Ministry of Agriculture
and Rural Development

Japan International
Cooperation Agency

DEPARTMENT OF FORESTRY

Feasibility Study Report

on agroforestry project
in Ta Hoc Commune, Mai Son District,
Son La Province

Book 8-1: F/S Son La

THE DEVELOPMENT STUDY ON CAPACITY BUILDING
FOR PREPARING FEASIBILITY STUDIES AND IMPLEMENTATION PLANS
FOR AFFORESTATION PROJECTS IN THE SOCIALIST REPUBLIC OF VIETNAM
---FICAB---

- March 2008 -

Preface

"Feasible Study Report on Agroforestry Project in Ta Hoc Commune, Mai Son District, Son La Province (Book 8-1: F/S Son La)" is part of the training package prepared under the development study on capacity building for preparing feasibility studies (F/S) and implementation plans (IP) for afforestation projects in the Socialist Republic of Vietnam (hereafter referred to as "FICAB").

The immediate objective of FICAB is to strengthen capacities for the preparation of afforestation projects through practical On-the-Job-Training (OJT), seminars, and workshops. Five provinces have been selected as targeted provinces for FICAB (Thai Nguyen, Son La, Quang Nam, Lam Dong, and Long An Provinces).

FICAB was divided into two phases. Phase I was to prepare Model F/S and IP as well as other training materials in Thai Nguyen, a Core Province (CoP). The second phase was to implement technical training for staff members of four other provinces as Participating Provinces (PPs), i.e. Son La, Quang Nam, Lam Dong, and Long An Provinces. The training was implemented using Model F/S, IP and other training materials.

Through conducting FICAB, four forms of output are to be generated. The first is an enhanced capacity for MARD personnel. Selected staff members of MARD develop administrative and coordination capacity for supervising the quality of F/S and IP. The second is an enhanced capacity for CoP and PPs personnel. Selected staff members of CoP and PPs enhance the capacity for preparing F/Ss and IPs. The third is the development of a monitoring and evaluation method for the technical training for preparation of F/S and IP. The fourth is the development of a training package for conducting the technical training for preparing F/S and IP for afforestation projects.

The training package is prepared as one of the four above forms of output of the FICAB. The entire training package comprises the following nine (9) books:

Book 1: Training plan
Book 2: Manual for preparation of feasibility study report for production forest / agroforestry development project in Vietnam
Book 3: Manual for preparation of implementation plan for production forest / agroforestry development project in Vietnam
Book 4: Model F/S of Thai Nguyen Province
Book 5: Model IP of Thai Nguyen Province
Book 6: Monitoring and evaluation report on technical training of PPs
Book 7: Market trend reference book on wood-based and agroforestry products
Book 8: F/S reports of Son La, Quang Nam, Lam Dong, and Long An Provinces
Book 9: IPs of Son La, Quang Nam, Lam Dong, and Long An Provinces

'Book 8-1' was prepared by the Provincial Study Team of Son La Province under the guidance of local consultant engineers.

Figure 1. Location of Son La in Vietnam

Figure 2. Proposed project area in Mai Son district – Son La province

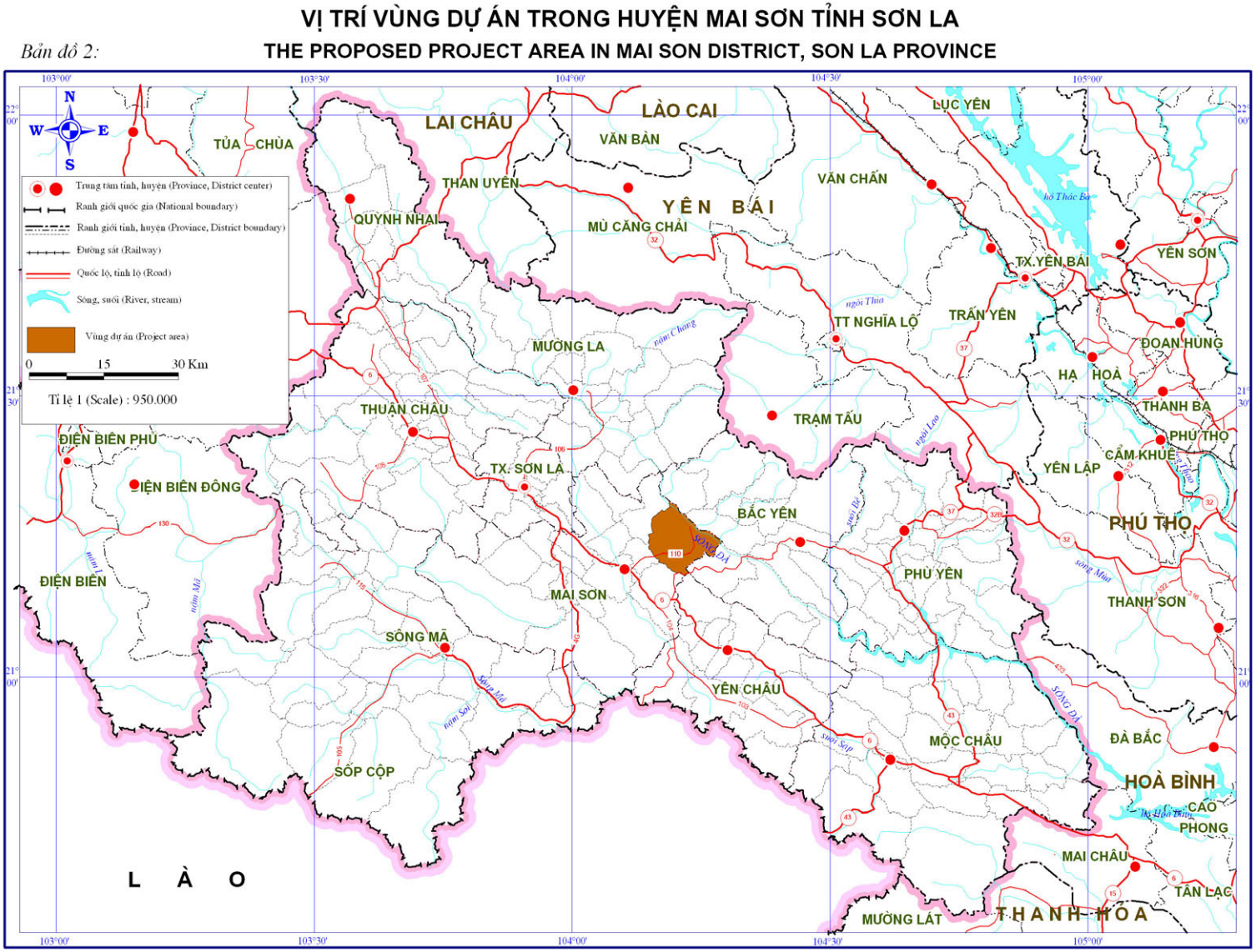

Figure 3. Four proposed villages in Ta Hoc commune

Bản đồ 3: **VỊ TRÍ XÃ ĐỀ XUẤT CHO DỰ ÁN**

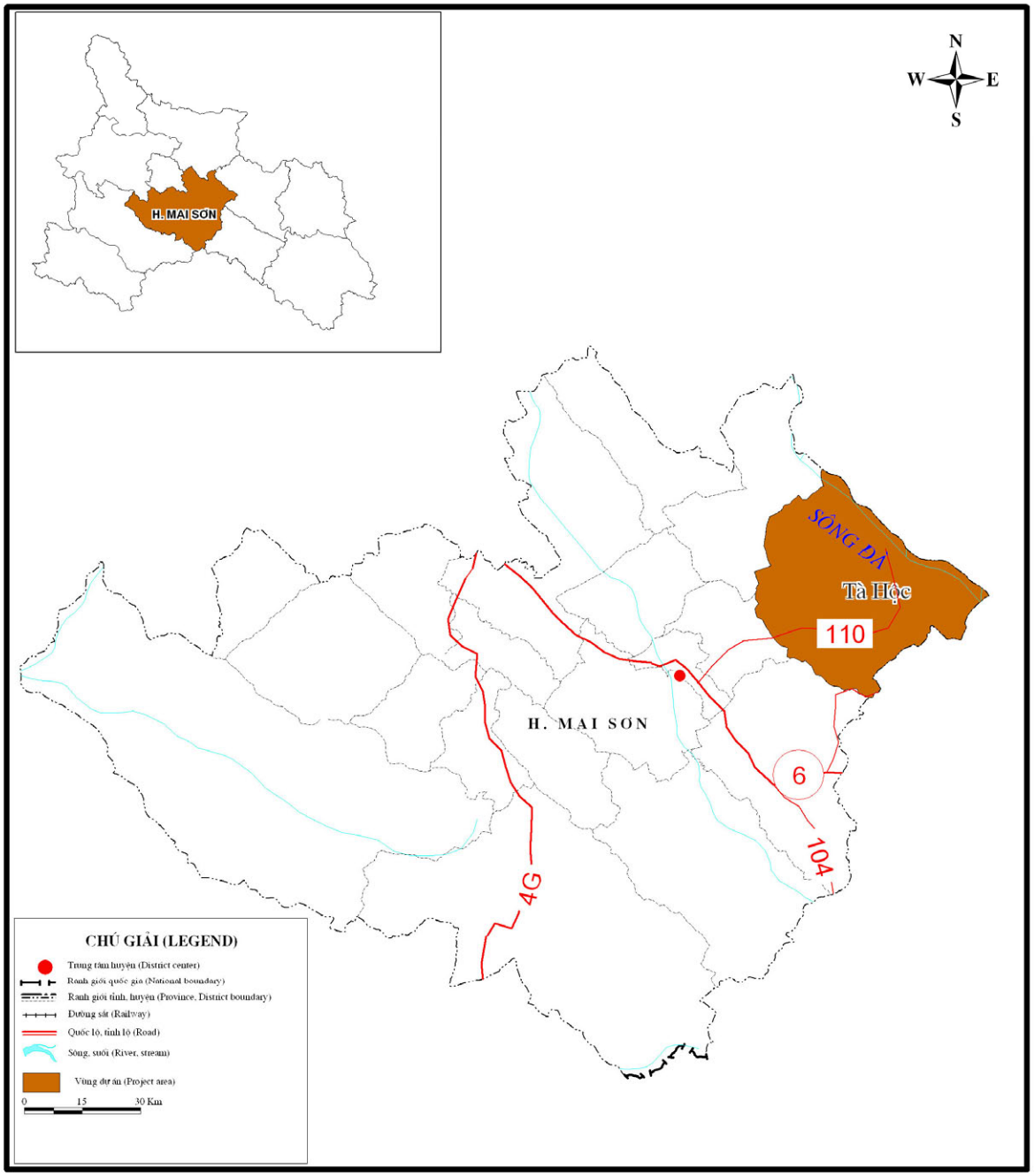

Table of contents

List of Figures

List of Tables

List of Appendices

Abbreviations

5MHRP	Five Million Hectare Reforestation Program
ASEAN	Association of Southeast Asian Nations
B/C ratio	Cost-Benefit ratio
Co	Core Province
DoF	Department of Forestry
EIRR	Economic Internal Rate of Return
FIPI	Forest Inventory and Planning Institute
FIRR	Financial Internal Rate of Return
F/S	Feasibility Study
GOV	Government of Vietnam
PIP	Project Implementation Plan
IRR	Internal Rate of Return
JAFTA	Japan Forest Technology Association
JICA	Japan International Cooperation Agency
JST	JICA Study Team
MARD	Ministry of Agriculture and Rural Development
MPI	Ministry of Planning and Investment
NPV	Net Present Value
PFEP	Production Forest Establishment Project
CPIU	Commune Project Implementation Unit
PMB/MB	Project Management Board
PPs	Participating Provinces
PST	Provincial Study Team
Sub-DoF	Sub-Department of Forestry at province level
WTO	World Trade Organization
PPC	Provincial People Committee

Summary

Part I Project Background

Chapter 1 Context of Project formulation

In Son La Province poor farm households still stick to maize farming on slopes where are planned for forestry use due to better profitability compared with forestry products. However, the forestry sector has important role in order to conserve watershed area of Da and Mar River as well as to fulfill wood demand for household use and wood processing. The province therefore aims at establishment of 30,000 ha of agro-forestry in which production forest accounts for 20,000-30,000 ha at Mai Son district where its forest was degraded by over exploration during these several decades.

Chapter 2 Natural and Socio-economic Conditions

The project area is located in the four villages: Hoc, Mong, Pa Dong and San in Ta Hoc commune, Mai Son district, Son La province. The project area is about 80 km away from Son La town. Total land area of the four villages is 3,673 ha and forest land is 2,966 ha that is 81% of the total area. Land use right for almost all land has been allocated to individual households up to 2003. Ta Hoc commune lies along Da River with complex topography in general. The population of the four villages is about 2,000 persons of five ethical groups. The average income of household is 13 million VND per year and 62% of this is agricultural income, and main source of income is crops and livestock. The role of forestry for the household economy is small but important. Average factory gate price of log is assumed from 0.7 to 1.1 million VND per m^3. Three wood factories are the major target markets located closest to the project area.

Chapter 3 Lessons Learnt

According to experiences from the Mai Son Economic Forest Project implemented in 2002-2004, projects may need to be based on actual condition of the project area, and capacity and expectation of farmers, because these points are determinants of the successfulness of projects. Agro-forestry models are needed to be appropriate for steep land features and for farmers living conditions that are under self-sufficiency economy.

Chapter 4 Advantages and Constraints

The following advantages have been observed: i) central and local government enhance tree plantation, ii) climate, forest land and transportation are favorable and iii) neighboring wood factories can process more raw material. On the contrary, i) there is some difficulties for establishing Acacia plantation in sloping land because of strong wind, and ii) afforestation does not seem to attract farmers for investment of their money due to longer time to harvest compared with agricultural crops.

Part II Project Content

Chapter 1 Project rationale

Long cycle of production forest is a major obstacle as investors are not able to have any earnings at early stage. This is the reason why farmers often utilize forest lands for short-term agricultural crops to satisfy their cash earnings for daily need. However, farmers

already applied agro-forestry models which short-term agricultural crops are intercropped with forestry species. In addition, theses models have shown positive results such as contribution to land protection, erosion prevention as well as contribution to increasing earnings. These models will be disseminated and applied on a larger scale in order to generate overall effects, which not only reduce the misuse of forest land but also help to improve environment and bring earnings for farmers in a sustainable manner.

Chapter 2 The project

2.1 Project objective

Overall objective of the project is to utilize forest land in a stable manner to improve livelihoods of farmers and to protect the environment through the application of agro-forestry model on sloping land. The immediate objective of the project is to increase incomes of farmers through the implementation of agro-forestry production on forest land.

2.2 Project components

The project consists of three components: i) establishment of the agro-forestry model, ii) project management, monitoring and evaluation and iii) facilitating implementation of the project.

Chapter 3 Implementation of the project

Planting site for the agro-forestry is selected among forest land as follows: i) forest land that is classified as production forest, ii) forest land where no conflict exist, iii) forest land that is allocated to households and iv) forest land that is bare land of Ib and grass land of Ia. In the project area, as Dendrocalamus, Acacia and Melia azedarach are developed well and farmers want to continue to plant, these species are selected in the agro-forestry model. Total area of agro-forestry model is 416ha, of which Dendrocalamus and maize model is established 183ha from 2008 to 2010, and Melia azedarach and maize model is established 233ha from 2008 to 2011. From 2013 to 2018, total 1.08 million stems of Dendrocalamus, and 16,000m3 timbers and 4,700 sters firewood of Melia azedarach are harvested.

Chapter 4 Project cost

Total cost of the whole project is 9.8 billion VND, of which baseline cost is 8.0 billion VND (81%), physical and price contingency is 0.3 and 1.5 billion VND (3 and 16%) respectively. Among baseline cost, basic labor cost is 5.3 billion VND(54%); materials and seedlings is 1.9 billion VND (20%), management cost is 0.5 billion VND (5%) and there are 0.7 billion VND (7%) of other cost.

Chapter 5 Financial plan

In order to implement the project, three financial resources are mobilized such as loan from financing agency, self-funds of farmers and state budget. Loan from financing agency is used to cover a part of labor cost and procurement of seedlings and fertilizer. A large part of self-fund of farmers is in form of labor for planting, tending and protection. State budget allocated to the project management, monitoring activities and training. Total project cost is 10.5 billion VND, of which self-fund of household accounts for 75%, loan from financing agency makes up 19% and state budget accounts for 15%.

Chapter 6.7.8 Project Management and Implementation etc.

The PMB is established by Son La PPC with consensus of Mai Son DPC and DARD. The PMB is under management of Mai Son DPC. The PMB is responsible for managing every project components to achieve the project objectives. At commune level, project implementation unit (CPIU) is established on approval of Mai Son DPC with consensus of the OMB and is carried out project activities under the guidance and supervision of the PMB.

Chapter 9 Training plan

Two kind of training course are conducted, one is training on credit service and techniques for implementation of agro-forestry model, and the other is training on sales and market information, harvesting techniques, cultivation method. Trainers for those courses are staffs of Provincial Extension Service Centre (PESC), DARD, PMB and credit officers at district level. Trainees are members of the CPIU and participating farmers.

Chapter 10 Monitoring and Evaluation

In order to monitor and evaluate the progress of the project activities and the achievement of the project objective and overall goal, the progress indicators and the development indicators are set respectively. These monitoring and evaluation method are shown in the Project Design Matrix.

Chapter 11 Sustainability

Timber demand in the province and in neighboring provinces is remain high. It is envisaged that Vietnam is a major supplying source of wood material. High demand of wood materials is major factor of the sustainability of the project. Participating farmers receive training and obtain knowledge and information on agro-forestry so that they are able to continue agro-forestry activities after the end of the project. New plantation contributes to the improvement of soil and consequently it is help the sustainable use of land.

Part III Project Effectiveness

Chapter 1 Financial and Economic effectiveness

1.1 Financial analysis

The project develops two agro-forestry models comprised with Dendrocalamus, Melia azedarach and Maize. The financial analysis is conducted on one ha agro-forestry model. The net benefits arising from the without-project case are expected to be marginal and the only with-project case is considered for the analysis.

The results of the analysis shows that the agro-forestry with both models viable as the financial internal rates of return (FIRR) show 41% for Dendrocalamus and Maize model and 35% for Melia azedarach and Maize model in the base cases. Calculating result reveal that when bank interest increases by 20% or 17.35%/year and labor price increases by 30% or 52,000 VND/man-day equivalently, NPV still remains at 3 millions. In practice, labor price can increase considerably but interest rate may not rise too drastically, it means that project remains feasible if interest rate would increase slightly.

1.2 Economic Analysis

The economic analysis of the project shows that the Net Present Value (NPV) is calculated at VND 2.0 billion (at the economic discount rate of 10%) and the Economic Internal Rate of Return (EIRR) are at 30.0%. The results confirm the feasibility of the project from a view point of the society.

Chapter 2 Environmental impact assessment

As Melia azedarach has low closure of canopy coverage, undergrowth develops quite well. Forest lands of types Ia (bare land), Ib (glass land) are replaced to agro-forestry model. By applying agro-forestry model, land erosion and top soil run-off is prevent.

Chapter 3 Social impact assessment

The project creates job and increases earnings for farmers. These contribute to poverty reduction in the area. The project helps to form a new cultivating method that is suitable to the practice maintaining combined agriculture-forestry production on forest land.

Chapter 4 Project risk

Long project cycle is face with weather fluctuations and actual productivity may be lower than the productivity estimated. If sale price reduce, project turnover and morale of participated farmers may be seriously affected. Non-timely and insufficient investment flows, changes of interest rate are also risk factors to the project. Farmers are accustomed to getting grants for planting and not familiar loans.

Part IV Conclusions and Recommendations

Chapter 1 Conclusions

Assessment of socio-economic conditions together with financial and economic analysis shows that the agro-forestry project is highly feasible. The project proposal is also in line with direction of Son La province in the formation of a sustainable model for economic production in areas where are steep slope so that it can be satisfied the livelihood of farmers and the protection of top soil layer and the watershed area of Da River.

Chapter 2 Recommendations

It is recommended that Son La PPC will appraise and approve the project so that local farmers can participate in the project, financing agencies provide loan farmers timely and sufficiently so that the project schedule is maintained and the Mai Son DPC, DARD assigns staffs for 661 PMB so that the project is able to manage successfully.

Legal framework

1 Legal basis for the establishment of the project

The agro-forestry project in Ta Hoc commune, Mai Son district in Son La province is a step forward to concretization of socio-economic development orientation of the province and district. The project is proposed to be formed on the regional practices that are of rationale with guiding policies of governmental levels.

The project shall be based on the following legal framework:

- Decree no. 16/2005/NĐ dated February 7, 2005 by the Government on management of investment into construction of civil work schemes.
- Decision no. 661/QĐ-TTg dated July 29, 1998 of the Prime Minister on objectives,, tasks, policies and the organization of new afforestation of 5 millions hectares of forest.
- Decision 199/QĐ-BNN-PTNT promulgated on January 22, 2002 by the Ministry of Agriculture and Rural Development on the approval of Vietnam forestry development strategy in 2001-2010 aiming at new plantation of 3.52 million hectares of forest in which economic forest of 1.8 million hectares is the main importance.
- Law on Forest protection and Development coded 29/2004/QH11, promulgated by the National Assembly of term 11^{th}.
- Strategy on Forest sector development of Son La province in the period from 2005-2015.
- Master plan for socio-economic development of Mai Son district in 2005-2010 period and orientation toward 2015.
- Decision no 3011/QDUB of Son La provincial people committee dated Dec. 12, 2000 on the temporary promulgation of policy and solution for provincial allocation of forestry land and natural forest.

2 Basis for project feasibility study preparation

The project is prepared in pursuant to various existing regulations on production forest that found below:

- Decision no. 210/2006/QĐ – TTg dated September 12, 2006 of the Prime Minister on promulgation of principles and norms for investments into development that covered by State budget in the period of 2007-2010.
- Decision no. 38/2005/QĐ-BNN dated July 6, 2005 of the Minister of Agriculture and Rural Development on labor cost norms for plantation, tending and designing of afforestation.
- Afforestation standard process promulgated by the MARD.
- Decision no 4047/QĐ-UB dated April 26, 2002 of the Son La PPC on promulgation of seedling unit price for afforestation in Son La province.

PART I: PROJECT BACKGROUND

1 General context

1.1 Context of Son La province

Nowadays, Son La province's economy mainly relies on agriculture and forestry production; living condition of the people is very difficult, poor household rate accounts for approximately 40% total province's population. Natural area of the province is 1.4 millions ha of which agricultural area accounts for a relatively small portion. Currently, total area for wet rice crop in the province is only 14,000 ha or 1% of natural area. In the province, agricultural activities are mainly wet rice cultivation and upland farming. Beyond the fact that agricultural land was allocated to households, groups of households and local communities but people in some areas still try to implement maize crops on sloping land where has been already planned for forestry use. Annually, Son La plants around 80,000 ha of maize and farmers can earn 6-8 millions per hectare after 3 months crop. Major agricultural products are rice, maize, livestock, tea and coffee beside cassava and others.

In Son La, economic contribution of forestry sector is relatively small but forest plays a crucial role as the province located in the catchments areas of the two large rivers namely Da and Ma. Particularly, this is the ecological roof of the whole North western region. Son La protection forest also functions as watershed region for the two national large hydro power plants namely Hoa Binh and Son La hydro-power plants. At present, there are about 987,000 ha of forest and forest land in the province among that, 600,000 ha was planned for watershed protection and 330,000 ha was allocated for production forest.

Current demand for timber in the province is 60,000m^3/year; for bamboo, Dendrocalamus material is approximately 4.2 million stems per year. Beside the need for wood materials of the industries, households also consume a large amount of timber for construction, producing furniture and for fuel. Premium rounded logs, straight stump with diameter of 10 cm or over can be sold at high price for construction and for making plywood. Medium or low quality timber, crooked form and branches can be sold to wood processing workshops. Small branches are used as firewood.

Trading of wood materials is implemented by Companies or Merchants. They often purchase standing trees from households then carry out harvesting, logging and transporting by themselves by hiring local labors or labors from other places. Wood price is not stable, it depends on harvesting and logging conditions in each location. Currently, stumpage price of Melia azedarach is 500,000 VND/m^3 and Dendrogramus is 5,000 VND/stem.

Resolution of Son La Communist Party Congress has addressed that forestry sector shall have to protect existing forest, retain economic development by developing forest, ensuring the sustainable development, enhancing forest coverage and strengthening protection function of forest, regulating water resource and promoting the contribution of forestry production to the course of economic development of the province. By the year 2010, the province aims at new establishment of 30,000 ha of forest in which production forest accounts for 20,000 – 30,000 ha with proper share of forestry species so as to satisfy

the need within province and neighboring areas for materials for paper production, pulp, wooden products and bamboo.

Son La poses a favorable location that enable the province to do business with other provinces such as Dien Bien and Lai Chau in the North, Yen Bai, Phu Tho, Hoa Binh and Hanoi in the East and the South. Border to the province in the West is Lao through local gates namely Chieng Khuong and Long Sap.

1.2 Forestry context in Mai Son

Located in the South Eastern part of the province, Mai Son's forest land is relatively concentrated and linked together. High mountains and steep slopes distributed mainly in the East and West while in the center, among low hills are fairy flat areas those are very good for agricultural crops. Few decades ago, there were large forest areas in the district with large timber forest, natural bamboo forest with high stock volume. Due to the recent frequent over exploitation, expansion of agricultural cultivation by burning forest, most of these areas have been taken away. This therefore leading to land- degraded rapidly, surface soil and litter washed away seriously.

In the mean time, forest coverage of Mai Son remains quite low at about 34%. Beside other cause, one of the main reasons is the wrong utilization of forest land. In several parts of the district, even land areas those have been planned for forestry production, people are still maintaining their agricultural activities for additional income since they can gain a high profit in a short cultivating period of agricultural crops.

Recent survey results show that the demands for timber for furniture, fuel wood, bamboo and Dendrocalamus of the local people and private wood processing workshops in the district are relatively high. However, it is estimated that annually, Mai Son can only provide about 5,000-7,000 m^3 to local market.

According to the forestry development orientation of Mai Son, the district targets at new plantation of 5,050 ha of production forest with proper share of species by the year 2010 so that forestry sector will remarkably contribute to economic development and satisfy wood materials demand of wood processing industries.

So as to solve the use of forestry land for agricultural cultivation, Mai Son has introduced some pilot agro-forestry models and initially positive effectiveness has been witnessed. Such model on one hand helps forest land to be correctly used and helps farmers to get short term income during the very beginning period of a forest plantation cycle, on the other hand.

1.3 Current situation of forestry activities in Ta Hoc commune

Ta Hoc commune is about 20 km away from the district center to the North. Most of forestry land in the commune has been allocated to village community. Areas closed to residential land were allocated to households nearby. There are quite many households are growing maize, cassava and other agricultural crops on allocated forest land. It is obviously that, such agricultural activities are not sustainable because the land being

cultivating on are mostly on high slopes, surface soil will be eroded rapidly and therefore, after few years of cropping production will no longer be organized and those land areas would be abandoned, local people life would be more seriously affected. Furthermore, these acts of wrongly use of forest land are not eligible and lands may be soon confiscated.

Nowadays, local people are awarded of this issue but they themselves can not determine on which direction they should drive their life to so that they can both maintain their living essential needs and be complying with using land on the right purpose. They are in urgent need of external supports on both technical and financial aspects. It is of crucial need for contribution of not only forestry sector but also other governing authorities so as to solve the existing problem successfully and effectively.

2 Natural and socio-economic conditions

2.1 Natural condition

2.1.1 Geographical location

The proposed project area is located in the four villages namely Hoc, Mong, Pa Dong and San village in Ta Hoc commune of Mai Son district, Son La province. Total natural area of the commune is 11,807 ha of which area of the four selected villages is 3,673 ha in total.

Ta Hoc commune lies along Da River. Bordered to the North is Pac Nga commune, in the East is Muong Khoa commune of Bac Yen district. The Western and Southern part of Ta Hoc are Chieng Chan and Co Noi communes correspondingly those are important maize production communes of Mai Son district.

The proposed project area is about 20 km to Hat Lot town – district center to the North, laying along provincial road no 110, distanced 12 km from Ta Hoc port, and about 80 km away from Son La town. The connection from project area to wood material markets in the province is fairly good.

2.1.2 Topography

Project area in particular and Mai Son area in general has complex topography, most parts are divided with elevations and streams and canyons. The closer to Da River, topography is the more complicated. Relatively flat and fertile areas distribute along the highway no. 6 that passes the central of Mai Son district.

Average sloping level in the project area is ranging from $25^0 – 30^0$. With this slope there are high risks for land slide, flashed flood and erosion on a large scale when heavy rain occurs. Average altitudes of the area are 788 m above sea level, the highest point is 1,176 m and the lowest point is on the Da river water level in dry season of 120 m.

2.1.3 Characteristic of land

Assessment of land productivity potential in the project area was conducted by rating method using 6 factors that based on suitability level of the soil with Agro-forestry model. These factors are: (1) Physical composition of land T; (2) Slope G; (3) Thickness of soil layer D; (4) Status of flora cover; (5) Absolute elevation H; and (6) Average rainfall per annum R.

Following table describes potentiality of land units in the project areas:

Table 1. Land form and productivity as per geographical unit

Unit: ha

No.	Productivity class	Area	Divide by village			
			Hoc	Mong	Pa Dong	San
1	Low	129.34	48.14	41.22	17.15	22.78
2	Medium	286.65	34.40	59.00	59.87	133.37
3	**Total**	**415.98**	**82.53**	**100.26**	**77.04**	**156.15**

Surveying results show that in project area, there are only two potential land classes (1) Medium class accounts for 69% and (2) low potentiality accounts for 31% of the total production land area.

2.1.4 Land resources

Field data collected from project preparation shows that total natural area of the four villages is 3,673 ha. Among this, forestry land is 2,966 ha, accounts for 80.7%; agricultural land is 546.5 ha of 14.9 %; other land is 148 ha of 4%; and residential land is 14 ha.

In forestry land aside, area of bared land and bushes (Ib) and grass land (Ia) is 841.5 ha, accounts for 28.3% of total area of forestry land. Beyond the fact that the above mentioned land area is bared land and had been allocated for forestry activities, but in recent years, local people have been using for maize crops. In line with solving the wrong use of land, the project is being studied and proposed to include this type of land into project area for establishment of agro-forestry models.

2.1.5 Climate

Weather of Mai Son district is typically tropical with seasonal winds and composed by two clear seasons.

Rainy season starts from April to August with high rainfall occurs in June, July and August, total rainfall during these months account for 85% of the annual. Average rainfall in recent years is around 1,600-1,800 mm per year.

Dry season starts from September to March of the following year. In the later half of dry season, weather becomes particularly dried that poses a high risk of forest fire. Hazardous cold occurs occasionally. Hoar frost often causes damages to vege-culture and crops in the area. Hail rarely happens but may cause serious losses and damage various crops and tree plantation once occurred.

Continental wind from Lao (that very dry and hot) actives mainly in February and March., causes hot weather and partial draught, sometimes it may continue in 25-40 day consecutively.

Average yearly temperature is 24,5^{0}C, maximum temperature reaches in June at 39^{0}C and minimum temperature falls in January-February and sometimes recorded at 2^{0}C. Average humidity per annum is around 83%.

2.1.6 Hydrology

There are two major streams in Ta Hoc commune namely Huoi Hoc and Huoi Duong that formed from several smaller streams and hold a high volume of water that flow in the whole year round, these streams supply water for people and serve irrigation in the area. Beside, there are some smaller streams such as Hac, Luon, Phat, Heo, they all flow into Da River. Transportation can not be maintained in these streams due to the swallow water level and too much rock rise on the bottom, narrow streams running through and water regimes evolve accordingly to season.

However, there is a river port in the commune on Da River, this is an important exchanging point for goods and produced products for the whole commune to other parts of the district as well as other districts and provinces. Average distance from villages in Ta Hoc to the port is around 6-7 km.

2.2 Socio-Economic conditions

2.2.1 Population, Ethnics and Labor

There are five brotherhood ethical minorities in Ta Hoc commune namely Thai, H'Mong, Muong, Kho Mu and Kinh. Among those, Thai accounts for 64.5%; H'Mong stands at 34% and the remaining for others as the whole. Total population of the commune is 4,825 people with density of 41 people/km^2. Natural population growth rate is 1.7% that is much higher than the average figure of the province (1.2%). Population distribution is not equally, most populated areas are low land and along roads. H'Mong people are living in high area where transportation is difficult. Labor force at ages ranging from 18-35 accounts for approx. 40% of population that makes an average labor number per household of 2.3.

Table 2. Population, labor and ethnical minority distribution in participated villages

Unit: person

Village	HH	People			Labor	Ethical tribe		
		Man	Woman	Total		Thai	Muong	H'Mong
Hoc	104	264	273	537	215	510	27	
Mong	96	262	271	533	213	533		
Pa Dong	119	341	354	695	278			695
San	47	138	144	282	113	282		
Total	**366**	**1,005**	**1,042**	**2,047**	**819**	**1,325**	**27**	**695**

Source: Mai Son Statistical office

Generally, poverty rate in the four villages are quite equal, with total number of poor households is 130 that account for 35.5% among total. San village is having highest

number of poor households that stands at 36.5%. Gender distribution is quite equal with a common balance of 50.9% between women and men.

Table 3. Population figures of villages in project area

Item	Unit	Ta Hoc Com.	Hoc	Mong	Pa Dong	San	4 villages
Population	Person	4,825	537	533	695	282	2,047
Women	Person	2,418	273	271	354	144	1,042
No. of household	HH	1,012	104	96	119	47	366
No. of poor hh.	HH	358	37	34	42	17	130
Labor	Person	1,939	215	213	278	113	819
Average per hh.	Person/hh.	4.8	5.2	5.6	5.8	6.0	5.6
Average labor	Person/hh.	2.0	2.1	2.3	2.4	2.5	2.3

Source: Mai Son economic section

2.2.2 Education

Site survey results and commune statistical data show that literacy rate in Ta Hoc is fairy low. There are 2 primary schools and 1 secondary school in Ta Hoc commune. However, with current 933 pupils of all grades, 78 teachers and 52 class rooms of which 43 primary classes and 9 secondary classes, education situation would be possibly improved in the near future; accessibility of children to primary classes is not too difficult because there are primary classes in each village. The newly built secondary school is located in commune center and of some distance to villages; pupils therefore, choose to register for boarding school. In some cases, families stop their children going to school due to either long distance or financial difficulty, this explains why there are still some youngsters do not attend secondary school in within their age.

2.2.3 Health care

There is a Health care center in commune town with 12 patient beds. The station is capable to treat almost all common diseases and to conduct first aid for accident cases or difficult case for later handing over to higher levels; the station itself can also organize vaccination and reproductive treatment. Currently, the healthcare center employed with 1 doctor, 1 specialized nurse, 2 nurses, 1 staff educated from medical school and other 19 unattended healthcare staff in villages.

2.2.4 Transportation

Largest road running through the commune is provincial road no. 110. Most part of the road has been semi-coated some segments covered with processed rock basement. The road links highway no. 6 with Ta Hoc port. Inter-commune and inter-village roads are available but with low quality, easily accessible in dry season but difficult in rainy season due to land slide and slippery occur often. However, rainy season is not the time for harvesting, therefore transporting of products is not seriously affected. In afforestation

season, seedlings, materials are mainly brought by human or animal to afforestation sites, thus planting activities are not too badly influenced.

From Ta Hoc port, various types of products and goods can be exchanged with other large markets in the province such as Muong La district, Van Yen town in Moc chau district or others like Cam Ha port in Hoa Binh, etc at much lower cost in comparison with inland transport. In the coming period, upon the completion of inter-provincial roads it is certainly that business exchanging between the project area and other location will be much more expanded.

Along roads, average transport distance for forest products from project area to markets such as Son La wood processing company, and merchants of agricultural products in Mai Son and Son La town is around 50 km. Following provincial road, distance from Ta Hoc center to the port is from 12-15 km.

2.2.5 Power and water supply

Power supply network connected with national grid is not fully maintained in the area but only reached governmental offices and healthcare center. Power transmission lines to villages have not been deployed. Currently, in some households, small hydro power generators that supply power for lighting have been installed with their owned budget.

In project area, there are no centralized water supply system, water for daily life is natural fed that carried from streams without treatment and unstable in term of supplying volume, redundant in rainy season but short in dry time. There is an irrigation scheme in commune for watering a very small area of wet rice crop, however, this system does not ensure water supplying in the whole year as it dependent on natural water and water from streams.

2.2.6 Poverty and household economy

Life of local people is mainly relied on self supplying and consuming basis. Main source of income is from crops and livestock. Some households participate in provision of services to local villagers. Surveying results obtained from project preparation show that average income of a household is about 13 Mil. VND/hh/year in which earnings from agriculture account for 62% (8 millions VND) of the total.

Table 3 indicates that poverty rate in project area is 35.5 %, a bit higher than the average of district (35%)[1]. According to the new poverty line standard[2], most of household in the area are considered poor. Annually, in the project area, these poor households often in shortage of food in 1-2 post harvesting months in Feb. and March.

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[1] Data provided by Economic section of the district.

[2] Poverty rate as of new poverty line of MOLISA applied since 2004.

2.2.7 Accessibility to credit sources

Accessibility to credit sources is facing with constraints in the project area. Interviews in the field reveal that in recent years, local farmers have borrowed loans from VBARD, VSPB for development of livestock and crops. However, rate of loan repayment was rather low due to people miserable life, therefore some bad debts still remained. This led to the denial of further lending from the bank. Although, it was informed that these banks will resume the lending in the area if all such bad debts shall be liquidated. This practice is a difficult issue because farmers are not being able to fund the whole investment into economic forest development.

Furthermore, too strict credit conditions of banks as well as irrelevant policy on interest to the case of project area are challenges for local people. Currently, accessible banks in the area are VBARD, VSPB and Development Bank tentatively. With a view to enable farmers accessibility to loan with terms of 5 years or more on a suitable basis of interest rate and credit scheme, it is necessary to extend bank supports as well as backing up of PPC.

In coming years, the implementation of works regulated by Decision no. 210/2006/QD-TTg of the Prime Minister on the promulgation of regulations, criteria and norms for the allocation of fund for development investment from state budget in 2007-2010 period, farmer shall be provided with a subsidy of 2 millions dong per each hectare of afforestation for purchasing seedlings and fertilizer. This support will create a strong momentum for farmer to develop the forestry economy.

2.2.8 Major economic activities

In the project area, agriculture is the main producing activity that includes crops and livestock and husbandry rising (cattle, buffalo, goat and chicken, duck, fresh water fish …) in which livestock is the major that brings about earnings for farmers. Other economic activities hold a very small portion. Important crops are maize, upland rice and cassava. These products are used up almost all for serving demand of families themselves, only cattle and livestock can be sold to other regions besides consuming in the local market.

Income retained from grain is 325 kg/head/year in average. Average cash earning is 2,200,000 VND millions/head/year.

Table 4. Distribution of income sources from economic sector in Ta Hoc commune

Sector	Rate %
I. Agriculture – aquaculture – forestry	75.0
1. Agriculture	62.0
- Crops	32.0
- Livestock	22.0
- Agricultural services	8.0
2. Forestry	3.0
3. Aquaculture	10.0
II. Construction	10.0
III. Other services	15.0
Total	100.0

Source: Economic section of Mai Son

Hold a smallest portion among household economy, forestry activities only account for 3% from the total income. In one hand, it is because a large part of forestry land in project area has been allocated for protection forest, therefore the area is only valued for watershed protection, reduction of erosion and effective regulation of water regime, but these all are not sufficiently evaluated. On other hand, several areas have been planned for forestry production, but local farmers are using for agricultural crops. This is the main cause for the low portion of forestry activities in local economy in comparison with agriculture. Currently, earnings from forestry are only the fee for natural forest management within framework of 661 program.

Other sectors such as traditional craft, servicing etc... almost underdevelopment. These activities only for serving local needs such as repairing of working tools, bike maintenance and retail sale of petty goods. There is a very low rate of business exchanging with other areas.

3 Land use and forest coverage

3.1 Land use and land using right

According to Land Law, natural land is classified into 3 categories of agriculture land, non-agriculture land and unused land; pursuant to current land classification, forestry land is a part of agriculture land. Results of the land survey conducted in 2006 in project area indicated that agricultural land accounts for a quite small portion (14.8%) in total land resource. Most areas of the four selected villages are forestry land (80.75%). Following table shows a summary on land distribution in the project area.

Table 5. Area of current land use in 4 villages

Unit: ha

Item	Commune	Total	Divide by village			
			Hoc	Mong	Pa Dong	San
Total area	**11,807.00**	**3,673.00**	**1,270.00**	**1,016.00**	**731.00**	**658.10**
1, Forestry land	**8,828.30**	**2,966.10**	**1,021.20**	**791.80**	**561.20**	**591.90**
Forest land	6,402.90	2,124.60	766.10	523.20	365.10	470.20
Non forest land	2,425.40	841.50	255.10	268.60	196.10	121.70
%/ natural area	88.41	80.75	80.41	77.93	76.77	89.94
2, Agricultural land	**2,026.81**	**546.20**	**185.40**	**175.30**	**142.00**	**43.50**
%/ natural area	17.16	14.87	14.60	17.25	19.43	6.61
3, Residential land	**120.00**	**14.00**	**5.50**	**3.00**	**2.80**	**2.70**
4, Other land	**831.89**	**148.80**	**57.90**	**45.90**	**25.00**	**20.00**

Source: Reclassification of three forest types in Son La province - 2006

Forestry land in project area were allocated to 2 parties namely village community with 2,922.0 ha, accounts for 98.5% from total and household with a very modest amount of 44.1 ha, accounts for 1.5 %. All these areas were issued with Red book certificates in 2003.

Land area proposed for project site is 462.1 ha in 4 villages in which in Hoc village is 91.7 ha; Mong 111.4 ha; Pá Đông 85.5 ha and San village is 173.4 ha.

Currently, there are no data on number of Redbooks issued to village communities and households in the area. According to statistical figures of Son La SubDof, allocation of forestry land in entire province almost finished in 2005. Specifically, forestry land allocation in Ta Hoc commune had finished in 2003. All households and villages communities have received Redbooks.

As mentioned in Table 5, total land area planned for forestry is 2,966 ha, and all these areas have been allocated to households and communities. However, results of study during project preparation show that more than 80% of such forestry land areas are used for maize crop but not for afforestation.

3.2 Area and stock of forest

3.2.1 Area

There is no specific data on forest area and status to village level. In Ta Hoc commune, there are approx. 5,579.3 ha of natural forest that accounts for 47% of total natural area. Planted forest accounts for 7% while bared land (Ic, Ib, Ia) hold a portion of 21% in the total. Major species in the forest are Schima wallichii, Castanopsis mollisima, Melia azedarach axillaris that distributed mainly in the experimental site of the Forestry University, specifically in Huoi Muoi, Pa Hoc, Huoi Cao and Pa Dong villages. Planted forest consists of timber forest and Dendrocalamus membranaceus.

Table 6. Statistical data on current forest status of entire Ta Hoc commune

Type of forest	Area (ha)
Natural forest (A)	**11,807.00**
I. Forestry land(B)	**8,828.30**
1. Natural forest (C)	5,579.30
1.1 Board leaves forest	3,572.50
Poor forest	583.20
Rehabilitated forest	2,989.30
1.2 Mixed forest	2,006.80
Timber – bamboo forest	2,006.80
2. Planted forest	823.60
Non-stock timber forest	62.90
Planted bamboo forest with stock	760.70
3. Bared land	**2,425.40**
IA	1,325.30
IB	500.70
IC	527.40
II. Other type of land	2,978.70

Source: Reclassification of three forest types in 2006 conducted by Sub-FIPI – North Western division

3.2.2 Forest stock

Natural forests in the area are mainly poor and rehabilitated (Regenerated) forests and mixed forest of timber and bamboo. Poor forest has very low stock of average 65m^3/ha; stock of young regenerated forest stands at less than 30m^3/ha. This low standing volume is not enough to satisfy the need for timber of local people.

Table 7. Stock of forest in project area

Forest type	Average stock/ha
1. Natural forest	
Poor timber forest (IIIa1)	63,7 m^3
Young forest (IIa, IIb)	From 20 – 30 m^3
Bamboo forest	4.500 stem
Mixed forest (bamboo + timber)	2.000 stems + 15m^3
2. Planted forest	
Timber forest	60 –100 m^3
Bamboo & Dendrocalamus	4.400 stem

Source: Son La Sub-DOF

3.2.3 Land type proposed for project area

Type of land form for Agro-forestry model in project area consists of bared land with bushes Ib and bared land with grass Ia. In the whole area of 4 villages there are 841.5 ha of land forms types Ia and Ib, but only 415.98 ha can be selected for Agro-forestry model.

Table 8. Area of land form for the model classified by status

Location	Total	Ia	Ib
Hoc	82.53	40.71	41.82
Mong	100.26	100.26	
Pa Dong	77.04	77.04	
San	156.15	150.62	5.53
Total	**415.98**	**368.67**	**47.31**

Bared land of Ia account for 88.9% from the total and mainly distributed in San (40%) and Mong villages while Ia type resides in Hoc and San villages with total portion of 11.1% in total.

3.2.4 Productivity of planted forest

Field survey shows that in project area, farmers are growing Melia azedarach, Dendrocalamus, Acacia and Eucalyptus. Few Acacia and Eucalyptus are grown mainly in forest gardens near residential areas. Melia azedarach are also planted scattered in all four villages but they are very common in other communes nearby. Dendrocalamus in particular, have been planted in large scale, condensed in a large area.

Because, project proposed to plant Melia azedarach and Dendrocalamus so during preparation of the project feasible study, only surveys on productivity of these trees are conducted.

