of 550 genera in 154 families. Subsequently, in 1998, Nguyen Nghia Thin identified 2,024 species within the protected area. The Sa Pa or Fansipan name has been given to 22 out of the total 710 endemic species.

Additionally, Sa Pa is also a suitable commercial area not only for various kinds of flowers such as roses, orchids, gladiolus and dahlia but also for numerous kinds of fresh vegetables and natural fruits as well as providing rare and valuable forest products such as herbal plants, field mushrooms etc.

Furthermore, Sa Pa is also famous for its diversified fauna with about 66 species of rare and valuable species as stated in Viet Nam's Red Book.

Apart from that, Sa Pa also has number of famous landscapes such as Silver Waterfall (O Quy Ho), Cau May (Ta Van), Ham Rong mountain, Ta Phin cave, the nature reserve, Co Hau Thao stone providing great tourism – Sa Pa Town is a big tourism center for the country.

As regard to infrastructure, Sa Pa has Highway No. 4 passing by, national 35Kv electricity network, postal communication in addition to water and electricity systems and guest houses. The majority of these infrastructure systems are only available in Sa Pa Town.

At every commune in Sa Pa, there is one primary school, one health care station. At district level, there is a boarding school for minority pupils, one central hospital in addition to radio and television transmission station and roads for vehicles to communes.

1.3 Overview of Hoang Lien Nature Reserve

1.3.1 Natural condition features

Hoang Lien Nature Reserve is located within the territory of Sa Pa District which comprises four communes: San Sa Ho, Lao Chai, Ta Va and Ban Ho. In the west, Sapa District is next to Than Uyen District of Lao Cai and Phong Tho District of Lai Chau Province.

The nature reserve is located in the area with geographical coordinates from 22°8' to 22°23' north parallel, 103°06' - 104°00' east meridian.

Dividing the protected area among the remaining areas of the cited communes is Muong Hoa Ho Valley and Muong Hoa Ho Stream.

The protected area is located on the Northwest of Hoang Lien Mountain Range with the highest peak at Fansipan: 3,143 m;

lowest point: 300m. Nevertheless, majority of protected area is situated at the average height of 1000 m with steep mountainsides and strong horizontal and vertical division. Average slope is 20⁰-30⁰. Land slippage also occurs on high mountainsides. Karst is quite common and underground streams are present as well. (Do Dinh Toat, Dang Van Bat 1998).

Geology and soil

protected area has hydrological structure of degraded sedimentary rocks and granite rocks. The degraded sedimentary range runs from northeast to southwest, along Muong Hoa Ho Valley. On the northeast of this valley, exist many marble rocks and carbonate blocks on which the existing caves contain lots of mystery. At the bed of the valley, Diep Thach rocks and Gonai rocks occur in the narrower area. Granite range seems to expand from Muong Ho Hoa Stream to Mount Fansipan and move towards the other side of Lai Chau. Land degradation process has occurred markedly due to high humidity and large proportion of clay (Frontier, Viet Nam 2000).

The protected area comprises the following main kinds of soil: gray humus on high mountain (over 2,800 m); light yellow Alit humus on high mountain (1,700-2,800 m); Yellow Feralite on acid rocks (700-1,700 m); Yellow-red feralite humus on degraded rocks (700-1700 m); Yellow-red feralite on degraded rocks (300-700 m); Feralite has changed due to paddy cultivation. In general, in this area soil layer is from 50-120 cm thick with a high proportion of humus.

Climate and hydrography

The protected area is characterized with montane climate that changes on a seasonal basis. Average temperature is 15.3 °C, highest temperature over 30 °C and lowest is 1 °C and sometime it falls below 0 °C. Coldest period is December to January.

Annual average sunny hours are 1,398; the highest average sunny hours focuses in April: 165 hours; lowest in October with 74 hours.

Hoang Lien Nature Reserve experiences a rainy season from May to September with the highest rainfall in July and August. Average annual rainfall is 2,064 mm, highest 4,023 mm and lowest 1,763 mm. Humidity varies from 75-91% (86% average).

The big differences in elevation result in the difference of climate between places in the protected area. Wind direction is from west to east. Annually, in March and April, hot wind blows from Than Uyen and brings along with it hotness and dryness so as to negatively impact on the biological system and assist forest fires during these months. Clouds surround high altitude areas all the year around and the humidity at these places is very high.

Average water evaporation/year is 865.5 mm (accounting for 31.5% of the rainfall). Highest evaporation/year is 1,034.1 mm, lowest 84.8 mm.

Excluding the three main streams, there are not any other large streams running through this protected area: Muong Hoa Stream originates from Mount Fansipan; Sep Chung Ho Stream from Ta Van and Ta Trung Ho from B¶n H¶. These three streams then meet at B¶n D¶n Village creating the Bo River running to the Red River.

Fauna

Hoang Lien Nature Reserve is very rich in terms of animals, from different kinds of invertebrate to advanced mammals.

Mammals: 66 kinds of mammals are found on the protected area of which 16 ones are listed in Red Book of Viet Nam and on the list of animals threatened with extinction (IUCN 1996). Black Gibbon (*Hylobates concolor*) is in danger currently in addition to another 9 types of animals vulnerable and another 6 species recognized as at risk.

Birds: With 347 different species, bird diversification in Hoang Lien Nature Reserve is much richer than that of other protected areas in Viet Nam. However, four species of birds are in danger and other 6 kinds recognized as at risk (Source: *Hoang Lien-Sa Pa NR Feasibility Studies*).

Amphibians: There are 41 species in 10 genera and 6 families.

Reptiles: Up to now, 61 species including 9 listed in the Viet Nam Red Book have been recognized.

Flora:

Forest plants in the protected area are also very diversified in terms of quantity. There are 2,024 species (*Nguyen Nghia Thin - 1998*), of which 65 are listed in Viet Nam's Red Book (*11 species are at the edge of extinction, another 11 species are in danger, 32 are rare and valuable species*) and additionally there are two other species that are not yet named scientifically.

1.3.2 Socio-economic features

Population and ethnic groups in the nature reserve

In total, there are 8,574 people in 1,337 households living at the 4 communes within the protected area. Majority of the entire population is H'mong people who settled at the height of over 1,000 m and in the valley on the north of Muong Hoa Ho. There

are several densely settled villages such as SĐo MÝ Tũ, ĐỒn Thũng; Dao and Tay people settled in lower areas, Day people can be seen only at T¶ Van with a few Kinh people. Ethnic group composition can be reflected as follows: H'M«ng 56.71%; D,y 17.94%; Dao 12.25%; Kinh 6.7%; Tµy 3.6% and some others 2.8%. (2000)

The 4 communes inside the protected area cover an area of 26,789 ha, of which agricultural land: 888 ha; forested land: 13,751 ha, other used land 145 ha; housing land: 48 ha; and unused land of 11,957 ha (data in 2000: refer to Annex 1)

Economic status: agricultural production is dominant with low cultivation knowledge and shifting cultivation-oriented features. Several communities that have settled their life in Muong Hoa for a long time are successful in establishing sustainable terraced fields. The existence of both unsustainable and sustainable cultivation categories within the protected area has suggested to us the need to find the way to help H'mong people give up shifting cultivation by assisting them in having sustainable cultivation systems. According to the statistical data in 2000, households' livelihood was assessed as follows: Among the total 1,337 households, 842 have sufficient food; 357 are poor; 138 have insufficient food. The cited poverty status resulted from various causes such as lack of cultivation experiences: 191 households; large number of non-working people: 48 households; lack of production land: 120 households; vulnerable to risks: 11 households; lack of laborers: 39 households; lack of capital: 80 households; illness: 2 households; lack of output market: 2 households etc; involved in 'social evils' (drugs) - 2 households: (refer to Annex 2).

Wet paddy cultivation also takes place here (on terraced fields) and upland paddy (upland area). On average, every year it is possible to harvest around 3,330 kg of wet paddy/ha. And recently, thanks to the application of new hybrid seeds from China, productivity may reach 4,000 kg/ha. Farmers use chemical fertilizer rather than organic fertilizer.

Several other economical agroforestry species:

- Cardamom (*Amomun aromaticum*) plantations are planted under the forest canopy. This tree has high economic value as it can be used as additives and medicine. In 2000, 1 kg of *Amomun aromaticum* cost 150,000 VND(10 USD/kg). Up to now, there are many indications reflecting the more and more stable and expansive trend of such a highly economic tree. That is why a great number of the population are engaged in planting this tree. *Amomun aromaticum* plantation also helps protect mature trees since it develops under the forest canopy, particularly in old age forest. However, people have to clear surrounding young trees and leave only *Amomun aromaticum* and other large trees. Regeneration of the forest is a very real problem. As well, it also takes considerable firewood to dry such products right on the site.

It is therefore necessary to on one hand exploit advantages and on the other hand restrict disadvantages of such trees by applying new technical science into drying steps, such as the use of solar energy, coal or oil heating etc. Needed as well are in-depth studies providing relevant policies and mechanisms.

- A part from that, people also plant potatoes, legumes for self-sufficiency.

- Plantations of bamboo and rattan also can be seen as an advantage for populations in this area: bamboo is foreseen as an industrial species in the coming time as demand for cellulose is increasing while quick development of bamboo can provide more cellulose than any other woody plants. Consumption market of bamboo outputs is available for every stage within the bamboo production cycle, particularly for bamboo shoots (plantation, tending, harvesting and processing).

Apart from that, people are also involved in forest products exploitation such as mushrooms, herbal plants, honey, cat's ear, etc. and animal hunting.

Living conditions of the local people is very poor, food average is 137 kg/capita/year with serious food shortages. Supplementary food is various kinds of subsidiary crops. Food insufficiency often occurs in May, June and July of the Lunar calendar and at the end of the previous and before the next crop.

Infrastructure inside protected area

Road system for vehicles directed to central commune has been set up. Inter-commune narrow paths are also made. However, under sharp steep conditions, it is hard to transport from one commune to another.

- Postal communication is set up in every commune so as to facilitate communication in a more suitable manner than that in previous years.
- Primary school was constructed in every village and there exists one boarding school per district. However, this school is far from meeting practical needs and currently it can receive just over 400 pupils annually. Proportion of female pupils in school is much lower than that in comparison with males. Within communes inside protected area, there are 1,681 pupils at primary school age of which 781 are female, secondary pupils are 194 in total of which there are 77 females that are classified on the basis of commune and ethnic groups (refer to Annex 3).
- Households living in the Reserve have not had electricity, some of them are using small generators (300 W).
- Each commune inside the protected area is provided with one health care station whose staff are regularly dispatched directly to village and hamlet to disseminate information and raise people's awareness on food-stuff hygiene and safe, good health, environment protection, use of portable water and particularly immunizations for children in addition to other activities such as setting malaria prevention movement and providing treatment to certain common diseases. Some people still believe in praying when ill or have doubts about the effectiveness of medicine even when they are

treated and provided medicine for free. Instead they still use traditional herbs. (Frontier - ViÖt Nam - 1999).

1.4. Objectives and duties of the pilot study at Lao Cai

Under the framework of SPAM Project, the definition of theoretical and practical bases with the aim to strengthen protected area management was very urgent.

General objectives

To protect the abundant, diversified and unique biological resources at the Hoang Lien high mountains for sustainable development of Lao Cai Province.

Specific objectives

1. Strengthen management capacity of the protected area, improve the effect of forest law and policy implementation, ensure synchronous coordination between specialized agencies, and encourage community participation in conservation.
2. Orient and propose scientifically-based solutions for investment in the protected area, human resources training, cooperation in conservation, thus contributing to sound policies related to conservation.

Project duties

To address the mentioned objectives, the project has to fulfill the following duties:

1. Evaluation of the boundary, area and biodiversity of the protected area as well as its buffer zone
2. Evaluation of the protected area's organization system
3. Evaluation of the relations between the protected areas and sectors, districts, communes and villages' communities
4. Evaluation of the forest law implementation
5. Evaluation of investment levels and effectiveness in protected areas
6. Evaluation of socio-economic activities' impacts to protected areas
7. Evaluation of ecotourism impacts to protected areas
8. Evaluation of the awareness raising of the resident community

1.5. Implementation methods

To achieve the project objectives, the SPAM Project PWG was set up under Decision 2304/QĐ-CT of 10 November 2000 by Lao Cai PPC. The PWG had 10 members. It has prepared an action plan, identified contents, defined methods and implementation schedules. The action plan to analyse protected areas of Lao Cai Province is presented at Annex 4 and undertaken in accordance with the following methods.

1.5.1 Information collection

It was the basic method to collect documents and information on the current status of Hoang Lien Nature Reserve, Lao Cai. The following groups of documents were collected.

Collection of legal papers relating to protected areas was aimed to gather State regulations on protected areas in general while reviewing the application of such regulations for protected areas in Lao Cai Province, based on which recommendations would be made for supplementation, deletion and amendment of the legal papers appropriately with protected areas' development in the country-wide in general and at Lao Cai Province in particular. The collected documents were the Law on Forest Protection and Development, Decrees, Decisions and Directives of the Government (GOV), etc. Collection of documents would help evaluate the institutional and policy system for Lao Cai's protected areas sufficiently and accurately.

Documents on inhabitants, peoples, socio-economic activities from 1994 to date allowed evaluation of the current status of inhabitants, peoples, socio-economic activities in protected areas and buffer zones; and compare the changes throughout different periods from 1994 to date.

Those documents were collected from various sectors at communes, districts and province such as protected area management board, district agriculture divisions, district statistical divisions, forest protection stations, district cadastral division... Those documents together with scientific research conducted by sectors, universities, international organizations served as the foundation for the assessment of existing socio-economic situation in the protected area. Added information from various document sources could be updated more accurately and uniformly and through that constraints in keeping and need to update information would be identified.

Reports on forest management and conservation at protected area from 1994 to date allowed us to have a practical look at the existing situation of protected area's conservation and management, define weaknesses and propose solutions and recommendations to sectors at different levels in an attempt to strengthen protected area management and protection.

Scientific research documents of the province, Central universities, international organizations... were important reference sources for the thematic analysis and assessment of the report.

1.5.2. Survey and field observation methods

These aimed at editing figures collected from the aforesaid documents. This method was implemented in two ways:

- Interviews using questionnaires: the working teams went to households of villages (hamlets) with local staff to interview by using the ready-made questionnaires in order to get required information. Due to people's limited education in the protected area, the guidance for filling questionnaire was carefully done, firstly with those who could speak Viet language for them to tell those who could not speak Viet, and finally interpreters of H'mong, Dao, Giay, Tay were used to check their awareness on the issue. The questionnaires were concentrated on the following issues:

* Person, minority, sex, age, occupation, demography, labor, income, living standard, natural conditions, socio-economic conditions in the protected area and its buffer zone, close relations of inhabitant communities in the protected area and its buffer zone with those in other areas.

* Questions to explore the participation of communities to forest conservation and management at protected area, comments of people to the protected area's management and conservation as well as their desires. The questions also helped evaluate awareness of people to the protected area, their dependence on natural resources, farming knowledge in order to make them understand advantages and disadvantages that they were faced with while living in the protected area and its buffer zone.

To use the participatory method, 17 meetings in 17 villages (hamlets) from core 4 communes in the protected area have been held, 5 meetings for 5 villages of 1 commune at the buffer zone with the aims to exchange with people on the challenges and difficulties in their production and daily life, recommend solutions together with the forest management board to protect forest, improve living conditions and alleviate poverty, overcome the risks of biodiversity degradation and exhaustion of natural resources, solve the conflicts between forest protection and improvement of people's life.

- Another way was to directly interview people in the protected area and its buffer zone. This method was to supplement information which were not on the questioners, clarify ideas as well as its accuracy indicated in the questionnaires.

17 meetings for 17 core villages and 1 meeting attended by the Chief Technical Advisor were held to review activities to be done. Another 5 meetings for 1 commune at buffer zone was organized to set up direct dialogue with people in order to get to know their desire in management and conservation of protected areas, listen to their proposed solutions on a best strategy for protected areas.

This method was to assess participation of ethnic communities in conservation and management of protected area and its buffer zone (see Annex 5a and 5b).

