Chapter 4

Regional Economy

4.1 Overview

4.1.1 Demography

The Northwestern Region geographically lies in latitude 20°20"N to 22°40"N and in longitude 102°40"E to 105°50"E. The Region borders on both China and Laos. The demographic information of eight (8) geographical regions of Vietnam is presented in Table 4.1.1. The Region occupies 37,534 km^2 or 11.3% of the total area of Vietnam. Its population is 2.65 million accounting for 3.1% of the national population (2007).

Table 4.1.1 Area and Population of Eight (8) Regions of Vietnam

Region	Area (km^2)	Population (,000 persons)	Population Density (persons/km^2)
Whole Nation	331,211.6	85,154.9	257
1. North-West	37,533.8	2,652.1	71
2. Red River Delta	14,862.5	18,400.6	1,238
3. North-East	64,025.2	9,543.9	149
4. North Central Coast	51,551.9	10,722.7	208
5. South Central Coast	33,166.1	7,185.2	217
6. Central Highland	54,659.6	4,935.2	90
7. South East	34,807.8	14,193.2	408
8. Mekong River Delta	40,604.7	17,524.0	435

Source：GSO National Census (2007)

The Red River Delta region that including Hanoi is a highly populated area with a population density of 1,218 persons/km^2. Although the Region adjoins the Red River Delta, it is sparsely populated with the density of 71 persons/km^2, which is the lowest among all the regions.

The Region administratively belongs to four provinces, namely Lai Chau, Dien Bien, Son La and Hoa Binh. Their demographic conditions are presented in Table 4.1.2.

Table 4.1.2 Areas and Populations of the Study Area (2007)

Description	The Study Area					Total of Vietnam	Regional Share (%)
	Lai Chau	Dien Bien	Son La	Hoa Binh	Total		
Land Area (km^2)	9,112.3	9,562.9	14,174.4	4,684.2	37,533.8	331,211.6	11.3
Population (1,000 persons)	330.5	467.8	1,024.3	829.5	2,652.1	84,155.8	3.2
Population density (persons/km^2)	36	49	72	177	71	257	-

Source： Statistical Yearbook of Vietnam 2007, Statistical Publishing House

As presented in Table 4.1.3, the primary sector including agriculture, livestock, fishery and forestry is the prime industry in the Region as far as the employment opportunity is concerned. The labor employment

in both of the second and tertiary industrial sectors is so far limited to few percent, except the service sub-sector of which the public service share more than 5% in all four provinces.

Table 4.1.3 Proportional Extent of Labour Population by Economic Sector (2005)

Provinces	Economic Sectors							
	Primary Sector		Secondary Sector			Tertiary Sector		
	Agriculture	Fishery	Mining	Manufacture	Construction	Commerce	Services	Others
Lai Chau	86.26	0.35	0.39	1.38	1.76	3.25	6.44	0.17
Dien Bien	79.14	0.46	0.41	2.08	3.53	3.58	10.66	0.14
Son La	86.75	0.01	0.17	1.27	1.55	3.57	6.54	0.14
Hoa Binh	82.35	3.38	0.59	2.61	1.27	3.31	6.41	0.08
Average	83.60	1.35	0.37	1.93	1.84	3.47	7.31	0.12

Source: Annual Statistics of each respective 4 provinces (2006)
Data of Lai Chau province is still under confirmation.

4.1.2 Economic Structure

Gross Domestic Products (GDP) of Vietnam amounted to 837,858 billion VND, of which the GRDP of the Region was 10,575 billion VND accounting only for 1.3% of the GDP in 2005. The per capita GDP of Vietnam was US$634 in 2005, while one of the study area was US$ 259 or only 40% of the national average, i.e. US$273 for Dien Bien, US$266 for Son La, US$263 for Hoa Binh and US$212 for Lai Chau. The regional economy has significantly grown by 160% to 200% from 2001 to 2005 as seen in Figure 4.1.1.

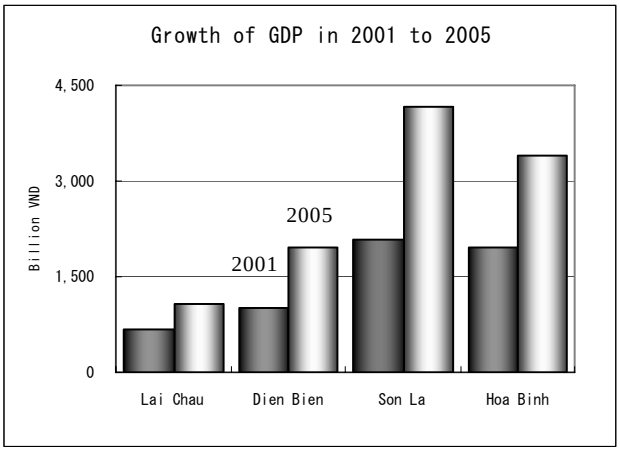


Figure 4.1.1 Economic Growth of the Study Area

In particular, GRDP of Son La has been grown in term of both annual growth rates and amounts. The shares among the economic sectors have also been changed. The regional economy is still dependent highly upon the primary sector of which share was 44% in 2005, while 22% for the secondary sector and 34% of the tertiary sector as seen in Table 4.1.4.

Table 4.1.4 Shares of Economic Sectors in the Study Area (2005)

Unit: Billion VND (%)

Description	The Study Area					Total of Vietnam	Regional Share (%)
	Lai Chau	Dien Bien	Son La	Hoa Binh	Total		
Total GDP	1,058	1,951	4,177	3,389	10,575 (100)	837,858	1.3
Primary Sector	479	729	1,813	1,561	4,582 (44)	175,048	2.6
Secondary Sector	269	520	902	684	2,375 (22)	343,807	0.7
Third Sector	310	702	1,463	1,144	3,619 (34)	319,003	1.1

Source : Statistical Yearbook of Vietnam 2005, Statistical Publishing House and Statistical Yearbooks 2005
Note: Primary Sector : Agriculture, forestry, fishery and livestock industries etc.
Secondary Sector : Manufacturing, construction and mining industries etc.
Third Sector : Service industries

The details of GRDP by sector are presented in Table 4.1.5.

Table4.1.5 Regional Gross Domestic Product (RGDP) of Each Respective Province

Unit: Billion VND

Particulars	Respective Provinces (Billion VND)							
	Lai Chau		Dien Bien		Son La		Hoa Binh	
	GDP	(%)	GDP	(%)	GDP	(%)	GDP	(%)
Primary Sector	479,048	45.28	730,900	37.46	1,831,900	43.85	1,561,308	37.29
-Agriculture	344,128	32.52	534,360	27.38	1,812,900	43.40	1,521,611	36.34
-Forestry	115,538	10.92	185,650	9.51				
-Fishery	19,387	1.83	10,890	0.56	18,760	0.45	39,697	0.95
Secondary Sector	259,531	24.53	490,805	25.15	824,620	19.74	604,638	14.44
-Mining & Quarry	21,800	2.06	18,500	0.95	166,400	3.98	48,715	1.16
-Construction	69,826	6.60	154,625	7.92			243,997	5.83
-Manufacturing	167,905	15.87	317,680	16.28	658,220	15.76	311,926	7.45
Tertiary Sector	319,494	30.20	729,638	37.39	1,520,730	36.41	2,020,806	48.27
-Trade & Commerce	61,171	5.78	321,351	16.47	636,060	15.23	481,845	11.51
-Services	192,158	18.16	210,405	10.78	355,160	8.50	1,326,319	31.68
-Others	66,165	6.25	197,882	10.14	529,510	12.68	212,640	5.08
Total	1,058,073	100.0	1,951,343	100.0	4,177,010	100.0	4,186,752	100.0

Note: Unit is at "million VND".

Source: Annual Statistics (2006) of the respective 4 provinces.

It is notable that the service sub-sector in Hoa Binh province has in 2005 achieved 1,326.3 billion VND or 32% of the provincial GDP through rapid expansion of the services both of the public and private enterprises under direct-cum-favorable impact by the most active economy in Hanoi.

The trend of changes in shares of economic sectors in recent years is illustrated in Figure 4.1.2

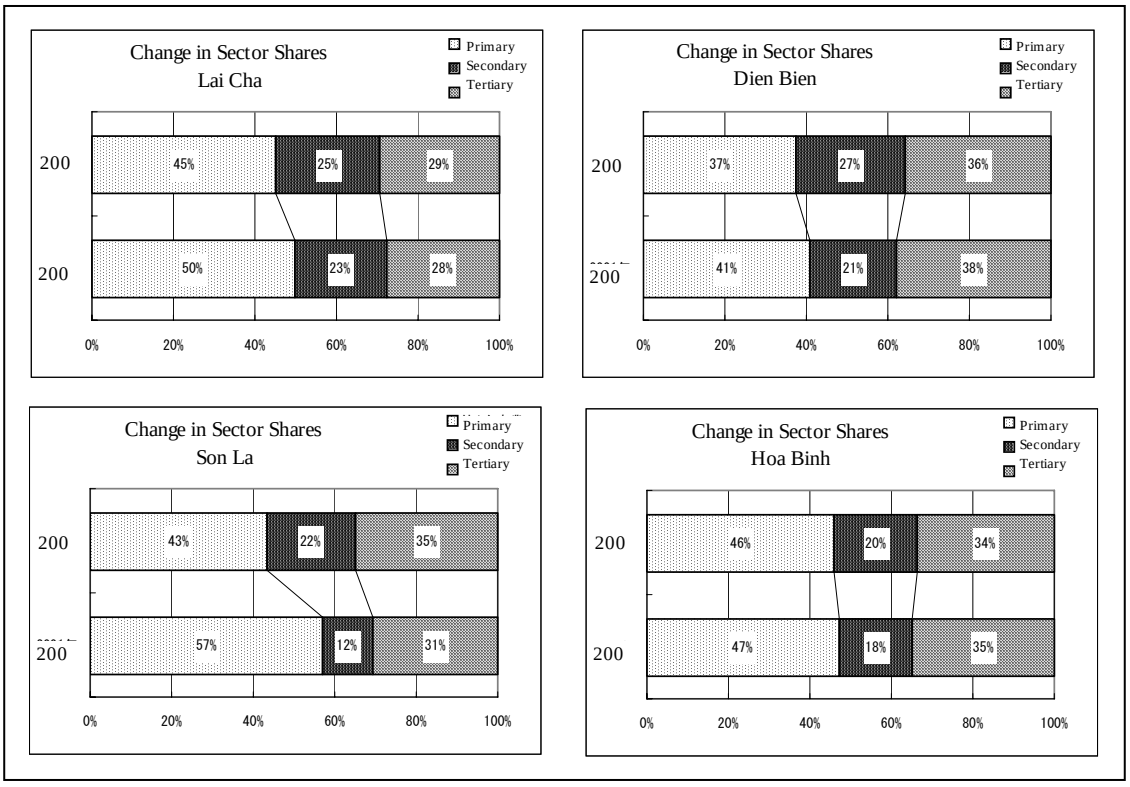


Figure 4.1.2 Changes of Shares in Economic Sectors (2001-2005)

There is a clear tendency in changes of economic sector share in the study area. All four provinces show

the expansion of shares of the secondary sector from 2001 to 2005, while the share of the primary sector was reduced. In particular, the secondary sector of Son La increased its share due to the growth of construction sub-sector encouraged by the on-going Son La hydro-power project

4.1.3 Food Security

Vietnam is the second largest rice exporting country in the world. The national paddy production of Vietnam amounted to 35.79 million ton, of which 3.27 million ton or 9.1% were exported in 2005. It is estimated that the national paddy consumption is 21.48 million ton taking into account rice consumed by agro-processing of rice for noodle production and brewery, animal feed and seed. Paddy of 21.48 million ton is equivalent to 258 kg of paddy or 168 kg of milled rice per capita.

The paddy production of the Region was as low as 0.54 million ton, or limited only to 1.7% of the national paddy production, which is equivalent to 211 kg of paddy or 137 kg of milled rice on per capita basis. It means that the per capita availability of rice in the Region is 31 kg (168 kg - 137 kg) less than or only 82% of the national average. Furthermore, the demand and supply balance of rice is changed by province in the Region. The per capita availability of milled rice in Lai Chau was 192 kg (114% of the national average) and 185 kg (110%) in Dien Bien, where rice is self-sufficient in the provinces. In contrast, rice supply is less than demand in the other two Provinces, namely 153 kg (91%) in Hoa Binh and 85 kg (59%) in Son La.

The demand and supply balance of milled rice in the Region is preliminarily analyzed as presented in Table 4.1.6.

Table 4.1.6 Demand and Supply Balance of Milled Rice in the Northwestern Region

Item	Lai Chau	Dien Bien	Son La	Hoa Binh	Total/ Average
Paddy Production (1,000 t)*	93	128	128	192	541
Rice Production (1,000 t)**	60	83	83	124	351
Per Capita Paddy Production (kg/year)	295	284	130	236	211
Per Capita Rice Production (kg/year)	192	185	85	153	137
Comparison to the National Average (%)	114	110	50	91	82

Note 1：* estimated on the basis of Statistical Yearbook of Vietnam 2005 and Statistical Yearbook 2005
2：**estimated milling recovery rate at 65%

Rice demand of Hoa Binh and Son La is partly fulfilled by rice supplied from the Red River Region and the other regions under rather favorable access conditions for distribution of imported rice. On the other hand, the demand and supply of rice is balanced with a little surplus in Lai Chau and Dien Bien as a whole. However, surplus rice can not be smoothly distributed to every corner of the Provinces due to poor accessibility. In both Provinces, maize plays the important role in food security by supplementing shortage of rice.

4.1.4 Border Trade

The Region is located along the borders to China and Laos. The Study made the review on prospects of the border trade with both countries so as to verify necessary measures to promote export-oriented products and to encourage regional economic development as a whole. Improvement of balance of payment is one of the important issues for the national economy of Vietnam. It is important to rationalize functions of the Region in external trade.

JICA carried out the study on the border trade in January 2007. According to "A Report on Vietnam Northwest Border Trade Situation" submitted in February 2007, the general situation of the border trade in the Region is summarized below.

Table 4 .1.7 Summary of Border Trade in the Northwestern Region

Unit: US$ million

Province	Trade with	2000	2001	2002	2003	2004	2005	2006
Lai Chau	China	-	1.2	1.7	4.7	2.0	6.3	3.7
Dien Bien	Laos	-	0.8	1.6	1.2	1.1	1.4	-
Son La	Laos	0.8	1.0	1.3	1.0	1.1	1.2	-
(Lao Cai)	China	132.2	209.9	254.6	279.3	350.9	400.0	460.0

Source：A Report on Vietnam Northwest Border Trade Situation, JICA Viet Nam, 2007

The trade at the Lao Cai gate sharply increased from US$132 million in 2000 to US$460 million in 2006. The proportion of import and export is 7:3. Import items are represented by chemicals, machinery, steels, etc., of which chemicals including pesticides occupy some 20% of the total import amounts. On the other hand, the major export items are raw materials for industries and fresh food including iron ore, fruits and vegetables, spices, seafood, etc. There is a direct route from the North-western Region to China at Ma Lu Thang of Lai Chau province. The total trade at Ma Lu Thang is limited only to US$ 3.7 million, which is less than 1% of the total trade at Lao Cai. Export is more predominant occupying over 90% of the total trade. Major export items are tea leaves, cardamon, bamboo pulp, etc. The total export amount is equivalent to 9.4% of GRDP of Lai Chau province. Although the amount is limited, the economic impact to the regional trade is not negligible (Table 4.1.8).

Table 4.1.8 Share of Export Amount in GRDP

Unit：%

Province	Country	2000	2001	2002	2003	2004	2005
Lai Chau	China	n/a	2.08	3.17	3.53	8.84	9.41
Dien Bien	Laos	n/a	1.19	2.64	1.36	0.89	0.87
Son La	Laos	n/a	0.78	1.06	0.68	0.64	0.60
(Lao Cai)	China	8.38	33.26	18.79	15.13	18.73	16.65

Source: A Report on Vietnam Northwest Border Trade Situation, JICA Viet Nam, 2007(original : Reports of Province's Socio-Economic Situation in 2001-2005)

(1) Border Trade with China through Lai Chau

There are two border gates at Ma Lu Thang and Muong Te, of which only Ma Lu Than is currently operational. Table 4.1.9 presents the past trend of the border trade with China.

Table 4.1.9 Past Trend of Border Trade with China through Lai Chau

Unit US$ million

Item	2001	2002	2003	2004	2005	2006
Total Trade	0.1	1.7	4.7	2.0	6.3	3.7
Export	0.1	1.6	4.6	1.9	6.1	3.4
Import	0.1	0.1	0.1	0.2	0.2	0.3

Source: A Report on Vietnam Northwest Border Trade Situation, JICA Viet Nam, 2007(original: Lai Chau Department of Trade)

Table 4.1.10 presents the major items of import and export with China at Ma Lu Thang. In recent years, export of cardamom has been drastically increased.

Table 4.1.10 Import and Export Items of Border Trade with China through Lai Chau

Items	2001	2002	2003	2004	2005	2006
Export						
Tea (ton)	80	120	150	250	300	1,865
Cardamom (ton)	100	150	150	250	410	410
Bamboo Pulp (ton)			100	200	450	450
Iron Ore (ton)	400	800	1,200	35,500	45,000	34,420
Black stone (piece)					400,000	400,000
Agro-products (ton)	0.25	0.33	0.30	0.35	0.35	0.35
Import (US$ million)						
Machinery	0.30	0.40	0.20	0.38	1.60	0.29
Raw Materials	0.13	0.15	0.10	0.10	2.00	0.50
Daily Commodity	0.17	0.45	1.50	1.50	6.40	1.50

Source : A Report on Vietnam Northwest Border Trade Situation, JICA Viet Nam, 2007(original: Lai Chau Department of Trade)

(2) Border Trade with Laos through Dien Bien

Dien Bien has borders with both Laos and China. The border trade with Laos through Thai Trang is officially recognized. The trade amount is as low as US$ 1.4 million. Table 4.1.11 shows the past trend of the trade amount and Table 4.1.12 presents the major items of the trade.

Table 4 .1.11 Past Trend of Border Trade with Laos through Dien Bien

Unit US$ thousand

Item	2001	2002	2003	2004	2005
Total Trade	764	1,584	1,189	1,108	1,413
Export	564	1,370	771	584	647
Import	200	214	418	524	775

Source: A Report on Vietnam Northwest Border Trade Situation, JICA Viet Nam, 2007(original: Ministry of Trade, Viet Nam)

Table 4.1.12 Import and Export Items of Border Trade with Laos through Dien Bien

Item	2001	2002	2003	2004	2005
Export					
Timber (m^3)	-	92	100	250	240
Commodity (US$1,000)	152	428	555	174	200
Import					
Machinery・Raw Materials (US$1,000)	111	102	224	424	600
Timber (m^3)	89	209	195	100	450

Source: A Report on Vietnam Northwest Border Trade Situation, JICA Viet Nam, 2007(original: Dien Bien Department of Trade)

(2) Border Trade with Laos through Son La

The border trade with Laos is made at several points in Son La. The official trade amount is only US$1.5 million.

Table 4.1.13 Past Trend of Border Trade with Laos through Son La

Unit US$ thousand

Item	2000	2001	2002	2003	2004	2005
Total Trade	830	960	1,311	950	1,085	1,215
Export	670	649	958	685	735	802
Import	161	311	353	300	350	412

Source:A Report on Vietnam Northwest Border Trade Situation, JICA Viet Nam, 2007(original: Son La Department of Trade)

4.2 Local Administration

4.2.1 Administrative Units

The Region administratively consisted of four provinces, which were further divided into two (2) cities, three (3) towns and 32 districts as of January 2007, when the Study was started. In May 2008, it was officially decided by the Government of Vietnam that four communes of Hoa Binh Province are to be separated and integrated into Hanoi city. In addition, Xuan Nha Commune of Moc Chau District of Son La Province was devided into three, whileTuan Giao District of Dien Bien Province was split into Tuan Giao District and the new district of Muong Ang. As a result, the administrative structure of the Region are changes as of August 2008 as presented in Table 4.2.1.

Table 4.2.1 Administrative Units in the Study Area

Province	City	Town	Districts	Communes & Wards	Villages
Lai Chau	0	1	5	94	1,060
Dien Bien	1	1	8	98	1,473
Son La	0	1	10	206	3,033
Hoa Binh	1	0	10	210	3,724
Total	2	3	33	608	9,290

Source：Based on information provided by the four provinces

The administration maps of four provinces are presented in Fingures 4.2.1 to 4.2.4.