Due to the scattered plantation of Melia azedarach in all four villages, the provincial study team therefore used data of Melia azedarach collected by Agricultural

development Inventory and Planning team of Son La in Huaphang commune – Moc Chau district. This area shares a similar natural condition to that of Ta Hoc commune. Inventory has made with planted Melia azedarach forest of 7 years old with density of 2,000 trees/ha. Data is calculated on basis of 13 standard sample plots (size 10m x 10m). Growth rate of Melia azedarach is described in Table 9:

Table 9. Inventory of Melia azedarach volume

Specie	D1,3m (cm)	Hvn (m)	HDC (m)	Quality	Vertical cut (m2)	Stock (m3)
Melia azedarach	14	12	8	Medium	0,0154	0,0923
Melia azedarach	16	12.5	8	Good	0,0201	0,1256
Melia azedarach	12	11	6	Medium	0,0113	0,0622
Melia azedarach	12	10	6	Bad	0,0113	0,0565
Melia azedarach	12	10	7	Medium	0,0113	0,0565
Melia azedarach	14	11	8	Medium	0,0154	0,0846
Melia azedarach	8	10	6	Bad	0,0050	0,0251
Melia azedarach	8	10	6	Bad	0,0050	0,0251
Melia azedarach	8	11	6	Bad	0,0050	0,0276
Melia azedarach	10	11	7	Medium	0,0079	0,0432
Melia azedarach	10	11	6	Medium	0,0079	0,0432
Melia azedarach	12	11.5	6	Medium	0,0113	0,0650
Melia azedarach	12	11	6	Medium	0,0113	0,0622
Average						0,7691

Based on stocks of surveyed plots, timber volume of Melia azedarach of one hectare model planted with Melia azedarach and maize, harvesting in the eighth year has been calculated. Results show that the obtained stock can be $90m^3$ of timber/ha/7year and 35 sters of firewood/h/year;

For the case of Dendrocalamus in particular, current planting area in proposed project area is large enough to ensure requirements for sampling. Sampling plots are taken in Dendrocalamus forest planted in 2000 with density of about 400 hedges/ha. The PST conducted surveying on 8 hedges with normal growth rate. Calculation has retained an amount of 88 stems of Dendrocalamus. Results are shown in table below:

Table 10. Inventory of Dendrocalamus stock in project area

No.	Specie	Stem/hedge	Avg. Hvn (m)	Avg. Doo (cm)	Quality
1	Dendrocalamus	13	10	10	Good
2	Dendrocalamus	10	9	9	Good
3	Dendrocalamus	9	10	8	Medium
4	Dendrocalamus	12	13	8	Medium
5	Dendrocalamus	9	12	10	Good
6	Dendrocalamus	11	14	9	Good
7	Dendrocalamus	10	12	9	Good
8	Dendrocalamus	12	11	8	Medium
Total		**88**			

On one hectare model of Dendrocalamus and Maize, planted with density of 400 hedges/ha, from the 6th year, harvesting volume can reach 1,200 stems/400 hedges/1ha/year.

4 Market for forest products

4.1 Assessment on current annual consumption of wood products

Currently, there are only 2 state enterprises those deal with forest products processing namely (1) Son La forest product processing company; (2) Wood processing workshop of Phu-Bac Yen state enterprise. Besides, there are some others private workshops. According to Strategy for development of Son La Forestry sector, province' demand for forestry product in the year 2010 may stand at 57,120m^3 of timber/year and about 5,000 tons of bamboo/ year. Among this, states enterprises will need around 45.120m^3 of timber and 5,000 tons of bamboo, the remaining will be of the private sector.

Estimated demand for forest products of Son La in 2006-2010 period is described in the following table:

Table 11. Estimation of demand for forest products till 2010

Item	Unit	2000	2005	2010
Furniture	m^3	88,138	99,000	110,000
Firewood	Ster	1,200,000	1,350,000	1,500,000
Bamboo & Dendro.	Stem	4,800,000	5,000,000	6,000,000
Wood for hydro power factory	m^3			100,000

Source: Strategy for development of Son La Forestry sector in 2006-2010 period

Figure 4. Volume of supplying of rounded timber and relation to supply in Son La

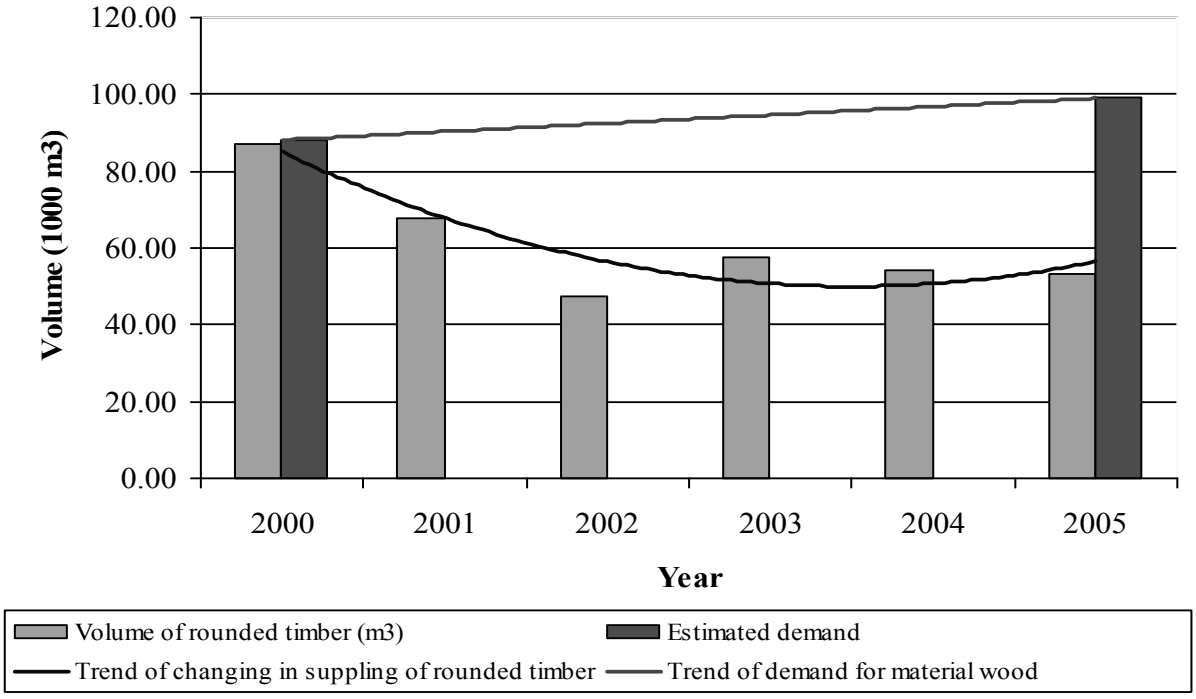

Table 12. Major forest products

Item	Unit	Year					
		2000	**2001**	**2002**	**2003**	**2004**	**2005**
Rounded timber	m^3	87,053.0	67,565.0	47,550.0	57,463.0	54,088.0	53,405.0
Firewood	1000 steer	1,319.6	1,369.7	1,387.9	1,485.6	1,425.6	1,394.7
Bamboo & Dendro.	1,000 stem	5,549.0	6,887.0	7,084.0	5,836.0	5,415.0	5,099.0
Pulps	Ton	7,605.0	14,262.0	7,334.0	5,437.0	7,670.0	3,800.0
Commercial bamboo	Ton	3,490.0	4,446.0	4,762.0	4,676.0	4,880.0	4,635.0

Source: Statistical year book of Son La 7/2006

Even though, there is no data in between 2001-2004, but estimation mentioned in the Development strategy of Son La forestry sector and actual harvested volume of rounded timber indicated that the gap between supplying and demanding is gradually growing and by the year 2005 it already topped at 37,000 m^3 (Figure 4). Along with economic development of the province, it is obvious that Son La will have to face with a large shortage of wood materials in the coming years.

4.2 Wood processing industry and prices of wood materials

In Son La, there are 3 major wood processing workshops namely (1) Son La forest product processing company; (2) Phu-Bac Yen state enterprise; (3) Minh trang private enterprise. They are of fairly small scaled factories, even the largest one can only process around 4,000 m^3 timber/year. Current supplying volume of wood materials of Son La can only meet with 80% of their total processing capacity. More specifically, Son La Forest product processing company can only maintain production at 40% of their demand for input materials annually.

Table 13. Demand for timber, bamboo & Dendrocalamus of factories in Son la province

Factory	Designed capacity / year	Actual capacity	Rate of Efficient	Rate of demand met
Son La FPC	3,500 – 4,500 m^3	2,000 m^3	80%	40%
Phu – Bacyen SFE	1,000 m^3	850 m^3	85%	70-80%
Minh trang private Co.	300 m^3	200 m^3	33%	70-80%

Source: Son La PST

Major processed wood products of Son La are semi-processed pulps, particle board, woodchip, plywood, wood for construction, furniture. Specification of wood materials, price at factory gate and transportation fee from forest to factory gate are mention in Table 14.

Table 14. Price of wood materials of some wood processing factories in Son La

Client	Type of product	Specification		Factory gate prices (VND/m^3),	Distance (km)	Freight (VND/m3)
		D (cm)	**H (m)**			
Son La FPC	Rnd. timber	> 25	> 2.5	1,000,000	50	100,000
	Rnd. timber	15 – 20	2.0 – 2.5	800,000	50	100,000
	Rnd. timber	10 – 15	> 1.0	700,000	50	100,000
Phu Bacyen SFE	Rnd. timber	> 25	> 2.5	1,100,000	55	110,000
	Rnd. timber	15 – 20	2.0 – 2.5	850,000	55	110,000
	Rnd. timber	10 – 15	> 1.0	700,000	55	110,000
Minh trang Co.	Rnd. timber	> 25	> 2.5	800,000	25	50,000

Source: Son La PST

Besides selling wood materials to processing workshops, supplying network of wood, bamboo and Dendrocalamus is gradually formed and expanded to towns, residential areas for provision of materials for construction.

4.3 Lesson learnt

4.3.1 Previous implemented projects

In 2003 - 2004, Mai Son Economic forest project for 2002-2004 period was implemented in some communes of the district with inclusion of Ta Hoc commune. Total implemented area of the project is 3,000 ha and activities were managed by Forest-Industry Company with loan provided by Bank for Investment and Development. According to the results of monitoring & evaluation conducted in 2005, the project was failed due to low survival rate of planted forest (only reached 30%). Basic reason of this unsuccessfulness was the project organization so that activities had been imposed from management level without considering expectation and desire of local farmers. The project failed in setting up the combination of forestry species and agricultural crops on the land allocated for forestry use. Furthermore, fund for project implementation was rather limited, releasing of loan was fragmented and often delayed, these all together and short loaning terms additionally were major causes to the failure of project.

4.3.2 Lesson learnt

Taking experiences from the above mentioned project, establishment of following projects may need to base on the actual condition of the project area. More specific, the pre conditions are capacity, expectation of local farmers as these will be determinants to the successfulness of the project. During project' establishment, it is necessary to study a suitable model for Son La condition whereas land is of high slope and local people life is still mainly relied on self-supplying and self consuming manners.

It is of great importance to elaborate a suitable credit scheme and loaning method so that fund for project implementation shall be provided sufficiently and timely.

Finally, there must have a close coordination among governmental levels and project operating board, thus problematic issues shall be identified and solved timely.

4.4 Opportunities and challenge

4.4.1 Opportunity

Project area is rich with land potentiality, there are many suitable tree species to natural condition. It is of easiness to move between areas to areas and there is high availability of labor force. Currently, Son La already promulgated policy for promotion of production forest

There are large market demand for timber, bamboo and Dendrocalamus. Processing industry in the province is till in shortage of material, and they are working under designed capacity. Additionally, Baibang paper mill already planned Son La as its supplying area of materials with main products of wood, bamboo and Dendrocalamus.

Also, it is a favorable condition that under the new policy, from 2007, the Government will support 2 millions VND for ensuring need of seedlings and fertilizer for each one hectare of new production forest.

4.4.2 Challenge

Product cycle of forestry species is long, therefore it yet to attract farmers to invest into forestry activity. It is because for the short run, agricultural crops are much more benefit able than forestry activities.

Soil in Son La is very fertile but mainly distributed in difficult areas of high slope and large attitudes those hinder production and cause the increasing of cost. In Son La case, it was observed that even Acacia can not survive in the high slope areas due to strong winds. Therefore, it is a big challenge that forestry in such slope areas will ensure both economic value but also help to prevent land slide and erosion as well as to create more economic value for local people to maintain their life.

PART II: PROJECT CONTENT

1 Project rationale

1.1 Reasons to select the project

Over the past few years, forestry sector has changed remarkably. Traditional forestry that mainly based on state's subsidy has been being gradually socialized, various sectors are allowed to participate into forestry development with the application of different types and diversified method of investment such as production forest reforestation, protection forest development, natural forest regeneration and enrichment, etc. It is obviously that a production forest cycle is much longer than that of agriculture production. Even for fast-growing species used widely such as Acacia Magium and Acacia Hybrid, production cycle requires 6-7 years, or Dendrocalamus still needs at least 5 to 6 years before harvesting. To some extends, the long business cycle of production forest is a major obstacle as investors may not have any earnings from forest at early stage. Therefore, the application of a model of sole forestry species for serving the poverty reduction course would completely not be sustainable. This is to explain recent findings in project area that local people often utilize forestry- planned lands for cultivating short-term agricultural crops to satisfy their cash earnings for daily need.

In some areas in Son La, local people already applied a model where short-term agricultural crops such as maize, Soya bean are intercropped with forestry species during the first and second year. Initially, this model has shown positive results: it did not only generate additional income while forestry products are yet to be harvested but also contributed to land protection, erosion prevention as the selected areas were often of the large elevation and so steep that land is always endangered of erosion. Recently, some forestry sector's projects funded by foreign donors have also studied such combined model and generally named it as Agro-forestry model. Research results and the piloting activities conducted in SFDP and KFW projects have proven that the model is of sound effectiveness.

However, the model has just been applied in small and scattered scale so it is yet to observe a persuasive achievement for up-scaling in a wider area. Hence, it is of due necessity to establish the model at a proper scale to sufficiently generate a sequencing impact in an area. Thus, the model will be disseminated and applied on a larger scale in order to generate overall effects which not only reduce the misuse of forestry land but also help to improve environment and bring about earning for the people in a sustainable manner.

1.2 Project selection criteria

Project selection is a very important part of a project feasible study. The work should be primarily done based upon three fundamental criteria (1) project owner; (2) financial sources; and (3) products of the project.

In Mai Son district, project owners can be households and some potential investors those accepted[3] to consider the project upon our feasible study report completion such as: 559 Hanoi Infrastructure Investment and Development Share holding Company; Van Dat Hai Duong Company Ltd.; Bai Bang Paper Company; Minh Trang Enterprise; 661 Afforestation Project Management Board and Mai Son Protection Forest Management Board.

Financial sources should possibly be: self mobilized capital of local people, loan from financing agencies and state budget.

Potential forest products that will be well consumed in the market include raw materials for paper production, pulps; materials for house construction like Dendrocalamus, Melia and materials for particle board production. Agricultural products (e.g. maize) are consumed quite well on local as well external markets for animal feeds production. Additionally, maize product can even be exported to China.

Apart from the three factors stated above, project selection is also based on matters of: (i) land use planning; (ii) policies environment; (iii) market's potentiality; (iv) results of financial and economic analysis; (v) environmental impacts; (vi) social impacts; (vii) people's expectation; (viii) and current status of land use and land using right.

1.3 Project selection result

Through the consideration of Ta Hoc Commune's specific conditions, of Mai Son District, Son La Province and matching up with above criteria, the provincial study team has agreed to select a project namely "Agro-forestry production forest in the 4 villages of Ta Hoc Commune, Mai Son Dist."

- Project implementers: Households (investors)
- Project management unit: Mai Son Protection forest Management Board.
- Expected products: Forest products include: Dendrocalamus, Melia azedarach as construction materials; and agricultural product of maize for producing animal feed;
- Financial source: household self mobilized capital, bank loan and government subsidy.

The obvious advantageous aspect of this project is that Mai Son Protection Forest Management Board has experience in forest management and plantation organization and they will be working on a co-responsible basis. Besides, local people wish to have an agro-forestry model that helps them to maintain sustainable earnings. Both Dendrocalamus and Melia azedarach products are on high demand in the market and this demand will last long in the future. Moreover, the Bank of Agriculture and Rural Development can offer long term loans to the people participating into the project.

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[3] During the project preparation, PST members have worked with these entities and it was shown that they are of interest to fund the project.

2 The project

2.1 Project summary

Project name:	Agro-forestry production forest in the 4 villages of Ta Hoc Commune, Mai Son District, Son La province.
Implementation period:	From 2008 to 2018
Authorized organization:	Mai Son People Committee.
Management body:	Mai Son Protection Forest Management Board.
Project implementer:	Farmers in Ta Hoc commune..
Implementing budget:	Bank loans, state budget and self-mobilized fund of people

Target products of the project are maize for onsite solving shortage of foods, creating of cash earnings, Dendrocalamus and small size timber for making furniture, firewood and for provision of materials for wood chips production of Son La Forestry Company.

2.2 Project objective

2.2.1 Overall Objective

Overall objective of the project is to utilize forestry land for right purpose in a stable manner to improve livelihoods of local people and to protect the environment through the application of agro-forestry model on sloping land.

2.2.2 Immediate objective

The immediate objective of the project is to increase incomes of local people through the implementation of agro-forestry production on planned forestry land.

2.2.3 Project outputs

From 2008, allocated land for forestry in four villages namely: Hoc village, Mong, Pa Dong and San village will be used for forestry activities.

By 2011, 182.79 ha of Dendrocalamus and maize forest shall be established;

By 2011, 233.19ha of Melia azedarach and maize forest shall be established;

By 2018, 1,080,756 Dendrocalamus stem shall be harvested and sold out;

By 2018, 16,323 m^3 of Melia azedarach shall be harvested and sold out;

By 2018, 4,663 ster of firewood shall be collected and sold out to markets;

By the end of 2009, 2,490 tons of maize shall be harvested and sold.

By 2011, 8 training courses on afforestation techniques shall be conducted.

2.3 Project Components

The project in Ta hoc commune consists of three main components: (1) establishment of the agro-forestry model; (2) Project management, monitoring and evaluation; (3) Facilitating the implementation of the project.

2.3.1 Establishment of the agro-forestry model

(1) Objective of the model

Objective of the model is to establish 2 agro-forestry models in 4 villages in Ta Hoc commune; specifically: (1) Dendrocalamus and maize model: 182.7 ha; (2) Melia azedarach and maize model: 233.2ha.

(2) Activities:

- Setting up of project managing and implementing mechanism;
- Selecting of project sites;
- Selecting of species for each model;
- Designing of agro-forestry afforestation;
- Planting, tending and protecting of forestry species and maize;
- Harvesting of maize and forest.

(3) Financial source:

There are three sources of capital for the ago- forestry model:

- Self-mobilized fund of households;
- Loans from financing agency (Possibly from Agriculture and rural development bank);
- Subsidy from state budget

2.3.2 Supports to agro-forestry production.

(1) Objective of this component:

Enhance technical capacity in planting and tending of Melia azedarach, Dendrocalamus and maize; promote accessibility to financial sources and market information of participating households.

(2) Activities:

- Training on planting, tending and protecting techniques of Melia azedarach, Dendrocalamus and maize.
- Providing guidance on loan application procedure and disseminating information on forestry products.
- Promoting and facilitating the formulation of household, community groups on doing business with production forest on a voluntary basis.

(3) Financial sources:

This component will be financed annually by the local state budget through supporting activities of state agencies; therefore, fund for implementation of this component shall be excluded from project cost.

2.3.3 Project Management, monitoring and evaluation

(1) Objective of the component:

Objective of this component is to manage and implement the project in order to achieve the expected objectives of the project.

(3) Activities:

- Defining organizational structure for implementing the project by drawing up project management board, identifying agencies and other entities participate into project' implementation.
- Specifying roles and responsibilities of the Mai Son Protection Forest Management Board and the implementing unit in Ta Hoc commune.
- Developing project implementation plan;
- Preparing monitoring and evaluation plan to monitor and evaluate progress of the project.

(4) Financial sources:

Fund for managing the project shall be allocated from management fee of governmental projects in the local state budget.

3 Implementation of the project

3.1 Selection of project area for the agro-forestry model

(1) Project site selection criteria

Project site for the agro-forestry is selected based upon the following criteria:

(i) **Policy on land management:** The entire project site selected for the agro-forestry is forestry land that has been planned for production forest where no conflict among land users are found; Project site only includes forestry areas those have been allocated to households or communities in Hoc, Mong, Pa Dong and San villages.

(ii) **Current status of land use:** Selected areas must be in Ta Hoc commune and on forestry land without forest consists of bared land of Ib and grass land of Ia types.

(iii)**Natural conditions in the area:** Selected areas for agro-forestry model are lands with productivity class of medium or low.

(iv)**Accessibility to the project site:** The project site must have a distance of less than 1 km to main road.

(v) **Distance to the market:** Distance from project sites to market must be less than 50 km.

(vi)**Project site selection result:** Suitable areas selected to the agro-forestry are in 4 villages of Ta Hoc commune with total area of 415.98 ha. Afforestation areas divided by administrative unit and land status are described in table below

Table 15. Area of Project site by village

Location	Total area	Land typed Ia	Land typed Ib
Hoc village	82.53	40.71	41.82
Mong village	100.26	100.26	
Pa Dong village	77.04	77.04	
San village	156.15	150.62	5.53
Total	**415.98**	**368.67**	**47.31**

Source: Report of forest and land allocation- Son la Sub- Department of Forest Protection)

3.2 Selection of tree species

(1) Basis for species selection

Selection of forestry species should be based upon the following criteria:

(i) **In line with current relevant policies:** Selected species should be those which recommended by the forestry agencies.

(ii) **Pose a sound suitability to technical and natural conditions:** Selected species should be suitable with soil condition of Ta Hoc commune or they have been proven to

retain good results in the neighboring areas where characterized by similar soil and natural conditions.

(iii) **In accordance with people's expectation:** species to be selected must be in line with people's expectation.

(iv) **Marketable:** The species to be selected should bring about products that the market is on demand or poses a consuming rate highly and stably in a long run.

(2) Results of species selection:

Currently, the project area has been planted with species including Dendrocalamus, Acacia and Melia azedarach. Those species have been developed well and local people want to continue planting them. The project therefore, decides to select Dendrocalamus and Melia azedarach as forestry species to be planted in the agro-forestry model. The proposed plantation area is as following:

Melia azedarach and maize: 233.2 ha; Dendrocalamus and maize: 182.7ha.

3.3 Afforestation plan

Basis for setting up forest plantation plan of the agro-forestry model in the 4 villages of Ta Hoc are: natural and social economic conditions of the project area (there are 366 households includes 2,047 people, of which labor force is 819). Labor demand at peak (in March and April) is 4,758 man-days in which labor provided from local are 4,500 man-days. Due to the fact that some tasks of forest plantation must be carried out at the same time such as vegetation clearance, land preparation and tending of both agricultural and forestry species, there possibly will have some shortage of labor during peak season. Therefore, external labor should be employed in addition to labor forces available at locals.

Total area of agro-forestry model is 415.98ha, of which (1) Dendrocalamus and maize are 182.7ha, will be planted from 2008 to 2010; (2) Melia azedarach and maize are 233.2ha, will be planted from 2008 to 2011.

Description of Annual Forest plantation is mentioned as below:

Table 16. Tentative afforestation plan by year and by model

Unit: ha.

Village	Total	Model- Progress							
		Dendrocalamus and Maize				Melia azedarach and Maize			
		2008	2009	2010	2011	2008	2009	2010	2011
Hoc	82.52	45.72	36.8						
Mong	100.27		41.23	59.04					
Pa Dong	77.06					47.16	29.9		
San	156.13						37.24	41.85	77.04
Total	**415.98**	**45.72**	**78.03**	**59.04**	**-**	**47.16**	**67.14**	**41.85**	**77.04**

3.4 Afforestation design

Based on project afforestation plan, the Mai Son protection forest management board household's afforestation designs shall be outsourced to agro-forestry consulting entities.

(1) Designing principles:

Only conduct the afforestation design for locations met with following criteria:

- Areas proposed for project sites must be issued with Redbook certificate.
- Households agreed to include these areas into project sites.
- Land classes are at medium and low potential (non-potential areas area excluded).

(2) Requirement on afforestation design

Process for conducting afforestation design and drafting of report contents will follow current applicable State's regulations. Upon completion, report of afforestation design shall be treated as a business plan for bank loan application. Report of afforestation designing work must meet with following requirements:

- General information: Name of household owner, area, location, species, suitability, year of planting.
- Productivity, harvesting volume, total revenue of planted forest.
- Loan demand, plans for borrowing and repayment of households.
- Financial analysis in the viewpoint of investment owner.

(3) Products of afforestation designs

- Map of afforestation designs.
- Report on afforestation designs.

All these documents must be approved by: (1) Consulting entities; (2) Household; (3) Commune implementing unit; (4) Mai Son protection forest management board.

3.5 Seedlings plan:

Quantity of seedlings will be calculated based on the density and area of forest plantation. Density of Melia azedarach and maize model is 2,000 seedlings/ha; and that of Dendrocalamus and maize model is 400 seedlings/ha.

Seedlings supply plan: Seedlings production capacity of Mai Son Protection Management Board has been acknowledged by the DARD. Production volume is 2 millions seedlings/year. Annually, 800,000 seedlings produced by the Mai Son Protection forest PMB are consumed by the Protection Forest PMB for forest plantation projects and programs in the district. Therefore, the Protection Forest PMB is capable to supply seedlings for the proposed project.

Rate of additional planting applied for both Melia. and Dendro are 15%.

Table 17. Progress of seedlings supply by model and by implementation year

Species		Year	Village				Total
			Hoc	Mong	Pa Dong	San	
Model-progress	Dendrocalamus and Maize	2008	18,288				18,288
		2009	17,463	16,492			33,955
		2010	2,208	26,090			28,298
		2011		3,542			3,542
		2012					0
		N/A					**84,083**
	Melia azedarach and Maize	2008			94,320		94,320
		2009			73,948	74,480	148,428
		2010			8,970	94,872	103,842
		2011				166,635	166,635
		2012				23,112	23,112
		N/A					**536,337**

3.6 Harvesting plan

Based on the afforestation plan as well as norm and process of forest harvesting, Dendrocalamus forest could be harvested in 5 years after plantation. Maximum annual harvesting volume must not exceeding 30% total number of trees per hedge and only trees over 3 years old age could be chopped down. According to productivity survey, a proposed harvesting volume for selective cutting applied for Dendrocalamus is 3 stems/hedge/year. Accordingly, by 2013, total volume of Dendrocalamus harvested is 1,200 trees/ha;

Proposed harvesting method applicable for Melia azedarach is clear-cutting and the post-harvested site will be replanted in the following year to protect the environment and avoid soil erosion. Melia is expected to be harvested in dry season, specifically from September to March. It is strongly recommended that no harvesting should be done in rainy season to avoid obstacles in transporting timber and not heightened the risk of erosion and land slide.

Table 18. Progress of harvesting Dendrocalamus and Melia azedarach

Year- Harvesting site	Progress				
	Dendrocalamus		Melia azedarach		
	Area (ha)	**Volume (stem)**	**Area (ha)**	**Timber (m3)**	**Firewood (Ste)**
Year 2013					
1. Hoc village	45.72	54,864			
Year 2014					
1. Hoc village	82.52	99,024			
2. Mong village	41.23	49,476			
Year 2015					
1. Pa Dong village			47.16	3,301.20	943.2
2. Mong village	100.27	120,324			
3. Hoc village	82.52	99,024			
Year 2016					
1. Pa Dong village			29.90	2,093.00	598.0
2. San village			37.24	2,606.80	744.8
3. Hoc village	82.52	99,024			
4. Mong village	100.27	120,324			
Year 2017					
1. San village			41.85	2,929.50	837.00
2. Hoc village	82.52	99,024			
3. Mong village	100.27	120,324			
Year 2018					
1. San village			77.04	5,392.80	1540.80
2. Hoc village	82.52	99.024			
3. Mong village	100.27	120,324			
Total in one project cycle		**1,080,756**		**16,323.00**	**4,663.00**

4 Project cost

4.1 Assumptions for calculation

Following assumptions are applied for calculating project costs:

1) Starting year (year to start calculation) is 2007
2) Expected National inflation rate is 5%
3) Physical contingency is 5% of total base cost
4) Price contingency : 5%
5) Bank interest rate is 14.4 %/year
6) Project duration: From 2008 to 2018
7) One business cycle of Melia azedarach is 7 years; harvesting starts in year 8th
8) One business cycle of Dendrocalamus is 5 years; harvesting starts in year 6th;
9) Unskilled Labor cost is 40,000 VND/man-day (local labor price)
10) Seedlings and fertilizers prices are 2007 price basis: Dendrocalamus: 2,500 dong/seedling; Melia 350 dong/seedling; NPK 2,200 dong/kg.
11) Project management cost is suggested at 10% of the total base cost (according to decision no. 38 promulgated by MARD).

4.2 Project cost

4.2.1 Cost for 1 ha of agro-forestry model

Table 19. Cost plan for 1ha of Dendrocalamus and maize; Melia and maize

Unit: 1,000 Dong

No	Cost item	Dendro. & maize	Portion %	Melia and maize	Portion %
1	Basis labor cost	13,530	58.50	12,184	63.15
2	Materials and seedlings cost	4,230	18.29	5,205	22.85
3	Other cost	1,729	7.74	1,706	7.76
-	Design	360	1.56	360	1.64
-	Check and taking over	240	1.04	240	1.09
-	Management cost (10%)	1,129	4.88	1,106	5.03
A	Total base cost	19,489	84.27	19,095	86.82
B	Physical contingency (5%)	974	4.21	954	4.34
C	Price contingencies	2,663	11.52	1,945	8.84
	Total cost (A+B+C)	23,126	100.0	21,994	100.0

Total cost for 1 ha of Dendrocalamus and maize is 23.1 millions dong. Of which, basic labor cost accounts for 58.5%; materials and seedlings make up 18.29%; other costs are at 7.74%; management cost stands at 4.88%; physical contingency accounts for 4.21%; price contingency is 11.52% of the total based cost.

Total cost for 1 ha agro forestry of Melia azedarach and maize model is 21.99 millions dong. Distribution of cost items is very similar to the Dendrocalamus and maize model but labor cost and seedlings cost is 4% higher.

Excluding contingencies, total cost for 1 ha of Dendrocalamus and maize is 19.489 millions dong; Melia azedarach and maize is 19.095 millions dong.

4.2.2 Cost for the whole model

Total project cost for 415.98 ha as described in the table below:

Table 20. Cost plan for both models of the project

Unit: 1,000 Dong

No.	Cost items	Entire model	Proportion %
1	Basis labor cost	5,290,254	5372
2	Materials and seedlings cost	1,944,981	19.75
3	Other costs	725,016	7.36
4	Management cost (10%)	464,278	4.71
A	Total base cost	7,960,251	80.84
B	Physical contingency (5%)	337,258	3.42
C	Price contingency	1,549,656	15.74
	Total cost (A+B+C)	9,847,165	100.00

Total cost of the whole project (415.98ha) of both agro-forestry models is 9.8 billions dong, of which basic labor cost accounts for 53.7%; materials and seedlings makes up 19.75%; management cost stand for 4.7% of the total.

5 Financial plan

5.1 Potential financial sources of the project

In order to implement the agro-forestry model in the four villages of Ta Hoc commune, three potential financial resources would be mobilized as described below:

(1) Capital loan from the financing agencies (possibly the Agriculture and Rural Development Bank)

Loan from financing agency shall be used to cover a part of labor cost and procurement of seedlings and fertilizer in case the state subsidy allocated for these is not sufficient. Based on incomes of households participating into the project, investment rate for 1 ha of each agro forestry model and self- mobilization of on-site labor, it is estimated that each household needs to borrow 2.5 millions dong per ha. The loan will be disbursed in the first year of the project. Households repay interest on annual basis. Repayment of principal debt will be done in the year 6th applied for Dendrocalamus - maize model and in the year 8th applied for the Melia azedarach - maize model.

(2) Self-mobilized funds of households

A large part of Self-mobilized fund of households is not in form of cash but in form of labor available for forest plantation, tending and protection. Labor wage could be taken back from sale revenue of agro-forestry products upon harvesting. Beside labor contribution, some households may also invest a certain amount of fund if possible for covering a part of materials, seedlings and fertilizer with a view to minimize loan amount from financing agencies.

(3) State budget

State budget allocated to the project provided by the government through financing to management, monitoring activities and technical trainings for households participating into forest plantation. Apart from the management fee, another state's subsidy of 2 million dongs shall be given to each ha of production forest.

Detail description of project cost breakdown is shown in Table 21. Total project cost is 10.5 billion dongs, of which household's self-mobilized fund accounts for 75.4%; loan from financing agency makes up 9.8% and state- budget accounts for 14.7%.

Table 21. Summary of funds for the entire project by financial sources

Unit: million dongs

No.	Cost items	Financial institutions	State budget	Capital of household	Total
1	Basic labor cost	151,182		5,363,325	5,514,507
2	Materials and seedlings cost	888,768	831,960		1,720,728
3	Other costs				-
-	Design, check and take over		260,738		260,738
4	Management cost		464,278		464,278
A	Total base cost	1,039,950	1,556,976	5,363,325	7,960,251
B	Physical contingency			337,258	337,258
C	Price contingency			1,549,656	1,549,656
I	Total base cost of the entire project (A+B+C)	1,039,950	1,556,976	7,250,239	9,847,165
II	Interest paid by households			740,923	740,923
	Total project cost	1,039,950	1,556,976	7,991,162	10,588,088
	Proportion %	9.82%	14.70%	75.48%	100.00%

5.2 Borrowing and repayment plans

(1) Loan conditions

As the financing agency for the project shall be decided upon further supporting plan of local Government, however, it is still viable for the project if VBARD may be selected as a funding source, for further details, the part III of this report will discuss about this matter. PST suggests to base on policy of VBARD for easing the credit scheme as well as paying back plan.

The Agriculture and rural development bank would give a loan with an interest rate of 14.4% per annum. According to loan conditions of the bank, size of planting area of households, average amount of bank loan applied is 2.5 million dongs/ha. Conditions to be followed by the households to get the loan are below:

a) Having own a forest land use right certificate

b) Have forestry business plan or forest plantation design.

c) Loan contract

(2) Borrowing and repayment plans for 1 ha model of Dendrocalamus - maize

Based on household incomes in the project area, investment norm for afforestation, bank loan shall be to cover seedlings, fertilizers and afforestation design, estimated loan amount is 2.5 million dongs/ha. Borrowing conditions are as following:

a) Borrowing amount: 2.5 millions dongs/ha, disbursed fully in the first year;

b) Interest rate : 14.4%/year; interest will be paid on annual basis;

c) Principal (debt) repayment: year 6th

d) Grace period: 5 years.

Borrowing and loan (principal debt) repayment plans for 1ha model of Dendrocalamus -maize are as described in the table below:

Table 22. Borrowing and loan repayment plans of 1ha model of Dendrocalamus - maize

Unit: 1000 Dong

Year	2007	2008	2009	2010	2011	2012	2013
Implementation Year		1	2	3	4	5	6
Outstanding at beginning			2,500	2,500	2,500	2,500	2,500
Disbursement of loan		2,500					
Repayment		0	360	360	360	360	2,860
Interest		0	360	360	360	360	360
Principal repayment				-	-	-	2,500
Outstanding at end		2,500	2,500	2,500	2,500	2,500	0

(2) Borrowing and repayment plans of 1ha model of Melia azedarach and maize

Based on households' incomes in the project area, the investment rate for afforestation and loan from the bank for purchasing seedlings, fertilizers and design cost, estimated loan amount is 2.5 million dongs/ha. Loan conditions are as following:

a) Loan amount: 2.5 million dongs/ha; disbursement would be completed in the first year;

b) Interest rate: 14.4%/year; interest shall be paid on annual basis.

c) Capital repayment: year 8

d) Grace period: 5 years and can be extended depending upon agreement

Table 23. Borrowing and repayment plans for 1ha model of Melia azedarach and maize

Unit: 1000 Dongs

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015
Implementation year		1	2	3	4	5	6	7	8
Outstanding at beginning			2,500	2,500	2,500	2,500	2,500	2,500	2,500
Loan disbursement		2,500							
Interest Repayment		0	360	360	360	360	360	360	2,860
Interest		0	360	360	360	360	360	360	360
Principal repayment									2,500
Outstanding at end		2,500	2,500	2,500	2,500	2,500	2,500	2,500	0

(3) Borrowing plan and repayment plan for the entire project of 415.98 ha

Based upon afforestation plan, Borrowing and repayment plans for 1ha of each model; Plans for the whole project area of 415.98 ha are presented in the table below:

Table 24. Borrowing and repayment plans for entire project

Unit: 1.000 Dong

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015
Implementation year		1	2	3	4	5	6		
Outstanding at beginning			232,200	595,125	847,350	1,039,950	1,039,950	582,975	582,975
Loan disbursement		232,200	362,925	252,225	192,600				
Interest Repayment		0	85,698	122,018	149,753	149,753	B606.728	83,948	666,923
Interest		0	85,698	122,018	149,753	149,753	149,753	83,948	83948
Principal repayment							456,975		582975
Outstanding at end		232,200	595,125	847,350	1,039,950	1,039,950	582,975	582,975	0

5.3 Financial flow of the project

The agro-forestry project in Ta Hoc Commune consists of three components (1) Agro-forestry plantation; (2) Project management component and (3) Project implementation support component.

5.3.1 Agro- forestry plantation component

Financial flow of the agro-forestry model project is the loan cash flow from the Agricultural bank. It is expected that households will utilize the capital borrowing in the right purpose and repayment will be made on time as agreed in the credit contract. Financial flow of the forest plantation component is shown in the diagram below.

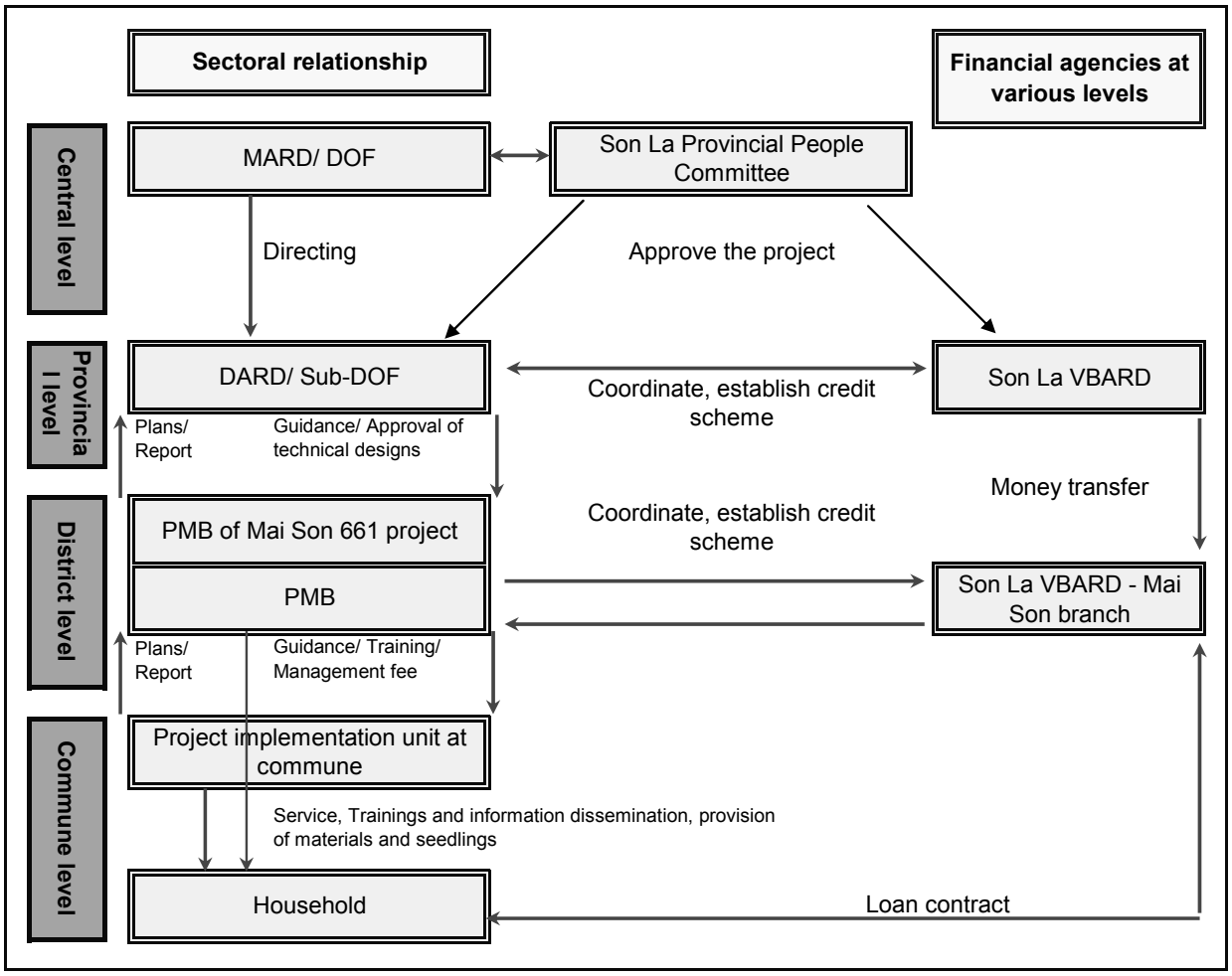


Figure 5. Financial flow for the forest plantation component

In order to get loan from the financing agency, participating households shall have to prepare a complete documents set as required by the financing agency. After being endorsed by the commune and the PMB, the set will be submitted to financing agency for appraisal and approval, households will then be provided with applied loan upon approval. Loan disbursement will be completed once in the first year.

5.3.2 Project management and project implementation support component

Financial flow for project management will be provided by state or provincial budget under the 661 program (a part of expense can be possibly taken from district budget) through authorized agencies, such flow will be regulated by procedures and regulations of state-budget management. The following chart describes financial flow of project management and project implementation support component.

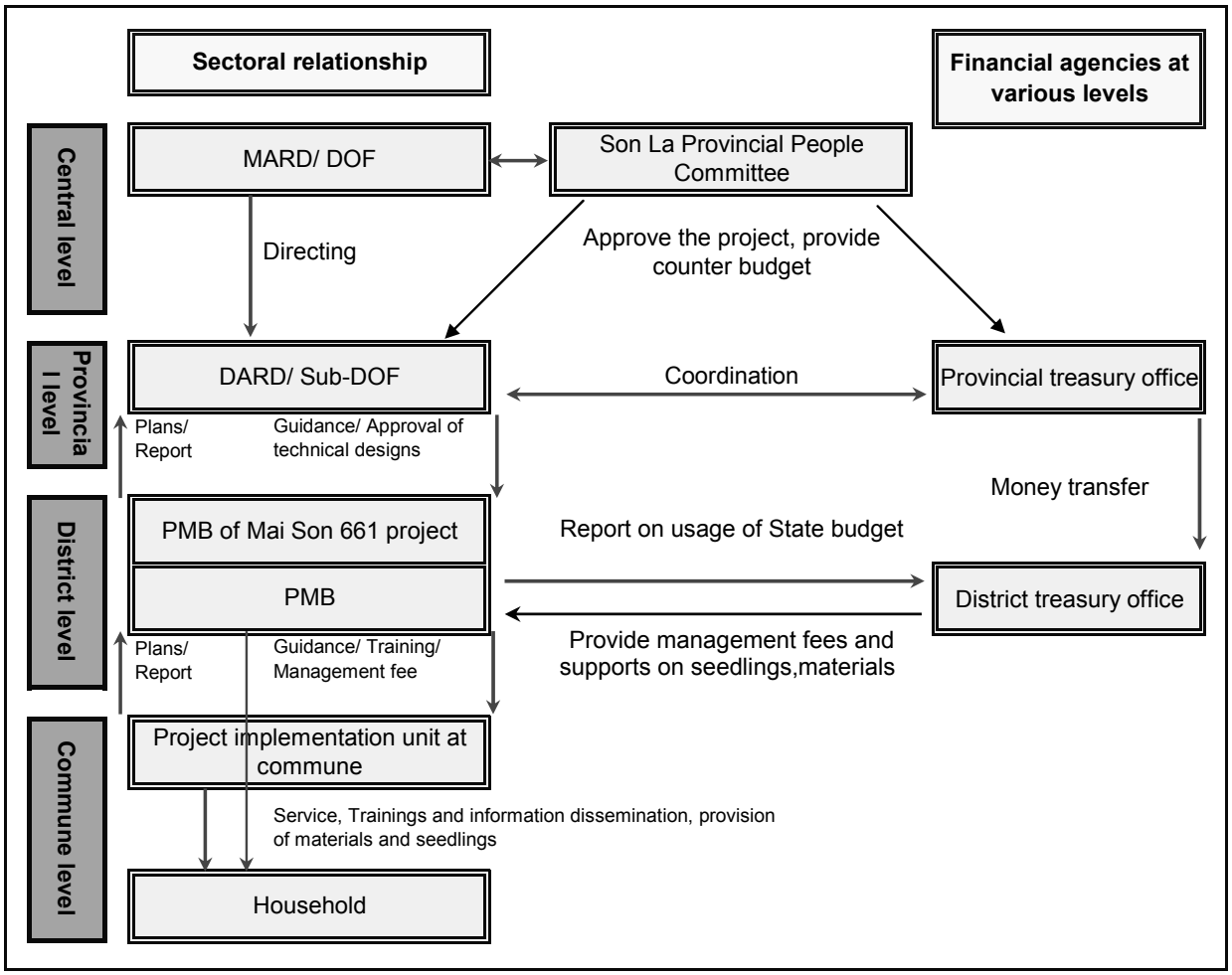


Figure 6. Organizational chart and financial flow for project management & support component

6 Project Management and Implementation

6.1 General aspect

The agro-forestry project in Ta Hoc commune will be managed by staff members of 661 Project Management Board in Mai Son (Mai Son Protection Forest Management Board in the future) based upon decision of Son La Provincial people committee on establishment of the PMB and assigning of personnel to work on the co-responsible basis.

