MINISTRY OF FORESTRY
THE SOCIALIST REPUBLIC OF VIETNAM

No. 1

BASIC DESIGN STUDY REPORT ON THE PROJECT FOR IMPROVEMENT OF EQUIPMENT FOR REFORESTATION PROGRAM IN NORTH-WEST VIET NAM IN THE SOCIALIST REPUBLIC OF VIET NAM

June, 1995

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
KOKUSAI KOGYO CO., LTD.

MINISTRY OF FORESTRY
THE SOCIALIST REPUBLIC OF VIETNAM

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PREFACE

In response to a request from the Government of the Socialist Republic of Viet Nam, the Government of Japan decided to conduct a basic design study on the Project for Improvement of Equipment for Reforestation Program in North-West Viet Nam and entrusted the study to the Japan International Cooperation Agency (JICA).

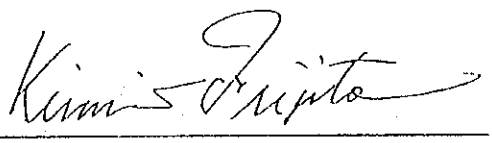
JICA sent to Viet Nam a study team from February 12 to March 13, 1995.

The team held discussions with the officials concerned of the Government of Viet Nam, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Viet Nam in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Socialist Republic of Viet Nam for their close cooperation extended to the teams.

June, 1995



Kimio Fujita
President
Japan International Cooperation Agency

June, 1995

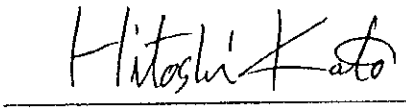
Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Improvement of Equipment for Reforestation Program in North-West Viet Nam in the Socialist Republic of Viet Nam.

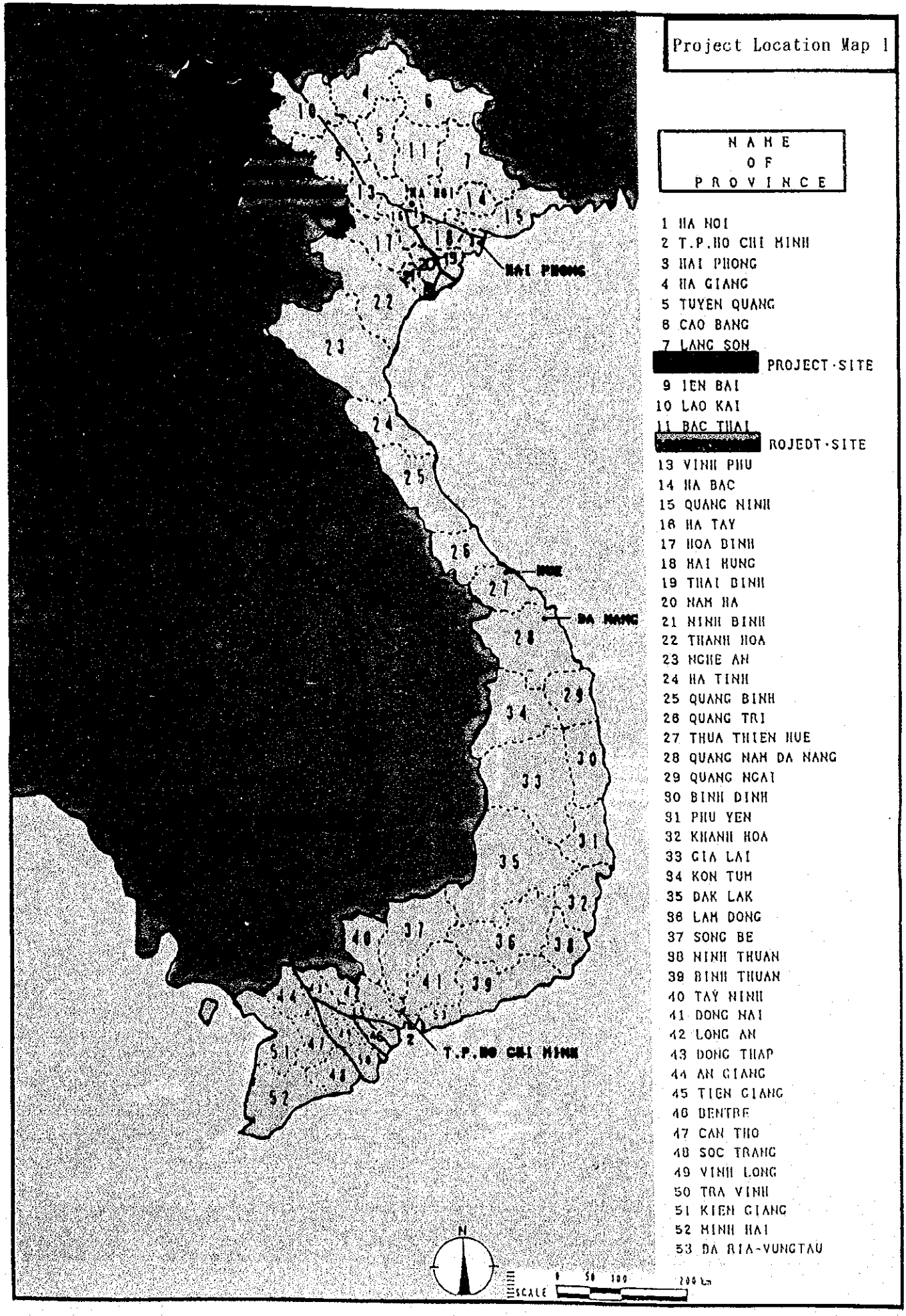
This study was conducted by KOKUSAI KOGYO CO., LTD., under a contract to JICA, during the period from February 7, 1995 to June 30, 1995. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Viet Nam and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,



Hitoshi Kato
Project manager,
Basic design study team on
the Project for Improvement of
Equipment for Reforestation Program
in North-West Viet Nam
KOKUSAI KOGYO CO., LTD.