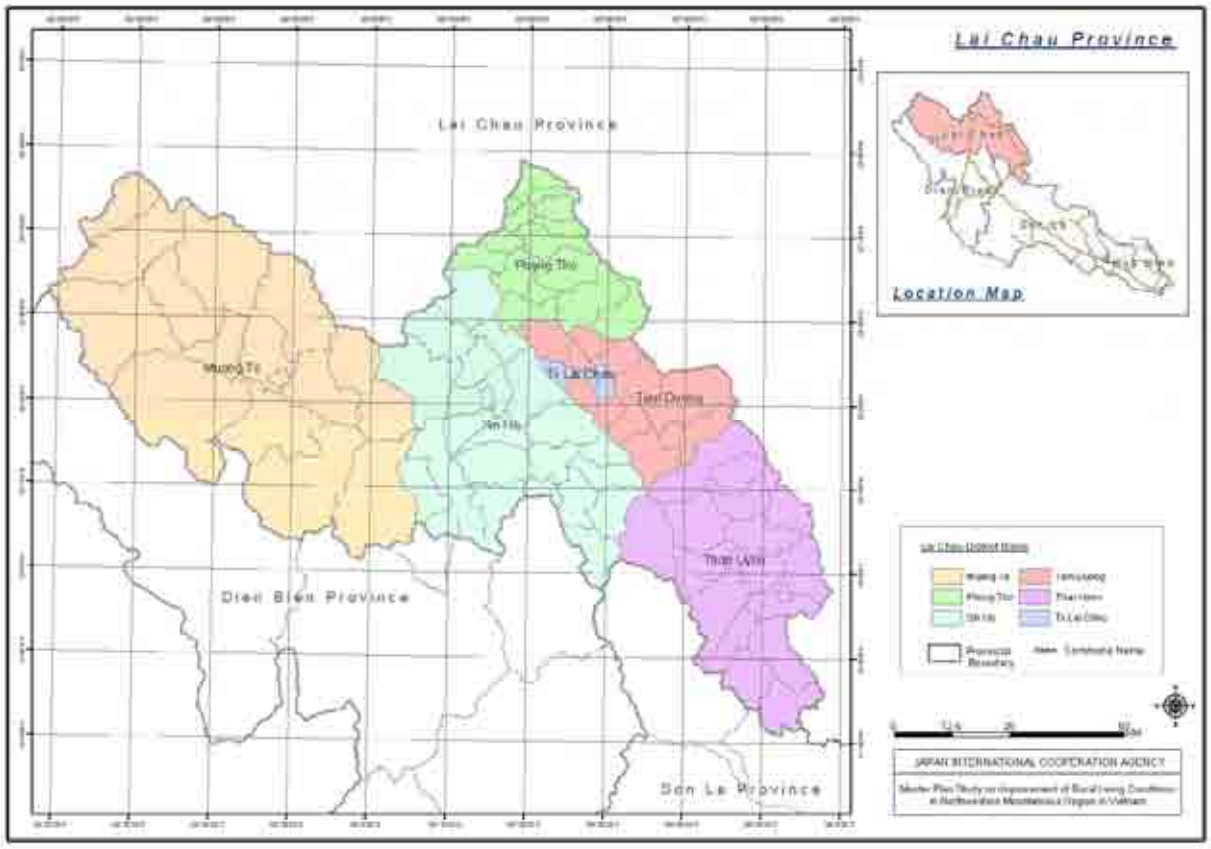


Figure 4.2.1 Administration Map of Lai Chau Province

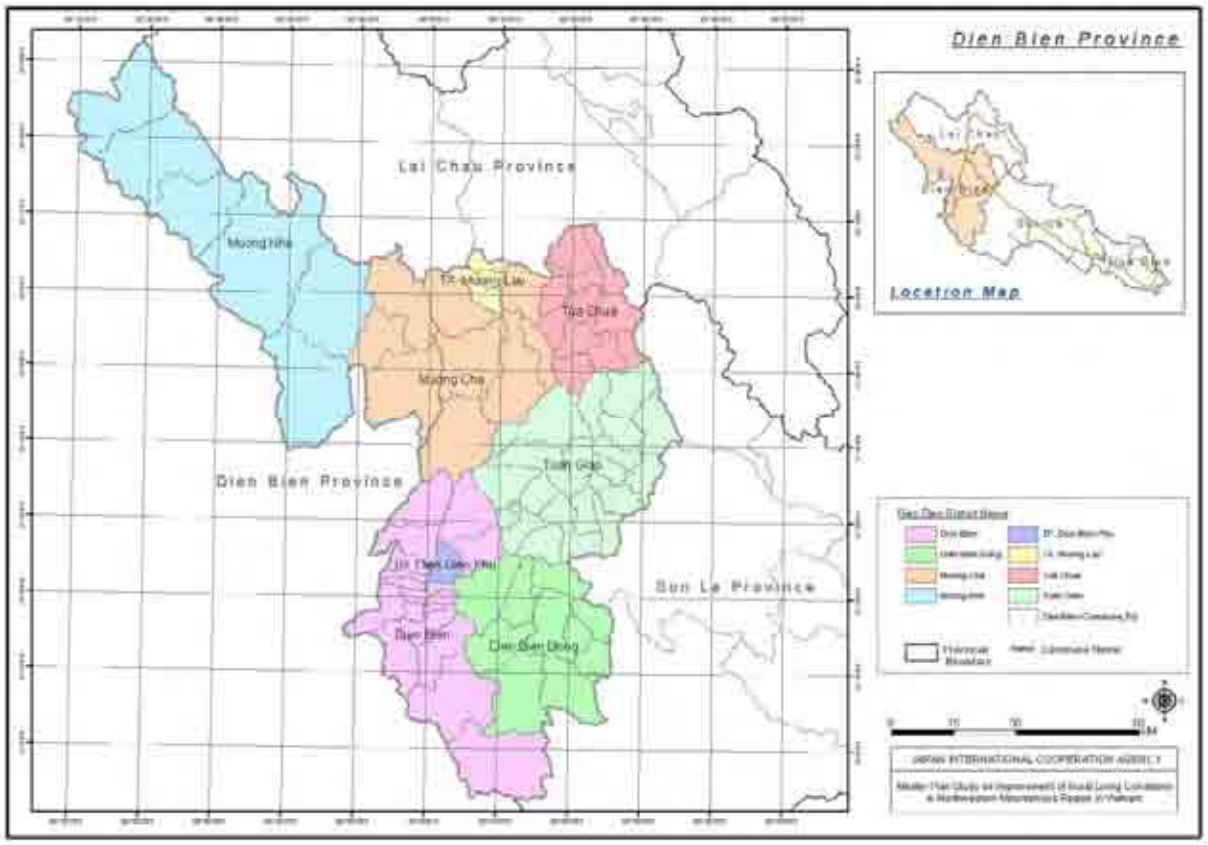


Figure 4.2.2 Administration Map of Dien Bien Province

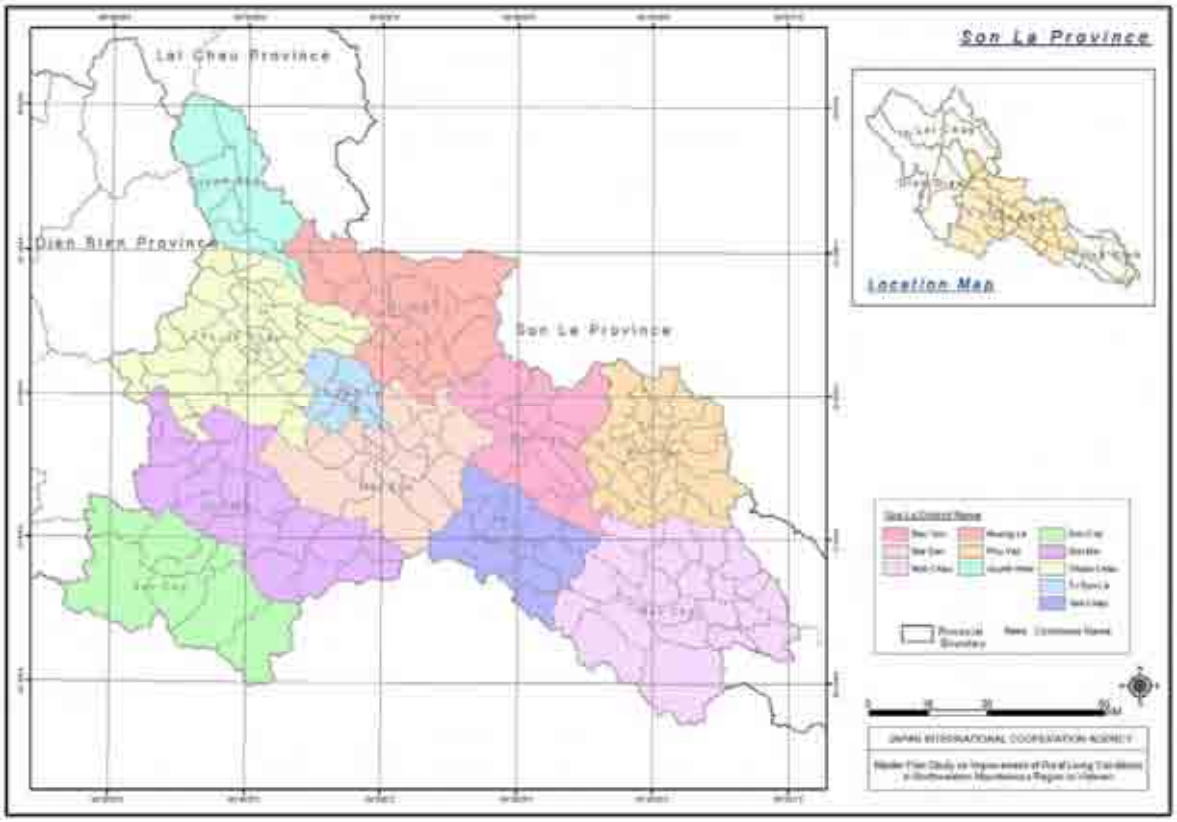


Figure 4.2.3 Administration Map of Son La Province

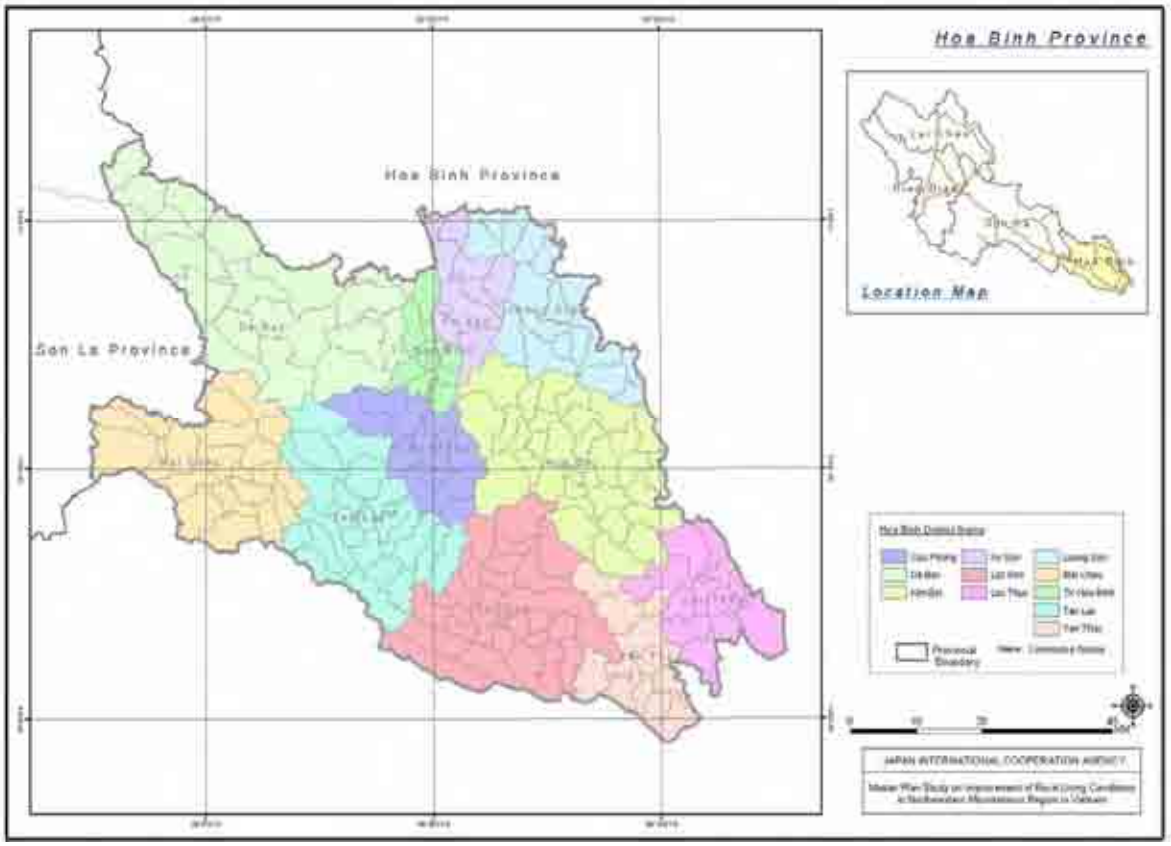


Figure 4.2.4 Administration Map of Hoa Binh Province

4.2.2 Local Administration for Agricultural and Rural Development

Administrative structure of the respective four provinces is, under supervision of the Provincial Peoples' Committee (PPC), composed of 16 Departments or so for extending administrative service activities, including the DARD that is the counterpart function in province for the Study.

PPC is constituted with the PPC Chairman and 2 to 3 Vice-chairmen who are directly appointed by the Central Government, and Administration Office as the secretary function. PPC Chairman as the top leader of province takes full responsibility for executing the socio-economic development and management of the provincial administration.

Vice-chairmen assist Chairman in general administration services for the provincial activities, and at the same time, they as the executive persons supervise and manage such specific activities as the general administration sector including finance and planning, technical administration sector including agriculture and rural development, transportation-communication-commerce sector, and education, culture and environment sector.

The general organization flow of PPC and the respective departments is as shown in Figure 4.2.5 as per attached hereto.

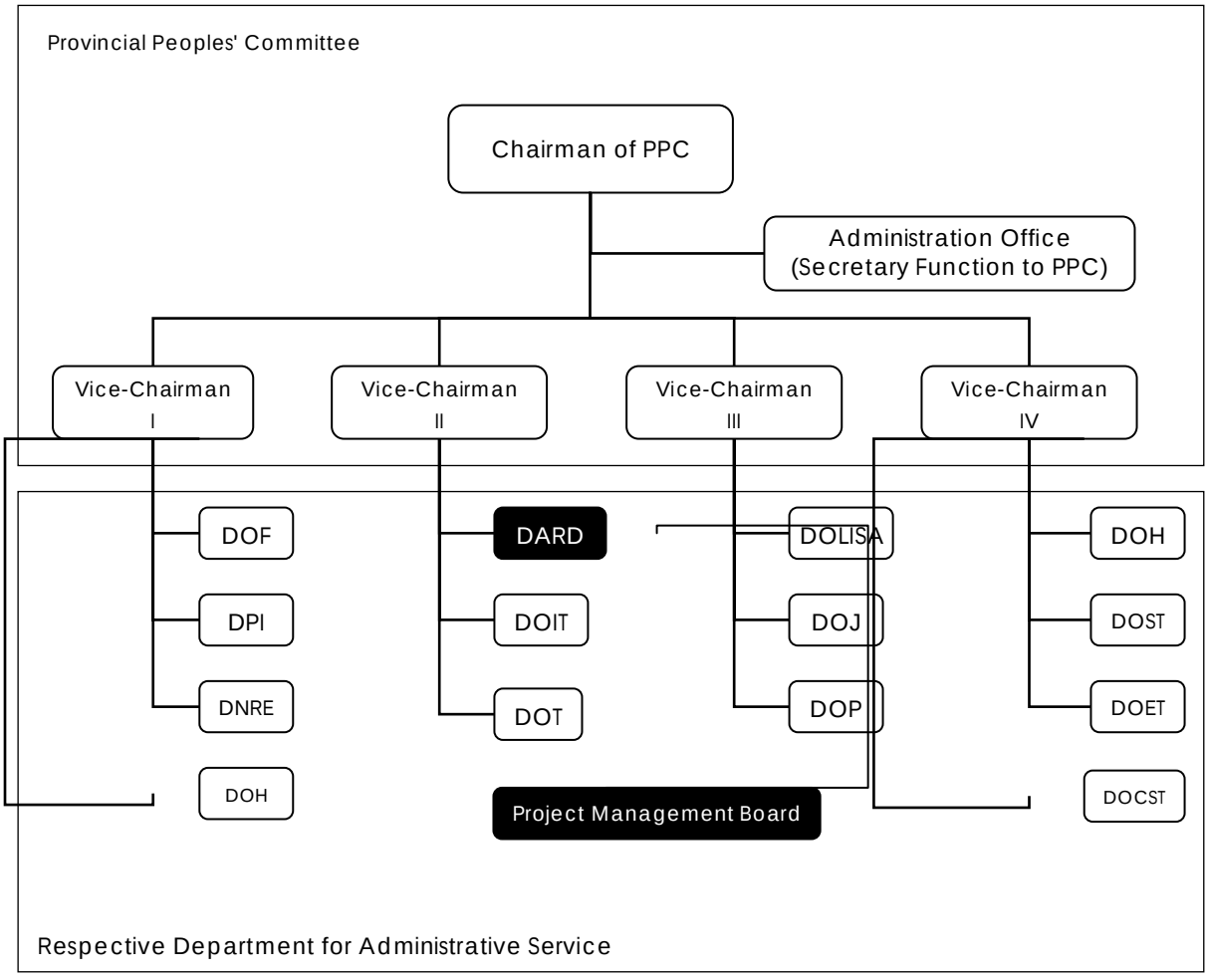


Figure 4.2.5 Organization Chart of Provincial Administration

Note:

DARD:	Department of Agriculture & Rural Development	DOH:	Department of Health
DPI:	Department of Planning & Investment	DNRE:	Department of Natural Resources & Environment
DOF:	Department of Finance	DOET:	Department of Education & Training
DOLISA:	Department of Labour Warf Invalid & Social Affairs	DOJ:	Department of Justices
DOIT:	Department of Industry and Trade	DOPS:	Department of Police Security
DOST:	Department of Science & Technology	DOT:	Department of Transportation
DOCST:	Department of Culture, Sports and Truism	DOHA:	Department of Home Affairs

Project Management Board (PMB) is organized from time to time under the respective department for execution and management of the subjected project. PMB is composed of a "Director (full-time)" and working staff to be assigned as required.

The Provincial DARD is responsible for execution of agricultural and rural development as well as management of agricultural production and O&M of rural infrastructures. Each department in general administration sector has working sections or service units more or less than 13 to 15 numbers. In most cases, the officers are not enough to be assigned for all the working sections or service units, and accordingly, one officer has to be seconded more than two posts in general. The organization structure of DARD is as shown in Figure 4.2.6.

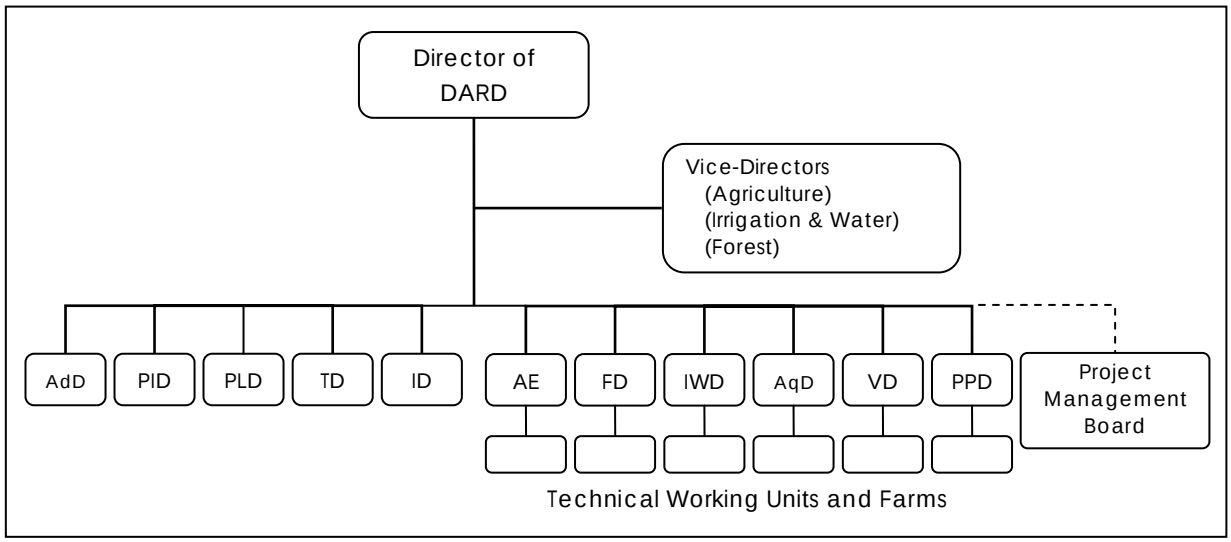


Figure 4.2.6 Organization Chart of the Provincial DARD

Administrative Divisions		Technical Working Divisions	
AdD:	Administration Division	AED:	Agricultural Extension Division
PID:	Planning & Investment Division	FD:	Forestry Division
PLD:	Personnel & Labour Division	IWD:	Irrigation & Water Division
TD:	Technical Division	AqD:	Aquaculture Division
ID:	Inspection Division	VD:	Veterinary Division
		PPD:	Plant Protection Division

DPI takes a responsibility for preparation of the annual working plan and budget, and then, prepare the application of those plan and budget to PPC. When someone development plan is approved, DARD organizes a "Project Management Board" and assigns a Director in charge and working staff as required for execution and management of the subjected project/scheme.

Each district has the (District) Division of Agriculture and Rural Development (District FARD). The details of the organization structures of Division of Agriculture and Rural Development (District DARD) in the study area are presented in Table 4.2.2. Shortage of the staff is one of the most serious constraints in provision of the public services in the relevant districts.

Table 4.2.2 Present Conditions of the District DARD in the Study Area

Particulars	North-west Region			
	Lai Chau	Dien Bien	Son La	Hoa Binh
I. Administrative Division				
1.1 Board of Directors	x	x	x	x
1.2 Administration Division	x	x	x	x
1.3 Planning & Accounting Division	x	x	x	x
1.4 Personal & Labour Division	x	x	x	x
1.5 Technical & Technology Division	x	x	x	
1.6 Inspection Division	x	x	x	
II. Technical Working Division				
2.1 Agricultural Extension Division		x	x	
2.1.1 Agricultural Extension Center	x		x	x
2.1.2 Agro-forestry Extension Centre				x
2.1.3 Plant Variety Centre				x
2.1.4 Fishery Centre	x	x		x
2.2 Rural Agric & Forestry Processing Division	x	x	x	
2.3 Irrigation & Water Management Division	x		x	x
2.3.1 Irrigation Schemes & Water Sources Management		x		
2.3.2 Rural Sanitation & Water Supply Center	x	x	x	x
2.3.3 Rural Infrastructure Sector Project		x	x	
2.4 Fixed Cultivation & Resettlement Division	x	x		
2.4.1 Agriculture Policy Project			x	
2.4.2 Funded Project Management Units			x	
2.4.3 Rural Agric. Sector Project	x	x		
2.5 Forest Development Division	x	x	x	x
2.5.1 Forestry Planning & Inspection Team	x	x	x	x
2.6 Co-operative Movement Division			x	
2.7 Plant Protection Division	x	x	x	x
2.8 Veterinary Division	x	x	x	x
2.9 Trade Union	x			

Communes have simple structures as presented in Figure 4.2.7. Only one officer in charge is assigned for each service section. All of them are not fulltime employees but work on the contract bases. To execute development projects, the "Project Coordinating Committee" is organized within the administrative structure under Chairman of CPC. Since working staff is not sufficiently at commune offices, the representative of respective villages is also appointed as members of Committee.

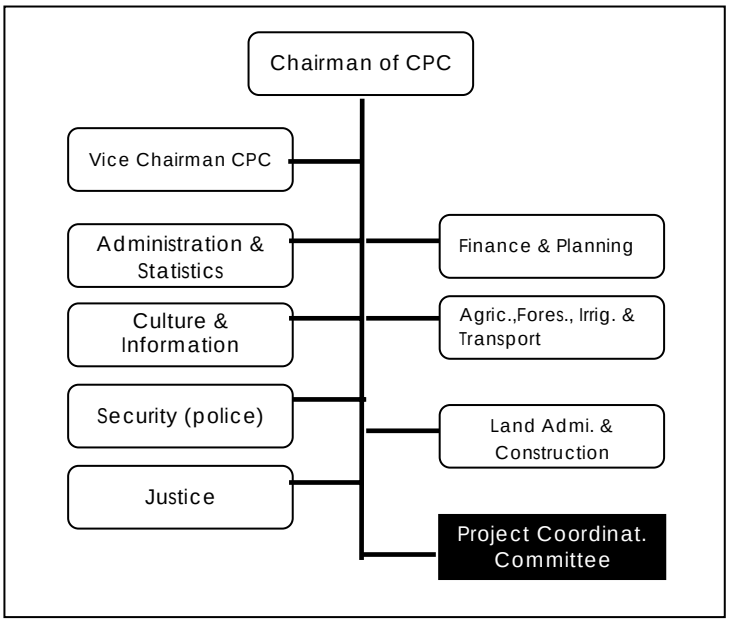


Figure 4.2.7 Organization of Commune

4.3 Ethnic Compositions

4.3.1 Ethnic Compositions of Vietnam

Vietnam is a multi-ethnic country with 54 different ethnic groups. The Kinh, the majority group, accounts for 86% of the whole population, while the rest is made up of 54 minority groups. The ethnic groups in Vietnam are presented in Table 4.3.1.

Table 4.3.1 Ethnic Groups in Vietnam (Classification based on Language)

Language Family	Language Group	Ethnic Group	Remark
Sino-Tibetan	Tibeto-Burman	1 Ha Nhi, Akha	Many live in the North-West (especially Muong Te District, Lai Chau Province) Population is smaller than that of Hmong and Dao Highland Swiddeners They also live in northern Myanmar, Northern Thailand, Northern Laos and Southern China
		2 La Hu	
		3 Phu La	
		4 Lo Lo	
		5 Coong	
		6 Sila	
	Miao-Yao	7 Hmong, Meo	Migrated from South-Western China within the last 300 years They also live in Southern China, Northern Myanmar, Northern Thailand and Northern Laos Highland Swiddeners; Hmong have a strong clan-based society
		8 Dao, Yao	
		9 Pathen	
	Tai/Thai	10 Tay, Tho	Lowland-Wet Rice Cultivators Original inhabitants of Lai Chau, Dien Bien and Son La They also live in Assam (India), South-Western China, Northern Myanmar, Northern Thailand and Northern Laos Some say Tai migration to Vietnam started in the days before Christ, but generally believed as the early 10th century.
		11 Thai, Tai	
		12 Nung	
		13 San Chay	
		14 Giay, Nhang	
		15 Lao	
		16 Lu	
		17 Bo Y	
	Kadai	18 La Chi	Closest to the Tai/Thai group in terms of language
		19 La Ha	
		20 Co Lao	
		21 Pu Peo	
	Chinese	22 Hoa	Related to Chinese Said to have the lowest poverty rate among the 54 ethnic groups
		23 Ngai	
		24 San Ziu	
Austro-Asian	Annnam-Muong	25 Kinh, Viet	The Muong are the closest to the Kinh and are original inhabitants of Hoa Binh and Tan Hoa Provinces
		26 Muong	
		27 Tho	
		28 Chut	
	Mon-Khmer	29 Khmer	(Mon-Khmer language group: Widespread from Assam Region in India to Indochina Peninsula) In Vietnam, many are in the South and the Central Highland: Khamu, Xin Munh, Khang and Mang live in the mountainous area in the North-West Many live in mid-area between highland and lowland in Laos, which may apply to Vietnam also
		30 Bahnar	
		31 Sedang	
		32 Kohor, Co Ho	
		33 Hre	
		34 Mnong	
		35 Stieng, Xtieng	
		36 Bru-Van Kieu	
		37 Co Tu	
		38 Gie-Trieng	
		39 Ma	
		40 Kho Mu	
		41 Chor	
		42 Ta Oi	
		43 Cho Ro	
		44 Xinh Mun	
		45 Mang	
		46 Brau	
		47 O Du	
		48 Ro Mam	
		49 Khang	
Austro-nesian	Malayo-Polynesian	50 Gia Rai	(Ausutronesian language group : Widespread from Madagascar to Indonesia, Philippines, Taiwan, Melanesia, Micronesia, Polynesia) Cannot be found in the North-West
		51 Ede, Rhade	
		52 Cham	
		53 Raglai	
		54 Chu Ru	

4.3.2 Ethnic Compositions of the Study Area

In the study area, the Kinh accounts for about 20% of the population and number-wise, the Kinh are not the majority ethnic group there. Ethnic composition in the study area is thus very unique and different from the overall ethnic composition in Vietnam (Table 4.3.2).

Table 4.3.2 Ethnic Composition of the Study Area

Lai Chau (20 groups)		Dien Bien (22 groups)		Son La (12 groups)		Hoa Binh (7 groups)	
Group	%*	Group	%	Group	%	Group	%
Thai	35.2	Thai	40.0	Thai	54.8	Muong	63.0
Hmong	21.9	Hmong	30.9	Kinh	17.4	Kinh	28.0
Kinh	12.7	Kinh	20.1	Hmong	13.0	Thai	2.7
Dao	11.8	Khamu	3.5	Muong	8.2	Dao	1.7
Hanhi	5.1	Lao	1.1	Xin Mun	1.9	Hmong	0.6

*: percentage among the provincial population
Source：Data obtained in each province

Distribution patterns of populario and ethnic minorities of the Region are illustrated in Figures 4.3.1 and 4.3.2.

Indigenous people of Lai Chau, Dien Bien and Son La are the Thai. In these provinces, the Thai have the largest population of over one-third of the regional population in each province. The Thai began their migration from the south-western part of China to the Region probably in the early 10th century, and created feudal chiefdoms in valleys. After the Thai came the Dao, the Hmong and other hilltribe groups. It was in 1950s and 1960s, after the Vietnam's independence from France, that a large number of the Kinh migrated to the Region. The original inhabitants of Hoa Binh are the Muong who belong to the same language group as the Kinh. Today more than 60% of the population of Hoa Binh is the Muong. The characteristics of minority groups in the Region are described in Attachment 4.1. Ethnic Groups in the Region can be categorized into two groups according to their historical patterns of lifestyles (Table 4.3.3).

Table 4.3.3 Ethnic Group Categorization based on Historical Features

	Lowland-Sedentarist	Highland-Migrants
Area of Residence	Lowland	Highland (Mountainous Areas)
House	On stilts or on ground	Many on ground, some on stilts
Patterns of Living	Sedentary	Non-Sedentary, Continuous Migration
Agriculture	Rice Paddy (Main)	Swidden Upland Rice, Opium Poppy, Maize
History (Leader, Territory)	Feudal Lord, Chiefdom / Territory	No Territories No big leaders
Majority-Minority	The Majority	Had relations with the majority as minorities (non-isolation)
Writing	Have writing system and record history	No writing system, Oral tradition
Ethnic Groups	Annam-Muong language group - Kinh, Muong Chinese language group - Hoa (Chinese) Tai-Kadai language group - Thai, Tay, Nhang, Lao, Laha, etc.	Miao-Yao language group - Hmong, Dao, etc. Burma-Tibetan language group - Hanhi, Lahu, Phula, Sila, Khamu, Khang, Xinh Mun, Mang, etc.

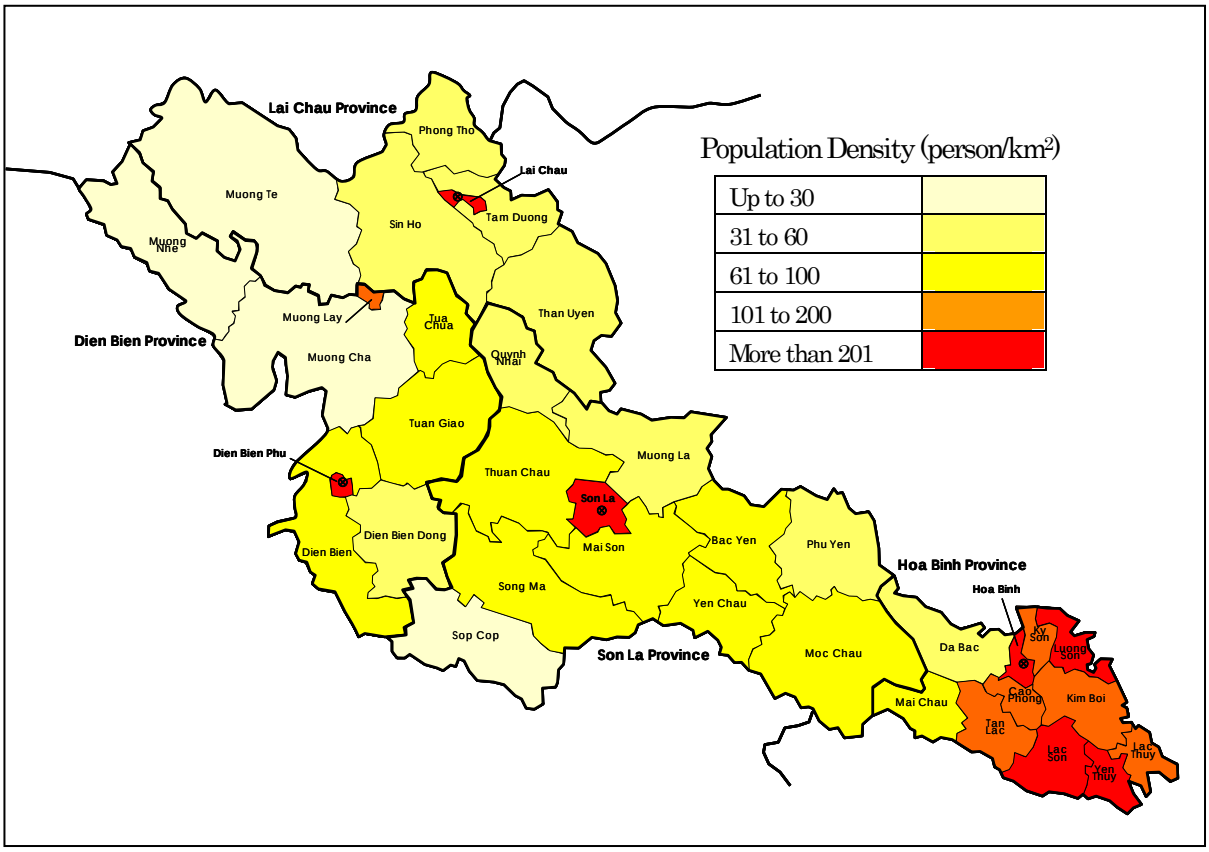


Figure 4.3.1 Population Distribution Pattern in the Northwestern Region

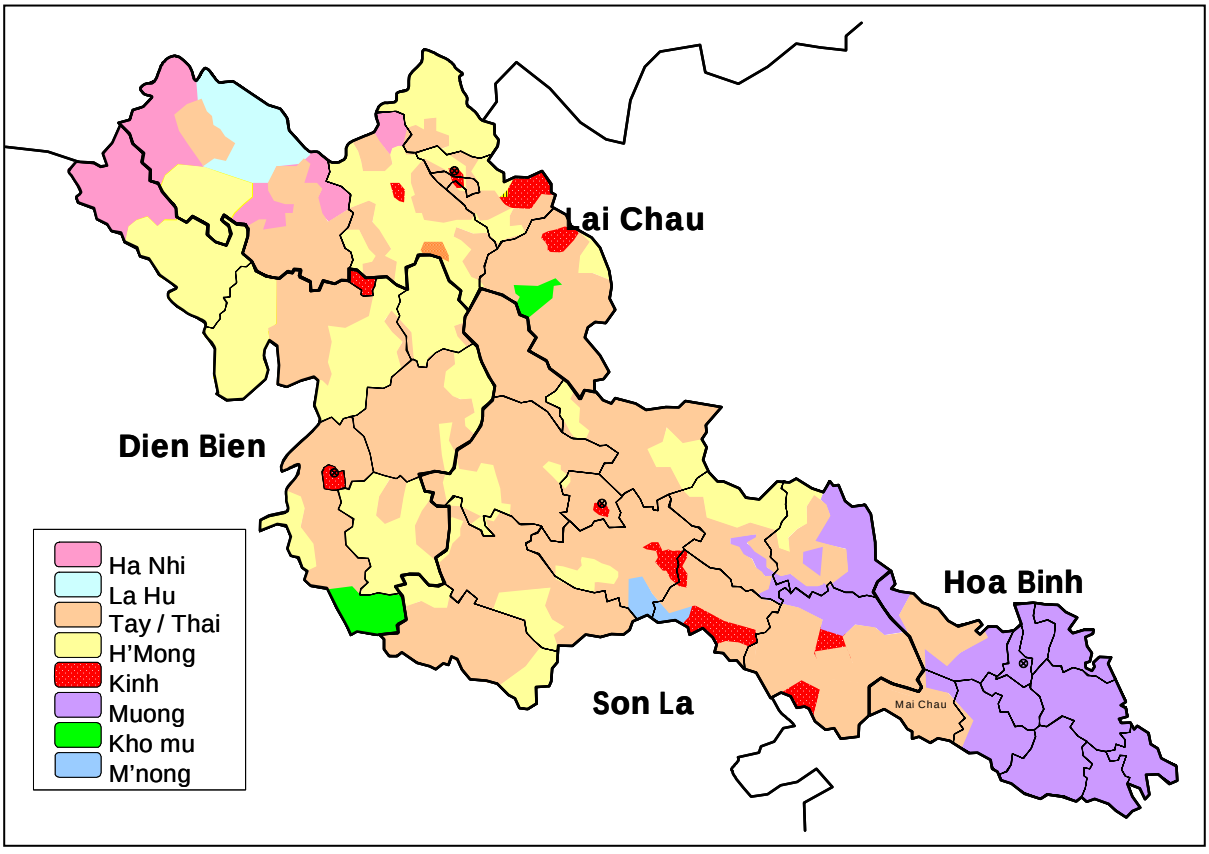


Figure 4.3.2 Ethnic Minorities in the Northwestern Region

One is a sedentary group and the other is a non-sedentary group. The former practices wet-rice agriculture and lead a sedentary life while the latter practices swidden agriculture and move from place to place. Although these two patterns of lifestyles are rather stereotypical ones that no longer fit well to the current living conditions of the Region, these patterns provide historical background and broad characteristics of ethnic groups in the Region, useful in understanding the nature of group differences.