The management board of "Agro-forestry production forest in the 4 villages of Ta Hoc Commune, Mai Son District, Son La province." shall be established as a supporting agency for the project and will be working on co-responsible basis. The PMB will be under management of Mai Son District People Committee (PC) with technical support from provincial sub- department of forestry (Sub- DoF). The PMB shall not hold the responsibility of loan of participating households but managing budget financed by the state. However, the PMB shall be responsible for managing every project components to achieve the project's goal. At communal level, project implementation unit (CPIU) will be established to implement project's activities such as: proposing forest plantation plan for each village on annual basis for submission to the PMB; dealing with misuse of land proposed for project (if any); giving instruction to onsite forest plantation; functioning as a bridge between the financing agency and participating households who apply for loan.

The financing agency shall provide loan to participating households. Application procedure for loan of participating households shall be carried out by financing agency through coordination with PMB and communal project implementation units. The bank shall take responsibility in managing loan contracts and keeping record of loan transactions.

The PMB will be responsible for managing budget allocated by the state (supporting to materials, seedlings procurement, technical designs and management cost).

The PMB prepares annual forest plantation plan of the commune, compiling technical design documents for submitting to authorize agencies for approval. The PMB works closely with the financing agency to disburse loan; supplying materials and seedlings for participating households

6.2 Project Management Board

The PMB will be established by Son La PC with consensus of Mai Son District PC and Son La DARD. The PMB consists of: Chair man (or vice chair man in charge of Forestry activities) of Mai Son PC as the Head of the PMB; Director (or vice director) of 661 Project in Mai Son District as vice head of the standing PMB and as the project account holder and technical project staff; chairman (or vice chairman) of commune as member of PMB.

Area of responsibility of the PMB:

- Supporting participating households to precede loan application and loan contract with financing agency

- Supervising activities of the CPIU.

- Reviewing forest plantation plan, investment capital and project management to submit to authority agencies for approval on annual basis.

- Steering the CPIU to carry out year- end check and hand over and working with district treasury on disbursement of state budget allocated to the project.

- Working in collaboration with technical agencies to organize trainings courses for provision of technical guidance on agro-forestry model for the CPIU and participating households.

- Expenditure for the operation of the PMB will be covered by budget for projects management of State channeled for production forest support.

6.3 Communal project implementation unit (CPIU)

The CPIU will be established on approval of Mai Son District People Committee (or of the communal people committee if being authorized) with consensus of the district project management board. Personnel of the CPIU includes: Chairman or vice chairman of the communal people committee as the head of the CPIU; Agricultural and forestry officer of the commune as a vice head of the CPIU; Head of the village as a member of the CPIU. The CPIU will carry out project activities under the guidance and supervision of the PMB. Expenditure and other allowance for the operation of the CPIU will be provided by the PMB and from the financial source funding to forestry activities of the commune.

6.4 Households

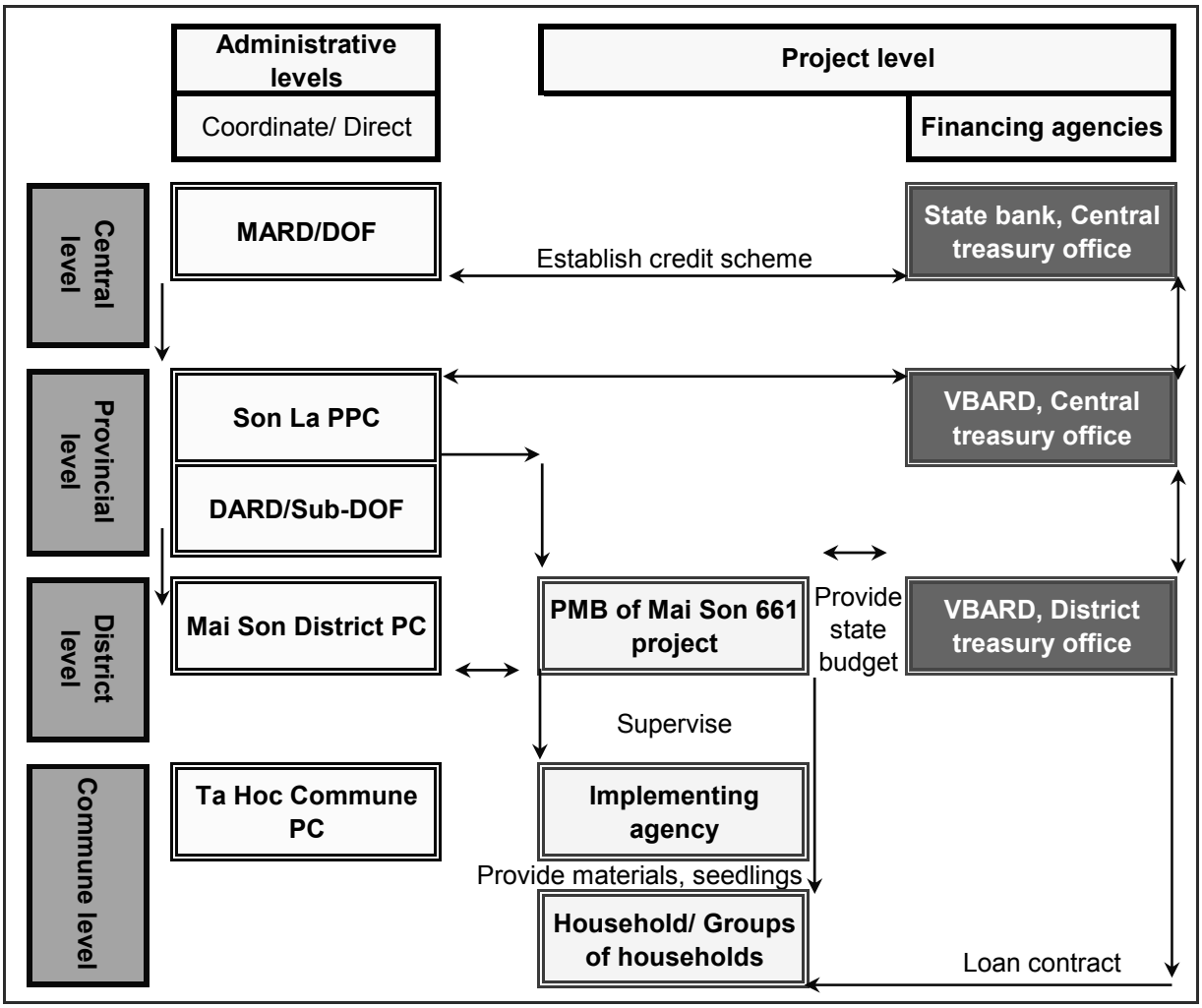
Responsibilities and rights of participated households and groups of households:

Implement the project on the allocated forestry land in accordance with components of the project, specifically, planting of forest according to the annual plan under the guidance of the CPIU and the Provincial PMB.

Utilize loan inline with predefined objective accordingly to terms and conditions set forth in loan contract with bank.

Be entitled to use up all products attained from the participated land into project.

Figure 7. Organizational chart for project implementation



6.5 Role of other stakeholders

6.5.1 Ministry of Agriculture and Rural Development/ Department of Forestry

Give general guidance on policies and orientation on development of forestry sector.

Approve annual afforestation plan (as a part of supporting work to production forest plantation) for 661 Project in Son La; approve the plan for providing of subsidized fund of 2 millions dong/ha to production forest accordingly to scheme of 661 program.

Support and disseminate information to Son La Sub DoF/DARD.

6.5.2 Son La provincial people committee

Approve the feasibility study of Agro- Forestry project at Ta Hoc commune- Mai Son District and establish the PMB of the Agro- Forestry project.

Steering the Agricultural and Rural development bank (or the Social policy bank) to develop a credit scheme to support participating households to get loan for afforestation.

Approve annual project plan and project financial plan;

Direct relevant bodies to settle problems rose during the course of project implementation. Especially, deals with those are beyond the coordinating capability of PMB;

Monitor and supervise progress of project implementation and solve problematic issues particularly, budget allocation of various financial sources to the project.

6.5.3 DARD/ Sub DoF

Give consultation to the provincial PC; coordinate with relevant stakeholders to establish a credit scheme and working in collaboration with the PMB to disseminate information about project in the project area;

Introduce overall guidance on policy and orientation of forestry development;

Supervise the implementation of project at provincial and district levels;

Conduct appraisal of project annual work plan and financial plan before submitting to provincial PC for approval;

Ensure coordination among participating bodies and relevant stakeholders while solving problems raised during project implementation, particularly dealing with those are beyond the coordinating capability of PMB;

Support and provide information on market and credit service, facilitate trainings on extension services;

Take accountability with Son La PPC and MARD about budget allocation under 661 program (support to production forest) for the implementation of agro-forestry project.

6.5.4 Treasury office and bank at various levels

The bank (VBARD or Social policy bank) at district level shall appraise the feasibility of the agro-forestry project, verify collateral of participating households. The bank will prepare loan contract with households via supports from the PMB.

Based upon approval decision of the PPC (or the DARD if authorized) and results of project performance check for each period, Mai Son state treasury office will provide management fees for the PMB and 2 millions for participating farmers.

6.5.5 Mai Son District People Committee

The Mai Son District PC will be responsible for the following tasks:

- Cooperate with Son La DARD to propose establishment of PMB to the provincial PC; develop work regulation for PMB; propose personnel for the PMB for later approval of PPC or designate staff for PMB if being authorized by provincial PC and mandated consensus of DARD.

- Guide Ta Hoc commune PC to complete necessary administrative procedures to establish project implantation unit at commune level and to assign personnel for project work; develop work regulation for the CPIU. Staff members recruited of the CPIU must be agreed by the PMB if the communal PC is being authorized to select personnel.

6.5.6 661 PMB in Mai Son District

661 Program PMB in Mai Son will carry out following tasks:

- Manage, coordinate every activities of the project.

- Provide market information, arrange supporting services and giving guidance on loan application procedure for participating households.

- Consolidate and approve annual operation plan, financial plan of the project before submitting to the provincial PC for approval.

6.5.7 Ta Hoc communal PC

Establish CPIU according to the instruction of the district PC;

Provide support to the CPIU on financial and personnel aspects; participate in directing and supervising participating households on the site.

Cooperate with the PMB to prepare monitoring plan and direct the implementation of project's activities. Take accountability with provincial PC about the project activities within the commune area.

6.5.8 Participating households

Repay loans and interests to the bank in accordance with loan contracts between them and the bank.

Carry out forest plantation, tending and protection according to plan.

Receive supports on agro-forestry cultivating techniques, market information, credit service through participating into training courses on extension service held by the project

Get benefit from agro-forestry products.

7 Labor demand

7.1 Annual labor demand to implement the project

Based on calculation of technical norms for agro-forestry plantation, average labor demand for 1ha model of Melia azedarach and maize is 304manday/11year, of which labor needed in year 1, year 2, year 3 is 121, 92 and 63 respectively; labor need for forest protection is 7 man-day/year. Dendrocalamus and maize model needs 339 man-day/year, of which labor needed in year 1, 2, 3 is 111, 100 and 72 respectively; need for forest protection is 7 man-day/year. Total labor demand for the entire project of 415.98 ha is: 127,472.25 man-day year.

Table 25. Total labor demand by work item.

Unit: man-day

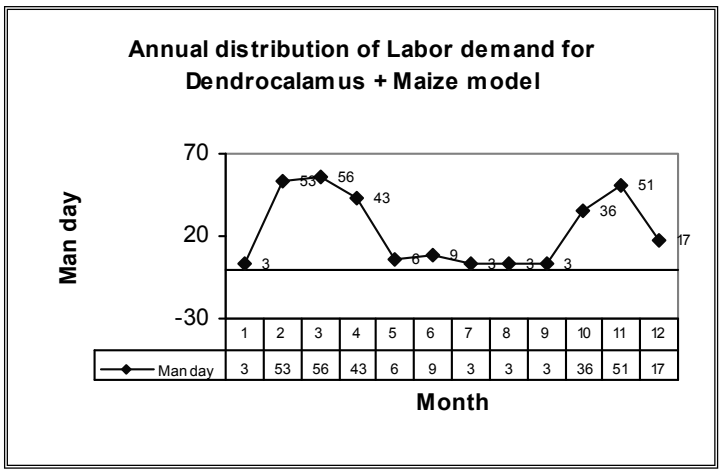
Year	Total	Forest planting	Tending year 2	Tending year 3	Protection	Planting and tending maize
2008	10,782.19	8,367.08	-	-	-	2,415.11
2009	25,704.14	13,016.39	6,496.58	-	-	6,191.17
2010	31,860.80	8,989.38	10,209.98	6,263.65	-	6,397.79
2011	27,566.90	7,315.38	7,127.21	9,852.35	650.22	2,621.74
2012	13,632.82	-	5,082.26	6,883.70	1,666.85	-
2013	7,223.96	-	-	4,851.25	2,372.71	-
2014	2,911.73	-	-	-	2,911.73	-
2015	2,581.68	-	-	-	2,581.68	-
2016	2,111.57	-	-	-	2,111.57	-
2017	1,818.75	-	-	-	1,818.75	-
2018	1,279.72	-	-	-	1,279.72	-
Total	**127,474.25**	**37,688.22**	**28,916.03**	**27,850.96**	**15,393.23**	**17,625.82**

Table 26. Annual labor demand by village

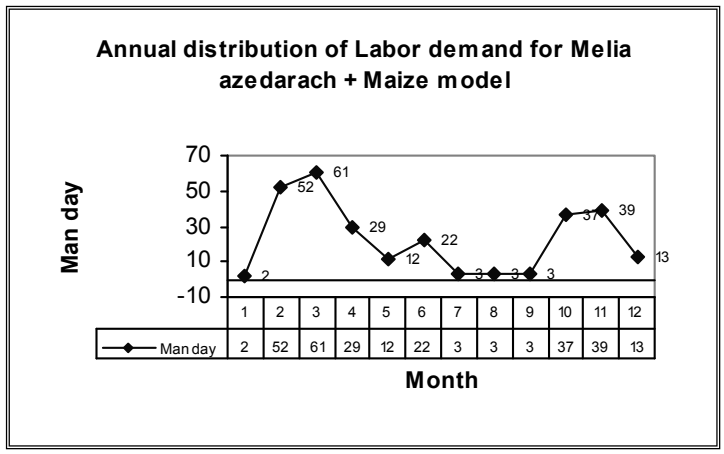
Unit: man-day

Year	Total	Hoc village	Mong village	Pa Dong village	San village
2008	10,782.19	5,076.92	-	5,705.27	-
2009	25,704.14	8,657.71	4,582.41	7,951.19	4,512.82
2010	31,860.80	6,972.34	10,677.74	5,717.82	8,492.90
2011	27,566.90	2,969.19	8,872.78	2,211.36	13,513.57
2012	13,632.82	577.71	4,537.27	539.09	7,978.75
2013	7,223.96	577.71	702.01	539.09	5,405.15
2014	2,911.73	577.71	702.01	539.09	1,092.92
2015	2,581.68	577.71	702.01	209.03	1,092.92
2016	2,111.57	577.71	702.01	-	831.85
2017	1,818.75	577.71	702.01	-	539.03
2018	1,279.72	577.71	702.01	-	-
Total	**127,474.25**	**27,720.10**	**32,882.30**	**23,412.00**	**43,459.90**

For agro-forestry of Dendrocalamus and maize model, labor demand is highest in February, April, October and December. At site clearance and forest planting stage, 53 man days/ha is needed to grow maize and 56 man days are needed for plantation of Dendrocalamus in April. Labor demand for tending reaches a peak in November with 51 man days needed.



For agro-forestry of Melia azedarach and maize model, high demand for labor takes place during Feb. - Apr., Oct. - Dec. A peak occurs in March as labors are required for field preparation and plantation with 61 man days. Most of labors required for tending are in November with 39 man days.



7.2 Labor forces of participating households

Interview with participants during the Communal Consultation Meeting in preparation for the project reveals that there are 2.2 labors in a household on average. During agricultural off-season, each household can provide 50 man-days/month. It is estimated that about 56- 61 man days per

month are needed for site preparation for forest plantation. As a result, labor needed for forest plantation (with average area of 1ha/household) at busiest season of the project would exceed the supply capacity of each household. Therefore, in order to maintain the project implementation within schedule, participating households will have to hire external labor from the neighboring villages with the rate of 30,000 to 40,000 VND/man-day or to exchange labor among participating households alternatively. During busy months of the project, each household will need to hire another 5-6 man day/ha.

8 Formulation of household groups

It is necessary to formulate household groups (communal groups), hence they will support each other on aspect of techniques to implement the model and exchanges of labor for forest establishment during peak season.

The survey reveals that formulation of participating household's groups for forest establishment creates more favorable condition in accessing to financial sources, to technology, labor, forest management & protection and approaching to market information.

9 Training plan

With a view to run the project smoothly while enhancing its effectiveness, it is essential to open training courses for provision of techniques on forest planting, harvesting and methods of cultivating agriculture crops in combination with forestry species. Also, it is of necessity to conduct dissemination of project information & project plan toward the public through such training courses.

Trainers for those courses shall be staff of Provincial Extension Service Centre (PESC), DARD, PMB and credit officers at district level.

Trainees are members of the CPIU and participating households.

Tentatively, 2 training courses/year will be organized, 2 villages will be gathered to attend a course at a venue in communal PC. Estimated training cost is 8 millions each.

Expected number of trainees is 60 participants/training course.

In the first year, training on credit service and techniques for implementation of agro-forestry model shall be conducted.

In the sixth year, training on market information, harvesting techniques applied for Melia azedarach, Dendrocalamus and cycling cultivation method shall be organized.

One part of training budget shall be taken from projects management fee and the other from budget for training of extension services provided by the province through PESC.

10 Monitoring and Evaluation

Monitoring and evaluation of the project will be conducted annually with involvement of various agencies including: DARD, District Treasury, District PC and the PMB.

M&E of the project is to evaluate progress of project implementation in comparison with the defined plans on annual and monthly basis which are approved by authorized body. Thus, helps working out timely solution to cope with project difficulties and enable it to achieve addressed objectives.

10.1 Development Indicators

By end of 2011, 415.9 ha of agro-forestry model shall be established, of which Melia azedarach and maize model is 233.19 ha; Dendrocalamus and maize is 182.79ha;

In the first year of project implementation, participating households will receive loan from bank and state- subsidy of 2 millions dong/ha to implement the project;

100% participating households and communal officers will attend training course held by the PMB;

By the end of 2007, the PMB and the CPIU shall be established.

10.2 Progressive Indicators of the project

There will be 366 households participate into the project and they will receive information on credit service, agriculture and forestry products and extension services.

Annual plantation area of agro-forestry according to plan: 2008: 92.88ha; 2009: 145.17ha; 2010: 100.89ha; 2011: 77.04ha.

By 2018, there will be 1,080,756 stems of Dendrocalamus harvested sold at the market;

By 2018, there will have 16,323 m^3 of Melia azedarach timber harvested and sold at the market;

By 2018, there will have 4,663 ster of firewood to be gathered and consumed on the market;

By the year 2009, there will have 2,490 tons of harvested maize (seed volume).

Area of tending will be inline with planting plan (planting and tending in 3 years with inclusion of plantation year; tending: Dendrocalamus and maize model: 2 years; Melia azedarach and maize model: 4 years.

Expected income would be generated from maize in the first 2 years (from maize) and from 2013 (from Dendrocalamus) with an average of 1,200 stems/ha and income from Dendrocalamus is calculated until year 11. Dendrocalamus forest will be maintained,

protected and harvested continuously by the households thereafter. Clear cutting of Melia azedarach will take place after year 7, estimated harvesting volume is 70m^3/ha and 2.5 ster of firewood/ha. Reforestation or coppiced regeneration of forest should be carried on immediately in the following year after harvesting completion to avoid land erosion and cost for the 2nd project cycle would be borne by the households.

10.3 Monitoring and Evaluation mechanism of the project

Mai Son District PC and the DARD conduct monitoring and evaluation activities conducted by the PMB through reviewing progress report of the project. The PMB supervises and evaluates efficiency of activities carried out by the CPIU and the project's performance through reviewing monthly progress report and bi-annual draft reports and year- end report. Financing agencies and other financial support agencies supervise the effectiveness of loan and subsidies utilization given to participating households.

Final monitoring and evaluation will be carried out by relevant agencies including: District People committee, DARD, financing agency, district treasury office and the PMB.

Final M&E cost shall be covered by project management cost. Contents and budgets for M&E shall be complied with current regulations of PPC.

11 Sustainability

11.1 Economic sustainability

According to market analysis, timber demand in the province and in neighboring provinces including Ha Noi will probably remain high. Currently, total demand for timber per annum of Son La stands at 65,000 m^3 and the province is currently facing with shortage of timber. Consequently, several wood processing workshops are not operating at full designed capacity. Beside local demand for wood, in the context of high growing rate of regional economies, it is envisaged that the demand for wood materials will be even more tensed and top at a high level. At the moment, many international companies as well as wood processing industries in the regions are paying special interest to the potentiality of Vietnam forestry with a hope that Vietnam shall be a major supplying source of wood material in times to come.

11.2 Other prospect of sustainability

High demand of wood materials shall be a supplementary to the sustainability of the proposed project. Participating households will be trained with techniques of agro-forestry model with obtaining of substantial information and know-how for continuing the afforestation and development of production forest right after the end of project. Further more, new afforestation will share a contribution to the improvement of land, soil and as a consequence it will help the sustainable use of land. Additionally, the project will try to utilized and take advantage of priorities given by the Government for the field of production forest development. It is noticeable that the retained experiences during the project implementation process will help the Government in up scaling and expanding projects of similar type onto other location.

PART III: PROJECT EFFECTIVENESS

1 Financial & Economic effectiveness

1.1 Financial analysis

1.1.1 Overview of the Agro-forestry Model

The Agro-forestry model is proposed to implement in four villages of Ta Hoc commune, Mai Son district of Son La province. Total area of the project sites is 415.98 ha. The project shall be implemented with 2 models of (1) Dendrocalamus and Maize – herein after called as Model 1; (2) Melia azedarach and Maize – Model 2. In the Model 1, Dendrocalamus is long life forestry specie with harvesting cycle of 5 years. In Model 2, Melia azedarach is a forestry tree with life cycle of 7 years. With both models, maize will be cultivated and harvested only in the first 2 years, then Dendrocalamus and Melia azedarach will be maintained and developed afterwards. Dendrocalamus shall be harvested on selective cutting method that is expected to start from 6th year until the 11th year. Harvesting of Melia azedarach would be applied with clear cutting method in the 8th year after plantation. Afforestation plan for both models is shown in the table below:

Table 27. Afforestation plan for Agro-forestry models

Unit: ha

	Model	Area	Planting year			
			2008	**2009**	**2010**	**2011**
Total		415.98				
1	Dendrocalamus and Maize	182.79	45.72	78.03	59,04	
2	Melia azedarach and Maize	233.19	47.16	67.14	41,85	77,04

1.1.2 Method of analyzing

Analyzing process is shown in the Figure 8 below with the calculation of net income flow on the basic of 2007 price terms and other investment criteria such as NP NPV, BCR, and IRR.

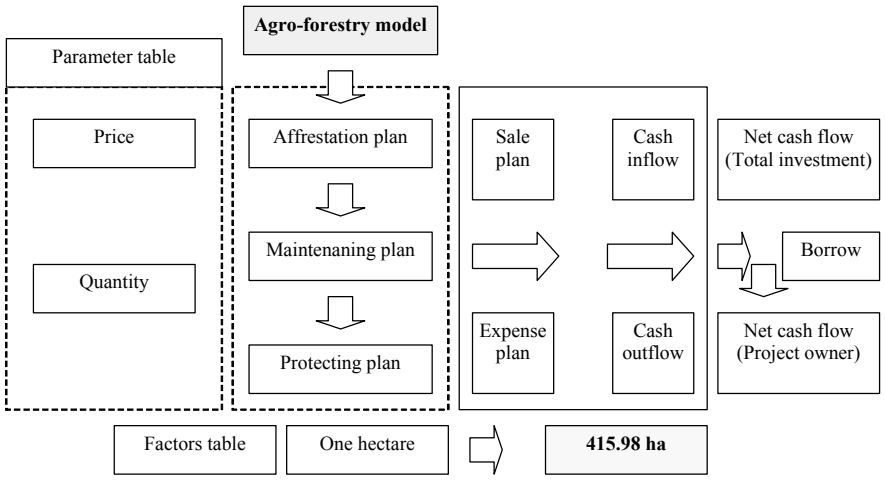


Figure 8. Diagram of process for conducting project's financial & economic analysis

With each Agro-forestry model, financial analysis shall be initially conducted for one hectare model then applied for models at entire project scale namely: Dendrocalamus and Maize (182.79 ha), and Melia azedarach and Maize (233.19 ha). Results retained from the analysis shall be consolidated for the whole project (425.79 ha).

Firstly, the financial analysis is implemented from the viewpoint of total direct investment in connection with cash inflow, cash out flow and net cash flow. Then the analysis shall be conducted on the perspective of investment owners (households). While undertaking financial analysis from investment owner viewpoint, loan and repayment schedules shall be applied with cash flow of aggregated investment's viewpoint.

Analysis shall be implemented on the basis of calculating net cash flow that applied with investment criteria such as Net present value (NPV), Internal rate of return (IRR) and the benefit and cost ratio (BCR) on the 2007 price term. NPV shall be retained from cost plan and sale plan those presented in Input parameters table (physical volume and prices), Table of afforestation plan and Sale plan according to each implementing year of the project. These analyzing processes are conducted as mentioned below:

1. Establish parameter table on work items, workload and market prices;

2. Establish table of inflation factor, discount rate;

3. Develop sale plan (cash inflow) and cost plan (cash outflow) of each model on one hectare basis;

4. Conduct financial analysis from viewpoint of total investment includes calculation of net cash flow; internal rate of return; net present value and the benefit and cost ratio for one hectare of each model; and for entire area of each model and the whole project;

5. Develop loan and repayment plan for one hectare models and for entire project;

6. Undertake financial analysis on view point of investment owner, including the calculation of net cash flow; net present value; net present value and the BCR ratio for one hectare of each model; and for entire area of each model and the whole project;

7. Analyze the sensitivity of NPV and IRR, BCR from the viewpoint of total investment for each model, for entire project; and for one hectare from the view point of project owner. Sensitiveness analysis from total investment's viewpoint requires assumptions that change sensitive factors and lay some effects to financial factors. These factors are often identified as labor unit price, timber price, Dendrocalamus price or volume of planted forest. While conducting sensitiveness analysis from investment owner's viewpoint, besides changing of mentioned pricing factors, it is necessary to consider the changes in loan and repayment conditions. Possible conditions could be amount of loan, interest rate and grace period.

1.1.3 Predetermined factors and assumptions

Assumptions in financial & economic analysis:

1. Based year is 2007 (analysis is conducted on the basic of financial price in 2007).
2. Estimated inflation rate is 5 %/year.
3. Physical contingency is 5% of total base cost.
4. Interest rate of bank is 14,4%/year (1,2 % /month)
5. Actual cost for unskilled labor in the area is 40,000 VND/man day.
6. Estimated discount rate is 14.4% (equals to interest rate);
7. Stumpage price of Melia azedarach: 490,000 VND/m^3;
8. Harvesting volume of Melia azedarach: 70 m^3/ha/7years and 20 ster of firewood /ha/7years;
9. Standing price of Dendrocalamus: 5,000 VND/stem;
10. Harvesting volume of Dendrocalamus: 1,200 stems/ha/year.

During the analyzing process, above stated assumptions are applied for both models (separately) and for the whole project.

1.1.4 Results of analysis

(1) With project case

(i) Project effectiveness from Total investment's viewpoint

One hectare model:

Table 28. Financial analysis from Total investment's viewpoint - One hectare model

No.	Item	Unit	Dendrocalamus and Maize	Melia azedarach and Maize
1	Net Cash flow	1,000 VND	27,536	27,650
2	CPV (a)	1,000 VND	15,335	15,789
3	BPV (b)	1,000 VND	21,607	21,998
4	NPV	1,000 VND	6,272	6,208
5	BCR (b)/(a)		1.41	1.39
6	IRR	%	31.76%	28.76%

Table 28 shows that factors for evaluating feasibility of the project of both Agro-forestry models are valued at the affirmative figures that reflect the high feasibility of the project. IRR figure is twice greater than bank' interest rate. BCR also proves that with an investment of one Dong into Agro-forestry model, a turnover of 1.4 fold will be created.

As well, it can be seen from the table that investment into Dendrocalamus and Maize model would retain a bit higher profit than the Melia azedarach and Maize model. However, Dendrocalamus is only suitable to areas of high humidity which mainly located in low land and areas nearby streams. Therefore, in high areas with steeper topographical conditions, the selection of Melia azedarach to plant with maize in intercropping manner shall be the most suitable for farmers.

Both models:

Results of financial analysis for both Agro-forestry model of Dendrocalamus and Maize (182.79 ha); Melia azedarach and Maize (233.19 ha) are described in the following table:

Table 29. Financial analysis from Total investment's viewpoint for both models

No.	Item	Unit	Dendrocalamus and Maize	Melia azedarach and Maize
1	Net Cash flow	1,000 VND	3,975,157	6,447,756
2	CPV (a)	1,000 VND	2,385,864	2,988,731
3	BPV (b)	1,000 VND	3,211,175	4,163,925
4	NPV	1,000 VND	825,310	1,175,204
5	BCR (b)/(a)		1.35	1.39
6	IRR	%	31.28	28.76

Similar to one hectare models, results of financial analysis also show that both models shall bring about high profit. Net income of each model records at about 1 billion Dong, Melia azedarach and Maize model even return 1.17 billions Dong. Internal rate of return of both models are 2 folds higher than bank's interest rate.

Entire project model of 415.98 ha:

Results of financial analysis from Total investment's viewpoint for the project as a whole also show high feasibility. Retained net income is 2 billions Dong. Internal rate of return is 29.73% that is much higher than bank interest rate (14.4%). On an overall aspect, if one Dong is invested, the project will generate a turnover of 1.4 Dong during project life cycle.

Table 30. Financial analysis from viewpoint of total investment for the whole project (415.98 ha)

No	Item	Unit	Total
1	Net Cash flow	1,000 VND	10,422,913
2	Total CPV (a)	1,000 VND	5,374,586
3	Total BPV (b)	1,000 VND	7,375,101
4	NPV	1,000 VND	2,000,515
5	BC Ratio (b)/(a)		1.37
6	IRR	%	29.73

(ii) Effectiveness from viewpoint of Investor (Households)

Financial analysis from investment owner's viewpoint for the Agro-forestry project is the combination of analysis from total investment's viewpoint and borrowing, interest repaying plans and plan for returning of principal debt and its interest.

Results of interviews with farmers in the four participating villages and banks reveals that required loan for implementation of one hectare of Agro-forestry model is of about 2.5 millions Dong. Because, farmers can mobilize almost sufficient labor themselves during planting season therefore, that loan amount shall be utilized mainly for paying additional labor those hired for serving peak season or covering additional expenses on seedlings and fertilizer in case the state subsidy of 2 millions Dong/ha under 661 program fails to fully cover.

One hectare model:

Total area of project site is 415 ha, but there will be 366 households directly participate into the project. Thus, in practice, each household's participating area is only about 1 - 1.5 ha. Therefore it is sufficient to conduct financial analysis from investment owner's viewpoint for one hectare model since farmers would easily realize specific effectiveness of their family' investment through a simple calculation. During forest plantation stage, households will need to borrow an additional loan of 2.5 millions Dong/ha for covering expenses in the first year of implementation. Since then, annually, farmers will have to pay interest rate of 14.4%/year and principal debt shall be returned in the 6th year for Dendrocalamus model, after having earned from Dendrocalamus. For Melia azedarach model, farmers will repay principals in the 8th year after harvesting of Melia azedarach. Analyzing results are shown in the following table:

Table 31. Financial analysis factors in the viewpoint of investment owner for One hectare model

No.	Factor	Unit	Dendrocalamus and Maize	Melia azedarach and Maize
1	NPV	1,000 VND	6,627	6,719
2	IRR	%	40.93	34.83

Calculation results reflect high feasibility of the project even in a case that farmers have to pay bank' interest rate. IRR is 2 times larger than interest rate and even higher than figures retrieved from analysis in perspective of total investment's viewpoint.

Dendrocalamus, Melia azedarach models and the whole project:

As for Project management board and relating stakeholders, analyzing results for the entire project of 415.98 ha are very important. Such information will enable them to evaluate the overall project's achievement for rational decisions in project investment. These also show that the proposed project is of high feasibility. IRR stands at 31%, 2 times higher than bank's interest rate.

Table 32. Financial analysis factors from viewpoint of investment owner for 2 models and entire project

No.	Factor	Unit	Dendrocalamus and Maize (182,79 ha)	Melia azedarach and Maize (233,19 ha)	Entire project (415.98 ha)
1	NPV	1,000 VND	840,029	1,194,945	2,196,538
2	IRR	%	37.64	32.13	35.67

(2) Without project case

Previously, the target project area used to be the area planned for protection area of Da river catchments. Since 2006, upon the completion of Son La' forest reclassification, such lands were converted into production forest area. Up to now, farmers in the four target villages have been utilizing the area for agricultural cultivation, specifically, maize crops are grown. It means that the land has been misused. Pursuant to the Land law that promulgated and came into effect in 2004, those areas that being used wrongly shall be reclaimed by the Government within 02 years from the date of allocation. This also means local farmers will not be allowed to cultivate maize alone on such area but to intercrop with forestry species through a forestry project. Thus, in a case of without project, farmers will gain no earnings from these lands, as it would be left with bared land, possibly being covered with full of grasses and bushes without any forestry product. Consequently, for carrying on their livelihood, farmers may search for income from other sources such as animal raising, servicing or employing for others.

(3) Incremental value of with project case

As mentioned above, in a without-project case, land in project area shall not capable to generate physical profit. Therefore, incremental value of the with-project is Net income brought about by the project. Specifically, each hectare of land of the with-project case will help to bring about a Net income of 6 millions dongs annually in a cycle of 6-7 years.

(4) Project sensitivity

Project sensitivity is analyzed on the basis of changes of factors those impose large impacts on project effectiveness such as: Labor unit price, timber volume and sale price. Implies of sensitivity analysis is to support investment owner in identifying the changes of project effectiveness when input factors change. For example, it helps to know how NPV, IRR and BCR would be if labor price increases. Sensitiveness analysis will be conducted from the viewpoint of project owner and total investment correspondingly.

(i) Sensitivity analysis from the viewpoint of project owner

One hectare model of Dendrocalamus and Maize:

Sensitiveness analysis from the viewpoint of project owner shall be conducted for one hectare model as each participating household owns only 1-1.5 ha forestry land. There are two sensitive factors that strongly affect the project effectiveness at household level namely labor price and bank interest. Assume that basic project return is 100%, then

process changes of bank interest and/or labor price by 10% each upward or downward. If these factors are increasing gradually, NPV will be reduced correspondingly since cost of implementation will increase. Calculating result reveal that when bank interest increases by 20% or 17.35%/year and labor price increases by 30% or 52,000 Dong/man day equivalently, NPV still remains at 3 millions. In practice, labor price can increase considerably but interest rate may not rise too drastically, it means that project still remains feasible if interest rate would increase slightly.

Table 33. Results of sensitive analysis in the viewpoint of project owner for 01 ha of Dendrocalamus and Maize

Unit: Dong

NPV			Labor pay (%)						
Changes of interest rate (%)			**130%**	**120%**	**110%**	**100%**	**90%**	**80%**	**70%**
		Labor pay/Interest rate	***52,000***	***48,000***	***44,000***	***40,000***	***36,000***	***32,000***	***28,000***
	120%	**17.3%**	2,962,017	4,124,269	5,375,912	6,448,771	7,611,022	8,773,273	9,935,524
	110%	**15.8%**	3,051,410	4,213,661	5,375,912	6,538,163	7,700,414	8,862,665	10,024,916
	100%	**14.4%**	3,140,802	4,303,054	5,465,305	6,627,556	7,789,807	8,952,058	10,114,309
	90%	**13.0%**	3,230,195	4,392,446	5,554,697	6,716,949	7,879,200	9,041,451	0,203,702
	80%	**11.5%**	3,319,588	4,481,839	5,644,090	6,806,341	7,968,592	9,130,843	10,293,094

One hectare model, Melia azedarach and Maize:

Table 34. Results of sensitive analysis in the viewpoint of project owner for 01 ha of Melia azedarach and Maize

Unit: Dong

			Labor price (%)						
Changes of interest rate (%)			**130%**	**120%**	**110%**	**100%**	**90%**	**80%**	**70%**
		Volume (m3/ha)	***52,000***	***48,000***	***44,000***	***40,000***	***36,000***	***32,000***	***28,000***
	120%	**17.3%**	3,167,648	4,285,354	5,403,059	6,520,765	7,638,470	8,756,176	9,873,881
	110%	**15.8%**	3,267,018	4,384,723	5,502,429	6,620,134	7,737,840	8,855,545	9,973,251
	100%	**14.4%**	3,366,387	4,484,093	5,601,798	6,719,504	7,837,209	8,954,915	10,072,620
	90%	**13.0%**	3,465,757	4,583,462	5,701,168	6,818,873	7,936,579	9,054,284	10,171,990
	80%	**11.5%**	3,565,126	4,682,832	5,800,537	6,918,243	8,035,948	9,153,654	10,271,359

Sensitive analysis in the viewpoint of project owner for Melia azedarach and Maize model is also conducted for one hectare model. Results show that when interest rate increases by 20% or 17.35%/year and labor price increases by 30% or 52,000 Dong/man day equivalently, NPV still stands at 3 millions or the project is still viable.

(ii) Sensitiveness analysis in the viewpoint of Total investment for entire project of 415.98 ha:

Sensitiveness analysis from the viewpoint of total investment for entire project is conducted by making changes in volume and price of Melia azedarach and Dendrocalamus so total of Net present value of the project shall be assessed. Assume that the initial analysis results are the based value corresponding to 100%. Considering volumes and prices of Melia azedarach and Dendrocalamus vary by 10%, 20%, 30% and 40% upward and downward. In those cases, NPV is shown in the table below. Analyzing results reflect that upon the decreasing of price of Melia azedarach and Dendrocalamus at 80-90% of the current price or Dendrocalamus stands at 3,000 Dong/stem and Melia azedarach at 294,000 Dong/m^3 and harvesting volumes correspondingly will be reduced to 720 stems of Dendrocalamus/ha/year with and 42 m^3 of Melia azedarach/ha/7 year, NPV is still remained a positive value, the project, therefore is still feasible. Of course, in the reversal case, project effectiveness will be much higher.

Table 35. Fluctuation of volume and sale price

Unit: 1,000 VND

NPV				**Changes of selling price**							
	Rate			130%	120%	110%	100%	90%	80%	70%	60%
		Dendrocalamus		6.5	6.0	5.5	5.0	4.5	4.0	3.5	3.0
		Melia azedarach		637.0	588.0	539.0	490.0	441.0	392.0	343.0	294.0
Changes of volume	130%	1,560	91	4,664,599	4,162,671	3,660,742	3,158,813	2,656,884	2,154,955	1,653,026	1,151,097
	120%	1,440	84	4,162,671	3,699,352	3,236,033	2,772,714	2,309,394	1,846,075	1,382,756	919,437
	110%	1,320	77	3,660,742	3,236,033	2,811,323	2,386,614	1,961,905	1,537,196	1,112,487	687,778
	100%	1,200	70	3,158,813	2,772,714	2,386,614	2,000,515	1,614,416	1,228,317	842,218	456,118
	90%	1,080	63	2,656,884	2,309,394	1,961,905	1,614,416	1,266,927	919,437	571,948	224,459
	80%	960	56	2,154,955	1,846,075	1,537,196	1,228,317	919,437	610,558	301,679	(7,201)
	70%	840	49	1,653,026	1,382,756	1,112,487	842,218	571,948	301,679	31,409	(238,860)
	60%	720	42	1,151,097	919,437	687,778	456,118	224,459	(7,201)	(238,860)	(470,520)

1.2 Economic analysis

1.2.1 Assumptions

Economic analysis is to evaluate the feasibility of project from national viewpoint. Preconditions and method of conducting are similar to financial analysis. In case of Agro-forestry project in Mai Son district, the Government will support a package of up to of 2 millions/ha covering seedlings and fertilizer. Management fee (10% of total base cost) shall be extracted from state budget. However, from the national viewpoint, implementation of the project does not help to create any incremental profit as Dendrocalamus and Melia azedarach products are not for exporting.

1.3 Results of economic analysis

With such above- explained approach, factors of economic analysis are also those used in financial from the view point of total investment of the project.

Table 36. Results of economic analysis of the project

No.	Analyzed factors	Unit	2,000
1	NPV	Mil. Dong	2,000
2	IRR	%	29.73
3	BCR		1.37

2 Environmental impact assessment

Currently, there are quite many areas planted with Dendrocalamus and Melia azedarach in Ta Hoc and other communes. Field observation shows that the selected species leaves some positive impacts on environment:

Melia azedarach has low closure of canopy coverage, litter and undergrowth species therefore could develop quite well that creating some helps to the maintenance of moist on the surface soil layer. In dry season, water is evaporated quickly lessening moisture on the surface that limits growth of underneath vegetation, and delays organic disintegration on the ground. However, in rainy season, the endanger period of surface erosion is remarkable shortened due to quick regeneration of undergrowth. Field observation also reflects that muddy rate of surface water is constantly reduced and almost disappeared in the peak of rainy season (around August – September annually). During the leave shedding period of Melia azedarach that takes place from October to the end of December, there is almost no heavy rain. In the design of planting sites, Melia azedarach is planted with 2m x 2m distance and during 2 initial years, Maize is intercropped into beds that lied in the middle of Melia rows. These planting techniques has remarkably helped preventing land erosion and wash away of top soil. Drops in Melia planted areas pose high contents of easily disintegrated organic thus remarkably improve the nutritive contents of surface land during planting cycle. However, with a view to maintain a sound nutritive balance of land, in the next cycle of either plantation or coppiced regeneration promotion,

it is necessary to supplement fertilizer and improve planting site with organic manure, NPK.

For Dendrocalamus, with a planting density of 400 hedges/ha, upon fully development, canopy coverage can reach almost 0.8. During dry season, the highest risk is forest fire due to low moist of ground and inflammable characteristics of Dendrocalamus Harvesting method applied in the area is selective cutting, therefore, a fair coverage is maintained for the entire life cycle of Dendrocalamus plantation (often last for 50 years from the beginning). According to experiences shared with people from other locations where Dendrocalamus are planted commonly, land slide and erosion have not happened in some times to this moment.

Agro-forestry model will replace forestry land of types Ia, Ib as well as areas where local people are cultivating agricultural crops. This will help solving the common seen negative impacts in upland farming sites in the area.

Additionally, forest coverage will be considerably increased upon the implementation of project. This is a visible impact toward environment on aspects of air quality, quantity and quality of ground, surface water as well as land and soil quality.

3 Social impact assessment

The project would create more job opportunities and earnings for local farmers as well as partially contribute to the course of poverty reduction in the area. It is expected that about 366 households would participate into the project upon its commencement.

The project would pose some long term impacts to the household economy

The implementation of the project will also help to form a new cultivating method that is of high suitability to the practice of maintaining combined agriculture – forestry production on forestry land, and as well to stop the trespassing upon forestry land for agricultural crops while increasing effectiveness of land use.

Moreover, the participation of farmers into project will also help strengthening community spirit, people strive together for the successfulness and at the same time create earnings for themselves and community.

4 Project risk

Due to the fact that there are no planted forest with high stock in the area, estimation of forest production volume therefore faces with some difficulties. Thus, such estimation only base on experience and some documentation about planted trees in vicinity. Long project cycle would probably face with weather fluctuations and actual productivity may be lower than calculated at the time of project preparation.

Products price also a risk factor that determines the project successfulness. Price often fluctuates over time and depends on market demand. If sale price may reduce sharply in comparing with price at the project preparation, project turnover and morale of project implementers may be seriously affected.

Besides, not timely and insufficient investment flows, changes of interest rate that tend to the worse direction are also risk factors to the project.

Government's policies subject to be changed over time toward a better life for people but the project is predefined so it may require modification later to suit with legal environment of the State.

Farmers are yet neither familiar with agro-forestry model that utilize the short term products for feeding the long term products nor accessing loans for forestry production. Moreover, the people have been accustomed to getting grants and doing business in independent and unorganized manner. These factors are additional difficulties that may weaken the viability of project.

Last but not least is lacking of experience in project management of district and commune governors.

PART IV: CONCLUSIONS AND RECOMMENDATIONS

1 Conclusions

Assessment of socio-economic conditions together with financial & economic analysis show that the Agro-forestry afforestation project that applies two models namely: (1) Dendrocalamus and Maize and (2) Melia azedarach and Maize in Hoc, Mong, Pa Dong and San villiages in Ta Hoc commune, Mai Sơn district of Son La province is of high feasibility. The project proposal is also inline with direction of Son La province in the formation of a sustainable model for economic production in area of high slope so that it can both satisfy the livelihood of local people and the protection of top soil layer and the watershed area of Da river. As a matter of fact that lands in Son La are mostly on high slopes, the top soil contains high nutritive content often in danger of being washed away, it is hopefully that the successfulness of this model will be up scaled and disseminated to other neighboring areas. Moreover, sustainable cultivation of agricultural crops on sloping land gathered with watershed management in Son La are not tasks for today but also for the long future to come.