Project Location Map 1
NAME OF PROVINCE
1 HA NOI
2 T.P.HO CHI MINH
3 HAI PHONG
4 HA GIANG
5 TUYEN QUANG
6 CAO BANG
7 LANG SON
PROJECT-SITE
9 IEN BAI
10 LAO KAI
11 BAC THAI
ROJEDT-SITE
13 VINH PHU
14 HA BAC
15 QUANG NINH
16 HA TAY
17 HOA BINH
18 HAI HUNG
19 THAI BINH
20 NAM HA
21 NINH BINH
22 THANH HOA
23 NGHE AN
24 HA TINH
25 QUANG BINH
26 QUANG TRI
27 THUA THIEN HUE
28 QUANG NAM DA NANG
29 QUANG NGAI
30 BINH DINH
31 PHU YEN
32 KHANH HOA
33 GIA LAI
34 KON TUM
35 DAK LAK
36 LAM DONG
37 SONG BE
38 NINH THUAN
39 BINH THUAN
40 TAY NINH
41 DONG NAI
42 LONG AN
43 DONG THAP
44 AN GIANG
45 TIEN GIANG
46 DENTRE
47 CAN THO
48 SOC TRANG
49 VINH LONG
50 TRA VINH
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DA NANG
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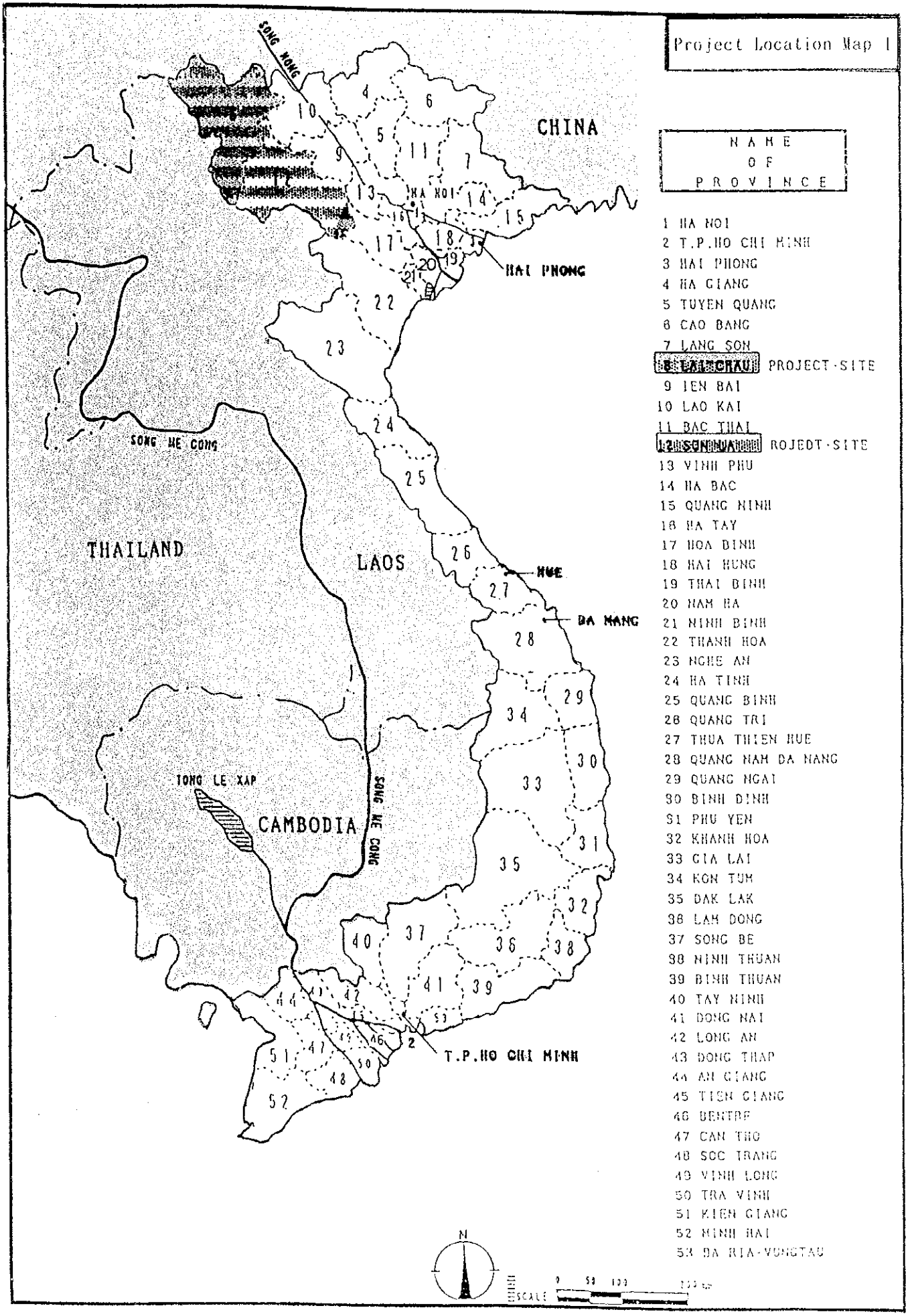
Project Location Map 1
NAME OF PROVINCE
1 HA NOI
2 T.P.HO CHI MINH
3 HAI PHONG
4 HA GIANG
5 TUYEN QUANG
6 CAO BANG
7 LANG SON
8 LAI CHAU PROJECT-SITE
9 IEN BAI
10 LAO KAI
11 BAC THAI
12 SON LA ROJEDT-SITE
13 VINH PHU
14 HA BAC
15 QUANG NINH
16 HA TAY
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52 MINH HAI
53 BA RIA-VUNGTAU
CHINA
HA NOI
HAI PHONG
SONG HONG
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THAILAND
LAOS
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DA NANG
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CAMBODIA
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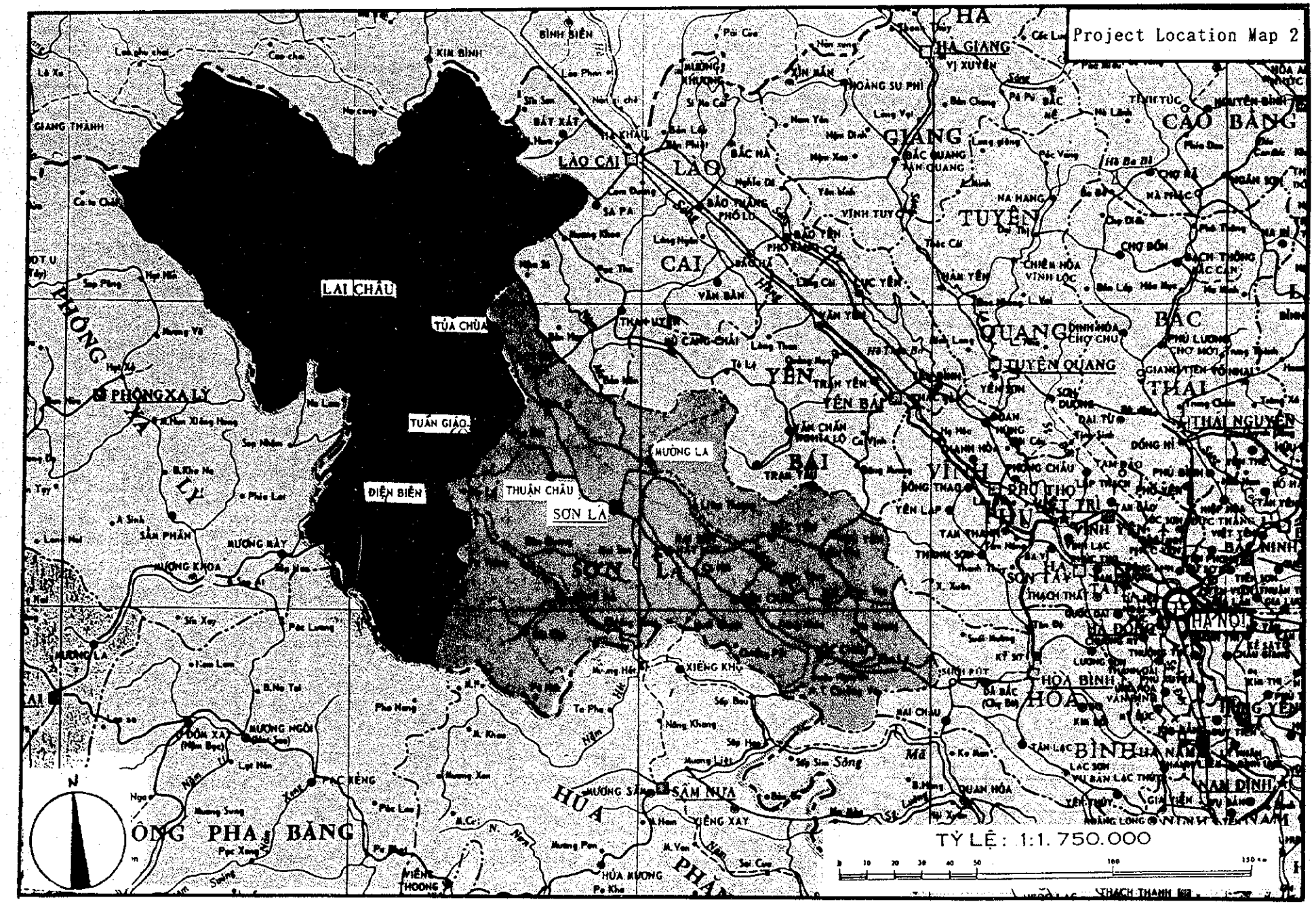
Project Location Map 2
LAI CHÂU
TỦA CHÙA
TUẦN GIÁO
ĐIỆN BIÊN
MƯỜNG LA
THUẬN CHÂU
SƠN LA
PHONGXALY
LÀO CAI
YÊN BÁI
TUYÊN QUANG
PHÚ THỌ
HÒA BÌNH
HÀ GIANG
CAO BẰNG
THÁI NGUYÊN
HÀ NỘI
BẮC NINH
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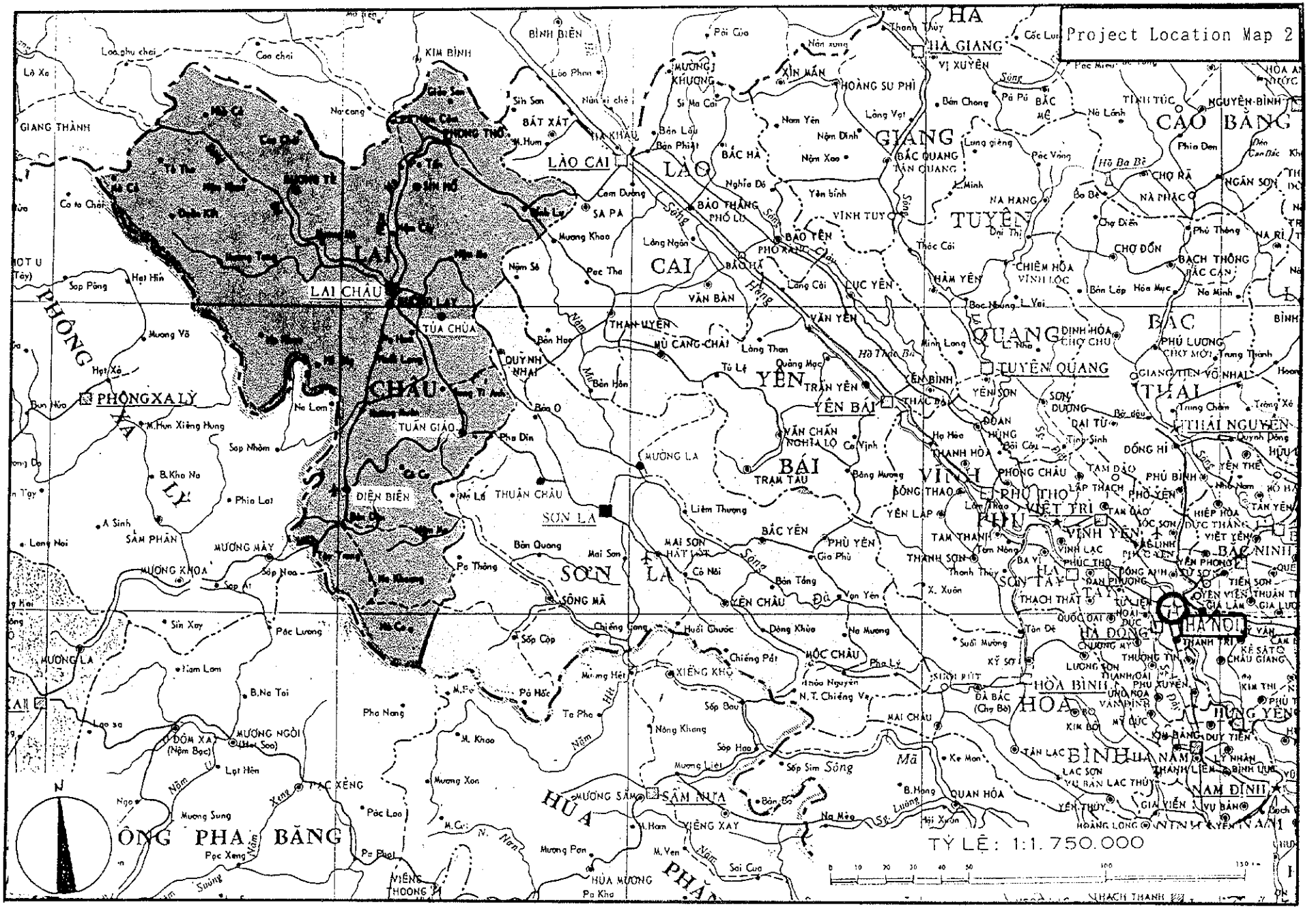
Project Location Map 2
LÀO CAI
LAI CHÂU
ĐIỆN BIÊN
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HÀ GIANG
CAO BẰNG
TUYÊN QUANG
YÊN BÁI
THÁI NGUYÊN
BẮC KẠN
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BẮC NINH
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TỶ LỆ: 1:1.750.000
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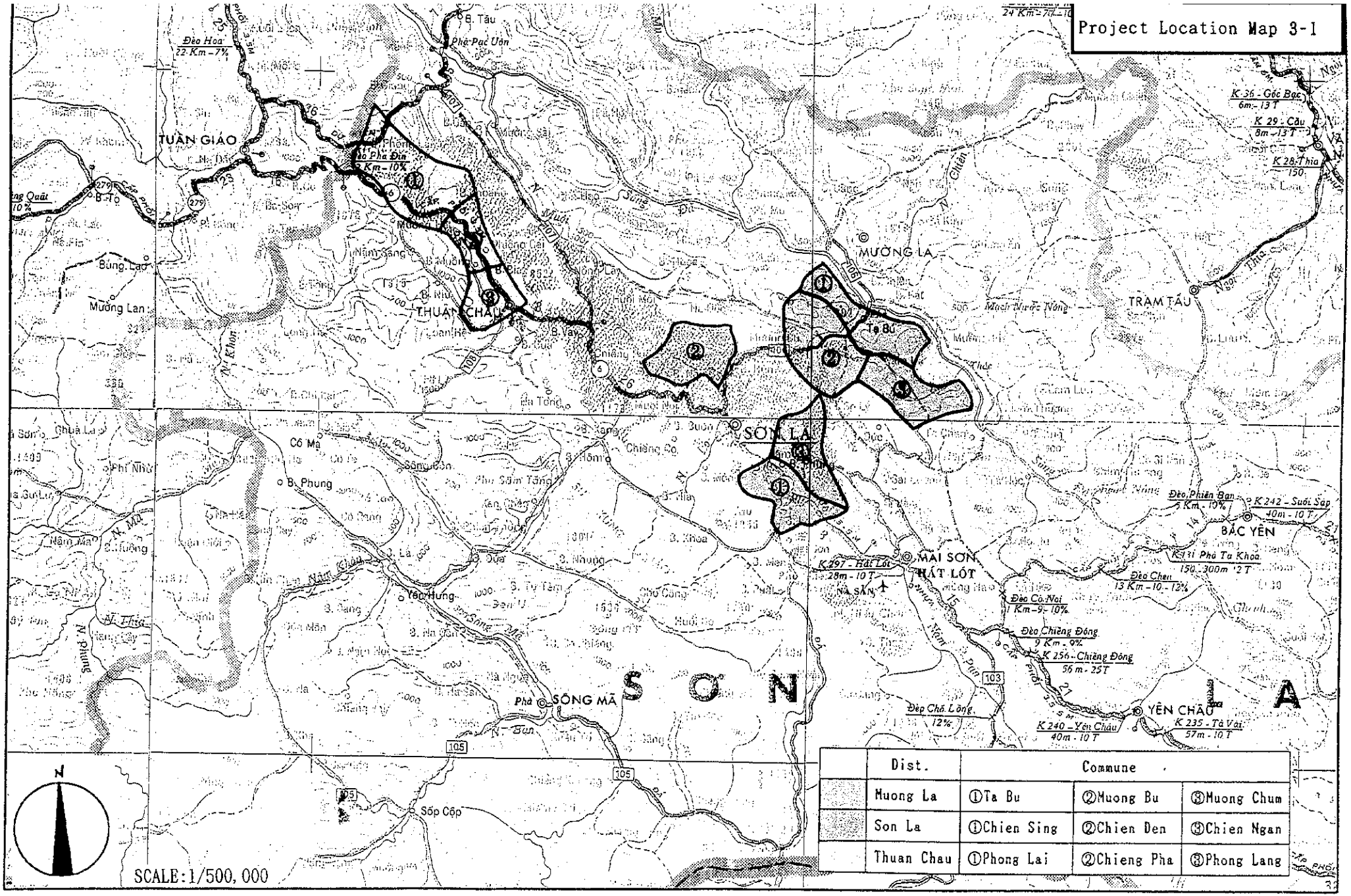
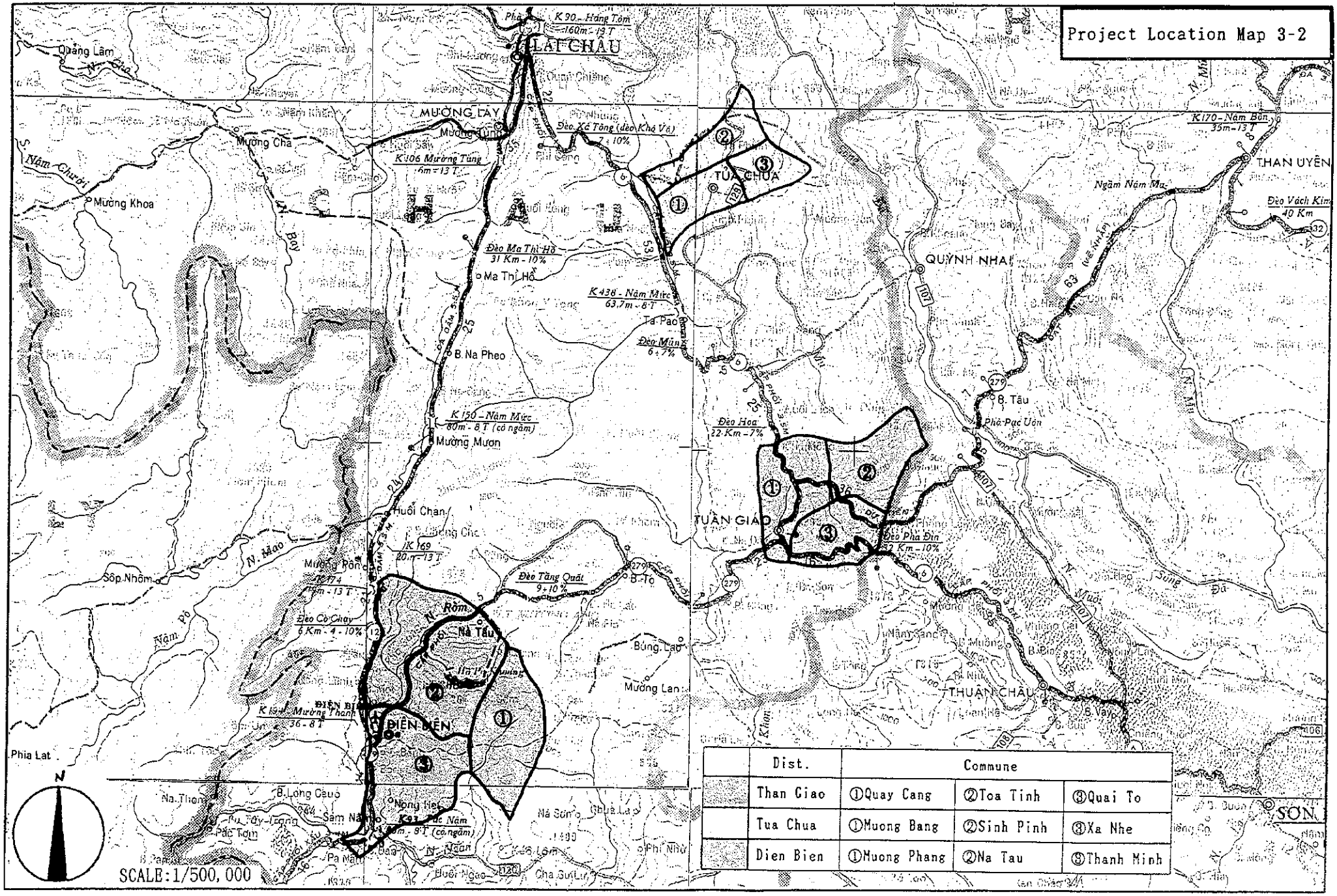
Project Location Map 3-1