1.5.3 Use of consultants/experts

This method was aimed to gather information from experts and consultants on the issues indicated in the report to analyse the natural conservation area systems at Hoang Lien, Sa Pa, Lao Cai. This method was applied in two ways:

1. Direct contacts: directly meet with experts to get comments on each of the 8 thematic studies and on the general report; directly meet 10 experts in the fields of agriculture and rural development, planning, finance, trade and tourism, science, technology and environment and mapping as well as experts from provincial and district people's committees, ethnic public relations committee, Women's Union and specialists on statistics and legal protection.
2. Organize provincial and district meetings to hold discussions between experts and managers of different sectors and to get agreement on recommendations, strengths and weaknesses, opportunities and challenges relating to Hoang Lien Nature Reserve.

At provincial level, two workshops have been held to contribute comments for the report on analysis of the protected area system. The workshops were attended by leading experts from various sectors, PWG and other experts interested in protected areas. 70 experts and leaders participated in the workshops.

At district level, two workshop meetings were organized. An inter-sectoral meeting was held at Sa Pa to discuss issues in the study outlines and assignment to sectors at district level to participate in the SPAM Project. The second workshop was on ecotourism in Sa Pa protected area. The workshop was attended by sectors from the province, districts, SPAM project office staff and commune representatives from the protected area to discuss various issues. These included evaluation of the situation of ecotourism in the past (from 1994 to date) and capacity to develop ecotourism at Sa Pa protected area, benefits as well as threats to the environment and biodiversity brought about by the tourism; relations between different sectors in managing ecotourism in protected area, assignment of duties to collect fees and use the collected fees, mechanism to develop ecotourism in the protected area, sharing of benefits resulting from the ecotourism, participation of community from the protected area and its buffer zone in ecotourism, management and conservation of the protected area.

1.5.4 Methods to analyse, synthesize and process data

- Processing and statistical analysis of data: the questionnaires and collected documents were processed by using Excel software on computer. Those were important data to figure out scientific conclusions, prepare tables for thematic

- studies and provide accurate and scientific review.
- Analyse the causes of biodiversity degradation, constraints hampering community participation in sustainable management and development of forest resources, the involvement of governments and unions in management and coordination of the protected area's management, and in application of policies and laws related to forests; constraints in the collaboration between functional agencies...
- Based on the analysis and assessment of outstanding problems, to recommend solutions, identify priority activities to undertake for management of protected areas.
- Preparation of thematic and general reports

CHAPTER II

EVALUATION OF THE CURRENT STATUS OF HOANG LIEN NATURE RESERVE

2.1 Evaluation of the protected area and its buffer zone

2.1.1 The protected area

According to the feasibility study (FS) prepared in 1994, the nature reserve is located at 22⁰⁰7'-22⁰⁰23' northern latitude and 103⁰⁰0'-104⁰⁰0' eastern longitude. The highest summit is Mount Fansipan (3,143 m). Within the natural boundaries, the nature reserve of 29,845 ha is located in the territories of Than Uyen and Sa Pa Districts including:

- Entire area of San Ho Commune with forest stands 267, 272, 274 and 278.
- Entire area of Ta Van Commune with forest stands 280,283, 286, 287, 290, 292 and 295.
- The south area of Muong Hoa Ho Stream of Lao Chai Commune with forest stands 279 and 285.
- Most of the area of Ban Ho Commune, including forest stands 295, 296, 297, 301, 302 and 305.
- Most of the area of the high mountains north-east of Than Thuoc Commune, including forest stands 547 and 552.
- The area at the north-east of Muong Khoa with forest stands 540, 541 and 544.

In 1997, the two communes of Muong Khoa and Than Thuoc of Than Uyen district were assigned to the Da River Catchment Management Board and the protected area reduced to 19,991 ha, including forest area of 13,499 ha, of which 12,776 ha were natural forests and 723 ha planted forests. There were also 3,682 ha bare land and hills with potential for forest plantation or regeneration and 2,810 ha of rocky mountains without trees .

The natural and administrative boundaries were defined quite clearly. At the north, west and south the boundaries were mainly the Muong Hoa Ho Stream, easy to recognize in the field but there were some hamlets/villages in the protected area so agricultural and residential land were not under management of the protected area. Therefore, internal boundaries of the protected area were not specifically identified, though landmarks were fixed. However, they are insufficient for local recognition.

2.1.2 Functional areas

There are three functional areas:

1.) *Strictly protected areas*: are the typical forests with high concentration of rare and valuable animal and plant species. The center of this forest stand is the highest summits of Hoang Lien Son mountain range. This stand was 11,875 ha.

At present, the strictly protected area is just 7,541 ha (area of Muong Khoa and Than Thuoc was transferred to the Song Da catchment project in 1997). The area had the following functions: strictly protect the existing ecosystem; monitor forest changes in all aspects based on detailed surveys and then prepare documents for tight supervision; strictly prohibit acts that harm or change forest landscapes and animals', plants' life; organize scientific research. The FS also raised management measures in order to address the aforesaid duties, as follows:

Strengthen management work and regular protection; allow to undertake scientific research which does not effect the existence and natural development of the ecosystem as well as animals and plants; prohibit construction of large roads and structures; the visits and tourists climbing mountains have to be organized and comply with specific regulations, not to damage the natural landscape and animals', plants' life; not to cut down trees, cause forest fires, hunt animals, gather samples of animals and plants, collect forest products, graze animals or plant exotic species; inhabitants were prohibited to live or cultivate in this area; it was also forbidden to use explosives to mine, exploit rock or to bring along explosive substances and weapons into the forest.

Though a series of regulations have been issued, practically for the last 7 years, those regulations were not strictly applied. Particularly, the hunting of wildlife kept going on beyond the control of the management board. The evidence was that some households still kept a shotgun for hunting, a lot of leather, horns and animal meat were available at restaurants in Sa Pa Town. Free climbing to mountains was very common, tourists were free to break off trees' branches, pick up flowers, leaves whilst they left wastes such as polymer packages, which are not biodegradable. Especially from 1994 to date, there were no detailed and large-scale research to undertake the duty of monitoring forest changes.

2.) Regeneration area

The FS defined the rehabilitation area located in between the protected area and the strictly protected zone.

Total area: 17,900 ha covering 6 communes. Presently, the area is just 12,400 ha (2 communes of Than Uyen District were handed over to other projects).

Functions and duties: rehabilitate the forest ecosystem and landscape, thus enhancing existence and development of animal populations and plants, i.e. protecting existing forest area (6,487 ha), regenerating, restoring, planting forests on bare land, hills where it was impossible for natural regeneration, preventing and fighting forest fires, conducting scientific research.

To fulfill the mentioned above duties, the FS have indicated several measures: stop the activities that reduce the forest area and reduce the quantity of forest plants and animals, regulate forests based on the principle of nature conservation, use all available technical measures (forest regeneration, rehabilitation) to restore the ecosystems, strengthen patrols.

For the last 7 years, Lao Cai has undertaken quite a big workload, all the forest areas have been well protected and 9,147 ha forests were contracted for protection. Regeneration and new planting achieved were even higher than the set plan.

However, forest regeneration still faced some outstanding problems: live tree proportion was only 60 - 70%, the prohibition of hunting was not strictly done, deforestation for fuelwood still existed.

3.) Administrative area

The total administrative area is 50 ha, located at Cat Cat Village, San Sa Ho Commune inside the reserve boundary and some spots planned for construction of guard stations.

Functions and duties: to construct infrastructure for people's welfare and service activities; to receive tourists, scientists; to build stations for forest management and protection, to establish experiment stations.

However, till now only the office of the management board and forest protection station have been constructed but not yet the experiment stations.

2.1.3 Biodiversity

Hoang Lien Nature Reserve was established to conserve the unique ecosystems of the high mountains of Viet Nam, located at the cross-roads of various geographical and biological areas.

➤ Flora:

Frontier-Viet Nam has divided the flora into 3 categories: forests, planted trees on agricultural land; small bamboo, *Phyllostachys* spp.

Mackinnon (1986) identified 3 forest types: green forests on the mountain plains, forests with deciduous trees on tropical mountains and forests in the high mountains. Planted trees on agricultural land, bushes and grass at the belts located under the elevation of 1,500m. Cover of short bamboo, *Phyllostachys* spp. growing at the elevation of over 2,800m.

According to Dr. Nguyen Nghia Thin (1998), 2,024 species from 171 genera and 200 families have been found in Hoang Lien Nature Reserve.

Practically, the flora in Viet Nam in general and in Hoang Lien Nature Reserve in particular varies depending on the elevation (Thai Van Trung 1978, Tran Ngu Phuong 1970, Mackinnon and Mackinnon 1986, P. Le Gris, F. Blasco and K.D. Singh 1989, Nguyen Duc Chinh and Vu Tu Lap 1970, Vo Van Chi 1964).

The flora at Lao Cai is very abundant and diversified with 9 families and 1 unique genus growing in a small area, which was discovered only at Hoang Lien Nature Reserve. It is not found in any other areas in Viet Nam (Le Tran Chan and NNK - 1994). Those families are *Berberidaceae*; *Bretschneideraceae*; *Dipxaceae*; *Mastixiaceae*; *Nyssaceae*; *Pentaphyllaceae*; *Rloipteleaceae*; *Strachyuraceae*; *Toricelliaceae*.

Flora and fauna of Lao Cai are valuable and rare genetic resources and must be protected, according to the Decree 18/HDBT of 17/1/1992 by the Ministers' Council to regulate the list of species having special scientific, economic and environment values, small quantity and deposits or risk extinction. Among 13 valuable and rare species under group IA (the extremely rare and valuable plants in Viet Nam), 6 of them (almost 1/2 of the total number) were found in Hoang Lien Nature Reserve, Lao Cai. Below is the list of rare and valuable species under group IA found here:

1. *Libocedrus macrolepis* Benth. et Hook.
2. *Tsuga yunnanensis* (Franch.) Mast.
3. *Podocarpus brevifolius* (Thunb.) D. Don

4. *Taxus chinensis* Ching.

5. *Amentotaxus yunnanensis* Li.

6. *Cephalotaxus* sp.

➤ Fauna:

1. **Amphibians:** the protected area has 41 amphibian species (Frontier-Viet Nam), making Hoang Lien Nature Reserve quite diversified.

2. **Birds:** Frontier-Viet Nam (1999) noted that at Hoang Lien Nature Reserve, there were 347 bird species, 7 of which were not in the list of Southeast-Asian birds. They were *Cicomia episcopus*, *Aquila clanga*, *Falco subbuteo* and *Falco amurensis*, and they were the migrant species.

Four species as indicated in the book by Bellar *et al.*, 1999, classified as vulnerable. They included the dotted eagle and *Gollinaga nemoricola*. Besides, there were 6 species at risk of extinction, including *Xiphirhynchus supercilialis*, *Garrulex milnei*, *Actinodura soulie*, *Brachypteryx stellata*, *Abroscopus hodgsoni* and *Niltava davidi*.

There were 49 species present in the north, including 2 species of *Spizixos* and *Semitoques* and *Actinodur souliei* which is known only from Southeast Asia.

3. **Mammals:** there are 66 mammal species identified, of which 16 were listed in the Red Book of Viet Nam - those were threatened with extinction (IUCN 1996). Black gibbon was highly threatened with extinction, 9 species were vulnerable and another 6 species were considered to be threatened.

4. **Reptiles:** 73 species were found at Sa Pa (Hoang Lien Mountain Range), including 7 species never found elsewhere in the country:

1. *Hemiphyllodaetylus chapaensis*
2. *Japalura swinhonis*
3. *Dipsas monticola*
4. *Pararhabdophis chapaensis*.
5. *Plagiopholis delacouri*.
6. *Subynophis melanocephalus*
7. *Trimeresurus jerdoni*.

(Nguyen Van Sang 1994)

Biodiversity conservation is aimed at conserving all genes, species and ecosystems. The value of biodiversity at Hoang Lien Nature Reserve was reflected through the abundant quantity of plant and animal species (over 2,000 and nearly 1,000 species respectively). Many animals and plants can be found only here. The flora is very typical. The flora varies depending on climate conditions at different elevations.

The tropical conditions in the low mountains (from 800 - 1,600m) have created various forest types:

- Closed forests with green trees at monsoon tropical area with the main families of Lauraceae, Fagaceae, Theaceae, Hamamelidaceae, Magnoliaceae
- Closed forests at tropical areas (low mountains) of over 1,000 m with mixed species
- The belt in the low mountains (1,600 - 2,600m): closed forests with green trees growing in communities such as *Fokienia hodginsii*, *Podocarpus* sp. and some other indigenous plants from the North of Viet Nam and South of China.
- The belt in cold areas (above 2,600 m): cold and wet, typically for high mountains. The forest, there, are often low trees with large canopy. The flora is very abundant with 5 main groups typical for tropical plants.

The flora and fauna at the protected area are the rare and valuable genetic resources, very valuable in terms of environment, scientific research, economics and ecotourism. The great concern now is how to protect such resources and develop them in a sustainable manner.

2.1.4. Buffer Zone

The buffer zone of the protected area is identified as a production forest area, located outside of and adjacent to the protected area, functioning to reduce the local people's pressures i.e. their encroachment and damaging activities, on the protected area.

The tasks and functions identified in the Feasibility Study are: to develop local forestry production; improve the capacity in satisfying local demands for forest products; partly decrease and stop encroachment and damaging activities in the protected area; use appropriate socio-economic (including social forestry) development measures to improve local people's material and spiritual lives.

The buffer zone of the protected area has been identified since 1994, located in the area of communes of Binh Lu, Ban Bo and

Phong Tho District, Lai Chau Province; Muong Khoa and Than Thuoc Communes of Than Uyen District; Nam Chay Commune of Van Ban District; Nam Cang, Hau Thao, Su Pan, Sa Pa Town, Sa P, Nam Sai and outside parts of the protected area in 4 communes of Ban Ho, Lai Chai, Ta Van, San Sa Ho of Sa Pa District, Lao Cai Province.

Thus, the buffer zone has been expanded into the area of 2 communes of Muong Khoa and Than Thuoc of Than Uyen, Lao Cai, and the core zone has been reduced within the area of 4 communes of Sa Pa.

Compared with the Technical and Economic Report of 1994, the buffer zone has expanded, i.e. into the area of Muong Khoa and Than Thuoc of Than Uyen. (According to the Feasibility Studies, the part which should have been inside the protected area actually is located in the area of the buffer zone).

Assessment of administrative boundaries

According to the Decision No.143/QDUB dated 10/4/1995 of Lao Cai Provincial People's Committee on issuance of Certificate of Land Use Right for the protected area, the administrative boundaries are located in the area of 4 communes of Sa Sa Ho, Lao Chai, Ta Van, Ban Ho (Sa Pa District), excluding Muong Khoa and Than Thuoc (Than Uyen District).

With such boundaries, administrative activities of the protected area are limited in comparison with initially identified scope.

Located surrounding the protected area is a huge area of valuable natural resources, which needs to be conserved. Therefore, current limited conserved area will lead to waste and losses of natural resources, and will endanger the protected area's safety.

2.2 Assessment on the organization system of the protected area

2.2.1. Tasks

Hoang Lien Nature Reserve was established according to Decision No.25/QD-UB dated January 11, 1994 of Lao Cai PPC on approving the Feasibility Study; followed by another Decision No.29/QD-UB issued on March 31, 1994 of Lao Cai PPC on the establishment of the protected area management board. Pursuant to the Decision No.25/QD-UB, Hoang Lien Nature Reserve has the 4 following tasks:

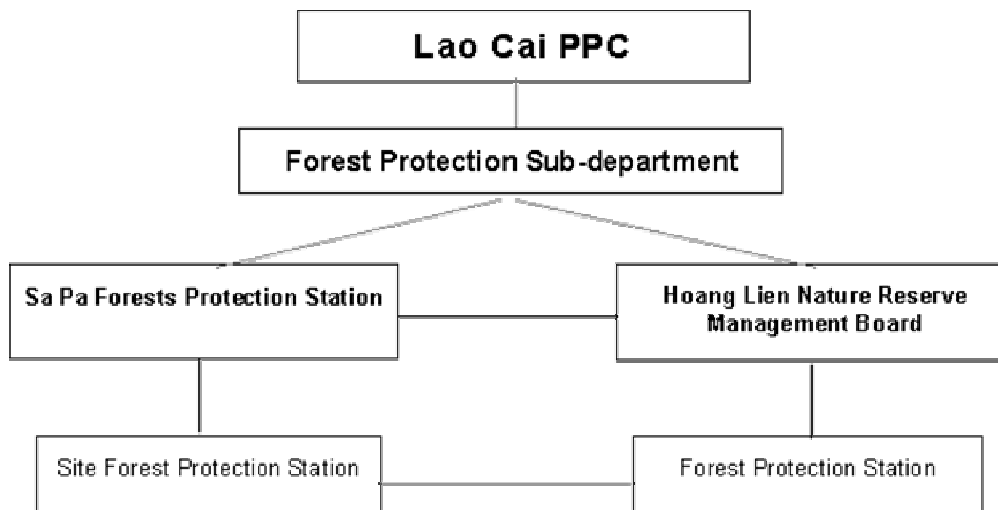
- To conserve ecosystems of Hoang Lien Son Mountain Range
- To conserve biodiversity and genetic resources in the area
- To conduct scientific studies and services to serve the conservation activity in the protected area.
- To develop the economy in the protected area, partly protect the catchment area of the Red River.