2 Recommendations

(1) We strongly propose the Son La PPC will appraise and approve the project so local farmers can participate into project implementation.

(2) We strongly propose that financing agencies will provide loan for farmers timely and sufficiently so the project schedule will be maintained.

(3) It is recommended that the Mai Son DPC, DARD will assign tasks, supplement staff if necessary for 661 PMB so they will be able to manage and implement the project successfully.

APPENDICES

Appendix I: Project designing matrix

Project name:
Agro-forestry production forest in the 4 villages of Ta Hoc Commune, Mai Son District, Son La province.
Target beneficiary: Farmers in 4 villages of Ta Hoc commune, Mai Son district.
Project area: Ta Hoc commune, Mai Son district, Son La province

Duration:
2008-2018
Version: 5
Date: Feb. 03. 2007

Summary	Indicators	Means of verification	Important assumptions
Overall objective: Utilize forestry land for right purpose in a stable manner to improve livelihoods of local people and to protect the environment through the application of agro-forestry model on sloping land.	Number of land slides in project regions reduce Household economy growth by 10%/year from 2009 By 2018, 415.98 ha of forestry land in project area will be used properly By 2018, 1,080,756 Dendrocalamus stem shall be harvested and sold out; By 2018, 16,323 m3 of Melia azedarach shall be harvested and sold out; By 2018, 4,663 ster of firewood shall be collected and sold out to markets; By the end of 2009, 2,490 tons of maize shall be harvested and sold.	Forest inventory report of Sub-DOF, Commune report on cultivating areas of agricultural crops; Site check; Annually statistical data; Project completion report 2008-2018; Business report of wood processing enterprises in the province.	Priority given by the State to production forest development is stable
Immediate objective Increase incomes of local people through the implementation of agro-forestry production on planned forestry land.	Income obtained from implementation of 1 hectare of agro-forestry model increase by 10%/year since 2009	Agricultural log, household survey, site checking, annual report on commune socio-economic development	There is no big change of price of agricultural products
Expected outputs 1. Successfully establish the Agro-forestry model. 2. Efficiency from utilization of forestry land increase	From 2008 to 2010, there will have 100 households each year apply the agro-	Project progress report, report on experimental model of Extension	No hazardous havocs occur and no epidemic broke outs

	forestry model; Areas of agro-forestry models established are as of project plan.	center, Report on market survey.	Financing agency will not change interest rate to worse direction
Activity 1.1. Supplement to the Mai Son protection forest management board with implementing function of project; 1.2 Technical design for the agro-forestry model; 1.3 Promoting and facilitating the formulation of household, community groups on doing business with production forest. 1.4 Training on planting, tending and protecting techniques of Melia azedarach, Dendrocalamus and maize. 1.5 Establish a credit scheme for farmers in project area 1.6 Prepare project site 1.7 Promote the accessibly to new agricultural variety and applicable techniques 1.8 Conduct agro-forestry afforestation 1.9 Strengthening market information channel and sale	**Input** Loan: 1.03 billions Dongs State Subsidy: (Seedlings, fertilizer, market information …) Human resource: Farmers will contribute 127,474 man-day, government will designate staff for project work.		**Precondition** Provincial People Committee of Son La approve the project

Appendix II: Results of Project Option Evaluation in Son La Province

1. Introduction

The project option evaluation is part of the feasibility study process to screen various project options and then select the most feasible project option. It will help a project planner identify the most feasible option out of a number of possible options at the early planning stage of the project. It will be conducted also in a less costly manner. Under the FICAB Study, the Study Team has been trying to develop a simple method of the project option evaluation, which should be well adopted into the project formulation method in the Vietnamese forest sector.

In phase I of the FICAB Study, the study team has conducted the option evaluation as a part of feasibility study in Thai Nguyen province. And in phase II, four provinces (Son La, Quang Nam, Lam Dong and Long An Provinces) have conducted the option evaluation as well by themselves base on the method developed.

The results of project identification show that the idea of agro-forestry project was selected in Son La Province, the rest three provinces chosen production forest projects. As the next step in the feasibility study, from August 2006 to October 2006, after intensive training course Provincial Study Teams (PST) of four (4) provinces have conducted the project option evaluation. This is the result of option evaluation conducted by Sonla PST.

2. Agro-forestry project in Son La

Step 1 Identification of possible key project components through data collection and analysis

Based on the of the basic idea project, based on data collection and analysis on the natural and socio-economic settings at the project sites, possible key project components have been identified and presented in the Table 37

Table 37. Possible project components

Implementing bodies	- Farmers - Mai Son PMU
Products	- Household wood - Live stock's food - Crop's products - Bamboo shoot
Financing sources	- Loan from Banks - Self capital - Government budget

From the Table 37, it can be seen that for implementation bodies, two possible options were identified: the first option is farmers; Mai Son PMU is another possible project implementer. Four target products from agro-forestry models were identified; they are household wood, live stock's food, crops' products and bamboo shoot. There are three

possible options for financial sources in Son La Province: (1) loan from banks, (2) self capital and (3) government budget

Step 2 Preparation of a long-list of project options

A long-list of project concept alternative has been prepared by combining the three key project components. As combinations of the project components are mechanically done, project concept alternatives that are not likely to be implemented are also included. Therefore, only for production forest, project concept alternatives on the long-list are examined from a viewpoint of the physical feasibility of the alternatives. Consequently, twelve (12) project concept alternatives have been set up as shown in Table 38.

Table 38. The long-list of project options

No.	Implementing bodies	Target products	Financial sources	Select/ reject
1	Farmers	Household wood+ Live stock's food + Crop's products	Self capital	Reject
2	Farmers	Household wood+ Live stock's food + Crop's products	Loan from Banks	Reject
3	Farmers	Household wood+ Live stock's food + Crop's products	Government budget	Reject
4	Farmers	Bamboo shoot + Crop's products	Self capital	Reject
5	Farmers	Bamboo shoot + Crop's products	Loan from Banks	Reject
6	Farmers	Bamboo shoot + Crop's products	Government budget	Reject
7	Mai Son PMU	Household wood+ Live stock's food + Crop's products	Self capital	Reject
8	Mai Son PMU	Household wood+ Live stock's food + Crop's products	Loan from Banks	Select
9	Mai Son PMU	Household wood+ Live stock's food + Crop's products	Government budget	Reject
10	Mai Son PMU	Bamboo shoot + Crop's products	Self capital	Reject
11	Mai Son PMU	Bamboo shoot + Crop's products	Loan from Banks	Select
12	Mai Son PMU	Bamboo shoot + Crop's products	Government budget	Reject

Step 3 Preparation of a short-list of project options

Project concept alternatives on the long-list are examined on their feasibilities in terms of institutional, technical and economic aspects.

(1) Technical aspect

a) As methods for short-term operations such as planting, tending, harvesting, etc. have been considerably confirmed, there are no specific problems in this technical aspect.

b) Silvicultural technology has not been confirmed for long-term operations such as production of furniture wood, which requires more than 20 years period.

(2) Economical aspect

As for Government budget and Self capital, it is not sure to get sufficient amount for conducting project activities. Therefore it is difficult to adopt these two as financing source

(3) Institutional aspect

Implementing body suppose to have a responsibility for attaining a project objectives. Farmers can participate in project activities such as planting, tending etc. However they can not engage a management of a project.

Then short-listed project options for agro-forestry are prepared as being shown in Table 39.

Table 39. Short-list of project options for Agro-forestry project in Son La

Project No	Implementing bodies	Target products	Financial sources
8	Mai Son PMU	Household wood + Live stock's food + Crop's products	Loan from Banks
11	Mai Son PMU	Bamboo shoot + Crop's products	Loan from Banks

Step 4 Option assessment and selection of the most feasible project option

In order to select the most feasible option from the short-listed project options, evaluation criteria for the project option evaluation are set up as in Table 40

Table 40. Criteria for evaluating project options

Category	Criteria	Indicator
Policy consideration	Balance among key policy considerations (economic efficiency, environmental sustainability and social equity)	Whether or not the project option takes into account three key policy considerations
Silvicultural technology	Appropriateness of operations	Whether or not the operations of the project option satisfy technological rationality
Market potential	Accessibility to market	Whether or not the targeted market accepts the products - Location of the market - Transportation network
Economic & financial evaluation	Profitability Rough estimate of profitability (cash inflow and outflow) based on the unit benefits and costs	Whether or not the project option yields profit - Project cost - Sales -Terms and conditions from financial sources -Project schedule
Environmental impact	Sensitive activity	Whether or not the operations of the project option affect environment such as river, soil and atmosphere
People's opinion	Priority of the people, people's need	Is the priority of the project option high among the people?
Social impact	Sensitive activity	Whether or not the operations of the project option affect people's life and how they affect their life? - Changes of traditional land tenure and land use -Widening of the socioeconomic gap - Negative impact on poverty, gender and ethnic minority
Comparison with similar afforestation projects in the past	Comparison with past practices (bad or good cases)	Whether or not the project option contain any lessons learned or bad practices of past projects

Based on data collected from field survey and analysis, each of the project options is examined if it satisfies the criteria and indicators in Table 40 above and the extent to which these criteria and indicators are satisfied. Each criterion was evaluated by scoring with 4 scales as follows:

For criteria being highly satisfied: 3

For criteria being satisfied: 2

For criteria not being satisfied:

1For criteria not being satisfied at all: 0

The option evaluation results are presented in the table 41.

Table 41. The option evaluation results

Criteria	Project Option Number	
	8	11
Policy consideration	2	2
Silvicultural technology	3	2
Market potential	3	2
Economic & financial evaluation	2	2
Environmental impact	2	2
People's opinion	3	2
Social impact	3	2
Comparison with similar afforestation projects in the past	2	2
Total score	20	16
Evaluation results	Most feasible option	

It can be seen from the table 41 that the most feasible project option is option No.8 with which the key components as follows:

Implementer: Mai Son PMU

Financial Source: Bank loans

Target products: Household wood, live stock's food and crop's products

Appendix III: Parameter tables for Financial & Economic analysis

(1) Technical & Economic Norms for afforestation

No.	Item	Unit	Norm/ha	Unit price	Note
I	Afforestation materials				
1	Seedling for Dendro (incl. additional Planting)	tree	460	2,500	
	Seedling for Melia (incl. additional Planting)	tree		350	
2	Maize variety	Kg/ha	10	22,000	
3	NPK fertiliser (Dendro + Melia)	kg	700	2,200	
II	Labour wage – day	VND/man-day		40,000	
III	Sale unit price				
1	Wood (stumpage price)	VND/m3		600,000	
2	Firewood (stumpage price)	VND/ster		90,000	
3	Dendrocalamus (per stem)	VND/tree		5,000	
IV	Cost norm				
1	Designing cost	manday/ha	8	40,000	
a	Afforestation	đ/ha	7	40,000	
b	Forest tending	đ/ha/year	1	40,000	
2	Administration fee (in comparing to labour wage)			10%	
VI	Estimated volume				
1	Wood material	M3/ha		70	
2	Firewood	ster/ha		20	
3	Dendrocalamus (stem)	tree/ha		1,200	
VI	Other indicators				
1	Expected inflationrate	%/year		5%	
2	Discount rate	%		14.4%	
3	Physical contingency	%		5%	
4	Bank interest rate	%/year		14.4%	
5	Time of borrowing	year		5	

(2) Parameters for Dendro. & Maize

No.	**Work item**	**Unit**	**QTY**	**Norm**	**Man-day**	**Unit price**	**Amount**
	Material/seedlings						
I	Year 1				193.0		8,169,877
1	Material cost						2,321,100
-	Cost for seedlings (Dendro.)	Tree	400	400		2,500	1,000,000
-	NKP fertiliser (for Dendro.)	Kg	400	0.5		2,200	1,100
-	Cost for variety (Maize)	Kg		10		22,000	220,000
-	NKP fertilizer (for Maize)	Kg		500		2,200	1,100,000
2	Cost for Labour				127.8		5,002,070
a	Planting tree						2,836,867
-	Vegetation clearing	m2/c	10,000	386	25.9	38,500	997,409
-	Hole digging	hố/c	400	11.8	33.9	38,500	1,305,085
-	Hole filling up	hố/c	400	97	4.1	38,500	158,763
-	Transporting & Planting (Dendro.)	Tree/c	400	41	9.8	38,500	375,610
b	Tending and protection in year 1				49.2		1,895,703
-	Tending first time (Dendro.)	m2/c	10,000	557	18.0	38,500	691,203
-	Land beating up for the first time (Dendro.)	Tree/c	400	28	14.3	38,500	550,000

No.	Work item	Unit	QTY	Norm	Man-day	Unit price	Amount
-	Prepare land for Maize	m2/c	6,000	500	12.0	38,500	462,000
-	Plant Maize	Kg/c	10	2	5.0	38,500	192,500
c	Protection in year 1	Man-day		7	7.0	38,500	269,500
3	Cost for other				9.0		846,707
-	Design for Plantation	Man-day			7.0	38,500	269,500
-	Check and hand over	Man-day			2.0	38,500	77,000
-	Administration fee = 10%(2+3)						500,207
II	Planting, Tending and Protecting in year 2				93.3		5,409,546
1	Material cost						1,470,000
-	Seedlings Dendro. Additional planting 15%	Tree	60	60		2,500	150,000
-	Cost for variety (Maize)	Kg		10		22,000	220,000
-	NKP fertilizer (bón Maize)	Kg		500		2,200	1,100,000
2	Cost for Labour				83.3		3,476,406
a	Planting tree						3,206,906
-	Tending twice (Dendro.)	m^2/c	20,000	557	35.9	38,500	1,382,406
-	Additional planting (Dendro.)	Tree/c	60	33	1.8	38,500	70,000
-	Land beating up twice (Dendro.)	Tree/c	800	28	28.6	38,500	1,100,000
-	Prepare land for Maize	m2/c	6,000	500	12.0	38,500	462,000
-	Plant Maize	Kg/c	10	2	5.0	38,500	192,500
b	Protection in year 2			7	7.0	38,500	269,500
3	Cost for other				3.0		463,141
-	Estimation for model tending	Man-day			1.0	38,500	38,500
-	Check and hand over	Man-day			2.0	38,500	77,000
-	Administration fee = 10%(2+3)						347,641
III	Tending and protection in year 3				74.5		3,142,596
1	Cost for Labour				71.5		2,751,906
-	Tending twice (Dendro.)	m^2/c	20,000	557	35.9	38,500	1,382,406
-	Land beating up twice (Dendro.)	Tree/c	800	28	28.6	38,500	1,100,000
-	Protection in	Man-day/ha/year		7	7	38,500	269,500
2	Cost for other				3.0		390,691
-	Estimation for model tending	Man-day			1.0	38,500	38,500
-	Check and hand over	Man-day			2.0	38,500	77,000
-	Administration fee = 10%(1)					38,500	275,191
IV	Protection in year 4	Man-day/ha/year		7	7.0	38,500	269,500
V	Protection in year 5			7	7.0	38,500	269,500
VI	Protection in year 6			7	7.0	38,500	269,500
VII	Protection in year 7			7	7.0	38,500	269,500
VI	Protection in year 8			7	7.0	38,500	269,500
VII	Protection in year 9			7	7.0	38,500	269,500
VI	Protection in year 10			7	7.0	38,500	269,500
VII	Protection in year 11			7	7.0	38,500	269,500

(3) Parammeters for Melia. & Maize model

Work item	Unit price	Unit	QTY	Unit	Amount/ha	Unit
Material, seedlings					5,205,000	
First year					3,780,000	
Tổng seedlings					920,000	
Cost for seedlings (Melia.)	350	VND	2000	Tree	700,000	VND
Cost for variety (Maize)	22000	VND	10	Kg	220,000	VND
Total quantity of input materials					2,860,000	
NKP fertiliser (bón lót Melia.)	2200	VND	800	Kg	1,760,000	VND
NKP fertiliser (bón Maize)	2200	VND	500	Kg	1,100,000	VND
Second year					1,425,000	
Total of seedlings					325,000	
Seedlings Melia. Additional planting 15%	350	VND	300	Tree	105,000	VND
Cost for variety (Maize)	22000	VND	10	kg	220,000	VND
NKP fertilizer (for Maize)	2200	VND	500	kg	1,100,000	VND
Labor wage per man-day	40.000	VND/Day			13,890,023	
Year 1					**5,692,098**	
Planting tree			60.0		2,401,066	
Vegetation clearing	40.000	VND	25.9	Man-day	1,036,269	VND
Hole digging	40.000	VND	15.2	Man-day	606,061	VND
Hole filling up + fertilized	40.000	VND	6.4	Man-day	255,591	VND
Transport and Plant tree (Melia.)	40.000	VND	12.6	Man-day	503,145	VND
Tending		VND	49.2	Man-day	2,166,296	VND
Tending first time (Melia.)	40.000	VND	18.0	Man-day	718,133	VND
Land beating up first time (Melia.)	40.000	VND	10.2	Man-day	408,163	VND
Prepare land for Maize	40.000	VND	12.0	Man-day	480,000	VND
Plant Maize + Tend	40.000	VND	14.0	Man-day	560,000	VND
Protection in year 1	40.000	VND	7.0	Man-day	280,000	VND
Cost for other	40.000	VND	9.0	Man-day	844,736	VND
Design for Plantation	40.000	VND	7.0	Man-day	280,000	VND
Check and hand over	40.000	VND	2.0	Man-day	80,000	VND
Administration fee (10% Cost for direct management)					484,736	VND
Year 2					**4,172,074**	
Planting tree			85.1		3,403,703	
Tending twice (Melia.)	40.000	VND	35.9	Man-day	1,436,266	VND
Additional planting (Melia.)	40.000	VND	2.8	Man-day	111,111	VND
Land beating twice (Melia.)	40.000	VND	20.4	Man-day	816,327	VND
Prepare land for Maize	40.000	VND	12.0	Man-day	480,000	VND
Plant Maize + Tend	40.000	VND	14.0	Man-day	560,000	VND
Protection in year 2	40.000	VND	7.0	Man-day	280,000	VND
Cost for other	40.000	VND	3.0	Man-day	488,370	VND
Estimation for model tending	40.000	VND	1.0	Man-day	40,000	VND
Check and hand over	40.000	VND	2.0	Man-day	80,000	VND
Administration fee (10% Cost for trực tiếp)	40.000	VND			368,370	VND
Year 3					**2,905,851**	**VND**
Cost for Labour			63.3		2,532,592	VND
Tending twice (Melia.)	40.000	VND	35.9	Man-day	1,436,266	VND
Land beating up twice (Melia.)	40.000	VND	20.4	Man-day	816,327	VND
Protection in	40.000	VND	7.0	Man-day	280,000	VND
Cost for other	40.000	VND	3.0	Man-day	373,259	VND

Work item	Unit price	Unit	QTY	Unit	Amount/ha	Unit
Estimation for model tending	40.000	VND	1.0	Man-day	40,000	VND
Check and hand over	40.000	VND	2.0	Man-day	80,000	VND
Administration fee (10% Cost for Direct management)					253,259	VND
Year 4	**40.000**	**VND**	**7**	**Man-day**	**280,000**	**VND**
Year 5	**40.000**	**VND**	**7**	**Man-day**	**280,000**	**VND**
Year 6	**40.000**	**VND**	**7**	**Man-day**	**280,000**	**VND**
Year 7	**40.000**	**VND**	**7**	**Man-day**	**280,000**	**VND**

Appendix IV: Land productivity class

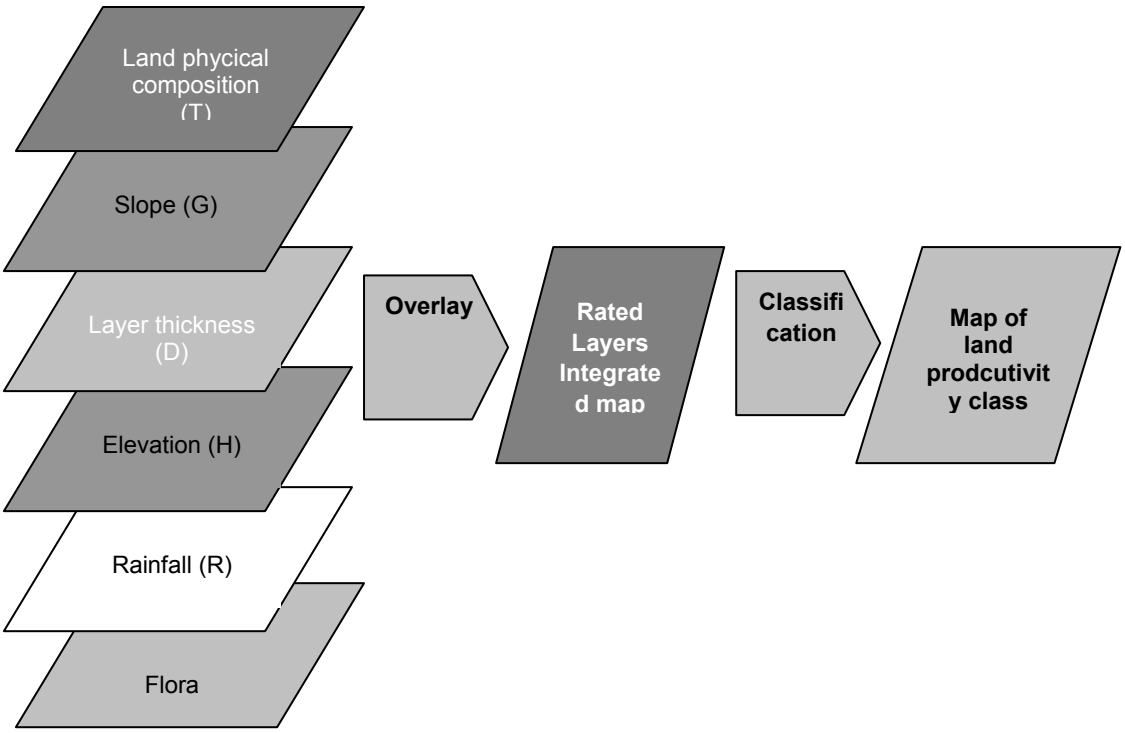
Productivity of land in project area is defined on the basic of 6 factors namely: (1) land physical composition, symbolized as T; (2) slope as G; (3) thickness of soil layer as D; (4) absolute elevation as H; (5) rainfall as R; (6) and status of vegetation cover. Productivity class of land is identified by overlaying mono-attribute maps. Each mono-attribute map displays one said factor.

On the mono-attribute map, characteristic of each factor shall be classified into different level corresponding to a value of a certain point. For example, slope is clustered into 4 levels of which: class (1) < 15^o, marked with 6 points; class (2) from 15^o - 25^o, marked with 3 points; class (3) from 25^o - 35^o, marked with 2 points; class (4) > 35^o, given with 0.5 point. Similarly, other factors shall be clustered and given with marks as mentioned in table below.

Table 42. Notes on land productivity class

Factor	Indicator	Symbol	Mark
Land physical composition (T)	Light earth and medium earth	T1	4
	Light clay and medium clay	T2	3
	Sandy mixed soil	T3	2
	Heavy clay or sandy soil	T4	1
Slope (G)	< 15^0	G1	4 x 1.5 = 6
	15 - 25^0	G2	3
	25 - 35^0	G3	2
	> 35^0	G4	1 x 0.5 = 0.5
Thickness of soil layer D	> 100 cm	D1	4 x 1.5 = 6
	50 - 100 cm	D2	3
	< 50 cm	D3	2
	Open rock	D4	1 x 0.5 = 0.5
Absolute elevation H	< 300 m, plain	H1	4
	300 - 700 m	H2	3
	700 – 1000 m	H3	2
	> 1000 m	H4	1
Rainfall R	> 2000 mm	R1	4
	1500 - 2000 mm	R2	3
	1000 - 1500 mm	R3	2
	< 1000 mm	R4	1
Status of vegetation cover. Regenerated tree ≥ 1m	> 1000 tree/ha, Acacia forest, indigenous forest	Ic, K	4
	300 – 1000 tree/ha	IB1	3
	< 300 tree/ha	IB2	2
	No existing vegetation, Eucalyptus forest	Ia	1

Upon the preparation of mono-attribute map, implement the overlaying of them. Result of this work will be the integrated map with rated layers that contains all of above factors. The overlaying process is described as below:



Integrated map is divided by 4 levels according to rating table. Land class shall reflect production potential of that land unit. Rating table for defining land class is mention below:

Productivity class I is a land unit with high production potential: total marks >22.

Productivity class II is a land unit with medium production potential: total marks ranges from 16-22.

Productivity class III is a land unit with low production potential: total marks ranges from 10-16.

Productivity class IV is a land unit without production potential: total marks <10.

Class I has a high potential for production with highest productivity, lowest slope, high rainfall, low attitude, large thickness of soil layer and vegetation cover is in good condition;

Class II is where of medium elevation, slope, soil layer thickness, rainfall and vegetation cover;

Class III is where of high slope, large attitude, low rainfall, low thickness of soil layer, vegetation cover is in bad condition; and tree productivity on this land is rather low;;

Class IV is where of very steep land, there's existing only clay or sandy soil with low thickness of soil layer, opened rocks are redundant, low rainfall, high elevation. No production can be maintained on this land.

Appendix V: Afforestation plan

Table 43. Afforestation plan as per Sub-plot and per year of villages

Unit: ha.

Location	Model - progress	
	Dendrocalamus and Maize	**Melia azedarach and Maize**
I. In year 2008	45.72	47.16
1. Pa Dong village	-	*47.16*
Sub Block 304C , Plot 5 , Sub-plot a		17.15
Sub Block 304C , Plot 5 , Sub-plot e		30.01
2. Hoc village	*45.72*	-
Sub Block 301B , Plot 4 , Sub-plot c	20.55	
Sub Block 301B , Plot 4 , Sub-plot i	6.31	
Sub Block 301B , Plot 4 , Sub-plot e	18.86	
II. In year 2009	78.03	67.14
1. Hoc village	*36.80*	-
Sub Block 301B , Plot 5 , Sub-plot f	17.39	
Sub Block 301B , Plot 5 , Sub-plot t	10.00	
Sub Block 301B , Plot 5 , Sub-plot i	4.85	
Sub Block 301B , Plot 5 , Sub-plot e	4.56	
2. Mong village	*41.23*	-
Sub Block 323A , Plot 1 , Sub-plot a	14.26	
Sub Block 323A , Plot 1 , Sub-plot c	14.18	
Sub Block 323A , Plot 1 , Sub-plot f	3.86	
Sub Block 323A , Plot 2 , Sub-plot i	8.93	
3. Pa Dong village	-	*29.90*
Sub Block 323B , Plot 1 , Sub-plot b		7.30
Sub Block 323B , Plot 1 , Sub-plot d		16.16
Sub Block 323B , Plot 1 , Sub-plot g		6.44
4. San village	-	*37.24*
Sub Block 323B , Plot 5 , Sub-plot d1		1.84
Sub Block 323B , Plot 5 , Sub-plot d2		3.16
Sub Block 323B , Plot 5 , Sub-plot d3		2.23
Sub Block 323B , Plot 5 , Sub-plot e		11.74
Sub Block 323B , Plot 5 , Sub-plot i		18.27
III. In year 2010	59.04	41.85
1. Mong village	*59.04*	-
Sub Block 323A , Plot 4 , Sub-plot b	29.65	
Sub Block 323A , Plot 4 , Sub-plot e	29.39	
2. San village	-	*41.85*
Sub Block 323B , Plot 5 , Sub-plot h1		3.24
Sub Block 323B , Plot 5 , Sub-plot h2		4.45
Sub Block 323B , Plot 5 , Sub-plot h3		1.94
Sub Block 323B , Plot 5 , Sub-plot l		5.53
Sub Block 323B , Plot 7 , Sub-plot b		7.25

Location	Model - progress	
	Dendrocalamus and Maize	**Melia azedarach and Maize**
Sub Block 323B , Plot 7 , Sub-plot d		19.44
III. In year 2011	-	77.04
1. San village	-	*77.04*
Sub Block 323B , Plot 7 , Sub-plot c		16.11
Sub Block 323B , Plot 7 , Sub-plot f		18.84
Sub Block 323B , Plot 7 , Sub-plot g		23.73
Sub Block 323B , Plot 7 , Sub-plot h		18.36

Appendix VI: Harvesting plan

Year – Harvesting location	Progress				
	Dendrocalamus		**Melia azedarach**		
	Area (ha)	**Volume (stem)**	**Area (ha)**	**Timber (m3)**	**Firewood (Ste)**
I. In year 2013					
1. Hoc village	*45.72*	*54,864*			
Sub Block 301B , Plot 4 , Sub-plot c	20.55	24,660			
Sub Block 301B , Plot 4 , Sub-plot i	6.31	7,572			
Sub Block 301B , Plot 4 , Sub-plot e	18.86	22,632			
II. In year 2014					
1. Hoc village	*82.52*	*99,024*			
Sub Block 301B , Plot 4 , Sub-plot c	20.55	24,660			
Sub Block 301B , Plot 4 , Sub-plot i	6.31	7,572			
Sub Block 301B , Plot 4 , Sub-plot e	18.86	22,632			
Sub Block 301B , Plot 5 , Sub-plot f	17.39	20,868			
Sub Block 301B , Plot 5 , Sub-plot t	10	12,000			
Sub Block 301B , Plot 5 , Sub-plot i	4.85	5,820			
Sub Block 301B , Plot 5 , Sub-plot e	4.56	5,472			
2. Mong village	*41.23*	*49,476*			
Sub Block 323A , Plot 1 , Sub-plot a	14.26	17,112			
Sub Block 323A , Plot 1 , Sub-plot c	14.18	17,016			
Sub Block 323A , Plot 1 , Sub-plot f	3.86	4,632			
Sub Block 323A , Plot 2 , Sub-plot i	8.93	10,716			
III. In year 2015					
1. Pa Dong village			*47.16*	*3,301.20*	*943.2*
Sub Block 304C , Plot 5 , Sub-plot a			17.15	1,200.50	343.0
Sub Block 304C , Plot 5 , Sub-plot e			30.01	2,100.70	600.2
3. Mong village	*100.27*	*120,324*			
Sub Block 323A , Plot 4 , Sub-plot b	29.65	35,580			
Sub Block 323A , Plot 4 , Sub-plot e	29.39	35,268			
Sub Block 323A , Plot 1 , Sub-plot a	14.26	17,112			
Sub Block 323A , Plot 1 , Sub-plot c	14.18	17,016			
Sub Block 323A , Plot 1 , Sub-plot f	3.86	4,632			
Sub Block 323A , Plot 2 , Sub-plot i	8.93	10,716			
4. Hoc village	*82.52*	*99,024*			
Sub Block 301B , Plot 4 , Sub-plot c	20.55	24,660			
Sub Block 301B , Plot 4 , Sub-plot i	6.31	7,572			
Sub Block 301B , Plot 4 , Sub-plot e	18.86	22,632			
Sub Block 301B , Plot 5 , Sub-plot f	17.39	20,868			
Sub Block 301B , Plot 5 , Sub-plot t	10	12,000			
Sub Block 301B , Plot 5 , Sub-plot i	4.85	5,820			
Sub Block 301B , Plot 5 , Sub-plot e	4.56	5,472			
III. In year 2016					
1. Pa Dong village			*29.90*	*2,093.00*	*598.0*
Sub Block 323B , Plot 1 , Sub-plot b			7.30	511.00	146.0
Sub Block 323B , Plot 1 , Sub-plot d			16.16	1,131.20	323.2
Sub Block 323B , Plot 1 , Sub-plot g			6.44	450.80	128.8
2. San village			*37.24*	*2,606.80*	*744.8*
Sub Block 323B , Plot 5 , Sub-plot d1			1.84	128.80	36.8

Year – Harvesting location	Progress				
	Dendrocalamus		**Melia azedarach**		
	Area (ha)	**Volume (stem)**	**Area (ha)**	**Timber (m3)**	**Firewood (Ste)**
Sub Block 323B , Plot 5 , Sub-plot d2			3.16	221.20	63.2
Sub Block 323B , Plot 5 , Sub-plot d3			2.23	156.10	44.6
Sub Block 323B , Plot 5 , Sub-plot e			11.74	821.80	234.8
Sub Block 323B , Plot 5 , Sub-plot i			18.27	1,278.90	365.4
3. Hoc village	*82.52*	*99,024*			
Sub Block 301B , Plot 4 , Sub-plot c	20.55	24,660			
Sub Block 301B , Plot 4 , Sub-plot i	6.31	7,572			
Sub Block 301B , Plot 4 , Sub-plot e	18.86	22,632			
Sub Block 301B , Plot 5 , Sub-plot f	17.39	20,868			
Sub Block 301B , Plot 5 , Sub-plot t	10	12,000			
Sub Block 301B , Plot 5 , Sub-plot i	4.85	5,820			
Sub Block 301B , Plot 5 , Sub-plot e	4.56	5,472			
4. Mong village	*100.27*	120,324			
Sub Block 323A , Plot 1 , Sub-plot a	14.26	17,112			
Sub Block 323A , Plot 1 , Sub-plot c	14.18	17,016			
Sub Block 323A , Plot 1 , Sub-plot f	3.86	4,632			
Sub Block 323A , Plot 2 , Sub-plot i	8.93	10,716			
Sub Block 323A , Plot 4 , Sub-plot b	29.65	35,580			
Sub Block 323A , Plot 4 , Sub-plot e	29.39	35,268			
III. In year 2017					
2. San village			*41.85*	*2,929.50*	*837.00*
Sub Block 323B , Plot 5, Sub-plot h1			3.24	226.80	64.8
Sub Block 323B , Plot 5 , Sub-plot h2			4.45	311.50	89.0
Sub Block 323B , Plot 5 , Sub-plot h3			1.94	135.80	38.8
Sub Block 323B , Plot 5 , Sub-plot l			5.53	387.10	110.6
Sub Block 323B , Plot 7 , Sub-plot b			7.25	507.50	145.0
Sub Block 323B , Plot 7 , Sub-plot d			19.44	1,360.80	388.8
2. Hoc village	*82.52*	99,024			
Sub Block 301B , Plot 4 , Sub-plot c	20.55	24,660			
Sub Block 301B , Plot 4 , Sub-plot i	6.31	7,572			
Sub Block 301B , Plot 4 , Sub-plot e	18.86	22,632			
Sub Block 301B , Plot 5 , Sub-plot f	17.39	20,868			
Sub Block 301B , Plot 5 , Sub-plot t	10	12,000			
Sub Block 301B , Plot 5 , Sub-plot i	4.85	5,820			
Sub Block 301B , Plot 5 , Sub-plot e	4.56	5,472			
2. Mong village	*100.27*	120,324			
Sub Block 323A , Plot 1 , Sub-plot a	14.26	17,112			
Sub Block 323A , Plot 1 , Sub-plot c	14.18	17,016			
Sub Block 323A , Plot 1 , Sub-plot f	3.86	4,632			
Sub Block 323A , Plot 2 , Sub-plot i	8.93	10,716			
Sub Block 323A , Plot 4 , Sub-plot b	29.65	35,580			
Sub Block 323A , Plot 4 , Sub-plot e	29.39	35,268			
III. In year 2018					
1. San village			*77.04*	*5392.8*	*1540.8*
Sub Block 323B , Plot 7 , Sub-plot c			16.11	1,127.70	322.2
Sub Block 323B , Plot 7 , Sub-plot f			18.84	1,318.80	376.8
Sub Block 323B , Plot 7 , Sub-plot g			23.73	1,661.10	474.6

Year – Harvesting location	Progress				
	Dendrocalamus		**Melia azedarach**		
	Area (ha)	**Volume (stem)**	**Area (ha)**	**Timber (m3)**	**Firewood (Ste)**
Sub Block 323B , Plot 7 , Sub-plot h			18.36	1,285.20	367.2
2. Hoc village	*82.52*	*99,024*			
Sub Block 301B , Plot 4 , Sub-plot c	20.55	24,660			
Sub Block 301B , Plot 4 , Sub-plot i	6.31	7,572			
Sub Block 301B , Plot 4 , Sub-plot e	18.86	22,632			
Sub Block 301B , Plot 5 , Sub-plot f	17.39	20,868			
Sub Block 301B , Plot 5 , Sub-plot t	10	12,000			
Sub Block 301B , Plot 5 , Sub-plot i	4.85	5,820			
Sub Block 301B , Plot 5 , Sub-plot e	4.56	5,472			
2. Mong village	*100.27*	*120,324*			
Sub Block 323A , Plot 1 , Sub-plot a	14.26	17,112			
Sub Block 323A , Plot 1 , Sub-plot c	14.18	17,016			
Sub Block 323A , Plot 1 , Sub-plot f	3.86	4,632			
Sub Block 323A , Plot 2 , Sub-plot i	8.93	10,716			
Sub Block 323A , Plot 4 , Sub-plot b	29.65	35,580			
Sub Block 323A , Plot 4 , Sub-plot e	29.39	35,268			
Total volume of products within harvesting period		1,080,756		20,137.95	5,753.70

Training Package

Book 1:	Training Plan on Capacity Building for Preparing Feasibility Studies and Implementation Plans for Production Forest/Agroforestry Development Projects in Vietnam
Book 2:	Manual for Preparation of Feasibility Study Reports for Production Forest/Agroforestry Development Projects in Vietnam
Book 3:	Manual for Preparation of Implementation Plans for Production Forest/Agroforestry Development Projects in Vietnam
Book 4:	Model F/S of Thai Nguyen Province
	Book 4-1: Model Feasibility Study Report for Smallholder Production Forest Development Project in Thai Nguyen Province
	Book 4-2: Model Feasibility Study Report for Agroforestry Development Project in Thai Nguyen Province
Book 5:	Model IP of Thai Nguyen Province
	Book 5-1: Model Implementation Plan for Smallholder Production Forest Development Project in Thai Nguyen Province
	Book 5-2: Model Implementation Plan for Agroforestry Development Project in Thai Nguyen Province
Book 6:	Monitoring and Evaluation Report on Technical Training of Participating Provinces
Book 7:	Market Trend Reference Book on Wood-based and Agroforestry Products
Book 8:	Feasibility Study Reports of Participating Provinces
	Book 8-1: Feasibility Study Report on Agroforestry Project in Ta Hoc Commune, Mai Son District, Son La Province
	Book 8-2: Feasibility Study Report on Production Forest Establishment Project in Nui Thanh District, Quang Nam Province
	Book 8-3: Feasibility Study Report on Treatment of Exhausted Natural Forest and Production Forest Establishment Project in Da Teh District, Lam Dong Province
	Book 8-4: Feasibility Study Report on Afforestation Project for Serving Biodiversity Conservation in Long An Province
Book 9:	Implementation Plans of Participating Provinces
	Book 9-1: Implementation Plan on Agroforestry Project in Ta Hoc Commune, Mai Son District, Son La Province
	Book 9-2: Implementation Plan on Production Forest Establishment Project in Nui Thanh District, Quang Nam Province
	Book 9-3: Implementation Plan on Treatment of Exhausted Natural Forest and Production Forest Establishment Project in Da Teh District, Lam Dong Province
	Book 9-4: Implementation Plan on Afforestation Project for Serving Biodiversity Conservation in Long An Province

Ministry of Agriculture
and Rural Development

Japan International
Cooperation Agency

DEPARTMENT OF FORESTRY

Feasibility Study Report

on Production Forest Establishment Project in Nui Thanh District, Quang Nam Province

Book 8-2: FS Quang Nam

THE DEVELOPMENT STUDY ON CAPACITY BUILDING
FOR PREPARING FEASIBILITY STUDIES AND IMPLEMENTATION PLANS
FOR AFFORESTATION PROJECTS IN THE SOCIALIST REPUBLIC OF VIETNAM
---FICAB---

- March 2008 -

Preface

The present report is prepared as one volume of the training package under the development study on capacity building for preparing feasibility studies and implementation plans for afforestation projects in the Socialist Republic of Vietnam (hereinafter referred to as "the Study") was defined in the Scope of Work, signed between the Government of Vietnam (GOV) and Government of Japan on December 2004.

The object of the Study is to strengthen the overall capacities of the governmental institutions for preparing Feasibility Studies (F/S) and Project Implementation Plans (PIP) for afforestation projects in order to facilitate investments in the forestry sector financed by the GOV as well as international/regional financial institutions, bilateral donors and private investors.

The Study was divided into two phases. Phase I was to prepare a model F/S and PIP as well as a training package at Thai Nguyen province as a core province (CoP). The second phase was to implement technical training to staff members of other four provinces as participating provinces (PPs), Son La Province, Quang Nam Province, Lam Dong Province, and Long An Province, by using the model F/S, PIP and the training materials.

Through conducting the Study, four outputs have been obtained. 1st output is an enhanced capacity of MARD staff members. Selected staff members of MARD develop administrative and coordination capacities for supervising the quality of F/S and IP. 2nd is an enhanced capacity of CoP and PPs staff members. Selected staff members of the CoP and PPs enhance the capacities for preparing F/Ss and IP. 3rd output is development of monitoring and evaluation methods for preparation of F/Ss and IP. 4th output is development of a training package for conducting technical training on preparing feasibility studies and implementation plans for afforestation projects.

The training package is prepared as one of the four above forms of output of the FICAB. The entire training package comprises the following nine (9) books:

Book 1: Training plan
Book 2: Manual for preparation of feasibility study reports for production forest / agroforestry development projects in Vietnam
Book 3: Manual for preparation of implementation plans for production forest / agroforestry development projects in Vietnam
Book 4: Model F/S of Thai Nguyen Province
Book 5: Model IP of Thai Nguyen Province
Book 6: Monitoring and evaluation report on technical training of PPs
Book 7: Market trend reference book on wood-based and agroforestry products
Book 8: F/S reports of Son La, Quang Nam, Lam Dong, and Long An Provinces
Book 9: IPs of Son La, Quang Nam, Lam Dong, and Long An Provinces

'Book 8-2' was prepared by the Provincial Study Team of Quang Nam Province under the guidance of local consultant engineers.

Map 1: Location of Quang Nam Province

Map 2: Proposed Project Area in Nui Thanh, Quang Nam

Map 3: Five-Proposed Project Commune

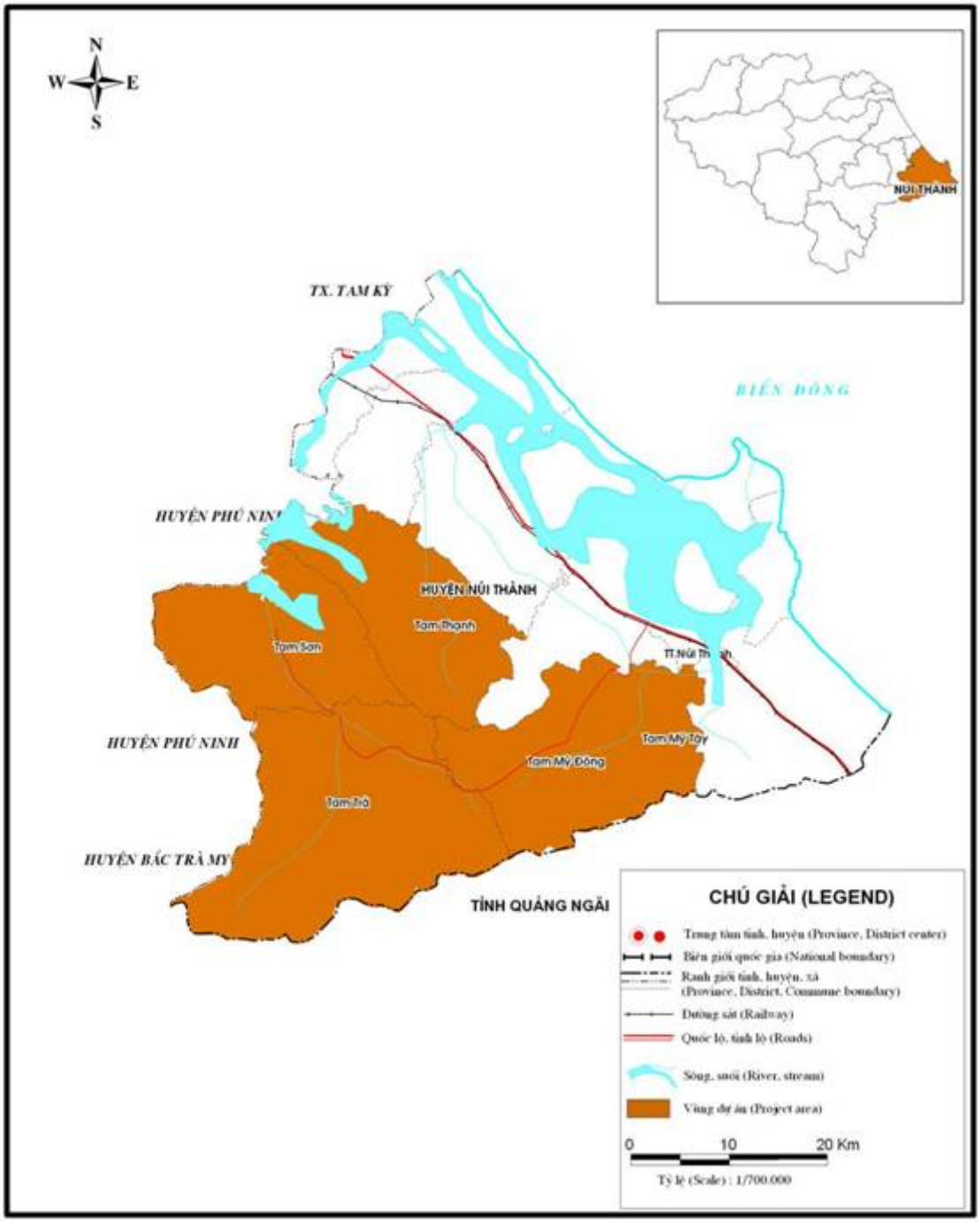


Table of contents

List of Maps

List of Figures

List of Tables

Abbreviation

5MHRP	5 million ha programme
CPC	Commune People's Committee
DoF	Department of Forestry
DPC	District People's Committee
DSF	Development Support Fund
FIPI	Forest Inventory and Planning Institute
GOV	Government of Vietnam
MARD	Ministry of Agriculture and Rural Development
MoF	Ministry of Finance
MPI	Ministry of Planning and Investment
PIU	Project Implementation Unit
PMB	Project Management Board
PPC	Province People's Committee
SFE	State Forest Enterprise
ST	Study Team
Sub-DoF	Sub-Department of Forestry
TOT	Transfer of Technology

Summary

Part I Project Background

1 Context of Project Formulation

According to the report from the Pulp and Paper Sector of Vietnam the demand for pulp of Vietnam as of 2020 is 3.5 million ton, or 10 million m^3 of material timber. However, existing forests for timber materials cover only 60% of the timber demand of the pulp sector. According to assessment of national and international specialist, Quang Nam province in particular and the South Central Region of Vietnam in general have good advantages in the development of forest fro timber material.