	Dist.	Commune		
	Muong La	①Ta Bu	②Muong Bu	③Muong Chum
	Son La	①Chien Sing	②Chien Den	③Chien Ngan
	Thuan Chau	①Phong Lai	②Chieng Pha	③Phong Lang

Project Location Map 3-2



Abbreviations

B/A	Banking Arrangement
CEMMA	Committee of Ethnic Minorities and Mountainous Areas
E/N	Exchange of Notes
FCSD	Fixed Cultivation and Sedentarisation Department
FD	Forestry Department Agro - Forestry - Fishery Department
F.E.	Forest Enterprise
FIPI	Forest Inventory and Planning Institute
FSIV	Forest Science Institute of Viet Nam
GTZ	Deustche Gesellschaft für Techniche Zusammenarbeit
MOF	Ministry of Forestry
SPC	State Planning Committee

Contents

Chapter 1
Background of the Project

Chapter 1 Background of the Project

The Socialist Republic of Viet Nam was once mostly covered by rich and beautiful natural forests. In 1943, the forest coverage was estimated at 14.3 million ha, or about 43% of the country's total land area of 33.2 million ha. However, the forest's flora and fauna was rapidly reduced by rampant bombing and defoliation during the war. Since then, deforestation due to such practices as shifting cultivation; cutting for fuelwood, estimated at over 90% of total wood-demand; immoderate extension of farmland; forest fire; and so on have depleted the rich natural forest resources. By 1987, the country had only 28% or 9.3 million ha of forested area left. The deterioration of soil conditions caused by these deforestation activities has ruined soil quality, thereby inducing harsh environmental conditions including drought in the dry season and floods in the rainy season.

Today, deforestation in Viet Nam continues to progress at a very fast pace. The annual decrease of forests is estimated to be over 100 thousand ha, mainly due to the shifting cultivation. The population of Viet Nam is made up of approximately 60 different ethnic groups, most of which 8 million are minorities. And a large number of the ethnic minorities in the mountainous areas are living by shifting cultivation practices.

In 1968, the Fixed Cultivation and Sedentarisation Department (FCSD) was established within the Ministry of Forestry (MOF) in order to promote fixed cultivation and sedentarisation program for farmers practicing shifting cultivation. Basically, it aimed to promote land distribution for sedentarisation, and the cultivation of fields for subsistence agriculture and cash crop production. However, the extreme difficulties in creating of job opportunities and income limited the number of farmers involved and hence the success of the program. Consequently, to actively facilitate the fixed cultivation and sedentarisation program, through supporting the regional and household economy, the jurisdiction of the FCSD was transferred from the MOF to the Committee of Ethnic Minorities and Mountainous Areas (CEMMA) on February, 1993.

Within its fifth five year socio-economic development plan (1991 - 1995), the Government of Viet Nam is planning to advance the establishment and preservation of forests, and the protection of environment, under an incorporated plan for reforestation, by planting and regeneration, and agricultural development in the mountainous areas, thereby improving the standard of living of the ethnic minorities through the introduction of agroforestry techniques.

Ethnic minorities are mostly concentrated in the northwestern mountainous areas and the central plateau areas of Viet Nam. They constitute a significant proportion of the population of Son La and Lai Chau - two relatively sparsely populated mountainous provinces bordering Laos and China. Both provinces are among the poorest in the country, with the average income per capita of US$80 and US$50 respectively. While the provinces were quite heavily forested until the middle of this century, they only have small areas of virgin forests left. Recent forest inventories indicate that dense natural forests coverage only 9% of Son La and 12% of Lai Chau. Deforestation has been mainly caused by the spread of shifting cultivation practices. The total area of irrigated land in the lowlands of these provinces only amounts to 28,000 ha, while the area annually cultivated by sweden agricultural practices totals 200,000 ha or 6% of the total land of the provinces.

Both provinces have been given high priority in a national context because they constitute about half the watershed of the Da River, the other half is in China. This area is one of the most important watersheds in Viet Nam, because of the existence of the Hoa Bin dam, whose preservation through reforestation and protection of forest resources directly affects electric power supply and the procurement of water resources in downstream areas. The forests in this area are also very important for the local people for two reasons, firstly, the stable supply of water for irrigation and, secondly, the reliance on the forests for fuelwood, construction materials and other forest products necessary for their subsistence.

The twin problems of rural poverty and forest losses in north-west Viet Nam, particularly severe in these two provinces, have been long recognized by the Government of Viet Nam. In order to solve the problems, the support for communities and forest development in these areas is necessary as a matter of the highest priority. This project aims to improve the standard of living of the local people, and increase forest coverage through the realization of the following specific benefits.

1)To increase the supply of fuelwood and other forest products through reducing shifting cultivation, and implementing reforestation by plantation or regeneration of degraded forests.
2)To increase the production/productivity of food through intensifying agriculture in valleys and improving cultivation practice in the uplands.
3)To improve health conditions and literacy of the people in the area.
4)To improve watershed conditions through the introduction of better land-use systems.

The Government of Viet Nam formulated "The Project for the Strengthening of Reforestation Program through Agroforestry Practice in Dac Lac Province". This province like the northwestern mountainous area is also largely populated with ethnic minorities, and requested Japan's grant aid for the equipment for this project. Through the preliminary study by JICA in December 1992, until the grant aid was concluded in March 1994, the project has been highly applauded by the Government of Viet Nam. The Government of Viet Nam has, therefore, again requested Japan to provide grant aid for the relevant equipment for "The Project for Improvement of Equipment for Reforestation Program in North-West Viet Nam" (hereinafter referred to as the "Project"), which has been given similar priority to the Dac Lac province project.

The contents of the Project requested by the Government of Viet Nam are as follows.

(1) Sites

Province	District (City, F. E.)	Commune
Son La	Muong La (F. E.)	Ta Bu Muong Bu Muong Chun
	Son La (city)	Chien Sing Chien Den Chien Ngan
	Thuan Chau (dist.)	Phong Lai Chieng Pha Phong Lang
Lai Chau	Than Giao (F. E.)	Quay Cang Toa Tinh Quai To
	Tua Chua (dist.)	Muong Bang Shinh Phinh Xa Nhe
	Dien Bien (F. E.)	Muong Phang Na Tau Thanh Minh

(2) Equipment

1) Equipment for Agroforestry
- Pickup truck
- Truck
- Hand Tractor with Trailer
- Cargo Boat, Cargo-Passenger Boat
- Water Pump
- Water Pipe
- Power Sprayer

2) Equipment for Training and Extension
- Station Wagon
- Motorcycle
- Slide Projector, Overhead Projector, Photocopier, Video Camera with Player, Television, Camera
- Personal Computer, Portable Personal Computer
- Water Analyzing Kit, Soil pH & Moisture, Penetrometer, Soil Auger

3) Equipment for Agricultural and Forest Products Processing
- Rice Shelling Machine
- Food Crushing Machine
- Crop Drying Machine
- Bamboo Chipper
- Disk Saw, Band Saw, Planer, 2-sided Planer, Polishing Machine
- Fokienia hodginsii Processing Machinery
- Tung Oil Processing Machinery
- Bamboo Fiber-Board Manufacturing Machinery

4) Equipment for Road and Irrigation Systems Construction
- Bulldozer, Dump Truck, Excavator, Roller, Crusher

5) Equipment for Electricity Supply
- Diesel Generator
- Hydropower Generator
- Cable for Transmission Line
- Transformer

Chapter 2
Contents of the Projects

Chapter 2 Contents of the Project

2-1 Project Objectives

Although the Da River watershed within the borders of Viet Nam covers five provinces, more than 80% of the watershed area is located in the two provinces of Son La and Lai Chau. The population of both provinces is about 1.2 million, mainly composed of ethnic minorities such as Thai, H'mong, Muong and Dao besides Kinh. The average population density of 40 (53 and 28 respectively) people/km^2 is one of the lowest in Viet Nam.