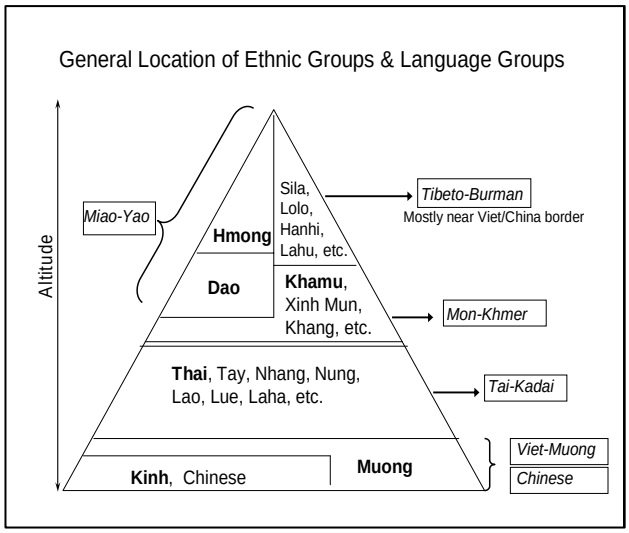


Figure 4.3.3 General Location of Ethnic Groups

Figure 4.3.3 shows the location of ethnic groups based on the altitudes of the residence, which clearly reveals the concentration of different language groups.

4.3.3 Ethnic Compositions by District

The population of ethnic groups in each district, province and the Region is presented in Attachment 4.2. Except for Son La, the Kinh account for more than 50% of the population of the main districts of the 4 provinces where the provincial offices are located. As the Kinh are about 20% of all the population of the Region, this shows a high concentration of the Kinh in urban areas. Furthermore, in Dien Bien Phu City, Hoa Binh City and Muong Lay Town in Dien Bien province whose poverty rates are 3.88%, 4.58% and 13.1%, the Kinh account for 78%, 72% and 60% of the population. This clearly demonstrates a strong relationship between the Kinh and economic development/wealth..

4.4 Poverty Rate

4.4.1 Poverty Line

Poverty rate in Vietnam can be defined as the ratio (percentage) of poor households. Whether a household is poor or not is determined by use of a poverty line. Vietnam has 3 poverty lines which are 1) General Poverty Line, 2) Food Poverty Line and 3) MOLISA Poverty Line. The first two poverty lines are set by the Government Statistics Office with assistance from the World Bank and are based on the Household Living Standard Survey which is carried out by MOLISA every other year. The third poverty line is set by MOLISA as the name shows. The General and Food Poverty Lines are based on the cost of food that meets 2,100 calories, the minimum daily intake calories necessary for a person in Vietnam. The total cost of food is calculated by using consumer prices. As this calculation method is rather difficult and complicated, these poverty lines are mostly used in reports that were written for international readers. For Vietnamese readers, especially in local provinces and districts, the MOLISA Poverty Line is most often

used.

Actual values of the three poverty lines are as follows:

I. General Poverty Line：Ratio of Poor Person (Set by GSO and WB)
Year 2002: 160,000VND/person/month
Year 2004: 173,000VND/person/month
II. Food Poverty Line：Ratio of Poor Household (Set by GSO and WB)
Year 2002: 146,000VND/person/month (urban) 112,000VND/person/month (rural)
Year 2004: 163,000VND/person/month (urban) 124,000VND/person/month (rural)
III. MOLISA Poverty Line：Ratio of Poor Household (Set by MOLISA)
Year 2001: 150,000VND/person/month (urban)
100,000VND/person/month (rural plains)
80,000VND/person/month (mountains and islands)
Year 2005 260,000VND/person/month (urban)
200,000VND/person/month (rural)

Poverty rate in Vietnam changed drastically when MOLISA raised its poverty line in 2005 from 100,000 VND/person/month to 200,000 VND/person/month. As a result, many households fell into the category of "poor". In one province, poverty rate jumped from 11% to 46%. Based on the new poverty line, the poverty rate of the Study area was 39.4% in 2006, the lowest among the 8 regions of Vietnam. This means that no other regions in Vietnam have more poverty than the Region.

Table 4.4.1 Regional Poverty Rate in Vietnam

	Year 2004			Year 2006	
	General Poverty (%)	Food Poverty (%)	New MOLISA Poverty (%)	General Poverty (%)	New MOLISA Poverty (%)
Whole Nation	19.5	6.9	18.1	15.97	15.5
1. North-West	58.6	21.8	46.1	49.0	39.4
2. Red River Delta	12.1	4.6	12.9	8.8	10.1
3. North-East	29.4	9.4	23.2	25.0	22.2
4. North Central Coast	31.9	12.2	29.4	29.1	26.6
5. South Central Coast	19.0	7.6	21.3	12.6	17.2
6. Central Highland	33.1	12.3	29.2	28.6	24.0
7. South East	5.4	1.8	6.1	5.8	4.6
8. Mekong River Delta	19.5	5.2	15.3	10.3	13.0

Source：Result of the Vietnm Household Living Standards Survey 2006

Similar to what the poverty rate indicates, per capita income and expenditure in the Region are the lowest in the nation.

Table 4.4.2 Per Capita Monthly Income and Expenditure in Vietnam

Unit：1,000VND

	income		Expenditure	
	Y2002	Y2004	Y2002	Y2004
Whole Nation	356.1	484.4	269.1	359.7
Urban	622.1	815.4	460.8	595.4
Rural	275.1	378.1	211.1	283.5
1. North-West	197.0	265.7	179.0	233.2
2. Red River Delta	353.1	488.2	271.2	373.5
3. North-East	268.8	379.9	220.2	293.8
4. North Central Coast	235.4	317.1	192.8	252.7
5. South Central Coast	305.8	414.9	247.6	330.8
6. Central Highland	244.0	390.2	201.8	295.3
7. South East	619.7	833.0	447.6	577.0
8. Mekong River Delta	371.3	471.1	258.4	335.1

Source：GSO National Census (2005)

The table below shows the changes of poverty rates of the Kinh/Hoa as one group and the ethnic minorities. Although the poverty rates are on the decline, the rate of decline of the ethnic minorities is much slower than that of the Kinh/Hoa. Economic gap between those who have and those who haven't is thus widening, and this is one of the reasons why so many poverty reduction programs target the ethnic minorities.

Table 4.4.3 Transition of Poverty Rate of Majorities and Minorities

Unit：%

	1993	1998	2002	2004
Kinh and Hoa	53.9	31.1	23.1	13.5
Minorities	86.4	75.2	69.3	60.7

Source：WB Report (2007)(Estimation by GSO and WB Staff)

4.4.2 Quality of Life

According to various statistical data, both the rate of access to electricity and the literacy rate in the Region are the lowest among the 8 regions.

Table 4.4.4 Rate of Access to Basic Infrastructure and Literacy Rate

	Access to Basic Infrastructure (%)		Literacy Rate(%) (over 10 years old) ***		
	Rural Water*	Electricity**	total	Male	Female
Whole Nation	57.7	77.1	92.96	95.87	90.21
1. North-West	53.2	48.4	80.04	89.02	71.27
2. Red River Delta	63.0	98.6	96.17	98.56	93.92
3. North-East	57.7	76.1	93.05	96.15	90.06
4. North Central Coast	56.1	85.2	94.13	97.11	91.28
5. South Central Coast	52.9	82.4	93.35	96.52	90.43
6. Central Highland	47.1	52.9	87.71	91.41	84.04
7. South East	62.1	82.8	94.48	96.38	92.76
8. Mekong River Delta	59.4	54.8	90.60	93.57	87.77

Source：*National Program on Clean Water and Rural Environmental (N-W and N-E Combined)
Human Development Report-Vietnamese Version (2001)*Household Living Standards Survey (2004)

The rate of access to rural water is the third lowest in Vietnam. These data show the low quality of life associated with poverty in the Region, reflecting the geophysical and socio-cultural conditions of the region such as mountainous area with difficult access to basic infrastructures, low population density, existence of many ethnic groups whose native tongues are not Vietnamese. Special attention should be paid that the literacy rate of the women in the Region is extremely low.

4.4.3 Demography and Poverty Rate of Provinces and Districts

While Son La province has the largest population among the 4 provinces in the Region, Hoa Binh province has the highest population density among the four. As for the monthly per capita income, Lai Chau and Dien Bien provinces have the lowest amount among all the provinces in Vietnam.

Table 4.4.5 Average Monthly Per Capita Income

	Monthly Income (1,000 VND)	Rank among 64 Provinces	Remark
Lai Chau	273.0	64th	National average: 636,500 VND Highest: HCM (1,479,900 VND) 2nd highest: Dinh Duong(1,215,000 VND) 3nd highest: Hanoi (1,050,900 VND)
Dien Bien	305.0	63rd	
Son La	394.0	61th	
Hoa Binh	416.0	55th	

Source：Household Living Standards Survey (2006)

Lai Chau province which is located at the Region edge of the study area is said to be the most remote province with extremely difficult access. Its poverty rate is 63.57%, the highest among the four provinces and in the nation. Muong Te District of Lai Chau province, which shares a national border with China, has the highest poverty rate (77.43%) among all the districts in the 4 provinces.

Lai Chau province has 7,320 urban households and 48,540 rural households. In other words, 86.9% of all the households in the province are located in the rural areas. Economic gap between the urban and rural areas in the province are extremely high as the poverty rates are 12.7% in urban areas and 71.2% in rural areas.

Table 4.4.6 Demography and Poverty Rate of Lai Chau Province

City/Town/ District	No. of Communes	Population	Area (km2)	Population Density (persons/km^2)	No. of House-Hold	Poverty rate (%)	Average HH Size (persons)
1.TX Lai Chau	5	18,408	70.8	260.00	4,064	13.51	4.53
2.Muang Te	15	44,336	3,678.8	12.05	7,303	77.43	6.07
3.Phong Tho	16	50,012	819.1	61.06	8,756	74.59	5.71
4.Sin Ho	24	76,089	2,038.8	37.32	11,900	74.10	6.39
5.Tam Duong	13	43,719	757.6	57.71	7,673	56.42	5.70
6.Than Uyen	17	91,101	1,700.0	53.59	16,164	59.58	5.64
Total	90	323,665	9,065.0	35.70	55,860	63.57	5.79

Source：Interview Survey in Province 2007

Demography and poverty rates of the remaining 3 provinces (Dien Bien, Son La and Hoa Bin) are as follows (Table 4.4.7 to 4.4.9)

Table 4.4.7 Demography and Poverty Rate of Dien Bien Province

City/Town/ District	No. of Communes	Population	Area (km2)	Population Density (persons/km^2)	No. of House-Hold	Poverty rate (%)	Average HH Size (persons)
1.TP Dien Bien Phu	8	43,863	60.10	729.83	11,15	3.	3.84
2.TX Muong Lay	3	9,526	114.06	83.52	3,60	13.	3.95
3.Dien Bien	19	99,759	1,639.90	60.83	21,44	39.	4.07
4.Dien Bien Dong	14	48,315	1,206.40	40.05	7,69	57.	6.16
5.Muong Cha	19	49,242	1,763.85	27.92	7,46	45.	6.04
6.Muong Nhe	11	35,089	2,507.90	13.99	6,07	75.	6.05
7.Tua Chua	12	42,583	679.40	62.68	7,14	56.	6.02
8.Tuan Giao	21	104,255	1,582.60	65.88	18,04	57.	6.15
Total	107	432,632	9,554.00	45.28	82,62	44.	5.18

Source：Interview Survey in Province 2007

Table 4.4.8 Demography and Poverty Rate of Son La Province

City/Town/ District	No. of Communes	Population (1,000)	Area (km2)	Population Density (persons/km^2)	No. of House-Hold	Poverty rate (%)	Average HH Size (persons)
1.TX Son La	12	81.3	324.93	250.21	18,652	8.90	4.36
2.Bac Yen	16	53.1	1103.71	48.11	9,697	57.76	5.48
3.Mai Son	22	129.6	1432.47	90.47	28,177	35.10	4.60
4.Moc Chau	29	147.6	2061.50	71.60	33,525	37.99	4.40
5.Muong La	16	84.7	1426.71	59.37	15,856	49.18	5.34
6.Phu Yen	27	104.1	1236.55	84.19	22,004	44.11	4.73
7.Quynh Nhai	13	66.3	1060.9	62.49	13,047	44.63	5.08
8.Song Ma	19	115.5	1646.16	70.16	21,073	37.48	5.48
9.Sop Cop	8	37.2	1480.88	25.12	6,685	51.92	5.56
10.Thuan Chau	29	139.4	1541.26	90.45	25,129	40.76	5.55
11.Yen Chau	15	65.5	859.37	76.22	12,567	40.80	5.21
Total	206	1024.3	14.174.44	84.40	206,412	38.71	5.07

Source：Interview Survey in Province 2008

Table 4.4.9 Demography and Poverty Rate of Hoa Binh Province

City/Town/ District	No. of Communes	Population	Area (km2)	Population Density (persons/km^2)	No. of House-Hold	Poverty rate (%)	Average HH Size (persons)
1.TP Hoa Binh	14	77,578	132.79	584.22	20,412	4.58	3.80
2.Cao Phong	13	39,402	254.60	154.76	8,632	24.78	4.56
3.Da Bac	21	51,652	820.19	62.98	11,395	48.77	4.53
4.Kim Boi	37	140,841	680.76	206.89	28,930	43.07	4.87
5.Ky Son	10	33,058	202.04	163.62	7,579	16.69	4.36
6.Lac Son	29	132,382	581.42	227.69	26,382	43.28	5.02
7.Lac Thuy	13	51,462	282.16	182.39	12,064	28.30	4.27
8.Luong Son	18	82,947	374.69	221.38	17,616	12.20	4.71
9.Mai Chau	22	48,783	520.38	93.74	10,974	39.41	4.45
10.Tan Lac	24	77,643	530.90	146.25	16,730	40.30	4.64
11.Yen Thuy	13	63,594	293.72	216.51	13,483	30.85	4.72
合計	214	799,342	4,673.65	171.03	174,197	31.32	4.59

Source：Interview Survey in Province 2007

4.4.4 Gender

(1) General Situation in Vietnam

According to *Vietnam Country Gender Assessment (December, 2006)*, over the last few decades, Vietnam has made striking progress in improving people's well-being and reducing gender disparities. Vietnam ranks 109th out of 177 countries in UNDP's human development index (UNDP, 2006), which places it in the group of countries of medium human development. In the South East Asia region, Vietnam stands out for its success in closing gender gaps in the last 20 years. It ranks 80th (out of 136 countries) on the Gender Development Index (GDI). These efforts have resulted in high adult literacy rates for men (96%) and women (91%) (2004), school enrolment data that show little difference between boys and girls, and the highest percentage of women in national parliament in the Asia-Pacific region (27% since 2002). Vietnam also has one of the highest Economic Participation Rates (EPR) in the world: 85 % of men and 83 % of women between the ages of 15 and 60 participated in the labor force in 2002 (Table4.4.10).

Table 4.4.10 Gender-related Indices in Vietnam (2006)

Index	Rank	Valuation
HDI	109th (out of 177 countries)	Medium human development
GDI	80th (out of 136 countries)	
EPR	85% men 83% women	One of the highest in the world

Source: Vietnam Country Gender Assessment (December, 2006)

Despite such remarkable progress, Table 4.3.2 represents a considerable gap for enrolment between boys and girls (age 15-17) of ethnic minorities. With respect to ethnic minorities, the enrolment rate of girls (61%) is much lower than that of boys (73%), while there is a little difference between the sexes with respect to Kinh/ Chinese group (Table4.4.11).

Table 4.4.11 Enrolment Rates of Boys and Girls (Age 15-17)

	Boys	Girls
Kinh/ Chinese	73%	71%
Ethnic Minorities	73%	61%

Source: World Bank (2006)

(2) Northwestern Mountainous Region of Vietnam

Table 4.4.12 shows that the percentage of girls among the total schoolchildren (Grade 5) in the region is also the lowest in Northwest (44.9%). The table represents also the Family Environment (including socioeconomic background, time needed for going to school, and time spent for chores around the house) Index by sex. In spite of the fact that fewer girls are enrolled than boys, there is only a little gap between boys and girls with respect to the basic family environment. This phenomenon is similar from one region to another at nationwide level.

Table 4.4.12 Gap between Boys and Girls (Grade 5, Elementary school, 2001)

Region	Ratio of girls to total schoolchildren (Grade 5, Elementary school, 2001)	Family Environment Index					
		Boys		Girls		Gap between Boys and Girls	
		M(B)	SE(B)	M(G)	SE(G)	M(G)-M(B)	SE(M(G)-M(B))
Whole Nation	48.1%	0.0	0.01	0.0	0.01	0.0	0.02
1. North-West	44.9%	-1.7	0.09	-1.6	0.10	0.1	0.13
2. Red River Delta	48.9%	0.4	0.02	0.4	0.02	0.0	0.02
3. North-East	48.5%	-0.4	0.03	-0.4	0.03	0.0	0.04
4. North Central Coast	47.7%	0.2	0.05	0.2	0.05	0.0	0.08
5. South Central Coast	48.8%	0.2	0.04	0.1	0.04	-0.1	0.06
6. Central Highland	45.5%	-0.4	0.07	-0.3	0.09	0.1	0.11
7. South East	48.0%	0.2	0.03	0.2	0.03	0.0	0.04
8. Mekong River Delta	48.1%	0.0	0.02	0.0	0.02	0.0	0.03

Source: "Cooperation for International Education (Hiroshima Univ.), Vol. 10", Report by Mr. SAITOH Mioko, M: Median, SE: Sample Error

In spite of the fact that gender disparities are rather small in childhood, adult women seem to have gender-related problems on daily basis.

Table 4.4.13 shows that the percentage of non-Vietnamese speakers among the total population of the entire region is the highest in North-west (22%). This phenomenon attributes to the high rate of ethnic minority population living there (78%). According to *Indigenous People/ Ethnic Minorities and Poverty Reduction, Vietnam (ADB)*, men often speak Vietnamese more than women. This fact can be one of the main reasons why women are marginalized in various programs and training courses and not selected as trainees, as the Vietnamese language has been used as the communication tool. Women's being incapable of speaking Vietnamese could also limit their access to the market, which is important for promoting and selling products.

Table 4.4.13 Background of the Northwestern Mountainous Region

Region	MOLISA Poverty Line (2005)	Ethnic Minority Rate (2001)	Ratio of Non-Vietnamese Speakers (2001)
Whole Nation	26.0%	13%	3%
1. North-West	62.3%	78%	22%
2. Red River Delta	19.8%	1%	0%
3. North-East	36.1%	34%	8%
4. North Central Coast	39.7%	11%	3%
5. South Central Coast	23.3%	5%	2%
6. Central Highland	52.2%	26%	8%
7. South East	10.2%	8%	2%
8. Mekong River Delta	20.8%	6%	1%

Source: "Cooperation for International Education (2007, Hiroshima Univ.), Vol. 10", Report by Mr. SAITOH Mioko/ GSO: General Statistics Office

Table 4.4.14 shows that 64.6% of women in North-West Region gave birth at home with no professional

assistance. This proportion in Region is much higher than national average and other poor regions in Vietnam.

Table 4.4.14 Proportion of women who gave birth at home with no assistance from qualified health workers in 2002

Whole Nation	16.6%
1. North-West	64.6%
2. North-East	32.6%
3. Central Highland	40.3%

Source: Vietnam Development Report 2004, Poverty

Birth is a burden for women in the Region for other reasons also. According to the living standard survey (2004), the average household size in the Region (5.15 persons/ household) is the largest among all the regions (National average is 4.36 persons/ household.), which suggests larger number of children in a family, that women in the Region bear more children. In addition to this, the fact that clean water s difficult to get in many remote places in the Region makes births difficult and dangerous for women.

Moreover, *Participatory Poverty Reduction Planning with Ethnic Minorities in Vietnam, Workshop Report (Dec. 2002)* addresses that the land use rights certificates, which are very important for poor families in terms of borrowing capital and using their land, are not given to men and women equally. The report also shows that women have had difficulty getting their names on these certificates, which usually list only the head of a household.

From the above findings, it can be concluded that it is only in their childhood that various human rights are equally enjoyed between men and women in North-West Mountainous Region. Gender gap could become more and more considerable on daily basis as people grow up and age due to inequality of opportunities.

(3) Strategy for improvement in gender gap

According to *the Comprehensive Poverty Reduction and Growth Strategy (CPRGS), Hanoi, November, 2003*, the poorest provinces also rank lowest in the countrywide Human Development Index (HDI) and the Gender Development Index (GDI). In this context, with respect to state budget expenditures, priority should be given to provinces and cities with low HDI and GDI indicators with the aim of reducing the gap between regions and encouraging provinces to promote policies that benefit the poor. Actually, Vietnam's Development Objectives stated in CPRGS include gender equality and advancement of women: Increase the number of women in elective bodies and in government bodies at all levels (national, provincial, district and commune). Increase the participation of women in agencies and sectors at all levels by an additional 3-5% in the next 10 years. This is the most important in Region where the ratio of minorities is the highest in the country and the poverty still dominates.

Though the gender gap of schoolchildren at household level is not remarkable in Region, education shall be enhanced especially for girls of ethnic minorities. According to *Vietnam Country Gender Assessment*, there

is scope for multiplier effects for solving other gender issues, since providing girls with education is known to be a good investment in terms of improving the welfare and opportunities of the next generation – especially for their female children.

4.5 Land Use and Tenure System

4.5.1 Present Land Use

Each province has been processed the Land-sat digital information and statistical data of the present land use, and then, compiled the vegetation and land use map, successfully. The present land use in each province is summarised in Table 4.5.1.

Table 4.5.1 Present Land Use of the Study Area (2005)

Unit: 1000 ha

Land Categories	The Study Area				
	Lai Chau	Dien Bien	Son La	Hoa Binh	Total
Total Area of Province	906.5	998.8	1,412.5	466.3	3,784.1
A. Agricultural Land	437.0	711.2	828.2	267.9	2,244.3
1. Arable Land	77.3	117.9	246.4	66.5	508.1
Paddy Field	30.5	40.0	39.0	41.8	151.4
Upland Field	40.5	73.6	173.8	3.8	291.7
Tea, Orchard, etc.	6.3	1.6	33.6	20.9	62.3
Other Fields	0.0	2.7	0.0	0.0	2.8
2. Pasture & Grassland	0.5	0.6	1.7	0.4	3.2
3. Fish-pond, etc.	0.4	0.7	2.1	0.8	4.0
4. Forest	359.3	591.9	578.0	200.2	1,729.4
5. Others	0.0	0.1	0.0	0.0	0.1
B. Non-agricultural Land	16.9	19.5	42.2	45.5	124.1
6. House & Building	2.5	3.27	6.6	6.3	18.5
7. Land for Special Use	4.5	7.1	13.7	28.4	53.7
8. Public Cemetery	0.3	0.6	2.7	0.0	3.5
9. Water Surface	9.7	8.5	19.1	10.9	48.1
10.Others	0.0	0.0	0.1	0.0	0.2
C. Non-used Land	452.6	268.2	542.1	152.8	1,415.7

Source: Land Use Maps and Statistical Date prepared by the Land Office, Department of Natural Resources & Environment of the respective 4 provinces

The arable land (cultivated land) in each province is limited to small extent that is representing at 17% in Lai Chau, 16% in Dien Bien, 29% in Son La and 24% in Hoa Binh to the total agricultural land, respectively. According to the statistical data presented above as well as the result of the field investigation, an arable land has been reclaimed entirely, and then, no more room for expansion of the farm land in future. In fact, many farmers are now obliged to cultivate their own food crops in such critical land as rocky field, extremely steep slope, shallow-cum-gravely/stony soils, etc. Thus, it is so anxious that in very near future when the land fragmentation is more progressed along with the generation changes, the land holding size per farm household would become small to a critical extent as the same to present situation of Red River Delta. Accordingly, farmers shall have to pay further effort to increase crop yield more than double of the present yielding conditions so as to maintain their livelihood to a favourable level.

4.5.2 Land Tenure System

After dissolution of the "Peoples' Corporation System", the "Land Office "of the Department of Natural Resources & Environment (DNRE) takes full responsibility for use and control of all the land. Agricultural land is defined as productive land such as arable land for crop production, pasture land for livestock grazing, forest including not only artificially planted forest but also natural forest, water surface for aquaculture, etc. To use all of the lands as well as the resources to be obtainable from the said land, either personal or organisation should submit the application to and then acquire the permission from the state government. The certified users are in general obliged to pay a land/resources utilisation tax[1] to the state. Up to present, the land and/or resources utilisation certificates have been issued to the following applicants, such as individual farm households, state farm enterprises, commune, private enterprises, social organisation in the Region, and other organisation.

The present land use by the certified land users is demonstrated in the following Table 4.5.2 that is representing in two cases of Lai Chau and Dien Bien provinces. As seen in Table, the land use certified for individual farm household shares almost all of the arable land. In contrast, the state enterprises share the forest land for resource conservation. In Dien Bien province, the individual farm household also shares large part of forest. This is owing to the provincial promotion programme on use of forest product for generation of the farm income.

In Lain Chau, the practical performance progress on issuance of the land certificate is as high as 98.67% in case of the forest land (application by 1.0 ha in unit). In contrast, it is far poor progress representing at less than 50% in case of the arable land, fish-pond, etc. This is due to a lot of applications that have a small land unit, i.e., 1,000 m^2 for arable land and 100 m^2 for fish-pond, etc.

Table 4.5.2 Present Land Use by Certified Land Users (2005)

Unit: %

Land Categories	Individual Farmers	Communes	Private Enterprises	Public Organization	State Enterprises	Others	Total
In case of Lai Chau Province							
Farm Land	98.98	0.40	0.00	0.57	0.05	0.00	100.00
Plantation	85.63	1,92	3.02		0.02	9.41	100.00
Forest	36.61	0.00	5,64	0.00	51.73	6.02	100.00
Fish-pond, etc.	93.29	1.62	0.00	0.00	2.72	2.37	100.00
In case of Dien Bien Province							
Farm Land	98.49	0.00	0.19	0.00	1.32	0.00	100.00
Plantation	92.08	0.00	5.69	0.00	1.66	0.57	100.00
Forest	72.83	0.10	1.17	1.42	24.03	0.45	100.00
Fish-pond, etc.	91.40	0.00	0.00	0.58	5.95	2.07	100.00

Note: In the above, the plantation in land category includes tea, coffee, orchard, etc.Figures in columns show the proportional extent (%) that is to the total extent of each land category.

Source: Statistical data of the Land Office of Lai Chau and Dien Bien province (2005)

[1] In case of the North-west Mountainous Region, the land and resources utilization tax is as a favourable treatment for the rural poor being fully exempted in agriculture, forestry, animal husbandry and fishery activities.

4.6 Agricultural Ecology

4.6.1 Agro-climate

The study area is located climatically under domination of the tropical monsoon, and then, it has distinct two seasons, namely, cool and dry winter season and warm and rainy summer season. Precipitation in the summer season generally exceeds over 2000 mm though it largely fluctuates annually. It is also notable that a monthly mean precipitation is as much as 200 mm or more during 4 month period from May to August. In winter season, it also rains with a monthly mean at 10 to 20 mm, and makes possible to grow someone green vegetables even without irrigation (Figure 4.6.1).

It is the coolest season in December and January, representing the daily minimum air temperature at 15^{o}C or less. Local farmers so far recognised such cool temperature is not a critical constraint for growing varieties of crops. In future when cropping is intensified, it should pay particular attention to this cool air temperature and take proper measure when nursery work is carried out in December and January. In Son La province, some farmers used plastic films for protection of paddy nursery against cool temperature in early February. In summer season, it is warm and no extremely hot day though over the season. But, it should take care and properly conserve the crop and land against a heavy precipitation especially in the steep slope-land.

The relative humidity is favourable representing at 75% in the winter season and 85% in summer season. The daily sun-shine hours are rather short at 4 to 5 hr. /day throughout the year except May.

4.6.2 Topography and Land Reclamation System

The Region lies in the mountainous ranges with peaks of 2,000 m or higher in elevation. Its topographics are rolling to hilly with steep slopes. Flat lans are limited only on narrow river valley bottoms formed along the Da river, the Ma river, the Nam Rom river and their tributaries. The topographical analyses were made by using the ASTER satellite imageries with pixels size of 15m x 15m with an aid of the GIS software. The results are summarized in Table 4.6.1.