2.2.2 Organization

Based on the specified tasks, Lao Cai PPC set up a Management Board immediately in 1994, which has been under the direct control of Lao Cai Forest Protection Sub-department (see Diagram No.1), with 9 staff, including 3 part-time and 6 full-time staff who work in the office of the protected area in Cat Village, San Sa Ho Commune, Sa Pa, Lao Cai.

By 1998, The Management Board was reorganized, with 6 staff coming from the forest protection force, of which 4 are part-time: The Head – Vice Director of the Forest Protection Sub-department; one accountant from the Forest Protection Sub-department; two staff from Sa Pa Forest Protection Station (director and technical staff); and two fulltime: Deputy Head and Technical staff. In addition, there are six staff from the forest protection force to assist the Management Board, who are tasked to mobilize the public force to participate in forest protection activities, giving instructions on techniques of forest plantation and tending, detecting and proposing issues related to the protected area and buffer zone, management and scientific research. As thus, the total staff number is 12 (4 part-time and 8 fulltime) - 11 males and 1 female, 10 of the majority Kinh ethnic group and 2 of the Tay and Nung ethnic peoples; 8 have university degrees and 4 have secondary degrees.

Organizational Diagram for the Hoang Lien Management Board



Viewing the organizational chart, we recognize heavy tasks of the protected area. It has to manage a huge area of dangerous topography and difficult transportation. The management force is small and part of it is part-time. Therefore, fulfillment of the tasks has faced a lot of difficulties. Over past years, the protected area has only focused on protecting existing forest, forest planting, tending and regeneration at ecological restoration sub-areas, while many other important tasks are still pending.

2.2.3 Management capacity

As mentioned above, the majority of the protected area's staff has been trained by the official education system. They are of good health, young and enthusiastic, but their management and technical capacity and experiences are still limited. They manage to complete their assignments such as encouraging the people to be involved in forest protection, plantation and tending, etc. – a necessary but not comprehensive job. The protected area staff should be capable of synthesizing, analyzing and solving complicated problems and of doing scientific surveys and foreseeing the development trends.

This fact has led to the need for short-term and long-term training for the staff. This activity should be done in great attention and on a regular basis. Training contents should be various, including newly emerged issues. Therefore, in order to have qualified and competent staff, it requires a long-term training strategy rather than short-term and immediate training plans.

In general, the organizational structure of the protected area management board has a lot of gaps, its management capacity is too weak to fulfill assigned tasks. This has limited the results over past years. These limitations have resulted from the following organization's aspects:

- At present, Lao Cai has one unique protected area which manages a not very big area. This issue should be reconsidered.
- Staff recruited for the management board should be qualified, because they play the key role in implementation. However, the recruitment has not met the requirement.

2.3. Assessment on the relationship between the protected area and agencies, districts, communes and village communities

2.3.1 Lao Cai Provincial Forest Protection Department (PFPD)

Lao Cai Provincial Forest Protection Department is a body to assist the PPC in fulfilling the state management over forest protection, as well as an agency to exercise the law on forest protection and management and forest product management in the area of Lao Cai Province. It is tasked by the PPC to manage the Management Board of Hoang Lien-Sa Pa Nature Reserve.

Since the establishment of the Hoang Lien-Sa Pa Nature Reserve Management Board in 1994, the PFPD has controlled activities of the management board, nominating one of its leaders to be the Head of the Management Board and some others to be part-time staff of the Management Board. All tasks, objectives and guidelines of the Management Board have been well fulfilled.

Over the past years, the PFPD has instructed the Forest Protection Station of Sa Pa District to regularly coordinate with the Management Board in: frequent checks, control and prevention of violations of the Law on Forest Protection and Development, such as deforestation for cultivation, illegal forest product exploitation, hunting of wildlife and insects inside and outside the protected area; management of eco-tourists; detecting and preventing forest fires by timely actions; strict sanctions

against violations of the Law on Forest Protection and Development; raising awareness of the local people in protecting the forest and protected area; developing forest reserves.

However, for effectiveness of the Management Board's operation, its organization and personnel should be strengthened, more attention should be paid to training and facilities so that the Management Board can achieve approved objectives.

2.3.2 Department of Agriculture & Rural Development (DARD)

DARD is a body to assist the PPC in fulfilling its state management over forest and forestland in the area of the province. DARD relates to the Management Board of the protected area via the Program 327 (the period 1994-1999) and the 5 Million Hectare Reforestation Program (2000-2010) in appraising designs of production development activities such as: forest protection, regeneration and rehabilitation, new plantings, or planting of roadside and tourist gardens, etc.

During implementing the state-assigned plan, DARD and the Management Board are to build up a supporting relationship to implement the plans and enhance the supervision and state management over the forestry and forest scientific research.

2.3.3 Land Administration Department (LAD)

LAD is a body to assist the PPC in fulfilling its state management over the land in the area. LAD has coordinated with the management board of the protected area to review the protected area planning, identifying boundaries of the protected area both at the field and on the map, and classify its area into sub-areas: Strict protection sub-area, forest ecological restoration sub-area, administration sub-area, tourist and service sub-area and buffer zone. During fulfilling their tasks, the two units have built up a good supporting relationship so as to perform their tasks and functions well.

However, land management is a complicated issue. Therefore, monitoring land changes, solving land conflicts and transforming land of the protected area should be better consolidated, especially in the aspect of the coordination among agencies and levels. For example, land of the protected area has been allocated to the Management Board, but when problems occur, they will be solved by the local authority, resulting in difficulties in management of the Hoang Lien Nature Reserve.

2.3.4 Department of Science, Technology and Environment (DOSTE)

DOSTE has a state management function over activities related to the environment. All protected area's activities which relate to the environment and biodiversity of the protected area are of interest and attention of the DOSTE in prevention of negative impacts on the protected area.

DOSTE has completed studies that assess the environment of Sa Pa protected area. These studies have described in detail the status of the environment of Sa Pa and its protected area. The DOSTE has conducted research on the medical herb status in Sa Pa and in the protected area as well. These activities partly clarify the value of biodiversity of the protected area.

However, the relationship among agencies has not been secure over the past years. For example, forest fire is an environmental incident. But when forest fire happens, the DOSTE is not timely informed due to its lack of staff at district and commune levels for prevention and fighting activities. Other incidents and activities are land slides and erosion, flood, rockfalls, scientific activities in the protected area, fauna and flora inventory and scientific researches within the protected area.

All of these activities require planning, and sufficient budgets are required for plan implementation; coordination, under the framework of the state and provincial regulations, between DOSTE, PFPD and the Management Board needs to be improved for implementation of scientific research and programs of the protected area.

However, due to many external influences, the relationships with other agencies and sectors are not regularly maintained, and specific programs have not been drawn up, resulting in low effectiveness.

2.3.5 Sa Pa District People's Committee (DPC)

Sa Pa DPC is a body to fulfill comprehensive state management over all socio-economic activities, national defense and political security in the area of Sa Pa District. Over the past years, Sa Pa DPC has paid serious attention to activities of the protected area, e.g. the DPC has instructed technical sections and relevant communes to coordinate with the Nature Reserve Management Board in forest protection, timely and effective prevention of illegal forest exploitation and wildlife hunting, and in forest fire control. Achievements of the protected area result from implementation of the DPC's guidelines and support of other sectors and communes in the district.

However, this relationship is still weak in terms of coordinated management and implementation, i.e. existing overlapping tasks and functions. Difficulties do not come from the guidelines, but from actual coordination and implementation.

2.3.6 The role and participation of commune authorities in the protected area

In the protected area, a lot of ethnic people are residing and their activities, especially economic activities which are mainly based on utilization of land, have caused many impacts on biodiversity conservation in the area. Cultivation techniques are backward, productivity is low, lines of industries are not developed, and cultivation land is limited. All are attributed to local people's low incomes and high poverty rate (37.05%). Besides, the people's education standard is of a low level, the practices and customs are backward and superstition is still very evident. Therefore, the assessment on the relationship, coordination and participation of the community and local authority in biodiversity is of very high importance.

The local authority (commune level) has conducted its management activities within its administrative vicinity and it is tasked to implement the state policies. In parallel, the local authority is competent to sanction against law violations under its competency. Therefore, all activities in the area must be passed by the local authority.

In addition to the local authority, each commune has social and political organizations such as Fatherland Front, Farmers' Association, Women's Union and Youth Union. Members of these organizations are farmers. One farmer can be a member of different organizations. Each organization has its own tasks and functions, focusing on the two following main tasks:

- Supervising the law enforcement by the local authority
- Encouraging members to implement policies and laws of the Party and State, as well as protecting lawful benefits of the members.

Activities of these organizations are various and focus on one main objective - the development of individuals and community in all walks of life. Therefore, good relationships with these organizations are needed to attract their participation and collaboration in conservation.

Over the past years, the local authority and social and political organizations have coordinated with the Nature Reserve Management Board in encouraging the people to well execute contracts on forest protection and plantation and in timely and effectively preventing illegal exploitation and hunting. At the same time, commune staff have tried to be good examples for families to follow. However, in fact, commune staff have low qualifications, resulting in limitation in their understanding of the state policies and guidelines.

Therefore, training to improve their capacity, especially their standard of living, is very necessary.

2.3.7 The participation of the community and ethnic people

The people are the major labor force influencing the environment and producing products essential for maintaining human life. Their influences can be either positive or negative to the protected area. However, meetings and swearing adherence to conservation at festivals have raised initial awareness of the people on the importance of forest protection and PAs, helping them to select better ways in their production so as to limit negative impacts on the protected area. The better ways can be:

- Cultivating on the land allocated by the state, avoiding deforestation for cultivation land
- No burning, and building anti-fire roads
- Being involved when forest fires happen
- Actively receiving forests for protection
- No free-grazing livestock
- Informing the village's head immediately when forest fire happens or an illegal action occurs.
- Actively attending meetings to be updated with new information
- Having expectations to receive lands for forestation, or forests for protection

Communes in the protected area contain many ethnic minority people, the majority being H'Mong people. They have established villages and live together, or reside in the forest of the protected area. They have had a long-existing tradition to live closely with each other to develop their land and villages. Each ethnic group has its own practices and customs, of which, some are good, some are not, but all are very faithful and friendly.

This prompts us to consider the opportunities to promote good habits and limit and revoke backward ones so as to increase the participation of the community in conservation activities.

2.3.8. Other organisations and institutions

Relationships exist with other sectors such as with the Department of Commerce and Tourism for tourism management, formulation of ecotourism proposals and management of tours to the top of Fansipan and around the protected area, with the Department of Culture and Information in dissemination of information about forest protection, management of cultural building

relics (ancient rock field at Hau Thao) in the buffer zone of the protected area, with the Police and other cabinet's bodies in public security of the protected area and imposition of sanctions against violations of the forest law. In addition, coordination is also undertaken with organizations such as Ethnic People's Movement Committee, Women's Union, Youth Union, etc. in encouraging the local people to become involved in forest protection and improvement of the community's life. Some of the work implemented in coordination with the organizations have achieved good results, e.g. 'green corridors' for fire protection inside the protected area, programs of information and community education.

2.3.9. Overall Assessment

The above analysis on the relationships between the protected area and other sectors, Sa Pa District, communes and communities shows many advantages for conservation activity. This is a very important and essential pre-condition as well as a background for the development of the protected area. These relationships help to ensure sustainable development for both the protected area and local people's lives. From that point, the local authority and community have acted to contribute to the development of the protected area, and their actions have been successfully promoting these relationships.

The local authority plays a very important role. It has become a connection between the State and the Party and local people, bringing the State and Party policies and regulations to the local people's awareness, putting guidelines into the practice and actual implementation by the local people. Thus, the level of coordination and participation of the local authority is very important and its results are shown in the effectiveness of management. The coordination and participation should become regular tasks and jobs of the local authority.

From the above understanding on the protected area, the local people have transformed their awareness into positive actions that are favorable for the conservation activity. As the major labor force working in every part of the protected area, the local people have proved that they are able to participate in every activity of the protected area. These activities are more than participatory actions, i.e. they can disseminate, check and monitor activities within the protected area. The people's benefits have become increasingly clearer and improved, resulting in their more practical and effective actions. Immediate achievements in the protected area are:

- Forest fires and deforestation are reducing.
- No more spontaneous migration.
- No more land conflicts.
- Increasing number of people who want to be involved in forest protection and planting.

These achievements are at a very early stage but they have come from the local people's responsibility and awareness. Therefore, they have great socio-economic and environmental significance. This is a firm background for future strengthening and developing activities in the protected area. In addition to the above opportunities, Hoang Lien Nature Reserve has been encountering some serious challenges coming from local pressures. These have resulted from existing and potential poverty of the community. All interviewed households had extremely low annual incomes, averaging 200,000 dong/person/year or even some at 70,000 dong/person/year (US \$13-\$4.70). According to the results of the survey on Sa Pa District's household economy of 2000, the poor households accounted for 29.3% and 5.7% suffered from a lack of food.

The cause of the poverty and hunger is much more than backward practices and cultivation techniques. It is mostly due to severe natural conditions (wet rice is the main cultivation, but having only one crop of very low productivity), limited cultivation land (500 m²/person) which tends to further reduce due to growing populations, limited ploughed virgin soil, droughts and infertile soils (cultivation lands have become increasingly infertile, resulting in low productivity and abandonment). Animal husbandry has not been developed and other lines of industry have not appeared. No specific plans on transforming tree and livestock composition or productivity improvement have been identified. Therefore, the local people have no other income than those from wet rice cultivation (some households have incomes from forest protection contracts but not much – about 30,000 dong/household/month: US\$2.00).

With such a situation, if there are no positive actions, the poverty cannot be alleviated and even tends to increase. Poverty has forced the people to think of any ways to overcome it. The best option is to earn their living from the forest, including deforestation for cultivation lands and shifting cultivation of wandering hill tribes. Poverty also influences the development of local livelihoods and economic conditions in the area.

2.4. Assessment on the execution of the forest law

2.4.1. Main policies implemented and related to the protected area

In general, the state policies all relate directly or indirectly to the management of the Hoang Lien Nature Reserve. Below, we mention some of the main policies classified into the following types:

Orienting policies: The Law on Forest Protection and Development dated August 19, 1991 – the highest legal document on forestry, providing general guidelines; Decree No.17/HDBT dated January 17, 1992 of the Minister Council on implementation of the Law on Forest Protection and Development.

Decision 245/QD-TTg dated February 21, 1998 of the Prime Minister on exercising the state management by different levels over the forest and forestland – a legal document to decentralize the state management over forest and forestland from central to grass-roots levels in order to improve the state management responsibility of administrations.

An important legal document related to the organization and operation of the protected area is the Decision 08/2001/QĐ dated January 11, 2001 of the Prime Minister on "issuing The Management Regulations of Special-use forests, Protection Forest and Natural Production Forests". Regarding the special-use forest, the document has clear specifications as a background for the renovation of organization and operation of the Hoang Lien Nature Reserve.