The mountainous region of both provinces is one of the poorest in the country, the average income per capita being US$70 (US$80 and US$50 respectively; nationally it is US$200). The population lives mainly on subsistence agriculture, where only small areas are suitable for paddy rice production. Agricultural systems are complex and are mainly based on shifting cultivation on steep slopes. Because of the poor infrastructure in the remote areas, access to markets and distribution of goods is difficult, therefore, most of the population are affected by food shortages for a few months every year.

Although the majority of the region is mountainous and officially classified as forest land, the average forest coverage is only about 10%. The main cause of the rapid decrease of natural forests during the past 30 years has been the over-exploitation by shifting cultivation, uncontrolled logging and expansion of inappropriate lowland agricultural systems into the uplands. The consequences of deforestation and unsustainable land-use are decreased soil fertility, and increased soil erosion, floods and landslides.

The watershed of the Da River, particularly in Son La and Lai Chau provinces, has been given its high priority in national development policy for the following three reasons:

1) The population of the region depends on the area for food production and the supply of forest products for local consumption
2) The watershed is of major importance for the Hoa Bin dam which is the country's largest hydroelectric power station
3) The large number of farmers in the downstream area of the Red River delta depend on the stable supply of water for irrigation of their paddy fields

Considering the circumstances mentioned above in the two provinces of Son La and Lai Chau, the Government of Viet Nam has thereby formulated the Project for the rural development by the use of demonstration activities in model areas selected from each province.

The objectives of the Project are as follows;

In each model area,

1) To eliminate the dependence on shifting cultivation,
2) To utilize forest resources on a sustainable basis,
3) To increase the proportion of fixed cultivation crops.

And, through the accomplishment of the above three short-term objectives, it is expected to realize the following long-term objectives:

In each province,

1) To increase forest coverage (in Son La from 9% to 18% and in Lai Chau from 12% to 43%),
2) To improve job opportunities and income of the inhabitants (per capita income: in Son La from US$80 to US$200 and in Lai Chau US$50 to US$200).

In order to achieve these objectives mentioned above, the Government of Viet Nam is planning the following:

1) The implementation of reforestation, natural regeneration and development of agricultural land according to a land use plan,
2) The implementation of training for personnel and extension to local people according to a training and extension plan,
3) The construction of irrigation systems according to an irrigation plan,
4) The construction and repair of roads, and setting up of electricity supply systems according to an infrastructure improvement plan.

The Project aims at providing necessary equipment to realize the above-mentioned activities through the selection of 18 communes as model areas from 6 districts (including 2 cities), 3 from each province.

2-2 Basic Concept of the Project

An outline of the study and examination on the request for the basic concept of the Project is shown below.

(1) Project Sites

The Project covers the 2 provinces, 6 districts (including 2 cities) and 18 communes, and aims to extend the results obtained to other areas in north-west Viet Nam. Therefore, it is planned to be implemented in the model areas selected for their distinctive zones in the mountainous region, under varying conditions. The bases of the selection of the model areas are contained in the following table (Table 2-1). Judging from the details, the selected Project sites are considered appropriate.

Table 2-1 Basis for the Selection of Model Areas

Province	Dist. (City)	Commune	Basis for Selection
Son La	Muong La District (Muong La F.E.)	Ta Bu Muong Bu Muong Chum	1) Directly faces the Da River, one of the most important watersheds in the country, therefore the effects of watershed conservation is large. 2) It is covered by the F.E., having favorable circumstances for extension services and forest products processing.
	Son La City	Chieng Sing Chieng Den Chieng, Ngan	1) Countermeasures are urgently needed because of the large population and low forest coverage. 2) It has potential for technical development of mechanization for agricultural and forest production practices because the area is mostly plains.
	Thuan Chau District	Phong Lai Chieng Pha Phong Lang	1) It needs to develop agricultural and forest production techniques to high altitude. 2) The land is almost bare with low forest coverage (only 3%), therefore the establishment of plantations is urgent.
Lai Chau	Than Giao District (Than Giao F.E.)	Quay Cang Toa Tinh Quai To	1) The development of general techniques are expected because of its average economic condition, and easy access due to its location at the mouth of the province. 2) Needs to secure water, being one of the better rice production area in the district. 3) Suffering from serious shifting cultivation.
	Tua Chua District	Sinh Phinh Muong, Bang Xa Nhe	1) Needs urgent countermeasures as it suffers from high rates of deforestation and water shortage. 2) Desperately needs proper watershed management because it is one of the basins of the Da River.
	Dien Bien City (Dien Bien F.E.)	Muong Phang Na Tau Thanh, Minh	1) It is suffering from the pressure of over population due to it becoming the capital of the province this year, otherwise it is a good model with good economic conditions. 2) The water situation is important, being located upstream of Dien Bien city.

(2) Components

In order to realize the objectives of the Project, activities will be implemented according to the following; land use, training and extension, irrigation and social infrastructure improvement plans.

1) Land Use Plan

The activities of reforestation, natural regeneration and development of agricultural land will be effectively implemented according to the following land use plan.

Province	Son La	Lai Chau	Total
Planting & Regeneration (ha)	+10,953	+25,716	+36,669
Agricultural Land Development (ha)	+2,347	+1,749	+4,096

Through the results of these activities, a decrease in shifting cultivation and increase of agricultural, and forest products will be realized as shown below:

(a) Shifting Cultivation

Province	Son La	Lai Chau	Total
Shifting Cultivation (ha)	−2,093	−7,887	−9,980

(b) Agricultural Products

Province	Son La	Lai Chau	Total
Rice Production (t/year)	+1,438 5,108	+2,378 9,527	+3,816 14,635
Maize Production (t/year)	+1,010 4,405	+2,120 6,851	+3,130 11,256
Cassava Production (t/year)	−500 30,700	+276 3,642	−224 34,342

(Note) Number below represents total volume.

(c) Forest Products

Province	Son La	Lai Chau	Total
Cut Volume for Timber (m^3/year)	+1,000 1,800	± 0 3,002	+1,000 4,802
Bamboo Cut Volume (million pipes/year)	+0.6~1.1 1.0~1.5		+0.6~1.1 1.0~1.5
Tung Nut Production (t/year)		+1,129 2,258	+1,129 2,258
Sawn Wood Production (m^3/year)	± 0 1,300~2,800	+900 ~1,300 1,450~2,100	+900 ~1,300 2,750~4,900
Bamboo Chip Production (million poles/year)	+0.30~0.55 0.50~0.75		+0.30~0.55 0.5~0.75
Tung Oil Production (t/year)		+350 350	+350 350

(Notes) Number below represents total volume.

2) Training and Extension Plan

The expertise and number of technical staff and extension staff will be improved according to the following training and extension plan.

Province	Son La	Lai Chau	Total
Number of Technical Staff (Dist., City, F.E., FSIV)	+48 180	+22 184	+70 364
Number of Local Technical Extension Staff	+361 361	+419 419	+780 780

(Notes) Number below is the total number of personnel.

3) Irrigation Plan

The facilities will be constracted according to the following irrigation plan.

Province	Son La	Lai Chau	Total
Reservoir Construction (number)	+41	+2	+43
Irrigation Channel Construction (m)		+18,300	+18,300
Water Supply Pipe Laying (km)	+373.1	+59.2	+432.3

4) Infrastructure Improvement Plan

The length of road construction and repairs will be undertaken according to the following infrastructure improvement plan.

Province	Son La	Lai Chau	Total
Road Construction (km)	+55	+254	+309
Road Repairs (km)	156	92	248

Electrification will be set up according to the following infrastructure improvement plan.

Province	Son La	Lai Chau	Total
Electric Power Supply (kW/h)	+1,421	+983	+2,404

The implementation of activities according to the above four plans will be achieved through the utilization of the equipment procured by this Project and by the personnel and budget provided by the Government of Viet Nam.

According to the request, the components consist of 5 categories, i.e., agroforestry, training and extension, agricultural and forest products processing, road and irrigation systems construction, and electricity supply. However, in order to execute the basic design more effectively and efficiently, the components will be rearranged in accordance with the main purpose of the equipment as follows:

1) Equipment for Agroforestry:

Same contents as the request except that the water pumps and pipe for small-scale water supply systems are tramsferred component to "6) Equipment for Improvement of Living Infrastructure".

The equipment of this component is for transportation of planting stocks, materials and machinery for reforestation and farmland development, agricultural and forest products, preparation of reforestation sites and farmland, irrigation system for farmlands, nurseries, reforested lands, coffee tree gardens and fruit tree plantations etc..

2) Equipment for Training and Extension:
Same contents as the request.

The abilities and number of technical staff of districts (cities, F.E.) and the North-West Center of FSIV will be improved. Local technical extension staff will be trained according to the training and extension plan. Therefore, they will be able to guide and diffuse efficiently essential techniques to the local people.

3) Equipment for Agricultural Products Processing:
The request of the Equipment for Agricultural and Forest Products Processing is divided into "3)" and "4)".

The equipment of this component is used to improve food production conditions of the local people by processing agricultural products, such as rice, maize and cassava of which productivity will increase through the utilization of the equipment in component "1)". The equipment of this component is utilized directly by local people in cooperation, who can see immediately themselves the benefits of this equipment.

4) Equipment for Forest Products Processing:
The request of the Equipment for Agricultural and Forest Products Processing is divided into "3)" and "4)".

The equipment of this component is used to process forest products such as timber, bamboo and tung nuts, to add value to the products, to meet the demand for sawn wood for building materials in the region, and to increase job opportunities and income of the local people. Therefore, the effect of this component is expected to be great.

5) Equipment for Improvement of Production Infrastructure:
Same contents as the request of Equipment for Road and Irrigation System Construction.

The equipment of this component is mainly used for improvement of production infrastructure such as road construction and repairs, and reservoir and water channel construction.

6) Equipment for Improvement of Living Infrastructure:
The equipment of water pump and pipe for small-scale water-supply systems is added to the equipment for electricity supply requested.

The equipment of this component is used for the improvement of small-scale water supply systems and electrification for the local people.

As the results of the study and examination on the request of the Government of Viet Nam, the basic concept of the Project is concluded as follows:

In order to achieve the objectives of the Project in the model areas, the activities for the reforestation, natural regeneration and development of agricultural land, the construction of irrigation systems, training of personnel and extension to local people, construction and repair of roads, and setting up of electricity supply systems will be implemented by each organization: MOF, provinces, districts (cities, F.E.) and communes.