2 Natural and Socio-economic Conditions

The proposed project area (PA) is in the west of Nui Thanh district, and consists of 5 communes: Tam My Dong, Tam My Tay, Tam Son, Tam Tra and Tam Thanh. Total area of the project is 283.6 km^2, or 55% of Nui Thanh district. The topography in the PA can be divided into 3 types: Mountainous type (9,000 ha), Hilly type (16,000 ha) and Plain type (3,000 ha). There are 3 main soil types groups in the PA: (i)Ferralite of the medium mountain , (ii) Ferralite of low mountain, (iii) Hilly Ferralite. The production potential of soil types in the PA is rather high. The climate of Nui Thanh district has 2 seasons that consist of the dry season from January to August and rainy season from September to December. Annual mean temperatures is 25.7^0C and annual rainfall is 2,879 mm/year that concentrates in 3 months of October, November and December accounting for 70% of annual rainfall.

The PA has 5,623 HHs with 23,885 inhabitants, or 16,56% of population of the district and each HH has 4 family members in average. The growth rate of population is 1.37%. There are 2 ethnic groups living in the PA, one group is the Kinh making up 96.3% and the other is Chor making up 3.7 %. Survey results show that average income of each HH is 21.0 million Dong per annum. The numbers of poverty HHs account for 39.6% of the total HHs in the PA, which is higher than the rate of poverty HHs of Nui Thanh district (28.3%). Agriculture production is the key source of income of people in the PA as well as Nui Thanh district. Forestry production brings about big income for HHs. Key species planted are Acacia hybrid, Acacia mangium, Eucalyptus and Pine. At present the forest land allocation to HHs is under implementation. Land allocation is not implemented in 3 communes and it is a big constraint for HHs to access to credit loan from the financial agencies.

In general transportation in the PA is fairly advantageous. Forest land area in the PA is 19,950ha covering 70% of the PA. Natural forest stock accounts for 78% of the total, although the most of the natural forest in the area is exhausted and regenerated forest. Plantation forest stock accounts for 22%, the average stock is roughly 29 m^3/ha, as most of the plantations are newly planted since 2001.

The demand for timber material grows very quickly, and the demand for material timber for processing mills in 2020 is estimated as 750,000ton. The potential clients of the project require up to 930,000 ton of material timber while the supply in the province can only meet half of it in the future. The demand for timber is going up, and the competition for materials among the mills make price increase.

3 Lessons Learnt

Considering the strength and weaknesses of afforestation projects which have been implementing in Quang Nam province, lessons are learned concerning project objectives, distributing information, farmer's volunteer, survey and assessment of land area for the

project, quality of seedling and technical measures for afforestation, working group, mechanism for credit loan, benefits and responsibilities of concerned parties, and regular checking.

4 Advantages and Constraints

The project area is located at a convenient location for goods exchange and close to timber processing mills in the Central, close to port and potential users of project products are available.

In 5 project communes, land allocation is under way in 2 communes (Tam My Dong, Tam My Tay), and in other 3 communes (Tam Tra, Tam Son, Tam Thanh) farmers do not have red book for land use. This is a difficulty for farmers to access to credits.

Part II Project Contents

1 Reasons for Project selection

Field survey results tell that local people wish to have a production afforestation project in their area and they will use their land and off-farm labors. In general, if the project is set up, the shortage of material in the coming is met while the project create job for local people.

2 Project Objectives

Overall objective of the project is to contribute to HH economic development by afforestation activities in 5 communes of Nui Thanh district. An immediate objective of the project is to improve the effectiveness of production afforestation project in 5 communes of Nui Thanh district, Quang Nam province.

3 Project Activities

(1) Project Components

The production afforestation project in 5 communes of Nui Thanh district has components consisting of (i) forestry land allocation, (ii) establishment of production forests, and (iii) management, supervision and evaluation

(2) Project Implementation Plan

Total area to be afforested with Acacia hybrid and Acacia mangium is 1,844ha and planting term is 4 years from 2008 to 2011. Seeds of Acacia mangium with clear background should be bought from local production, and seedling of Acacia mangium should be bought from nurseries certified by DARD. Logging plan is implemented in 2015 to 2018. Establishment or upgrading of nurseries is not planned.

4 Project Cost

Total cost of the project is 27.2 billion Dong (implementation term is 11 years from 2007 – 2018).

5 Financial Plan

To implement this project following 3 financial sources will be mobilized: (i) loan from Agriculture Bank of Nui Thanh district, (ii) farmers' own fund, and (iii) state budget. Total cost including bank interest is 37,220 million Dong and the cost consists of 56.2% of farmers' own fund, 40.1% of loan and 3.7% of state budget. Based on the income of HHs and investment cost norm per one ha of afforestation, it is estimated that each HH can borrow about 6 million Dong/ha. Project management fee is taken from the province budget (or district budget).

6 Project Management and Implementation

At the moment, Nui Thanh district has 661 afforestation PMB, and the 661 PMB will take the position of management of the project. At commune level the PIU will be responsible for day-to-day field activities.

7 Monitoring and Evaluation

The following indicators should be supervised: (i) established production forest area, (ii) yield of timber, (iii) income obtained from timber selling, (iv) created job, and (v) net income from afforestation.

Part III Evaluation of Project Effectiveness

1 Economic evaluation

(1) Financial Analysis

Outcomes of analysis show that both Acacia hybrid and Acacia mangium model are feasible with IRR index bigger than the rate of interest of loan. Outcomes of financial analysis on the point of view of total investment with model 1,844 ha show that the project is of high feasibility as the net benefit obtained is 8.48 billion Dong and IRR is 18.18%, which is bigger than the rate of interest of loan (14,16%).

(2) Economic Analysis

Economic effectiveness of the project is fairly high. The possibility of recovery of investment of the project is fairly high with the IRR of 23,7%, or 1.6 times bigger than the rate of interest of loan.

2 Evaluation of Environmental Impacts

Absorption and fixation of CO_2 in the form of organic substances contribute to the green house effect that makes warm the globe. Acacia hybrid and Acacia mangium forests have a dense canopy. The ground floor contains a good decomposed litter that helps retaining water. The project applies the method of clear cut (clear logged site is more than 450 ha/year), and intensive soil erosion is unavoidable in rainy season.

3 Evaluation of Social Impacts

By the end of the cycle, the net income of the HH will be 38 – 49 million Dong depending on tree species planted. Annual income of the HH increases by 6 million Dong, or by 30%. Economic gap between the rich and the poor may widen if HHs with higher income by the project buy land from other low income HHs. Women can participate in family and social activities and their role will be ever improved by the project.

4 Project Risks and Mitigation Measures

Although land use right certificate is necessary for borrowing money, only 3/5 of communes prepare the certificate. This area is very sensitive to fire. It is recommended to raise awareness to local people in use of fire in the forest. Quang Nam province suffers damage from typhoon often. It is recommended to plant Acacia hybrid in the site with the elevation lower than 100m and with the inclination less than 20^0. Pure species afforestation with large scale makes poor bio-diversity in the area with the result that chance for pests development increases. It is recommended to avoid to plant one species in the same place for a long period.

Part IV Conclusions and Recommendations

1 Conclusions

The project proposes to grow 1,844 ha of Acacia mangium and Acacia hybrid forest in 5 communes of Nui Thanh district. The lifetime of the project is from 2007 to 2018 and total investment to the project is 37,220 million Dong. After a cycle of management, the timber quantity will be 180,000 m^3 of timber material with the net benefit of 8,481 million Dong.

2 Recommendations

Nui Thanh DPC should speed up land allocation in 5 project communes. Financial agencies should carry out disbursement timely as planned. Nui Thanh DPC and DARD should assign this project to Nui Thanh Afforestation Project Management Board to manage.

PART I: BACKGROUND

1 Introduction

1.1 Context of project formulation

According to the Final Review Report of the 5 million Ha Programme (5MHRP) period 1998-2005 of MARD, the project of 5MHRP only focuses on the development of protection forest and special use forest using the State budget, while the production afforestation in period 1998 – 2005 only reaches 49% of the plan. The reason is that less consideration and limited lands planning is paid to this category while much attention is set for the other two categories say, protection and special use forests and farmer households (HH) meet with difficulty in accessing credit loans from the banks. On the other hand, there are risks and low benefits that cannot encourage farmers involving in afforestation. Therefore Vietnam cannot satisfy the demand of timber of processing mills at home and Vietnam has to import to fill the gap of timber deficiency annum. At present Vietnam has to import timber and total value reaches 600-800 million USD.

Facing with such the situation, the GOV and the forestry management agencies set up many policies for forest development such as checking and adjusting its planning of 3 forest categories in the way of increasing production forest and forest land area; allocating land use rights to farmer HHs and agencies practicing forest production; providing preferential credits for afforestation for timber raw materials; renewing the national and provincial forest development strategy. All modification of policy mentioned above of the GOV are aiming at the ensuring of materials for the timber processing industry for export.

The economic duty of the Vietnam Forestry Sector as to 2020 is afforesting 2.4 million ha in continuous area, and growing of about 200 million of scattered trees per year, production and supply 22 million m^3 of timber /year. The value of NTFP will be 800 million USD/Year. The rate of growth of forestry production will be 4-5%/Year, exporting value of forest products - 4 billion USD as of 2020 (Draft strategy of Vietnam Forestry).

The production of paper and pulp is part of task of timber processing industry, and this sector has biggest raw material timber demand. According to the report from the Pulp and Paper Sector of Vietnam the demand for pulp of Vietnam as of 2020 is 3.5 million ton, or 10 million m^3 of material timber. However, as for the situation of the establishment of forests for timber materials as the time being Vietnam can only cover 60% of the timber demand of the pulp sector.

Quang Nam is the South Central Region of Vietnam, and its total natural land is 10,000 km^2, of which forestry land accounts for 2/3 of the total. Total forested area of the province is 451,000 ha (natural forests: 388.000 ha; plantation forest: 71.000 ha). The forest coverage in Quang Nam province is about 43%.

According to assessment of national and international specialist, Quang Nam province in particular and the South Central Region of Vietnam in general have good advantages in the development of forest fro timber material. The advantages include:

(1) Distance from forest site to the mills, seaports is short (< 100 km), transportation (road, waterway, railway) is very good. This is the most advantageous point as transport cost accounts for > 20% of product selling price.

(2) Quang Nam province has abundant land resource for the development of production forests, the results of soil map construction show that, the topography is not so

steep, the inclination is < 25^0 accounting for > 30% land area of the province. This is the suitable site for production afforestation.

(3) The South Central Region of Vietnam and Quang Nam province has high rainfall annum (> 2000 mm/Year), high temperature, which is suitable for the growth and increment of different tree species

(4) Consumption market of timber of Quang Nam province is very big, at present, 4 big capacity production companies are operating that require 50.000 m^3 of timber from natural forests and 400.000 ton of timber from plantations. But, the supply capacity of forest at the moment is very limited, all natural forest timber is imported from other provinces and timber from plantation can only cover 60% of the demand of the mills.

Although, Quang Nam still does not bring into full play its advantages as mentioned above, at present the province has 342.000 ha of un-used hilly and mountain land, the causes for this is land allocation which is taking place slowly, lands planned for production afforestation is not reasonably; the accessibility to credit loans of farmers meets with difficulty; the support activity for production afforestation is not well implemented.

As said in the plan fro period 2006 – 2010, Quang Nam province will set up a pulp mill with capacity of 100.000 ton/Year, or 250.000 ton of timber, that results in serious timber shortage for pulp and chip production.

The Draft Forestry Strategy Development of Quang Nam province indicates that during the period 2006 - 2020 fund from national and international sources and including self-fund from farmer HHs will be mobilized to grow 50.000 ha of production forests, increase area of production forest up to 80.000 ha. Supplied timber material quantity annum is 750 – 800.000 ton, that satisfies the demand for processing of pulp and chip for export in the province

1.2 Legislation for project formulation

1.2.1 Legislating base

(1) Decision No. 148/2004/QĐ-TTg, 13 - 8 - 2004 on the main orientation for socio-economic development in the target economic zone of the Central Region as of 2010 and the Vision as of 2020, among which Quang Nam is one of the provinces.

(2) Decision No. 199/QĐ-BNN-PTNT, 22 - 1 - 2002 on Forestry Development of Vietnam in period 2001-2010 aiming at afforestation of 3.52 million ha, of which key economic forest is 1.8 million ha.

(3) Decision No. 47/QĐ-UBND, 25 - 9 - 2006, Quang Nam province PC on the provisional declaration of 3 forest categories planning.

1.2.2 Related Legislation Documents

(1) Circulation No. 28/1999/NO.-BTC, 13 - 3 - 1999 of the Ministry of Finance (MoF) on guiding the issuance of State budget for 5MHRP million ha as said in Decision No 661/QĐ-TTg, 29 - 7 -1998 TTg

(2) Based on he Document No. 279/BNN-PTNT 27 - 02 - 2003 of MARD on the guideline of investment norm for afforestation as said in document No. 95 CP-NN.

(3) Based on Decision No. 38/2005/QĐ-BN 6 - 7 - 2005 of MARD on the promulgation of labor cost norm for afforestation design, planting and tending

(4) Information Letter No. 1018/TC-NN&PTNT of inter sector Department of Finance (DoFi) – DARD of Quang Nam province on the price of seedlings for afforestation in 2004.

(5) Technical Regulation on intensive afforestation for some tree species as A. hybrid, A. mangium (National and Provincial level)

2. Natural and socioeconomic conditions

2.1 Natural conditions in the project area (PA)

2.1.1 Geographical location

Nui Thanh is situated in the southern most of Quang Nam province, and 25 km away from Tam Ky town (capital town of Quang Nam province).

The proposed project area (PA) is in the west of Nui Thanh district, of 5 communes: Tam My Dong, Tam My Tay, Tam Son, Tam Tra, Tam Thanh. The coordinates of the PA:

$108^0$26' - $108^0$40' ELo.

$15^0$19' - $15^0$29' NLa.

The north side of the PA borders to Tam Ky town and Phu Ninh; the south - Quang Ngai province; the east – delta communes of the district; the west - Bắc Trà My district.

The center of the PA is 15 km far from the highway No. IA, 20 km from Chu Lai Open Economic Zone and 40 km away from timber processing mill.

Total area of the project is 283,6 km^2, or 55% of Nui Thanh district or 2,8% of Quang Nam province.

2.1.2 Topographical characteristics

The PA has a complicated topography, low transection, average inclination of 20^0, and inclining southwest-northeast. The topography can be divided into 3 types:

(1) Mountainous type

Mountainous zone is of 9,000 ha (32% of the PA), and is located in the south and southwest of the PA, consisting of 2 sub-topography: low and medium mountain.

Medium mountain type is in the southwest of Tam Tra commune and the absolute elevation is 700 – 1,500 m, inclination - 25 - 35^0, strongly transected, with high peak as Hon Chua Peak (1.362 m), Nui Duc (1.324 m), and Nui Cat (1.132 m).

Low mountain type is in the west and southwest of Tam Tra, at the elevation of 300 m to 700 m, inclination - 20 - 30^0, low transected, and inclining southwest-northeast, the vegetation is mainly natural forests with different forests: medium - (IIIA2); poor forest - (IIIA1); regenerated forest - (IIA, IIB).

(2) Hilly zone

The hilly zone is of about 16,000 ha (or 57% of the PA), less complicated topography, low transected, mainly plantations, cash crops, swidden land and here and there regenerated forests existing. The absolute elevation is 50 – 200 m, and mean inclination is 15 - 20^0. This zone is advantageous for production afforestation.

(3) Plain zone

The plain zone is of 3,000 ha (or 11%), rather flat and close to the riverside, concentrating in Tam My Dong and Tam My Tay communes.

So the PA is favorable for forestry development as the elevation and inclination are suitable for production afforestation.

2.1.3 Soil characteristics

(1) Mother rock

According to results of soil survey in Quang Nam province and site survey of the study team (ST), soil in the PA is consisting of 2 types of mother rocks:

- Group of magma acid consisting of Granite, Liparit and Pocfia.
- Groups of clay and metamorphism consisting of Gneiss, Filit and micaschit.

(2) Soil type characteristics

There are 3 main soil types groups in the PA:

(i) Ferralite of the medium mountain developed on Magma acid, clay and metamorphism

Ferralite of the medium mountain is mainly distributed in the south and southwest of Tam My Dong, Tam My Tay and Tam Tra commune, at the elevation of 800 m upward. The soil depth is 30 – 40 cm, mixed with rocks (>30%), good humus layer as most of the area is covered by natural forests. This land form is not suitable to production afforestation.

(ii) Ferralite of low mountain developed on Magma acid, clay and metamorphism Ferralite of low mountain is in communes of Tam My Dong, Tam Tra, Tam Son, at the elevation of 300 – 500 m. The soil depth is 55 – 75 cm, and the rate of mixed rocks is 10 – 20%, mean humus layer (10 – 15 cm). This soil type is covered by natural and plantation forests. Part of this type can be used for production afforestation.

(iii) Hilly Ferralite develops on Magma acid, clay and metamorphism

The Hilly Ferralite is in commune Tam Thanh, at the elevation of 150 m, inclination - 15^0. Soil depth is 70 – 80 cm, rate of mixed rock is < 10%, poor humus layer or no humus layer and is covered by plantations and cash crop plantation. This soil type is most suitable for production afforestation due to a long time of cultivation.

(iv) Alluvium

The alluvium concentrates in the east and southeast of 2 communes namely Tam My Dong and Tam My Tay and small parts lying in valley of 3 communes of Tam Tra, Tam Son and Tam Thanh. Most of this soil type is planned for afforestation annum.

(3) Assessment of the potential of forestry land

(i) Assessment method

Assessment of production potential of soil bases upon the classification of suitability for production afforestation and scoring using 6 factors: Texture (T), Inclination (G), Depth (D), Vegetation state, Absolute elevation (H), Mean rainfall annum (R) (Table 1.1)

Base on total sores of stands, classification of production potential of soil types by 4 classes as follow (Table 1.2):

- High production potential stand: > 22
- Medium production potential stand: 16 - 22
- Low production potential stand: 10 - 16
- No production potential stand: ≤ 10

(i) Entities involved in the assessment

- Plantation sites
- No plantation sites
- Forestry land is in using for paddy rice.

(ii) Assessment results

Table 1.1 Results of assessment of soil potential

No	Production potential	Total (ha)	By commune				
			Tam My Dong	Tam My Tay	Tam Son	Tam Thanh	Tam Tra
	Total	**10.930.6**	**588.5**	**2.284.1**	**2.957.5**	**2.336.0**	**2.764.5**
1	High production potential	4.159.8	119.9	754.3	1.056.8	1.083.1	1.145.7
2	Medium production potential	6.770.8	468.6	1.529.8	1.900.7	1.252.9	1.618.8

So, the production potential of soil types in the PA is rather high, high production potential - 38% and medium production potential - 62%

(4) Assessment of the suitability of tree species

Identify the suitability of species by the combination of limitation method (soil depth and inclination are limited elements) and specialist method.

Criteria for assessment of the suitability consist of: (1) Texture (T), (2) inclination (G), (3) soil depth (D), (4) vegetation, (5) absolute elevation (H), (6) mean rainfall (R). The criteria mentioned above are divided in 4 classes: Very suitable (S1), Suitable (S2), Less suitable (S3), Not suitable (S4) (Table 1.3).

Implement the comparison the ecological requirement of trees with 6 indicators of the soil to identify the suitability of tree species by the principles:

(i) Case 1 in 6 indicators at the 'not suitable' level, that the species is not suitable to that land unit

(ii) In case of inclination or soil depth at less suitable level, that the species is less suitable (S3) to that land unit

(iii) In case of texture - absolute elevation, vegetation and rainfall - there should be at least 2 elements at the suitable level that the species is specified less suitable (S3) to that land unit.

(iv) In addition to the cases said above, the suitability of species is identified based on the principle of bigger figure, if most of (>50%) the assessment criteria is at which suitable level then the suitability of species to the land unit should be at that suitable level.

(v) Suitability of species may be adjusted by specialist ideas

Results of land use status in the PA show that 5 key tree species are planted in this area are *Acacia mangium; Acacia auriculiformis*; *Eucalyptus camaldulensis; Acacia hybrid* and *Pinus merkusii*.

Based on the ecological characteristics and results of survey of the said tree species, technical measures issued, the reality of afforestation in the area, the results of suitability of species can be seen below:

Total assessed area: 10.930,6 ha.

- Very suitable (S1): 4.565,3 ha, or 41,8%.
- Suitable (S2): 6.333,8 ha, or 57,9%.
- Less suitable (S3): 31,5 ha, or 0,3%.

2.1.4 Climatic characteristics and dangerous climatic forms

(1) Climatic characteristics

The climate of Nui Thanh district bears the South of the Central coastal line characteristics and of 2 seasons. The dry season: from January to August and west season: from September to December. Observed data for 12 years (1991 - 2002) of the Tien Phuoc and Tam Ky hydrometeorology, the climate of this area is as follow:

Mean temperatures annum: 25,7^{0}C, lowest: 12^0, absolute high: 40^0, mean in highest month in June and July: 29 ^{0}C, mean in lowest month in December: and January: 21 ^{0}C.

The mean rainfall is 2.879 mm/year and concentrating in 3 months of October, November and December accounting for 70% of rainfall annum. Number of rainy days is 155, and mean rainy days in the month are 13.

The humidity in this area is rather high say 86%. Mean humidity of the highest month is 92% (Nov. & Dec.), and mean humidity of lowest month is 76% (Jul. and Aug.).

Mean evaporation annum is 1.150 mm or 40% of the rainfall, the highest evaporation is 150 mm (June) and lowest 22 mm (Dec.)

Based on the climatic characteristics it is seen that the planting season may start in October and end at the end of November, harvesting season stars from March to July annum. Months of high fire risk in this area are May, June and July.

(2) Dangerous weather forms

The Central region is often suffering from typhoons from September. To December, and the frequency of occurrence is 40%, which caused great losses to agriculture and forestry production and people's assets. And this area is also suffering from the dry and hot west wind from April to August which may last for 5 – 7 days a time, and sometime

fro 10 – 15 which greatly impacts on the increment of tree species as well as the people's life

Whirl is also a great danger for the area.

2.1.5 Hydrological characteristics

The river/stream system in 5 project communes lies in the Tam Ky river basin with the tributary system of Ba Truc, Ba Ky, Giai, Chau, Ben Dinh, Quan and Ngang rivers, and other small alternated ones to set up a water supply network to production and life of people. However the rainfall is not evenly distributed annum so the water flow on the rivers is not stable, surplus in rainy season and shortage in dry season, so waterway transport is not possible.

Reservoirs and lakes in 5 communes: 1 reservoir of big capacity Phu Ninh of 274 million m^3) and other 3 of small capacity of 5 – 12 million m^3 (Dong Nhon, Ho Cai, Cây Sơn). In general these supply a great deal of water to agriculture and forestry production. However, in dry season these lakes and reservoirs are of low water level or drought. Only Phu Ninh reservoir can be used for water transport around the year and this is the inter-commune district water way in the area.

2.2 Socio-economic conditions in the project area (PA)

2.2.1 Population, demography and labor

The PA has 5.623 HHs with 23.885 inhabitants, or 16,56% of population of the district in average each HH has 4 persons. The proportion between Male and female is rather equal (Female -50,8%, male -49,2%). The rate of population increasing naturally is 1,37%, something similar to the rate of population increasing of the district. Density is 139 person/km^2, lower than the mean density of the district (270 person/km^2).

Table 1.2 Population and demography of 5 project communes

NO.	Commune	Population by gender			Population by ethnic group		
		Total	Male	Female	Total	Kinh	Chor
1	Tam My Dong	6.668	3.259	3.409	6.668	6.668	
2	Tam My Tay	5.613	2.744	2.869	5.613	5.613	
3	Tam Son	4.690	2.321	2.369	4.690	4.690	
4	Tam Thanh	3.987	1.957	2.030	3.987	3.987	
5	Tam Tra	2.927	1.469	1.458	2.927	1.044	883
Total		**23.885**	**11.750**	**12.135**	**23.885**	**23.002**	**883**

Source: *Year Book 2005 Nui Thanh district*

There are 2 ethnic groups living in the PA, the Kinh–96.3% and the Chor-3.7 % 883 inhabitants, living in villages 4, 6 and 8 of Tam Tra commune. The Chor now knows how to grow paddy rice and afforestation but their knowledge is lower than tat of the Kinh's.

Total labors are 11.332 or 47% of the population. Agriculture and Forestry labors account for 76%, other sectors 24%, and up to 10% of Agriculture and Forestry labors having no stable job, these can be mobilized for production afforestation project in the coming time (Table 1.3)

There is no difference in labors as far as gender is concerned in particular Agriculture and Forestry production, but in reality, women have cover more work than men. Through interview to know that there happens a difference in payment to labor day of man and woman's (30-40,000 and 40-50,000 Dong VND respectively). Nowadays, average payment to a labor day is 40,000 VND per man-day.

Table 1.3 Labors in 5 communes in the PA

	Labor	Tam Mỹ Đông	Tam Mỹ Tây	Tam Sơn	Tam Trà	Tam Thạnh	Total
	Total	**3.161**	**2.661**	**2.223**	**1.390**	**1.897**	**11.332**
1	***Agriculture, forestry labor***	***1.907***	***2.017***	***1.922***	***1.269***	***1.512***	***8.627***
	Having stable job	1.812	1.815	1.730	1.079	1.304	7.740
	Having no stable job	95	202	192	190	208	887
2	***Other sectors***	***1254***	***644***	***301***	***121***	***385***	**2.705**
	Industry	379	425	108	84	267	1.263
	Construction	85	63	35	22	31	236
	Aquiculture	158		95			253
	Services	632	156	63	15	87	953

Source: Socio-economic report of 5 communes in the PA

2.2.2 Household (HH) economy

(1) Income and living conditions

Survey results show that average income of each HH is 21.0 million Dong annum, from cultivation – 21.43%; livestock - 22,38%; Forestry - 44,76%; others – 2.40 million Dong, - 11,43%.

Table 1.4 Incomes and Expenditures of HHs

No.	Income source	Income (million Dong)	No.	Expenditure Item	Expenditure (million Dong)
	Total	**21,0**		**Total expenditure**	**16,9**
1	Cultivation	4,5	1	Food	8,9
2	Livestock	4,7	2	Agriculture and forestry production	5,5
3	Forestry	9,4	3	Others	2,5
4	Other	2,4			

Source: *Interview HHs*

Average expenditure annum of each HH is 16,9 million Dong/Year, food -52,5%, Agriculture and Forestry production 32.4%, others -15.1%. So savings can be 4 million Dong/year, this is an important investment source to agriculture and Forestry production.

The Kinh and the Chor are experienced in intensive rice practice and other food crops (maize, cassava) and forest trees. However, the income level is different due to different cultivation knowledge and investment, The results of survey show that the income of the Kinh household (HH) is as twice as much comparing to that of the Chor's (Figure 1.1).

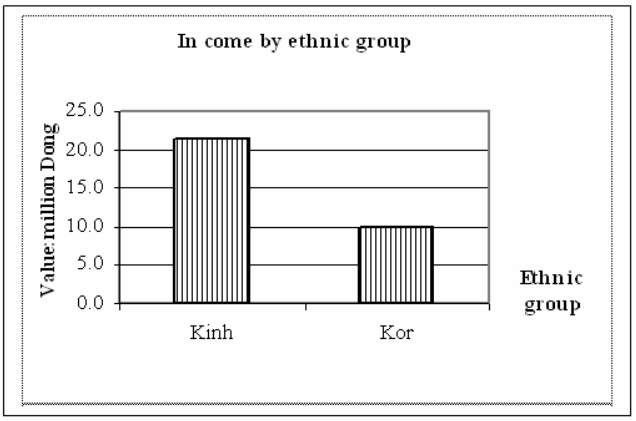


Figure 1.1: Household income by minority ethnic groups

On the other hand, the geographical location of communes is one the factors deciding income of HHs. Tam My Dong, Tam My Tay and Tam Thanh communes are situated close to the district center, the soil quality is better and transport i more convenient comparing to the communes in the PA resulting in higher income of HHs from Tam My Dong and Tam Thanh communes comparing to communes. Tam Tra commune is very far from the district center, difficult transport, results in lowest income (Figure 1.2).

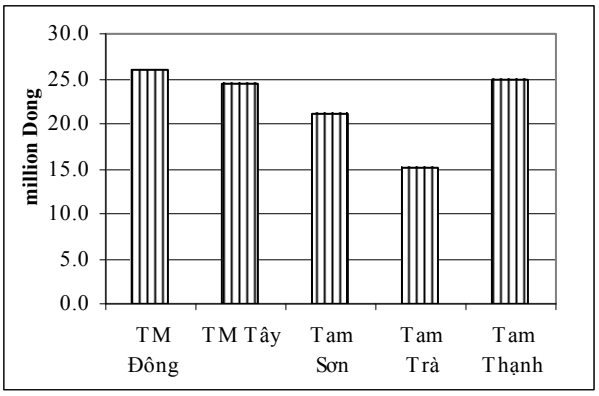


Figure 1.2: Household income by commune

The numbers of poverty HHs account for 39.6% of the total HHs in the PA, higher than the rate of poverty of Nui Thanh district (28.3%). Out of which Tam Tra commune has the highest rate of poverty - 64,4% and of up to 85% Cor HHs.

Table 1.5 Poverty in 5 proposed project communes and Nui Thanh district

NO.	Commune name	Total HH	Poverty (HHs)	(%)
	Total district	**33.930**	**9.598**	**28,3**
	Total 5 communes	**5.623**	**2.227**	**39,6**
1	Tam My Dong	1.569	426	27,2
2	Tam My Tay	1.321	427	32,3
3	Tam Son	1.104	523	47,4
4	Tam Tra	689	444	64,4
5	Tam Thanh	940	407	43,3

Source*: Year book, 2005, Nui Thanh district*

(2) Land use of households

In average each HH in the project area has 2.63 ha of cultivation land, forestry land - 79,5%, agricultural land - 20,5%.

Table 1.6 Land use types of HHs

NO.	Item	Average (ha)	Types of land use (%)
	Total	**2,63**	**100,0**
2	Paddy	0,23	8,7
3	Corn crops	0,17	6,5
4	Garden	0,14	5,3
5	Forest land	2,09	79,5

Source*: Results of HH interview*

All forest land of the HH is used for growing of Acacia (A. hybrid, A. mangium) and local people think that these species yield high economic effectiveness as they grow fast and cause no harm to soil. Eucalyptus is of low economic values as they grow slowly while make soil degraded. On the other hand, HHs also recognize that A. hybrid is easily fall down in storm or strong wind, so it is better to grow it at the elevation of < 700 m and low inclination.

HHs growing Eucalyptus and pineapples are also recognized the low economic values of these 2 species mentioned above and they want to grow Acacia instead. Some of the better off HHs invest to grow Acacia spp. themselves.

Land use rights for agricultural land of HHs is certificated. As for forestry land, this is only done in 2 communes namely Tam My Dong and Tam My Tay, while communes as Tam Tra, Tam Son, Tam Thanh are not.

2.2.3 Key economic activities

(1) Agriculture production

Agriculture production is the key source of income of people in the PA as well as Nui Thanh district. In 2005 total income from agriculture in the PA is 56 billion Dong, cultivation accounts for 27 billion Dong, livestock - 29 billion Dong.

Key cultivation products consist of rice, maize, cassava, groundnut, sesame, pineapple, and rubber. In 2005, total food income in the PA is 8,112 tons, or 338 kg/head/year, or 1.56 times higher than the average level of the district.

At present pineapple is grown in commune of Tam Thanh, but no potential markets for pineapple as it is grown in forestry land of $> 15^0$ and soil erosion is a big problem which should be considered. HHs who are growing pineapple wish to grow trees but they are lacking of investment. Only better off HHs grown trees instead of growing pineapple.

Growing animals in the PA is fairly developed at HH scale; in average each HH possesses 3 - 4 cattle and 15 poultry. According to data from interview in average each HH gets income from livestock of 5 million Dong/Year. Cattle are grazing freely in the forest, and no planning for raising animals matches the potential of the area.

Key animal species are buffalo, cow, pig and poultry, this is an important cash income source of the HH economy and supply manure for cultivation.

(2) Forestry Production

(i) Forestry production enterprises in Nui Thanh district

At the moment there are 2 Forestry production enterprises in the PA: The 661 Project Management Board of Nui Thanh district and Phu Ninh Reservoir Watershed Project Management Board, Quang Nam province.

The 661 Project Management Board of Nui Thanh district plays the role of management and forest establishment in the district, during the period of 2001-2005 this organization is in charge of implementation of Project 661, aiming at forest establishment and protection of watershed forests. This organization is experienced in management and implementation of afforestation project. The 661 Project Management Board of Nui Thanh district is functioning concurrently, most of staff is coming from Nui Thanh district Economic Section.

Phu Ninh Reservoir Watershed Project Management Board plays the role of watershed protection forest establishment Phu Ninh reservoir, and in the PA the bodies dealing with watershed forest management are communes of Tam Son, Tam Tra and Tam Thanh. Phu Ninh Reservoir Watershed Project Management Board is a professional body responsible for protection forest establishment, its head office is not located in the district, so the assignment for production afforestation project implementation is not considered of.

(ii) Results of Forestry production in the PA in 2001 – 2005

Forestry production brings about bigger income for HHs; interview results show that income from Forestry production accounts for 44.76% of the total.

Results of Forestry production in 5 proposed project communes obtained in period 2001–2005 shown in Table 1.7.

Table 1.7 Results of Forestry production in the PA

No.	Item	Unit	Total	By years					
				2001	2002	2003	2004	2005	2006
1	Afforestation	ha	6.792	308	540	1.707	2.325	1.430	1.430
2	Forest exploitation		-	-	-	-	-	-	-
-	Area	ha	3.675	475	390	570	870	800	570
-	Productivity	m^3	257.250	33.250	27.300	39.900	60.900	56.000	39.900
3	Regeneration	ha	2.350	263	263	263	520	520	520
4	Protection	ha	13.845	2.796	2.182	2.182	2.228	2.228	2.228
5	Seedlings	stem	18.900.000	450.000	1.520.000	1.930.000	4.730.000	6.370.000	3.900.000

Source: *The 661 PMB Nui Thanh district*

During 2001 – 2005, 6.792 ha of forest were planted in the PA of which, 742 ha of protection forests, and 6.050 ha of production, particularly since 2003 HHs grew 1.700 ha/Year.

Key species planted are A. hybrid, A. mangium, Eucalyptus, Pine. The best choice is Acacia spp. (*A. hybrid* and *A. mangium*), as they are fast growing species and short

management cycle (6-7 years) and help improve soil conditions. The method of extensive growing is applied, no fertilizer, and high density 2.000 – 2.500 stem/ha.

High density, no thinning result in small size of trees the rate of commercial product is low comparing to the standing volume.

Most of A. mangium sites were burned after logging to speed up the germination of seeds, after a year, the owners do the thinning by cut off the saplings and remain 2000 – 2500 per ha and then do the tending. The management cycle is 6 – 7 years.

HH interview results show that, local people invested themselves of about 1.5 – 2 million Dong/ha and using their own labor. Only 10% of HH get loan from Agriculture bank or the policy bank to afforest, but the purpose of getting loan in the credit contract is for agriculture production or raising animals but not for afforestation.

At present the forest land allocation to HHs is under implementation, measurement is practicing and mapping in 2 communes - Tam My Dong and Tam My Tay for issuing land use rights with Red Book. As for other 3 communes Tam Tra, Tam Son, Tam Thanh land allocation is not implemented. This is a big constraint for HHs to access to credit loan from the financial agencies.

Natural forest in this area is mainly regenerated and exhausted protection forest and impossible for timber supply. In recent years, harvest is mainly happening in plantations of HHs. During 2001 – 2006 plantation area for harvest is about 600 ha/Year, and the quantity of harvest is 42,000 m^3 per year.

Most of HHs do not do harvesting themselves but sell the standing trees in the forest to local traders. Clear cut is applied in this area, and felling by using chain saw, skidding manually, transporting mechanically.

Forest protection in the PA as well as in Nui Thanh district is seriously considered, PMB of 661 Nui Thanh district applies the system of contract for forest protection and 2000 ha in average of natural is under protection contract, in general forest is well rehabilitated. As the education and dissemination are good and no forest fires happen in the PA. The use of 661 fund in the recent 5 years, so 783 ha of open land of scattered trees is under regeneration.

Seedlings supply for afforestation in the PA can be taken from 3 suppliers in Nui Thanh district:

- Nurseries from Quang Nam province.
- Nurseries from adjunct provinces
- HHs' nurseries

HHs in the PA have tradition of producing seedlings, however most of the seedlings are produced from seeds, as local people never access to new technology of producing seedlings from cuttings. Survey results show that of about 70% of HHs produce seedlings of A. mangium, A. auriculiformis and A. hybrid from seeds. In the recent 5 years, 17.3 million seedlings were produced, 661 PMB can only produce 1,6 million seedlings. Seeds were taken from HHs' plantations or bought from the markets, the quality of the seeds are not controlled which greatly impacts on the effectiveness of afforestation.

Nui Thanh district Afforestation PMB has one nursery with capacity of 1 million per year, (A. mangium), the PMB is registering to get certificate from DARD (Sub-DoF). Capacity of this nursery is 500.000 per year.

The adjunct districts also have 5 nurseries which have certificate issued, these nurseries are located in north of Tra My, Hiep Duc, Tien Phuoc and Dai Loc, Phu Ninh districts, and the capacity is 4 million per year. At present Quang Nam Sub-DoF has checked other 4 nurseries in districts of Phu Ninh, Duy Xuyen, Phuoc Son, and Thang Binh to propose to DARD for issuing certificate for production of seedlings legally. Total capacity of these 4 nurseries is about > 4 million per year (mainly A. mangium, Dipterocarpus and cutting A. hybrid).

(3) Other sectors

There are 174 handicraft production enterprises in the PA and 340 service enterprises, and most of them are HH scale. This sector attracts about 2.000 local labors to.

These enterprises are dealing with the production of rice, ground maize, sugar cane and vegetable oil, small transport services and trading of timber materials. In 2005, income from this sector is about 11.43% of total HH income. As the PA is located close to timber processing mills, so timber trading enterprises have good chance for development and attraction of local labors to involve in their activities.

2.2.4 The situation of getting loan, agriculture and forestry production

(1) The situation of getting credit loans for investment to agriculture and forestry production

Nui Thanh district has 2 banks namely Agriculture Bank and Policy Bank that lend HHs with cash. Table 1.8 show the situation of lending of these 2 banks.

Table 1.8 Numbers of borrowing HHs and Total Outstanding loan at the end the term of Nui Thanh district

Unit: million Dong

No.	Bank	Year	Total outstanding loan	Total HHs
	Total		**194,623**	**17.923**
1	Nui Thanh district Policy Bank	Total	90,669	15.423
		2004	21,960	7.520
		2005	31,570	7.903
		As of 30/ 07/2006	37,139	
2	Nui Thanh district Agriculture bank	Total	103,954	2.500
		2005	48,659	
		As of 30/07/2006	55,295	2.500

Source: *Interview Banks in Nui Thanh district*

Interview and field survey in banks from Nui Thanh district results show that total outstanding loan of the banks as of July 2006 is 194,623 billion Dong and 17.923 borrowers. In average each HH borrow about 11 million Dong. But in reality so far HHs borrowed money for agriculture production and raising animals, HHs do not venture to invest their loan to production due to different causes, (a) the banks have no preferential policy to lend for afforestation, (b) long term forest tree management, (c) high risk and (d) high interest rate.

(2) Existing mechanism in getting credit loan of financial agencies (rate of interest, term, policies of concern)

Lending mechanism of the Agriculture Bank and Policy Bank in Nui Thanh district:

Item	Nui Thanh district Agriculture Bank	Nui Thanh district Policy Bank
Lending capacity	80-85% of project cost	10 million Dong/HH, the bank is depending on the supply from the Central Bank
Conditions	HHs get loan directly from the bank Sum: < 10 million Dong, no collateral (depending on HHs) Sum: 10-20 million Dong, farm model available or planned Sum: > 20 million Dong (collateral) If borrow for afforestation (Red Book available) and enough labors	Through social organizations (Youth union, farmer association, women union,…), belief collateral
Term	Short term < 12 months Trung hạn from 12 -16 months Long term > 60 months	Short term <12 months Medium term from 12 -16 months Long term > 60 months
Interest	Short term: 1.03 %/month Medium term, Long term: 1.18%/month	Short term, Medium term, Long term same rate of interest (0.65%)
Extension time	1/3 of the term	Not > 6 months
Payment	Principal: paid in year 2 of the term, Paid in 1, 2, 3 times (periodically) Interest: paid quarterly or monthly	* From 120-source; after 5 years: principal & interest paid. Extension is applied for principal if do afforestation or objective reasons … * Contribution funds: + Principal: paid periodically. - After year 1, 1/3 principal - Year 3, 1/3 principal - Year 5, 1/3 principal + Interest: paid quarterly

(3) Potential financial agencies to supply loan for afforestation:

Strong points of the Banks:

(i) Agriculture Bank is established to supply finance for the development of agriculture and forestry production

(ii) Agriculture Bank can mobilize funds from society

(iii) Policy bank can only lend poor HHs, while the Agriculture Bank can lend all people (rich, medium poor HHs)

2.2.5 Infrastructure

(1) Transport

The Highway No. 1 is running cross Nui Thanh district (35 km) and 20 km away from the PA.

2 provincial road systems, road DT 617 from Tam Hiep commune to Tam Tra commune – 22.3 km, are under upgrading. Road DT 618 from Nui Thanh town to Tam Quang commune, 7.1 km, earth roads.

District road system, 9 roads, 91.2 km, of which 7,0 km is asphalted, 20 km of stone road and 64,2 km earth road

The North-South Railroad: Quang Nam to Hanoi and Quang Nam to TP Ho Chi Minh City.

Roads from communes in the PA to Ky Ha port; Quang Nam Share Stock Company. (Under Pisico) and Quang Nam Pulp Production Company, the shortest distance is 20-25 km and longest from Tam Tra commune is 40-50 km. In general transportation in the PA is fairly advantageous.

There exists in the PA of 180 km for lorry operating all year around, the road net work is distributed fairly even and not more than 500 m far from the project afforestation sites, that is to say that opening new roads is not necessarily

Consequently, the net work of road in the PA, the connection of the afforestation sites to mills, port is convenient.

(2) Power and water supply

Almost of villages and communes in the PA use electricity from the national power supply system. More than 90% of HHs use electricity for daily life and production

Only village 8 of commune of Tam My Tay has no power, but Nui Thanh district PC has planned to supply power to this village in 2007.

According to Year Book of Nui Thanh district, 50% of HHs in 5 communes in the PA has good water for use others use water from wells or pipe water from forests

2.3 Land use and forest resources use status

2.3.1 Land use

(1) Area of lands

Table 1.9 shows the results of land survey in 5 communes.

(i) Forest cover: 70%, (province - 43%). Natural forests: Poor and Medium, no possibility of timber supply. Plantations: main species: A. mangium, A. auriculiformis, A. hybrid, Eucalyptus, and Pine. Some area of Acacia is going to be cut, Eucalyptus: poor quality and needs replacing by new plantation forests

Table 1.9 Land use by administrative units

NO.	Types	Total (ha)	ADM units				
			TM Đông	TM Tây	T Sơn	T Thạnh	T Trà
	Total	**28.364,7**	**1.902,9**	**5.330,5**	**5.527,7**	**5.420,7**	**10.182,9**
1	Forested land	19.949,9	1.097,8	3.978,0	3.797,9	2.503,6	8.572,6
-	Natural forest	11.077,0	509,3	1.764,9	1.578,1	479,3	6.745,4
-	Rừng trồng	8.872,9	588,5	2.213,1	2.219,8	2.024,3	1.827,2
2	Non-forested land	1.794,2	-	71,0	737,7	48,2	937,3
3	Pineapple land	263,5				263,5	
4	Agriculture land	4.915,4	549,7	1.002,0	638,6	2.152,7	572,4
5	Others	1.441,7	255,4	279,5	353,5	452,7	100,6

(ii) Non-forested lands are mainly open land- IC, far from resident areas at high elevation, and most of this land cannot be used for afforestation.

(iii) Pineapple land is planned for forestry production, but local people want to replace with afforestation.

(2) Land use by holders

(i) There are 5 landholders in the PA: mainly Watershed Management Board, CPC and HHs.