There are many documents and regulations related to the management and protection of protected areas. However, we mention some documents, which have been applied for management:

- Decree 18/HĐBT dated January 17, 1992 of the Minister Council providing the List of Valuable Forest Plants and Animals together with The Regulation on Management and Protection; The Directive 130/TTg dated March 27, 1993 of the Prime Minister on management and protection of valuable forest plants and animals; The Directive 359/TTg dated May 29, 1996 of the Prime Minister on urgent tasks to protect and improve populations of wild animals.
- Decree 22/CP dated March 9, 1993 of the Government issuing the regulation on forest fire control; The Directive 177/TTg dated March 20, 1995 of the Prime Minister on urgent measures on forest fire control.
- Documents related to the forest development in terms of policies on forest development encouragement and investment have been applied for protection of existing forest and forest plantation and regeneration at Sa Pa protected area
- Decision 327/CT dated September 15, 1992 of the Chairman of the Minister Council on some policies and guidelines on using barren land and denuded hills, coastal area and water surface.
- Decision 661/QĐ-TTg dated July 29, 1998 of the Prime Minister on objective, tasks, policies and implementation of the 5MHRP.

2.4.2 Potential and constraints in implementing the policies

Potential

Since establishment, the Hoang Lien Nature Reserve has continuously received attention from the PPC to its organizational structure, investment and project activities. At the same time, it has also received support from other sectors, different levels, Sa Pa DPC and the 4 communes in solving difficulties. This facilitates the protected area in fulfilling its tasks.

The protected area is located in the area of the 4 communes of Sa Pa District, having a clear area and border – a favorable condition for the management and implementation of relevant policies.

The local people have had a long-lasting community spirit and good practices such as annual festivals for swearing to their intention to protect the forests including village forests that all people are required to protect and forests surrounding their houses and fields to maintain water sources for their life and production.

The protected area is located in an area with huge tourism potential, especially eco-tours to the top of Mount Fansipan. The development of sustainable, ecologically sensitive ecotourism in the protected area promises further income sources to reinvest in the development of the protected area.

Constraints

Main investments come from the funds of the Programs 327 and 661 - only sufficient for forest protection and restoration in areas where forest is lost. Therefore, funds are still insufficient to fulfill other objectives and tasks identified at the establishment of the protected area. In parallel, due to the shortage of funds, staff of the protected area are taken from the forest protection force, who are entitled to forest protection force's benefits but work on conservation. Therefore, they do not have the required qualifications and experience for conservation activities.

Inside the protected area, the people reside in the forest. Before the establishment of the protected area, the people were free to exploit forest products, hunt forest animals and cultivate, etc. But after the establishment, they have faced stricter management which influences their activities and reduces their incomes from the forest. Therefore, conflicts have arisen and are very difficult to solve. The question is how to protect the forest and improve local livelihoods in parallel. The people's knowledge is still limited, i.e. part of population is illiterate, and this causes difficulties in information dissemination. Backward practices and customs still exist, such as free-ranging livestock, shifting cultivation, etc. All have negatively influenced production and livelihoods and are very difficult to revoke.

There has not been any plan on reorganization of residents inside the protected area, especially of those who live in the forest, due to the shortage of funds. Although there is an annual funding increase from the state budget, it is still insufficient to overcome these constraints. Investment plays a decisive role in the economic development of the area to sustain livelihoods and improve the people's educational standards so as to reduce the local pressures on the protected area.

All these difficulties are always factors of the development of the protected area. Therefore, during the practical operation, the protected area should be clearly aware of their direct and indirect impacts so as to manage them properly.

2.4.3 Situation on violations of the Law on Forest Protection and Development

Sa Pa District in general and the protected area in particular are located in the focal forest fire area of the Province; the dry season lasts from October to the next April; fog and cold winds are added factors for the pervasive death of straw grass and reeds. This area is also popular for burning for clearing upland fields. Therefore, forest fire potential is very big. In addition, in the area, there are many valuable timber trees with export value. Traders (mostly ethnic Kinh people) have tried to exploit this opportunity and hired local people to exploit and transport timbers and forest products for sale at the national borders for extremely high profits. The statistic of the Sa Pa Forest Protection Station show the violations of the law on forest protection and development from 1993 to 9/2001 are as follows: in 1993 – 31 cases; 1994 – 72 cases; 1995 – 101; 1995 – 42; 1997 – 57; 1998 – 23; 1999 – 27; 2000 – 48; 9/2001 – 22. (See details in the Annex 7).

The number of violations of the forest law has been gradually decreasing. However, this issue is still complicated and dependent on the coordination among functional sectors and agencies. The PFPD and Sa Pa FP station have closely coordinated with relevant sectors and Sa Pa District in fulfilling forest protection, control of forest products, timely and lawful sanctions against violations, partly limiting the violations of the law on forest protection and development.

2.4.4. Implementation and achievements

- Firstly, the forest law requirements should be disseminated. Conservation staff should have full understanding of the State and the Party guidelines and policies, especially those related to the management of protected areas. To do that, the management board has regularly improved technical knowledge and skills of its staff who directly carry out tasks in the protected area.

The protected area management board has coordinated with different sectors, public media agencies, district and commune authorities in disseminating the Law on Forest Protection and Development and relevant policies by using many ways that are appropriate with features of each ethnic people. Commitments signed by households to protect the forest are also well performed. Annually, more than one thousand out of 1,337 households of the 4 communes sign the commitments to protect the forest. Every spring, the management board has also coordinated with the commune and village authorities to organize the festival for swearing to protect the forest with neat and understandable regulations that are appropriate with the practices of every ethnic group. The festival attracts more than 6,000 out of 8,574 persons of the four communes. The management board instructs villages to discuss contents of the regulations that are very easy to understand and quite lawful. For example, a regulation specifies that a tree cut shall be replaced by 10 newly planted ones, or another regulation that whoever causes forest fire has to do reforestation, ... and there are many other offenses determined by the village community. In addition, the management board has coordinated with relevant sectors in information dissemination on poverty alleviation, agroforestry production development, intensive cultivation, and grazing at right places . . .

Thank to good fulfillment of above jobs, the local people's knowledge and awareness have been step-by-step improved; the community spirit has been raised toward agroforestry production and forest protection - a significant contribution to the effectiveness of forest protection activity at the grass-roots level.

- The management board has conducted good management and protection of forest. It has studied the state policies and collaborated with the local authorities to protect the forest, controlling forest fires, regularly patrolling at the border between the protected area and buffer zone communes, timely preventing violations such as deforestation, hunting forest animals, and coordinating with functional agencies in sanctioning against the violations. The number of violations of the forest law has been reducing from year to year, serious violations are no longer found. The protected area is located in the focal forest fire area of the province and forest fire easily happens in the dry season. After studying the fact, we have found that the main reasons for the forest fires are burning for cultivation and drying cardamom inside the forest.

Therefore, an important task is to think of zoning areas for cultivation, guiding the use of fires for burning and to dry the cardamom; closely linking the responsibility of the forest protection staff of the protected area with mass-organizations in forest protection and management, and utilization of cultivation lands; studying cases of forest fires happening over past years to design fire-control boundaries, including green corridors and clear roads, and annual construction plans should be drawn up with priority given to areas of high forest fire threats.

Over the past years, more than 500km of clear roads have been constructed in non-forested areas surrounding the protected area and at separating forested land and non-forested land planned for forestation and forest regeneration. In parallel, nearly 20 km of green corridors have been constructed, using native trees that are evergreen and difficult to burn.

- Effective execution of the previous program 327 and current 661 in the protected area. Annually, the management board bases activities on the provincial plans to coordinate with communes in the area to discuss measures for implementation. Forested areas have been contracted to households - 50 ha is the maximum - for protection at a fee of 50,000 dong/ha. Areas for annual plantation and regeneration are designed in detail and contracted to households, and the management board is responsible for supplying seedlings and other services to facilitate forest plantation. Each household is entitled to 1-5 ha for forestation and 20-30 ha for regeneration. This is regulated by the contract where obligations of both sides are specified, including payments based on actual results. Good contracts can lead to the improvement of responsibility of contracted households, better quality of the forest and increasing participation of the people. Nearly 300 households have been contracted to protect 9,927 ha out of 14,419 ha of forest and completed the plantation of 843 ha. Due to shortage of funds, it cannot manage to bring all forested area into the protection contracts. Forest fires are still a big threat and at serious levels. The Programs 327 and 661 have gained significant achievements in forest protection and plantation, generating a lot of stable jobs and increasing incomes for laborers, contributing to the poverty alleviation process.

2.5 Assessment on the levels and effectiveness of investments

Since protected area establishment in 1994, the investments have mainly come from the provincial budget through the Program 327 and 661, sufficient for immediate needs to maintain management. Using this source has resulted in practical effectiveness.

2.5.1 Investment in infrastructure construction

According to the technical-economic report approved in 1994, the investment in infrastructure construction is aimed to create a background for management. In brief, planned investment has been focussed on the following aspects:

- Construction of the nature reserve office.
- Construction of 9 forest protection stations at Th₃c b¹c, C₃t c₃t, sĐo MÝ Tũ, DỒn Thũng, Sỗ P₃n, T₃ trung Hũa, Mềng Khoa, Th©n Thuéc, Hề MÝt and forest fire lookout tower with total area of 675 m².
- In addition, purchases of equipments and facilities such as cars, communication radio and others.

Over the past 7 years, the management board's office, forest protection stations at Cat Cat and Ban Ho and the Forest Fire Lookout tower have been constructed. In general, the completed constructions have met the Management board's need of space for working and accommodation. However, it is still facing a lot of difficulties in construction of forest protection stations, places for scientific research and in purchasing required equipment. The investment has amounted to 1,409,319 thousand dong, of which, 1,316,641 thousand dong is the accumulated amount for the period 1993-1998, and 92,678 thousand dong for 1999-2000 (see details in Annex 8).

2.5.2. Investment in forest protection and development

According to the objective set in the technical/economic report and tasks specified in the Programs 327 and 661 being implemented in the protected area, the management board has formulated annual plans on funding needs to implement tasks of forest protection, regeneration, plantation and tending, and some other work. The investment is divided into two stages:

- Stage I: implementation of the program 327 from 1994-1998 with total investment amounting to 3,294,475 thousand dong, mainly coming from the 327 Program's fund and provincial budget; major investments have been made for forest protection – 1,290,149 thousand dong and for forest plantation – 1,303,488 thousand dong, and for others.
- Stage II: implementation of the program 661 from 1999-2000 with total investment amount of 1,333,182 thousand dong, mainly used for protection of existing forest, planting of plantation forest and others (see details in Annex 8).

In general, the right investments have been made according to approved designs and profiles. The investments are made via contracts with households, in which, results are checked and evaluated and payments have been made correctly. Each household keeps an investment book, which fully records payment amounts and contains signatures of payers. Clear payment procedures have made the contracted households secure, and encouraged them to be actively involved in forest protection and planting. Annual evaluations have shown that the forest protection and planting have achieved good results; deforestation, forest fires and hunting have reduced; the forest is better protected and developed with positive trends. The quality of planted forest is good at 60-70%. This result is lower than expected due to many reasons, including difficulties in fulfilling the tasks:

- When the program 327 started, the majority of the population was confused and unfamiliar with technical issues and the work. Therefore, the protected area had difficulty instructing on technical issues at first. It had to make examples of all steps including the simplest one. Recently, it seems better since the people have become familiar with the new work.
- Unit price or investment rate is generally regulated, and if applied in the protected area, it is unrealistically low due to neglecting the special features of the protected area. Therefore, results are influenced negatively.
- Some backward practices and customs like free-grazing livestock, burning grass fields, etc. have influenced the quality of the planted forest, especially of newly planted forest, in which reforestation is required to be repeated many times, hence, future forest quality will be influenced accordingly.

The management board has made many efforts to overcome the above difficulties to manage the investments well and implement the following load of work up to 2000:

- Protecting 9,147 ha of forest
- Regenerating 2,285ha
- Supplementary plantings of 50ha
- Construction of forest regeneration models of 50ha
- Plantation along the roadside of 22.5ha
- Plantation in Ham Rong tourist garden – 11.2ha
- Construction of fire-control 'green corridors' – 13.5ha
- Moving residents – 20 households

2.5.3 Investment in management

The investment is made for maintaining the management and related activities, reviewing land planning, land allocation and

issuance of land use right certificates to the protected area management board. The investment has accumulated to 410,871 thousand dong, of which 220,500 thousand dong is for the period 1994-1998 and 190,371 thousand dong is for 1999-2000 (see details in Annex 8). The investment amount has been basically sufficient to maintain the management of the protected area, especially to ensure the fulfillment of tasks.

In short, annually planned investment is 7,825,770 thousand dong, of which 6,447,757 has been spent, accounting for 82.4% of the plan.

2.5.4 Evaluation of effectiveness

The effectiveness of the investment is evaluated in the following aspects:

- Economical aspect: such an investment has actively contributed to good protection of existing forest and restoration of degraded forest, greening barren land and denuded hills, increasing the forest cover, protecting and developing biodiversity, generating great values of forest resources for the future, increasing incomes for the laborer (each contracted household has an annual income of 2 million to 2.5 million dong, about US\$135).
- Social aspect: generating many new jobs for nearly 300 households who engage in forest protection and plantation. Nearly 600 laborers have got stable and regular jobs, contributing to ensuring local security; the relationships among villages are firm and closer, they support each other in economic development and building up of their new cultural life.
- Environmental aspect: creating a fresh social environment for economic development. The natural environment has been one-step improved; the natural landscape has been protected; the water supply has been regulated; soil erosion has been limited; agroforestry production has been developed to facilitate the protection of the environment, generating various benefits for the human population.

2.6. Evaluation of socio-economic activities' impacts on the protected area

2.6.1. Burning-off to clear land for cultivation

Due to the location of the province on the mountainous area of rare wet rice field, one typical feature of the ethnic peoples is to use a lot of laborers for upland cultivation. To meet this labour demand, the birth rate here is very high (3.38% in 1999). Fast population growth will negatively affect the natural resources and environment in the future.

Annually, new family households are formed in every village in the Hoang Lien Nature Reserve; most of the cultivation land has already been allocated to established households for long-term use. Therefore, the new ones have no other way than destroying the forest for their own cultivation land. The burning-off is very popular in communities. They carry out shifting cultivation. H'Mong people have never regarded the forest as a resource to be protected, but as one of the factors hindering their cultivation activities. Due to backward cultivation practices, poor techniques and increasing food demand, burning-off for cultivation land has been a very regular activity. The productivity is very low, leading to the need for large cultivation areas. Burning-off not only damages botanical resources but also destroys the soil resource, reducing the underground water reserve and affecting flows of water.

After burning-off, if the land is not used in a sustainable way or is used with incorrect fertilizers, or uncultivated period is shortened, the soil fertility will be destroyed and the land may be unusable. The majority of suitable lands has been cultivated; newly ploughed virgin soils are mostly located on very sloping areas, hence easily eroded after natural vegetation cover disappears. Therefore, the degradation of the soil fertility has been increasing.

2.6.2 Grazing livestock

Local livestock like buffaloes, cows, horses, goats, etc. are grazed inside the forest or at shrub areas. This is a long-lasting custom of the upland people. Grazing livestock is hindering the forest regeneration process. Although wood and firewood exploitation may be carried out in a sustainable way, grazing alone can lead to gradual degradation of the forest quality. Moreover, freely wandering livestock will be threats to reforestation because young trees are vulnerable (Donovan *et al.* (eds) 1997). For example, in Hoang Lien Nature Reserve, there was an area for reforestation and freely wandering livestock destroyed all young trees.

As estimated by the PFPD, freely wandering livestock have caused 30-40% impacts on the forest quality and quantity. Obviously, this is a serious problem requiring immediate solutions, otherwise reforestation will face a lot of difficulties.

There should be a ban to prohibit grazing livestock at these areas and surrounding barriers or ditches should be constructed. However, the constructions will be very costly. Another option is to yard the livestock. This helps to reduce potential dangers for crops, and the livestock dung can be used as a natural fertilizer.

2.6.3. Ecotourism

Ecotourism is tourism in natural surroundings and links closely with nature conservation, aiming at protecting nature and providing environmental education.

Ecotourism at the Sa Pa protected area has gained a lot of good attention. It has attracted more attention from different sectors and levels from the central to local levels and the protected area. If done well, the forest is better protected, funds for investment in reforestation are better and the landscape can be maintained or improved.