Accordingly, the equipment necessary for these activities will be provided to each organization, consisting of the 6 components i.e. agroforestry, training and extension, agricultural products processing, forest products processing, improvement of production infrastructure, and improvement of living infrastructure.

2-3 Basic Design

The study and examination of the contents of the request has confirmed the appropriateness of the Project sites, the necessity and effect of the components of the Project and also the executing ability of the Vietnamese side. Further, the effect of undertaking the Project is compatible with Japan's Grant Aid Scheme, therefore, the implementation of the Project by the Japan's Grant Aid Cooperation System is adjudged pertinent.

Since "The Project for Strengthening of Reforestation Program through Agroforestry Practice in Dac Lac Province" implemented in 1993 is similar to the Project, the distribution, utilization and effects of its equipment shall be investigated through field surveys, and the results reflected in the Project.

2-3-1 Design Concept

(1) Contents and Selection of Equipment

The equipment shall be prioritized based on planning intensity, beneficiary population, extent of local participation, implementation ability and urgency.

For the execution of the basic design, the following specific requirements shall be considered for selecting equipment:

1) To be simple, durable and easy to maintain,
2) To be optimum for the purpose and the conditions in which it will be used,
3) To have low running costs in order to avoid difficulties of operation and maintenance due to insufficient use of the equipment,
4) To be possible for shared and substitution use.

It is planned that necessary spare-parts for the equipment will also be purchased.

(2) Guidance for Installation and Operation of Part of the Equipment

The Vietnamese side also requested the Japanese side to guide the installation and operation of some of the equipment because of technical difficulties. It is necessary to provide technical guidance especially for installation and operation of the hydro-power generators, and the forest products processing machines such as the Fokienia hodginsii processing machinery, Tung oil processing machinery and bamboo fiber-board manufacturing machinery.

(3) Internal Transportation Costs

Since the Project sites are located a long way, over 500km, from the port of Hai Phong and road conditions are poor, internal transportation costs are estimated to be considerable. The Vietnamese side strongly requested the Japanese side to bear the costs, citing on the heavy burden imposed by "The Project for Strengthening of Reforestation Program through Agroforestry Practice in Dac Lac Province". Therefore, the internal transportation costs shall be borne by Japan's grant aid for the smooth implementation of the Project.

The storage of the equipment, except for MOF's, after delivery from the Japanese side to the Vietnamese side,

- in Son La province, a former food warehouse in the city will be used for all of the equipment for each district (city, F.E.) and commune,
- in Lai Chau province, former food warehouses, located centrally in Than Giao, Tua Chua and Dien Bien will be used for the equipment of each district (city, F.E.) and commune. Further, because the provincial capital will be moved from Lai Chau to Dien Bien in near future, the warehouse in Dien Bien will be used for the equipment for the provincial government.

Therefore, the transportation costs shall be estimated from the port of Hai Phong to each warehouse yard.

2-3-2 Basic Design

(1) Basic Design of the Equipment

The basic design of the equipment by component is as follows:

1) Equipment for Agroforestry

(a) Water Pump (request 134 units, design 134 units)

The request of

- 134 units for irrigation systems to pump water from the reservoir to farmlands, nurseries, reforested lands, home gardens (mainly coffee trees) and fruit tree plantations.

is considered appropriate.

(b) Hand Tractor with Trailer (request 115 units, design 115 units)

For preparation of reforestation sites and farmlands, and for transportation of products, materials and machinery within the areas, total 112 units, 1 for each village are requested except for villages where they cannot be effectively used because of steep topography.

In addition, for preparation of an experimental nursery and for transportation of products and materials, machinery, total 3 units, 1 for the North-West Center of FSIV and 2 for the Muong La F.E. are requested.

All are considered appropriate judging from the necessity.

(c) Pickup Truck (request 24 units, design 11 units)

Utilized for mainly for transportation of essential materials and machinery for reforestation and development of farmland, and the production of agricultural and forest products,

- 5 units requested, 1 for each district (city, F.E.), except for the Moung La F.E. where 2 trucks are arranged, are considered appropriate.
- 18 units requested, 1 for each commune will be changed to a total of 6 units arranged for each district (city, F.E.) in order to be jointly used between 3 communes of model areas, because motorcycles and hand tractors will be arranged for the communes and villages.

However,

- 1 unit requested for the North-West Center of FSIV is judged to be unnecessary considering the arrangement of a hand tractor, station wagon and motorcycle for this center.

(d) Truck (request 2 units, design 2 units)

To transport timber and bamboo being produced on a sustainable basis for income for the local people, 2 trucks have been requested for the Muong La F.E. to replace old ones. This request is considered appropriate judging from the necessity.

(e) Cargo Boat (request 1 unit, design 0 unit)

1 cargo boat has been requested for the Muong La F. E. to transport timber and bamboo produced on a sustainable basis down the Da River to Foa Bin dam by rafting in order to attain income for the local people. Considering the provision of 2 trucks and 2 bamboo chippers to the F.E. by the Project, and the present demand for bamboo in Hoa Bin and Hanoi for paper chips and building materials, the request is judged to be unnecessary.

(f) Cargo-Passenger Boat (request 3 units, design 0 units)

3 units have been requested, 2 for the Muong La F.E. to transport agricultural and forest products as well as the staff and local people for training and extension across and along the Da River between the F.E. office and villages, and 1 for the Dien Bien F.E. to improve the means of transportation between across a large 4,000 ha reservoir between a major road and 4 villages. Considering the difficulties of daily upkeep and management of this kind of equipment at the site, and the possibility of road construction in those areas through the utilization of the equipment for improvement of production infrastructure procured by the Project, the request is judged to be unnecessary.

(g) Power Sprayer (request 62 units, design 0 units)

The need for the power sprayers is not recognized, because the request is only for the model areas in the Than Giao F.E. Furthermore, considering the operation and maintenance costs and the importance of proper application of agricultural chemicals, the necessity of this equipment is not recognized.

No.	Item	Number	Remarks
1-1	Water pump 6m³/h-45m³/h	134	
1-2-1	Hand tractor 12HP	115	
1-2-2	Trailer 0.5t	115	
1-3	Pick-up 4WD, W-Cabin, 0.5t	11	
1-4	Truck 5t, 100HP	2	

2) Equipment for Training and Extension

(a) Audio visual education kits and Formulation of teaching materials kits

Slide Projector (request 9 units, design 2 units), Overhead Projector (request 9 units, design 2 units), Photocopier (request 11 units, design 3 units), Video Camera (request 7 units, design 1 unit), Video Tape Recorder (request 7 unit, design 1 unit), Television (request 7 units, design 1 unit), Camera (request 1 unit, design 1 unit).

7 sets each containing a slide projector, overhead projector, photocopier, video camera, video and television for the North-West Center of FSIV and each district (city, F.E.), and 4 photocopiers, 2 slide projectors and 2 overhead projectors for each province for training and extension services have been requested. In addition, 1 Camera has been requested for the North-West Center of FSIV.

Since the Project sites are extensive and with poor roads, it is desirable that the possible distribution of the equipment for training and extension is taken into consideration. However, from the point of view of the effective utilization of the equipment, the number of units requested shall be revised.

Considering the present necessity in establishing and facilitating of training and extension in the North-West Center of FSIV and at the provincial level, and also considering the possibility of effectively implementing the system of training and extension in the future by utilizing the equipment introduced by the Project, 1 set of audiovisual education aids consisting of slide projector, overhead projector and photocopier for each province, and 1 set of teaching materials preparation kits consisting of photocopier, video camera, video tape recorder, television and camera for the North-West Center of FSIV is considered appropriate.

(b) Personal Computer (request 7 units, design 4 units), Portable Personal Computer (request 1 unit, design 0 units)

The request of 8 units has been made as follows;

- 3 units for the central level (2 including 1 portable personal computer for MOF and 1 for CEMMA) for supervision, analysis of data and preparation of documents for the Project,
- 1 unit for the North-West Center of FSIV for analysis of research data to contribute to the implementation of the Project,
- 4 units, 1 each for the (Agro -) Forestry (- Fishery) Department(FD) and the Fixed Cultivation and Sedentarization Department (FCSD) of each province for producing materials and documents and monitoring the Project.

It is necessary to establish an efficient management system for the implementation of the Project because of the wide range of sites and large populations of the areas. However, the number requested is significant as it totals 8 units. Accordingly, 4 units, 1 for MOF, 1 each for both provinces and 1 for the North-West Center of FSIV are considered appropriate judging from the view of effective use.

(c) Soil and Water Analyses Kits

Water Analysis Kit, Soil pH & Moisture Meter, Penetrometer, Soil Auger (request each 1 unit, design each 1 unit)

1 set containg a water analysis kit, soil pH & moisture meter, penetrometer, soil auger has been requested for the North-West Center of FSIV to carry out water and soil analysis in order to introduce suitable tree and crop species to the Project sites. The request is considered appropriate judging from the necessity.

(d) Station Wagon (request 12 units, design 6 units)

Regarding the request of 2 units, 1 each for MOF and FCSD under CEMMA for the Project guidance at the central level, only 1 unit for the MOF is considered appropriate, judging from the fact that 1 unit was previously provided to each organization by "The Project for the Strengthening of Reforestation Program through Agroforestry Practice in Dac Lac Province", however the Project site is located a long way from Hanoi and the road conditions are poor.

1 unit requested for the North-West Center of FSIV is considered necessary for the purpose of research and extension activities.

4 units requested, 1 each for FD and FCSD in both provinces are considered necessary for field supervision which cover all the model areas.

5 units requested, 1 for each district (city, F.E.), except for Thuan Chau district located along the national road, are judged to be unnecessary considering the provision of a pickup truck and motorcycles to each district (city, F.E.).

(e) Motorcycle (request 76 units, design 19 units)

2 units requested, 1 each for the North-West Center of FSIV and the FSIV office in Tua Chua are considered necessary for the extension of the results of the research works to all the model areas.

23 units requested, 3 for each district (city, F.E.)

- except for the Muong La F.E. which needs 5 units as no additional requests for its communes, and also
- except for the Dien Bien F.E. which has not specialized in reforestation works until recently, the Dien Bien city office needs 3 additional units to cover reforestation works,

are considered unnecessary except for 2 additional units for the Muong La F.E., because a pickup truck will be provided to each district (city, F.E.) and will be able to be utilized for extension services to its communes and other places.

15 units requested, 1 for each commune except for the three communes in the Muong La F.E. are considered appropriate for transportation to villages for staff involved extension services.

36 units for the villages in Tua Chua district to assist local staff commuting to the commune office because of the poor road conditions, are judged to be unnecessary.

No.	Item	Number	Remarks
2-1	Audio visual education kits	2	Slide Projecter,OHP, Photocopier
2-2	Formulation of teaching materi-als kits	1	Photocopier,Video camera Camera, Television, Video
2-3	Personal computer kits	4	w/printer& stabilizer
2-4	Soil and water analyses kits	1	Water analysis kit, Soil pH & moisture meter Penetrometer, Soil auger
2-5	Station wagon 4WD	6	
2-6	Motor cycle 100cc	19	

3) Equipment for Agricultural Products Processing

(a) Rice-Shelling Machine (request 182 units, design 182 units), Food Crushing Machine (request 168 units, design 168 units)

Since the local people shell rice and crush maize and cassava by hand, in order to improve shortages of food, and to reduce heavy work, 1 rice-shelling machine and food crushing machine for each village are requested. However, in the case that several villages are able to share 1 machine, and some villages already own such machines, the number requested was adjusted. Judging from the details, the request is considered appropriate.