Table 4.6.1 Areas by Elevation Range in the Region

Elevation Range (m a.s.l.)	Lai Chau		Dien Bien		Son La		Hoa Binh		Northwestern	
	Area (km^2)	Prop-orti on(%)	Area (km^2)	Prop-orti on(%)	Area (km^2)	Prop-orti on(%)	Area (km^2)	Prop-orti on(%)	Area (km^2)	Prop-orti on(%)
101-500	1,262	13.9	59	6.2	2,92	20.8	3,58	76.8	8,37	22.4
501-1000	3,988	43.9	5,62	59.0	6,89	48.9	91	19.6	17,42	46.6
1001-1500	2,276	25.1	3,06	32.1	3,50	24.8	9	2.1	8,94	23.9
1501-2000	1,049	11.5	23	2.5	55	4.0	0	0.0	1,84	4.9
2001-2500	375	4.1		0.0	13	1.0	0	0.0	51	1.4
2500-3000	49	0.5	0	0.0	1	0.1	0	0.0	3	0.1
error	83	0.9	1	0.2	7	0.5	6	1.5	24	0.6
	9,085	100.0	9,53	100.0	14,11	100.0	4,67	100.0	37,40	100.0

Remarks : imageries were recorded in 2000-2004. Errors are areas covered by clouds.

About 50% of the Region lies in the elevation range between 500 m a.s.l. and 1,000 m a.s.l. Over 30% of the provincial areas of Lai Chau, Dien Bien and Son La are located over 1,000 m a.s.l., while some 70% of Hoa Binh are lower than 1,000 m a.s.l.

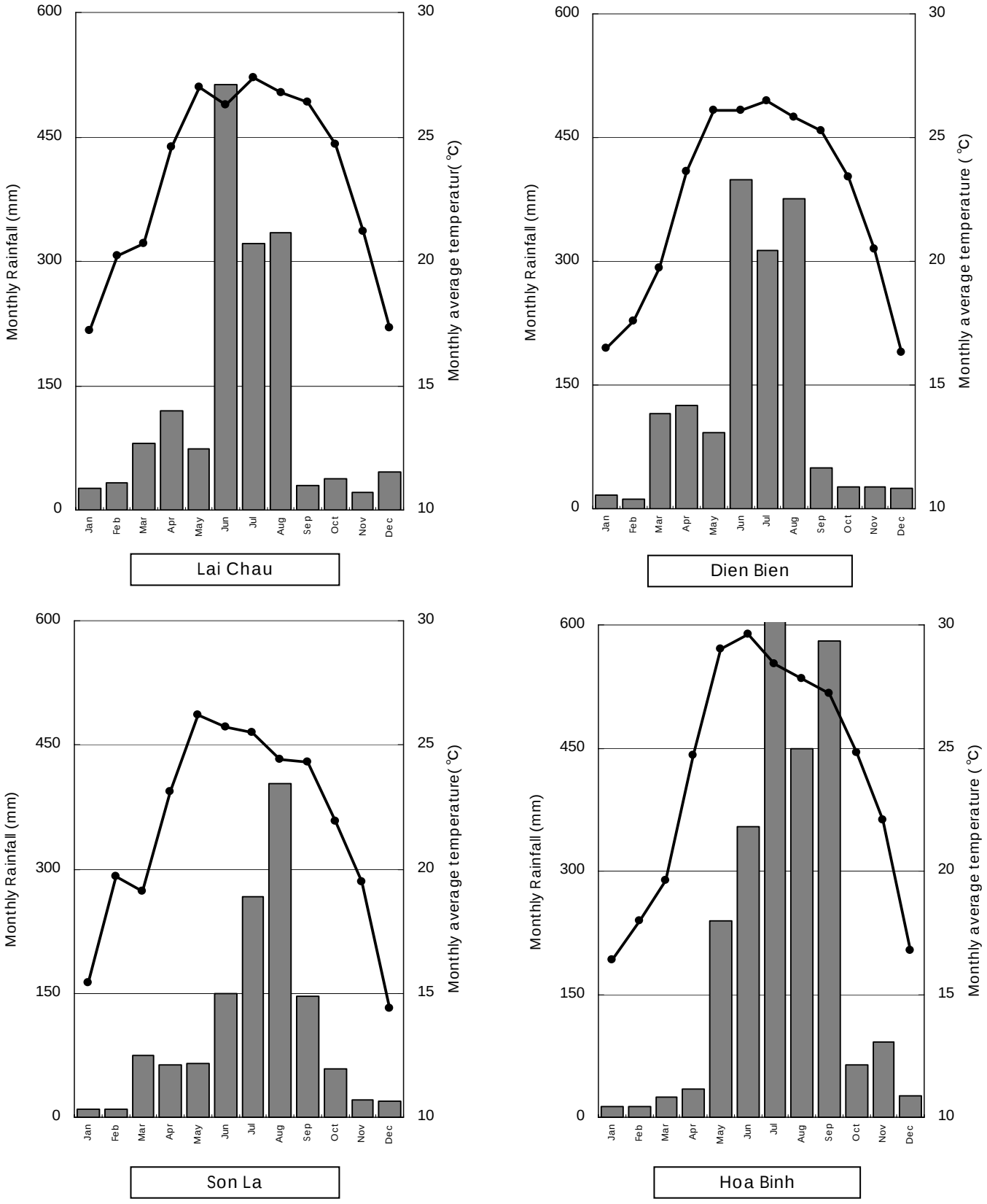


Figure 4.6.1 Climatic Conditions of the Study Area

The slope classification of the Region is presented in Table 4.6.2. According to the FAO criteria, land over 30% slope gradietnts are not suitable for agriculture. As seen in Table 4.6.2, 16,000 km^2 or 40% of the regional land are classified into not suitable land for agriculture. The existing farmland of the Region amounts to 5,502 km^2 including 613 km^2 of paddy field. It deems that almost all of the land with slope gradietnts of 16% or less are used for current agricultural activities.

Table 4.6.2 Slope Classification of the Region

Slope Range (%.)	Lai Chau		Dien Bien		Son La		Hoa Binh		Northwestern	
	Area (km^2)	Prop-ortion (%)	Area (km^2)	Prop-ortion (%)	Area (km^2)	Prop-ortion (%)	Area (km^2)	Prop-ortion (%)	Area (km^2)	Prop-ortion (%)
<2	77	0.9	107	1.1	122	0.9	338	7.2	645	1.7
2-5	133	1.5	196	2.0	346	2.4	438	9.4	1,112	3.0
5-8	169	1.9	266	2.8	425	3.0	352	7.5	1,212	3.2
8-16	643	7.1	1,063	11.1	1,445	10.2	757	16.2	3,907	10.4
16-30	1,931	21.3	2,772	29.1	3,612	25.6	1,132	24.2	9,446	25.3
30-45	2,692	29.6	2,920	30.7	4,241	30.1	899	19.3	10,754	28.7
45<	3,356	36.9	2,197	23.0	3,852	27.3	685	14.7	9,950	26.6
error	83	0.9	17	0.2	71	0.5	69	1.5	240	0.6
	9,085	100.0	9,538	100.0	14,112	100.0	4,671	100.0	37,406	100.0

Remarks：imageries were recorded in 2000-2004. Errors are areas covered by clouds.

4.6.3 Soils

Soil classification of the study area is presented in Table 4.6.3.

Table4.6.3 Soils in the Respective 4 Province Area

Great Soil Groups	Soil Types	Remarks
Lai Chau Province		
Complex of Oxisols and Cambisols	Infertile Sandy Soils	Soils are originated from Igneous Rocks and most popular in the north-west part of the province area.
	Moderately Deep Soils	Soils are originated from the Sedimentary Rocks, and being predominant in the mountain and hilly slopes.
	Deep Soils	Soils are developed on the weathered rocks, which are being extended in the Dien Bien Tuan Giao valley
Fluvisols	Fertile Deep Soils	Soils are from alluvium deposited in the flood plain of the major rivers
Dien Bien Province		
Complex of Oxisols and Cambisols	Infertile Sandy Soils	Soils are originated from Igneous Rocks and most popular in the north-east part of Dien Bien District area.
	Moderately Deep Soils	Soils are originated from the Sedimentary Rocks, and being predominant in the mountain and hilly slopes.
	Deep Soils	Soils are developed on the weathered rocks, which are being extended in the Dien Bien Tuan Giao valley
Fluvisols	Fertile Deep Soils	Soils are from alluvium deposited in the flood plain of the major rivers
Son La Province		
Complex of 8 Soil Groups, i.e., Oxisols & Cambisols	Complex of 24 Types of Soils	Deep Soils(effective soil layer more than 100 cm deep) 33.5% Moderately Deep Soils(effective soil layer 50 – 100 cm deep) Shallow Soils(effective soil layer less than 50 cm deep) 30.4%
Fluvisols	3 Types of Fertile Deep Soils	Soils are from alluvium deposited in the flood plain of the major rivers
Hoa Binh Province		
Oxisols	Infertile Deep Soils	Most predominant Soils in province (71.6% to the total provincial area). Soils are arable but need careful fertilization for crop production
	Infertile Shallow Soils	Soils in higher part of mountains (9.66% to the total provincial area). Soils are not arable due to steep slope & shallow effective soil layer. Careful land conservation measure is required even in forestation work.
Regosols	Strong Acid & Gravelly Soils	Soils are from colluviums deposited through the fan-formation in valley area. Soils are strong acid (pH=4.0 to 4.2) and contain a large quantity of gravels and stones through over the soil layer. A part of the soils is used for paddy and vegetable production (1% around to the provincial area)

Great Soil Groups	Soil Types	Remarks
Cambisols	Infertile Shallow Soils	Soils are the residue on a steep mountain slope, and share 3.13% to the total provincial area. Due to consecutive erosion, rainy season and season, an effective soil depth becomes shallow at critical ranges, and thus, land conservation is crucially needed.
Fluvisols	Deep Fertile Soils, partly Gravely Soils	Soils are the typical alluvial soil that has been developed on the flood plain of the Da, Boi and Buoi rivers. Soils share 2.9% to the provincial area, and at present, paddy is intensively cultivated under irrigated conditions.
	Fertile Deep Black Soils	Soils are also from the alluvium, which is being deposited in valley of Yen Thuy district. Proportional extent of the soils is only 0.8% to the provincial area. Soils are being cultivated with sugarcane as well as paddy intensively.
Peat/Mushy	Mushy Peaty Soils	Soils, which are originated from swamp deposition, are developed only in swamp and mushy land in Luong Son district. Occupation of these soils is as small as 0.08% to the provincial area. Soils are being so far not used for economic activities.

Source： Soil Map and statistical data provided by Department of Natural Resources & Environment, Lai Chau、Dien Bien、Son La、Hoa Binh provinces, respectively

Higher elevated and steep mountains occupy almost 85%, the plateaus and fan formations at the foot of mountains share 13%, and the low-lying plain is only limited to few % of the total study area.

With such above topographic situations, the soils in the study area are broadly classified into three soil groups, i.e., residual soils that are being developed on the base rock; colluvial soils on the plateau and fan formations; and alluvial soils in the flood plain along the rivers. These soils have recently been classified into great soil groups and soil types in conformity with the soil classification system of "Soil Map of the World" defined by FAO/UNESCO. Most of the soils have no structural development in those bodies, and thus, firmly compact through over the layers. Accordingly, the soils are capable for construction of terrace field; also suitable for effective operation of irrigation without serious water seepage losses. Amongst the soil types classified, deep Oxisols or Cambisols, deep fertile Fluvisols are selected as a priority soils for reclamation. However, moderately deep Oxisols or Cambisols, moderately deep rocky Cambisols are also used in a part of the mountain area where no deep soils are available.

4.7 Agricultural Production

4.7.1 Agricultural Sector in GRDP

The agricultural sector in GRDP of the study area is presented in Table 4.7.1

Table 4.7.1 Gross Regional Domestic Product (GRDP) of Agricultural Sector

Unit: million VND

Particulars	Respective Provinces				Total
	Lai Chau	Dien Bien	Son La	Hoa Binh	
Agric. Production	365,623	620,040	1,371,178	1,200,876	3,557,717
－Cereals	252,435	414,196	789,182	768,695	2224,508
－Tubers	39,065	40,524	153,177	-	232,766
－Pulse & Vegetable	13,419	77,303	16,242	109,352	216,316
－A-industrial Crops	24,274	73,932	102	205,889	304,197
－P-industrial Crops	33,113	5,048	16,242	9,406	63,809
－Fruits	3,214	8,078	116,218	106,334	233,844
－Spices & Herb	61	595	280,015	1,202	281,873
－Others	42	-	-	-	42
Livestock Production	113,591	171,567	56,2491	426,565	1,274,214
Agricultural Services	773	5,719	14,422	3,136	24,050
Total	479,987	797,326	1,948,091	1,630,579	4,855,983

Source：Agricultural Statistics of respective 4 provinces,(2006)

The agricultural sector of the study area generated 4.9 billion VND in 2006, of which 73% or 3.6 billion VND were produced by crop production and 26% or 1.3 billion VND were under animal husbandry. Out of crop production, 63% were generated by cereals, 10% by industrial crops, 8% by spices, 7% by fruits 6% by tuber crops, and 6% by pulses and vegetables.

In the study area where it is even having a remoteness, agricultural commercialisation has recently been progressed step by step thereafter liberation of market economy. The following is the current situation of agricultural sector of the study area.

1) In Lai Chau province, arable land is limited to a subsistence extent due to mountains topography in most part of the provincial territory. The provincial administration attaches a priority not only to export-oriented industrial crops, e.g. tea, but also achievement of self-sufficiency of food for the local inhabitant by improving rural accessibility. A special support fund for agricultural development was provided by the central government in introduction of high-yielding varieties of crops, improvement of farming practices, intensification of cropping pattern, enlargement of planting acreage, etc. As a result, the per capita production of rice and maize has increased from 290 kg in 2003 to 350 kg in 2005.

2) In Dien Bien province, the agriculture sector sustains a livelihood of the most 83% of total population (63,000 farm households or 183,000 persons). The current development program has been progressed and brought a marketable surplus of rice. Amongst the industrial crops, plantation of soybeans and groundnut has much been activated, and in 2005, achieved 8,000 ton and 1,400 tons of production respectively that are almost 4 times of that in 2000. The gross agricultural product then increased with an annual increment at 5.37%, and highly contributed for activation of the regional economy in the province.

3) In Son La province, agricultural production pattern is being under amendment from the subsistence farming to commercialization oriented farming. The agricultural production structure has much been improved through crop diversification and intensification of crop farming as well as commercialization of crop product with an intensive supporting assistance in technology (extension service) and finance (investment). The planting acreages of soybeans and groundnut as well as such provincial specialties as fruits, tea, coffee, etc. has also been enlarged recently. Accordingly, in near future, those cash crops would bring much production and then contribute directly to the provincial economy as well as the farm household economy.

4) In Hoa Binh province, the agriculture sector is the main stay, maintaining livelihood of more than 80% of the total inhabitant. The agriculture sector shares almost 50% of regional GDP, amounting at VND1,042.8 billion in 2000 at the 1994 constant price bases, and increasing with an annual incremental rate at 6.7% (or VND289.9 billion per annum). Per capita rice production has been achieved at 350 kg in the recent year. Accordingly, it has produced a large marketable surplus of rice every year. A good performance of the above agricultural development is being appreciated as the

results of technical renovation, i.e., “introduction of high-yielding varieties of crops”, “propagation of appropriate farming practices”, and “practical operation of wide-area plant protection”, etc.

The agricultural development achieved self-sufficiency of Lai Chau and Dien Bien of remote-cum-mountainous provinces has just achieved food self sufficiency, and subsequently, the per-capita-GDP in agricultural sector is becoming at a little over than VND10 million level. In contrast, the said GDP is exceeded over VND105 million in a case of Son La and Hoa Binh provinces where the provincial area is located near by the great Hanoi city and being directly influenced with advanced economic activities and/or effect.

4.7.2 Type of Farming

As stated in Section 4.5.2 hereof, there are broadly three types of farming unit in the Study Area, namely, “Individual Farms” managed by small-holder farmers, “State Farms” managed by the state enterprises or agencies and “Private Farms” that have been recently established by the private investors.

(1) Individual Farms (small-holder farmers)

The individual farms are further divided into three sub-types of farming, i.e., traditional shifting cultivation in the higher-part of mountain area; settled farming with terrace field formation; and intensified-cum-commercialized farming in the floodplain. In a part of the settled farming, farmers are being diversified cash crops, i.e., tea, coffee, fruits, etc., and challenged commercialization of crop productions. For all three farming types, it is notable that a land fragmentation is being started through current generation changes, and the unit land holding size per household is becoming to small at 0.5 to 0.7 ha on an average. According to the “Farmers’ Needs Survey (2003)”, population pressure to the arable land has been becoming to a serious extent. A size of each farm household is being reduced to 0.32 ha and 0.74 ha on an average in case of Red River Delta and North-west region, respectively. The North-west region still keep more than double of farm size than that in Red River Delta, however, the land productivity is smaller due to steep mountain topography and poor soils (Figure 4.7.1).

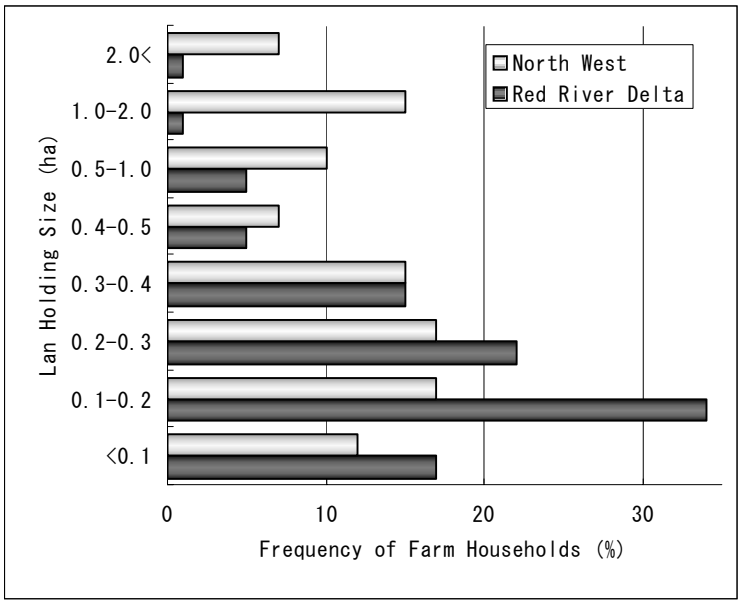


Figure 4.7.1 Land Holding Sizes in Red River Delta and Northwestern Region

(2) Agricultural Enterprises

State Farms

All of the state farms except a large scale sugarcane plantation in Son La and Hoa Binh provinces have been

transferred to the local government; and major part of the farms are now under management of the respective communes. At present, crop production activities from seeding up to harvesting are undertaken by the individual farmers on the contract bases. Thus, the farm operation in the state farm is practically the same to the individual farms. Regarding the sugarcane plantation in both Son La and Hoa Binh provinces, plantation of sugarcane is also being entrusted to the individual farmers. The state farm is undertaking only a sugar processing work and marketing of the sugar product. Since sugar prices dropped in the international sugar market, the sugar factory is being obliged to decline the purchasing price of sugarcane at factory gate. Accordingly, farmers are being much discouraged and broken away from the contract. As the result, works of the sugar factory has recently been reducing to critical level, representing at around 40% to the normal working capacity.

Agro-business in Private Sector

In the private sector in the Study Area, the agro-business has recently set up using such local specialities as tea, fruits, spices, pharmaceutical crops, etc. A part of the enterprises also involve in the reforestation as well as forest conservation works. Almost all of the private farm enterprises are the joint ventures that are inviting a foreign capital investment (foreign and domestic capital = 50%:50%). In the current performance of land registration, the private farm enterprises successfully registered is still limited to 5% to the total applications.

4.7.3 Major Crops and Predominant Varieties

Crop production activities in the Study Area has been much activated recently especially after adoption of the Doi Moi policy, and promoted commercialization of the agriculture sector under the policy in diversification to the socialism marketing economy from the previous planned economy system. Through the above, it has been achieved crop diversification as well as intensification of the crop production, successfully. In fact, such industrial crops as soybean, groundnut, sesame, etc. are introduced in addition to the traditional cereals and tuber crops, and besides, varieties of fruit trees and Arabica coffee are also introduced in succession to tea, spices, pharmaceutical crops, etc. Major crops growing in each respective province are as summarized as follows:

(1) Essential Food Crops

Higher-part of Mountains:	Mountain Slope:	Upland Rice, Maize, Cassava
Lower-part of Mountains:	Terrace Field:	Paddy, Maize, Sweet-potatoes, Cassava
Low-lying Plain:	Irrigated Field:	Paddy, Vegetables

Table 4.7.2 Essential Food Crops and Predominant Varieties

Crops & Varieties	Respective Provinces			
	Lai Chau	Dien Bien	Son La	Hoa Binh
Upland Rice(Glutinous)	Nep Hat Tron	Nep Hat Tron	LC-95-1	-
	Nep Hat Dai	Nep Hat Dai	Te Meo	-
Upland Rice(Ordinary)	Te Do	Te Do	Nep Tam	-
	Te Thai Lan	Te Thai Lan	Nep-87	-
		93 - 1		

Crops & Varieties	Respective Provinces			
	Lai Chau	Dien Bien	Son La	Hoa Binh
Paddy(Glutinous)	Vu -352	Vu -352	Vu Mua	
	Vu Mua	IR-352		
Paddy(Ordinary)	IR-64, TH-1	IR-64, TH-1	IR-64	IR-64
	Khang Don		Bac Vu-903	Khang Don
Maize	VN10	VN10	VN10	LVN-10
	Ngo Thu Dong	Bio-seeds 9681	DK	Thu Dong
	Bio-seeds 9681	Thu Dong	LVN-10	Bio-seeds 9681
	P-11			
Sweet-potatoes	Local Variety	Local Variety	KT-2	KT-2
Cassava	Local Variety	Local Variety	Local Variety	Local Variety
Potatoes	Trung Quoc	-	-	-

Note: Vu Dong Xuan-352, Paddy (glutinous) is the same variety to IR-352
Source: Data & Information provided by Agricultural Extension Office, respective 4 provinces

In Hoa Binh area except two mountain districts, cultivation of upland rice has been fully replaced under the current crop diversification and 5 million ha re-forestation campaign. Most of the land used for upland rice cultivation has been then shift to orchard, i.e., longan, litchi, mangoes, oranges, etc. In the Region, the food production especially rice would keep its position as the most important sub-sector in agriculture as well as the regional economy. Recently, under the "Socio-Economic Renovation Campaign", the Region has achieved a high growth rate in food production. These food outputs especially rice and maize has not only been exceeded a self-sufficiency over the regional demand but also brought a large surplus for commercialization.

At the household level, however, it is still crucial issue so as to ensure food security especially in the northern mountainous districts, i.e. Muong Nha, Muong Cha, Tuan Giao, Dien Bien Dong in Dien Bien province and Phong Tho in Lai Chau province. To this end, the respective provinces should pay utmost effort for successful set up of crop diversification with introduction of profitable industrial crops, and then, intensification of such industrial crop production with adoption of a modern farming practices so as to allow access to an available food even at the individual farm household level...

(2) Major Industrial Crops

Higher-part of Mountains:	Mountain Slope:	Cotton, Soybean
Lower-part of Mountains:	Terrace Field:	Soybean, Groundnut
Low-lying Plain:	Irrigated Field:	Sweet-potatoes, Soybean, Groundnut

Table 4.7.3 Major Industrial Crops Prevailed in Provinces

Crops	Respective Provinces			
	Lai Chau	Dien Bien	Son La	Hoa Binh
Tea Green Tea	●	●	●	
Coffee Arabica		●	●	
Sugarcane	●	●	●	●
Cotton	●	●	●	–
Soybean	●	●	●	●
Groundnut	●	●	●	●
Sesame	●	●	–	–

Source: Information provided by DARD of each respective 4 province (2006)

(3) Particular Cash Crops

Higher-part of Mountains:	Mountain Slope:	Spices and Herb
Lower-part of Mountains:	Terrace Field:	Fruits, Tea and Coffee
Low-lying Plain:	Irrigated Field:	Vegetables and Herb

Table4.7.4 Major Cash Crops Prevailed in Provinces

Crop Species	Kind of Crops	Respective Provinces			
		Lai Chau	Dien Bien	Son La	Hoa Binh
Orchard	Mango	●	●	●	●
	Banana	●	●	●	●
	Pineapple	●		●	●
	Citrus	●	●		
	Litchi & Longan		●	●	
	Apricot			●	●
	Plum			●	●
Spices	Cardamon				
Mulberry Tree				●	●
Vegetables	Cabbage	●	●	●	●
	Chinese Cabbage	●		●	
	Lettuce	●	●	●	●
	Green Mustard	●	●	●	●
	Dry Onion	●		●	●
	Green Onion	●	●	●	●
	Carrot	●		●	●
	Tomatoes	●	●	●	●
	Cucumber	●	●	●	●
	Egg-plant	●	●		●
	Cauliflower	●	●		●
	Broccoli	●	●	●	●
	Pumpkin	●			●
	Green Peas	●		●	●
	String Beans	●			●
Cut-flower	Rose			●	●
	Chrysanthemum			●	●
	Gladiolus				●
	Gerbera				●
	Lilies				●

Source: Information provided by Extension Office, DARD of respective 4 provinces

4.7.4 Typical Cropping Pattern

As it has been stated in the preceding Sections, crop diversification as well as intensification of crop production has been well progressed in the low-lying plain and its peripheral mountain foots where soil and topographic conditions are favourable for farming, and also good support is available in transportation and communication service system. Commercialisation of crop products is also being gradually performed in the local market, and more or less, contributed to the farm household economy.

The typical cropping patterns have been prepared on the bases of the crop information provided by the agricultural extension officers as well as crop production in charges in the respective provinces as illustrated in Attachment 4.3. The typical cropping patterns demonstrate the most popular season of each crop, crop prevailed area, crop planting acreage (ha) and its proportional extent (%), working days to be required in essential farming practices, etc. As it has been classified the farming types in the preceding

Section 4.7.2, there are three farming types, i.e., shifting farming (cultivation) in higher-pert of mountains, settled farming with terrace field formation in the lower-part of mountains, and intensive paddy cultivation with irrigation in the low-lying plain. These three farming types are characterised by the specific crops that are, area by area, introduced under crop diversification campaign. For instance, upland rice, maize and cassava are the staple crops in the higher-part of mountains. Amongst 4 respective provinces, plantation of "cardamon" is distinctive in the said farming type of mountain area especially in Lai Chau province.

In case of the lower-part of mountains, rice production has been diversified from upland rice to paddy, and besides, such industrial crops as soybean and groundnut are being introduced as an important cash earning sources. In this area, sweet-potatoes are also introduced as a complementary crop to cassava which has a long growing term (more than one year) for maturation. Other than the said annual crops, such perennial crops as tea, coffee, fruits, etc. are also grown under crop diversification campaign. The area-specific characteristics especially in the cash crop production are basically depending on accessibility to the central market. Namely, farmers in Son La and Hoa Binh province get an advantage for access to the great Hanoi market, and accordingly, grow fruit tree and vegetables. In contrast, tea plantation has been much activated through border-trade with China in case of Lai Chau province.

In the low-lying plain, double cropping of paddy has been popularised under irrigated conditions. Besides, vegetable is growing as the secondary crop especially in the winter season. In case of Hoa Binh province, farmers also grow "cut-flowers" and "dwarf trees" for Hanoi market, and earn the secondary income for their livelihood following to the crop production.

4.7.5 Farming Practices

The farming practices prevailed in the study area are still at traditional and extensive methods, except advanced technology adapted to such commercialised crop production as cut-flowers, vegetables, spices, etc. As for operation and management of the plantation farming on tea, coffee, sugarcane, etc., an improved farming technology is being adopted through learning from the advanced countries. However, those technologies are not all applicable to the local conditions of the study area.

In general, farmers purchase "good seeds (improved varieties and/or hybrid)"for production of paddy, industrial crops, spices, herbs, etc. However, due to traditional farming practices and poor farm management in most of farming cases, farmers could not obtain high enough yield of crop, and more over, being affected by big field losses and poor quality of product. Table 4.7.5 demonstrates how the local farmers carry out field works in the prevailed farming practices.

Table 4.7.5 Farming Practices Prevailing in the Study Area

Farming Practices	Tools & Equipment	Working Power	Remarks
Ploughing & Harrowing	Hoe Plough	Man-power Animal-power	Higher part of mountain Lower part of mountain & plain
Puddling & Levelling	Soil-puddler	Animal-power	Paddy cultivation in lower part of mountain & plain
Sowing		Man-power	For all of the annual crops
Transplanting		Man-power	Paddy cultivation in lower part of mountain & plain
Weeding	Hoe	Man-power	For all of the annual crops (use of rotary-weeders is so far to limited cases). In a case of paddy cultivation in the plain area, herbicides are used regularly, at present.
Plant Protection	Knapsack-sprayer	Man-power	Use of agro-chemicals is only to the limited area where road system has been developed.
Harvesting	Sickles	Man-power	Sickles are used only for rice harvesting. Other crops are harvested by hand.
Threshing	Power-thresher Cereal-beater	Diesel Man-power	Power-thresher is used only in the area where road system has been developed. Beat-threshing is predominant practices in most area.
Drying & Cleaning	Drying yard Grain-dryer	Man-power Coal & Husk	Sun-shin drying in house yard Power-dryer still has a problem how to supply fuel steadily.