Ecotourism also generates income for the local population who provide the services of guides, porters, transportation, hotels, restaurants and selling goods and products. The state gets more taxes of many types so as to promote the development of traditional industries such as weaving brocades, making souvenirs and to promote the conservation and development of the national culture. Good practices are maintained and significantly contribute to the protection of the nature reserve.

Eco-tourists have brought here chances for culture exchange among peoples in the whole country and over the world. Civilized behaviors of the eco-tourist have positively influenced the local people in their attitude to nature and environment (e.g. no free disposal of wastes, no damage of grass and trees, etc.)

However, the potential of ecotourism also presents threats, e.g. its negative impacts on the biodiversity, damage of the natural landscape and environment.

Therefore, the development of ecotourism should go along with measures to minimize the threats so as to have sustainable ecotourism development. (Details of ecotourism are mentioned in section 2.7).

2.6.4 Wood and firewood exploitation

At areas below 1,800 m in the Hoang Lien Nature Reserve, cutting trees for wood has been done at increasing levels. Exploitation activity still happens at the southern Den Thang where there are a lot of Po Mu trees. At places where Po Mu are no longer plentiful, trees of Fagaceae family are also exploited. At areas of the height above 1,800 m, the exploitation is increasing for wood of better quality. Besides, at areas nearby villages, both big and small trees have been cut for firewood.

Selective cutting does not cause complete loss of the forest if forest fire and grazing livestock can be avoided as they affect the regeneration process of the forest. However, cutting will change the composition and structure of the forest. Especially for Pomu, which has a very slow regeneration process. Therefore, the exploitation should be done at low levels: currently, the exploitation is being carried out within its capacity. However, it takes at least 50 years or more for Pomu to mature at a very slow speed. Therefore, the Government has issued documents such as the Decision 821/TTg dated November 6, 1996 to prohibit the exploitation of this species of tree. Despite that, illegal cuttings still occur or local people try to get the tree's roots for their home furniture. The protected area and Programs 327 and 661 have conducted the planting of Po Mu at the forest ecological restoration area and in catchment protection forests at the density of 200-300 trees/ha.

Levels of impacts by cutting depend on the cutting's quantity, areas and speeds. For example, cutting in the high mountains has negatively affected the underground water of the reserve (Hamilton, L.S & Pearce, A. J in Jves & Pitt (eds), 1998). The underground water source is a significant water source for the water flow of streams. In the dry season, this source can provide much more water than from rains (Bruineel, 1996). If the canopy of trees at the very high areas decreases due to cutting, the underground water will reduce and the water flow of streams will decrease accordingly (Zadroga, F. in Lal, R, & Russell, F, W, (eds) 1981). This will considerably affect agricultural production. Therefore, the most important action is to stop cutting at very high areas.

Most wood and firewood are cut for home use by local households. However, interviewees say that exploiters come from outside the protected area, rather than the local people. These outside exploiters get wood for sale to China or to processing workshops. The exploiters often contract with local men. Wood is sawn before being transported outside by local people. Transporters are paid 100,000 d/m³ of Po Mu of 0.2x0.2x0.5m. A big tree can contain 10 m³ of that dimension. Pomu can be sold at 3,000,000 dong/m³ at Sa Pa and at much higher prices in Chinese markets.

Local people are worried about exploitation by outside (Kinh) people, but they are unable to prevent the action. Staff of the protected area have recognized that it is very difficult to control illegal exploiters. However, the district forest protection station has checked very carefully at every road where wood transportation can occur.

Since timber markets are located outside Sa Pa, careful checks at all roads (e.g. the way to Lao Cai, Lai Chau and Ngoi Bo at the district's southeast) will reduce illegal exploitation.

2.6.5. Forest fires

Forest fires frequently happen due to burning-off for maize plantation (maize is normally planted at high and sloping areas nearby the forest). Fires often happen at high areas in the dry season. In this season, plenty of dry leaves fall down and winds blow much stronger – very good conditions for fires over a large area, including nearby forests and shrubs. Typically in 1998, there were a lot of fires due to very dry climate at that time (El Nino phenomenon).

Burning-off for cultivation is often done in dense forest areas (where the restoration has taken a long time and the soil is of good quality), located remotely and deeply inside the protected area; it is very difficult to get there, therefore, timely fire-prevention is not easy at all.

On tops of mountains, features of the dry season are very typical, the blowing of winds are the strongest and fires occur easily due to intentions or otherwise of hunters. In the Hoang Lien Nature Reserve, forest has disappeared from the tops of many mountains due to fires, and those places have become semi-tropical deserts.

From 1994 – 2000, there were 200 forest fires in Lao Cai, of which, 16 cases (8%) happened in the protected area and its buffer zone.

In general, the number of cases tends to reduce, but the situation is not yet stable. Not many people lighting fires have been arrested, compared with the actual number of forest fires.

Repeated fires have hindered the forest regeneration process and led to the possibility of alarming fire levels, because the vegetation cover is mainly comprised of tall grass (*Imperata cylindrica*). There is a large area of such a vegetation cover, especially places surrounding villages of Seo My Ty, Den Thanh and Ta Trung Ho. The fertility of soil here is of very low quality for agriculture production and this area is being abandoned.

The interviewees know very well the reasons for the fires but they do not know how to prevent them. Fire is the most dangerous threat to the Hoang Lien Nature Reserve and surely the main reason for the loss of forest. A series of information dissemination programs have been conducted to warn local people about the danger of fire and to encourage them to use fire in safe ways so as to minimize the loss of forest in Hoang Lien Nature Reserve.

2.6.6 Wildlife hunting

In the winter time, when no agriculture production activities take place and foods are scarce, hunters go into the forest to hunt large animals. In addition, small animals and birds are also hunted all the year round even by wood exploiters. Therefore, the control of hunting has faced a lot of difficulties without limiting local people from going inside the forest.

Fishing with nets and by hand methods happens at every river and stream near residential areas. Even small fish are caught, resulting in increasing loss of fish populations.

In 1994, such small animals were openly sold at Sa Pa market (Ghazoul and Le Mong Chan, 1994). During 1997-1998, small animals have not been found in the market, only parrots and some others were still available. This may have resulted from either better control or increasing scarcity.

Several animals (especially singing birds, bears and pangolins) are caught alive to sell at markets in other parts of Viet Nam or in China, where they are either fed or killed for medicines. The same as illegal wood exploitation, preventing illegal hunting requires strict control and checks at checking stations.

Local people's hunting forest animal for food is still very popular (especially for the food demands by tourists to Sa Pa, who intentionally come to Sa Pa to enjoy these foods). Therefore, hunting tends to increase. At the market, some small animals and birds are sold for pets. In restaurants, animals are sold as food and in families' houses hunting guns, traps and other hunting tools are found available. We can find in their houses also skin hides and horns of forest animals. Many valuable animals such as birds, bears, slow loris and snakes are also hunted for food or pet purposes. Such a hunting speed will soon deplete the protected area of endemic species.

Since 1996 (up to 9/2001), 1,318 hunted wild animals of 1434.50 kg have been retrieved (in the area of Lao Cai Province), of which many come from other provinces.

Hunting insects is also a threat to the biodiversity of the protected area. Many international and national tourists have ordered insects of various species, offering very high prices, therefore, the hunting of insects has become very hot in the area.

It seems very difficult to control and prevent hunting of animals and insects, since there has not been any specific regulation on this kind of hunting, or if any, they are not effective enough for enforcement. The pressures of poverty and high profits of trading have added more difficulties to prevention.

2.7 Assessment of impacts of ecotourism on the protected area

Sa Pa is an ever more attractive tourist place for both international and domestic tourists thanks to its cool and fresh climate, quietness and wonderful landscape of mountains and diverse birds and animals. Although Sa Pa people have undergone changes of the time, they still maintain their own culture. The harmonization between Sa Pa's nature and people is a good condition for tourist activities: cultural tourism, ecotourism, relaxing tourism, scientific research tourism, sporting tourism, mountain tourism, etc. This place has a great comparative advantage over other places in the country.

2.7.1 Tourism situation

To evaluate impacts of ecotourism on the protected area, we are dividing our analysis into two stages:

Before 1994

In 1903, the French discovered Sa Pa, starting construction of the first guesthouse, followed by 200 villas, guesthouses and other constructions to serve relaxing and holiday purposes. Undergoing many historical events and the wartime, the constructions and facilities were damaged and tourist activities temporarily paused. However, tourist resources of Sa Pa had still attracted international and domestic tourists. In this period, facilities for tourist activities were accommodation places, services of eating and drinking, relaxing, entertainment and transportation, that had not been properly developed to satisfy the demand of the tourists in both quality and quantity. There were 7 guesthouses in total. These guesthouses were owned by the state institutions like the Trade Union, Forestry, Finance, Planning, etc. including 69 rooms, 165 beds and toilets. Hot and cold water systems and telephones were available of poor quality in some guesthouses and unavailable in some others. The traffic system was bad and transportation was difficult, e.g. there was only one single road, seriously degraded, from Lao Cai to Sa Pa. Advertisements about Sa Pa were not good and hence, Sa Pa was not well-known.

The tourists (mainly domestic ones) came to Sa Pa just for summer holidays and staying in Sa Pa town. They rarely walked into the forest for sight-seeing and visiting ethnic peoples' villages. 3,000 to 4,000 were the annual number of tourists to Sa Pa. This fact showed that the protected area had not paid sufficient attention to the potentials of the protected area. Therefore, impacts of tourism in general and of ecotourism in particular had not been considerable. In this period, the protected area and its diversity were just negatively impacted by deforestation, wood and firewood exploitation and hunting wild animals.

From 1994 to present

As reported by the Center on Culture, Information and Tourism of Sa Pa District, new policies and mechanisms have created many good conditions to attract economic sectors to be involved in tourist services which have become more and more varied. More and more international and domestic tourists have come to Sa Pa, averaging at 60,000 tourists per year, of which 50% are internationals of different nationalities. Most of the international tourists come to Sa Pa to study the place, culture and history of Sa Pa peoples over the ages, viewing the landscape, especially visiting the protected area where there exists a lot of interesting animals and plants. Results of interviewing the tourists showed that 79% want to go inside the protected area, 80% prefer climbing the mountain, 85% are ready to pay for visiting the protected area (Frontier Viet Nam 1994).

2.7.2 Impacts of ecotourism

The development of tourism has changed the socio-economic aspects of Sa Pa, gaining important promotion. Besides good points, some weaknesses exist in management of tourism:

- Some valuable forests have been logged and degraded by specimen collecting, some landscapes have been damaged and the ancient rock field cultural relic has not been properly protected.
- The forest vegetation cover has been damaged, fire is used in the forest for cooking and warming and, therefore, forest fires occur easily.
- Wastes disposed of by the tourists in the protected area have caused environmental pollution; social order and security are also affected, social evils (drugs, prostitution, gambling) happen in some places.
- In the future, the province plans to construct a road up to the top of Mount Fansipan to facilitate the tourists access to the summit. With the road, the tourists will find much easier to go up there, certainly leading to considerable increases of tourists. This will allow much more access to the forest, affect the forest vegetation cover and animals of the protected area and disturb the habitat of animals, forcing them to move.

According to the Decision 08/2001/QĐ-TTg dated January 12, 2001 of the Prime Minister issuing the management regulation of 3 types of forest, the tourist activity should be managed and operated by the protected area management board. However, the management board is mainly engaged in the task of forest protection, and ecotourism activities are still being managed and implemented by the Sector of Commerce and Tourism and the local authority. This needs to change.

2.7.3 Issues of concern

Fuels

Popularly used fuels in Sa Pa are firewood and charcoal for cooking and warming for local households and for tourists. Firewood is collected from the surroundings of the protected area; unused firewood will be sold at Sa Pa market or burned for charcoal to sell to restaurants and hotels. In previous years, hotels and restaurants mainly used charcoal for warming in the winter time. Recently, the volume of charcoal used has been decreasing as it is replaced by electric warming systems.

Despite that, charcoal is still an essential need, requiring appropriate solutions – looking for alternative energy sources and having a proper quota of exploitation from the forest to sufficiently meet the local demand and generate jobs and incomes for the laborer.

Wastes

Attention should be paid to the protection of the environment since wastes from tourist activities and local residents have affected the environment and health of the local population. In general, the waste has not been properly processed and gathering is very difficult. This has affected the water source used for local livelihood. Some water pipelines of high capacity

are being renovated to supply clean water for Sa Pa. However, they do not yet satisfy current and future demands of this town as well as adjacent areas. Majority of the tourists unintentionally dispose of food boxes and wrappings, which are not biodegradable, negatively affecting the visual environment.

In Sa Pa, environmental pollution caused by wastes is not yet a serious problem. However, solutions are required right now.

Forest animals and plants are also impacted by tourists. The tourists buy birds and insects and forest animal meat. This has motivated local people to hunt forest animals to sell as meat – an interesting food for the tourists. These foods all come from the forest and the protected area. The local people just see immediate benefits and worry about their daily life. Bonsai like orchids and medical herbs are also sold to the tourists.

Therefore, clear regulations together with urgent measures are required to guide the tourists to avoid violations of the state regulations on protecting forest animals and plants.

- The increasing number of tourists has shaken up the local security and politics. For the safety of the tourists and their properties, they are required to obey the Vietnamese laws.

This is a serious problem needing resolution to create a favorable and safe environment for the tourists and to attract more tourists to Sa Pa and to Mount Fansipan.

2.8 Evaluation of the community's awareness

2.8.1 Before the establishment of the protected area (before 1994)

The community of ethnic minorities has resided here for a very long time, undergoing conflicts with nature and wars. This has made them live in a very close relationship. The life here is also hard, roads are of poor condition and, therefore, it is not easy to communicate with outside communities; their cultural standard is low; part of the population is illiterate leading to limitations in their knowledge and awareness. Their life is dependent on the forest due to shortage of area for wet rice and no intensive cultivation, low productivity and consequently insufficient food. Therefore, they are forced to destroy the forest for cultivation and burn-off for land – a main reason for forest fires and forest loss accordingly. The older people and heads of villages have a common observation that in previous times, forests were plentiful, even located at the back of their houses and there were plenty of wild animals like monkeys, bears, wild boar, etc. but now the forest just exists deeply and remotely in mountain areas.

Their life is too hard and the poverty is so long lasting. For their living, the local people regard forests as public property, which can be shared among everyone and they can freely go into the forest for cutting, hunting and cultivating. They assume that they are inheriting land from their previous generations. Therefore, a growing population requires increasing areas for cultivation.

2.8.2 After the establishment of the protected area (since 1994)

Initially, the management was strict and there were regulations specifying no deforestation for cultivation, no burning, no hunting. Therefore, free activities inside the forest became illegal, resulting in considerable decreases of the local people's incomes. Part of the population was against the protected area since they assumed their lives were negatively affected. The other part supported the establishment of the protected area but in a compulsory way to obey the state regulations and guidelines. In another words, they used to depend for their lives on forest exploitation and now they have to protect and plant the forest – a reversal in their point of view, requiring a long time for them to adapt.

After the establishment of the protected area, the management board recognized the matter and started activities to improve the awareness and knowledge of the local community. Over the past years, the protected area has coordinated with commune authorities and relevant sectors to fulfill the following jobs:

- Patiently disseminating and convincing the local people to help them understand the objective and significance of the establishment of the protected area and its tasks and functions; trying to explain whatever concerns the local people.
- Allocating land to the residents inside the protected area for long-term use, including cultivation land, residential land, upland field, rice field and part of barren land and denuded hills for them to construct forest farms. Over the past years, the majority of households have been granted Land Use-right Certificates so that they can settle down to conduct their production, construction of forest gardens and farms on the allocated land areas.
- Encouraging households to get contracts for forest protection and plantation; technical staff are available to provide instructions; and funds are provided timely. Contracted households earn incomes that are not very big but stable and compensating the incomes from forest product exploitation received previously.