(b) Crop Drying Machine (request 17 units, design 17 units)

In each model area, a lot of agricultural products rot and are wasted because of the lack of crop drying facilities. In both provinces, since harvesting season of the crops, especially maize, is in the rainy season, it is necessary to dry the products to keep them for long periods and utilize them without wastage. Therefore, 17 units, 1 for each commune, are requested, except for Phong Lang commune in Thuan Chau district, where maize production is comparatively low and possible for them to use the one in Chien Pha commune. Judging from the details, the request is considered appropriate.

No.	Item	Number	Remarks
3-1	Rice-shelling machine 400kg/h	182	
3-2	Food crushing machine 15-20kg/h	168	
3-3	Crop drying machine 800kg/day	17	

4) Equipment for Forest Products Processing

(a) Bamboo Chipper (request 4 units, design 2 units)

In Muong La F.E., since it is expected to harvest 1.0 - 1.5 million poles of bamboo a year in the future, and half of them will be produced into wood chips, 4 units, 1 for the F.E. and 1 for each commune, are requested.

However, since 2 trucks will be provided for the F.E. by the Project, there is no rationality in arranging 1 for each commune. Moreover, considering the present bamboo harvesting volume of 0.4 million poles a year, it is judged that 2 units for the F.E. is sufficient.

(b) Disk Saw (request 7 units, design 7 units), Band Saw (request 1 unit, design 1 unit), Planer (request 4 units, design 4 units), 2-sided Planer (request 2 units, design 2 unit), Sander (request 1 unit, design 1 unit)

In each district (city or F.E.), except for Thuan Chau district, to meet the demand for lumber for building materials, facilities for wood processing are planned to be renewed or established.

The request for these machines is as follows;

- Renewal of 1 set consisting of 1 disk saw and 1 planer for the Muong La F.E. and Son La city,
- Addition of 1 band saw, 1 2-sided planer and 1 sander for the Than Giao F.E. to increase the volume of wood production threefold in order to produce furniture and therefore increasing income for the local people,
- Introduction of 2 disk saws and 1 planer for Tua Chua district where no facilities exist,
- Renewal of 3 disk saws, 1 planer and 1 2-sided planer for the Dien Bien F.E. where all existing facilities are out-dated.

The request is considered appropriate judging from the necessity.

(c) Fokienia hodginsii Processing Machinery (request 1 set, design 1 set)

In the Than Giao F.E., to use the wastes of valuable Fokienia hodginsii wood, 1 set of Fokienia hodginsii processing machinery is requested in addition to the above-mentioned plan. The request is considered proper.

(d) Tung Oil Processing Machinery (request 1 set, design 1 set)

In the Than Giao F.E., since it is more profitable for the local people to sell the

(d) Tung Oil Processing Machinery (request 1 set, design 1 set)

In the Than Giao F.E., since it is more profitable for the local people to sell the processed tung oil rather than the tung seeds, 1 set of tung oil processing machinery has been requested for the F.E. Judging from its necessity to improve income of the local people by selling tung oil instead of tung seeds, the request is considered appropriate.

(e) Bamboo Fiber-Board Manufacturing Machinery (request 1 set, desgin 1 set)

It is important to develop technical means for manufacturing artificial board from bamboo in order to encourage the management of bamboo forests among the local people. Therefore, 1 set of bamboo fiber-board manufacturing machinery has been requested for the North-West Center of FSIV. The request is considered appropriate.

No.	Item	Number	Remarks
4-1	Bamboo chipping machine 1t/h	2	
4-2	Disk saw ϕ300-800mm	7	
4-3	Band saw W=0.8-1m	1	
4-4	Planer 400mm×300mm	4	
4-5	2-sided planer 350mm×220mm	2	
4-6	Sander W>300mm	1	
4-7	Fokienia hodginshii processing machinery 15,000 beads/day	1	Grange Ripper 1, Round Bar Making Machine 1, Wood Turning Lathe 2, Shaking Machine 1, Beads Polishing Machine 1
4-8	Tung oil processing machinery 2.5 t/day	1	Crusher 1, Roasting Machine 1, Pressing Machine 2, Oil Pump 4, Heater 6, Oil Refining Machine 1, Tank 1, Press 1,Switchboad 1
4-9	Bamboo fiber-board manufacturing machinery 500mm×500mm	1	Glue Spraying Machine 1, Hot Press 1

5) Equipment for Improvement of Production Infrastructure

Bulldozer (request 4 units, design 4 units), Dump Truck (request 7 units, design 7 units), Excavator (request 4 units, design 4 units), Rollers (request 3 units, design 3 units), Crusher (request 3 units, design 3 units)

As necessary equipment for the construction and repair of roads, irrigation systems and others, the request for these machines is as follows;

In Lai Chau province, 1 set of earth moving machinery consisting of 1 bulldozer, 1 dump truck and 1 excavator, and 1 set of road-bed construction machinery consisting of 1 dump track and 1 crusher have been requested for each district (city or F.E.).

In Son La province, considering that the necessary length of new road to be constructed is only one fifth of that in Lai Chau province, and there is no need to construct water supply channels, 1 set of earth moving machinery is requested for the provincial office.

This machinery is vital for the improvement of infrastructure in the mountainous areas, and the both provinces have the staff and work shops necessary for its operation and maintenance, therefore, the request is considered appropriate.

No.	Item	Number	Remarks
5-1	Bulldozer 75-100HP	4	
5-2	Dump truck 5t	7	
5-3	Excavator 0.28m^3	4	
5-4	Roller 12t	3	
5-5	Crusher Maximum size 200mm×300mm	3	

6) Equipment for Improvement of Living Infrastructure

(a) Water Pump (request 16 units, design 16 units)

The request of

- 16 units for small-scale water supply systems from springs in some villages within the model areas.

is considered appropriate in terms of necessity to improve living conditions of the local people through the provision of good drinking water.

(b) Water Pipe (request 253.3km, design 289.5km)

Water pipes are requested for the small-scale water supply systems in villages within the model areas. Since bamboo is used for most of the existing systems as pipe and guttering, the need to install proper pipe is acknowledged in view of dilapidation, damage, and water loss. The request is considered appropriate.

(c) Diesel Engine Generator (request 42 units, design 29 units), Hydropower Generator (request 8 units, design 7 units), Cable for Transmission Line (request 624.0km, design 331.2km), Transformer (request 8 units, design 2 units)

Since almost all the villages of the Project sites have no electricity, it is necessary to provide electric power to increase training and studying hours for local trainees and schoolchildren in the evening and to improve the living conditions of the local people. Therefore, considering the needs of each village, the electricity facilities have been requested to be arranged as follows:

- 3 generators and 1 hydropower generator to supply 130 kW/h of electricity (150 - 200 W/h to each household, except for remote areas) in the Muong La F.E.,
- 5 diesel generators and 3 transformers to supply 555 kW/h of electricity (340 - 450 W/h to each household of 37 villages, except for 4 villages that are supplied from the Son La city center) in Son La city,
- 20 diesel generators and 3 transformers to supply 600 kW/h of electricity (200 - 340 W/h to each household in all villages) in Thuan Chau district,
- 2 diesel generators and 2 hydropower generators to supply 63.5 kW/h (200 W/h to each household, except for remote areas) in the Than Giao F.E.,
- 1 diesel generator, 3 hydropower generators and 2 transformers to supply 160 kW/h (100 W/h to each household, except for remote areas) in Tua Chua district,
- 7 diesel generators and 2 hydropower generators to supply 104.5 kW/h of electricity (60 W/h to each household, except for remote areas) and in addition, 1 diesel generator to supply electric power for wood processing in the Dien Bien F.E.

All units requested are considered necessary because they shall improve the living conditions of the local people. However, the number of diesel engine generators, cables for transmission line for these generators and transformers will be decreased because of the new public electrification plan in some model areas of the Project sites formulated recently. And as for the hydropower generator requested for Muon Bang commune in Tua Chua district, head and water-volume are not sufficient to generate 15 kW/h of electric-power, therefore it shall be replaced with a diesel generator.

No.	Item	Number	Remarks
6-1	Water pump 30-60m^3	16	
6-2	Water pipe ϕ20-150mm	289.5km	Polyethylene pipe
6-3	Diesel engine generator 1.9- 60kW/h	29	
6-4	Hydro-power generator 10-40kW/h	7	
6-5	Cable for transmission line A16-A70	331.2km	
6-6	Transformer 50KVA	2	

As a result of a study on the markets in Viet Nam and third countries, the local procurement of the following equipment is considered appropriate due to availability, ease of maintenance, guaranteed availability of spare-parts and expendable supply etc.

1) Procurement in Viet Nam
   (a) Trailer for Hand Tractor
   (b) Audiovisual Education Aids
   (c) Formulation of teaching materials kits
   (d) Personal Computer
   (e) Motorcycle

2) Procurement from a third country (Thailand)
   Water Pipe

(2) Phased Implementation

The Project sites cover 2 provinces, 6 districts including 2 cities, and 18 communes, and 6 categories of components. Because the contents of the Project, the sites and components, are extensive, further, the range of the equipment is diverse and of large scale, it is necessary to implement the Project in 2 phases, either by dividing the sites or the components.

However, in consideration of the strong desire of the Vietnamese side to simultaneously implement the Project in all the model areas, selected by the distinctive features of each site, and to immediately introduce the results of the Project to other areas in the north-west region, it is difficult to divide the implementation of the Project by sites.

Accordingly, the phased implementation of the Project shall be divided by components. Based on the principle that there are 2 types of equipment:

- firstly, the equipment that can be immediately introduced, bringing about direct effects, and
- secondly, the equipment required after the completion or improvement of facilities or infrastructure such as buildings and roads etc.

Therefore, as a rule, the former will be incorporated into Phase 1 and the latter into Phase 2. However, due to certain priorities of the Vietnamese side, this rule cannot be applied to some of the equipment.

1) Equipment for Agroforestry
This component is incorporated into Phase 1.

2) Equipment for Training and Extension
This component is incorporated into Phase 1.

3) Equipment for Agricultural Products Processing
This component is incorporated into Phase 1.

4) Equipment for Forest Products Processing
This component is incorporated into Phase 2. However, the Fokienia hodginshii processing machinery will be included in Phase 1.

5) Equipment for Improvement of Production Infrastructure
This component is incorporated into Phase 1. However, 1 set of road-bed construction machinery will be included in Phase 2.

6) Equipment for Improvement of Living Infrastructure
This component is incorporated into Phase 2. However, for the hydropower generators, the 3 sites will be included in Phase 1 (Quai To commune in Than Giao F.E., Muong Bang commune in Tha Chua district, Than Minh commune in Dien Bien F.E.).

The following table sumarizes the phased implementation of the Project divided by components.

Compornent	Phase 1	Phase 2
1) Agroforestry	◎	
2) Training and Extension	◎	
3) Agricultural Products Processing	◎	
4) Forest Products Processing	○	◎
5) Improvement of Production Infrastructure	◎	○
6) Improvement of Living Infrastructure	○	◎

(Notes) Mark "◎" indicates original rule, and mark "○" indicates that its component includes the equipment as follows:

(a) 1 set of Fokienia hodginshii processing machinery for "4)"

(b) 1 set of road-bed construction machinery for "5)"

(c) 3 hydropower generators for "6)"

Chapter 3
Implementation Plan

Chapter 3 Implementation Plan

3-1 Implementation Plan

3-1-1 Implementation Concept

This Project is to be implemented under Japan's grant aid program. After the signing of the Exchange of Notes (E/N) by both Governments, the Government of Viet Nam will conclude a consulting agreement with a Japanese consultant firm, and in compliance with the provisions of the agreement, the detailed design of the Project will be implemented. After the completion of the detailed design documents, a Japanese corporation, selected as supplier through tender by the Vietnamese side, will procure, deliver, and guide the installation and operation of the equipment.