Source: Observation by JICA Study Team (February to June 2007)

As seen in Table above, the agricultural production in the Region is being made mostly using the "internal producers' goods (inputs)", inclusive of family labour force, animal power, and farming implements and/or tools. Use of the "external producers' goods (inputs)" such as seeds, chemical fertilizers and agro-chemicals, machinery and/or equipment are limited only in the area where road network has been consolidated favorably for transportation of the said goods.

(1) Farming Tools and Equipment

In the study area, the farm mechanisation has been progressed only in the sugarcane plantation in the state farm. Farm tractors that have more than 45HP are being used for soil-ploughing and harrowing work and transportation means for harvested cane to factory.

In the private farms, farm mechanisation is not so popular up to present. Hand-tractors and power-threshers are available in villages, but practical use in farming is so far limited to a small extent where village road is networked favourably. In case of paddy cultivation, use of water-buffalos is predominant for doing soil-ploughing and puddling works. For upland cropping, however, majority of farmers plough soils by use of handy hoes. As it has been demonstrated in Table 4.6.5, most part of crop cultivation is practised by hand using the traditional simple-tools/implements. Accordingly, working efficiency of each farming practice is as low at subsistence level.

In most cases, farmers dry the harvested product in the sun. Since the sun-shine hour is as short as 5 hrs per day or less in most months, drying efficiency is not all able to satisfy. In taking countermeasure to the above end, the power-dryers have been prevailed in some communes for drying paddy and maize grains, cassava chips, etc. However, in steady supply of fuel is a critical constraint in operation of the said power-dryers.

(2) Seeds

In Vietnam, seed is produced by variety of organisations and/or agencies, such as “agricultural university”, “research institutes”, “central and provincial seed agencies” and “private seed companies”. The research institutes not only breed varieties of crops but also multiply seeds, and sell seeds directly to farmers. Similarly, the central and provincial seeds agencies produce all categories of seeds. To the above end, only limited testing is conducted by the “National Centre for Variety Evaluation and Seed Certification (NCVESC)”. The seed producer, with no external verification, thus carries out self-certification. Repackaging of seed by seed dealers further reduces a confidence of farmers. Due to the above problems, use of the purchased seeds is becoming small.

In Lai Chau province, there are no seeds and/or nursery farms. Accordingly, farmers purchase all of the seeds and seedlings from other provinces. The seeds purchased annually are as summarised in Table 4.7.6 here below. Farmers in Lai Chau have no technology for processing their own seeds and seedlings, so far.

Table 4.7.6 Annual Seed Use in Lai Chau Province

unit : kg

Crops	Seeds Procured	Crops	Seeds Procured
Paddy	149,500	Soybean	10,240
Maize	2,757	Groundnut	11,100
Sweet-potatoes	2,000		

Source: Agricultural Statistics in Lai Chau province (2005)

In Dien Bien province, there are two seeds companies, i.e., “North-west Forest Seeds Enterprise” and “Dien Bien Agricultural Seed Company”. These companies have a dual functions for processing own seeds and trade and marketing services on the external seeds. For instance, the Dien Bien Agricultural Seed Company produces 500 tons of paddy seeds, 65 tons of maize, 117 tons of soybeans and 12 tons of groundnuts. The company handles 900 to 1,000 tons of seeds annually, of which about 70% is of the own seeds and remaining 30% is of the external seeds. For propagation of the “high-yielding variety of crops”, the subjected crops or varieties and related farming technology are demonstrated in the technical demonstration farm plots which will be established in the village area and operate/manage through inter-cooperation amongst DARD, key farmers and seeds company.

In Son La province, numbers of seed farm and nursery have been established and extending seeds supply services to farmers under management of provincial DARD (Table 4.7.7).

The state government has recently shared VND437.4 million to the cereal seed farms using the special fund for relief poor provinces, and accordingly, the seed producing function in the said seed farms is being reinforced, successfully and satisfactorily.

Table 4.7.7 Seed Farm & Nursery in Son La Province

Seed Farm & Nursery	Locations (Nos.)	Farm Size (ha)	Remarks
Nursery for Forest Trees	10	10	2000 $m^2$for preparation of graft-seedlings
		322	For production of bamboo seedlings(Chinese & Taiwanese Bamboo for green shoot production)
		100	Bamboo seedlings for native variety
Nursery for Agro-Forestry	10	200	Tea (Maca Chinese Tea), Coffee (Arabica) & Fruit Trees Production capacity is 10-15 million seedlings per year
Nursery for Fruit Trees	5	50	Nursery of major fruit trees is available.
Seed Farm	7		Possible to supply Maize (LVN-10) 500 ton & Paddy (Bac Vu-903) 100ton a year

Source: Data provided by DARD, Son La province(2005)

In Hoa Binh province, the seed centre was established under management of the provincial DARD, and undertakes seeds/seedlings processing and supply services. A few private seed companies also extend their commercial seed services. For propagation of the "high-yielding variety of crops", the provincial DARD first organises the technical training courses for the extension workers. DARD also assist district and/or commune offices for establishing the technical demonstration farm plots for demonstrating the subjected crops or varieties and related farming technology. Besides, the provincial government issues subsidy for purchasing the seeds, chemical fertilisers, agro-chemicals, etc. For instance, the subsidy granted in 2004 is VND8.3 billion for assisting procurement of the farm inputs without discrimination.

The seed supply in all provinces includes the hybrid seeds of paddy and maize which are imported from China. Those hybrid varieties of paddy and maize are being prevailed entirely in the respective 4 provinces. Since no specific cultivation technology is propagated properly, majority of farmers grow hybrid varieties of paddy and maize without application of fertilizers, at present. In fact, in spite of widespread use of hybrid seeds, paddy yields have been stagnated and maize yields are as low at 1.7 ton/ha on an average in the mountain slope, and 2.7 tons/ha in the advanced plain area.

(3) Fertilizers and Agro-chemicals

To use of such external producers' goods as chemical fertilisers, agro-chemicals, etc. (Table4.7.8), the local government provides technical orientation as well as workshop for transfer of related technology to farmers. In reality, however, practical users are only limited to an advanced area where road system has been developed favourably. In fact, the total consumption of chemical fertilisers is as small as 2,000 to 4,000 tons a year even though the government subsidizes transportation of fertilisers.

Table4.7.8 Use of Chemical Fertilizers

Unit: ton

Fertilizers	Lai Chau	Dien Bien	Son La	Hoa Binh	Total
N-Fertilisers	2,300	3,760	2,950	4,120	13,130
P-Fertilisers	2,730	2,930	1,840	4,890	12,390
K-Fertilisers	290	910	190	790	2,180
NPK Compound	2,300	210	-	500	3,010
Total	7,620	7,810	4,980	10,300	30,710

Source: Agricultural Statistics of respective 4 provinces (2006)

For plant protection works, the "Integrated Protection Management (IPM)" has been organised in each commune and village, and has been functioning for operating systematic plant protection in wide area under the technical supervision of the expert in charge in the provincial DARD (Table4.7.9). Fortunately, it was no outbreak of insects, pest and diseases up to present, and no experience in taking IPM action.

Table 4.7.9 Use of Agro-chemicals

Unit: kg

Agro-chemical	Lai Chau	Dien Bien	Son La	Hoa Binh	Total
Fungicides		9,240	11,600	1,190	22,030
Insecticides		3,640	4,000	240	7,880
Herbicides		5,040	3,400	-	8,440
Rats bane		20	5,600	-	5,620
Plant Hormone		150	-	-	150
Total	9,000	18,090	24,600	1 ,430	44,150

Source: Agricultural Statistics of respective 4 provinces (2006)

4.7.6 Present Conditions of Major Crop Production

The present conditions of major crop production in the Region could be grasped using the agricultural statistics of each province covering the years from 2000 to 2005.

(1) Food Crops

Upland rice is a particular food for the local people in the higher-part of mountains. Even though upland rice especially of the glutinous varieties is generally recognised as low productive crop (one ton/ha or around), the local farmers are being grown it widely in the mountain slopes. In case of Hoa Binh province, upland rice cultivation has been recently diversified to fruits production under promotion campaign on agro-forest plantation.

Paddy is being regularly cultivated as the staple crop in the low-lying plain. With performance of irrigation development, double cropping of paddy is popularised in the plain area. In the lower-part of mountains, farmers have diversified the staple crop from upland rice to paddy as much as terrace field is prepared in success. Paddy is grown successfully under the rain-fed conditions during the month period from mid-May to mid-October, and being brought production with a reasonably high yield at 2 to 3 tons/ha. In the plain area, farmers achieved paddy yield at 4 to 5 tons/ha under technically advanced conditions, inclusive of irrigation, fertiliser and agro-chemical application, weeding by use of herbicides.

Maize is the staple crop in the upland field, and accordingly, being shared wider acreage amongst the crops introduced in Region. Recently, many farmers challenge to grow hybrid maize, and achieved higher yield at 2.5 ton/ha on a regional average. In reality, however, a large increment of maize yield is only observed in Son La and Hoa Binh where infrastructure development has been progressed well in success. In contrast, maize yield in Lai Chau and Dien Bien is still low at subsistence level (Table4.7.10).

Table 4.7.10 Planted Area, Yield and Production of Staple Food Crops

Crops	Particulars	Respective Provinces			
		Lai Chau	Dien Bien	Son La	Hoa Binh
Paddy	Planting Acreage (ha)	21,221	21,925	24,496	41,814
	Yield (ton/ha)	3.91	4.67	4.55	4.39
	Production (ton)	83,028	104,279	111,354	192,216
Upland Rice	Planting Acreage (ha)	9,293	18,102	14,534	0
	Yield (ton/ha)	1.04	1.16	1.16	0
	Production (ton)	9,694	23,257	16,848	0
Maize	Planting Acreage (ha)	15,945	25,524	80,903	33,872
	Yield (ton/ha)	1.79	1.75	2.83	2.72
	Production (ton)	28,574	49,066	228,030	96,778
Sweet-potatoes	Planting Acreage (ha)	611	713	613	4,927
	Yield (ton/ha)	5.29	2.93	5.95	4.38
	Production (ton)	3,232	2,940	36,450	23,893
Cassava	Planting Acreage (ha)	5,524	7,167	10,806	10,711
	Yield (ton/ha)	7.63	6.97	10.80	8.50
	Production (ton)	42,129	51,796	192,271	102,060

Source：Agricultural Statistics of respective 4 provinces,(2006)

(2) Industrial Crops

As far as tea and coffee plantations are concerned, processing technology and facilities have been available and functioning enough for practical processing of the product and its marketing. In Son La and Hoa Binh province areas, sugarcane was previously grown as the main product of the state farms. At present, sugarcane is grown by individual farmers under the production contract between farmers and the state farm. The cane yield is favourably maintained as high as 54 ton/ha on an average through provision of advanced services of the state farm in technical extension, supply of seedlings as well as fertilisers, etc. In case of Lai Chau and Dien Bien province, sugarcane is grown in a small area mainly for the local consumption. (Table 4.7.11)

Table 4.7.11 Planted Area, Yield and Production of Major Industrial Crops

Crops	Particulars	Respective Provinces			
		Lai Chau	Dien Bien	Son La	Hoa Binh
Tea	Planting Acreage (ha)	4.176	199	4,144	-
	Yield (ton/ha)	1.80	1.17	4.96	-
	Production (ton)	4,126	138	20,553	-
Coffee	Planting Acreage (ha)	-	323	2,866	
	Yield (ton/ha)	-	2.06	1.05	
	Production (ton)	-	347	3,022	
Sugarcane	Planting Acreage (ha)	176	85	3,468	6,589
	Yield (ton/ha)	43.56	22.21	43.96	54.92
	Production (ton)	7,666	350	152,436	389,275
Cotton	Planting Acreage (ha)	759	813	1,769	0
	Yield (ton/ha)	0.45	0.56	0.89	0
	Production (ton)	341	787	1,580	0
Soybean	Planting Acreage (ha)	1,682	8,509	12,093	2,185
	Yield (ton/ha)	0.80	1.10	1.12	1.28
	Production (ton)	1,344	10,590	13,549	3,178
Groundnut	Planting Acreage (ha)	1,053	1,276	1,453	4,599
	Yield (ton/ha)	0.87	0.90	0.83	0.81
	Production (ton)	920	1,267	1,206	3,736
Sesame	Planting Acreage (ha)	89	54		
	Yield (ton/ha)	0.33	0.43		
	Production (ton)	29	23		

Source：Agricultural Statistics of respective 4 provinces,(2006)

Production of cotton and sesame is made mainly for the local consumption except Son La. Cotton cultivation in Son La has recently been promoted by the private cotton company for textile fabrics. Since most farmers have not enough working capital, cotton and sesame are grown without application of fertilisers. Accordingly, yield of both crops is as low at subsistence level.

Soybeans and groundnut are produced as an edible oil resource and for practical commercialisation. Recently, plantation acreage of these two crops has been increasing, year and year, successfully. However, yield of both crops is as low at subsistence level since the cultivation technology is not guided satisfactorily. To achieve a reasonably high enough yield, it shall be essential and crucially needed to clarify the best applicable planting spaces as well as an economic dosage of fertilisers through practical field experimental works.

(3) Other Cash Crops

All of the perennial tree crops are being traditionally grown in Region since long years ago. Recently, under the agricultural commercialisation campaign, the local government has paid utmost effort for refreshing the varieties to improve a quality of product to be applicable to the practical trade. Most of trees are young at this moment, and accordingly, yield in unit acreage is still limited to a small quantity for marketing. However, these trees would be growing up to maturation stage within a few years. (Table4.7.12)

Table 4.7.12 Planting Acreage, Yield & Production of Essential Cash Crops

Crops	Particulars	Respective Provinces			
		Lai Chau	Dien Bien	Son La	Hoa Binh
Cardamon	Planting Acreage (ha)	2.338			0
	Yield (ton/ha)	0.40			0
	Production (ton)	359			0
Litchi & Longan	Planting Acreage (ha)		203	13,498	
	Yield (ton/ha)		2.37	2.76	
	Production (ton)		630	37,304	
Mango	Planting Acreage (ha)			4,217	
	Yield (ton/ha)			2.59	
	Production (ton)			10,942	
Citrus	Planting Acreage (ha)	226			
	Yield (ton/ha)	2.71			
	Production (ton)	573			
Apricot	Planting Acreage (ha)	-	-	901	
	Yield (ton/ha)	-	-	3.71	
	Production (ton)	-	-	3,343	
Plum	Planting Acreage (ha)	-	-	2,686	
	Yield (ton/ha)	-	-	6.47	
	Production (ton)	-	-	17,378	
Mulberry	Planting Acreage (ha)	-	-	357	-
	Yield (ton/ha)	-	-	7.11	-
	Production (ton)	-	-	2,541	-

Source : Agricultural Statistics of respective 4 provinces,(2006)

Regarding the post-harvesting process on the spice production (Cardamom), establishment of “green-fruit drying function (power-dryer)” is indispensable so as to dry the harvested green-fruits promptly-cum-timely with in short hours. As for the post-harvest-handling of the fruits, it is essential and crucially needed to establish such marketing supporting function as cold stores and such primary processing factories as dry-fruit, syrup-preserving fruit, jam, juice, fruit-wine, etc. for sustaining

smooth-cum-effective marketing, and then, achieving successful commercialisation of the subjected product.

4.8 Institutional Supporting Services in Agricultural Sector

4.8.1 Farmers Organization and Agricultural Cooperatives

(1) Lai Chau Province

In Lai Chau province, there is a Farmers' Union organised as a branch of the Vietnam Farmers' Union (VFU). The Farmers' Union established in each administrative stratum, i.e., Commune Farmers' Union, District Farmers' Union, and Provincial Farmers' Union. Besides, the Union also has Youth Union and Women Union as an internal structural function for group and/or gender activities. Participation to the Union is allowed thereafter 18 years old, and need permission from the executive committee of the Union.

District Farmers' Union have currently worked quite well especially on implementation of the socio-economic development schemes, inclusive of village development, road construction, irrigation and electricity service, preservation of breeders, supply of farm inputs, etc. Some of NGOs is being extended technical assistance and guidance to these activities. The essential purposes of Unions' activities are (i) to raise technical features of each farmer and build up capacity to activities; (ii) to eradicate poverty in farm households; and (iii) to improve and rise up living standard of farm households. Other than the above Union, there are 5 formal units of farmers' organizations in the province:

i)	Production oriented co-operative	2 units	Irrigation O&M and inputs supply
ii)	Multipurpose co-operative	2 units	Supply of farm inputs and technical extension services
iii)	Civil & electricity service co-operative	1 unit	Contract services on civil work and works in electricity supply

(2) Dien Bien Province

In Dien Bien province, there is a "Farmers' Union" that has been organised as a member of the VFF. The Farmers' Union established in each administrative stratum, i.e., Provincial Farmers' Union, District Farmers' Union (8 units), and Commune Farmers' Union (88 units). Besides, the Union has recently promoted to organise the Sub-union at each village, and up to present 1,405 Sub-unions was established in total and participants increased to 44,854 farmers that is equivalent to 32% of the total farmers. The essential purposes of Unions' activities are practically the same to VFU as organised in Lai Chau province. Other than the above VFF, there are 64 units of Water Users' Association which have been organised under irrigation project assisted by EU. Besides, it has also been organised 73 groups of farmers; 15 agricultural co-operatives, and more than 1,000 of the rural credit oriented groups in the entire province.

(3) Son La Province

In Son La province, the Farmers Union in direct descent from VFU has been organized as the same to Lai

Chau, and takes activities in the province as well as in the respective districts and commune areas. Other than the Unions, there are 1,506 units of farmers' organizations in the entire province either those are formal or informal units. The Water Users Association has also organized at least one unit in every communes.

(4) Hoa Binh Province

In Son La province, the Farmers Union of VFU descent as the same to Lai Chau and Son La has been organized, and takes similar activities in the province as well as the respective districts and communes. Besides, there are lots of agricultural co-operatives and water users' associations in the entire province though majority of them are still on the informal units.

Either formal or informal organization units, the farmers' organizations have the following problems and/or constraints in those operation and management of the business activities:

1) Lack of persons who have a capable talent and/or skill for taking leadership
2) Lack of knowledge and technical skill for taking executive works in operation and management of the co-operative activities
3) Lack of facilities, equipment and other related functions for operation and management of the co-operative activities
4) Lack of information to be required for maintaining the co-operative activities, such as new production technology, trade and marketing of the commodities, etc.
5) Lack of capital fund for taking action and business

4.8.2 Agricultural Research and Extension Services

(1) Agricultural Research

Vietnam has recently achieved self-sufficiency of food, and shifted one's position to rice export to the international market as the second largest rice exporter. In contrast, however, it is essential and crucially needed to pay continuous efforts to exploitation of new technology for maintaining sustainable food security as well as rural economy through further activation of agricultural commercialization. To this end, it has been focused on the following aspects (*refer to Master Plan for Reinforcement of Agricultural Research & Experimental Services Activities*).

1) Unit yields of agricultural products, especially of staple food crops are stagnated, and an effectiveness of applied technology and financial investment (irrigation, farm inputs, labour works, etc.) is being balanced at a lower level, and as the results, production increment is becoming to a small extent.

Comment:

The above article caught only a surface of the present conditions of the crop production, shallowly, and accordingly, not directly applicable to the the Region. In fact, there are many positive problems for improvement even in the farming practices, for instance in paddy cultivation;

i) Planting system be shift to transplanting method from direct seeding method,
ii) Diversify the plant spacing to control adequate seedling population from the present dense seedling population,
iii) Planting the most active seedlings (18 to 20 day ages or 4 to 4.5 leaf stage),
iv) 4-split application of fertilizers at the most essential growing stages,
v) Use of appropriate farming tools, etc.

If the above problems are solved properly, rice production could be increased more than double to the present conditions.

For proceeding technical improvement or development as regards the production practices/technology for all of the diversified crops, there are two essential ways, namely:

- Technical improvement without (or to be not required) capital investment but crucially need "changing mind" of the local farmers; and

- Technical improvement/development with (or to be required) capital investment for facilitating to achieve the subjected target.

Amongst the farming practices and those related technology, the nursery preparation and planting works are the most essential key points for doing improvement of the present crop production. Even without capital investment, improvement of the farming practices would be effective enough for maintaining crop yield at reasonable level, and contributable to a financial amendment of the farm budget.

2) People of Vietnam are being successfully improved ones' living standard in performance of the socio-economic development, and in the said ways, it has been changing ones' favourite on food from the traditional simple product to sophisticated product, i.e. low-fat meat, quality fruits and vegetables, etc. A demand of such favourite food is also increased on a way where the marketing system is diversified from the traditional trade to a trade with large quantity unit in super-market, etc.

Comment:

To cope with the above demand, it should improve farming practices on crop production and/or fertilisation practices on livestock. Introduction of favourable varieties of crops and livestock is indispensable counter-solution, accordingly.

3) Rice has become a staple product for exportation. To maintain a reasonable export prices for rice, it is required to keep high enough quality and quantity since most Asian countries also achieved or nearly achieving self-sufficiency of rice, and rather over supply of rice in the international rice market, at present. Thus for producing the exportable rice continuously, it is crucially needed to breed new rice varieties to be favourable for international trade as well as to improve farming practices for not only maintaining a quality of product but also favourable balance I farming economy.

Comment:

At the first step, the farming practices for rice production should be satisfied through practical field experimental works. To maintain bargain force in rice trading field, it is also essentially needed to achieve reasonably high enough land productivity of paddy field through consolidation of farm plots as well as intensification of cropping using the diversified cash crops.

4) Since food supply conditions has been secured successfully and satisfactorily, it should control planting acreage of paddy. To this end, paddy so far planted in unfavorable area should be replaced, and diversify to more suitable-cum-profitable industrial crops

Comment:

In case of the Region, upland rice and maize should be cultivated within the gently slope land and/or plateau, and steep slope land should put under conservation measurement, such as reforestation, fruit tree plantation, bamboo plantation, etc. To this concern, it is recommendable that mulberry plantation and then promote sericulture would be one of the promising scheme specifically applicable to the Region.

5) Under the promotion campaign on farm inputs utilization, consumption of the chemical fertilizers and agro-chemicals are being gradually increasing, year and year, even in the Region, and as the results, the natural environment especially in the eco-river system is now facing a hazardous contamination. Accordingly, an eco-balance study as well as monitoring on farm input utilization should be programmed on and execute promptly.

Comment:

The subjected area (the Region) is located at the most upper-and middle-leaches of the Red River Basin that shall be a function for reserving the water resource for the great Hanoi city. Accordingly the water reservoir should keep free from the hazardous contamination even in a small part. Thus, to maintain the eco-system and making eco-balance between the natural environment and agricultural activities, satisfactorily and successfully, it should establish the specific crop production system and achieve production of a clean-cum-safe crop product using only the internal producers' inputs and natural resources available within the Region. Promotion of resources-cycle-utilization farming, which is practically use of the by-products of crop production, is highly contributable not only to effect for crop/soil fertilization in paddy cultivation but also upland crop production increase, livestock, poultry and fishery development, e.g., by returning straws and husks to uplands field as organic manure and/or mulching materials, and by feeding livestock, poultry and fishes with bran and fine broken rice, etc.

The Region plays an important role as one of the principal sources of domestic water supply for Hanoi and other urban centers. Therefore, special attention should be paid to water quality control by appropriate use of chemical fertilizers and biocides through improvement of farming techniques. In Vietnam, the on-farm cycle management of organic matters so-called the VAC system is widely known.

VAC is the abbreviation consisting of Vietnamese letters, i.e. *Vuon* (Garden), *Ao* (Pond) and *Chuong* (Stall). At individual farm level, recycle of organic matters are practices among vegetable gardening, animal husbandry and fish pond in order improve food security and farm family income. The VAC system also encourages effective use of organic matters such as by-products of crops and barnyard manures for promotion of organic agriculture in Vietnam.

(2) Agricultural Extension Services

Previously in Vietnam, the agricultural extension services to farmers were being undertaken by the Peoples' Corporation one's-self for maintaining crop production within its administrative territory. After structural break-up the Peoples' Corporation, the agricultural extension services system was fully stopped and suspended its function till 1992. The present agricultural extension service system was then established newly in conformity with the "Ordinance 13-CP" issued on March 1993. The followings are the present conditions of the agricultural extension services structures and its staffing.

Table 4.8.1 Employment of Extension Staff in Each Service Unit (unit: persons)

unit : persons

Extension Service Units	Respective Provinces			
	Lai Chau	Dien Bien	Son La	Hoa Binh
Provincial Extension Centre	20	17	36	18
District Extension Office	32	42	50	110
Commune Extension Office	75	81	218	214
Total	125	140	304	342
No. of Farm Households/Ex-staff	392	471	483	363

Source : Agricultural Statistics of respective 4 provinces,(2005)

Recently, the government has pursued restructuring of the administrative organisation and its staffing, and being under elaboration about privatisation of the technical services, in which it is scheduled to invite "volunteers" for staffing and apply a "reward system" in the technical services. Accordingly, it is untouchable to reinforce staffing for the present service system (Table 4.8.1).

In the study area, a presence of agricultural extension agencies is limited only 66% to the total communes. The extension agencies are the extension workers who are employed by each commune at the temporary-cum-short term contract bases. Commune could not employ more than one. Majority of these extension staff are not specialised as agricultural technician or agriculturalist; however, being entrusted to undertake mostly field inspection works, such as (i) growing conditions of each crop, (ii) seasonal appearance of insect and disease influences, (iii) climatic disaster and damages of properties, etc. Practical agricultural extension services are unfortunately absent in all the cases. Farmers contact with their commune extension agents irregularly at the rate of once to twice a year.

In the provincial DARD, the agricultural extension officers are also not directly engaging in the extension services, but concurrently hold two or more service jobs in usual. Eventually, the specialised extension staff is not all assigned as the extension officer in charge.

The Provincial Agricultural Extension Centre (PAEC) organises a short-term training courses 5 to 6 times a year for the extension staff of district and communes. The Department of Agricultural Extension (DOAE)

of MARD provides technical and administrative supervision services to this end. In close collaboration with Farmers' Union, Youth Union, Women' Union, etc. the district extension officer, who got training courses in the above, establish the "technical demonstration farm plots (TDFP)" and demonstrates subjected farming technology to propagation. In reality, however, establishment and then operation of the said TDFP is not equal to the scheduled plan in most cases due mainly to a lack of fund as well as shortage of technical knowledge and experiences.

It has been recognised that the agricultural extension services should be in onerous, and thus, the beneficiaries be liable for the cost of services that are provided either by the officers, researchers or extension workers. At present, a salary paid by the local government to the extension staff is VND300,000 to 500,000 per month. Accordingly, the extension staffs are much discouraging in deal with the said poor financial situations. The followings are the present constraints and/or problems lying in the practical operation and management of the agricultural extension services:

1) Shortage of extension staff:

As stated in the preceding paragraph, the government is now under restructuring of the local administrative organization and its staffing. Therefore, it is difficult to reinforce extension staffing at this moment. To this end, the government is being elaborated about a plan on privatization of the technical services, including such idea as "employment of volunteers for staffing" and "application of reward system to the technical services". Practically, no persons who own technical knowledge and skills for the extension services are available in the local area. Thus, the said privatization plan should review more precisely before step forwarding to execution.

2) A lack of incentives for extension services:

A lack of reasonable incentives for the extension services; as stated in the preceding paragraph, the monthly rate of salary to the extension staff is abnormally small at subsistence level at this time. The budget allocation to such related cost as transportation, communication, hotel accommodation allowance, etc. is also negligible small. For instance, the staff own motor-cycle shall be used for movement on field services; to this end, budget is allocated only for fuel supply but covering not fully for the total requirement. With such poor incentives, the extension staff never contact with a poor farmers, but frequently approaching to the rich farmers.

3) A lack of adequate agricultural technology and skill of extension staff

In performance of the current crop diversification campaign, it has appeared a deep gap (or mismatch) in between the own technology of extension staff and the technical demand of the beneficiaries. To cope with the said trouble, the provincial DARD organised the technical training courses for the extension staff; however, the transferred technology has been old enough and not sufficiently effective in many cases . On the contrary, it is highly required to introduce fresh technology, up-dated marketing information, processing technology, etc. so as to properly manage the commercial operation of the crop production under the marketing economy.

4) A lack of state budget for agricultural extension services:

At present, the extension services that are provided by the state government are too short to the total demand of services. These short portions are then supported by the informal sectors, such private organisation as Farmers' Union, Youth Union, Women Union, agricultural co-operatives, private agricultural enterprises, etc. In case of the private agricultural enterprises, the technical extension services is extended as a part of the commercial activities, and directly provided to the beneficiaries but limited only to the subjected crops production under the contract with the enterprises.

Other than the above, someone NGO also extends the services and either directly or indirectly assists the beneficiary farmers. For instance, Helvetas from Switzerland is being worked at Hoa Binh, and SNV from Netherlands is extending the extension technology at Son La, Lai Chau and Dien Bien.