Completed tasks have step-by-step raised the awareness of the community and integrated their responsibility into the

protected area. However, these are just the very first results of the protected area. Currently, the community's awareness is just at a limited level, i.e. not all people can understand correctly. The number of households engaged in forest protection in the protected area is still low – only 30%. The other 70% have not been assigned any jobs. This is a problem. The question is how to provide jobs to the majority of people and how they can make incomes from the protected area activities. If the question is successfully answered, a strong background can be created to effectively prevent deforestation and protect natural resources of the protected area. To raise the awareness of the community is a shared responsibility of all sectors and levels, including of the management board. The responsibility can be shown through practical actions and models to disseminate information and encourage the local people to implement, improving the living condition to easily raise their awareness.

CHAPTER III

ORIENTATIONS AND MEASURES TO IMPROVE MANAGEMENT CAPACITY OF THE PROTECTED AREA OF LAO CAI PROVINCE

3.1. Perfecting the system of protected areas

Since the establishment in 1994, the management board has made many efforts to fulfill its assignments, however, there are still unsolved problems that are out of its capability. The area of the Hoang Lien-Sa Pa protected area accounts for just 10% of the total area (about 208,000 ha) of the Hoang Lien Mountain Range, and for 2.5% of the total area of Lao Cai Province. This is less than desirable since many forests inside or outside the Hoang Lien range need to be protected as well. In addition, areas surrounding the protected area are always in danger of human and natural impacts and the protected area is also seriously influenced. Therefore, it is necessary to study to perfect the protected area system and strengthen its management mechanism.

a) Studying the facts has shown that one single Hoang Lien-Sa Pa protected area is not enough to protect the forest ecosystems of the Hoang Lien Range – an area of endemism for the high mountains in the north of the country. Development of more protected areas is required urgently. We propose the two following options:

Option 1: Establishment of new protected areas

+ Expanding the area of the Hoang Lien-Sa Pa protected area established under the Technical/economic report approved in 1994, to cover 29,845 ha, situated in 24 sub-zones, 6 communes of 2 districts of Sa Pa and Than Uyen of Lao Cai Province. Of the 6 communes, 4 belong to Sa Pa District – San Sa Ho, Lao Chai, Ta Van and Ban Ho; and 2 belong to Than Uyen District – Muong Khoa and Than Thuoc. Orienting all activities of the protected area according to initial objectives and tasks.

Establishing the new Hoang Lien- Van Ban protected area (Lao Cai) of 30,000 ha, located in the area of Nam Xay, Nam Xe, etc.. Communes next to the Hoang Lien-Sa Pa Nature Reserve. In this place, there still exist large areas of natural forest of many valuable timber trees like Po Mu and recently found the black gibbon, *Hylobates concolor*. This is one of the last places in Viet Nam where this species can be found and may be the place of biggest population of *Hylobates concolor*.

+ Establishment of new Hoang Lien-Lai Chau protected area of 20,000 ha, next to the Hoang Lien-Sa Pa Nature Reserve. In addition, further studies are needed to establish another protected area in Yen Bai Province, next to the Hoang Lien-Van Ban protected area (this is an issue of management of Yen Bai and Lai Chau provinces, therefore we leave it aside).

Under this option, the Hoang Lien Range will be managed by three protected areas, creating an inter-regional protected area system and covering major forest areas of the Hoang Lien Range.

The option shows many advantages. The protected areas are small areas, each located in the area of one district of one province – very suitable to the type of territorial management which can be under the direct control of PPCs and receive support of different sectors and levels and also suitable to current capability of local staff.

However, some difficulties are foreseen. The coordination among management boards will be limited, especially at border areas where less attention is paid and less coordination is performed. Investments mostly come from the provincial budget which rarely meet practical requirements and need for scientific research. Moreover, other sources of funds are also limited.

Option 2: Establishment of Hoang Lien National Park

The National Park (of above 70,000 ha) will cover the majority of the forest area of Hoang Lien Range which is situated in the area of 3 provinces of Lai Chau, Lao Cai and Yen Bai or of their districts of Phong Tho (Lai Chau); Sa Pa, Van Ban, Than Uyen (Lao Cai) and maybe part of Mu Cang Chai (Yen Bai).

Advantages of the option are that with such a big size and under a central management, the Park will get timely instructions from the Ministry of Agriculture and Rural Development; it will be under one unique management board; investment is easier and comes directly from the central government so as to meet requirements of management; it also has a chance to attract

investments from other sources.

Constraints of the option are that it is inconsistent with Decision 08 promoting decentralisation of management, the area is large and its activities will be carried out in broad locations. This leads to difficulties in traveling and other management activities; the coordination between the management board with the localities will be sometimes irregular; the capacity of local staff is not sufficient to fulfill required tasks.

From the above analysis, we support Option 2 – establishment of Hoang Lien National Park. If the option is approved, the management of the protected area will be favored. Strengths and potentials of forest resource of the Hoang Lien range can be well exploited. The forest ecosystem - an excellent example of the northern high mountain area of the country – can be properly protected. There will be a good combination of socio-economic development and protection of environment and natural resources; and a harmonization between protection of valuable animal and plant genes and scientific research activities.

b) In addition to the above protected areas, we recommend the establishment of a new Bao Thang protected area of 10,000 ha in Lao Cai Province, located in the area of communes of Ban Cam, Phong Hai and Phong Nien (Bao Thang) and Coc Ly (Bac Ha). This area is unique with limestone mountains and vegetation here being mainly Nghien trees and some others.

Thus, in Lao Cai Province, the protected area system will cover more than 60,000 ha, accounting for 7.5% of its total natural area and 11% of its forest land area. The area of protected areas mainly originates from areas of crucial protection forests, hence, no affect on forest production occurs. We assume that such a proportion is suitable, balancing 3 types of forest (special-use, protection and production forests) and positively contributing to socio-economic development of the province.

3.2. Perfecting the management structure

Once the PA system is established, management apparatus should be reorganized to meet 2 following criteria:

- Suiting the system of protected areas and effective regulations of the state
- Using properly the function of management, ensuring a transparency from the central to grass-roots levels.

To perfect the management structure we need to focus on the following main issues:

3.2.1 Proposed organization of the management mechanism

- For Hoang Lien National Park, its management board will be staffed by one Director, deputy director and some members, and operated under the direct and comprehensive management of MARD and in collaboration with the PPC. The management mechanism is divided into 3 sections: administrative management, scientific research, and forest protection and management. According to the Decision 08/QD-TTg dated January 11, 2001 of the Prime Minister issuing the management regulation of special-use, protection and production forests, we propose to set up forest protection stations in districts and under the National Park Management board. As thus, the new Hoang Lien National Park will have two more new forest protection stations in Sa Pa and Van Ban.
- For Bao Thang protected area, a management board is to be set up, comprised of one head, deputy head and some other members, under the management of Lao Cai PFPD. Due to the smallness of the protected area and its features, we propose not to set up a forest protection station under the management of the management board, but to assign the tasks of forest protection and management to the existing Bao Thang Forest Protection Station.

3.2.2 Tasks of the Management board

Based on the scope and features of the protected area's operation, tasks and functions of the management board are to be identified. Tasks of Hoang Lien National Park will be different from those of Bao Thang protected area. In general, the common task is nothing than forest management and protection in combination with eco-environment conservation, scientific researches done in framework of protection of valuable animal and plant genes, and development of ecotourism.

At the same time, relationships related to the management will need to be developed, especially those between Hoang Lien National Park and PPC of relevant provinces, and between Hoang Lien National Park and local PFPD.

3.2.3 Staff on the payroll

Number of the staff should be suitable, based on Decision 08/QD-TTg of the Prime Minister and on the local practical situation to ensure all designed activities, tasks and functions of the protected area are properly fulfilled.

We propose that Hoang Lien National Park of 70,000 ha should have a minimum of 60-70 personnel, and the two forest protection stations in Sa Pa and Van Ban have at least 30-35 personnel.

Number of Bao Thang protected area's staff should be 8-10.

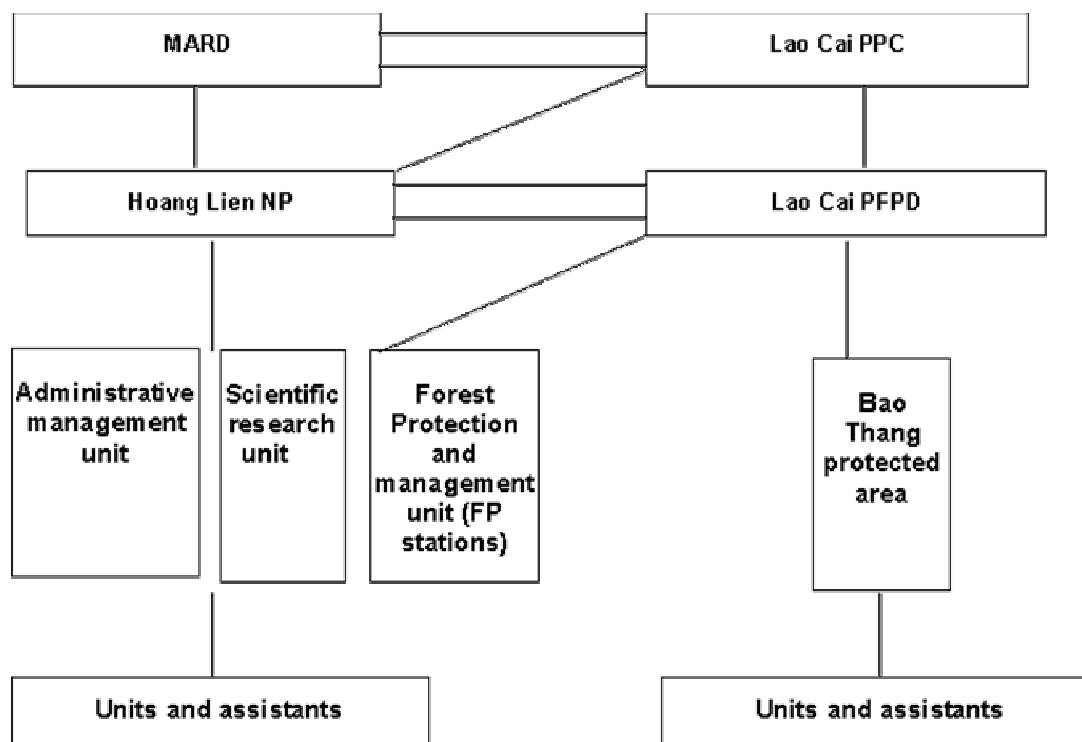
3.2.4 Qualifications and technical skills

Management in protected areas is not simply forest management and protection, it covers activities of training and scientific research as well. Therefore, qualifications and technical skills of staff are very important, i.e. most of the staff should be at tertiary levels and over, able to speak a foreign language and competent in scientific surveys; technical staff should be put in the right positions for purposes of administrative management, forest protection and management, planning scientific research and ecotourism, etc.

3.2.5 Improving the capacity to execute the forest law

Management of the protected area requires its staff to solve many problems related to execution of laws on forestry. Therefore, improvement of the staff's capacity to execute the laws on forestry is very necessary, enabling them to have good knowledge of the forest laws and to be capable of their execution. Firstly, the protected area management board should formulate its own plan and propose to upper levels to open annual training courses on self-defense, criminal inspection and administrative sanctions in the forestry sector. At the same time, the forest protection force should be equipped with weapons and other supporting tools. In addition, the staff are required to regularly study, learn and exercise during their daily work.

Organizational Chart of the Proposed Management Structure



3.3 Solutions to investments in the protected area and buffer zone

Identification of investments for the protected area and buffer zone is very important to maintain the management and to improve the local people's lives. The investments should be sufficient, timely, appropriate and effective.

3.3.1 Main sources of investments

Identification and mobilization of investment sources are the tasks of the protected area management board. We are mentioning hereinafter some main investment sources:

- The investment source of the state is the most important, decisive and major one. This source can provide capital directly to the national park or indirectly to provincially-run protected areas through local budgets. The investment is run according to long-term and annual plans, hence, able to be controlled. The protected area management board, based on its assignments, formulates annual work-plans, which identify specific activities and required budgets.
- Resources from international and local organizations are supplementary and very important. To exploit and mobilize these resources require clear identification of activities, such as scientific research on management, forest resource protection or environment protection, according to our recommendations. When receiving this type of investment, the protected area management board in coordination with sponsors organize activities according to project contents.
- Sources from joint ventures. Currently, the type is not popular. But in the future, it should be seriously taken into

account. Joint ventures through contracts on scientific research, development of ecotourism in the protected area, etc. will improve technical skills of the protected area's staff on one hand, and generate incomes for reinvestments on the other. Besides, there may exist other sources. Therefore, during the operation, all types of investment sources should be exploited in order to meet the actual needs – the objective of the protected area management board.

3.3.2 Areas for investment

We are reviewing main areas to be invested in order to identify investment level and period, ensuring that the investments are used as planned and reasonably.

- Investments in activities of administrative management are aimed at maintaining the management structure of the protected area, covering salaries, allowances and other administrative expenses. Based on the payroll and other effective regulations, the management board is to formulate the plan on salary and other expenses. Due to the protected area's own features, further considerations and policies are required to protect the lives of its staff and to attract qualified staff for long-term working.
- Investments in forest protection and management including protection of existing forests, forest plantation, tending and regeneration, ... have been made through contracts with households residing inside the protected area. The investments help to improve the people's living conditions and their awareness, attracting them to be involved in forest protection and harmonizing the relationship between the protected area and the village communities.
- Investments in scientific research including researches on forest ecology, conservation of valuable animal and plant genes and on environment protection. Scientific research needs a considerable fund. However, the management board should consider carefully before planning. It will cooperate with universities, research institutes and scientists to do the research. Scientific research is an important job, which requires identification priorities for research in order to conserve the ecosystems and to ensure the management activity.
- Investments in construction of infrastructure: normally, the investment takes the major proportion of the fund at the time of establishment of the protected area. It may cover constructions of offices, researching rooms, animal rescuing areas, botanical gardens, working equipment and facilities, system of forest protection stations, roads inside the protected area for traveling by its staff and by tourists.
- Investments in services and tourism are aimed at exploiting the potentials of the protected area. The management board should base actions on the local socio-economic development strategy to coordinate with relevant agencies and sectors in formulating plans on service and tourism development.

Ecotourism is in fast development and, therefore, tourist potentials of Hoang Lien Mountain Range, a place of temperate climate, many undiscovered mysteries and great attractions, should be exploited.

- Investments in socio-economic development in the core and buffer zones of the protected area will positively and directly influence the protected area. This is a comprehensive investment, covering different areas under the responsibility of different sectors and levels to stabilize and step-by-step improve the people's living condition.
- Firstly, regarding poverty alleviation, to implement the program 135 requires attentions to roads running to centers of communes and to villages in the buffer zone and within the reserve; to irrigation works, electric and water systems for the local daily life, production and cultivation such as for plantation of rice, maize, fruit trees and production of agroforestry products so as to reach high productivity and good quality.
- Forest protection and development at buffer zone communes, the implementation of the 5MHRP and construction of forest farms and gardens have been using funds from the state budget and from the people's contributions.
- In addition, it is necessary to integrate into programs and projects of other sectors and funded by international organizations for socio-economic development.

3.3.3 Management of investments

Good management will result in high effectiveness of the investments. The matter is to identify the order of priorities for the investment. All activities of the management of the protected area need investments, but the point is when and how much the investments should be made for what activity. Therefore, priorities should be clear for each activity, in each period. This will help to arrange funds in reasonable ways, ensuring continuously sufficient funds for activities.

Correct investments require the management board to identify accurate investment objectives. To avoid waste of money, the fund should not be used without plans.

The investment directly addressed to the people is an effective way and easy to manage. The investment is made for activities of the protected area, that the people are involved in, such as forest protection and plantation, road and house constructions, etc. The investment helps to bind the two parties through contracts as well as to raise the awareness and responsibility of the people in activities of the protected area.

3.3.4 Integration of investment sources

In the protected area and buffer zone, there are various investment programs and projects, which aim at poverty alleviation and socio-economic development. Good coordination and effective management of these investments will facilitate the socio-economic development in the area. We are recommending some projects and programs for investment:

- Regarding agricultural economic development, poverty alleviation, settlement, transportation, irrigation, agroforestry

extension, we have found activities: intensive rice cultivation at focal areas of Ta Van, Lao Chai, production of high quality tea, plantation of maize, soybean and fruit trees, . . . which can use strengths of climate and soil of Sa Pa; durable construction of canals and ditches at focal areas of rice production; provision of clean water and sufficient fuels for the poor and for people of extreme difficulty living in upland areas; the objective by 2005 is 50-60% upland people with tiled houses, 70-80% have clean drinking water; rearrangement of upland population in extremely difficult areas, especially those living dispersedly, to ensure they have sufficient land for cultivation and good conditions for socio-economic development.