In addition, it is necessary to take into consideration the implementation schedule of the manufacture and transportation of the equipment in order to complete the supply within the scheduled period.

3-1-2 Scope of Works

The scope of works in accordance with the responsibilities of both Japanese and Vietnamese sides is as follows:

(1) Responsibilities of Japanese Side

1) Procurement of the equipment
2) Transportation of the equipment (packing, shipment, sea transportation, transfer from ship to trucks, internal transportation)
3) Guidance for the installation and operation of the equipment
4) Supervision of the implementation of the Project

(2) Responsibilities of the Vietnamese side

1) Arrangement of warehouses for the equipment
2) Transportation of the equipment within the Project sites
3) Construction and installation works (the equipment for agricultural and for-

est products processing, diesel engine generator, hydro-power generator)

4) Water pipe distribution work
5) Electric wiring work

Note: Refer to appendix - 5 for further details.

3-1-3 Consultant Supervision

For the smooth supply of the equipment, the following consultant supervision works will be proficiently and systematically carried out:

1) Examination and approval of the drawings of the equipment to be manufactured
2) Verification of the shipment of the equipment
3) Confirmation of the progress of the works under the responsibility of the Vietnamese side
4) Report on the progress of the implementation plan to the authorities concerned of both Governments
5) Observation of the installation and operation guidance of the equipment
6) Confirmation of the inspection and delivery of the equipment

3-1-4 Implementation Schedule

As mentioned above, the Project will be implemented in 2 phases. The detailed design, equipment procurement, and supervisory services will be properly undertaken in accordance with the implementation schedule shown in Table 2-1.

(1) Detailed Design

After signing the contract for consulting services, the detailed design work will start subject to the verification of the contract by the Government of Japan. Based on the basic design, field surveys and domestic work will be conducted in order to prepare tender documents. Through discussions with the Vietnamese side, the document required for tendering is to be approved by the Government of Viet Nam. The period for detailed design will be 3.5 months for phase 1 and 2.33 months for phase 2.

(2) Equipment Procurement

After signing the contract for the supply of the equipment, the equipment procurement work will commence subject to the verification of the contract by the Government of Japan. The equipment is scheduled to be delivered to the sites when facilities such as warehouses for the equipment, buildings for generators and so on are nearly completed. The total period required from the time of order to the time of delivery to port in Japan is estimated to be 6 months. A further 3 months are allowed 45 days for marine transportation and custom clearance, and another 45 days for internal transportation, inspection, and delivery, including installation and operation guidance.

Table 3-1 Implementation Schedule

Classification		1	2	3	4	5	6	7	8	9	10	11
Phase 1	Detailed Design	(Consultant Contract & Work in Viet Nam)										
			(Work in Japan)									
					(Confirmation & approval)							
										(Total : 3.50 months)		
	Procurement of Equipment	(Manufacturing and Delivery)										
								(Overseas Transportation)				
										(Internal Transportation & Inspection)		
										(Total : 9.00 months)		
Phase 2	Detailed Design	(Consultant contract & Work in Viet Nam)										
			(Work in Japan)									
				(Confirmation & approval)								
										(Total : 2.33 months)		
	Procurement of Equipment	(Manufacturing and Delivery)										
								(Overseas Transportation)				
										(Internal Transportation & Inspection)		
										(Total : 9.00 months)		

3-1-5 Obligations of the Government of Viet Nam

On condition of receiving Japan's grant aid, the Government of Viet Nam is required to undertake necessary measures.

1) To provide the land for a temporary site office, warehouse and stock yard during the implementation of the Project,
2) To provide necessary facilities for the Project such as electricity and other incidental facilities,
3) To bear commissions to the Japanese foreign exchange bank for the Banking Arrangement (B/A),
4) To exempt the equipment from taxes and to take necessary measures for customs clearance at the port of disembarkation in Viet Nam,
5) To accord Japanese nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into Viet Nam and stay therein for the performance of their work,
6) To maintain and use properly and effectively the equipment provided under the grant,
7) To bear all the expenses, other than those to be borne by the grant, necessary for construction and the installation of the equipment.

Moreover, since the Project is to be implemented in accordance with the budget system of Japan, the period for the completion of the Project is severely restricted. Therefore, the Vietnamese side is obliged to undertake these necessary measures without delay.

3-2 Operation and Maintenance Plan

(1) Operation and Maintenance Plan

The operation and maintenance plan of the Project shall be formulated and carried out in accordance with the following policies.

1) In order to implement the Project properly and effectively, a central level steering committee consisting of personnel from MOF and CEMMA shall be established, while a provincial level steering committee shall also be established in each province of Son La and Lai Chau.

2) All the equipment to be procured by Japan's grant aid program is to be supplied directly to the respective provinces, except for the equipment for MOF. Therefore, both provinces shall take ultimate responsibility for the overall management of the operation and maintenance of the equipment and the facilities for its installation.

3) As for the equipment and facilities directly utilized by the North-West Center of FSIV, provinces, districts (cities, F.E.), and communes, each body shall take responsibility for the daily operation and maintenance.

4) As for the equipment and facilities of the Project directly utilized at village level, the direct beneficiaries shall take responsibility for the daily operation and maintenance. Accordingly, a committee, or cooperative, for the operation and maintenance shall be established at every village.

5) The establishment of the beneficiary-pay-principle system is strongly recommended to cover the expenses for the operation and maintenance of the equipment and its facilities in the case where the beneficiaries are the local people.

6) The personnel and budget for the operation and management of the Project should be secured by MOF and CEMMA at central level, and by the provinces, districts (cities, F.E.) and communes at provincial level.

(2) Operation and Maintenance Costs

The operation and maintenance costs of the Project are as follows:

Table 3-2 Calculation of Costs (Yearly)

Unit : million Dong

Classification	Costs
1) Personnel Costs (a)+(b)	723
(a) Office Staff	314
(b) Other Staff	409
2) Equipment Operation Costs (a)+(b)+(c)	14,675
(a) Fuel Costs	12,026
(b) Electric Costs	63
(c) Maintenance Costs	2,586
Total 1)+2)	15,398

Chapter 4
Project Evaluation and Recommendation

Chapter 4 Project Evaluation and Recommendations

4-1 Project Effect

The population of the direct beneficiaries of the Project are estimated to be about 77,000 people of ethnic minorities living in the model areas in the mountainous regions of Son La and Lai Chau provinces. The total number of indirect beneficiaries through influential areas is huge as it includes the total population of 1.211 million of both provinces, and the residents in the downstream watershed of the Da River including the Ko River delta, Ma River and Mekong River. The degree of the effects and improvements resulting from this Project is shown in Table 4-1.

Table 4-1 Project Effect and Improvement Degree

Existing Condition and Problems	Project Countermeasures	Project Effect and Improvement Degree
1. Increase of deforestation and unsustainable landuse Forest coverage in Son La and Lai Chau provinces has markedly decreased to 9% and 12% respectively due to shifting cultivation and uncontrolled logging and expansion of inappropriate lowland agriculture systems into the uplands. The consequences of deforestation and unsustainable land-use are decreasing soil fertility, and increasing soil erosion, floods and landslides.	- To implement reforestation, natural regeneration and development of agricultural land according to a land-use plan by introduction of necessary equipment. - To implement training for personnel and extension to local people according to a training and extension plan by introduction of necessary equipment. - To construct irrigation systems according to an irrigation plan by introduction of necessary equipment.	- To decrease shifting cultivation (- 10.0 thousand ha) - To increase forest cover through reforestation and regeneration (+36.7 thousand ha) - To develop agricultural land (+4.1 thousand ha) - To increase agricultural and forest products - To increase number of technical staff (+70) and extension staff (+780) - To construct irrigation systems (reservoir, irrigation channel etc.) - To construct and repair

2. Low living condition of the people Ethnic minorities who depend on shifting cultivation, are mostly concentrated in the northwestern mountainous areas, particularly in Son La and Lai Chau provinces. The majority of the population of the areas suffer from food shortages for a few months every year. The provinces are among the poorest in the country, with average income per capita of US$ 80 and 50 respectively.	- To construct and repair roads, and set up electricity according to an infrastructure improvement plan by introduction of necessary equipment.	roads (309km for construction and 248km for repair) - To establish electric power supply As a result, the following targets will be attained: 1) To reach forest coverage ratio in Son La and Lai Chau provinces to 18% and 43% respectively, 2) To reach average income per capita to US$ 200 by the year 2000.

4-2 Recommendations

The following suggestions will be presented with a view to expediting the smooth and effective implementation of the Project.

(1) Smooth implementation of the works to be undertaken by the Vietnamese side

The works to be undertaken by the Vietnamese side such as the preparation of warehouses for equipment storage, transportation of the equipment within the Project sites, water pipe distribution, building construction to install the equipment for agricultural and forest products processing, diesel engine generator, hydropower generator, electric wiring etc. shall be implemented in accordance with the implementation schedule of the Project. It is particularly important that the facilities necessary for the equipment in need of the technical guidance for its installation and operation, shall be completed before the delivery of the equipment. Accordingly, an ample budget for those activities shall be secured and timely disbursed.

Morcover, care shall be taken in the building construction works, water pipe installation and electric wiring etc., to ensure the long term use of the equipment.

(2) Establishment of the system for the operation and maintenance

A system for the operation and maintenance of the equipment and its facilities shall be established to assure the smooth and effective conduct of the various activities involved in the Project. The responsibilities of the various organizations involved in the Project from the central level, the MOF and the CEMMA to the executing agencies of the provincial government shall be clearly defined due to the extensive scope of the Project. Moreover, as for the system for operation and maintenance, the early establishment of a committee or cooperative, by the direct beneficiaries, the local people, is necessary.

Appendices

Appendix-1 Member List of the Survey Team (1/2)

(1) Basic Design Study Team

1) Leader	SUEMORI Mitsuru Director, First Basic Design Study Division, Grant Aid Study & Design Department, JICA
2) Rural Development Planner	KUNIMITSU Yoji Director, Planning Division, Tone River Basin Agricultural Land & Water Planning & Management Office, MAFF
3) Forestry Development Planner	YASUMURO Masahiko Management Planning Division, National Forest Management Department, Forestry Agency, MAFF
4) Project Coordinator	ISHIMORI Tomohiro First Basic Design Study Division, Grant Aid Study & Design Department, JICA
5) Chief Consultant	KATO Hitoshi KOKUSAI KOGYO CO., LTD.
6) Reforestation Planner	YAMAZAKI Hideto KOKUSAI KOGYO CO., LTD.
7) Interpreter	Nguyen Xuan Truong KOKUSAI KOGYO CO., LTD.

(2) Study Team for Explanation of the Draft Basic Design (2/2)

1) Leader	INOUE Shin Grant Aid Division, Economic Cooperation Bureau, MOFA
2) Project Coordinator	ISHIMORI Tomohiro First Basic Design Study Division, Grant Aid Study & Design Department, JICA
3) Chief Consultant	KATO Hitoshi KOKUSAI KOGYO CO., LTD.
4) Reforestation Planner	YAMAZAKI Hideto KOKUSAI KOGYO CO., LTD.
5) Interpreter	Tran Van Vinh KOKUSAI KOGYO CO., LTD.