4.8.3 Agricultural and Rural Credit Services

There are several credit organizations serving in rural areas. These are Vietnam Bank for Agriculture and Rural Development (VBARD) established in 1990 as a formal credit organization for agriculture development, and Vietnam Bank for Social Policies (VBSP), which is the former Vietnam Bank for the Poor (VBP), and started its operation in 2003.

VBARD has 91 branches and 513 district service points and recently opened service points at commune level. VBARD is preparing to sell shares to the public by the end of 2008 and expected to become a joint stock company. VBSP took over operation of its predecessor VBP financing for the poor. VBSP has 64 provincial branches, 597 district service points, and 8,076 transaction points in communes. VBSP also provides support for job creation activities by small-scale enterprises and financial support for tuition fee for the poor children. The table below presents lending performance for the last five years for VBARD and VBSP of Dien Bien Branches and shows that loan for the poor has been transferred from VBARD to VBSP since 2003.

Table 4.8.2 Last Five Years Performance of VBARD and VBSP Dien Bien Branches

VBARD Dien Bien Branch	2002	2003	2004	2005	2006
Total Lending Amount (Million VND)	415,111	569,668	538,769	706,237	833,933
Total Repayment Amount (Million VND)	322,869	516,579	742,448	694,064	781,598
Total Number of Borrowers	32,562	31,426	22,650	25,858	25,287
Share of the Poor Borrowers defined by MOLISA Standard	36%	22%	7.80%	0	0
VBSP Dien Bien Branch	2002	2003	2004	2005	2006
Total Lending Amount (Million VND)	62,360	48,136	108,558	129,411	140,172
Total Repayment Amount (Million VND)	46,011	42,960	33,489	49,100	61,740
Total Number of Borrowers	16,520	17,428	17,545	16,500	17,462
Share of the Poor Borrowers defined by MOLISA Standard	100%	100%	100%	100%	100%

Source: Hearing at VBARD and VBSP Dien Bien Provincial Branches, August 2007.

In Dien Bien Province, VBARD has 5-6 times of lending amount of VBSP. Nationwide, VBARD has capital of 267 trillion VND, while VBSP has about 5 trillion VND. In terms of capital amount, VBARD is overwhelming. However, VBSP plays very important roles in lending to the poor in Northwest Region, where the poverty rate exceeds 60%.

While the lending amount grew double in the past five years for both VBARD and VBSP, total number of borrowers has not been drastically changed. This indicates increase in lending amount per cusotomer. MOLISA's poverty definitions are revised according to national economic growth and inflation rate and the povery line tends to be raised nationwide. Thus, potential number of poor households entitled for VBSP lending services is expected to increase in Northwest Region where economic growth rate is relatively lower than in the other region, since poverty rate in the region is more likely to go up due to the revision of poverty definition by MOLISA.

The followings are lending conditions and procedures of VBSP.

VBSP Lending Condtions for the Poor Household

The following conditions are applicable for production activities in agriculture and animal husbandry, while VBSP carries other conditions for the purpose of house repair, electric equipment, water supply and flood damage recovery.

1) Households are included in the List of Poor Households at commune/ward/town under the poverty standard specified by MOLISA.

2) The borrowing poor households are not required to have collaterals and are exempted from administration fees upon conditions that they are members of and proposed by credit and savings groups

3) Loan Period: Short-Term (less than 1 year), Medium-Term (less than 5 years), Long-Term (more than 5 years)

4) Interest Rates: 0.6-0.65%/month or 7.2-7.8%/year (about half of VBARD), more difficult communes specified in Program 135 is offered at 0.45%/month. In case of overdue, 130% of initial rate unless overdued becasause of accidental forces.

5) Limit of the Amount: 30 million VND per household (In fact, short and medium-term loans with less than 10 million VND is the most popular)

VBSP Lending Procedures for the Poor Household

1) Poor households write the requests for borrowing and submit it to the Savings & Credit Group.

2) Savings & Credit Group selects the households to be entitled to borrow and submits the list of borrowers to the Commune Poverty Reduction Board and Commune People's Committee (CPC).

3) The Commune Poverty Reduction Board and the CPC certify and pass the list of poor households to VBSP for consideration

4) VBSP approves and announces to the CPC about the results of the approved list of borrowers, the schedule and location of disbursement and VBSP directly disburses to the borrowers.

It is concerned that the data of Dien Bien Province indicates greater gap between lending amount and repayment amount every year. Yet, according to the lending procedures mentioned above, series of checking functions such as loan application through the Savings & Credit Group, collective responsibility of the belonging village, prior check and approval by the CPC are likely to control credit losses.

4.9 Marketing System of Agricultural Products

In the Study Area, commercialization of the agriculture has been challenged by the state farms in plantation of such cash crop as tea, coffee, sugarcanes, etc. On the other hand, such traditional food crops as rice, cassava, sweet potatoes as well as the traditional industrial crops as cotton, hemp, etc., are being grown by the farmers for their self consumption. A small surplus from those crops is also consumed within a village and/or commune, and not commercialized practically.

Under socio-economic renovation to the Socialism Marketing Economy in the later 1980s, it has permitted to operate private farming by individual farmers, and then, being popularized commercialization of crop production at reasonably profitable bases. In the said ways, the government is being promoted crop diversification and propagated maize, soybeans, groundnuts, various species of fruits, etc. so as to develop farm household economy. As for such traditional food crops as rice, cassava, sweet potatoes, etc. the government also paid utmost effort for regularizing a commercialization of surplus products thereafter achievement of self sufficiency.

In 2000s, the Region has achieved food self sufficiency in response to the government subsidiary support in farm input supply. Accordingly, commercialization of the surplus food product is being accelerated in progress. F Since a lack of information on a quantity of product that is being actually traded on each trading route, it is so far difficult to grasp a total quantity of crop trade. The followings are the trading conditions very preliminarily assumed according to the information obtained from the local rice millers, crop processing factories in provinces, and intermediate buyers who engaging in crop trading.

1) As for the food production, almost 50% is purchased by the intermediate buyers at each farm gate, while about 40% is sold by individual farmers to the rice mills, maize flour mills, etc., and thus, trading in the central market in terms of the primary processed product. The marketing oriented co-operatives might so far handle as small as 5% or less. On the other hand, farmers directly access (street stall or stall in local market) to the consumers by themselves, and sell the product, representing about 5% of the total marketable product.

   The industrial crops subjected to commercialization are sold almost half (40 to 50%) to the intermediate buyers as similar ways to the food crops. The remaining half is then purchased by the

processing companies through their own collection routes.

2) Amongst the particular cash crops, the harvested tea leaves are all purchased by the state farm, and selling to the market thereafter processing at the own tea factories. In case of the Study Area, a greater part of the processed tea is exported to the neighboring countries, i.e., China, Laos, and Thailand.

3) Trade of sugarcane also made as the same to tea plantation. The state farm handles all the harvested cane, and processed at the own sugar factory. The refined sugar is then sold to the consumers through specific marketing channel. A greater part of the sugar product is also share to exportation for earning the foreign exchanges. Sugarcane grown in Lai Chau and Dien Bien provinces is consumed within the local market after processing the crude sugar (brown sugar).

4) Fruits and vegetables are in most cases purchased by the intermediate buyers at the farm gate. Only a small part is sold by farmers at the street stall or local market by themselves

4.10 Animal Husbandry

4.10.1 Animal Population

In Vietnam, various livestock such as cattle, buffaloes, horses, chickens, pigs, goats, ducks, and bees (beekeeping) is raised. The animal population of all over Vietnam are as shown in Table 4.10.1.

Table 4.10.1 Animal Population of Vietnam

	Buffalo (unit: thousand)	Cattle (unit: thousand)	Pig (unit: thousand)	Poultry (unit: million)
2000	2,897	4,128	20,194	196
2001	2,808	3,900	21,800	218
2002	2,815	4,063	23,170	233
2003	2,835	4,394	24,885	255
2004	2,870	4,908	26,144	218
2005	2,922	5,541	27,435	220
2006	2,921	6,511	26,855	215
Average	2,867	4,778	24,355	223

Source: Statistical year-book of Vietnam 2007

Main livestock in the North-western Region includes cattle, buffaloes, pigs, and poultry. Buffaloes and cattle are used as draft animal for farming practices and transportation, in addition to as meat and dairy sources. Meanwhile, pigs and chickens are kept for meat. According to agriculture and forestry statistics in 2005 (General Statistics Office), the livestock numbers at the end of fiscal 2005 are as shown in Table 4.10.2. Part of the table contents is complemented by the information obtained from each local province.

Table 4.10.2 Animal Population in the Northwestern Region (2005)

	Buffalo (unit: thousand)	Cattle (unit: thousand)	Pig (unit: thousand)	Poultry (unit: thousand)
Lai Chau	75.9	10.5	139.5	555.7
Dien Bien	93.7	24.1	192.4	1,050.1
Son La	135.3	107.2	443.1	3,190.4
Hoa Binh	121.0	57.1	371.3	3,169.0
Total	425.9	198.9	1,146.3	7,965.2

Source: Statistical year-book of Vietnam 2005

In each province, the numbers of buffaloes, cattle, and pigs show healthy growth every year. For poultry, the number thereof was once decreased due to the influence of avian influenza in 2004, but the number was recovered in next years up to the number in an average year. As long as the livestock is not largely influenced by livestock infectious diseases and as long as feed can be supplied, the livestock numbers can be further increased.

Meanwhile, agricultural works and transportation have been mechanized. Accordingly, buffaloes and cattle that have been raised as draft buffaloes and draft cattle are shifted to meat use. Further, people's standard level and diet modification have been improved. Thus, it is predicted that the meat consumption of each province will be increased. In the future, it is necessary to consider increasing the livestock numbers and improving sales and distribution of livestock and meat, in view of large consuming regions outside the relevant region as well.

4.10.2 Purposes and Practices of Animal Husbandry

In the North-western Region, the number of farm households specialized in livestock breeding is small, and the livestock numbers per one farm household are small. Buffaloes and cattle are bred as draft animals, and are used for cultivation and transportation of harvested products. The livestock number of pigs per one farm household is also small, and pigs are mainly bred for personal consumption. Part of the livestock is sold to local traders dealing livestock. Such livestock is slaughtered, sold and cashed in the market. Accordingly, as to the raising method, livestock is rarely raised in the livestock barn. Buffaloes and cattle are tied up in the yard or are left in the roadside or agricultural fields after harvest and freely fed. In the rainy season, they can take abundant grass. Meanwhile, in the dry season, they cannot take sufficient feed, and it is often the case that they hardly maintain or increase the weight. Pigs and chickens are generally range-fed.

In the future, it is expected that farm households projecting large scale breeding will be shown. For such large scale breeding, comprehensive knowledge of reproduction, fattening, and livestock breeding, and knowledge and techniques of feed production are required. In addition, it is necessary to fully pay attention to livestock hygiene and preventive actions for epidemic diseases.

When fattening livestock, it is important to secure introduced feeder's cattle and piglets, feed production, and a purchase route of purchase feed such as a feed mixture, and to secure purchasers of the livestock. It

is also important to pay attention to the stock market of the meat market in a large city such as Hanoi. That is, it is not possible to carry on large scale livestock breeding if focusing on selling livestock only in a local market as these days. In Dien Bien province, a pig farmer fattening 200 hybrid pigs, a farm household specialized in fattening 70 sows to breed piglets, and a farm household breeding 6 boars for artificial insemination such as Doric and Landrace exist. In addition, in the province, cost is reduced by adding self-made ground maize to the feed purchased from a feed company in farm households specialized in pig fattening.

4.10.3 Hygiene of Livestock

According to the information obtained from each local province, in the past 5 years, commencing with foot-and-mouth disease, avian influenza, anthrax, hog cholera (infectious disease designated as legally designated infectious disease in Japan) were broken out almost every year. In particular, foot-and-mouth disease is spread around each local province. Each province strives to implement vaccination to prevent the disease, but no preventive effects have been shown. Foot-and-mouth disease is scaring worldwide, since once foot-and-mouth disease is broken out, cloven-hoofed animal in the vicinity of the outbreak source is subject to infection. When infected livestock (cattle, pigs, goats and the like) are not dead, a farm household having no knowledge of livestock infectious diseases does not pay attention thereto, resulting in further spreading the disease around the farm household. In each province, when the infected livestock is slaughtered and disposed, about 50% of the current price of the disposed livestock is compensated to the relevant farm household. However, damage to the livestock breeding farm household is enormous, leading to national loss.

In recent years, livestock infectious diseases have gotten into the media or the like, and thus the citizens have recognized such diseases. However, accurate information on the outbreak state of livestock infectious diseases and the economical loss due to the outbreak thereof is not sufficiently given to the citizens. The survey target regions are under the same conditions. The economical loss due to livestock infectious diseases is major in the entire livestock breeding industry.

In each province, vaccination is implemented twice a year to take a preventive action for livestock infectious diseases. However, the vaccination seems to be insufficient, and thus infectious diseases are sporadically broken out in various regions every year. As the traffic sector is developed, livestock infectious diseases may influence not only the adjacent countries but also all the countries of the world. Therefore, in the future, it is necessary to further take a preventive action for livestock infectious diseases. Specifically, it is necessary to implement the following actions. Vaccine manufacturing facilities should be expanded and increased. People having knowledge, techniques, and experiences on preventive actions for livestock infectious diseases should be grown. Preventive actions for livestock infectious diseases such as complete vaccination for all livestock should be implemented. In addition, it is necessary to collect information from locality such as a commune, record the result, and establish the system with which such resultant data is usable in a long range.

In the adjacent countries, China, Laos, and Cambodia, livestock infectious diseases such as foot-and-mouth disease have been broken out seriously. Therefore, it is also necessary to cooperate with these surrounding countries to completely take a preventive action together. Lai Chau has a border with China and Laos. Dien Bien and Son La have a border with Laos. Therefore, such provinces should closely exchange information on livestock infectious diseases with these countries to implement preventive actions for livestock infectious diseases together with these countries.

4.10.4 Feed Production

Feed mixtures should be transported from remote regions such as Hanoi. Therefore, the feed mixtures are expensive and thus the usage amount is small. The survey relevant regions include feed factories in 3 provinces of Dien Bien, Hoa Binh, and Son La (Moc Chau). The feed factory in Bien Dien province is a joint feed company with China (Viet-Trung Animal Feed Company). This company produces feed for pigs, chickens, and fish made of local produced maize and cassava, and sells it to local purchasers and surrounding each province. In Hoa Binh province, Tuan Mins Company was established at the end of 2006. In Son La province, there is a factory to produce feed for dairy cows (daily output: about 10 tons) of Moc Chau Cattle Breeding Co.

Meanwhile, out of the farm households that breed livestock, there are some cases of adding self-made ground maize to purchased feed such as the above-mentioned pig fattening farm household, or there are some cases of growing pasture glass in fields such as a cattle fattening farm household. However, in general, in almost all farm households, they directly supply vegetable wastes, crop wastes, maize, cassava, rice straw and the like to livestock, or livestock takes weeds in the roadside. Supplying feed with considering nutrition and feed efficiency is not generally made.

4.10.5 Artificial Insemination and Breed Improvement

For beef cattle and dairy cows, in Moncada artificial insemination center of Viet-Nam Ruminant Breeding Company, livestock breed improvement has been implemented by producing cattle frozen semen, or by importing frozen semen from abroad and thereby creating a crossbred with a Vietnam local breed. In Moncada artificial insemination center, in the past, breed improvement was made by crossing between a Vietnam local breed and a foreign large-sized breed with the use of pellet type frozen semen. In the center, breed improvement for dairy cows was also made by crossing the Holstein and a local breed to increase the milk amount. In recent years, the center is supported by JICA (from September, 2000 to September, 2005) to change their method to straw type frozen semen method being in widespread use worldwide. In the straw type frozen semen method, the each original bull can be individually recognized. While maintaining the apparatuses, the facilities, and the high technology, the center produced about 0.8 million pieces of frozen semen and supplied them throughout the nation last year.

In the center, commencing with 7 Holstein seed male bulls imported from the USA and Australia, 67 seed male bulls in total including 44 Brahman bulls exist. Further, in March 2007, the center planned to import 10 beef type cattle bulls, and exported about 0.25 million pieces of frozen semen to China, Laos, and

Cambodia. In this fiscal year, the center plans to further increase the production up to 1 million pieces of frozen semen. Currently, the center sells the frozen semen at 17,000 VND/piece domestically. The average technical fee of an artificial insemination operator is 50,000 VND per one artificial insemination.

For large scale pig farming and broiler chicken farming, grand parent stock pigs and grand parent stock broiler type chickens are introduced with the aid of capital investment from foreign companies and Vietnamese companies to implement large scale fattening (meat production) business.

4.10.6 Livestock Products and Market Distribution

In developed countries, there are regularly held livestock markets in which live cattle and live pigs are dealt with the use of "auction" Vietnam has no livestock market, and thus livestock is not dealt with the use of "auction" However, in Vietnam, the following traders exist:

1) Livestock traders who regularly come to farm households
2) Traders who assemble live cattle and live pigs in the specified place in each region, send them as meat use to urban areas such as Hanoi, and sell them
3) Traders who assemble pigs, self-slaughter them, and then sell the pork meat in the market or the like
4) Traders who buy piglets from other province vaccinate and habituate them, and sell them to local pig farmers

As above, in each province, livestock dealing is made in various forms.

In Ho Chi Minh City, there is a governmental modern slaughter house. In other regions, there are only small size private slaughter houses that do not satisfy the minimum meat hygiene and the minimum safety standards. Thus, in such regions, there is no sufficient hygiene management from assembling live livestock, slaughtering it, to selling it in the market. They say regulations on conditions of installing a slaughter house, a meat processing plant and the like, processing conditions, and meat inspection; or legal rules for inspections, supervision, guidance and the like exist. However, meat inspectors in each province do not observe slaughtering and only inspect the actual product in the market. Despite this, they receive 5,000 VND as an inspection fee from a distributive trader, and give a permit for the sale of the actual product to the distributive trader (in the case of Hoa Binh province). In result, self slaughter is daily made at their house back yard in various regions. The self-slaughtered meat is sold as meat in the meat shop space of the market for ordinary people.

4.10.7 Dairy Farming

As Vietnamese eating habit has been changed and improved, dairy products have been increasingly demanded. In the past, supplying the dairy products depended on importing them from Australia. However, since 2001, Vietnamese government has aimed at improving the self-sufficiency rate of dairy products, has promoted dairy farming, and has promoted expansion of dairy products consumption. With the aid of JICA's technical cooperation, the plan for improving product techniques of dairy farming has been already implemented. The project target regions of the plan include the Moc Chau dairy farming

region in Son La province. In addition to Son La province, several hundreds of dairy cows are milking in Hoa Binh province. Meanwhile, in the other 2 provinces out of the survey target regions, they are not much interested in dairy farming.

4.10.8 Support Service

(1) Animal health center

In each local province, the animal health center is arranged. In the center, veterinarians and collage-educated staffs are working mainly on prevention of livestock infectious diseases. In Son La province, a district veterinary station exists instead of the animal health center. In the entire province, there are about 120 relevant people including Vet-Shop staff. Veterinarians are assigned as follows: 18 for the province, 67 for the districts, and 35 for the Vet-Shop.

The animal health center in Dien Bien province has a district animal health station in each district. The numbers of staffs working on business are 59 in total, including 19 veterinarians and 35 animal health technical staffs. Their main business is taking preventive actions for livestock infectious diseases. Twice a year (March, April and September, October), vaccination is made. Such vaccination includes foot-and-mouth disease vaccination for cattle and pigs, cattle pasteurella infection vaccination, cattle blackleg vaccination, anthrax vaccination, and hog cholera vaccination. As for livestock infectious diseases such as foot-and-mouth disease, preventive actions have given good results and the number of infectious diseases has been decreased. However, it is difficult to eradicate infectious diseases for the following reasons. Since a personal in charge at the work site still lacks knowledge and experiences, the person in charge has a problem to diagnose the infectious diseases. Further, since the site where an infectious disease is broken out is located in an inconvenient place, discovering the infectious disease is delayed. Furthermore, the preventive actions do not establish into the mountains area. In the province, technical experts have been trained in 93 communes, but approximately one third only thereof has been completed.

Lai Chau province has the animal health center, and the districts have the animal health station. In the center, 3 veterinarians and 7 animal health technique staffs are assigned. In each station, 1 veterinarian and 1 animal health technical staff are assigned.

(2) Promotion of livestock industry technique

It is needless to say that for developing livestock industry, promotion staffs working on the front lines are required. Each province is trying to train promotion staffs and make them acquire knowledge and skills in order to promote appropriate promotion activities. However, knowledge, skills, and experiences necessary for the promotion staffs in livestock industry are manifold. It takes a lot of time to acquire such knowledge, skills, and experiences. In addition, it is difficult to promote the business without win farmers' trust. Therefore, in each province, the number of the promotion staffs specialized in livestock industry is small yet. Out of the survey target provinces, some provinces (Lai Chau province and Son La

province) have no promotion staffs specialized in livestock industry.

4.10.9 Environmental Issues

As livestock breeding has been developed, there is a fear of environmental pollution. In the past, a problem occurs as follows. In southern Vietnam, Mekong Delta, the number of pigs was increased but the excrements disposal capacity was ignored then. In result, the excrements were accumulated, produced a bad odder, and were flown into the Mekong River. However, in the survey target regions, there are no companies or large farm households that fatten lots of livestock, and thus there has been no problem. Farmers are not conscious of environmental pollution, and thus buffaloes, cattle, pigs, and chickens that are left in the field discharge untreated excrements everywhere. In the future, consideration should be given as follows. That is, leaving livestock in the field should be changed to feeding in the shed. In the shed feeding method, the excrements should be effectively used (home gas by a bio digester, production of organic soil and the like). Currently, the JOCV members dispatched to Hoa Binh are in charge of promotion.

4.11 Inland Fishery

4.11.1 Overview of Fisheries in Vietnam

In 1995 to 2004, landings of capture fisheries increased less than twice folds, while production of aquaculture forth folds. In total, the production of fisheries increased to twice folds in the past ten years in Vietnam (Table4.11.1, Table4.11.2).

Table 4.11.1 Comparison of Production in Agriculture, Forestry and Fisheries

Unit: 1000 ton

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Capture fisheries	1,195.3	1,278.0	1,315.8	1,357.0	1,526.0	1,660.9	1,724.8	1,802.6	1,856.1	1,940.0
Aquaculture	389.1	423.0	414.6	425.0	480.8	589.6	709.9	844.8	1,003.1	1,202.5
Total	1,584.4	1,701.0	1,730.4	1,782.0	2,006.8	2,250.5	2,434.7	2,647.4	2,859.2	3,142.5

Source: Statistical Year Book of Vietnam 2005

Table 4.11.2 Landings of Capture Fisheries and Aquaculture

Unit: million VND

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Capture fisheries	10,884.4	12,016.8	12,944.1	13,938.8	14,737.7	15,356.6	15,848.2	17,279.7	19,706.6	10,884.4
Aquaculture	5,260.9	5,499.0	6,362.9	6,803.9	11,761.2	16,842.2	21,282.6	26,184.8	34,271.1	5,260.9
Total	16,145.3	17,515.8	19,307.0	20,742.7	26,498.9	32,198.8	37,130.8	43,464.5	53,977.7	16,145.3

Source: Statistical Year Book of Vietnam 2005

In the past ten years, proceeds of the capture fisheries increased to less than twice folds, but that of aquaculture to sixth folds. This demonstrates that aquaculture proceeds may contribute too much compared with proceeds of capture fisheries in the total proceeds of fisheries sector.

(1) Marine fisheries and inland fisheries

Landing of marine fisheries occupies about 90 % of total landings of Vietnam fisheries. Landings of inland

fisheries might mainly be based on aquaculture (Table4.11.3).

Table 4.11.3 Comparison of Landings of Marine and Inland Fisheries

Unit: 1000 ton

Year	Marine catch	Inland catch	Total
1995	990.3	205.0	1,195.3
1996	1,058.7	219.3	1,278.0
1997	1,098.7	217.1	1,315.8
1998	1,155.2	201.8	1,357.0
1999	1,314.6	211.4	1,526.0
2000	1,419.6	241.3	1,660.9
2001	1,481.2	243.6	1,724.8
2002	1,575.6	227.0	1,802.6
2003	1,647.1	209.0	1,856.1
2004	1,733.4	206.6	1,940.0

Source: Statistical Year Book of Vietnam 2005

4.11.2 Policy of Ministry of Fisheries

The master plan of the fisheries development as approved by the prime minister in January of 2006, aquaculture production should reach 980,000 ton. Land of aquaculture area should reach 600,000 ha. About fifth folds of the aquaculture production has been proposed, so the strong support is directed to the aquaculture activity in these years.

Regarding the fish processing, capacity of equipment for frozen fishes should be 3,500-4,000 ton per day, which is parallelly proposed with new technology and new facilities. And until 2010 safety, hygiene and fish pathology should be in accordance with that of the world standard. Diversity of fish processing products and high value added fresh products should be highly required and export products should increased to obtain US$400 million with export quantity of 891,000 ton.

Regarding the Northwest and Central Highlands, aquaculture especially for that in the reservoirs should be highly developed and the VAC system should be extended to produce Tilapia, giant prawn, common carp and grass carp.

4.11.3 Assistance to Fisheries Sector

(1) Japan

The past and on-going technical assistance provided by JICA are presented in Table 4.11.4, one fisheries resources survey, one expert dispatch, one fisheries port and one research station. This survey is the first assistance to both in the fisheries and in the Region. The SEAFDEC (Southeastern Fisheries Development Center) office is located in Haiphong and JIRCAS is jointly studying the fisheries resources with Cantho University. OFCF is dispatching an expert at the RIA 3 in Nha Trang (Table 4.11.4).

Table 4.11.4 JICA Assistance to Fisheries Sector

year	Contents	Field
1998	Fisheries resources survey in the off shore area	Fisheries resources
1999	Construction of Catlo fisheries port, Bung Tau	Infrastructure
2000	Dispatch of expert	Technical Transfer
2004	Construction of Aquaculture research station in Nha Trang	Infrastructure

Source: the JICA Study Team

(2) Other Foreign Donors

Assistances form the foreign donors other than Japan are listed in Table 4.11.5.

Table 4.11.5 Fisheries Sector Support from Other Donors

Year	Donors	Contents
1986-1997	UNDP/FAO	Strengthen research capacity, develop an extension network for the promotion of low-cost aquaculture to small scale farmers
1995-	AIT/SIDA	Extend on-farm research to integrated agriculture-aquaculture systems in Red River Delta
1997-	AIT/SIDA	Support a dialogue with the northern mountain provinces to introduce the potentials of such technologies for poverty alleviation
1998-	NORAD	Capacity building to support poverty issues in rural and coastal areas
1999-	UNDP/FAO	Follow a more participatory approach in three northwest highland provinces
2000-	AIT/SIDA	Following UNDP approach
2000-	DANIDA	Provide broad support to the fisheries sector, with poverty alleviation as one core objective
2000-	NACA、OFID、FAO	Aquaculture for sustainable livelihood development, regional network
2000-	ACIAR etc.	Small-scale research projects to support the small scale aquaculture

Source: Le Than Luu (Sustainable aquaculture for poverty alleviation)

4.11.4 Fisheries in the Northwestern Region

(1) Landings of the Region

The landings are 6,988 tons in total which is only about 0.2% of total landings of this country. The reason might be only inland fisheries and promotion of aquaculture is only poorly developed.

Table 4.11.6 Landings of the Region

Unit: ton

	2,000	2,001	2,002	2,003	2,004
Dien Bien	527.0	603.0	640	373	632
Lai Chau				297	638
Son La	2,181	2,335	2,942	3,065	3,205
Hoa Binh	1,291.0	1,734.0	2,048	2,334	2,513
Northwest total	3,999.0	4,672.0	5,630	6,069	6,988
Whole country	2,250,499.0	2,434,649.0	2,647,408	2,859,200	3,142,478

Source: Statistical Year Book of Vietnam 2005

(2) Proceeds of capture fisheries and aquaculture in the Region

Proceeds of both capture fisheries and aquaculture are about 0.05%, quite low level in this country. Capture fisheries is most high in Son La, which might be from the reservoir fisheries. In Lai Chau and

Dien Bien province, the proceeds of the capture fisheries is small despite the existence of three big rivers. In aquaculture proceeds, again the Son La province if highest followed by Hoa Binh (Table4.11.7 and Table 4.11.8).

Table 4.11.7 Precedes of the Capture Fisheries in the Region

Unit: ton

	2,000	2,001	2,002	2,003	2,004
Dien Bien	195.0	151.0	150.0	67.0	70.0
Lai Chau				83.0	94.0
Son La	543.0	622.0	694.0	684.0	772.0
Hoa Binh	346.0	432.0	483.0	534.0	549.0
Northwest total	1,084.0	1,205.0	1,327.0	1,368.0	1,485.0
Whole country	1,660,904.0	1,724,758.0	1,802,599.0	1,856,105.0	1,939,992.0

Source: Statistical Year Book of Vietnam 2005

Table 4.11.8 Proceeds of Aquaculture in the Region

Unit: ton

	2,000	2,001	2,002	2,003	2,004
Dien Bien	332.0	452.0	490.0	306.0	452.0
Lai Chau				214.0	544.0
Son La	1,638.0	1,713.0	2,248.0	2,381.0	2,433.0
Hoa Binh	945.0	1,302.0	1,565.0	1,800.0	1,964.0
Northwest total	2,915.0	3,467.0	4,303.0	4,701.0	5,503.0
Whole country	589,595.0	709,891.0	844,809.0	1,003,095.0	1,202,486.0

Source: Statistical Year Book of Vietnam 2005

(3) Fish suitable for pond aquaculture in the northwest

Chinese common carp, Bighead carp, Grass carp, and Indian carp are suitable for pond aquaculture in the northwest. Characteristics of each fish are as follows. All the photographs were taken during this Master Plan Study.