- Regarding construction of infrastructures: the objective by 2003: completion of the roads running to centers of communes and to villages in BZs and in PA boundary; development of the local industry, focusing on agroforestry product processing.
- Regarding the development of tourism in Sa Pa: exploiting all types of tourism, especially ecotourism in the protected area.
- Building up a local network of health clinics and sending doctors to communes; construction of schools; alleviating illiteracy and popularizing primary education.

With increasing investments, the integration of programs and projects is very necessary to avoid wasting money due to overlapping investments. The management board should timely take opportunities so as to combine with these programs and projects once they take place in the protected area.

3.4 Human resource training solutions

Good management of the protected area requires qualified staff who are competent to both fulfill their tasks and encourage and educate the community to be involved in forest protection and other activities. Human resource training is to focus on the following points:

3.4.1 Encouraging the people to protect the forest

Since the people reside in the forest of the protected area, all of their activities and their lives relate to the forest. Moving these people outside will cost a lot of money. Even so, it is very difficult to move all people outside since there are a lot of households living inside the protected area. Daily activities of food production, plantation and husbandry affect the forest. Therefore, the management board is required to disseminate information and get the people aware of the fact. This should be carried out by staff who have knowledge of the local living conditions, practices and customs, expectations of the people, and are experienced in protection of village community's forests so that they can draw up different measures appropriate to different peoples.

Coordination with public media such as radios, newspapers... to provide information about the Law on Forest Protection and Development and other relevant documents and get the people aware of good examples in forest protection, construction of forest farms and being rich by using allocated land. Coordination with communes and villages to build up typical models for people's learning and experience. Coordination with the forest protection force to encourage the people to sign commitments on forest protection, and to guide villages in formulation of their own forest protection conventions which promote good practices and customs of each peoples, in organizing commitment festivals for H'Mong and Dao peoples. Grazing and cultivation areas outside the protected area should be clearly specified; encourage the people not to free their livestock and burn. Coordination with the local authorities to control the usage of hunting guns, traps and other hunting tools for hunting and shooting forest animals and birds.

Educating community consciousness in forest protection; early detecting violations of the Law on Forest Protection and Development; having measures to timely prevent illegal actions; promoting the strengths of the community and local features to protect the forest, prevent illegal deforestation and well fulfill forest fire control.

3.4.2 Training on technical skills for the staff of the protected area

With the protected area's own features, the staff should meet the following requirements:

- Have technical qualifications, being at tertiary level and above and with a deep understanding in all related fields.
- Being capable of fulfilling the tasks, doing surveys, encouraging the public force and intending to work for the protected area over the long-term.

To have such qualified staff, there should be good policies to attract those trained at national and international universities, to provide good living conditions to the staff so as they can develop their own capabilities and be devoted to the work.

On the other hand, the management board should create favorable conditions for scientists and good experts to come and help the protected area in solving complicated problems outside the management board's ability.

Regular training is the best way to develop and use the human resource. The current situation requires the staff improving their qualifications and being updated with new science and technologies. Therefore, they have to learn themselves through their whole life.

Hence, the management board should provide favorable conditions for its staff to study and access new knowledge. In addition, the management board should have training plans in the following areas:

- Management staff are to get training on management and be updated with all information so as to be able to foresee problems and suggest implementation solutions.
- Technical and scientific staff are to get training on forest ecology, biodiversity, environment protection, and scientific research methodologies and skills. This is the major part of the human resource, which need regular short term training. They may be staff of other agencies other than of the protected area, who have relevant activities or working relationship with the protected area.
- Poorly trained staff are to be sent to long-term training at universities (full-time or part-time) or short-term training courses conducted by central bodies and by local institutions.

Develop libraries, research rooms and facilities to meet on-site study and research demands in order to combine theory and practice and help to develop staff capable of carrying out their tasks successfully.

3.4.3 Training for commune staff and village communities

In general, commune staff are at limited levels of politics, culture and technical skills. Majority of the staff have only finished primary school, hence, difficult to understand and transfer the state and party guidelines and policies to the people. Training commune staff is part of the overall training program of the state. Here, we just want to confer training on forest protection and management, techniques of intensive cultivation, tree and forest plantation. The training will help the staff to become key actors in disseminating information and instructing the people and be the first doers for the people to follow.

Village communities are at even more limited levels. They are still conducting their production for self-sufficiency and rarely communicate with the world outside. Their life is still very hard. Training the village communities should concentrate on the most fundamental knowledge, be conducted in the simplest and most understandable way and be the most practical.

The management board should formulate clear plans that are appropriate with the local production situation and practices and customs. Short training of 3-5 days should be held at non-crop time and focus on practical issues. Training contents should include:

- Issues directly related to local socio-economic development such as techniques of intensive cultivation and husbandry, new seedlings, irrigation, construction of forest farms and gardens, production of high-productivity and quality products. This requires the management board to collaborate with professional agencies and programs/projects.
- Issues on raising awareness on forest protection and development, including: forest ecology, biodiversity, forest protection, forest plantation, plantation of short-period trees under the forest canopy, protection of forest animals,... The contents of training courses should depend on requirements of each period or be integrated with issues of the villages.

Training is regular work, done together with political tasks of every unit. The training should obtain the following results: step-by-step improve the awareness of the village communities and put their awareness into actions to involve them in activities of the protected area of forest protection and management.

3.5 Cooperation solutions

To improve the management capacity of the protected areas in Lao Cai Province, national and international cooperation should be carried out in addition to internal activities. The cooperation helps to solve difficulties, gain good experiences and open peoples' eyes to see and integrate into the world.

3.5.1 Key areas require cooperation

It can be said that there are a lot of areas that need cooperation. However, the cooperation must obey the regulations and law, and mutual respect principle. We mention below some areas that need cooperation:

Management

In current conditions, the management capacity of the protected area's staff is still weak since they used to be technical staff and have little chance to access new knowledge of management. The cooperation in this area will provide opportunities for the management staff to gain more experiences, learn new methodologies and to improve the management methods that are suitable to the local conditions and situation, increasing the management effectiveness of the protected area.

Scientific research should be closely linked with activities of the protected area. Limitations in knowledge and incompetence to participate in research have caused a passive spirit in planning and identifying contents for research. The management board just plays a coordinating role in research and studies of universities, research institutes and local and international scientists.

Research results are not sufficiently collected. To take initiative in this issue, there is no way but to improve the technical standards and survey capacity of the staff through practical activities. All research should aim to solve urgent matters and draw out long-term development strategies for conservation and development of the forest ecosystem in combination with socio-economic development.

Forest management and protection

This requires multi-sectoral cooperation. It means instructions of the upper levels via policies and guidelines; it is also the cooperation among relevant sectors and levels to timely solve difficulties and facilitate the management board in organizing forest management. It is the participation of the village communities in forest protection and fulfillment of contracts. It is solutions to the usage of funds and aid for investment effectiveness.

3.5.2 Cooperation between protected areas

There has existed a system of protected areas in our country for a long time. Activities of these protected areas vary from one to another with plenty of good experiences. Therefore, there should be a strategy in conducting common activities through workshops, information updates and scientific magazines - the common voice of the protected area system. The management board should take initiative in introducing its own activities and organizing study tours to other protected areas for experiences and lessons learnt.

3.5.3 International cooperation in nature conservation

This issue is still new and difficult for protected areas, especially for locally-run ones due to their limited knowledge and information. Therefore, good international cooperation in this area will help to improve the management capacity of protected areas and give them chances to learn worldwide experiences in natural conservation.

- Upper management levels should act as a link between national protected area and the foreign organizations. They should actively introduce to the world the features and activities of the protected areas and about needs for the cooperation, and seek funds to meet the requirements of management of protected areas.
- The management boards should also take initiative in cooperation and commitment to implement effectively cooperation programs so as to create relief for long-term relationships. The cooperation for integration and development needs attention and solutions to create a good international environment for nature conservation.

For specific conditions we have proposed some important and practical measures to improve the management capacity of protected areas in Lao Cai. The above measures relate to each other. However, during the implementation, it requires selection of the right measure to be applied to solve the right problems dependent on the actual situation.

3.6 Priorities to be implemented to enhance management capacity of the protected area

To apply the above measures, the actual situation should be taken into account. If it is favorable, all these measures can be implemented in a synchronous way. This will take effect in a short time to improve the management capacity and results. If the conditions are unfavorable, priorities should be identified and efforts will be focused to solve the top priority problems. In our opinion, the order of priorities should be as follows:

- Organization is the top priority, which needs to be strengthened and stabilized immediately. This job is to concentrate on identification of managerial relationships, management by upper levels, working and coordinating mechanism, staff on the payroll, human resource quantity and quality, . . . A structure is to be built based on the criteria of capacity, ability to fulfill tasks and management functions.
- Investment is also of the top concern, including investments in the core and buffer zones of the protected area, where the core zone will get more priorities. The important issue is to identify investment sources, which mainly come from the state budget that is consistently managed from central to local levels. There should be an individual budget line (not through the 661 program) for the protected area.
- Policy is an issue affecting many other issues, requiring practical and theoretical studies. The focal points are put at localities and for favorable conditions for the localities. Further studies on some policies as well as detailed guidelines by relevant sectors are required for unique implementation.
- Buffer zone people's livelihood within the trend of socio-economic development is the responsibility of different sectors and levels. It is construction of infrastructure, stabilization of production, development of multi-commodity economy, and improvement of material and spiritual conditions. This is a very difficult task, hence, identification of immediate tasks is very important and it is necessary to have consistent implementation.
- Dissemination and education should be done to facilitate the implementation of tasks of the protected area. A good performance of this job will help both to improve technical capacity of the staff and to raise the awareness of local communities. The dissemination and education should focus on policies and guidelines of the State and Party, technologies and science, good examples and typical models on forest protection, new business methods, ...
- The international cooperation aims to exchange experiences in management and scientific research, and to seek supplementary funds for activities of the protected area. To do that, the protected area's staff's capacity should be comprehensively improved and they should get support from higher management levels in cooperation, orientation and identification of issues for cooperation in different periods.

CONCLUSION

From the above analysis and assessment, the following conclusions can be drawn up:

1. Hoang Lien Nature Reserve is a high mountainous area with tropical ecosystems of high and unique biodiversity.
2. Hoang Lien Nature Reserve presents a great opportunity, i.e. it gets significant attention from the Government, central bodies, local authorities, FPD and other agencies; many international and national organizations are willing to invest, support and participate in its research and activities.
3. Main threats to the forest resource and biodiversity degradation in the Hoang Lien Nature Reserve are: forest fires, wood and firewood exploitation, illegal hunting, upland cultivation, grazing livestock and ecotourism. Underlying causes of this situation are: poverty, people's low education standards and backward cultivation practices.
4. Hoang Lien Nature Reserve is situated in the area of Sa Pa District with a total area of 34,608 ha. The protected area includes three functional sub-areas: strict protection sub-area, ecological restoration sub-area and administration sub-area. Its buffer zone's area is 31,961 ha, located partly in the area of Sa Pa, Van Ban and Than Uyen (Lao Cai) and partly in the area of Phong Tho (Lai Chau). Outside the Hoang Lien Nature Reserve is a huge area of forest resource needing protection, which is located in the area of Sa Pa, Van Ban and Than Uyen (Lao Cai) and of Phong Tho (Lai Chau) and of Mu Cang Chai (Yen Bai)
5. The protected area management board under the direct control of the PFPD and with insufficient staff and facilities, have made many attempts to protect and develop the forests in the core and buffer zones. Its human resources need to be strengthened and more facilities should be provided for the management board.
6. Recently, Lao Cai PFPD and the management board have closely coordinated with the local authorities and provincial agencies in activities of the protected area. In the future, a better coordinating structure should be built up.
7. The Law on Forest Protection and Development and other forestry policies are being well implemented in the protected area. Thank to enhanced law education, agroforestry extension and strict sanctions against violations, the number of forest law violations has been decreasing recently.
8. Investments in forestry development of the protected area and buffer zone come from the programs 661 and 327. Forest plantings, tending, regeneration and protection in the protected area have resulted in good changes. However, total investment amount and investment rates are still low; there is a shortage of specific regulations on rights and obligations of people working in the forests.
9. The local communities have increased their participation in the management of the protected area through activities like commitment festivals, forest protection conventions, etc. However, poverty is still a serious pressure on the forest of the protected area.

MAJOR RECOMMENDATIONS:

To fulfill the management and improve the management capacity of the protected area in the coming years, we have the following recommendations:

1. To perfect the protected area system in Lao Cai, we propose to establish the Hoang Lien National Park of 70,000 ha, covering the major forested area of Hoang Lien Mountain Range in the area of Lao Cai, Lai Chau and Yen Bai Provinces. The national park will be under the direct control of the central government and be operated with funds directly from the state budget. In Lao Cai Province, we propose to establish one more Bao Thang protected area of 10,000 ha, under Lao Cai PFPD's management and run with the local budget, in order to protect the forest animals and flora of the limestone mountains in Ban Cam, Phong Hai, Phong Nien and Coc Ly.
2. To implement the Decision 08/QD-TTg of the Prime Minister, we propose to supplement staff for the forest protection force for better quality and sufficient quantity. For the protected area system, we propose to establish two new forest protection stations in Van Ban and Sa Pa of 30-35 staff and under the management of the Hoang Lien National Park. For Bao Thang protected area, we propose to establish a management board of 8-10 staff.
3. The State has issued many legal documents and policies, which are being effective and useful. We propose to supplement some issues:
 - There should be a detailed guideline for implementation of the Decision 08 of the Prime Minister for consistent implementation in the whole country.
 - There should be some regulations on coordinating relationships and management responsibility of relevant agencies, between the protected area and PCs of districts and communes on management of the buffer zone; on ecotourism in the protected area, clear identification of responsibility over management and organization of ecotourism; on scientific research in the protected area; set up of research stations; international cooperation in scientific research; encouragement policies for staff and workers of the protected area as well as for local people to participate in forest protection.
4. Regarding investments, as objectives, tasks and functions of the protected area, special attention should be paid to investments in the protected area. We propose:
 - Protection of forest is not simply the prevention of deforestation, exploitation and forest fires. Its sense is much broader, i.e. protection of forest ecosystems, protection of valuable animal and plant genes for scientific research purposes and tourism development. Therefore, the investment rate should be increased to 100,000 dong/ha/year for protection contracts.

- Forestation here has encountered more difficulties than in other places. We propose to increase the investment rate to 4-5 million dong/ha for planting contracts. The young trees for planting should have a height of 40-50cm to be strong enough to be survive severe natural conditions and free-grazing livestock.
- Investments in moving people outside. Moving 500 current households to villages in the buffer zone is too difficult to implement. We propose to set up a new village where these households will be moved to, or to encourage existing villages to integrate them. The latter option is possible, but they should be provided at least 10-15 million dong each. For no cultivation inside the protected area, we propose the state to supply foods to compensate for shortages due to giving up upland cultivation.
- There should be investments in construction of infrastructure, forest protection stations, biodiversity research rooms, purchase of 1-2 cars, and other tools for forest fire control.

5. For plantation of cardamom under the forest canopy in the protected area, we propose no encouragement. Cardamom is better to planted at ecological restoration sub-area, not at the strict protection sub-area which is contrary to the objective of the protected area. This requires further studies for better harmonization of economic development and forest protection. Cardamom plantation procedures should be formulated.

6. Regarding ecotourism, we propose to give the responsibility of organization of ecotourism to the protected area management board as specified in Decision 08 of the Government. There should be only two ways to the top of Mount Fansipan – one from Tram To and the other from Cat Cat. There should not be many routes as this will cause difficulties for forest protection and damage to the environmental landscape and biodiversity.