Appendix-2 Survey Schedule (1/3)

(1) Basic Design Study Team

No.	Date	Activities & Remarks	Stay
1	Feb. 12 (Sun)	Lv. Tokyo, Ar. Hanoi(CX 509 & VN 791)	Hanoi
2	13 (Mon)	Courtecy call on Embassy of Japan Courtecy call on and meeting with Ministry of Forestry(MOF) and Committee of Ethnic Minorities and Mountainous Areas (CEMMA) Courtecy call on State Planning Committee(SPC)	Hanoi
3	14 (Tue)	Visit to FIPI, FSIV, other donor countries and organizations Data collection	Hanoi
4	15 (Wed)	Lv. Hanoi, Ar. Ho Chi Minh (VN 2111) Lv. Ho Chi Minh, Ar. Buon Ma Thout (by car)	Buon Ma Thuot
5	16 (Thu)	Courtecy call on and meeting with parties concerned in Dac Lac Province Field survey of the sites	Buon Ma Thout
6	17 (Fri)	Field survey of the sites Lv. Buon Ma Thout, Ar. Ho Chi Minh (VN 339)	Ho Chi Minh
7	18 (Sat)	Lv. Ho Chi Minh, Ar. Hanoi (VN 210) Lv. Hanoi, Ar. Son La (by car) Field survey of the sites	Son La
8	19 (Sun)	Courtecy call on and meeting with parties concerned in Son La Province and North-West Center of FSIV Field survey of the sites	Son La
9	20 (Mon)	Field survey of the sites Lv. Son La, Ar. Than Giao (by car) Courtecy call on and meeting with parties concerned in Lai Chau Province	Than Giao
10	21 (Tue)	Field survey of the sites Lv. Than Giao, Ar. Dien Bien (by car) Field survey of the sites Lv. Dien Bien, Ar. Than Giao (by car)	Than Giao
11	22 (Wed)	Field survey of the sites Lv. Than Giao, Ar. Hanoi (by car)	Hanoi

(2/3)

No.	Date	Activities & Remarks	Stay
12	23 (Thu)	Meeting with MOF	Hanoi
13	24 (Fri)	Signing of Minutes of Discussions Reporting to Embassy of Japan Reporting to SPC	Hanoi
14	25 (Sat)	Governmental members: Lv. Hanoi, Ar. Tokyo (VN 790 & JL 064)	
		Consultant members : Continue survey	Hanoi
15	26 (Sun)	Data arrangement	Hanoi
16	27 (Mon)	Meeting with MOF	Hanoi
17	28 (Tue)	Lv. Hanoi, Ar. Son La (by car)	Son La
18	Mar. 1 (Wed)	Field survey of the sites	Son La
19	2 (Thu)	Lv. Son La, Ar. Than Giao (by car) Field survey of the sites	Than Giao
20	3 (Fri)	Lv. Than Giao, Ar. Tua Chua (by car) Field survey of the sites Lv. Tua Chua, Ar. Dien Bien (by car)	Dien Bien
21	4 (Sat)	Field survey of the sites Lv. Dien Bien, Ar. Son La (by car)	Son La
22	5 (Sun)	Lv. Son La, Ar. Hanoi (by car)	Hanoi
23	6 (Mon)	Meeting with MOF Lv. Hanoi, Ar. Ho Chi Minh (VN 229)	Ho Chi Minh
24	7 (Tue)	Meeting survey	Ho Chi Minh
25	8 (Wed)	Lv. Ho Chi Minh, Ar. Hanoi (VN 222) Meeting with MOF	Hanoi
26	9 (Thu)	Meeting with MOF	Hanoi
27	10 (Fri)	Inspection of Woodworking plants (in Hanoi) Reporting to Embassy of Japan	Hanoi
28	11 (Sat)	Lv. Hanoi, Ar. Hoa Bin (by car) Inspection of bamboo-paper mill Lv. Hoa Bin, Ar. Hanoi (by car)	Hanoi
29	12 (Sun)	Data arrangement, Meeting with MOF	Hanoi
30	13 (Mon)	Lv. Hanoi, Ar. Tokyo (VN 790 & JL 064)	

(2) Study Team for Explanation of the Draft Basic Design (3/3)

No.	Date	Activities & Remarks	Stay
1	Jun. 11 (Sun)	Lv. Tokyo, Ar. Hanoi (CX 509 & VN 791)	Hanoi
2	12 (Mon)	Courtecy call on and meeting with MOF Courtecy call on SPC Courtecy call on Embassy of Japan	Hanoi
3	13 (Tue)	Courtecy call on JICA Office Meeting with MOF	Hanoi
4	14 (Wed)	Meeting with MOF	Hanoi
5	15 (Thu)	Meeting with MOF	Hanoi
6	16 (Fri)	Meeting with MOF Signing of Minutes of Discussions	Hanoi
7	17 (Sat)	Leader of the study team : Lv. Hanoi, Ar. Tokyo (VN 790 & JL 064)	
		Meeting with MOF	Hanoi
8	18 (Sun)	Data arrangement	Hanoi
9	19 (Mon)	Reporting to SPC Reporting to Embassy of Japan Reporting to JICA Office	Hanoi
10	20 (Tue)	Lv. Hanoi, Ar. Tokyo (CX 790 & JL 734)	

Appendix-3 List of Parties Concerned in Viet Nam (1/4)

(1) Basic Design Study Team

1) State Planning Committee (SPC)

Mr. Trung Van Doan	Director General,
	Department of Foreign Economic Relations
Mr. Bui Liem	Senior Expert
Mr. Thao	Director,
	Department of Agriculture and Forestry
Mr. Tuong	Senior Expert

2) Ministry of Forestry (MOF)

Mr. Nguyen Quang Ha	Minister
Mr. Nguyen Van Dang	Vice Minister
Mr. Bui Xuan Yen	Director,
	International Cooperation Department
Mr. Dao Dug Tung	Senior Expert of Investment and Construction
Mr. Ngo Sy Hoai	Senior Expert,
	Internationasl Cooperation Department
Mr. Kazuhiro Goseki	JICA Expert

3) Committee of Ethnic Minorities and Moutainous Areas (CEMMA)

Mr. Phan Thanh Xuan	Vice Chairman
Mr. Phan Trung Truong	Vice Director,
	Fixed Cultivation and Sedentarization Department
Mr. Nguyen Van Dinh	Director,
	International Cooperation Department

4) Forest Inventry and Planning Institute (FIPI)

Mr. Nguyen Huy Phon	Deputy Director
Mr. Nguyen Hoai Phuong	Vice Director,
	International Cooperation Department
Mr. Le Canh Cu	Forestry Expert,
	International Cooperation Department

Mr. Nguyen Dinh Quoi	Deputy Director Director, GTZ Project
Mr. Henk Paul Van Poel	Social Forestry Expert, GTZ Project
Dr. Bernd-Markus Liss	Forestry and Natural Resources Expert, GTZ Project

5) Forest Science Institute of Viet Nam (FSIV)

Mr. Vu Long	Vice Director
Mr. Doan Bong	Head, Science Planning Division
Mr. Lau Tin	Head, Forest Product Chemistry
Mr. Nguyen Din Hung	Head, Forest Plant Resource Division
Mr. Nguuen Tuong Nhan	Head, Forest Products Processing
Mr. Vu Duc Tai	Member, Information Service
Mr. Dang Dui Cat	Member, Information Cooperation Division

6) Easup Forestry-Agro-Industry Union

Mr. Do Khac Than	Director General
Mr. Vu Duy Duong	Vice Director
Mr. Dau Duc Hong	Chief, Technical Section
Mr. Nguyen Dinh Tuan	Accountant, People's Comittee of Dac Lac
Mr. Phan Van An	Chief, Warehouse
Mr. Va Van Sy	Staff, Warehouse

7) Cune Forest Enterprise (F.E.)

Mr. Yback Nie	Vice Director
Mr. Le Duc Thao	Chief, Organization Division

8) Cupong Forest Enterprise (F.E.)

Mr. Ong Tran Van Bau	Vice Director

9) People's Committee of Dak Lac Province

Mr. A Ma Thuong	Chairman, CEMMA
Mr. Do Hun Ba	Chairman, Committee of Nationalities and Sedentary Cultivation and Settlement

10) People's Committee of Son La Province

Mr. Nguyen Van Tu	Vice Chairman
Mr. Nguyen Van Thong	Chairman, Committee of Nationalities and Sedentary Cultivation and Settlement
Mr. Hoang Khai	Chairman, Board of Directors
Mr. Luong Van Thiet	Vice Director, Agro-Forestry-Fishery Department (FD)
Mr. Nguyen Van Tho	Chairman, Foreign Relation Department
Mr. Do Bang Chen	Staff, Foreign Relation Department
Mr. Nguyen Van Luan	Staff, Foreign Relation Department
Mr. Nguyen Van Uy	Staff, Foreign Relation Department
Mr. Nguyen Van Vu	Engineer, Agro-Forestry-Fishery Department (FD)
Mr. Nguyen Tuong Nhan	Head, Forest Products Processing

11) People's Committee of Lai Chau Province

Mr. Sung A Vang	Chairman
Mr. Phan Van Prong	Vice Chairman
Mr. Ka Van Quy	Chairman, People's Committee of Tuan Giao District
Mr. Vu Duc Thinh	Chief, Planning Bureau
Mrs. Nguyen Thi Minh	Deputy Chief, Planning Bureau
Mr. Tran Van Thang	Staff, Planning Bureau
Mr. Ho Si Hong	Director, Forestry Department (FD)
Mr. Dinh Duc Thong	Director, Tuan Giao Forest Enterprise (F.E.)
Mr. Mai Xuan Hai	Director, Dien Bien F.E.
Mr. Vu Hona Bai	Vice Director, Dien Bien F.E.
Mr. Pham Doc Hien	Vice Chairman, People's Committee of Dien Bien District

12) Embassy of Japan

Mr. Shiro Sadoshima	Counsellor
Mr. Masao Miyazaki	Second Secretary
Mr. Takahiro Sasaki	Second Secretary
Ms. Emiko Kaneda	Staff

(2) Study Team for Explanation of the Draft Basic Design (4/4)

1) State Planning Committee (SPC)

Dr. Ho Quang Minh	Deputy Director General, Foreign Economic Relation Department
Mr. Nugyen Xuan Tien	Staff, Foreign Economic Relation Department

2) Ministry of Forestry (MOF)

Mr. Nugyen Quang Ha	Minister
Mr. Nugyen Van Dang	Vice Minister
Mr. Tran Son Thuy	Vice Minister
Mr. Doan Dien	Director, International Cooperation Department
Dr. Nugyen Dinh Huong	Vice Director, International Cooperation Department
Mr. Ngo Sy Hoai	Senior Expert, International Cooperation Department
Mr. Nugyen Ton Quyen	Director, Forest Industry Department
Mr. Hoang	Senior Expert, Planning Department
Mr. Kazuhiro Goseki	JICA Expert

3) People's Committee of Son La Province

Mr. Luong Van Thiet	Vice Director, Agro-Forestry-Fishery Department (FD)
Mw. Nugyen Van Vu	Expert, Agro-Forestry-Fishery Department (FD)

4) People's Committee of Lai Chau Province

Mr. Ho Sy Hong	Director, Forestry Department (FD)

5) Embassy of Japan

Mr. Naota Ikeda	Second Secretary

6) Viet Nam Office of JICA

Mr. Masaru Todoroki	Resident Representative
Mr.Hiroshi Tsujino	Staff