Table 1.10 Land use by holders

No	Holders	Total (ha)	In site types			
			Agricultural. Land	Forested	Non-use	Others
	Total	**28,364.7**	**5,178.9**	**19,949.9**	**1,794.2**	**1,441.7**
1	Watershed MB	11,096.3	-	9,665.2	1,431.1	-
2	HHs	13,008.4	5,178.9	7,063.0	18.4	748.1
3	CPC	3,679.3	-	2,642.7	343.0	693.6
4	Enterprises	580.7	-	579.0	1.7	-

(ii) HHs in the PA use 35,4% of Forestry land, most of the land is covered by plantations. However land allocation is not taken place. Measurement for land allocation is happening in 2 out 5 communes for issuance of land use certification.

To deploy the production afforestation project the key issue for Nui Thanh district is to quickly issuing red book for HHs in 5 communes, to support farmer HHs to access to financial agencies.

(iii) Area managed by enterprises is 2,9% of high potential for afforestation, however land use conflict between Tam Ky Special Forest Products Enterprise and local people is not settled, so this land is not involve in the project.

(3) Forest land by functions

Total: 22.007,6 ha:

Watershed: 13.464,2 ha, or 61%.

Production forests: 8.543,4 ha, or 39%.

Table 1.11 Forest land by functions

No	Types	Total	Functions	
			Protection	Production
	Total	**22,007.6**	**13,464.2**	**8,543.4**
1	Natural	11,077.0	10,391.3	685.7
2	Plantations	8,872.9	1,611.3	7,261.6
3	Non-use	1,794.2	1,461.6	332.6
4	Agricultural. Land to Forest production	263.5		263.5

2.3.2 Area and stock

Results of stock survey by species, age class of natural forest status in Quang Nam province made by Sub-FIPI are shown in Table 1.12:

Table 1.12 Area and Stock of forest types

No.	Status	Area (ha)	Stock (m3)
	Total	**19,949.9**	**1,131,588**
1	***Natural forest***	***11,077.0***	***885,659***
-	Medium (IIIA2)	1,734.7	211,634
-	Poor (IIIA1)	681.3	65,405
-	Regenerated (IIA, IIB)	8,661.0	608,620
2	***Plantations***	***8,872.9***	***245,929***
-	A. auriculiformis	1,456.6	100,626
-	A. mangium	6,191.5	97,052
-	A. hybrid	485.5	
-	Pine	46.9	10,580
-	Eucalyptus	691.8	37,671
-	Other	0.6	

(i) Natural forest stock accounts for 78% of the total, although the most of the natural forest in the area is exhausted and regenerated forest, and the capacity of timber supply of the natural forest is no more.

(ii) Plantation forest stock accounts fro 22%, the average stock is roughly 29 m^3/ha, as most of the plantations are newly planted since 2001. Eucalyptus was planted in 1986, and the growing stock is not high as it is at the third coppice.

2.3.3 Potential of production plantation forests

(1) Area of plantation forests

Area for afforestation in the coming time:

- Non-use;
- Forestry land under agriculture production;
- Plantations going to be harvested.
- Plantations need to be improved.

These categories are planned for production afforestation

Table 1.13 Potential Area for afforestation

No	Types	Total (ha)	By commune				
			TM Dong	TM Tay	T Son	T Thanh	T Tra
	Total	**2,707.5**	**133.4**	**776.8**	**133.3**	**1,042.7**	**621.3**
1	Non-use	332.6	-	20.1	54.6	32.6	225.3
2	Eucalyptus. (coppice)	604.3	84.8	403.5	1.7	114.3	
3	A. auriculiformis	683.8	48.6	156.9	36.9	359	82.4
	Age class II	581.9	48.6	146.9	36.9	267.1	82.4
	Age class III	101.9		10		91.9	
4	A. mangium	823.3	-	196.3	40.1	273.3	313.6
	Age class II	668.1	-	194.9	40.1	119.5	313.6
	Age class III	155.2		1.4		153.8	
5	Pineapple	263.5				263.5	

(i) Potential land for production afforestation in the PA is about more than 2.700 ha, of which: non-use and pineapple land accounts for 12%; Eucalyptus - 22%; replanting after harvest - 66%.

(ii) Pineapple land is located at the elevation of > 100 m, slope > 20^0, this land is planned for forestry production. Prior to 2000, pineapple land in Nui Thanh district was about > 400 ha, but when Quang Nam Pineapple Processing Mill closed, no market for pineapple, few better off HHs replaced pineapple by growing Acacia. Interview results show that most of farmers Tam Thanh commune want to replace their pineapple plantations by production afforestation.

(2) Result of survey of productivity

Results of survey of land use status indicate that plantations in this area consist of 5 species: A. mangium, A. auriculiformis, A. hybrid, Eucalyptus and Pine.

Plantations in 5 communes of Nui Thanh district are mainly extensive using local seedlings, no fertilizers applied. Some of A. mangium plantations planted without soil preparation and growing by sowing. Field survey results show that these 5 tree species are planted on 6 land units of 2 production potential classes (I, II) and 3 suitability (S1, S2, S3). Field survey results area shown in Table 1.14.

Table 1.14 Result of survey of productivity

No	Species	Suitability	Age	Density	D1,3 m	Hvn	M/ha	ΔD	ΔH	ΔM
					(cm)	(m)	(m3/ha)	(cm/year)	(m/year)	(m3/year)
1	**A. auriculiformis**									
		S1	6	2,500	9.10	11.00	90.0	1.52	1.83	15.00
		S2	6	2,400	8.50	11.00	76.0	1.42	1.83	12.67
		S1	8	1,700	11.50	14.00	123.5	1.44	1.75	15.44
		S2	8	1,750	11.00	13.00	108.0	1.38	1.63	13.51
2	**A. mangium**									
		S1	5	2,200	10.50	12.00	114.2	2.10	2.40	22.85
		S2	5	2,300	9.50	11.50	94.5	1.90	2.30	18.90
		S1	7	1,850	12.00	14.00	146.4	1.71	2.00	20.91
		S2	7	2,000	11.00	13.50	128.2	1.57	1.93	18.31
		S3	5	2,200	9.00	11.00	76.9	1.80	2.20	15.39
3	**A. hybrid**									
		S1	2	2,400	5.0	6.8		2.50	3.40	
		S2	2	2,500	4.5	6.2		2.25	3.10	
		S1	5	1,400	12.00	14.50	114.7	2.40	2.90	22.95
		S2	5	1,400	11.50	13.50	98.1	2.30	2.70	19.62
4	**Eu. (coppice)**									
		S1	5	1800	8.50	11.50	58.7	1.70	2.30	11.74
		S2	5	1800	8.00	11.00	49.7	1.60	2.20	9.95
5	**Pine**									
		S1	20	1630	16.60	11.50	226.7	0.83	0.58	11.34
		S2	20	1750	16.20	11.50	207.3	0.81	0.58	10.37

(i) A. auriculiformis is of slow increment, D = 1,44 cm/year, H = 1,76 m/year, stock =14 m^3/year/ha.

(ii) A. mangium is mostly grown in this area; this is one of the fastest increment species in the PA. Mean increment per year is 20 m^3/ha.

(iii) A. hybrid is newly planted in this area 3 year ago, the increment indicators are fairly high, D = 2,4 cm/year, H = 3,25 m/year. Additional survey results in areas of similar conditions are something compatible (Đại Lãnh commune, Đại Lộc district) A. hybrid cuttings yield high volume and the increment is 21,3 m^3/year/ha in average.

(iv) Eucalyptus planted before 1990, 3 coppice crops obtain, the volume of the first crop is > 20 m^3/ha/year, and now only 10 - 11 m^3/year/ha. This needs to be replaced.

(v) Pine planted in 1986, D = 0,82 cm/year, H = 0,58 m/year. At the moment pine is under resin exploitation of 30% of total standing trees.

(3) Prediction of productivity of plantations

There are at the moment 4 tree species that give suitable products as the project wishes: (1) A. hybrid, (2) A. mangium, (3) A. auriculiformis, and (iv) Eucalyptus. These species are under volume increment prediction.

Based on volume increment prediction of plantations:

- Results of productivity survey of species in the PA
- Afforestation techniques and intensive.

- Results of afforestation of A. hybrid in adjunct areas.
- Characteristics of increment of species
- Suitability of tree species

Results of productivity prediction of would be plantations with 4 species by 2 suitability classes as follow:

Table 1.15 Results of productivity prediction of some species

NO.	Species Suitability	Cycle (Year)	Planting Density	Harvest density	D1.3 m (cm)	Hvn (m)	M (m^3/ha)
1	**A. hybrid**						
-	Very suitable (S1)	7	1660	1250	14,0	16,0	154,0
-	Suitable (S2)	7	1660	1250	13,0	15,5	134,0
2	**A. mangium**						
-	Very suitable (S1)	7	1660	1250	14,0	15,5	149,0
-	Suitable (S2)	7	1660	1300	13,0	15,0	129,0
3	**Eucalyptus coppice**						
-	Very suitable (S1)	7	2500	1650	9,5	12,0	70,0
-	Suitable (S2)	7	2500	1650	9,0	11,5	60,0
4	**A. auriculiformis**						
-	Very suitable (S1)	8	2500	1700	11,5	14,0	123,0
-	Suitable (S2)	8	2500	1750	11,0	13,0	108,0

2.4 Markets and sales

2.4.1 Assessment of timber sales at present an in the future

Quang Nam province demands for domestic sales and export shown in Table 1.16:

Table 1.16 Quang Nam province demands for domestic sales and export shown at present and in the future

Unit: m^3

NO.	Item	Unit	2006	2010	2015	2020
1	**Large timber**	**m^3**	**41.0000**	**48.000**	**39.000**	**30.000**
-	Construction		30.000	35.000	25.000	15.000
-	Specialized use		4.000	5.000	6.000	7.000
-	Furniture		7.000	8.000	8.000	8.000
2	**Material**	**Ton**	**400.000**	**700.000**	**750.000**	**750.000**
-	Export		400.000	500.000	500.000	500.000
-	Domestic production			200.000	250.000	250.000

Source: *Forestry Development Strategy Quang Nam province (2006 - 2020) Draft*

Large size timber demand of natural timber in Quang Nam province is of deceasing trend due to the use of substitute materials and using plantation processed timber.

The demand for timber material grows very quickly due to the coming into life of many timber-processing mills in Quang Nam province. Intentionally by 2010 the demand

for small size timber for processing will be 700.000 ton, increasing by 1,75 times comparing to 2005 and as of 2020 the demand or material timber for processing mills is 750.000 ton.

2.4.2. Processing mills and material supply situation

Located in and around the PA are 4 timber processing companies: (1) Quang Nam Forest Product share Stock Co., (2) Quang Nam Special Forest Product, (3) Quang Nam Pulp Co., (4) Quãng Ngãi Construction Co. No. 5. The distance from the project sites to the mills is < 100 km, therefore these are potential clients of the project.

Quang Nam Forest Product share Stock Co. bases in Nui Thanh district, 30 km away from the PA to the Southeast. Capacity annum is about 105.000 of fresh ton to produce 67.000 ton of dry chip.

Quang Nam Special Forest Product is in Dien Ban district, 80 km away from the PA to northeast. Capacity annum is about 105.400 ton to produce 70.000 ton chip and 30.000 m^3 round wood/year to produce furniture.

Quang Nam Pulp Co. is situated Chu Lai Industrial Park in Tam Hiệp commune – Nui Thanh district - Quang Nam province, 25 km to the northeast from the PA, capacity is bout 90.000 ton to produce 50.000 ton of chip annum.

Quãng Ngãi Construction Co. No. 5 is in Bình Sơn district, Quang Ngai, 45 km from the PA to the southeast, capacity is 180 000 ton annum

Table below show capacity of biggest timber processing mills in Quang Nam province and adjunct ones.

Table 1.17 Biggest timber processing mills as of 2006

NO.	Mill	Designed capacity (ton/Year)	Real capacity (ton/Year)	Rate of capacity use (%)
	Total	**680.000**	**470 400**	**69**
1	QN Forest Product Share Stock Co. (Under Pisico)	140.000	105 000	75
2	Quang Nam Pulp Company.	110.000	90 000	82
3	QN Forest Product Share Stock Co	150.000	105 400	70
4	Quãng Ngãi Construction Company. No. 5	180.000	100.000	56
5	Others	100.000	70.0000	70

Source: *Interview the mills*

Potential clients of timber from the PA will be Quang Nam Forest Product share Stock Co and Quang Nam Pulp Co. These 2 companies locate in Nui Thanh district and very close to the PA. The capacity of these 2 companies is 250.000 ton/Year. At present only 75 - 80% of timber can be satisfied

Besides, Quang Nam Special Forest Product and Quãng Ngãi Construction Co. No. 5 are also secondly-ranked potential clients. And the adjunct provinces are also potential clients as (Da Nang VIJACHIP).

In the future, Quang Nam province plan to establish a Pulp Mill with capacity of 100.000 ton of pulp/Year, that needs 250.000 ton of timber. Therefore the potential clients

of the project require up to 930.000 ton of material while the supply in the province can only meet half of it (50%.)

2.4.3 Distribution channel, timber price and transport cost

(1) Distribution channel

The network of supply timber from plantation at the moment in the PA is mainly relying on private traders and they sell to the mills. Only few HHs do the harvest and take timber to the mills. Loading is done manually and transported by vans of sizes. Loading capacity is 6-10 ton/time.

(2) Timber price and transport cost

As shown in the Table (Table 1.18) it is known that the price of timber varies from mill to mill but the difference of price if not so much, say, 10.000 – 15.000 Dong/ton, as the price depends on the transport distance. Survey and interview results obtained from transporters to tell that the transport cost is 1,500 Dong/ton/km

Survey and interview results obtained from processing mills in Nui Thanh district and Quang Nam province show that the price of timber varies depending on specifications of logs as follow:

Table 1.18 Sizes, timber prices and transport cost

N.	Client	Types	Sizes		Price (Dòng/ton)	Transport (Dòng/ton)
			D(cm)	L(m)		
1	QN Forest Product Share Stock Co. (Under Pisico)	Acacia spp. Eucalyptus Casuarina	≥ 5 cm ≥ 5 cm ≥ 5 cm	1 - 2.4 m 1 - 2.4 m 1 - 2.4 m	560.000 590.000 460.000	60.000 60.000 60.000
2	Quang Nam Pulp Company.	Acacia spp. Eucalyptus	≥ 5 cm ≥ 5 cm	1 – 4 m 1 – 4 m	545.000 580.000	55.000 55.000
3	Quãng Ngãi Construction Co. No. 5	Acacia spp. Eucalyptus	≥ 3 cm ≥ 3 cm	2 – 2,5 m 2 – 2,5 m	550.000 580.000	60.000 60.000
4	Quang Nam Special Forest Product	Acacia spp. Eucalyptus	≥ 6 cm > 25cm ≥ 6 cm	2,1 - 2,2 m ≥ 1,5 m 2,1 – 2,2 m	620.000 1.200.000/m^3 645.000	150.000 150.000 150.000

Source: *Interview timber processing mills*

Different mills require different timber specifications. And the common specifications re seen to be: D small end = 3 – 5 cm, L = 1 – 2.4 m

Timber prices are in the increasing trend in the coming years due to: labor cost per man-day and transport cost increases.

The demand for timber is going up, the competition of materials among the mills make price increase. In 2005, the price of Acacia and Eucalyptus varied from 450.000 – 500.000 Dong/ton, in 2006 increased by 550.000 – 600.000 Dong/ton, or 20% increased.

2.5. Lesson learnt from projects in the area

2.5.1. Projects under implementation

In Quang Nam province, there are many afforestation project which have been deploying since 1987, these projects greatly contributed to the Forestry sector of the province, the forest cover also increases, job and income opportunity for local people. However each project has certain constraints.

Afforestation projects have been implementing in Quang Nam province:

- Project 661: Watershed afforestation: 2001 - 2010
- Project JBIC: Watershed afforestation to protection reservoirs: 2002-2008.
- Project KFW6: Production afforestation + protection: 2006-2013.
- Project WB3: Production afforestation: 2005 – 2010.

2.5.2. Lessons learnt

Considering the strength and weaknesses of afforestation projects that have been implementing in Quang Nam province, the following lessons can be withdrawn:

- Project objectives should clearly be identified since the project design and should base on what are available in the locality as natural and socio-economic conditions and market for products
- Information should sufficiently be supplied to local people, organizations of concerned on the objectives, method of implementation, activities of the project since the project preparation stage.
- Farmers should volunteer for the project implementation with their commitment, without any compulsion by any reasons.
- Land area for the project should well be surveyed and assessed objectively. The land should have owner with land use certificate and no land use conflicts.
- Good seedlings with a reliable background and technical measures for afforestation must be well followed by the growers.
- There should be a working group who are of forestry understanding and capability of management at commune level to support technical guidance and exchange ideas with staff involving in afforestation. Groups and associations on forest production in villages to improve effectiveness in project management, capacity for HHs involving in afforestation via exchanging information among members.
- Clear mechanism for getting credit loan should be available with close supervision/monitoring by the lenders. There should be a commune working group to support loan use in an effective and correct way.
- Benefits and responsibilities of HHs and members of the PIU, commune working groups should well be identified.
- Regular and periodic checking made by PIU and commune working group toward the HHs involving project implementation.

2.6. Advantages and disadvantages

2.6.1. Advantages

- The project area is located at a convenient location for goods exchange and closed to timber processing mills in the Central, closed to port and potential users of project products are available.

- Areas for afforestation in 5 communes of Nui Thanh district is in concentrated site, low sloping, soil conditions suit the species, close to roads easy to access. This is a big advantage for the project as project cost is reduced, no need to build new roads, possible for the application of intensive farming method in afforestation for higher productivity.

- Located in the tropical monsoon, high rainfall annum and stable temperature

- GOV organizations from province to district level are interested in the production afforestation, and local people in 5 proposed project communes volunteer to participate in the project.

- Labors on the spot are available for different afforestation activities as they have certain afforestation experience.

- Markets available (within and without the country)

2.6.2. Disadvantages

- The project area has a disadvantageous element of the climatic conditions, it is impacted by the west wind, storm, whirl...

- In 5 project communes, land allocation is under way in 2 communes (Tam My Dong, Tam My Tay), and in other 3 communes (Tam Tra, Tam Son, Tam Thanh) farmers haven't got red book for land use. This is a difficulty for farmers to access to credits.

- Numbers of poor HHs in these 5 communes are high, up to 2.227 HHs (or 39,6%), so, it is difficult for mobilization of fund for afforestation from farmer HHs.

- Local people's knowledge is uneven, most of people at 18-22 years of age are nor experienced enough in production as the are not trained.

PART II: PROJECT CONTENT

1. Reasons for Project selection

Locality in the proposed project area has fairly forestry land pool for a production afforestation project.

Forestry projects have not yet brought about high economic effectiveness to people, attracted local people to involve in project implementation. The demand for timber of the processing mills is going up, and which results in higher timber price. This attracts attention of farmers to participate in production afforestation project. In the PA, the transport system is fairly advantageous and abundant labor force.

Field survey results tell that local people wish to have a production afforestation project in their area and they will use their land and off-farm labors. In general, if the project is set up the shortage of material in the coming is met while the project will create job for local people.

Selection/assessment of the project is an important part in the feasibility study to consider all proposals to have a best feasible project. The selection is done by 4 steps as follow: (1) Create the scope for selection of the project; (2) Long list (3) Short list; (4) Most feasible project selection.

1.1 Project selection scope

Three key elements for project selection scope are (1) Implementation body, (2) Products, and (3) Financial source and are shown in Table 2.1.

Table 2.1 Project selection scope

1	Implementation body	HHs, enterprises
2	Products	Chip and construction wood
3	Financial source	Credit loan; Farmers' own fund Credit loan + Farmers' own fund

1.2 Project selection

From the short list of production afforestation projects, based on indicators and criteria of assessment of proposals for selection of project to get a best one. The indicators and criteria are set up to assess the project on the following aspects:

1.2.1 Indicators and criteria for project selection

(1) Policy consideration: the balance of key policies on socio-economy; environment

(2) Silvicultural techniques: The activities of the selected project must ensure the rationales technically

(3) Potential of the markets: Assessment of market accessibility of products made by the project (relating to location for selling, competition, transport system, market expansion, and product specification)

(4) Assessment of finance and economy: Primarily assess on benefits (based on the in- and out cash flow): whether or not the project will bring about benefits to the society, people life in the PA is improved

(5) Environment impacts: Assess on the sensitive activities of the project that impact the environment: any negative impacts on the environment: pollution of water, soil air...

(6) Social impacts: Assess on the sensitive activities of the project that impact people's life: any positive/negative changes in land use; in gender equality;

(7) Local people's point of view: Assessment of people's needs, priority of people to the project.

(8) Comparing this project to the former ones: any lessons learnt from other project in the past

Criteria and indicators for assessment are classified in 4 levels: Very suitable, Suitable, Less suitable and Not suitable. The results of assessment are based on the 4 mentioned levels.

1.2.2 Results of selection

Results creating project scope, selection of long/short list and the project of most feasible consisting of the following contents:

(1) Implementation body: Household (HH)

(2) Product: Round wood for chi production

(3) Financial source:

- Loan from agriculture bank (for seedling + fertilizer)
- Farmers' own funds (labor)
- State funds (infrastructure, management, land allocation, afforestation design)

Project with contents as mentioned above is selected as:

(i) Most of forestry land planned for production afforestation in the PA is managed and used by farmers; therefore farmers should be the implementers.

(ii) Shorter management cycle (7 years), fitting the financial capacity of HHs and credit conditions. On the other hand, timber processing mills in the area are in shortage of materials, say, 30% of the demand annum.

(iii) Up to 39,6% poor HHs, financial support is necessary for project implementation.

2 Project objectives

2.1 Overall objective

Project contributes to HH economic development from afforestation activities in 5 communes of Nui Thanh district.

2.2 Immediate objectives

Improve the effectiveness of production afforestation project in 5 communes of Nui Thanh district, Quang Nam province.

Indexes to be obtained by the project

(1) Intensive planting: 1.844 ha.

(2) Quantity of harvest from 2015 – 2018: 180.000 m^3/cycle

(3) Income from 1 ha of plantation (including labor) > 18 million Dong/7 years.

3 Project activities

3.1 Project components

The production afforestation project in 5 communes of Nui Thanh district consists of components as follow:

3.1.1 Forestry land allocation

Land allocation in the PA is under way in 2 communes (My Dong and Tam My Tay) while other 3 communes (Tam Tra, Tam Thanh and Tam Son) land allocation is yet done. Land use certificate is a prerequisite for farmers to involve in the production afforestation project as the land use certificate can be used for borrowing money from financial agencies.

(1) Objective

Speeding up forest land allocation in 5 communes: Tam My Dong, Tam My Tay, Tam Son, Tam Tra, Tam Thanh - Nui Thanh district.

(2) Activity

- Set up plan for land allocation to each commune, submit to DPC for approval
- Survey, measure and sampling for land allocation
- Inform the results of measurement for mapping in an open manner
- Issue land use certificate to farmer HHs

(3) Financial source

Budget for land allocation is taken from state budget of Nui Thanh district. This component is to be compulsorily implemented before the implementation of the project. And this component should be fulfilled within 6 months since the project approved.

3.1.2 Establishment of production forests

(1) Objective

Basic objective is to establish 1.844 ha plantation forest to supply materials to chip producing mills in Quang Nam province.

(2) Key activities

- Project site selection.
- Species selection.
- Afforestation design.

- Planting, tending, protection
- Harvest

(3) Supporting activities

- Technical training on afforestation
- Procedure for borrowing money from banks, market information for forest products.
- Support and speed up the setting up of groups, local organizations dealing with forest management in a volunteer manner.

(4) Finance

Financial source for afforestation and harvest is taken from:

- Farmers' own fund
- Credit loan from agriculture bank
- State fund

3.1.3 Management, supervision and evaluation

(1) Objective

Capacity building for project management of the district PMB and commune PIU and procurement of equipment for project management

(2) Activity

- Identify the role of the PMB and PIUs
- Set up plan for project implementation
- Set up plan for M&E
- Procurement of equipment for project management, and M&E

(3) Finance

Taken from local budget via project management fee

3.2 Project implementation

3.2.1 Site selection for afforestation

(1) Criteria for site selection

Site selection is aiming at identification of forest land area for afforestation suitable to the project objective. Based on the results of survey on natural and socio-economic condition in this area, 6 criteria for site selection are formulated as follow:

(i) Land use policy

Selected site for afforestation is forestry land planted for production afforestation and no land use conflict

(ii) Land use status

Non-forested land consists of: Open land IA, IB, IC and agriculture crops planted on forest land (means pineapple land).

Forest land with plantations:

- Pine plantation for resin since 1986 - 1988. The pine is matured enough for tapping and local people do not want to convert to other use
- A. mangium and A. auriculiformis planted 7 years ago, good increment, few stands are at age class II (>4 years old), going to be cut, need to re-grow after logging.
- Eucalyptus (coppice crop III), need to be replaced by fast growing species and possible for land improvement

From the analysis above, only 4 key objects are selected for site selection: open land, Eucalyptus sites; would be matured Acacia sites, pineapple land

(iii) Land owners' point of view

Land selected for afforestation must gain agreement of farmers

(iv) Natural conditions in the PA

Lands selected for afforestation sites are high and medium production potential at the suitability (S1) and (S2) for A. hybrid and A. mangium.

(v) Accessibility to project sites

Based on the existing road system and the orientation of transport development of Nui Thanh district PC as of 2010, to ensure economic effectiveness for afforestation the distance of selected stands to roadsides is not longer than 1.0 km.

(vi) Distance to consumable markets

The distance of all forest lands in the PA to markets (port, mills) is < 50 km.

(2) Results of site selection

Suitable area for production afforestation is 1.844,0 ha. Areas for afforestation by status and administrative units are as follow:

Table 2.2 Results of site selection for production afforestation

Unit: ha

T	Status	Total	Tam My	Tam my	Tam	Tam	Tam
T			Dong	Tay	Sơn	Thanh	Tra
	Total	**1,844.0**	**108.5**	**670.0**	**119.9**	**494.5**	**451.1**
1	Open land (IA, IB, IC)	213.4	-	16.5	49.1	29.3	118.5
2	Pineapple land	237.1				237.1	
3	Plantations to be improved	479.8	64.7	351.9	1.5	61.7	
4	Plantations for harvest soon	913.7	43.8	301.6	69.3	166.4	332.6

3.2.2 Forestry land allocation

(1) Forestry land to be allocated for project implementation:

Total land to be allocated in the PA: 1.844 ha.

Land under preparation for allocation: 778,5 ha.

Measured area for mapping: 1.065,5 ha.

Land allocation details are shown in Table 2.3.

(2) Time for implementation

In the first 6 months of 2007

Table 2.3 Land allocation for project implementation

No	Commune	Total	Complete procedure for land allocation.	Measured area for mapping
	Total	**1,844.0**	**778.5**	**1,065.5**
1	Tam My Dong	108.5	108.5	
2	Tam MyTay	670.0	670.0	
3	Tam Sơn	119.9		119.9
4	Tam Thanh	494.5		494.5
5	Tam Tra	451.1		451.1

3.2.3 Species selection

(1) Bases for selection

Five (5) criteria are used:

(i) Policy suitability

The species that are recommended by Forestry agencies for afforestation

(ii) Technical and natural condition suitability

Good example of results set in the PA and area around of similar conditions

Ensuring the supplies of seedlings, technical planting regulations available for the selected species

(iii) Market suitability

The selected tree species should give product highly required by the markets and suitable to the project objective

(iv) Point of view of land users and financial agencies

Suitable management cycle and agreed upon by the growers,

(v) Impacts on environment

No do any harm to the environment and make soil degrade

(2) Results of tree species selection

Based on 5 criteria mentioned above and results of field survey in 5 project communes in Nui Thanh district, it is seen that A. hybrid and A. mangium are 2 best suitable species for the following reasons:

(i) A. hybrid and A. mangium are suitable to pulp material, particle board while the demand of the market within and without the country is high

(ii) Planted mostly in the PA (80% of area) and the MAI is > 15 m^3/ha/year. On the other hand, Quang Nam province and adjunct provinces have many nurseries that can satisfy the demand of seedlings with high quality.

(iii) Interview results show that, 100% of HHs select these 2 species for afforestation, of which 70% HHs prefer A. mangium, 30% - A. hybrid.

(iv) Cycle of management of A. hybrid and A. mangium is shortest among the existing species at the moment (7 years).

(v) Possible to improve soil conditions and productivity of the next cycle is better than the precious one.

(vi) A. hybrid is easily damaged by wind. Better grow it at the elevation of < 100 m, sloping < 20^0.

3.2.4 Design for afforestation

On the basic of afforestation plan of the project, 661 PMB of Nui Thanh district employ advisers for design to support farmer HHs dealing with production afforestation project.

(1) Principles for design

- Only happening to stands having land use right in red book
- Stands that HHs agree to use for project purpose
- Two suitability levels (S1 and S2) for Acacia spp.

(2) Requirements

Afforestation design is a scenario to borrow money from the banks, so the design should ensure the following:

- General information: Name of land user, area, location, species, suitability, planting year
- Harvest quantity, total revenue of the plantations
- Loan requirement, plan for borrowing and payment of the HHs
- Analysis of effectiveness by point of view of the investor

(3) Product from design

- Afforestation design map
- Afforestation design report

The mentioned products should be approved by the consultancy agency, HHs, PIU and PMB of Nui Thanh district.

3.2.5 Afforestation plan

(1) Bases for setting up afforestation plan

Based on the results of field survey on the natural and socio-economic conditions in the PA; total forest area to be planted; management cycle, the criteria for identification of afforestation area annum can be seen below:

(i) Implementation capacity: area to be planted should suit the existing implementation capacity as labors, seedling supply ... In year 1, planting quantity is low but increasing gradually in the coming years

(ii) Land use status: In initial years, planting priority is given to open land category and Eucalyptus sites, and then the logged sites to be set in afforestation plan

(iii) Ensure the implementation of project, fitting the conditions of borrowing money from banks

(2) Afforestation plan

Total area to be afforested is 1.844,0 ha; with A. hybrid and A. mangium and plant in 4 year from 2008 to 2011.

Table 2.4 Afforestation plan in 5-commune project in Nui Thanh district

UNIT: ha

No	Species	Suitability	Total	Planting year			
				2008	2009	2010	2011
	Total		**1,844.0**	**290.0**	**484.5**	**536.4**	**533.1**
1	***A. hybrid***		***765.2***	***101.2***	***186.7***	***183.2***	***294.1***
		S1	765.2	101.2	186.7	183.2	294.1
		S2	-				
2	***A, mangium***		***1,078.8***	***188.8***	***297.8***	***353.2***	***239.0***
		S1	66.8		5.6	22.3	38.9
		S2	1,012.0	188.8	292.2	330.9	200.1

3.2.6 Seedling supply plan

(1) Annual seedling supply plan

(i) Annual afforestation plan set up

(ii) Density for A. hybrid and A. mangium is1.660 per ha.

(iii) Seedlings for beating-up is (10%): 166 per ha.

Total seedling required is 1.826 per ha.

Annual seedling demand is set up as follow:

Table 2.5 Seedling supply plan

Uni: stem

No	Species	Total	By years			
			2008	2009	2010	2011
	Total	**3,367,144**	**529,540**	**884,697**	**979,466**	**973,441**
1	A. hybrid	1,397,255	184,791	340,914	334,523	537,027
2	A. mangium	1,969,889	344,749	543,783	644,943	436,414

(2) Seeding supplying sources:

(i) A. mangium

Local people will be supported in buying seeds of A. mangium of clear background for their own seedling production or buying seedlings from nurseries certified by DARD

(ii) A. hybrid

At the moment, capacity of nurseries of A. hybrid (cuttings) in Quang Nam can ensure the supply annum. Small nurseries of HH level are not far from the planting sites (1-5 km). The problem is that, there is not any A, hybrid nursery of big quantity in Nui Thanh. So buying seedlings from other places in the province is planned.

3.2.7 Logging plan

(1) Logging techniques

(i) Clear cut

(ii) Opening forest 1 month before felling

(iii) Chain saw is used for felling

Logging consists of felling, branching, sectioning, debarking. Falling direction in felling should be considered to facilitate later activities.

(iv) Skidding

Skidding distance is about 400 – 500 m, and is doing manually, or using animals to support

(v) Time: in dry season from April to July annum

(2) Area and quantity

(i) Based on the afforestation plan developed (location, area by species, suitability and planting year)

(ii) Based on the result increment prediction of tree species

(iii) Commercial quantity is 70% of standing volume

Logging plan is implemented in 2015 to 2018. Area and quantity of logging is presented in Table 2.6:

Table 2.6 Area and quantity of harvest annum

No	Species	Unit	Total	Year			
				2015	2106	2017	2018
1	**Harvest area**	**ha**	**1,844.0**	**290.0**	**484.5**	**536.4**	**533.1**
	A. hybrid		765.2	101.2	186.7	183.2	294.1
	A. mangium		1,078.8	188.8	297.8	353.2	239.0
2	**Harvest quantity**	**m^3**	**180,670**	**27,922**	**47,044**	**51,886**	**53,818**
	A. hybrid		82,643	10,930	20,164	19,786	31,763
	A. mangium		98,027	16,992	26,880	32,100	22,055

3.2.8 Plan for construction and upgrading infrastructure

(1) Establishment of nursery

Nurseries in Quang Nam province, as well as in the HHs' in the PA can possibly supply enough seedlings to afforestation project, so newly building and upgrading the nurseries is not necessary

(2) Construction and upgrading the road system

In the PA exists 188,5 km of road for vehicles, and evenly distributed and the distance to the afforestation sites is < 500m and no need to deal with this component.

(3) Equipment

For project implementation, Nui Thanh district Watershed PMB needs the following equipment:

- Computer: 02 pcs
- Printer: 01 pcs
- Desk: 02 pcs
- Cupboard: 01 pcs

Budget for procurement of equipment is taken from project management fee. As of 2008, procurement of equipment will be implemented

4 Cost of project

4.1 Assumptions

To implement the project the prerequisites for cost calculation are as follow:

(1) Base year: 2007.

(2) Inflation: 6%.

(3) Reservation: 5% baseline cost.

(4) Project life time2007 - 2018.

(5) Cycle: 7 years and for 1 cycle only

(6) Labor: 40.000 Dong/man-day (local price)

(7) Price of seedling, fertilizer is identified a in 2006, so, the price for seedling of cutting A. hybrid is 520 Dong/ste, A. mangium - 210 Dong/stem and NPK is 4.500 Dong/kg.

(8) Management fee for the PMB is 10% of total baseline cost by Decision No. 38/2005/QĐ-BN, 6-7-2005, MARD on the cost norm for afforestation, management, training, supervision and evaluation.

4.2 Project costs

4.2.1 Cost per 1 ha

Table 2.7 Cost per 1 ha A. hybrid and A. mangium

Unit: 1000 Dong

NO.	Item cost	A. hybrid	%	Acacia	%
1	Labor Cost	7.200	52,6	7.200	55,1
2	Seedling + fertilizer Cost	3.191	23,3	2.624	20,1
3	Other cost	360	2,6	360	2,8
-	Design	280	2,0	280	2,1
-	Nghiệm thu	80	0,6	80	0,6
4	Management fee	756	5,5	756	5,8
A	Total baseline cost	11.507	84,0	10.940	83,8
B	Reservation of quantity	575	4,2	547	4,2
C	Reservation of price	1.611	11,8	1.575	12,1
	Total cost (A+B+C)	**13.693**	**100,0**	**13.063**	**100,0**

Total cost per 1ha of A. hybrid is 13,7 million Dong: labor = 52,6%; materials = 23,3%; other cost = 2,6% and management fee - 5,5%. Total cost per 1 ha of A. mangium is 13.1 million Dong. The percentage of items of cost is something similar to the model of A. hybrid. If reservation is not calculated the cost for 1 ha A. hybrid is 11,5 million Dong, A. mangium is 10,9 million Dong.

4.2.2 Cost the whole project

Total cost for the whole model production afforestation is 27,2 billion Dong, 1.844,0 ha (765,2 ha A. hybrid and 1.078,8 ha A. mangium) and the model is implemented in 11 years from 2007 – 2018).

Table 2.8 Cost for the whole model (1844 ha)

Unit: Million Dong

No.	Item	Model	%
I	**Land allocation**		
II	**Production forest development**	**19.213,3**	
1	Labor Cost	13.276,8	
2	Materials	5.272,7	
3	Others	663,8	
III	**Management and Monitoring**	**1.394,1**	
A	Total baseline cost (I+II+III)	20.607,4	75,8
B	Reservation of quantity	1.030,4	3,7
C	Reservation of price	5.564,8	20,5
	Total cost (A+B+C)	**27.202,5**	**100,0**

(1) Cost for land allocation is not included in the project total cost, as it is local government's duty.

2) Cost for production forest development is 19.213,3 million Dong or 93% of total baseline cost of the project.

3) Cost for management and supervision is 1.394,1 million Dong, or 7% of total baseline cost of the project.

5 Financial plan

5.1 Financial sources for the project

To implement this project 3 financial sources will be mobilized:

(1) Loan from Agriculture Bank of Nui Thanh district

Loan from the bank is used for procurement of materials, design and part of it for labor cost. Based on the income of HHs, investment cost norm per one ha of afforestation, it is estimated that each HH will have to borrow about 6 million Dong/ha, disbursement in the first 3 years (Y1: 3,5 million Dong; Y2: 1,5 million Dong; Y3: 1 million Dong).

(2) Farmers' own fund

Farmers' own fund for afforestation investment is mainly labors involving planting, tending, protection. Their labor days will be paid by quantity of harvest

(3) State budget

State budget for the project is used for land allocation, management fee, supervision, design, check upon delivery and equipment.

Table 2.9 shows the breaking up of fund for project implementation. Total cost is 37.220 million Dong, Farmers' own fund is 56,2 %, loan is 40,1% and State budget is 3,7% .

Table 2.9 Total budget by financial sources

Unit: Million Dong

No	Item	Financial agency	State budget	HH fund	Total
1	Labor cost	6,205.0		7,071.8	13,276.8
2	Materials	4,859.0		413.7	5,272.7
3	Other		663.8		663.8
-	Design		516.3		516.3
-	Check upon delivery		147.5		147.5
4	Management fee		1,394.1		1,394.1
A	Total baseline cost	11,064.0	2,057.9	7,485.5	20,607.3
B	Quantity reservation	553.2	102.9	374.3	1,030.4
C	Price reservation	697.0	129.6	471.6	1,298.3
I	**Total baseline cost + Reser. (A+B+C)**	**14,932.9**	**2,290.4**	**10,875.6**	**27,202.5**
II	**Bank interest**			**10,017.7**	**10,017.7**
	Total	**14,932.9**	**2,290.4**	**20,893.2**	**37,220.2**

5.2 Borrowing and payment plan

(1) Loan conditions

Loan is supplied by agriculture bank based on the conditions set up by the bank. In average each HH can borrow 6 million Dong/ha, and conditions to be followed by HHs as follow:

(i) In case the HH has less than 3,5 ha for afforestation

In case the HH has less than 3,5 ha for afforestation or loan sum is <20 million Dong/HH, belief collateral should be applied as follow:

- Land use certificate
- Management plan or afforestation design scenario
- Loan contract.

(ii) In case the HH has more than 3,5 ha for afforestation

In case the HH has more than 3,5 ha for afforestation, or loan sum is >20 million Dong/HH, collateral should be applied as follow:

- Land use certificate.
- Management plan or afforestation design scenario.
- Assets for collateral
- Loan contract.

(2) Plan for getting loan and payment for one ha model

Based on the income of HHs, investment cost norm per one ha of afforestation, it is estimated that each HH can borrow about 6 million Dong/ha.

(i) Loan sum: 6 million Dong per 1 ha, disbursement in Y1: 3,5 million, Y2: 1,5 million and Y3: 1 million.

(ii) Rate of interest: 14,16%/year, pay in yearly manner, principal is paid in year 8 (harvest time)

(iii) Loan term: 7 years

(iv) Grace period: 7 years

Plan for getting loan and payment is shown in the table below:

Table 2.10. Plan for getting loan and payment for one ha model

(A. hybrid and A. mangium)

Unit: 1.000 Dong

Implementation year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Outstanding loan at the beginning of the year		3500	5000	6000	6000	6000	6000	6000
Disbursement	3500	1.500	1.000					
Repayment		495,6	708	849,6	849,6	849,6	849,6	6.850
Interest		495,6	708	849,6	849,6	849,6	849,6	849,6
Principal								6000
Outstanding loan at the end of the year	3500	5000	6000	6000	6000	6000	6000	

(3) Plan for getting loan and payment - 1844 ha

Based on the plan of afforestation and logging, Plan for getting loan and payment for model 1 ha and model 1.844 ha is shown in Table 2.11:

Table 2.11 Plan for getting loan and payment for the whole project model

Unit: Million Dong

Implementation year	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Outstanding loan at the beginning of the year	-	-	1.015,0	3.145,8	6.039,9	9.194,9
Disbursement (B1)	-	1.015,0	2.130,8	2.894,2	3.155,0	1.336,1
Repayment (C1)	-	-	143,7	445,4	855,2	1.302,0
Interest payment	-	-	143,7	445,4	855,2	1.302,0
Principal payment	-	-	-	-	-	-
Outstanding loan at the end of the year	-	1.015,0	3.145,8	6.039,9	9.194,9	10.530,9
Implementation year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Outstanding loan at the beginning of the year	10.530,9	11.064,0	11.064,0	9.164,0	6.364,0	3.164,0
Disbursement (B1)	533,1	-	-	-	-	-
Repayment (C1)	1.491,2	1.566,7	3.466,7	4.097,6	4.101,1	3.612,0
Interest payment	1.491,2	1.566,7	1.566,7	1.297,6	901,1	448,0
Principal payment	-	-	1.900,0	2.800,0	3.200,0	3.164,0
Outstanding loan at the end of the year	11.064,0	11.064,0	9.164,0	6.364,0	3.164,0	-

5.3 Cash flow of the project

Production afforestation Project in 5 communes of Nui Thanh district consists of 4 components, one out of which, land allocation, is supported by state fund. So this component is not calculated in total cost of the project.

5.3.1 Production afforestation

As regard the cash flow for project components it is the loan flow from the agriculture bank (proposed bank). The diagram below shows the organizational structure and administrative procedure relating to afforestation component.

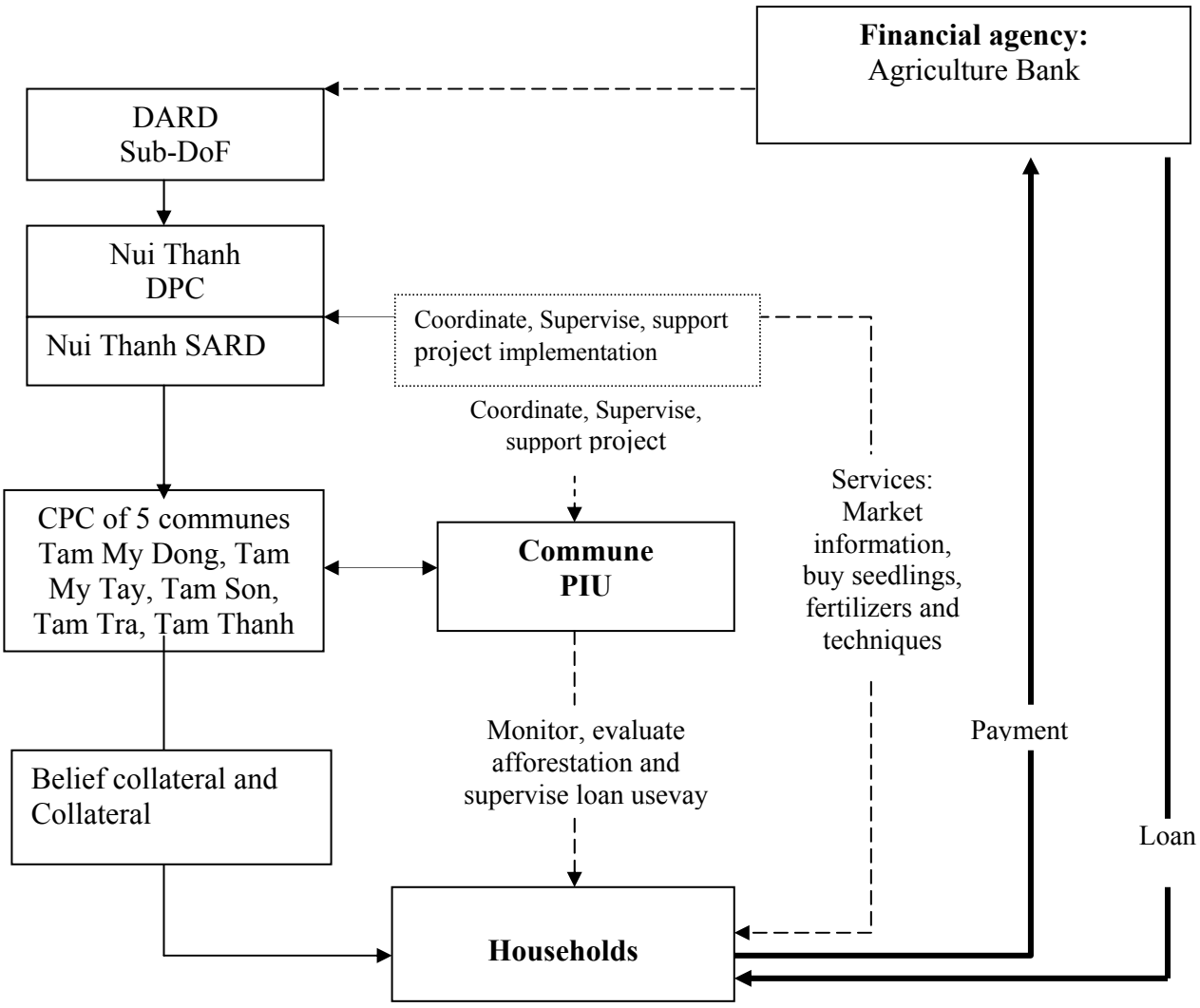


Figure 2.1: Organizational structure of financial flow for production afforestation component

The demand for loan annum is predicted in accordance with progress of production plan. PMB and PIU will implement the project by means of closely linking with Commune People's Committees (CPC) and village representatives, farmers and financial agencies.