Annex 1. land areas and ethnic groups in communes in hoang lien nature reserve

(Data from General Land Inventory in 2000)

#	Indicators	Total	Communes				Note
			Ban Ho	Lao Chai	Ta Van	San Sa Ho	
I	Population						
1	Households	1,337	286	362	315	374	
2	People	8,574	1,793	2,308	1,982	2,491	
3	Agricultural labourers	3,595	751	968	831	1,045	
II	Land areas						
1	Total natural area	26,789	11,439	2,828	6,759	5,763	
2	Agricultural lands	888	185	207	275	221	
	- wet rice lands	433	92	105	134	102	
3	Forestry lands (forested)	13,751	3,004	1,742	4,662	4,343	
	- natural forests	12,895	2,870	1,521	4,519	3,985	
4	Commercial lands	145	19	35	51	40	
5	Resident lands	48	10	14	10	14	
6	Unused lands	11,957	8,221	830	1,761	1,145	
III	Average data						
	Population density (people/km ²)		16	82	29	44	
	Average agricultural land/head (m ² /person)		1,030	897	1,387	887	
	- Of which wet rice land per head (m ² /person)		513	455	676	409	
IV	Ethnic groups (%)						
	Kinh	6.7	32.03	0	0	0	
	H'Mong	56.71	27.73	33.06	56.12	100	
	Dao	12.25	23.04	17.41	11.89	0	
	Tay	3.6	17.20	0	0	0	
	Day	17.94	0	46.86	23.00	0	
	Others	2.8	0	2.67	8.99	0	

Annex 2. ECONOMIC SITUATIONS OF HOUSEHOLDS IN THE NATURE RESERVE COMMUNES

Data collected in 2000

Commune	Household	People	Economic conditions (households)			Poverty reasons								
			Non-poor	Poor	Hunger	Lack experience	No. of riders	Lack lands	Risks	Lack workforce	Lack capital	Commit social evils	Illness	Over-stock
Ban Ho	286	1,793	178	86	22	38	7	26	6	15	14			2
Ta Van	315	1,982	210	93	61	52	14	39	5	10	34			
Lao Chai	362	2,308	195	127	40	72	18	43		6	25	1	2	
San Sa Ho	374	2,491	308	51	15	29	9	12		8	7	1		
Total	1,337	8,574	842	357	138	191	48	120	11	39	80	2	2	2

Annex 3. EDUCATION LEVELS IN THE NATURE RESERVE COMMUNES

Level	Ethnic groups	School name					Total	Note
		San Sa Ho 1	San Sa Ho 2	Lao Chai	Ta Van	Ban Ho		
	Total	251	250	465	373	342	1,681	
	Girls	107	107	244	161	162	781	
Primary	HMong	251	250	465	48	38	1,052	
	Dao	0	0	0	38	196	234	
	Tay	0	0	0	0	108	108	
	Day	0	0	0	117	0	117	
	Total	13	0	39	57	84	194	
	Girls	7	0	4	26	40	77	
Secondary	HMong	13	0	39	18	1	72	
	Dao	0	0	0	0	0	0	
	Tay	0	0	0	0	83	83	
	Day	0	0	0	39	0	39	

(Source: Education Division - Sa Pa District)

Annex 4: KẾ hoạch hoạt động "phấn tǎch hũ thềng khu bđo tǎn" tđnh lụo cai

TT	Thịnh quđ vđ c,c ho't đđng	Th,ng 6				Th,ng 7				Th,ng 8				Th,ng 9				Th,ng 10				Ngđi thđc hiđn
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
1	Xđy đđng c,c bđc thđc hiđn cđ thđ vđ x,c đđnh c,c bđn thđm giđ	x																				Chuyđn giđ, trđng nhđm, c,c c,n bđ chuyđn tr, ch
2	Hđp nhđm cđng t,c cđp tđnh đđ thđng quđ chđng trđnh hđnh đđng			x												x						C,n bđ chuyđn tr, ch
3	Hđi thđo đđy ý kiđn c,c Ban, ngđnh liđn quđn																x					C,n bđ chuyđn tr, ch
4	Lđp cđu hđi đđi đđu trđ vđ chđđn bđ đđi thđc đđđ		x																			Chuyđn giđ, trđng nhđm, c,c c,n bđ chuyđn tr, ch
	- đđi thđc đđđ hđp vđ phđng vđđ đđ x. Bđđn hđ			x																		Tđ 1
	- đđi thđc đđđ hđp vđ phđng vđđ đđ x. Lao chđđi				x																	Tđ 2
	- đđi thđc đđđ hđp vđ phđng vđđ đđ x. San sđđ hđ			x																		Tđ 3
	- đđi thđc đđđ hđp vđ phđng vđđ đđ x. Tđđ van				x																	Tđ 4
	- đđi thđc đđđ hđp vđ phđng vđđ đđ x. Mđng				x																	Tđ 1

	khoa																													
5	Hấp c, c b^n li^n quan cÊp huyÕn						x																				C, c tæ vµ c, n bé chuyªn tr, ch			
6	Pháng vËn, thu thËp th«ng tin vµ c, c ý kiÕn cª c, c Ban, nguõnh cũ li^n quan ẽ @Đa ph-ng						x																				Tæ 2			
7	TiÕn hính phÕn tÝch, ®, nh gi,																													
	- §, nh gi, hÕ theng tæ chøc											x															Tæ 1			
	- §, nh gi, mèi quan hÕ												x														Tæ 2			
	- §, nh gi, nguån ngÕn s, ch													x													Tæ 3			
	- §, nh gi, ¶nh hng cª ho't ®éng KT-XH														x												Tæ 4			
	- §, nh gi, t×nh h×nh vi ph'm ph, p luËt															x											Tæ 1			
	- §, nh gi, qui m«, ph'm vi giánh giú																x										Tæ 2			
	- §, nh gi, ho't ®éng du lpch sinh th, i																			x							Tæ 3			
	- NÕng cao ý thøc cª céng ®ång																										Tæ 4			
8	PhÕn tÝch SWOT																	x	x	x							Tæ tæng hóp vµ tæ trng cª tæ 1, 2, 3, 4			
9	Dù th¶o b, o c, o																							x	x	x	C, c chuyªn gia, CB chuyªn tr, ch, tæ trng 4 tæ			
10	Tæng hóp ý kiÕn vµ viÕt b, o c, o cuèi cõng																									x	x	x	x	C, c chuyªn gia, trng nhãm, CB chuyªn tr, ch
11	Đpch ra tiÕng Anh, gõi v'n phõng dù, n vµ nhËn ý kiÕn ®ång gáp cª dù, n																										x	x	x	
12	QuyÕt to, n híp ®ång víi WWF																										x			

Annex 5. HOUSEHOLD SURVEY RESULTS

Buffer zone

#	Issues	Trung Trai commune
1	2	3
1	Average income per capita (VND mill./person/year)	0.9
	Highest	2
	1. Lowest	0.08
2	Income from forests (VND mill./person/year)	0.23
	Highest	1.4
	2. Lowest	0.1
3	Forest assignment for protection from the Nature Reserve	-
4	Total assignment areas (ha)	-
	Largest	
	3. Smallest	
5	Forest plantation, tending (%)	
6	Household's relationships with the NR Management Board	
	Good (%)	
	Bad (%)	
7	Rewards, fines during assignment time	
	Yes (%)	

	No (%)	
8	Plant short-term crops under the forest coverage	
	Yes (%)	
	No (%)	
9	Terrace field planning	100%
10	Terrace field areas (average ha/household)	0.99
	Largest	4
	4. Smallest	0.3
11	Clear forests for terrace fields	
	Yes (%)	6.70%
	No (%)	93.3
12	Firewood harvest for sale	
	Yes (%)	3.3%
	No (%)	96.70%
13	Home-made rifles	
	Yes (%)	33.30%
	No (%)	
14	Participation in forest fire control	
	Yes (%)	100%
	No (%)	
15	Attend forest protection meetings	
	Yes (%)	100%
	No (%)	
16	Tourist guides	
	Yes (%)	
	No (%)	
17	Forest gardens	
	Yes (%)	56.70%
	No (%)	
18	Tree types in forest gardens	
19	Areas of forest gardens (ha)	
	Largest (ha)	14
	Smallest (ha)	0.1
20	Income from forest gardens (VND million)	
	Highest	6
	Lowest	0.1
21	Land allocation for forest plantation	
	Yes (%)	86.70%
22	Develop forest protection principles in villages	100%

Annex 6

LIST OF ENDEMIC SPECIES IN THE NORTHERN REGION NAMED AFTER SA PA AND FANXIPAN

No.	Species
1	Anemone chapaensis Gagnep. (Rauunculiaceae)
2	Michelia Chapaensis Dandy (Magnolia ceac)
3	Cyclea Phanxipangensis Gagnep. (menispermaceae)
4	Holboellia Chapaensis Gagnep.(La rdizabalaceae)
5	Ternstroemia Chapaensis Gagnep (Ternstroemiaceae)
6	Agapetes Chapaensis P Dop (Ericaceae)
7	Enkyanthus Chapaensis P Dop (Ericaceae)
8	Rhododendron Chapaensis P Dop (Ericaceae)
9	Primula chapaensis Gagnep. (Primulaceae)
10	Symplocos chapaensis Guillaum. (Symplocaceae)
11	Staurogyne chapaensis R. Ben. (Acanthaceae)
12	Ficus chapaensis Gagnep. (Moraceae)
13	Pellionia chapaensis Gagnep. (Urticaceae)
14	Quercus chapaensis H. et . C. (Fagaceae)
15	Liparis chapaensis. (Orchidaceae)
16	Epigeneium chapaensis Gagnep. (Orchidaceae)
17	Tainia chapaensis Gagnep. (Orchidaceae)
18	Sarcanthus chapaensis Guillaum. (Orchidaceae)
19	Anae tochilus chapaensis Gagnep. (Orchidaceae)
20	Habenaria chapaensis Gagnep. (Orchidaceae)
21	Smilax chapaensis Gagnep. (Orchidaceae)
22	Sepisorus chapaensis C. chr. et Tard. (Polypodiaceae)

REFERENCE

I. In Vietnamese:

1. Summary Report for 1996 - 2000 of Lao Cai FPD.
2. Summary Report for 1996 - 2000 of Hoang Lien-Sa Pa Nature Reserve Management Board.
3. Report on socio-economic situations in Sa Pa district in 2000.
4. Statistics report on land utilisation of Sa Pa District Land Administration Division in 2000.
5. Forest Inventory Report in Lao Cai province pursuant to the Directive No. 286/TTg in 1999.
6. Household's economy survey report in 2000 of Lao Cai province.
7. Dang Dinh Bat, Do Dinh Toat and et. al, 1999 - Evaluation on Current Environment and Tourism Potentials in Sa Pa.
8. Frontier Viet Nam: Forest Study Programme - Technical Report No. 13: Hoang Lien Nature Reserve; Andreu Tordoff, Steuveu, Mark Crindley and Hanna Siurua, July 1999.
9. Investment project to develop socio-economic conditions in mountainous communes in Sa Pa district in 2000.
10. Poverty alleviation project in Sa Pa district, 2000.
11. Archive documents of land allocation, land use right certification granting to Hoang Lien-Sa Pa Nature Reserve Management Board in 1995.
12. Nguyen Quang Hung, Tran Van Phi, Dinh Cong Hinh, Nguyen Manh Hung, Nguyen Ba Viet, Nguyen Van Cong, Le Van Bon and Hoang Van Ha, 1997 - Revised and supplement project to 327/CT project - Hoang Lien Nature Reserve.
13. Results from forest regeneration and plantation from 1999 to 2000 in Hoang Lien-Sa Pa Nature Reserve, Lao Cai province.
14. General Land Inventory in 2000 of Lao Cai province.
15. Feasibility Studies of Hoang Lien-Sa Pa Nature Reserve, 1993.
16. Statistics Year Book in 1999 of Lao Cai province.
17. Dao Van Tien, 1995: Mammal Surveys in the North of Viet Nam - Technical Science Publishing House.
18. Nguyen Nghia Thin, 1998: Vascular flora diversity in the high mountains in Sa Pa-Fanxipan, Hanoi National University

Publishing House.

19. Socio-economic development planning in Sa Pa district 2000 - 2010.
20. Vo Quy and Nguyen Cu, 1995: Bird Viet Nam - Agriculture Publishing House, Hanoi.
21. State Planning Committee, 1999: National Action Plan on Environment and Sustainable Development 1991 - 2000.
22. Project Document "Strengthening Protected Area Management in Viet Nam", 1999.

II. In English:

1. Gazoul, J và Le Mong Chan (1994) Unpublished. Scientific Report No. 3; Viet Nam Forest Research Programme, Site Description and Conservation Evaluation, Nui Hoang Lien Nature Reserve, Lao Cai, Viet Nam. The Society for Environmental Exploration, London.
2. Cao van Sung (ed.) 1995. *Environment and Bioresources of Viet Nam: Present Situation*. The Gioi Publishers, Hanoi.
3. Corbet, G. B. & Hill, J. E. 1992. *The Mammals of the Indomalayan Region*. Oxford University Press, Oxford.
4. Di Gregorio, M., Phuong, P. & Yasui, M. 1997. *The Growth and Impact of Tourism in Sa Pa*. Working paper of the Centre of Natural Resources and Environmental Studies, London.
5. Ghazoul, J. & Le Mong Chan. 1994. *Nui Hoang Lien Nature Reserve*. SEE Viet Nam Forest Research Programme Technical Report No. 2. Society for Environmental Exploration, London.
6. Grindley, M. 1998b. *Constraints and Opportunities for a Nature Trail and Visitor Centre within the Hoang Lien Nature Reserve, Sa Pa District*. Unpublished report. Frontier - Viet Nam, Hanoi.
7. Hoa, P. and Lan, L (1999), *The impact of tourism on ethnic minority inhabitant Sa pa district, Lao Cai: their participation in, and attitudes toward, tourism*, Human Geography Research Centre, National Centre for Social Science and Humanity in collaboration with IUCN Capacity Building for Sustainable Tourism Initiatives Project, IUCN, Hanoi.
8. Kemp, N., Le Mong Chan & Dilger, M. 1995. *Nui Hoang Lien Nature Reserve*. SEE Viet Nam Forest Research Programme Technical Report No. 5. Society for Environmental Exploration, London.
9. MacKinnon, J. 1990. *Refor Forestry Sector Review Tropical Forestry action Programme, Viet Nam*. Ministry of Forestry, Socialist Republic of Viet Nam. Hanoi.
10. Ministry of Forestry 1991. *Forestry Sector Review Tropical Forestry Action Programme, Viet Nam*. Ministry of Forestry, Socialist Republic of Viet Nam, Hanoi.
11. Sobey, R. (ed.) 1998. *Biodiversity Value of Hoang Lien Mountains & Strategies for Conservation*. SEE Forest Research Programme, London.
12. Witty, B. and Hamilton, A. 1996. *Tourism and Minority Groups in Hoa Binh, Lao Cai and Lang Son, Viet Nam*. Unpublished report by Community Aid Abroad. One World Travel, Australia.

LIST OF WORKSHOP PARTICIPANTS AND COMMENT GIVERS

-----***-----

#	Name	Working place
1.	Nguyen Quang Hung	Lao Cai PFPD
2.	Nguyen Ba Viet	Lao Cai PFPD
3.	Nguyen Tien Khoat	Lao Cai PFPD
4.	Hoang Van Ha	Lao Cai PFPD
5.	Luong Cong Hoan	Lao Cai PFPD
6.	Nguyen Thi Lan	Lao Cai PFPD
7.	Hoang Van Chinh	Lao Cai Finance & Pricing Dept.
8.	Pham Van Cuong	Lao Cai Planning & Investment Dept.
9.	Dinh Van Toan	Lao Cai DARD
10.	Pham Duc Thuan	Lao Cai Land Administration Dept.
11.	Hoang The Hung	Lao Cai Land Administration Dept.
12.	Duong Ba Truc	Lao Cai DoSTE
13.	Luong Kim Tan	Lao Cai DoSTE
14.	Nguyen Manh Hung	Lao Cai DARD
15.	Pham Ngoc The	Lao Cai Provincial Organisation Committee
16.	Pham Van Dang	Hoang Lien - Sa Pa NR Management Board
17.	Nguyen Anh Tuan	PPC Office
18.	Luc Thuong Binh	Commerce - Tourism Dept.
19.	Hua Thi So	Provincial Women's Union