1) Chinese common carp

Vietnamese: Ca chep Scientific name: *Cyprinus carpio*

This fish can be found in Europe and Asia. Carp in Japan originally came from China in the 14th century. It is omnivorous and strong against dysoxic (not enough oxygen) water. It grows fast and tastes good. It is benthic with habitable temperature of 3 to 35 degrees Celsius. Habitable water area is wide, and prefers water area that is deep and has flow of warm water. Its breeding season is from spring to summer, and the eggs are attached to plants. 50 cm-long female lays 3,000 eggs. It can grow up to 120 cm, but the ones for commercial sale are less than 50 cm long.

Fry production of this fish is generally easy. Although viral carp herpes is a big cause for concern, possibility of outbreak in the northwest is low because fries do not come from outside regions. It has

high resistance to general fish diseases. Quality of fish meat is high and it is favored by people.

2) Bighead carp

Vietnamese: Ca me Scientific name: *Aristichthys nobilis*

It is one of the four major fish in China. Its place of origin is China and it transmigrated to Laos, Thailand and Cambodia. It is an important fish for farming. It is animal plankton-eating fish and grows fast. It can grow up to 110 cm, but the ones for commercial sale are less than 50 cm. It is characterized by big head and big eyes. Production of fries is rather difficult.

Quality of fish meat is high. It is favored by local people and eaten often. It maintains firmness even if it is cooked in soup. Resistance to diseases is high. It is plankton-eating fish, thus at a low tropic level.

3) Grass Carp

Vietnamese: Ca tram Scientific name: *Ctenopharyngodon idella*

It is one of the four major fish in China. Its place of origin is China and it is spread out all the way to the Amur river basin. It is grass-eating fish. Lately it has been widely believed that grass carp cannot break cellulose. However, this is not understandable, considering the fact that it grows fast. It can be used to exterminate water hyacinth. Habitable water area is wide, and prefers water area that is deep and has flow of warm water. It can live in water of temperature between 0 to 38 degrees Celsius. It lays eggs in water area with fast flow. It can grow up to 150 cm, but the ones for commercial sale are less than 70 cm. Production of fries is fairly easy.

Quality of fish meat is high. It is favored by local people and eaten often. It maintains firmness even if it is cooked in soup. Resistance to fish diseases is rather low, but can be solved by management of water quality and prevention measures. It is a host of protozoan parasites, and the parasites may spread out by transmigration. It is grass-eating fish, thus at a low tropic level.

4) Indian carp

Vietnamese: Ca troi Scientific name: *Labeo rohita*

It originated in India, and can be found in Pakistan, Bangladesh, Myanmar and Nepal.

It transmigrated to Southease Asia. It lay between 300,000 to 2.8 million eggs in monsoon season. It is grass-eating fish and grows up to 200 cm. Production of fries is fairly easy.

Quality of fish meat is high. It is favored by people and eaten often. It maintains firmness even if it is cooked in soup. Resistance to fish diseases is rather low, but can be solved by management of water quality and prevention measures. It is grass-eating fish, thus at a low tropic level.

(4) Seeds production and their distribution to farmers in the northwest

Nature of the seeds production in the northwest is 1) water is cold and pure, 2) hatchery stations are recently constructed with recent-most technology and techniques, 3) staffs of the stations are young. This nature also indicates that staffs do not have high skills and director class persons do not have experience to manage the stations.

In Dien Bien, there are one public station and four private stations.

The seeds production started only this year and at present staffs are energetically doing the seeds production of Tilapia, Oreochrmois niloticus. Pairs of adult fishes are put into the hatching tank and females spawn and males let the eggs be fertilized. Larvae are aggregated in the bottom tanks. After absorbing the yolk, post larvae are transferred to the small pans and they are fed by primary foods made of cereals. When they grow up to juveniles, they are transferred to nursery ponds. Farmers come to stations to buy those seeds in the nursery ponds.

As explained in the former sentences, the following facilities and equipments are necessary for the hatchery station.

Facility: stock ponds for adult fishes; hatchery tanks; area for primary foods for larvae and juveniles; house for staffs to stay during the hatching of larvae; storage. Equipments: seine net to catch adult fishes; iron cages for hatchery tank; small mesh to catch larvae; pans for larvae and juveniles; oxygen cylinders to put oxygen in the bag transferring the juveniles. The number of staffs of the station is eight. They received training at the Research Institute of aquaculture 1 in the Bac Ninh province, so they have high experience in the technique for seeds production. Staffs of the private hatchery stations have more skills for seeds production.

Prices of the seeds are shown in Table 4.11.9 in which weight of one individual will be 10g. Farmers will come to the stations to buy seeds. Or, intermediate persons transfer the seeds to the communes. There is not data for the number of fingerlings since the seeds production in the public station has been just started.

Table 4.11.9 Price of fingerlings

Fish	value（VND/kg）
Tilapia	15,000
Indian carp	30,000
Grass carp	50,000
Common carp	30,000
Bighead carp	80,000

Sizes of the private hatchery stations are not large. Larvae are kept in the nursery tanks with water hyacinths and transferred to the juvenile tanks when they grow.

There is no concern for water temperature using the water from streams, which are suspected to be 25 to 30 degrees Celsius. For the survival of the larvae, Oxygen demand (DO= Dissolved oxygen) will be more than 3.0 mg/L which are already available.

There are one public hatchery station and seven private ones in the Lai Chau province. The public station is now under the construction and will be completed in the spring of 2009. The owner of a private hatchery station has high skills in the seeds production and he produces 1 ton of fingerlings every month. He is respected by the staffs of the fisheries department of DARD. The owner of the hatchery station in the Tam Duong district also produces plenty of fingerlings. Only available data for seeds production in the Lai Chau province is 1 ton per one month.

There are one public and 13 private hatchery stations in the Son La province. 42 million of fingerlings are produced by the public station which reaches half of the total production of the fingerlings in the province.

There are three public hatchery stations and one private one in the Hoa Binh province. New public station is now under construction. After the completion of the new station, it may provide total demand of seeds in the province.

4.12 Agricultural Industry

4.12.1 Industries and Employees

The industrial sector in the North-western Region is still in developing. Apart from agro-industry, limited number of small enterprises is operational in construction materials (sand and aggregates), wooden products (furniture), daily commodity production, pulp, etc. The total number of enterprises and employees are 1,044 and 51,000 respectively as presented in Table 4.12.1.

Table 4.12.1 Enterprises in North-western Region

Description	Lai Chau Province	Dien Bien Province	Son La Province	Hoa Binh Province	Total of 4-Provinces	Total of Vietnam	Share of 4-Provinces in Vietnam
Nos. of enterprises	129	251	274	390	1,044	91,755	1.1%
Nos. of employees(as of the end of 2004)							
Nos. of employee	4,338	12,413	14,663	19,941	51,355	5,770,201	0.9%
Ratio of employees in total population (%)	1.4%	2.8%	1.5%	2.5%	2.0%	6.9%	

Description	Lai Chau Province	Dien Bien Province	Son La Province	Hoa Binh Province	Total of 4-Provinces	Total of Vietnam	Share of 4-Provinces in Vietnam
Average capital amount of enterprises (as of the end of 2004)							
unit: Billion VND	301	1,967	2,529	1,801	6,598	1,966,163	0.3%
Net sales amount (as of the end of 2004)							
unit: Billion VND	317	1,397	1,580	1,824	5,118	1,719,401	0.3%
Direct investment project from overseas (2005)							
Number of investment		1		2	3	970	0.3%
Sum of investment (Billion US$)		0.1		4.2	4.3	6,839.8	0.1%

Source: Statistical Yearbook of Vietnam 2005, Statistical Publishing House

The scale of enterprises in the North-western Region is micro to small. Because of lack of statistical data and information, further study is required to verify their current position. Apart from forestry products, agro-industry including rice milling, flour milling, tea processing, coffee processing, sugar processing and bamboo pulp, etc. was studied. Details are mentioned below.

4.12.2 Rice Milling

Rice (paddy) production status of 4 provinces in 2005 is shown in Table 4.12.2.

Table 4.12.2 Rice (paddy) Production in the Region in 2005

Description	Lai Chau Province	Dien Bien Province	Son La Province	Hoa Binh Province	Total of 4-Provinces	Total of Vietnam	Share of 4-Provinces in Vietnam
Rice (paddy, ton)	92,722	127,536	128,202	192,216	540,676	35,790,800	1.5%

Source: Statistical Yearbook of Vietnam 2005, Statistical Publishing House, etc.

Common feature regarding rice processing industry in 4 provinces is that the large scale rice milling plant is very few, and almost of all rice is processed by small scale rice mills having capacity of less than 1ton paddy per hour, which are operated in the villages. About 80% of rice milling machines of such small scale rice mills is simple one box type and remaining 20% is integrated type rice mill which can process higher quality rice compared with one box type.

Above small rice milling machines are usually purchased and operated by individual farmers who have financial muscle comparatively. Such farmers not only process his own produced rice but other farmers' rice who don't have rice milling equipment by getting milling charge. Some rice millers sometimes purchase paddy from other farmers, and resell it to middle man of the paddy, they can be called as "Rice Miller-cum-Middle man".

In 4 provinces, especially Lai Chau and Dien Bien provinces, since road condition etc. are severe by the geographical feature, transportation of paddy and/or milled rice is difficult. Therefore processing and distribution of agricultural products within the area is the main current.

Under the present circumstances, self-consumption rates of rice are high especially among the farmers of a mountain slope, and they probably not feel the necessity of increase of the milled rice quality.

However, when rice will be sold in order to obtain a money income, the rice milling facilities which can produce higher quality of rice should be prepared. However, the improvement of these processing equipments cannot be made independently. It can accomplish with an improvement of infrastructures, such as road and electricity, and will be synchronized with carrying out of synthetic rural-community infrastructure building.

Almost same amount of required volume of rice is produced in Lai Chau and Dien Bien provinces, and it seems that there is no transfer to out of provinces not much. By the Son La province and the Hoa Binh province, production of rice does not fulfill consumption but is considered that a considerable amount of rice is flowing in from other provinces.

In Dien Bien province, the value-added "Dien Bien rice" which has good taste and high quality is successful as top-grade rice, and is lengthening distribution and sale in many fields including capital Ha Noi. The centers of production of "Dien Bien rice" are Dien Bien district and Tran Giao district, and the high quality brand rice is mainly milled and processed by following large scale plants.

1) Dien Bien Industrial Tree Co., Ltd.: Former state-operated factory and now semi-privatized company. 1,500 ton of milled rice is processed per year and sold as Dien Bien rice in 3wholesale shops in Ha Noi.

2) Agricultural Engineering and Construction Company: Modern rice milling plant has been installed and began the operation, with daily processing capacity of 8 ton.

Although in 4 provinces, mainly one-box type small-scale rice milling machines are used, the point that all use the rubber roll-type rice milling machine is very much characteristic, and no Engelberg type milling machine (husking and rice milling are performed at the same process, and it causes high broken rice ratio and quality of rice decreases) was seen.

A rubber roll type rice-milling machine is used also in a remote area to ensure higher quality rice. This is the one good example of the long history of rice of Vietnam.

4.12.3 Flour Milling Industry

Maize production of 4provinces in 2005 is shown in Table 4.12.3.

Table 4.12.3 Maize Production in the Region in 2005

Description	Lai Chau Province	Dien Bien Province	Son La Province	Hoa Binh Province	Total of 4-Provinces	Total of Vietnam	Share of 4-Provinces in Vietnam
Maize (ton)	28,574	49,066	228,030	96,778	402,448	3,756,300	10.7%

Source：Statistical Yearbook of Vietnam 2005, Statistical Publishing House etc.

Like rice milling industry, it is dotted with many small flour mills having milling capacity of about 1 ton/hour. The owner of a small flour mill is owner of a small rice-polishing machine simultaneously in many cases. In Dien Bien Phu, a joint venture with People's Republic of China is operating the

animal-feed production plant of 5,000 to 7,000 ton of annual output which is made from the main material of maize. In Son La province, the animal-feed production plant of 7,500 ton of annual output is in operation.

4.12.4 Tea Processing

Status of tea processing industry of 4provinces in 2005 is shown in Table 4.12.4.

Table 4.12.4 Status of Tea Processing Industry in the Region in 2005

Description	Lai Chau Province	Dien Bien Province	Son La Province	Hoa Binh Province	Total of 4-Provinces	Total of Vietnam	Share of 4-Provinces in Vietnam
Processed Tea (ton)	4,126	138	20,553	0	24,817	106,840	23.2%

Source: Statistical Yearbook of Vietnam 2005, Statistical Publishing House etc.
Note: Total processed tea production in Vietnam is calculated from weight of fresh tea leaves (534,000ton) based on the processing yield of 20%

Features of tea industry of each province are as follows;

Son La province: The largest tea production province in 4 provinces. There are 20 tea processing factories in province. Out of them, 6 factories are managed by government and remaining 14 are joint ventures of 50% of the Vietnam domestic capital and 50% of overseas capital.

Lai Chau province: In recent year national tea farm is divided into a small unit, and each farming family is performing contract farming and management. A state farm buys the fresh tea leaves which contract farming family produced as a crude material, and make them into green tea. Tea processing is performed in 100 or smaller scale house industry, besides seven larger processing plants. The main processing plants under operation are as follows

1) San Thang Tea Factory: Private tea factory in Lai Chau suburbs. The raw tea of annual 2,000 ton is processed and it ships as a finished product of 400 ton.
2) Tam Duong Tea Factory: Management of DARD Lai Chau. 5,000 to 7,000 ton of fresh tea leaves are processed annually. Half processed product is shipped to Kim Anh Factory of Ha Noi, and also final products which are manufactured in-house are shipped.

4.12.5 Coffee Processing

Coffee is produced in Son La and Dien Bien provinces. Status of coffee production of both provinces in 2005 is shown in Table 4.12.5.

Table 4.12.5 Status of Coffee Processing Industry in the Region in 2005

Description	Lai Chau Province	Dien Bien Province	Son La Province	Hoa Binh Province	Total of 4-Provinces	Total of Vietnam	Share of 4-Provinces in Vietnam
Coffee (ton)	0	347	3,022	0	3,369	767,700	0.4%

Source： Statistical Yearbook of Vietnam 2005, Statistical Publishing House etc.

Most of coffee from Vietnam is produced in the central highland now, and the majority variety is Lobster,

because the climate condition of high temperature and humidity of the central highland is suitable for cultivation of the Lobster variety.

On the other hand, the northern-part of Vietnam has climate condition of cold in winter season and a lot of rain which is suitable for cultivation of Arabica variety. Although the history of the coffee cultivation in the northwestern part is short and is small, the production increase of Arabica variety which has a high added value is desirable.

Features of coffee processing industry in both provinces are as follows.

Province	Features
Son La	• Largest coffee production province in 4 provinces. About 3,000 to 4,000ton of green coffee (processed coffee before roast) is produced per year. • Cong Ty CAFE Vay An Qua Son La Company in Son La town is managed by provincial government and largest processing factory in province. About 25% of green coffee is processed by this factory and all products are exported, as USA, Germany and Japan etc.
Dien Bien	• Coffee cultivation and production has just started. • Nursery coffee trees are planted mainly on Tuan Giao and Dien Bien district, and production increase is aimed.

Most of coffee processing factory in object area is using the wet processing method during the process from fresh fruit coffee into coffee with husks (called parchment coffee). Although this method has an advantage to process coffee beans into high quality compared with the dry processing method, however the sewage is generated in this process. It is necessary to take a suitable management measure so that the waste water may not flow out to the exterior.

4.12.6 Sugar Processing

Status of sugarcane production of 4provinces in 2005 is shown in Table 4.12.6.

Table 4.12.6 Status of Sugarcane Production in the Region in 2005

Description	Lai Chau Province	Dien Bien Province	Son La Province	Hoa Binh Province	Total of 4-Provinces	Total of Vietnam	Share of 4-Provinces in Vietnam
Sugarcane (ton)	7,666	350	152,436	389,275	549,727	14,730,500	3.7%

Source: Statistical Yearbook of Vietnam 2005, Statistical Publishing House etc.

A considerable amount of sugarcane is grown in 4 provinces with Hoa Binh province as a center. However as a result of the downturn of sugar price in recent years causing the fall of a sugarcane price, and the farmer's motivation for the cultivation have been lose and planted area is decreasing. In Hoa Binh province, there is sugar processing factory having capacity of 700 to 1,000 ton on material sugarcane. Approximately 11,000 ton of crude sugar was produced in 1999/2000 season. Son La province is a 2nd largest production area of sugar in 4 provinces. In the Hat Lot area along the national-highway No.6, the sugar processing plant with capacity of 1,500 t (crude-material sugarcane weight) is working.

4.12.7 Paper/Pulp Manufacturing

Other than the paper-manufacturing from the wood, manufacturing of paper material is also done by using

the bamboo as material. A fiber is extracted from a bamboo and from it material for a paper manufacturing is processed. It is used as pulp for a paper manufacturing. Other than the paper material, this also used as the material of corrugated roofing sheet like a slate, after mixed with cement. In the suburbs of Dien Bien town, Agricultural Engineering & Construction Co. operates the processing plant in which about 1,500ton of the paper material is produced per year. Moreover, Key Son area in Hoa Binh, Vietnam National Paper Corporation is operating the bamboo paper factory.

In the production process of the paper pulp from the bamboo, sodium hydroxide etc. are used. Such chemical should not be discharged to outside of the factory as drainage. It is not thought that the wastewater treatment etc. is performed in fact now, but it is necessary to fully implement an environmental measure from now on.

4.12.8 Others

Other than the above main products processing, following small-scale processings are performed in some provinces.

1) Production of the tapioca starch from cassava.
2) Production of the starch from the root stock of edible canna. The produced starch is mainly used as a crude material of noodles.
3) Processing of cardamom, a kind of spices.
4) Dry processing of bamboo shoot.
5) Manufacture of dry fruits and fruit wine, etc.

In Lai Chau province, cardamom is one of the most important agricultural product and also important export product. The volume of production is also increasing with cultivation area. The status of the cardamom production in Lai Chau province is as in Table 4.12.7.

Table4.12.7 Status of Cardamom Production in Lai Chau Province in 2005

Description	2004	2005
Cultivated area (ha)	1,582	1,950
Production (ton)	302	336

Source: A Report on Vietnam Northwest Border Trade Situation, JICA Viet Nam, 2007

4.13 Forest Conservation and Forest Utilization

4.13.1 Recent Status of Forest Sector in Vietnam

(1) Status of forests

Forest areas in Vietnam is estimated as 12,616,700 ha, which is 37% of total land area, as of December 2005 (Decision No.1970/QD/BNN-KL, dated on 6 July, 2006). Forests in Vietnam are categorized into three (3) management classifications as regulated by the Article 4 in the amended Law on Forest Protection and Development (No. 29/2004/QH11), as follows:

1) Production forests: Forests which are used mainly for production and trading of timber and non-timber forest products in combination with protection, thus contributing to environmental protection.
2) Protection forests: Forests which are used mainly to protect water sources and land, prevent erosion and desertification, restrict natural calamities and regulate climate, thus contributing to environmental protection,
3) Special-use forests: Forests which are used mainly for conservation of nature, specimens of the national forest ecosystems and forest biological gene sources; including national parks, nature conservation zones, and sanctuaries, managed by MARD. Scientific researches and service of recreation are permitted in the special-use forests.

Forest areas by forest categories are shown in Table 4.13.1.

Table 4.13.1 Forest Areas by Forest Categories in 2005

Unit: ha

Forest Classification	Special-Use Forests	Protection Forests	Production Forests	Total
Total Forest Areas(ha)	1,929,304	6,199,682	4,487,714	12,616,700
Natural Forests	1,849,049	5,328,450	3,105,674	10,283,173
Artificial Forests	80,255	871,232	1,382,040	2,333,526
Ratio (%)	15.3	49.1	35.6	100.0

Sources: Decision No. 1970/QD/BNN-KL dated 06/7/2006 of the Minister of MARD on announcement on national forest status in 2005

The transition of forest areas in Vietnam is shown in the Table 4.13.2. The areas of natural forests gradually decreased up to 1990s, and are gradually increasing by the latter 1990s. From 1990s, forestation activities have been implemented in active way, and forest coverage ratios in the whole country are increasing, accompanying with increment of reforestation areas.

Table 4.13.2 Transition of Forest Areas in Vietnam

Unit: Million ha

Year	Forest Category		Total	Ratio to Total Land Area (%)
	Natural Forests	Artificial Forests		
1943	14.0	0	14.0	43.0
1976	11.077	0.092	11.169	33.8
1980	10.486	0.422	10.608	32.1
1985	9.892	0.584	9.892	30.0
1990	8.430	0.745	9.175	27.2
1995	8.252	1.050	9.302	28.1
1999	9.470	1.524	10.995	33.4
2002	9.865	1.919	11.784	35.8
2004	10.088	2.219	12.307	37.3
2005	10.283	2.334	12.617	37.0

Sources: For data between 1943 to 2002: NATURAL ENVIRONMENT & FOREST DATA IN VIETNAM, Forest Sector Manual、Hanoi、August 2003; for data between 2004 to 2005: MARD(2005)Decision No. 1116/QD/BNN-KL dated 18/5/2005 of the Minister of MARD on gazettement of forest area and unused land nationwide in 2004, and MARD(2006)Decision No. 1970/QD/BNN-KL dated 06/7/2006 of the Minister of MARD on announcement on national forest status in 2005.

Forests are distributed in different ratio by regions; highest in the Central Highland Region, continuing from the northern areas to the South Central Coast Region. Forest ratios are low in the Red River Delta Region, South East Region and Mekong River Delta Region (Table 4.13.3).

Table 4.13.3 Forest Distribution in Vietnam (2005)

Unit: ha

Region	Total Geographical Areas by Region	Forest Category		Total Forest Area (ha, %)	
		Natural Forests	Artificial Forests		
Red River Delta	1,262,544	49,702	45,504	95,206	(7.5)
North East	6,598,826	2,231,174	824,938	3,056,112	(46.3)
North West	3,733,675	1,376,952	100,924	1,477,876	(39.6)
North Central Coast	5,151,713	1,999,855	484,840	2,484,694	(48.2)
South Central Coast	4,466,539	1,448,666	315,108	1,763,774	(39.5)
Central Highland	5,451,217	2,827,342	144,393	2,971,735	(54.5)
South East	2,356,083	292,038	164,591	456,630	(19.4)
Mekong River Delta	3,999,015	57,446	253,227	310,672	(7.8)
Total	33,019,611	10,283,173	2,333,526	12,616,699	(38.2)

Sources: MARD(2006)Decision No. 1970/QD/BNN-KL dated 06/7/2006 of the Minister of MARD on announcement on national forest status in 2005

(2) Forest Utilization

According to the Statistical Year Book of Vietnam 2005, timber yield volumes increase from 2000 to 2005 in the whole country. However, timber yield volumes in the Region are decreasing in these 6 years (Table 4.13.4).

Table 4.13.4 Timber Yield Volume of Vietnam

Unit: 1,000 m^3

Region	Year					
	2000	2001	2002	2003	2004	2005
Red River Delta	133.0	117.5	112.7	98.4	93.1	99.6
North East	489.1	519.7	530.0	525.2	638.5	719.2
North West	245.5	247.4	207.3	185.0	171.3	171.4
North Central Coast	237.0	235.2	226.8	293.6	292.2	296.6
South Central Coast	275.9	278.3	314.3	324.9	428.9	490.5
Central Highland	372.8	395.2	419.8	313.0	324.1	286.3
South East	160.0	145.1	132.7	113.9	110.6	86.2
Mekong River Delta	462.3	458.8	560.4	581.8	569.1	553.2
Total	2,375.6	2,397.2	2,504.0	2,435.8	2,627.8	2,703.0

Source: Statistical Year Book of Vietnam 2005

Transition of output value of forestry in Vietnam (constant 1994 price) is shown in the Table 4.13.5.

Table 4.13.5 Output Value of Forestry in Vietnam (constant 1994 price)

Unit: BillionVND

Region	Year					
	2000	2001	2002	2003	2004	2005
Red River Delta	259.0	237.0	228.7	210.4	206.1	224.3
North East	1,761.1	1,786.9	1,816.9	1,854.9	1,895.6	1,912.4
North West	719.8	638.2	641.2	657.1	633.2	640.4
North Central Coast	1,112.3	1,158.8	1,180.9	1,210.2	1,217.9	1,233.2
South Central Coast	416.7	441.9	459.6	477.0	489.8	501.5
Central Highland	404.5	463.5	473.3	453.4	456.2	441.9
South East	345.6	367.7	377.5	379.1	370.9	384.6
Mekong River Delta	882.6	920.0	929.5	932.7	972.7	979.0
Total	5,901.6	6,014.0	6,107.6	6,174.8	6,242.4	6,317.3

Source: Statistical Year Book of Vietnam 2005

(3) Forest-Related Industries

Forest-related industries shown in the Statistical Year Book 2005 of Vietnam are manufacture of wood and wooden products, paper and paper products and furniture. Gross outputs of each industry have been doubled in value, and output of furniture manufacturing increases the number in four. However, the output of furniture manufacturing accounts for approximately 4% of all the industries, and the total outputs of forest-related industries occupy approximately 11% of the total (Table 4.13.6).

Table 4.13.6 Industrial Output at Current Prices by Industrial Activity

Unit: Billion VND

Kinds of Industries	Year			
	2000	2002	2003	2004
Wood and wooden products	6,059.3	8,587.0	11,249.0	14,786.8
Paper and paper products	6,086.1	9,163.3	11,440.4	15,210.6
Furniture	7,435.5	12,971.6	20,719.7	30,356.7
Sub-total of forest-related industries	30,101.4	48,055.9	66,430.4	92,781.0
Total of all the industries	336,100.3	476,350.0	620,067.7	808,958.3

Source: Statistical Year Book of Vietnam 2005

(4) Shortcomings in Forest Sector

Shortcomings and weaknesses for forest sector are mentioned in the Vietnam Forestry Development Strategy 2006-2020 (MARD, 2007), as follows:

i) Although the forest area is increasing, the quality and biodiversity of the natural forests in many locations have been continuously reduced.
ii) The growth of the forestry sector is low and unsustainable.
iii) Although the timber processing industry has developed rapidly in recent year, it is still ad hoc and unstable. No trademarks have been established in the international market.
iv) The impacts of forestry sector on poverty reduction are still limited.

4.13.2 Forest Status in the Study Areas

(1) Forest Areas

The Region is located on the eastern slope of Annamite Mountains, so that main parts are high mountainous areas and large areas of natural forests are distributed. Forest areas in the Region are 1.47 million ha in 2005, and forest coverage ratio is approximately 40% (Table 4.13.7).

Table 4.13.7 Forest Areas in the Region from 2003 to 2005

Unit: ha

Year	Geographical Areas	Forest Areas				Unused Land and Mountainous Areas	Other Landuse	Forest Coverage Ratio (%)
		Total	Natural Forest	Artificial Forest				
				Sub-total	Under 3 years			
Dien Bien								
2003	955,411	367,398	356,173	11,225	1,336	411,642	176,371	38.5
2004	955,411	367,681	356,242	11,439	445	411,217	176,513	38.5
2005	955,410	372,030	360,082	11,948	1,227	406,787	176,592	38.9

Year	Geographical Areas	Forest Areas				Unused Land and Mountainous Areas	Other Landuse	Forest Coverage Ratio (%)
		Total	Natural Forest	Artificial Forest				
				Sub-total	Under 3 years			
Lai Chau								
2003	906,512	302,559	289,465	13,094	1,375	483,379	120,574	33.4
2004	906,512	318,466	303,758	14,708	1,615	467,255	120,791	35.1
2005	906,512	332,111	315,747	16,364	3,568	453,480	120,921	36.6
Son La*								
2003	1,405,500	494,561	468,609	25,952	4,256	383,212	527,727	35.2
2004	1,405,500	526,722	497,429	29,293	4,345	389,427	489,351	37.5
2005	1,405,500	571,069	550,921	20,148	4,065	342,271	492,160	40.6
Hoa Binh								
2003	466,252	197,449	150,867	46,583	5,514	128,859	139,944	42.3
2004	466,253	200,210	150,267	49,943	4,593	126,082	139,961	42.9
2005	466,253	202,666	150,202	52,464	14,081	124,431	139,155	43.5
Total of the Region								
2003	3,733,675	1,361,967	1,265,113	96,854	12,481	1,407,092	964,616	36.5
2004	3,733,676	1,413,079	1,307,696	105,383	10,998	1,393,982	926,615	37.8
2005	3,733,675	1,477,876	1,376,952	100,924	22,940	1,326,970	928,829	39.6

Source: MARD(2005)Decision No. 1116/QD/BNN-KL dated 18/5/2005 of the Minister of MARD on gazettement of forest area and unused land nationwide in 2004, MARD(2006)Decision No. 1970/QD/BNN-KL dated 06/7/2006 of the Minister of MARD on announcement on national forest status in 2005

Note*: Son La province pointed out the forest coverage be 43%, instead of 41%.