HHs involving in the project will have to prepare a document for getting loan and certificate saying that the HHs is trained under the support of the CPC via the village leader. Having been approved by the CPC the document is submitted to Nui Thanh district agriculture bank. The bank will do appraisal the document and approve and then HHs can get money from the bank when HHs get certificate from PMB on the quantity of

work of the HHs. The disbursement is done in 3 times in year 1, year 2 and year 3 of the project.

5.3.2 Project management

This fee is taken from the province budget (or district budget) through the functional sections to the PMB and PIU on the basic of administrative procedure in financial management. (Organization as the DPI, DoFi and District Treasury). See the diagram below shows the organizational structure and administrative procedure relating the project components.

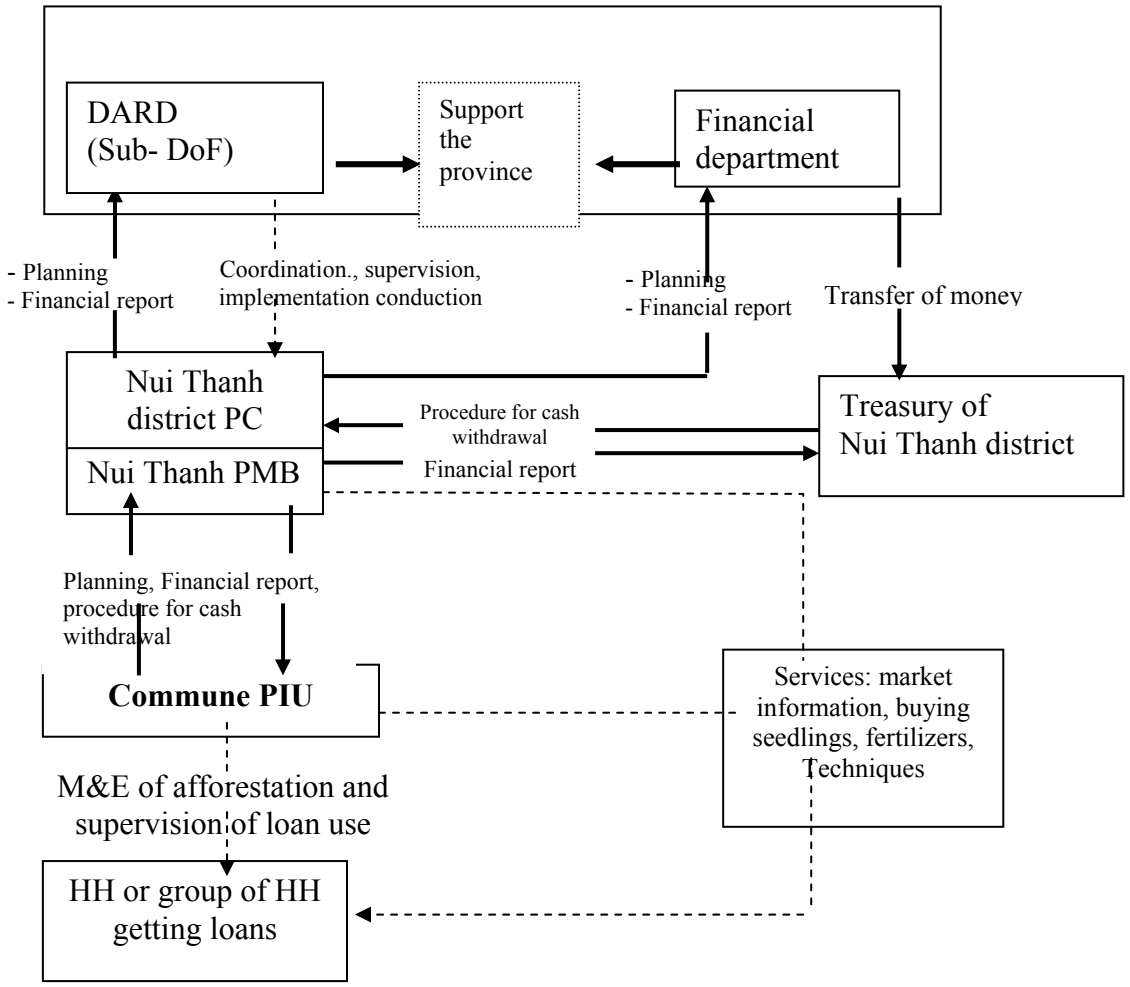


Figure 2.2: The organizational structure and cash flow for project management component

6 Project management and implementation

6.1 General aspects

For the implementation of the project, staff and existing equipment from relating organizations will be used. Consultants and extension staff will be recruited when needed.

At the moment, Nui Thanh district has 661 afforestation PMB, that is why no new Board is established and 661 PMB will take the position of management. The PMB is not responsible for loan of the HHs. However the Board will be responsible for different aspects relating to implementation to obtain project targets. At commune level the PIU will be responsible for day-to-day field activities.

HHs will contact directly to the banks to borrow money under the support of related organizations and follow all necessary procedure on credit loan.

In first 4 years, most of project work is implemented and it will gradually reduce from year 5 and work will be changed in year 7 to prepare for harvest work and consolidation of the supply system of the harvested product. Therefore staff from PMB and PIU should pay attention to the time of a big work load for implementation conduction.

6.2 Project Management Board (PMB)

The P.661 PMB of Nui Thanh district will be assigned to manage, implement the production afforestation project in 5 communes. At the moment, the structure of the PMB is complete and headed by a vice chairman of DPC who is in charge of forestry of the district, head of the district Economic Section is a vice head, and staff of the Economic Section are accountant and secretary as well as other technical staff.

The PMB will supply information and services to staff involving in project and support techniques to financial agencies a well. The detailed duty of the PMB will be dealt with in Plan for Project Implementation.

6.3 Commune Project Implementation Unit (PIU)

As planned the PIUs are also established in 5 communes of Tam My Dong, Tam My Tay, Tam Tra, Tam Son and Tam Thanh. Members of the PIU are commune staff/cadres in charge of cadastral or forestry and village heads, the chair or vice chairman will take the leading role of the PIU.

The PIU is responsible for supporting HHs in getting loan, planning afforestation annum, supervision, checking and check upon delivery project activities.

6.4 Households and groups of Households

Households or groups of households are key project implementers in the field. They have to borrow/repay money from/to the banks and implement afforestation plan. HHs involve in annual planning in connection to the PIU by means of registering area for afforestation.

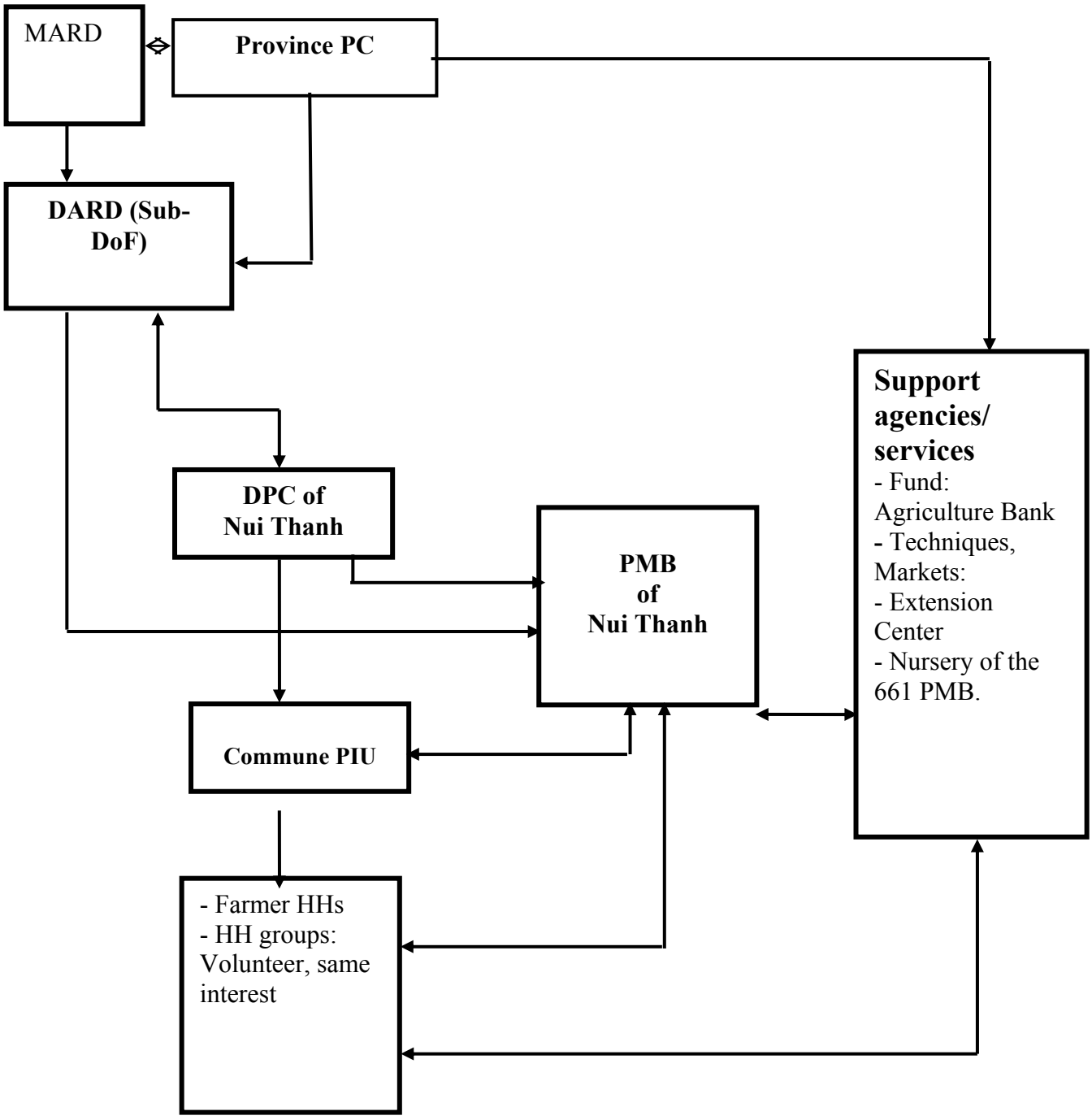


Figure 2.3: Management model and project implementation

6.5 Role of organizations, agencies of concern

(1) MARD is responsible for:

- Forestry policy;
- Approve annual production afforestation plan of P.661 of Son La province;
- Approve budget plans for production afforestation as said in Decision No. 210/2006/QĐ-TTg, dated 12-9-2006 on the principles, criteria and cost norm of development investment using state fund during 2007-2010.

(2) Quang Nam province PC:

Quang Nam province PC is the investment holder responsible for:

- Approve the project
- Consider, approve operational plan and annual budget for the project.
- Conduct, assign DARD in connection to Nui Thanh DPC and other functional organizations to supervise, evaluate project implementation plan.
- In connection to the Agriculture Bank to conduct to build a credit programme.
- Ensure the cooperation of related organizations and solve problems arisen during the implementation of the project
- Monitor and grasp the process of the project implementation, arrange human source and distribute state fund for the management component of the project.
- Conduct Nui Thanh district PC to complete land allocation and issue land use certificate to farmers in the PA soonest.

(3) Quang Nam DARD-SubDoF.

Quang Nam DARD—Sub-DoF the governing body is responsible for:

- Consultancy, information supply, orientation and technical recommendation.
- Assign duty to P. 661 PMB of Nui Thanh district.
- In connection to Nui Thanh district PC and the functional organizations to conduct PMB to realize, the plan.
- Support and supply information to PMB

(4) Nui Thanh district People's Committee (PC)

- Solve administrative procedure relating to the implementation of the project as issue land use right certificate, assign duty to P.661 PMB.
- Conduct the establishment of the PIU in 5 communes: Tam My Dong, Tam My Tay, Tam Tra, Tam Thanh and Tam Son.
- Support the district PMB with financial issue, human source as well as project implementation.

(5) Five Commune PCs:

- Set up the PIU follow the conduction of the DPC

• Support with personnel, afforestation planning, tending and protection of forest, planning for getting loan to implement the project annum.

• Participate in the settlement of problems in the process of project implementation

• Monitor and supervise, assess the situation of annual project implementation plan as well as project termination at commune level.

• The PIU is responsible for supporting HHs to borrow money, afforestation planning annum, checking, supervision and check upon delivery project activities

(6) Households and groups of households

- Households are responsible for implementation of all project activities as planned
- Have right to borrow money from the bank, and pay the principal and interest timely as committed
- Have the rights to decide the harvest and sales of products

7. Demand and solutions for labor mobilization

7.1 Labor demand

(1) Labor demand during the project cycle

Due to specific characteristics of the afforestation, as it depends on the season in the year, the demand for labors between months in the year is different. The calculation of labor demand relies on the implementation calendar of the project activities to set up the table of labor demand annum.

Based on the afforestation plan, labor norm per 1 ha afforestation, labor demand for project implementation is shown in Table 2.12.

Table 2.12 Labor demand for project implementation by administrative units

Unit: man-day

No	Year	Total	Tam My Tay	Tam Son	Tam Thanh	Tam Tra	Tam My Dong
1	2008	18,960	6,773	2,021	4,384	4,346	1,436
2	2009	49,369	18,833	3,507	11,872	11,971	3,186
3	2010	81,725	30,600	5,873	21,254	19,379	4,619
4	2011	101,961	37,013	6,110	27,865	25,174	5,799
5	2012	75,879	27,027	4,551	21,360	18,724	4,218
6	2013	39,548	16,536	2,665	5,458	12,054	2,836
7	2014	17,825	7,014	1,170	3,462	4,980	1,199
8	2015	11,639	4,236	704	3,168	2,867	663
9	2016	8,758	3,126	515	2,472	2,163	482
10	2017	5,139	1,766	280	1,488	1,306	301
11	2018	-					
	Total	**410,803**	**152,924**	**27,395**	**102,782**	**102,962**	**24,739**

Results from table 2.12: Total labor demand of the project in 11 years is 410,083 man-day, or 37,500 man-day per year in average. Although the implementation of work depends on the season in the year and work is distributed as planned, therefore from 2009 – 2012 the labor demand is biggest at 49,000 – 102,000 man-day/year.

The demand of labor during the project life time in Tam My Tay commune is biggest (152.924 man-day), and then Tam Thanh and Tam Tra (more than 103,000) Tam Son (27.395) and smallest is Tam My Dong (24.739 man-day only).

Total labor demand for afforestation is 119,860 man-day, or 29% of labor demand of the project, of which, vegetation, hole digging, hole filling in, and fertilizing need most labors. Total labor demand for tending accounts for high level (51%) concentrating fro 2010 – 2012, at 41,000 – 63,000 man-day per year. Labor for protection - 20% from 2011 – 2016 at 9,000 – 13,000 man-day per year (Table 2.13).

Table 2.13 Annual labor demand

UNIT: man-day

No	Implementation year	Total	Afforestation	Tending	Protection
	Tổng	**410,803**	**119,860**	**209,352**	**81,591**
1	2008	18,960	18,850		110
2	2009	49,369	31,493	15,660	2,217
3	2010	81,725	34,866	41,243	5,616
4	2011	101,961	34,652	57,922	9,388
5	2012	75,879		62,971	12,908
6	2013	39,548		26,640	12,908
7	2014	17,825		4,917	12,908
8	2015	11,639			11,639
9	2016	8,758			8,758
10	2017	5,139			5,139
11	2018	-			

(2) Month that requires most labor in project cycle

Quantity of work concentrates in month 9, 10, and 11 of the initial years that requires most labor during the project cycle. And it gradually increases from 2009-2011; And 2011 need most in particular in September

Month that requires most labor in project cycle is as follow

Table 2.14 Month that requires most labor in project cycle (Sep. 2011)

No	Item	Unit	Tam My Dong	Tam My Tay	Tam Son	Tam Thanh	Tam Tra	Total
	Total	man-day	**1,048**	**6,295**	**1,027**	**4,822**	**4,419**	**17,612**
			40	**242**	**40**	**185**	**170**	**677**
1	Afforestation	man-day	561	2,967	426	2,591	2,347	8,892
			22	114	16	100	90	342
2	Tending	man-day	443	3,042	547	2,033	1,891	7,955
			17	117	21	78	73	306
3	Protection	man-day	44	287	55	198	181	765
			2	11	2	8	7	29

7.2 Labors in households

Year Book 2005 of Nui Thanh district and survey results in 5 project communes show that, labors in 5 project communes is 11,332 persons. Agriculture and forestry labor having no job in 5 project communes is rather big, up to 887 persons.

Consequently, agriculture and forestry labor having no job in 5 project communes will satisfy the labor demand of the project, even the months that project requires most labors.

7.3 Development of groups / local organizations and support forest management

Through the results of field survey in the PA made by FIPI group and PST of Quang Nam to know that most of HHs here want to development afforestation themselves on their own lands while few others like to do it in group but not so many, say, (30%).

At present, in locality within and without the project area, production afforestation activities are implemented in 2 ways: afforestation by individual HHs and by groups of HHs.

Although, through the analysis of the advantages of afforestation in groups as easy to access to credit loan, to new techniques, labor supporting, management and protection of forests, market information, sharing experience in intensive farming...

With advantages of afforestation in group local government, the PMB encourage local people to apply this system. HHs of the same interest gather together to support each other in afforestation.

7.4 Training

HHs need to be supported technically in intensive afforestation and market information on forest products. To strengthen knowledge for farmers in afforestation with high effectiveness the project will support training to farmers in soil preparation, planting, tending, protection and market information on forest products

Venue for training is in CPC office of 5 project communes. Trainees are farmers involving in the project, commune forestry cadres and staff from Nui Thanh district Forest Protection Station.

Trainers are from the Extension Center of Quang Nam province and Center of Technical Application and TOT of Quang Nam.

Intentionally there will be 30 training courses in 4 years on afforestation techniques and market information on forest products

Table 2.15 Time and numbers of training courses

No.	Commune name	Total	Training courses in different years			
			2008	2009	2010	2011
	Total	**30**	**6**	**8**	**8**	**8**
1	Tam My Dong	4	1	1	1	1
2	Tam My Tay	8	2	2	2	2
3	Tam Son	4	1	1	1	1
4	Tam Tra	7	1	2	2	2
5	Tam Thanh	7	1	2	2	2

8. Monitoring and Evaluation (M&E)

8.1 Development criteria

According to the project aim and objective, the following indicators should be supervised:

As of 2011, 1,844 ha of production forest established

As of 2019, about 180,000 m^3 of timber will be harvested and sold to the markets

As of 2019, about 60 billion Dong obtained from timber selling

Job created for about 677 persons in the PA

The net income from afforestation is > 18 million/ha/7 years

8.2 Progressive indicator

Area to be planted. Tended and protected annum

About 30 training courses carried out

Harvested area annum since year 8

Timber quantity sold to the markets since year 8

8.3 Mechanism for M&E

8.3.1 Monitoring

The aim of project M&E of project progress is to check the results of project implementation comparing to what are planned the and to timely adjust plan to make it relevant to reality of implementation.

Monitor the project progress is implemented by the PMB

Monitor the project progress at commune level is implemented the PIU

Monitoring period may be done at quarterly or 6 months or yearly
Fund for monitoring is taken from the management fee

8.3.2 Evaluation

Evaluation of the project is done in 2 stages; (1) Mid-term review, and (2) termination review to evaluate the project. There are 5 criteria for evaluation: (1) suitability; (2) effectiveness; (3) efficiency; (4) impacts and (5) sustainability.

Project evaluation is done independently by a mixed group consisting of (1) Đại Nui Thanh district PC representative; (2) Quang Nam DARD representative (3) P.661 representative; (4) Agriculture bank representative; (5) Extension agency representative; (6) PIU representative and representative from the consultancy agency.

8.3.3 Methods of M&E and information collection

(1) Research study

Compare the implementation plan to implementation reports to evaluate what are implemented. The contents of report need to be studied:

Disbursement plan and lending report of the bank
Reports on afforestation plan, tending, protection annum
Sales plan and report of buying materials of the timber processing mills
Repayment plan and report on loan recovery
Report on check upon delivery of the project

(2) Field survey

Field survey is to evaluate the area and quality of plantation forests planted, tended and protected annum

As for vegetation clearance, digging holes, filling in holes: 100% of area should be checked.

To evaluate items as planting and tending, setting up sample plots to evaluate the rate of survival. The size of the sample plots is 100 – 400 m^2. Sample plot is set up systematically. Plot area is 3% of the stand area.

Field survey covers all project sites, compare to the afforestation design map to delineate and identify area planted

As for the M&E of commercial timber productivity harvested and sold to the markets, it is done as follow:

Set up sample plots to identify stock of the plantations, random check the timber volume in the harvest stands.

(3) Interview

Interview HHs involving the project to get to know the numbers of HHs involving the project and revenue obtained from selling timber.

Interview enterprises dealing with timber business and processing in Quang Nam province and adjunct provinces to know how much they bought and prices of timber.

8.3.4 Achievements of M&E

Achievements of M&E will be reports, documents of quality check upon delivery, constraints and proposals for improvement of project implementation.

PART III: EVALUATION OF PROJECT EFFECTIVENESS

1. Economic evaluation

1.1 Financial analysis

1.1.1 Summary of production afforestation plan of Nui Thanh district

The production afforestation project in 5 communes of Nui Thanh district has an area of 1844 ha, with 2 key tree species namely A. hybrid and A. mangium; management cycle is 7 years. The project life time is 11 years, starting in 2008 and terminating in 2018. Afforestation and harvest plans are shown in Table 3.1.

Table 3.1 Planting and harvesting plan

Unit: ha

No.	Item	Total	Planting Year /Harvesting Year			
			2008/2015	2009/2016	2010/2017	2011/2018
	Total	1844,0	290,0	484,5	536,4	533,1
1	A. hybrid	765,2	101,2	186,7	183,2	294,1
2	A. mangium	1078,8	188,8	297,8	353,2	239,0

1.1.2 Prerequisites and assumptions

- Base year: 2007 (analysis is implemented in fiscal year 2007).
- Inflation: 6 %/year.
- Quantity reservation: 5% of baseline cost
- Rate of interest: 14,16% year.
- Unit price for a labor day: 40.000 Dong/man-day (local price).
- Rate of discount: 10%.

1.1.3 Method of analysis

The analysis manual is shown in Figure below by means of calculation of net income based on the price of 2006 and criteria of investment as NPV, BCR, IRR.

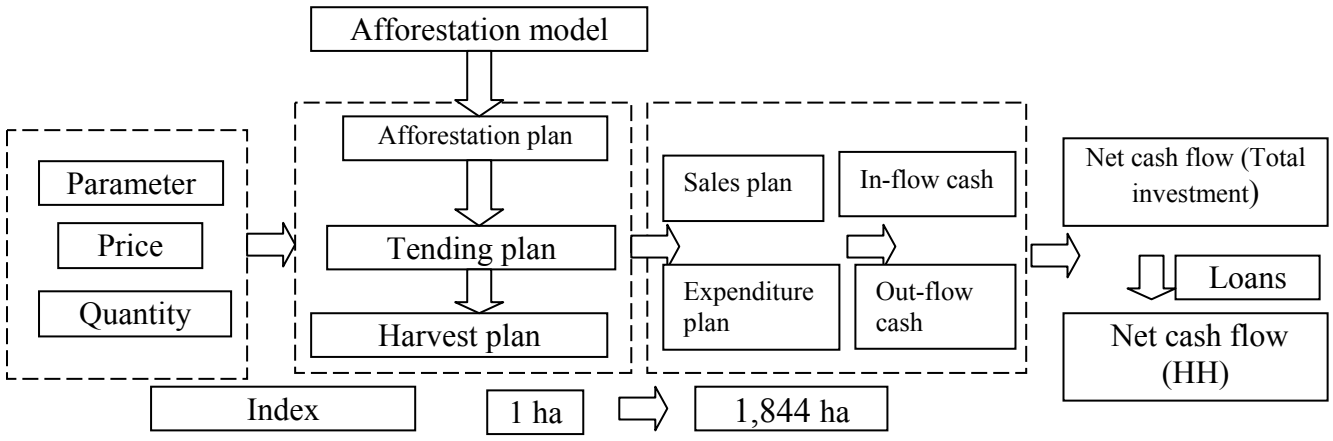


Figure 3.1 Diagram for economic and financial effectiveness analysis of the project

The analysis is applied to 1 ha model and the whole model (1.844 ha). From the point of view of total investment, direct benefits and costs are calculated in the cash flow, and then analysis by the investor point of view (HHs). In the analysis of the investor point of view, the credit programme and payment is located in the cash flow of total investment point of view.

The analysis will be implemented by calculating the net cash flow and applied by investment criteria as NPV, IRR and the rate between benefit and costs (B/C ratio) on the basic of 2006 price. The net cash flow is calculated based on the sales and costs plans, which are presented in parameter table (unit price). Quantity of the benefits and costs for 1 ha afforestation model and implementation time schedule; and planting and harvest plan are set up based on 1 ha afforestation model. And analysis steps are implemented as follow:

(1) Set up sales plan (cash in-flow) and cost plan (cash out-flow) for 1 ha A. hybrid and A. Mangium model.

(2) Analysis of the net cash flow, calculation of indexes as IRR, NPV and B/C ratio by point of view of total investment of 1 ha model (average area of a HH involving in the project) for each model (A. mangium and A. hybrid) and total area of the whole model.

(3) Set up plan table for getting loan and payment

(4) Analysis of cash flow and calculation of NPV, IRR index and B/C ratio by point of view of investment for 1 ha for each model for each model and total area of the whole model.

(5) Analysis of the sensibility on indexes as NPV and IRR total investment point of view for the whole model on changing conditions as: rate of bank interest and unit price for labor day wage.

1.1.4 Results of analysis

(1) With-project case

(i) Effectiveness by total investment point of view

- **Model of 1 ha:**

Table 3.2 Financial analysis by total investment point of view - Model 1 ha

NO.	Item	Unit	A. hybrid	A. mangium
1	Net income	1.000 đ	23.558	18.542
2	Total CPV (a)	1.000 đ	10,007	9,466
3	Total BPV (b)	1.000 đ	16,626	14,009
4	NPV	1.000 đ	6,620	4,543
5	BC Ratio (b)/(a)		1.66	1.48
6	IRR	%	19.41	17.27

Outcomes of analysis show that both A. hybrid and A. mangium model are feasible with IRR index bigger than the rate of interest of loan. A. hybrid species has the index of NPV, BCR, IRR higher than that of the A. mangium, which proves that the effectiveness of A. hybrid model is bigger as A. hybrid is growing faster.

The IRR is fairly high, min. is 17,27% (A. mangium) and max. is 19,41% (A. hybrid). Net benefit obtained is 4,5 – 6,6 million Dong/ha in the 7-year management cycle.

- **Model 1,844 ha:**

Outcomes of financial analysis on the point of view of total investment with model 1,844 ha show that the project is of high feasibility, the net benefit obtained is 8.48 billion Dong, and IRR is 18.18%, which is bigger than the rate of interest of loan (14,16%)

Table 3.3 Financial analysis by total investment point of view- Model 1,844 ha

No.	Item	Unit	Total
1	Total CPV (a)	Million Dong	15,250
2	Total BPV (b)	Million Dong	23,732
3	NPV	Million Dong	8,481
4	BC Ratio (b)/(a)		1.56
5	IRR	%	18.18

(ii) Effectiveness by investor's point of view (household)

Analysis by investor's point of view is done by combining the loan and payment of rate of interest and principal with the point of view of total investment with the unskilled labor wage is 40.000 Dong/man-day

Necessary loan sum is calculated on the basic of material costs (seedlings, fertilizer...) is 6 million Dong and disbursed in the first 3 years.

Based on collected data on the socio-economic situation, in 5 communes of Nui Thanh district, the area set aside for the project is 1.844 ha, and 922 HHs. It means that each HH has 2 ha of forestry land and possibly involving in the production afforestation project.

Table 3.4 Plan for borrow and repayment for model 2 ha A. hybrid

UNIT: 1.000 Dong

No.	Implementation year	1	2	3	4	5	6	7	8
1	Outstanding loan at the beginning of the year	-	7,000	10,000	12,000	12,000	12,000	12,000	12,000
2	Disbursement	7,000	3,000	2,000	-	-	-	-	-
3	Repayment	-	991	1,416	1,699	1,699	1,699	1,699	13,699
4	Interest paid	-	991	1,416	1,699	1,699	1,699	1,699	1,699
5	Principal paid	-	-	-	-	-	-	-	12,000
6	Outstanding loan at the end of the year	7,000	10,000	12,000	12,000	12,000	12,000	12,000	-

HHs grow 2 ha of A. hybrid will have the net benefit of 14.12 million Dong, and 2 ha of A. mangium – 9.96 million Dong. The IRR is 1.5 times of the rate of interest (22 – 24%). So, analysis by investor's point of view, the project is of higher feasibility comparing to the total investment point of view (Table 3.5)

Table 3.5 Financial analysis indicators by investment point of view

No.	Indicator	Unit	Model 2 ha A. hybrid	Model 2 ha Acacia NO.	Whole project (1,844 ha)
1	NPV	1,000 Dong	14,115	9,962	9,108,901
2	IRR	%	24.44	22.02	22.47

(2) Without-project case

In of no project, local people continue managing their coppice Eucalyptus plantations and low productivity of Acacia sites; open land is not planned for afforestation; and pineapple lands bring about low effectiveness.

Open land brings about insignificant benefits annum except for firewoods, no market for pineapple. Therefore, 450.5 ha of open land and pineapple lands are not mentioned in the calculation.

In this case, an area of 1.393,5 ha of coppice Eucalyptus, A. mangium, A. auriculiformis giving products are financially analyzed in case of no project.

Assumptions for calculation: base price, rate of inflation, rate of discounts, cycle of management, rate of interest ... are applied as the case of wit-project analysis.

Table 3.6 Effectiveness of the model – no project case

No.	Indicators	Unit	Total
1	Total CPV (a)	Million Dong	6.274,1
2	Total BPV (b)	Million Dong	9.559,6
3	NPV	Million Dong	3.285,5
4	BC Ratio (b)/(a)		1,52
5	IRR	%	16,68

Analysis results show that, in case of no project local people continue managing their coppice Eucalyptus, pineapple and Acacia spp. of low net benefit – 6.2 billion Dong or 40% comparing to the case on with-project, net benefit is 3.2 billion Dong.

(3) Additional growth value of the project

The additional growth value of the project is big, net income and a benefit of the project is 2 times bigger than the management of the coppice Eucalyptus, A. auriculiformis, A. mangium.

Table 3.7 Growth value of the project (1,844 ha)

Unit: Million Dong

No.	Indicators for evaluation	Unit	Increased value of the whole project
I	**Growth cash flow**	Million Dong	
1	Production Costs and Quantity reservation (price of base year)		10.542,9
2	Income from sales		26.737,6
3	Net income		16.194,7
II	**Indicator for growth analysis**	Million Dong	
1	CPV		8.976,3
2	BPV		14.172,1
3	NPV		5.195,7

1.1.5 Project sensibility

The sensibility of the project is analyzer on the basic of changing of elements that greatly impact on the project effectiveness as: labor wage, timber productivity, and selling price of products.

(1) Sensibility analysis by labor wage

Table 3.8 Variation of effective indicators by man-day cost norm

UNIT: Million Dong for NPV

No.	Labor price	NPV	BCR	IRR
1	25.000	12.629	2,14	24,14%
2	30.000	11.246	1,90	21,93%
3	35.000	9.864	1,71	19,96%
4	40.000	8.481	1,56	18,18%
5	45.000	7.099	1,43	16,57%
6	50.000	5.716	1,32	15,08%
7	55.000	4.333	1,22	13,71%

Table of analysis above shows that with the unit price for labor day smaller than 50,000 Dong/man-day, the afforestation project is still feasible. When the man-day price is equal to 55.000 Dong/man-day, and the IRR is smaller than the rate of interest of loan, say the project is not feasible.

(2) Analysis of sensibility by product price

When the price of the standing trees is 80% of the price used for analysis, the index of IRR is 14%, smaller than the rate of loan interest, which shows infeasibility of the project when the selling price of products reduces by 20% (Table 3.9).

Table 3.9 Variation of effective indicators by sales price of products

No.	Price variation (%)	Price level (Dong/m^3)	NPV	BCR	IRR
1	130	429.000	15,601	2.02	23.25%
2	120	396.000	13,228	1.87	21.69%
3	110	363.000	10,854	1.71	20.01%
4	100	330.000	8,481	1.56	18.18%
5	90	297.000	6,108	1.40	16.20%
6	80	264.000	3,735	1.24	14.00%
7	70	231.000	1,362	1.09	11.55%

(3) Sensibility analysis by labor wage and selling price of products

Results of sensibility analysis of the project show that, 4 cases that the NPV is negative or the project is lost. The most feasible project in case the labor wage is ≤ 40.000 Dong/man-day and the timber price is ≥ 330.000 Dong/m^3.

Table 3.10 Analysis of the change of NPV by productivity and product sales price

Unit: Million Dong

Labor price (Dong/man-day)	NPV	Product price (Dong/m3)						
		429.000	396.000	363.000	330.000	297.000	264.000	231.000
	25.000	19.749	17.375	15.002	12.629	10.256	7.883	5.510
	30.000	18.366	15.993	13.620	11.246	8.873	6.500	4.127
	35.000	16.983	14.610	12.237	9.864	7.491	5.118	2.744
	40.000	15.601	13.228	10.854	8.481	6.108	3.735	1.362
	45.000	14.218	11.845	9.472	7.099	4.725	2.352	(21)
	50.000	12.835	10.462	8.089	5.716	3.343	970	(1.404)
	55.000	11.453	9.080	6.707	4.333	1.960	(413)	(2.786)

1.2 Economic analysis

1.2.1 Economic indexes

Economic analysis is an analysis of the feasibility of the project by nationwide point of view. The prerequisites for the analysis and method are similar to financial analysis. In economic analysis, the financial price is adjusted to make it a base price.

The labor wage is similar to the price used for financial analysis (40,000 man-day), as it is the real local price.

Results of interview at the Dung Quat Customs Office and Timber Processing Mills on the price of chip for export, port fee, chip price at mills, chopping fee... Interview transport companies on transport costs. A result of identification of economic price of

timber (standing trees) is 440.000 Dong/m^3. Prices used for calculation of economic price are shown in Table 3.11.

Table 3.11 Indicators for economic price

NO.	Item	Chip	Unit
1	Chip export price (USD)	92	USD/ton
2	Chip price (VND)	1,472,000	VND/ton
3	Sea port fee	130,000	VND/ton
4	Transport fee from mill to port	50,000	VND/ton
5	Chip price at mill	1,292,000	VND/ton
6	Round wood to chip (54%)	697,680	VND/m^3
7	Cost for copping	120,000	VND/m^3
8	Round wood price at mill gate	577,680	VND/m^3
9	Transport fee from forest to mill	52,000	VND/m^3
10	Wood price at forest gate	525,000	VND/m^3
11	Cost for felling, debarking, skidding	85,000	VND/m^3
12	**Price for standing trees**	**440,000**	**VND/m^3**

1.2.2 Outcomes of economic analysis

(1) With-project analysis results

Table 3.12 Results of economic analysis of the project

No.	Indicators for analysis	UNIT	Results
1	NPV	Million Dong	16.392
2	IRR	%	23,7
3	BC ratio		2,07

Economic effectiveness of the project is fairly high, net benefit of the project is 16,39 billion Dong, in which the net benefit in the period of forest establishment is 8.48 billion Dong (financial effectiveness), the net benefit in processing is 7.99 billion Dong.

The possibility of recovery of investment of the project is fairly high with the IRR of 23,7%, or 1.6 times bigger than the rate of interest of loan.

(2) Without-project case outcome analysis

Table 3.13 Results of economic analysis - no project case

No.	Indicators for analysis	Unit	Results
1	NPV	Million Dong	6.472,0
2	IRR	%	21,4
3	BC ratio		2,03

In case of no project local people continue managing the coppice Eucalyptus, A. auriculiformis and A. mangium of low productivity, net benefit is of only 6.47 billion Dong or 40% comparing to that of the case of with-project. Due to low investment so the indexes of IRR, BC ratio are something approximate to intensive growing of A. hybrid and A. Mangium

(3) Additional growth of economic effectiveness of the project

Table 3.14 Results of growth analysis

No.	Indicators for evaluation	Unit	Increased value of the whole project
I	**Growth cash flow**	Million Dong	
1	Production costs and Quantity reservation (price of base year)		10.542,9
2	Income from sales		35.650,2
3	Net income		25.107,2
II	**Indicator for growth analysis**	Million Dong	
1	CPV		8.976,3
2	BPV		18.896,1
3	NPV		9.919,8

The Intensive Afforestation Project (A. hybrid and A. Mangium) in 5 communes of Nui Thanh district will have the increased net income of 25.1 billion Dong, and net benefit increases by 9.9 billion.

2 Environmental Impact Evaluation

(1) New plantation forests improve soil conditions

The Afforestation Project in 5 communes of Nui Thanh district will establish 1,844 ha of plantation forests, of which open lands and pineapple lands account for 450.5 ha and Eucalyptus lands – 479.8 ha. Pineapple lands are at high risk of erosion. Eucalyptus lands is dry as the species need lots of water during its growth, at the same time Eucalyptus leaves containing oil which is difficult for decomposing, less organic matter returning to soil, and gradually soil is compacted with high acidity

The species used to replace pineapple and Eucalyptus are A. hybrid and A. mangium, these are legume species the root system contains nitrogen fixing symbiotic bacterium, that is why Acacia is often compensated with certain content of nitrogen. This is the reason explaining that the productivity of the Acacia plantations does not reduce after the cycle II.

(2) Higher content of CO_2 absorbed by new plantation forests

New plantations of Acacia spp. are of higher growth than Eucalyptus and the biomass is bigger so the content of CO_2 absorbed by the new plantations is much higher than that of the open land, pineapple and Eucalyptus lands. Absorption and fixation of CO_2 in the form of organic substances contribute to the green house effect that makes warm the globe.

(3) New plantation forests have many storeys, and improve water retaining capacity

Under the Eucalyptus canopy, shrubs and vegetation floor poorly developed as Eucalyptus leaves contain oil that is not suitable to the growth of many species. In general, the open land, pineapple and Eucalyptus lands are of poor cover, the decomposed litter is poor and cannot retain water.

A. hybrid and A. Mangium forests have a dense canopy. The ground floor contains a good decomposed litter that helps retaining water.

(4) The intensiveness of soil erosion after clear feeling

The project applies the method of clear cut, clear logged site is > 450 ha/year, and soil erosion with high intensiveness is unavoidable in rainy season.

To halt this situation, the PMB should have regulations for replanting soonest after logging in the same year logging year.

3 Social impact evaluation

(1) Impact on HH economy

Each HH will grow 2 ha, beside the loan from the bank of 6 million Dong, and the HH must invest 2 other million Dong per year while HH must pay the rate of interest of the loan (1.5 million Dong/year). So each year the HH must spend 3.5 million Dong, or 17% of income, that causes difficulty to poor HHs. However, most of the costs mentioned above can be solved by using off-farm labors and part of their annual accumulation to pay the interest of loan.

By the end of the cycle, HH sell their timber and can obtain 60.0 million Dong from A. mangium and 71 million Dong from A. hybrid, the net income of the HH will be 38 – 49 million Dong depending on tree species planted. Annual income the HH increases by 6 million Dong, or 30% of HH's income.

(2) The gap between rich and poor in mountain rural areas

Results of socio-economic survey in 5 communes show that in average each HH will have 2.0 ha of forestry land, 30% of HH has < 1.0 ha, 5% of HH has > 15.0 ha.

With the average income from 1 ha of 3 million Dong/year, the HHs having more forestry land will have 15 times of income comparing the less (15 ha x 3 million = 45 million Dong). With much higher income annum these HHs can buy land from other of low income. This is the process of land accumulation that makes wide the gap between rich and poor in the mountain rural areas.

To limit this situation, when dealing with land allocation local governments should have regulations on levels of forest land allocated to HHs fitting the land pool of the locality as well as the requirement of afforestation of HHs.

(3) Impact on gender

Women are undertaking many things in their daily life other than house work as growing plants and animals, collecting firewood and others to generate income for the family while men control finance and decide how money is used.

In case of with-project, women are ready to involve in the project to generate income for their families. They wish to do with the nursery work and management of loan ...No doubt, more job more income women can participate in family and social activities and their role will be ever improved.

(4) Impact on the minority ethnic groups

In the PA, the Cor live in Tam Tra commune, their annual income id only 45% of the average income in the area. However the results of field survey show that the Cor people own more forestry land, say 3 ha/HH or 1.5 times bigger than the average level of the area.

With the income of 3 million Dong/ha times 3 ha each Cor HH can get 9 million Dong per year, or 100% of the present income. It is possible to say that afforestation is the strength of the Cor, which may help them to be improved a lot.

4 Technical evaluation

(1) Area set aside for the project

In forestry production, area used is often smaller than the natural area as part of it cannot be used (steam/river, rock, local steep sites...), so the coefficient of forest land use is applied in forestry production. The coefficient in Quang Nam ranges from 0.7 – 0.9, depending on topographical conditions and land use of each locality.

Area for afforestation project is calculated based on the land use coefficient as follow:

Open land: 0.8

Old plantations/pineapple lands: 0.9.

This land use coefficient is taken from afforestation design of Quang Nam Consultancy of Afforestation Design Center of Sub-FIPI.

(2) Afforestation technical measure

The proposed technical measure for the project is considered and examined on the basic of Guidelines for growing A. hybrid and A. mangium made by national and local levels. At the same time this measure is being applied in the PA. Consequently the technical measure for afforestation project is of high feasibility.

(3) Seedling quality:

Seedlings are taken from 2 suppliers:

- HHs involving in the project can do the nursery themselves for A. mangium, seeds bought from reliable centers certificated, and the quality of seeds is ensured.
- As for A. hybrid, HHs buy it from nurseries certificated in the area.

So, all seedlings and seeds used for the afforestation project are supplied by reliable centers certificated by Quang Nam DARD as some of the centers serve program as P.661, WB3 and KFW6, which are undertaking their activities in Quang Nam province.

(4) Stock and productivity of harvest

Findings of survey and prediction of stock and productivity of the existing plantations are dealt with in Part I, however, these plantations are planted in an extensive way, no technical measures applied, as the use of fertilizers and the provenance of varieties are not well identified. We base ourselves on the existing data to calculate the stock and productivity for the intensive planting of our afforestation project and seedlings are supplied by certificated nurseries.

The calculation of productivity for harvest via the commercial productivity, the result of harvest in the project area is 70%.

From the analysis above, the stock and productivity for harvest is always higher than the planned figure. This factor forms the feasibility for the project.

5. Risks of the project

The production afforestation project ha a long management cycle (7 year), risks may happen during the lifetime of the project. That is why it is necessary to predict the risks what will be happening and set up solutions for overcoming to limit negative impacts if any. Risks in the development of production forests may consist of:

(1) Land use right certificate is issued lately

Land use right certificate is used for borrowing money, while only 3/5 of communes have this kind of document.

(2) Fore fires

This area is very sensitive to fire particularly in the area where large pure forest stands established. To halt the risk of fore fires it is important to raise awareness of local people in the PA in use of fire in the forest. In months that fire may easily happen there should be a task force to take care of fore fires.

(3) Strong wind and typhoons

Quang Nam province as well as the Central suffers from typhoon every year causing great losses to economic sectors as well as local people. As for the forestry production, those fast growing species the process of lignification takes place slowly, so they easily fall down and break in strong wind. To avoid this situation, it is better to grow A. hybrid on sites of low elevation at < 100 m, inclination < 20^0.

(4) Epidemics

Pure species afforestation with large scale makes poor bio-diversity in the area, and the capacity of natural anti-diseases reduces and creates chances for pest development. It is recommended that planting one species in the same place for a long period is not advised.

PART IV: CONCLUSIONS AND RECOMMENDATIONS

1 Conclusions

The production afforestation project in 5 communes Nui Thanh district is formulated since August 2006 to January 2007 and is completed by the cooperation of many functional organizations from central to local level under the support of JICA specialists.

Organizations directly involve in the formulation of this project in 5 communes of Nui Thanh district consist of:

- Quang Nam province study team (staff from DARD, Sub-DoF, FPD, Extension Center, Nui Thanh District Financial Section, Section of Natural Resources - Environment.
- Sub-FIPI in the Central
- FIPI

The project is formulated based on the comprehensive analysis on: site conditions, land use status and natural resource utilization, socio-economic situation, forest product markets, financial resources, and national and local policies relating to and aspiration of local people ... Consequently, the production afforestation project in 5 communes of Nui Thanh district is of high feasibility

The project proposes to grow 1,844 ha of A. mangium and A. hybrid forest in 5 communes of Nui Thanh district: Tam My Dong; Tam My Tay; Tam Tra; Tam Son and Tam Thanh. The lifetime of the project is from 2007 to 2018. Total investment to the project is 37,220 million Dong, mobilized from Agriculture Bank and Policy Banks of Nui Thanh district, local state funds, farmers' own funds. Tentatively after a cycle of management, the timber quantity will be 180.000 m^3 of timber material and the turnover is 59,677 million Dong, the net benefit is 8.481 million Dong. Income of HHs involving in the project is increasing due to participating in afforestation activities. The sum is 35 million Dong in 7 years (including labor investment)

2 Recommendations

To make the project deploy timely as planned it is recommended to concerned agencies of Quang Nam province that:

(1) Nui Thanh DPC speeds up land allocation in 5 project communes soonest

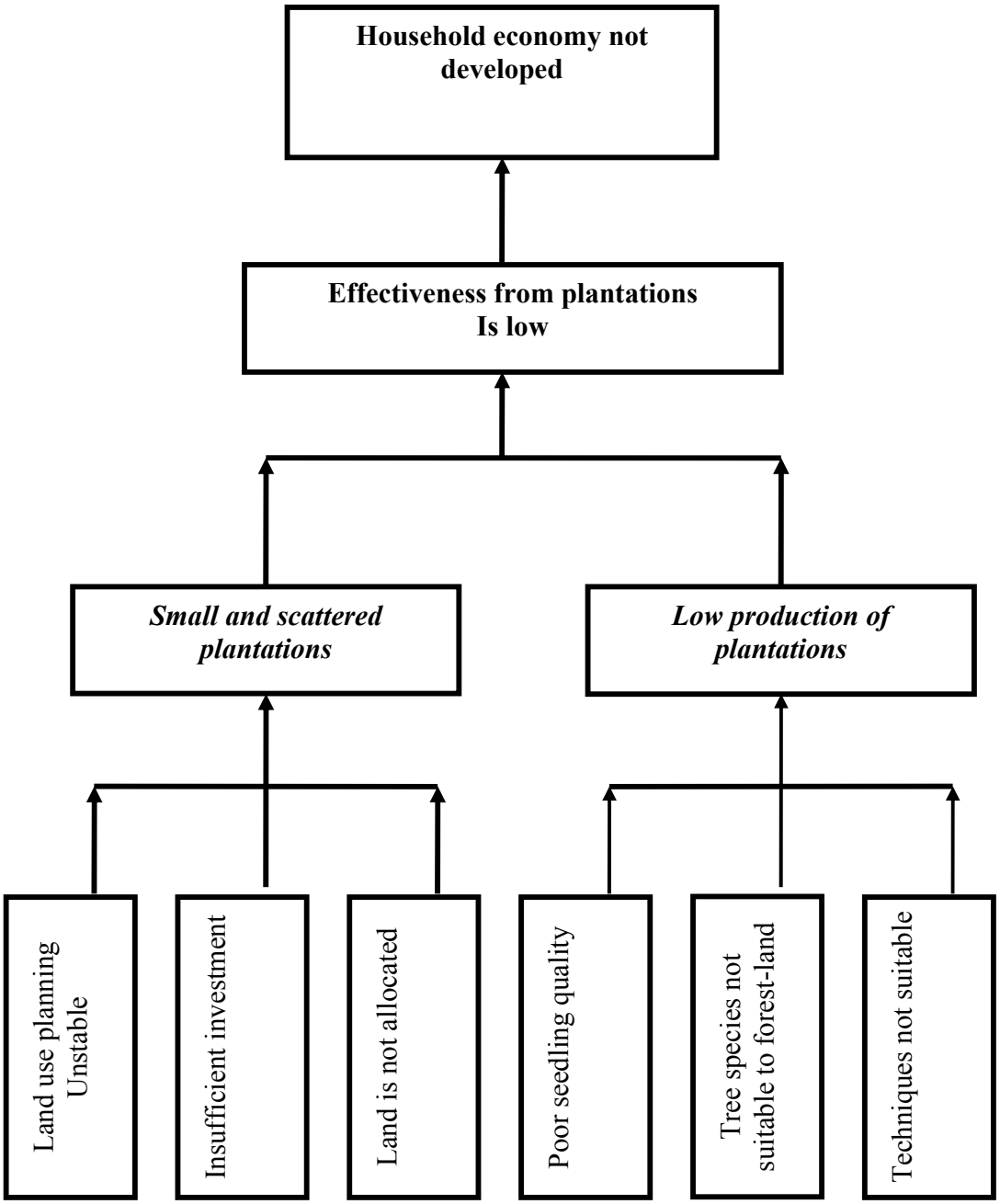
(2) Financial agencies do disbursement timely as planned

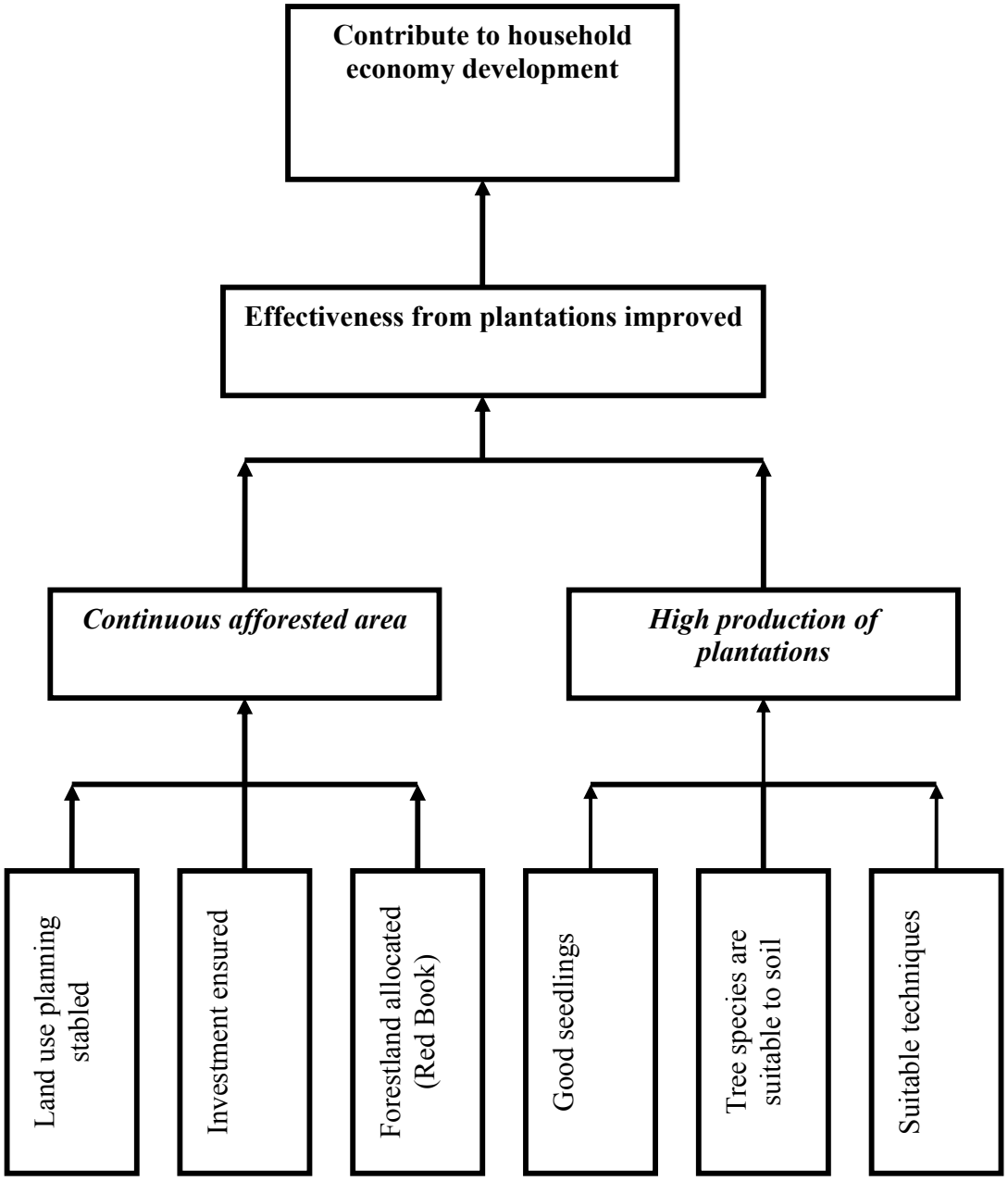
(3) Nui Thanh DPC and DARD assign this project to Nui Thanh Afforestation Project Management Board to manage and conduct the project as well as nominate staff for the implementation.

(4) Quang Nam province functional organizations soon approve the project for timely deploying the project.

Annexes

Annex 1: Project Matrix




Contribute to household economy development
Effectiveness from plantations improved
Continuous afforested area
High production of plantations
Land use planning stabled
Investment ensured
Forestland allocated (Red Book)
Good seedlings
Tree species are suitable to soil
Suitable techniques

Project name: Production Forest Establishment Project
Target areas: Tam My Dong, Tam My Tay, Tam Tra, Tam Thanh, Tam Son, Nui Thanh District, Quang Nam province
Duration: 2007-2018
Target Beneficiaries: Households who have forest land allocated in the project site
Version 03: 11/2006 to 3/2007

ITEM	EVALUATION INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
Overall objective Contribute to HHs economic development by production afforestation of 5 project communes of Nui Thanh,	- Job for 500 labours in the PA - Benefit from sales of forest plantations products is 12,8 million-VND/ha/year in 2006 price	- Project termination report - Management report of Quang Nam Timber Processing Companies	
Project objective The effectiveness of plantation is improved	- In 2014, 1,844 ha planted - In 2021, 200,000 m^3 of timber produced - Profit of 14 - 15 million-VND /ha/7 years obtained	- Management report of Mills and Project - Socio-economic report - Results of field check - Interview farmers in the PA - Data of supervision and evaluation	- Stable market;
Expected outputs 1. Forest land allocation is completed 2. Production forest is established 3. Institutional arrangement to manage production forest is defined.	1. 800 ha of forest land is allocated within 2007 2-1: 1,844 ha planted in 5 communes 2-2: 30 training courses are held, 3-1: Project Implementation institution is established 3-2: Regular meetings are held among concerned stakeholders on six-month or quarterly basis	- Management report of Mills and Project - Socio-economic report - Approval decision - Red Book for land use rights - Credit contract - Seedling supply contract - Training report - Document of checking upon delivery - Project synthesis report - Financial report - Minutes of meetings	- Commitments of buyers are implemented - Active involvement of local people - Supported by local governments - There will not be any serious pest and disease nor natural disasters
Activities 1. PMB negotiate with local authority to accelerate forest land allocation 2. PMB Facilitates farmers to carry out plantation activities 3. Establish PMB in Nui Thanh district and 5 PIU and farmers' groups.	Inputs Total 27,2 Billion VND (excluding land allocation cost) 2: production component 19,2 Billion VND 3: Management and M&E 1,3 Billion VND 4: Physical contingencies 1,7 Billion VND 5: Price contingencies 5,0 Billion VND 6: Labour input for project implementation 500		- Adequate staff and budget is allocated by the government through the project implementation period; - Interest of participants in forest planting is maintained. Pre-condition 1. Approval of Provincial People Committee is obtained; 2. Credit schemes principle agree with PMB on terms and condition of loan

Annex 2: Afforestation Area by Stands

Name of commune	Forest district	Plot name	Status	Owner	Red Book	Function	Land unit	Potential class	Suitability	Species	Planting year	Harvest	Area
Tam My Dong	620	17a	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KL	2008	2015	22.0
Tam My Dong	620	17b	BDC	Household	Yes	Production	T1G2IAD2H1R1	II	S2	KNO.	2009	2016	17.0
Tam My Dong	620	23	BDC	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	11.2
Tam My Dong	620	8	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KL	2010	2017	3.3
Tam My Dong	620	6	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	6.4
Tam My Dong	NTK	15	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KL	2010	2017	5.2
Tam My Dong	620	1b	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KL	2010	2017	2.9
Tam My Dong	620	13a	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KL	2010	2017	3.1
Tam My Dong	620	9	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	3.6
Tam My Dong	620	25	KLTII	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	26.4
Tam My Dong	620	25b	KLTII	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	7.4
Total													**108.5**
Tam My Tay	NTK	15a	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KL	2008	2015	17.6
Tam My Tay	NTK	16	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KL	2008	2015	24.9
Tam My Tay	NTK	4	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KL	2008	2015	4.0
Tam My Tay	617	14b	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KL	2008	2015	20.8
Tam My Tay	617	8	IA	Household	Yes	Production	T1G2IAD2H1R1	II	S2	KNO.	2008	2015	1.8
Tam My Tay	617	1	BDC	Household	Yes	Production	T1G2IAD2H1R1	II	S2	KNO.	2008	2015	17.3
Tam My Tay	617	7	BDC	Household	Yes	Production	T1G2IAD2H1R1	II	S2	KNO.	2008	2015	17.3
Tam My Tay	NTK	35	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	1.2
Tam My Tay	NTK	36	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	1.7
Tam My Tay	619	7	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	4.1
Tam My Tay	NTK	25	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	4.8
Tam My Tay	617	17	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	4.5
Tam My Tay	NTK	32	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	3.7
Tam My Tay	NTK	22	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	6.0
Tam My Tay	619	18	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KL	2009	2016	11.4
Tam My Tay	617	32	KNO.II	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	1.6
Tam My Tay	NTK	24b	IC	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	4.0
Tam My Tay	619	8	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	10.9
Tam My Tay	NTK	34b	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KL	2009	2016	23.0
Tam My Tay	NTK	34a	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KL	2009	2016	7.7
Tam My Tay	617	22b	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KL	2009	2016	36.5
Tam My Tay	617	26	KLTII	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	5.0
Tam My Tay	617	27	KNO.II	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	0.9
Tam My Tay	617	12	KNO.II	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	4.0
Tam My Tay	619	19	KLTII	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	17.8
Tam My Tay	617	18	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KNO.	2009	2016	4.0
Tam My Tay	617	22A	BDC	Household	Yes	Production	T1G2IAD2H1R1	II	S2	KNO.	2009	2016	38.7
Tam My Tay	617	39	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	2.4
Tam My Tay	617	40	KNO.II	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	5.5
Tam My Tay	618	5	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KL	2010	2017	31.5
Tam My Tay	617	54	IB	Household	Yes	Production	T1G2IB2D2H1R1	II	S2	KNO.	2010	2017	3.1
Tam My Tay	617	52	BDC	Household	Yes	Production	T1G2IAD2H1R1	II	S2	KNO.	2010	2017	2.1
Tam My Tay	617	28	KLTII	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2010	2017	4.0

Name of commune	Forest district	Plot name	Status	Owner	Red Book	Function	Land unit	Potential class	Suitability	Species	Planting year	Harvest	Area
Tam My Tay	617	41	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KNO.	2010	2017	1.7
Tam My Tay	619	9	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KNO.	2010	2017	3.0
Tam My Tay	619	15	BDC	Household	Yes	Production	T1G2IAD2H1R1	II	S2	KNO.	2010	2017	7.3
Tam My Tay	617	51	BDC	Household	Yes	Production	T1G2IAD2H1R1	II	S2	KNO.	2010	2017	4.0
Tam My Tay	617	38	KNO.II	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2010	2017	2.2
Tam My Tay	617	25	BDC	Household	Yes	Production	T1G2IAD2H1R1	II	S2	KNO.	2010	2017	4.4
Tam My Tay	619	11	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KNO.	2010	2017	3.6
Tam My Tay	619	17	BDC	Household	Yes	Production	T1G1IAD2H1R1	II	S1	KNO.	2010	2017	14.0
Tam My Tay	617	49	KNO.II	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2010	2017	2.0
Tam My Tay	619	16	KNO.II	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2010	2017	56.1
Tam My Tay	620	5	BDC	Household	Yes	Production	T1G2IAD2H1R1	II	S2	KNO.	2010	2017	49.1
Tam My Tay	616	22	KLTIII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	1.2
Tam My Tay	616	23	KLTIII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	0.8
Tam My Tay	618	4	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	9.0
Tam My Tay	616	6	KNO.III	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	1.3
Tam My Tay	616	27	KLTIII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	4.5
Tam My Tay	620	4	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	19.9
Tam My Tay	616	5	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	6.1
Tam My Tay	616	21	IC	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	0.6
Tam My Tay	617	33	KLTII	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	0.6
Tam My Tay	616	2	KNO.II	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	8.2
Tam My Tay	618	7	KNO.II	Household	Yes	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	18.6
Tam My Tay	616	17	KNO.II	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	6.8
Tam My Tay	616	25	KLTIII	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	2.5
Tam My Tay	619	13	IA	Household	Yes	Production	T1G2IAD2H1R1	II	S2	KNO.	2011	2018	3.2
Tam My Tay	618	14b	BDC	Household	Yes	Production	T1G2IAD2H1R1	II	S2	KNO.	2011	2018	2.4
Tam My Tay	617	48	KLTII	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	1.3
Tam My Tay	618	8	KNO.II	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	10.5
Tam My Tay	619	12	KNO.II	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	6.4
Tam My Tay	616	11	KLTII	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	13.8
Tam My Tay	618	10	BDC	Household	Yes	Production	T1G2IAD2H1R1	II	S2	KNO.	2011	2018	12.2
Tam My Tay	618	17	KNO.II	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	36.3
Tam My Tay	620	9	KLTII	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	1.1
Tam My Tay	620	8	KLTII	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	7.7
Tam My Tay	616	7b	IC	Household	Yes	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	3.8
Total													**670.0**
Tam Son	595	12	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2008	2015	11.9
Tam Son	595	3	IC	CPC	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2008	2015	19.0
Tam Son	598	3b	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	1.4
Tam Son	595	14	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	9.5
Tam Son	596	6	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	1.8
Tam Son	596	4	IC	CPC	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	1.2
Tam Son	598	7	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	6.3
Tam Son	596	10	IC	CPC	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	0.7
Tam Son	595	16	IC	CPC	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	1.1
Tam Son	595	10	BDC	Household	No	Production	T1G2IAD2H1R1	II	S2	KNO.	2009	2016	0.5
Tam Son	598	3a	IC	CPC	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	2.3
Tam Son	598	19	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	2.4
Tam Son	598	17	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	1.1
Tam Son	598	18	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	1.5
Tam Son	598	13	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	6.0

Name of commune	Forest district	Plot name	Status	Owner	Red Book	Function	Land unit	Potential class	Suitability	Species	Planting year	Harvest	Area
Tam Son	598	12	IC	CPC	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	2.6
Tam Son	598	29	IC	CPC	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2010	2017	1.5
Tam Son	598	30	IC	CPC	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2010	2017	5.5
Tam Son	598	20	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2010	2017	2.0
Tam Son	598	22	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2010	2017	1.5
Tam Son	598	23	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2010	2017	2.2
Tam Son	598	28a	IC	CPC	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2010	2017	12.5
Tam Son	594	14	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	1.7
Tam Son	597	25	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	6.9
Tam Son	594	15	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	1.4
Tam Son	594	17	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	1.0
Tam Son	597	21	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	3.1
Tam Son	597	24	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	4.1
Tam Son	597	28	IC	CPC	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	1.8
Tam Son	597	16	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	2.3
Tam Son	597	17	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	1.2
Tam Son	597	19	IC	CPC	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	0.9
Tam Son	594	18	BDC	Household	No	Production	T1G2IAD2H1R1	II	S2	KNO.	2011	2018	1.0
Total													**119.9**
Tam Thanh	602	11	DUA	Household	No	Production	T1G2IAD2H1R1	II	S2	KNO.	2008	2015	34.0
Tam Thanh	602	12	DUA	Household	No	Production	T1G2IAD2H1R1	II	S2	KNO.	2008	2015	33.0
Tam Thanh	602	10	BDC	Household	No	Production	T1G2IAD2H1R1	II	S2	KNO.	2009	2016	28.4
Tam Thanh	602	16	DUA	Household	No	Production	T1G2IAD2H1R1	II	S2	KNO.	2009	2016	13.3
Tam Thanh	603	16	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	25.2
Tam Thanh	602	12	DUA	Household	No	Production	T1G2IAD2H1R1	II	S2	KNO.	2009	2016	18.8
Tam Thanh	602	11	BDC	Household	No	Production	T1G2IAD2H1R1	II	S2	KNO.	2009	2016	33.3
Tam Thanh	603	7	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2010	2017	25.2
Tam Thanh	602	14	IB	CPC	No	Production	T1G2IB2D2H1R1	II	S2	KNO.	2010	2017	29.3
Tam Thanh	603	13a	DUA	Household	No	Production	T1G2IAD2H1R1	II	S2	KNO.	2010	2017	28.7
Tam Thanh	603	13b	DUA	Household	No	Production	T1G2IAD2H1R1	II	S2	KNO.	2010	2017	70.4
Tam Thanh	602	2	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	4.7
Tam Thanh	599	20	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	25.8
Tam Thanh	603	9	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	2.3
Tam Thanh	603	5	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	24.9
Tam Thanh	603	4	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	35.4
Tam Thanh	600	24	KNO.III	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	0.8
Tam Thanh	601	6	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	22.1
Tam Thanh	599	19	DUA	Household	No	Production	T1G1IAD2H1R1	II	S1	KNO.	2011	2018	38.9
Total													**494.5**
Tam Tra	615	26	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2008	2015	5.6
Tam Tra	615	24	IC	CPC	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2008	2015	20.7
Tam Tra	614	10	IC	CPC	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2008	2015	40.1
Tam Tra	615	12	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	2.9
Tam Tra	615	13	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	1.7
Tam Tra	615	4	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	4.2
Tam Tra	614	7	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	4.0
Tam Tra	608	31	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	3.4
Tam Tra	608	24	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	3.1
Tam Tra	615	11	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	4.0
Tam Tra	615	23	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	6.7
Tam Tra	615	18	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2009	2016	2.7

Name of commune	Forest district	Plot name	Status	Owner	Red Book	Function	Land unit	Potential class	Suitability	Species	Planting year	Harvest	Area
Tam Tra	615	9	IA	CPC	No	Production	T1G1IAD2H1R1	II	S1	KL	2009	2016	10.9
Tam Tra	614	3	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	1.1
Tam Tra	608	38	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	1.3
Tam Tra	608	36	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	6.7
Tam Tra	608	35	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	2.2
Tam Tra	608	28	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	2.2
Tam Tra	608	29	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	3.0
Tam Tra	607	20	IC	CPC	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	9.9
Tam Tra	615	8	IA	CPC	No	Production	T1G1IAD2H1R1	II	S1	KNO.	2009	2016	1.6
Tam Tra	614	2	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	0.7
Tam Tra	614	6	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	9.2
Tam Tra	614	11	IB	CPC	No	Production	T1G2IB2D2H1R1	II	S2	KNO.	2009	2016	29.4
Tam Tra	608	34	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	3.4
Tam Tra	608	32	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	2.8
Tam Tra	608	27	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	1.9
Tam Tra	608	26	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2009	2016	2.0
Tam Tra	607	14	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	13.7
Tam Tra	608	18	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	2.6
Tam Tra	608	23	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	3.3
Tam Tra	608	10	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	7.7
Tam Tra	608	14	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	1.5
Tam Tra	608	11	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	2.4
Tam Tra	608	12	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	2.2
Tam Tra	613	1	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	9.5
Tam Tra	608	30	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	12.7
Tam Tra	607	19	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2010	2017	50.1
Tam Tra	608	3	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2010	2017	7.5
Tam Tra	608	7	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2010	2017	3.7
Tam Tra	608	6	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2010	2017	6.6
Tam Tra	613	6	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	21.7
Tam Tra	606	23	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	7.3
Tam Tra	606	24	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	4.0
Tam Tra	606	17	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	14.5
Tam Tra	606	13	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	10.1
Tam Tra	606	16	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	6.6
Tam Tra	607	11	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	2.5
Tam Tra	607	2	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	7.5
Tam Tra	606	19	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	3.4
Tam Tra	607	15	KNO.II	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	32.4
Tam Tra	607	10	KLTII	Household	No	Production	T1G1ICD2H1R1	I	S1	KL	2011	2018	15.7
Tam Tra	606	8	IB	Household	No	Production	T1G1IB2D2H1R1	I	S1	KL	2011	2018	2.0
Tam Tra	606	21	KLTII	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	3.1
Tam Tra	607	9	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	2.0
Tam Tra	607	1	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	1.0
Tam Tra	606	20	KNO.II	Household	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	2.5
Tam Tra	606	1	IC	CPC	No	Production	T1G2ICD2H1R1	II	S2	KNO.	2011	2018	3.9
Total													**451.1**
Total 5 commune													**1844.0**

Annex 3: Socio-economic conditions

Table 3.1 Five target communes in the PA (2006)

Content	Quang Nam	Nui Thanh	Tam My VND	Tam My Tay	Tam Son	Tam Tra	Tam Thanh
Area (km2)	10.408,78	533,03	16,74	51,57	54,02	97,13	53,96
Population	1.465.922	143.652	6.643	5.592	4.677	2.915	3.983
Household (HH)		33.930	1.569	1.321	1.104	689	940
HHs with forest land			419	1.256	980	581	752
Poor HHs *	30,29	27,38	426	427	523	444	407
Labours	746.475	68.364	3.161	2.661	2.223	1.390	1.897
Village			6	7	6	8	4

Source: Year Book, Nui Thanh-2005 and Year Book, Quang Nam-2005

Table 3.2 Population in 2005 of 5 communes

No.	Commune	Population 01/01/2005			Population 31/12/2005			Mean Population		
		Total	Male	Female	Total	Male	Female	Total	Male	Female
1	Tam My VND	6.618	3.241	3.377	6.668	3.259	3.409	6.643	3.250	3.393
2	Tam My Tay	5.570	2.727	2.843	5.613	2.744	2.869	5.592	2.736	2.856
3	Tam Son	4.663	2.308	2.355	4.690	2.321	2.369	4.677	2.315	2.362
4	Tam Thanh	3.978	1.948	2.030	3.987	1.957	2.030	3.983	1.953	2.030
5	Tam Tra	2.902	1.457	1.445	2.927	1.469	1.458	2.915	1.463	1.452
Total		**23.731**	**11.681**	**12.050**	**23.885**	**11.750**	**12.135**	**23.810**	**13.169**	**10.641**

Source: Year Book, Nui Thanh-2005

Table 3.3 Labours distributed by profession in the district

No.	Content	Labour	(%)
	Total	**70,459**	**100**
1	Agri-Forestry-Fishery	**50,105**	**71.11**
-	Agri-Forestry	37,947	53.86
-	Fishery	12,158	17.25
2	**Industry - Construction**	**7,299**	**10,37**
-	Industry	6,177	8.77
-	Construction	1,122	1,60
3	**Services - Tourism**	**13,055**	**18.52**

Source: Year Book, Nui Thanh-2005

Table 3.4 Economic structure of the PA

No.	Economic sectors	Quang Nam (%)	Nui Thanh (%)
	Total	**100**	**100**
1	**Agri-Forestry-Fishery**	**30,95**	**43,79**
-	Agri-Forestry	24,02	11,88
-	Fishery	6,93	31,91
2	**Industry - Construction**	**34,02**	**41,03**
3	**Service - Tourism**	**35,03**	**15,18**

Source: Year Book, Nui Thanh-2005

Table 3.5 Average income of HH

No.	**Source**	**Income (Mil. VND)**	**(%)**
	Total	21,00	100,00
1	Growing	4,50	21,43
2	Livestock	4,70	22,38
3	Forestry	9,40	44,76
4	Others	2,40	11,43

Source: HH survey

(2) Poverty

Analysis of 116 questionnaires shows that the rate of poor HHs is rather high:

Rich: 0%
Better off: 13.79%
Medium: 51.72%
Poor: 34.48%

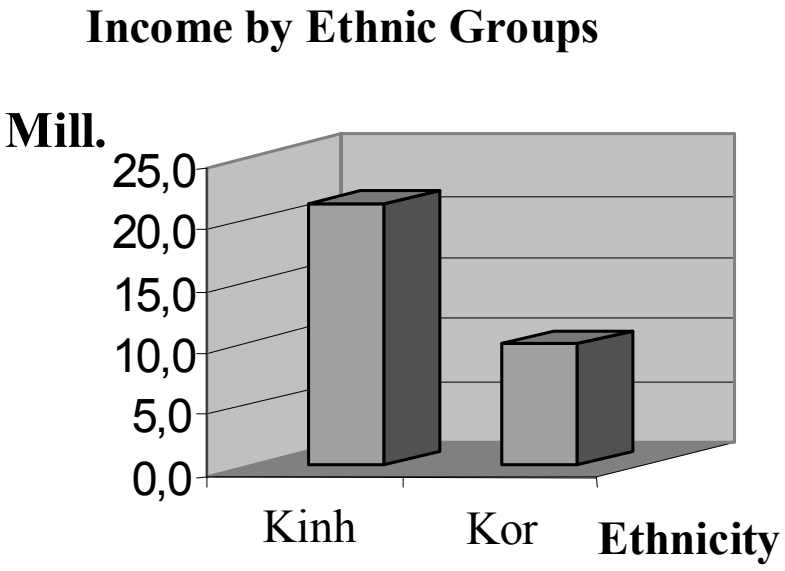


Table 3.6 Mean number of animals of a HH

No.	Cattle, poultry	Project area	Tam My VND	Tam My Tay	Tam Son	Tam Tra	Tam Thanh
1	Buffalo/cow	3,08	1,60	2,77	3,67	3,26	2,65
2	Pig	2,79	4,00	4,73	1,77	2,03	2,35
3	Poultry	11,41	21,00	12,17	12,23	6,97	14,71

Source: HH interview

Table 3.7 Loans for production

No.	Item	(%)
	Total	**100**
1.	Livestock	60.5
2.	Agri-forestry production	33.2
3.	Handicraft	2.7
4.	Others	4.6

Table 3.8a Land use types

No.	Item	Average area of each HH (ha)	Land use (%)
	Total	**3.93**	**100**
1.	1 crop rice land	0.02	0.51
2.	2 crop rice land	0.21	5.34
3.	Corn crop land	0.17	4.33
4.	Garden	0.14	3.56
5.	Forest land	3.39	86.26

Table 3.8b shows that each HH has 3.93 ha while forest land accounts for 3.39 ha or 86.26%.

Labours by Seasons in 5 Project Communes

Item	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Winter-spring rice	→	→		→								→
Summer-autumn rice					→	→	→		→	→		
Maize	→	→	→	→								
Summer maize						→	→	→	→			
Sweet potato						→	→	→	→			
Cassava		→	→	→	→		→					→
Sesame						→	→	→	→			
Ground nut	→	→	→	→								
Summer nut						→	→	→	→			
Winter vegetable	→	→	→	→								

Item	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Summer vegetable						→	→	→	→			
Sugar cane		→	→	→	→		→					→
Winter bean	→	→	→	→								
Summer bean						→	→	→	→			
Poultry diseases		→	→	→							→	→
Cattle diseases			→	→	→					→		
Human epidemics					→						→	
Forestry activity						→	→	→	→	→	→	→

Table 3.9 Some of economic indicators in 2005

Unit: Million VND

Item	Country	%	Quang Nam	%
GDP	**837.858.000**	**100**	**8.802.368**	**100**
GDP per capita	8,312		6,005	
By sectors				
- Agriculture	132.633.000	15.8	1.673.961	19,0
- Forestry	10.052.000	1.2	440.118	5,0
- Fishery	88.154.000	10.5	610.082	6,9
- Industry and construction	314.893.000	37.6	2.994.477	34,0
- Service	292.126.000	34.9	3.083.730	35,0

Source: Year Book 2005 and Quang Nam Year Book 2005

Table 3.10 General Poverty Rate

Item	1998 (%)	2002 (%)	2004 (%)
Country	**37,4**	**28,9**	**24,1**
By regions:			
Red river delta	34,2	22,6	21,1
Northeast	65,2	38,0	31,7
Northwest		68,7	54,4
North of Trung bo	52,3	44,4	41,4
Coastal Nam Trung bo	41,8	25,2	21,3
Highland plateau	52,4	51,8	32,7
East of Nam bo	13,1	10,7	6,7
Mekong river delta	41,9	23,2	19,5

Table 3.11 Transport network of Quang Nam province

Type of road	Length (km)	Status of road			
		Asphalted	Concrete	Gravel	Earth
National road	469.8	469.8			
Provincial road	420,9	92.2	35.7	285.9	7.1
District road	1,150.5	282,1 (asphalted + cement)		136.6	731.8
Commune road	1.695	112.6	534.7	16.7	1,031
Inter village road	2,535	1,014 (asphalted + cement)		1,521 (gravel + earth)	

Source: Department of transport - Quang Nam (2005)

Annex 4: Cost for the whole afforestation model

Table 4.1a Plan of cost for 01 ha – A. hybrid

Unit: 1.000 VND

No.	Implementation year	1	2	3	4	5	6	7	Total
I	**Material + seedlings**	**2,444**	**747**	**0**	**0**	**0**	**0**	**0**	**3,191**
1	Seedling (Acacia)	950	0	0	0	0	0	0	950
2	Fertilizers	1,494	747	0	0	0	0	0	2,241
II	**Labor costs**	**3,564**	**1,496**	**1,452**	**880**	**308**	**308**	**308**	**8,316**
1	Year 1	3,564	0	0	0	0	0	0	3,564
2	Year 2	0	1,496	0	0	0	0	0	1,496
3	Year 3	0	0	1,452	0	0	0	0	1,452
4	Year 4	0	0	0	880	0	0	0	880
5	Year 5	0	0	0	0	308	0	0	308
6	Year 6	0	0	0	0	0	308	0	308
7	Year 7	0	0	0	0	0	0	308	308
	Total cost for 1 ha	**6,008**	**2,243**	**1,452**	**880**	**308**	**308**	**308**	**11,507**
	Physical contingency	300	112	73	44	15	15	15	575
	Total cost + physical contingency	**6,308**	**2,355**	**1,525**	**924**	**323**	**323**	**323**	**12,082**
	Price contingency	378	291	291	243	109	135	163	1,611
	Total cost + price contingency	**6,686**	**2,646**	**1,816**	**1,167**	**433**	**459**	**486**	**13,693**

Table 4.1b Plan of cost for 01 ha – A. mangium

Unit: 1.000 VND

No	Implementation year	1	2	3	4	5	6	7	Total
I	**Material + seedlings**	**1,877**	**747**	**0**	**0**	**0**	**0**	**0**	**2,624**
1	Seedling (Acacia)	383	0	0	0	0	0	0	383
2	Fertilizers	1,494	747	0	0	0	0	0	2,241
II	**Labor cost**	**3,564**	**1,496**	**1,452**	**880**	**308**	**308**	**308**	**8,316**
1	Year 1	3,564	0	0	0	0	0	0	3,564
2	Year 2	0	1,496	0	0	0	0	0	1,496
3	Year 3	0	0	1,452	0	0	0	0	1,452
4	Year 4	0	0	0	880	0	0	0	880
5	Year 5	0	0	0	0	308	0	0	308
6	Year 6	0	0	0	0	0	308	0	308
7	Year 7	0	0	0	0	0	0	308	308
	Total cost for 1 ha	**5,441**	**2,243**	**1,452**	**880**	**308**	**308**	**308**	**10,940**
	Physical contingency	272	112	73	44	15	15	15	547
	Total cost + physical contingency	**5,714**	**2,355**	**1,525**	**924**	**323**	**323**	**323**	**11,487**
	Price contingency	343	291	291	243	109	135	163	1,575
	Total cost + price contingency	**6,056**	**2,646**	**1,816**	**1,167**	**433**	**459**	**486**	**13,063**

Table 4.5 Costs for the whole afforestation model (1,844 ha)

Unit: Million VND

No	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
1	Labor cost	835.2	1,789.8	2,586.6	3,136.4	1,901.9	1,349.7	793.5	435.1	299.5	149.3	-	13,276.8
2	Seedling + Fertilizers cost	601.7	1,231.9	1,472.7	1,568.0	398.2	-	-	-	-	-	-	5,272.7
3	Others	104.4	174.4	193.1	191.9	-	-	-	-	-	-	-	663.8
4	Management fee	94.0	196.4	278.0	332.8	190.2	135.0	79.4	43.5	29.9	14.9	-	1,394.1
	Total cost	**1,635.3**	**3,392.5**	**4,530.3**	**5,229.2**	**2,490.3**	**1,484.6**	**872.9**	**478.6**	**329.4**	**164.2**	-	**20,607.4**
	Physical contingency	81.8	169.6	226.5	261.5	124.5	74.2	43.6	23.9	16.5	8.2	-	1,030.4
	Total cost + contingency	**1,717.1**	**3,562.2**	**4,756.8**	**5,490.6**	**2,614.8**	**1,558.9**	**916.5**	**502.6**	**345.9**	**172.4**	-	**21,637.7**
	Price contingency	103.0	440.3	908.6	1,441.2	884.4	652.4	461.6	298.4	238.5	136.3	-	5,564.8
	Total cost + contingency	**1,820.1**	**4,002.5**	**5,665.5**	**6,931.8**	**3,499.2**	**2,211.3**	**1,378.1**	**801.0**	**584.4**	**308.8**	-	**27,202.5**

Annex 5: Financial – Economic analysis

Table 5.1a Financial analysis for 1 ha model – A. hybrid by total investment point of view

Unit: 1.000 VND

No	Year	1	2	3	4	5	6	7	8	Total
1	Total cost + contingency	6,308	2,355	1,525	924	323	323	323	0	12,082
2	Total revenue	0	0	0	0	0	0	0	35,640	35,640
3	Net cash flow	(6,308)	(2,355)	(1,525)	(924)	(323)	(323)	(323)	35,640	23,558
4	CPV	5,734	1,946	1,145	631	201	183	166	0	10,007
5	BPV	0	0	0	0	0	0	0	16,626	16,626
6	NPV	6,620								
7	BCR	1.66								
8	IRR	19%								

Table 5.1b Financial analysis for 1 ha model – A. mangium by total investment point of view

Unit: Million VND

No	Year	1	2	3	4	5	6	7	8	Total
1	Total cost + contingency	5,714	2,355	1,525	924	323	323	323	0	11,487
2	Total revenue	0	0	0	0	0	0	0	30,030	30,030
3	Net cash flow	-5,714	-2,355	-1,525	-924	-323	-323	-323	30,030	18,543
4	CPV	5,194	1,946	1,145	631	201	183	166	0	9,466
5	BPV	0	0	0	0	0	0	0	14,009	14,009

Table 5.2 Financial analyses for 2 ha model by total investment point of view

Unit: Million VND

No	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
1	Total cost + contingency	1,717.1	3,562.2	4,756.8	5,490.6	2,614.8	1,558.9	916.5	502.6	345.9	172.4	0.0	21,637.7
2	Total revenue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9,226.1	15,541.7	17,145.2	17,764.0	59,677.0
3	Net cash flow	(1,717.1)	(3,562.2)	(4,756.8)	(5,490.6)	(2,614.8)	(1,558.9)	(916.5)	8,723.6	15,195.8	16,972.8	17,764.0	38,039.3
4	CPV	1,561.0	2,943.9	3,573.9	3,750.2	1,623.6	879.9	470.3	234.4	146.7	66.5	0.0	15,250.4
5	BPV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,304.1	6,591.2	6,610.2	6,226.2	23,731.6

Table 5.3a Financial analysis for 2 ha model by investor's point of view – A. hybrid

Unit: 1.000 VND

No	Implementation year	1	2	3	4	5	6	7	8	Total
1	Net cash flow of total investment	-12,616	-4,710	-3,049	-1,848	-647	-647	-647	71,280	47,116
2	Net cash flow of loan by fixed price	6,604	1,788	490	-1,346	-1,270	-1,198	-1,130	-8,595	-4,657
3	Net cash flow	-6,012	-2,922	-2,559	-3,194	-1,917	-1,845	-1,777	62,685	42,460
4	NPV	14,115								
5	IRR	24%								

Table 5.3b Financial analysis for 2 ha model by investor's point of view – A. mangium

Unit: 1.000 VND

No	Implementation year	1	2	3	4	5	6	7	8	Total
1	Net cash flow of total investment	-11,427	-4,710	-3,049	-1,848	-647	-647	-647	60,060	37,085
2	Net cash flow of loan by fixed price	6,604	1,788	490	-1,346	-1,270	-1,198	-1,130	-8,595	-4,657
3	Net cash flow	-4,823	-2,922	-2,559	-3,194	-1,917	-1,845	-1,777	51,465	32,428

Table 5.4 Financial analysis by investor's point of view for the whole project

Unit: Million VND

No	Implementation year	2,008	2,009	2,010	2,011	2,012	2,013	2,014	2,015	2,016	2,017	2,018	Total
1	Net cash flow of total investment by fixed price	-1,717	-3,562	-4,757	-5,491	-2,615	-1,559	-917	8,724	15,196	16,973	0	17,764
2	Net cash flow of loan by fixed price	958	1,768	2,056	1,822	25	-675	-1,042	-2,175	-2,425	-2,290	0	-1,903
3	Net income	-760	-1,794	-2,701	-3,669	-2,589	-2,234	-1,958	6,549	12,770	14,683	0	15,861
4	NPV	9,109											
5	IRR	22.5%											

Table 5.5 Economic analysis of the whole model – without project case

Unit: Million VND

No	Year	1,997	1,998	1,999	2,000	2,001	2,002	2,003	2,004	2,005	2,006	2,007	2,008	2,009	2,010	2,011	Total
1	Total cost + contingency	23.6	25.9	20.5	1,766.3	3,124.3	2,440.0	1,397.4	979.6	584.2	447.1	212.2	73.6	0.0	0.0	0.0	11,094.8
2	Total revenue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	207.9	12,436.3	10,052.9	6,692.5	3,549.8	32,939.4
3	Net cash flow	(23.6)	(25.9)	(20.5)	(1,766.3)	(3,124.3)	(2,440.0)	(1,397.4)	(979.6)	(584.2)	(447.1)	(4.3)	12,362.7	10,052.9	6,692.5	3,549.8	21,844.6
4	CPV	21.5	21.4	15.4	1,206.4	1,939.9	1,377.3	717.1	457.0	247.8	172.4	74.4	23.5	0.0	0.0	0.0	6,274.1
5	BPV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	72.9	3,962.6	2,912.0	1,762.4	849.8	9,559.6
6	BPV-CPV	(21.5)	(21.4)	(15.4)	(1,206.4)	(1,939.9)	(1,377.3)	(717.1)	(457.0)	(247.8)	(172.4)	(1.5)	3,939.1	2,912.0	1,762.4	849.8	3,285.5

Table 5.6: Economic analysis of the whole model – with-project case

Unit: Million VND

No	Year	2,008	2,009	2,010	2,011	2,012	2,013	2,014	2,015	2,016	2,017	2,018	Total
1	Total cost + contingency	1,717.1	3,562.2	4,756.8	5,490.6	2,614.8	1,558.9	916.5	502.6	345.9	172.4	0.0	21,637.7
2	Total revenue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12,301.5	20,722.2	22,860.3	23,685.3	79,569.3
3	Net cash flow	(1,717.1)	(3,562.2)	(4,756.8)	(5,490.6)	(2,614.8)	(1,558.9)	(916.5)	11,799.0	20,376.4	22,687.8	23,685.3	57,931.6
4	CPV	1,561.0	2,943.9	3,573.9	3,750.2	1,623.6	879.9	470.3	234.4	146.7	66.5	0.0	15,250.4
5	BPV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,738.7	8,788.3	8,813.6	8,301.6	31,642.2
6	NPV	16,392											
7	BCR	2.07											
8	IRR	23.7%											

Table 5.7: Economic analysis of the whole model – without project case

Unit: Million VND

No	Year	1,997	1,998	1,999	2,000	2,001	2,002	2,003	2,004	2,005	2,006	2,007	2,008	2,009	2,010	2,011	Total
1	Total cost + contingency	23.6	25.9	20.5	1,766.3	3,124.3	2,440.0	1,397.4	979.6	584.2	447.1	212.2	73.6	0.0	0.0	0.0	11,094.8
2	Total revenue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	277.2	16,581.7	13,403.9	8,923.4	4,733.0	43,919.2
3	Net cash flow	-23.6	-25.9	-20.5	-1,766.3	-3,124.3	-2,440.0	-1,397.4	-979.6	-584.2	-447.1	65.0	16,508.1	13,403.9	8,923.4	4,733.0	32,824.4
4	CPV	21.5	21.4	15.4	1,206.4	1,939.9	1,377.3	717.1	457.0	247.8	172.4	74.4	23.5	0.0	0.0	0.0	6,274.1
5	BPV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	97.2	5,283.4	3,882.6	2,349.8	1,133.1	12,746.1

Training Package

Book 1:	Training Plan on Capacity Building for Preparing Feasibility Studies and Implementation Plans for Production Forest/Agroforestry Development Projects in Vietnam
Book 2:	Manual for Preparation of Feasibility Study Reports for Production Forest/Agroforestry Development Projects in Vietnam
Book 3:	Manual for Preparation of Implementation Plans for Production Forest/Agroforestry Development Projects in Vietnam
Book 4:	Model F/S of Thai Nguyen Province
	Book 4-1: Model Feasibility Study Report for Smallholder Production Forest Development Project in Thai Nguyen Province
	Book 4-2: Model Feasibility Study Report for Agroforestry Development Project in Thai Nguyen Province
Book 5:	Model IP of Thai Nguyen Province
	Book 5-1: Model Implementation Plan for Smallholder Production Forest Development Project in Thai Nguyen Province
	Book 5-2: Model Implementation Plan for Agroforestry Development Project in Thai Nguyen Province
Book 6:	Monitoring and Evaluation Report on Technical Training of Participating Provinces
Book 7:	Market Trend Reference Book on Wood-based and Agroforestry Products
Book 8:	Feasibility Study Reports of Participating Provinces
	Book 8-1: Feasibility Study Report on Agroforestry Project in Ta Hoc Commune, Mai Son District, Son La Province
	Book 8-2: Feasibility Study Report on Production Forest Establishment Project in Nui Thanh District, Quang Nam Province
	Book 8-3: Feasibility Study Report on Treatment of Exhausted Natural Forest and Production Forest Establishment Project in Da Teh District, Lam Dong Province
	Book 8-4: Feasibility Study Report on Afforestation Project for Serving Biodiversity Conservation in Long An Province
Book 9:	Implementation Plans of Participating Provinces
	Book 9-1: Implementation Plan on Agroforestry Project in Ta Hoc Commune, Mai Son District, Son La Province
	Book 9-2: Implementation Plan on Production Forest Establishment Project in Nui Thanh District, Quang Nam Province
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