Approximately 33% of land areas in Dien Bien are natural forests and over 35% of land areas in Dien Bien, Lai Chau and Son La provinces are natural forests, including bamboo forests and rattan forests. On the other hands, relatively low lands are distributed in large extent in Son La and Hoa Binh provinces, that are located eastern parts of the Region, so that there can be seen large extent of agricultural fields. Rocky mountain forests, bare lands and denuded hills are distributed in Dien Bien and Son La provinces with over 40% in areas, and approximately 30% of land areas in Lai Chau are grass lands and areas of reeds.

Forest coverage ratios in all the four provinces increase gradually, and go up to 43% in 2005 in Hoa Binh. Natural forest coverage ratios there are between 30% and 40%. Regarding artificial forests, Hoa Binh province has 11% of artificial forest ratio, whereas other three provinces have only 1% of artificial forest ratios. That is because three provinces other than Hoa Binh province are located in the hilly-mountainous regions, so that ratio for unused lands and mountainous lands are high (Dien Binh: 43% and Lai Chau: 50%) and other usage, including agricultural field, are high (Son La: 35% and Hoa Binh: 30%).

Summarized forest areas by land categories and forest functions in the Region are shown in Table 4.13.8 (details are shown in Attachment 4.4). Regarding forest functions, the protection forests, such as watershed protection forests, are distributed in more than double compared with the national average (about 41%) in the Region. Areas of production forests, however, are lower than the national average in the three provinces other than Hoa Binh province. That is because those large extents of areas have hilly-mountainous geographical features, so those large amounts of areas are not suitable for planting production forests. There can be found wide areas without any tree vegetation, therefore high potential to reforestate is recognized in the Region.

Table 4.13.8 Forest Areas by Land Categories and Forest Functions in Four Provinces in 2005

Forest and land category	Total (ha)	Divided by functions (ha)		
		Special-use	Protection	Production
Dien Bien				
Physical area	955,409.7	-	-	-
I. Forested land	372,030.1	112,477.5	258,521.2	1,031.4
A. Natural forests	360,081.6	112,477.5	247,604.1	-
B. Plantations	11,948.5	-	10,917.1	1,031.4
II. Bare land, denuded hills	406,787.2	-	406,787.2	-
III. Other land types	176,592.4	-	-	-
Lai Chau				
Physical area	906,512.3	-	-	-
I. Forested land	332,110.6	33,360.1	273,125.9	25,624.6
A. Natural forests	315,747.2	33,360.1	260,343.0	22,044.1
B. Plantations	16,363.4	0.0	12,782.9	3,580.5
II. Bare land, denuded hills	453,480.1	48,930.2	242,015.4	162,534.5
5. Invaded sandy and mud area	0.0			
III. Other land types	120,921.6	-	-	-
Son La				
Physical area	1,405,500.0	-	-	-
I. Forested land	571,069.0	55,072.1	479,080.6	36,916.3
A. Natural forests	550,920.7	55,043.1	466,018.8	29,858.8
B. Plantations	20,148.3	29.0	13,061.8	7,057.5
II. Bare land, denuded hills	342,271.3	25,532.8	184,557.8	132,180.7
III. Other land types	492,159.7	-	-	-
Hoa Binh				
Physical area	466,253.1	-	-	-
I. Forested land	202,666.3	20,201.3	141,019.5	41,445.5
A. Natural forests	150,202.1	19,589.6	119,340.1	11,272.4
B. Plantations	52,464.2	611.7	21,679.4	30,173.1
II. Bare land, denuded hills	124,431.4	2,740.1	72,069.0	49,622.3
III. Other land types	139,155.4	-	-	-

Source: Source: MARD (2006) Forest Plan for Forest Area and Unused Land

(2) Plantation and Tending

Main activities in plantation and tending works in the Region are planting to the protection forests and production forests (Table 4.13.9).

Table 4.13.9 Plantation and Tending Activities in the Region from 2003 to 2005

Unit: ha

Year	New Plantation (ha)					Assisted Natural Reforestation ＋Enrichment	Tending (ha)		
	Total	Special-Use Forest	Protection Forest	Production Forest	Industrial Plantation		Total	Assisted Natural Reforest.	Protection
Dien Bien									
Total	9,187	0	6,871	2,316	0	360	39,910	32,670	7,240
2003	3,600	0	3,257	343	0	0	7,338	5,519	1,819
2004	3,632	0	2,832	800	0	0	11,877	11,080	797
2005	1,955	0	782	1,173	0	360	20,695	16,071	4,624
Lai Chau									
Total	7,914	0	4,769	3,145	0	22,147	196,960	100,053	96,907
2003	4,003	0	1,946	2,057	0	20,717	70,242	28,250	41,992
2004	1,588	0	1,313	275	0	1,350	72,081	38,258	33,823
2005	2,323	0	1,510	813	0	80	54,637	33,545	21,092
Son La									
Total	14,065	183	7,727	6,155	0	4,284	702,622	109,489	593,133
2003	6,205	0	3,137	3,068	0	1,984	221,833	11,473	210,360
2004	4,488	0	2,526	1,962	0	2,300	227,063	37,546	189,517
2005	3,372	183	2,064	1,125	0	0	253,726	60,470	193,256
Hoa Binh									
Total	15,722	178	8,800	6,744	0	4,162	235,538	17,605	217,933
2003	6,120	148	1,691	4,281	0	1,349	75,287	7,180	68,107
2004	6,615	30	5,322	1,263	0	1,710	74,974	4,507	70,467

Year	New Plantation (ha)					Assisted Natural Reforestation ＋Enrichment	Tending (ha)		
	Total	Special-Use Forest	Protection Forest	Production Forest	Industrial Plantation		Total	Assisted Natural Reforest.	Protection
2005	2,987	0	1,787	1,200	0	1,103	85,277	5,918	79,359
Total of the Region									
Total	46,888	361	28,167	18,360	0	30,953	1,175,030	259,817	915,213
2003	19,928	148	10,031	9,749	0	24,050	374,700	52,422	322,278
2004	16,323	30	11,993	4,300	0	5,360	385,995	91,391	294,604
2005	10,637	183	6,143	4,311	0	1,543	414,335	116,004	298,331

Source: MARD, 7-2006

(3) Timber production

Timber production in the Region is 171,400 m^3 in volume and approximately 6% of national production volume (Table 4.13.10). Timber production in Vietnam is gradually increasing, whereas those of the Region are decreasing. That is because i) harvesting from the natural forests are decreasing, ii) artificial forest ratios are smaller than the national average, and iii) many areas of artificial forests have not yet reached to the cutting period as most of artificial forests planted there are young forests.

Table 4.13.10 Wood Production in the Region

Unit: 1,000 m^3

Province	Year				
	2000	2001	2002	2003	2004
Dien Bien	108.6	113.9	117.8	61.5	63.7
Lai Chau				11.9	9.7
Son La	87.1	67.6	47.6	57.5	54.1
Hoa Binh	49.8	65.9	41.9	54.1	43.8
Northwest total	245.5	247.4	207.3	185.0	171.3
Whole country	2,375.6	2,397.2	2,504.0	2,435.8	2,627.8

Source: Statistical Year Book of Vietnam 2005

(4) Non-Timber Forest Products (NTFPs)

Typical non-timber forests products (NTFPs) in the Region are shown in Table 4.13.11. Main NTFPs there are bamboos (materials for construction and paper making and fresh/ dried bamboo shoots), rattans (materials for handicrafts) and reeds (materials for making brooms). Tree fruits, such as Hat Trẩu, for extracting oil for cosmetics, vine trees, such as Huyết giác and Thien nhien kien, and lac for materials for making lacquer are also produced there. However, as there are fewer facilities to process those materials in the Region, almost all those materials are now transported to sell to the neighboring provinces , such as Hanoi, and so on, as raw materials.

Table 4.13.11 Typical Non-Timber Forest Products in the Region

Category	Vietnamese Name	Outline	Dien Bien	Lai Chau	Son La	Hoa Binh
Food	Măng khô	Dried bamboo	＋	＋		＋
	Sat truc	Small bamboo	＋			
Medicine	Sa Nhân		＋	＋		
	Huyết giác (dây máu chó)	Kinds of vines	＋	＋		
	Khuc khac		＋			
Oil	Hạt trẩu	Tree fruits	＋	＋		
Resin	Cánh kiến	Lac. Lac insects are the must.	＋	＋		

Category	Vietnamese Name	Outline	Dien Bien	Lai Chau	Son La	Hoa Binh
Materials	Song mây	Rattan	+	+		
	Tre nứa	Bamboo pulp	+	+	+	+
	Bông chit	Reed. Materials for making broom				+

Source: Interviews to each Sub-DOF (DARD)
Note: "+" in the above table indicates materials, which are managed by Sub-DOF of each province, by issuing licenses to collectors. In fact, many other kinds of materials are produced in each province which are difficult to grasp the production volumes, as the Sub-DOF do not manage.

Production volume of fuelwoods and bamboos for construction and paper-making materials in the Region are shown in the tables below (Table 4.13.12 and Table 4.13.13). Production of fuelwoods is relatively stable in these years. Production volume of bamboos for construction, paper-making materials and handicrafts is increasing in Dien Bien, whereas is unstable in Son La and Hoa Binh.

Table 4.13.12 Production of Fuelwoods in the Region

Unit: 1,000 Ste

Province	Year					
	2000	2001	2002	2003	2004	2005
Dien Bien	N.A	520.195	551.407	568.0	596.3	631.6
Lai Chau	N.A	N.A	N.A	692	707	721
Son La	1,319.6	1,369.7	1,397.9	1,485.6	1,425.6	1,394.7
Hoa Binh	1,156	1,006	963	1,206	1,066.2	1,250.0
Northwest total	(2,475.6)	(2,895.9)	(2,912.3)	3,951.6	3,795.1	3,997.3

Source: Statistic Year Book, 2005, of each province

Table 4.13.13 Production of Bamboo (Tre, Nua, Luong) in the Region

Unit: 1,000 pieces

Province	Year					
	2000	2001	2002	2003	2004	2005
Dien Bien	N.A	4,131	4,713	4,851	5,046	5,267
Lai Chau	N.A	N.A	N.A	1,405	1,434	1,463
Son La	5,549	6,887	7,084	5,836	5,415	5,099
Hoa Binh	9,526	9,100	10,500	6,100	5,952	7,142
Northwest total	(15,075)	(20,118)	(22,297)	18,192.0	17,847.0	18,971.0

Source: Statistic Year Book, 2005, of each province

Conditions and features of NTFPs in the Region are as follows:

Dien Bien province

1) Edible bamboos are produced in some amount every year with varying in quantity. Dead bamboo stands are scattered about the mountains after flowering.
2) Bamboos for construction and processing and rattans are produced in some amount every year with varying in quantity. Dead bamboo stands are scattered about the mountains after flowering.
3) Lac production is increasing recently. That is because that host trees, such as Cọ khiết (*Delbergia hupeana*), have been planted in large areas and the areas of stands of host trees that grow enough to be able to produce lac are increasing.
4) Production of Bông chit (*Thysanolaena maxima*), kinds of reeds, is increasing. As Bông chit is one of vegetation which grow after harvesting of trees, relationships between varying in areas of forests and production of Bông chit should be taken into consideration.

Lai Chau province

1) Edible bamboos are produced in some amount every year with varying in quantity. Dead bamboo stands are scattered about the mountains after flowering.
2) Production of bamboos for construction and processing are increasing rapidly in recent years. That is because that production of bamboo pulps are increasing, accompanying with improvement of capacity of factories for making bamboo pulps. Dead bamboo stands are scattered about the mountains after flowering.
3) Lac production is increasing recently.
4) Productions of many kinds of NTFPs, which are not managed by responsible organizations in other provinces, are managed by Sub-DOF in Lai Chau province.

Son La province

1) Production of bamboos is managed by Sub-DOF by issuing licenses for exploitation. Productions of NTFPs other than bamboos are not managed by any organizations, including Sub-DOF, so that it is difficult to grasp the quantity of production and distribution.
2) Production of lac and oil-producing trees, such as hat trau, has beed decreasing, because of decrement of demands of them.

Hoa Binh province

1) Production of bamboos is managed by Sub-DOF by issuing licenses for exploitation. Productions of NTFPs other than bamboos are not managed by any organizations, including Sub-DOF, so that it is difficult to grasp the quantity of production and distribution.
2) Production of brooms made by Bông chit is very popular activity in Hoa Binh, so that produced brooms are exported to the South-East Asia countries, China and Europe.

Except some activities, such as production of Lac and Huyết giác (Máu chó) in Dien Bien, production of NTFPs are not main income sources and remain as supplementary income sources.

(5) Forest-related industries

1) Forest-related industries in the Region

Forest-related industries shown in the Statistical Year Book 2005 of each province are manufacture of wood and wooden products, paper and paper products and furniture (Table 4.13.14). Manufacturing furniture is increasing stably within these industries. Ratios of manufacturing furniture in three provinces rather than Hoa Binh province are between 3.5% in Lai Chau and 5.4% in Dien Bien. Ratio of manufacturing furniture is quite low (0.8%), but gross production of manufacturing furniture in Hoa Binh is more than those in other three provinces and is increasing in quantity. According to the report from RENFODA project (2006), bamboos in Hoa Binh are used to produce furniture in Ha Tay province under the license of IKEA, which is Swedish Furniture Company, and exported to Europe.

Table 4.13.14 Industrial Output at Current Prices in the Region

Unit: Million VND

Kinds of Industries	Year					
	2000	2001	2002	2003	2004	2005
Dien Bien						
Wood and wooden products	N.A.	7,038.0	8,142.0	3,340.0	2,223.0	3,483.0
Paper and paper products	N.A.	0.0	0.0	270.0	1,320.0	1,546.0
Furniture	N.A.	19,328.0	18,839.0	22,879.0	26,075.0	29,860.0
Sub-total of forest-related industries	N.A.	26,366.0	26,981.0	26,489.0	29,618.0	34,889.0
Total of all the industries	N.A.	261,523.0	314,593.0	386,254.0	462,107.0	556,017.0
Lai Chau						
Wood and wooden products	N.A.	N.A.	N.A.	348.0	377.0	1,120.0
Paper and paper products	N.A.	N.A.	N.A.	0.0	466.0	39.0
Furniture	N.A.	N.A.	N.A.	1,813.0	2,567.0	2,600.0
Sub-total of forest-related industries	N.A.	N.A.	N.A.	2,161.0	3,410.0	3,759.0
Total of all the industries	N.A.	N.A.	N.A.	50,253.0	66,385.0	74,838.0
Son La						
Wood and wooden products	1,300.0	2,979.0	2,850.0	7,365.0	10,751.0	6,939.0
Paper and paper products	0.0	0.0	1,202.0	293.0	0.0	0.0
Furniture	10,729.0	10,681.0	12,890.0	21,857.0	25,302.0	28,561.0
Sub-total of forest-related industries	12,029.0	13,660.0	16,942.0	29,515.0	36,053.0	35,500.0
Total of all the industries	213,668.0	261,936.0	304,035.0	451,347.0	525,589.0	670,997.0
Hoa Binh						
Wood and wooden products	16,306.0	13,716.0	21,740.0	36,654.0	31,795.0	47,251.0
Paper and paper products	13,102.0	8,105.0	16,715.0	19,985.0	19,844.0	25,096.0
Furniture	20,758.0	18,970.0	18,014.0	37,450.0	31,321.0	35,772.0
Sub-total of forest-related industries	50,166.0	40,791.0	57,543.0	95,650.0	83,594.0	109,154.0
Total of all the industries	3,866,032.0	4,084,954.0	4,118,972.0	4,469,404.0	4,709,054.0	4,676,460.0

Source: Statistic Year Book, 2005, of each province

2) Forest-related industries and industries for NTFPs in Son La province

Present status of wood processing facilities in Son La province is shown in Table 4.13.15, according to DARD Report No. 42/BC-SNN dated on 29 March 2007 on statistics of timber and non-timber products processing workshop. There are 195 numbers of wood processing facilities in Son La province licensed by Sub-DOF of Son La province, in which five are managed by cooperatives and rest of them are by individuals.

Table 4.13.15 Wood processing facilities in Son La province in 2006

SN	Name of District	Number of Timber Processing Places	Total Volume of round wood (m^3)			Total human labor	Total practical production capacity (m^3/y)	Export to foreign countries (USD)
			Total	Imported Products	Local products			
1	TX. Son La	27	1,374.54	144	1,230.54	110	3,805	-
2	Muong Lay Dis.	19	212.00	0	212.00	53	212	-
3	Quynh Nhai Dis.	8	690.00	0	690.00	42	690	-
4	Yen Chau Dis.	24	566.00	0	566.00	51	566	-
5	Phu Yen Dis.	33	416.00	0	416.00	84	5,045	-
6	Moc Chau Dis.	15	408.00	0	408.00	72	283	-
7	Thuan Chau Dis.	14	283.00	0	283.00	39	283	-
8	Bac Yen Dis.	4	85.00	0	85.00	8	85	-
9	Sop Cop Dis.	6	270.00	0	270.00	23	130	-
10	Song Ma Dis.	33	476.00	0	476.00	68	374	-
11	Mai Son Dis.	12	121.20	0	121.20	31	121	-
	Total	195	4,901.74	144	4,757.74	581	11,594	0

Source : Son La DARD (2007): DARD Report No. 42/BC-SNN dated on 29 March 2007 on statistics of timber and non-timber products processing workshop

Practical production capacities of most facilities are relatively small, from 3 to 40 m^3, and numbers of labors are between 1 from 5, mainly. There can be found 6 numbers of large facilities with practical production capacity of over 100 m^3. However, there are many factories/ workshops of which volumes of round wood for processing are quite small, as compared with the practical production capacities. Average rate of operation for the factories with practical production capacity of over 100 m^3 is 19%, whereas 42% in total (Table 4.13.16). Regarding facilities for processing NTFPs, it is reported in the same report that there are no facilities to process NTFPs in Son La province.

Table 4.13.16 Wood Processing Facilities in Son La Province in 2006
(over 100m³/y Production Capacity)

SN	Name of District	Number of Timber Processing Places	Total Volume of round wood (m^3)	Total human labor	Total practical production capacity (m^3/y)	Rate of Operation (%)
1	TX. Son La	1	1,011.54	30	3,000	34%
		1	27.56	3	100	28%
3	Quynh Nhai Dis.	1	200.00	7	200	100%
		1	150.00	4	150	100%
5	Phu Yen Dis.	1	60.00	5	800	8%
		1	4.00	15	3,500	0.11%
Total over 100m^3/y		6	1,453.10	64	7,750	19%
Total below 100m^3/y		189	3,448.64	517	3,844	90%
Total		195	4,901.74	581	11,594	42%

Source: Son La DARD (2007): DARD Report No. 42/BC-SNN dated on 29 March 2007 on statistics of timber and non-timber products processing workshop

4.13.3 Natural Condition of the Study Area

(1) Site Condition

1) Special-Use Forests in the Region

Special-use forests in Vietnamese forest classification consist in the national parks, nature conservation areas and landscape protection areas, according to the Law on Forest Protection and Development in 2005. In advance, BirdInternational in Indochina and MARD[2] assigned 15 numbers of existing and proposed protected areas in the Region in 2002. MARD also developed guidelines on the management of protected areas, including the special-use forests, by formulating the management strategy of protected areas[3] in 2003. In the management strategy, 12 numbers of special-use forests in total, including 3 numbers of National Parks and 9 numbers of Nature Conservation Areas, were mentioned in the management stratedy as existing and proposed special-use forests. Activities in the special-use forests are strictly restricted by many kinds of regulations, including the Law on Forest Protection and Development. However, in the fact, people are living inside the special-use forests, and many areas are used as agricultural fields. In addition, conditions on production forests and protection forests also have been changed. Therefore, current conditions of the special-use forests differed from the existing data and information, the Forest Protedtion Department (FPD) in MARD has conducted to review the special-use forests in Vietnam

[2] BirdLife International in Indochina and MARD (2002) Sourcebook of Existing and Proposed Protected Areas in Vietnam: Second Edition
[3] Management Strategy for a Protected Area System in Viet Nam to 2020

in 2006. According to the review[4], eleven numbers of special-use forests are assigned in the Region. Existing and proposed special-use forests mentioned in the report by BirdInternational in Indochina and MARD, the management strategy and the review in the Region are summarized in Table 4.13.17. Existing and proposed special-use forests in the Region mentioned in the report by BirdInternational in Indochina and MARD are shown in Figure 4.13.1

Table 4.13.17 Existing and Proposed Special-use Forests in the Region

I. National Park

M.S (2003)	B.I. (2002)	Review (2006)	Name	Location	Area (ha)	Description
2	-	-	Ba Vi	Ha Tay, Hoa Binh	12,023	Evergreen forest on low mountains; main flora, *Libocedrus macrolepis*, *Podocarpus neniifolius*, and endemic primate species, Tonkin Snubnose: *Pygathrix avunculus*
12	-	-	Cuc Phuong	Ninh Binh, Thanh Hoa, Hoa Binh	22,200	Primary forest on limestone mountains. Diverse flora and fauna; Delacour's Langur (*Semnopithecus francoisi delacouri*)
13	+	-	Hoang Lien	Lao Cai、	28,500	Evergreen forest on highest mountain in Viet Nam. Many threatened and endemic gymnosperm species and precious medicinal plants; *Hylobates concolor* and endemic bird species.
13	+	-		Lai Chau	7,500	

II. Nature Conservation Area

IIa. Nature Reserve

M.S (2003)	B.I. (2002)	Review (2006)	Name	Location	Area (ha)	Description
7	+	5	Copia	Son La	11,996	Forest on island with many Rhesus Macaque: *Macaca mulatta*.
19	+	1	Muong Nhe	Dien Bien	44,940	Evergreen, broad-leaved forest; many large mammal species. The relevant parts in each province are now managed by each rovince after division of former Lai Chau province into Dien Bien and Lai Chau province.
	+	2	Muong Te	Lai Chau	33,775	
27	+	7	Hang Kia - Pa Co	Hoa Binh	5,258	Evergreen forest on limestone mountains; *Pinus kwangtungensis*; *Paphiopedilum* spp., new orchid variety.
30	+	9	Phu Canh	Hoa Binh	5,647	Evergreen forest on low mountains; high biodiversity.
37	+	3	Sop Cop	Son La	17,369	Located in the steep and mountainous region. Evergreen forests still remain at high elevation, however, the natural vegetation there has been extensively cleared and replaced by scrub.
40	+	6	Ta Sua	Son La	13,412	Ever-green tropical forests on the ridges of the mountains; Black-cheeked Crested Gibbon: *Nomascus (Hylobates) concolor*)
45	+	8	Thuong Tien	Hoa Binh	5,873	Ever-green tropical forests on the low mountain region.
48	+	4	Xuan Nha	Son La	16,317	Forest on limestone mountains; *Podocarpus nagi* and many Angiosperm species.
-	+	10	Ngoc Son – Ngo Luong	Hoa Binh	15,891	The proposed nature reserve lies on the north-eastern flank of the limestone range that extends in a north-westerly direction from Cuc Phuong National Park to Son La province. Tropical forests on the limestone karsts. The globally critically endangered and endemic primate,

[4] FPD internal data (2006). According to the Directive No. 38/2005/CT-TTg, each province has prepared "Report of Results on Review and Planning on Three (3) Categories of Forests under the Directive No. 38/CT-TTg" in 2006. FPR organized and summarized the reports from all of the provinces.

M.S (2003)	B.I. (2002)	Review (2006)	Name	Location	Area (ha)	Description
						Delacour's Leaf Monkey *Trachypithecus delacouri* has been recorded in several contiguous areas of similar habitat.
-	+	-	Nam Don	Son La	18,000	This reserve is situated on the south-western flank of a mountain range that runs parallel to the main chain of the Hoang Lien mountains. The main objective of the nature reserve was the protection of a population of Gaur *Bos gaurus* that previously occurred in the area.

III. Landscape protected area

M.S (2003)	B.I. (2002)	Review (2006)	Name	Location	Area (ha)	Description
15	+	-	Dao Ho Song Da	Hoa Binh	3,000	Island in the Da river water reservoir.
-	+	2	Muong Phang	Dien Bien	936	The site protects the base of General Vo Nguyen Giap, the commander-in-chief of the Viet Minh forces during the Dien Bien Phu campaign of 1954. The site is only 40 km from Dien Bien Phu town.

Source: M.S. (2003): MARD, 2003 (Management Strategy for a Protected Area System in Viet Nam to 2020).
B.I. (2002): BirdLife International in Indochina and MARD, 2002, Sourcebook of Existing and Proposed Protected Areas in Vietnam: Second Edition
Review (2006): FPD data (2006) which were organized and summarized with "Report of Results on Review and Planning on Three (3) Categories of Forests under the Directive No. 38/CT-TTg" from each province.
Serial numbers in three colomns from the left in the table are concurrent with those in the tables in three kinds of reports mentioned above.

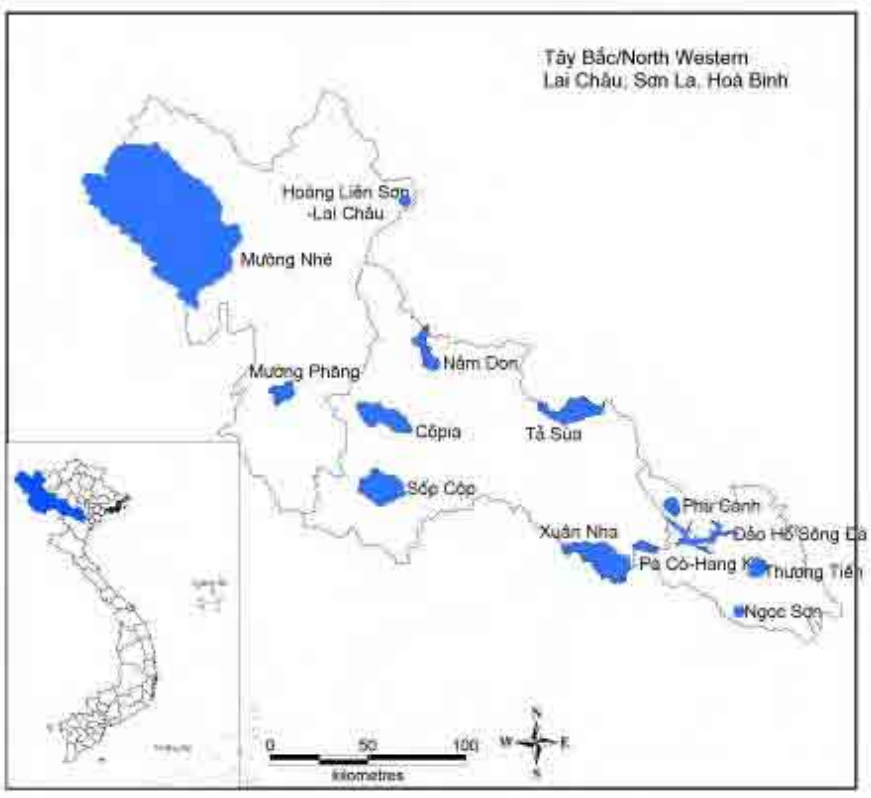


Figure 4.13.1 Existing and Proposed Special-Use Forests in the Northwestern Region

Source: Sourcebook of Existing and Proposed Protected Areas in Vietnam: Second Edition

2) Wetlands necessary to be protected except for the special-use forests

Wetlands necessary to be protected in the Region are summarized in Table 4.13.18. Those wetlands

should be protected as recognized as important wetlands regionally and internationally.

Table 4.13.18 Wetlands necessary to be protected in the Region

I. Wetlands with high values on biodiversity and environment

No.	Name	Province	Area (ha)	Coordinates	Characteristics
1.	Hoa Binh Lake	Hoa Binh	72,800	20°00' - 21°30' N, 103°00' - 106°00' E	Reservoir

Source: Viet Nam Environment Protection Agency (2005). Overview of Wetlands Status in Viet Nam Following 15 Years of Ramsar Convention Implementation.

II. Important Bird Area (IBA)
(a) Important Bird Area (IBA)

IBA Code	Name	Criteria	Province	Coordinates of the center	Area (ha)	Altitude (m)
VN018	Che Tao	A1, A2, A3	Son La,Yen Bai	104° 2' E 21° 42' N	16,000	260 - 2512
VN034	Cuc Phong	A2, A3	Hoa Binh, Ninh Binh, Thanh Hoa	105° 37' E 20 ° 19' N	22,200	50 - 648
VN057	Fan Si Pan	A1, A2, A3	Lai Chau, Lao Cai	103 ° 53' E 22 ° 16' N	49,584	380 - 3143

Source: BirdLife International (2005). BirdLife's online World Bird Database: the site for bird conservation. Version 2.0. Cambridge, UK: BirdLife International. Available: http://www.birdlife.org (accessed 30/11/2006)

(2) Biodiversity in the Region

There can be seen many existing and proposed nature reserves in the Region. Rare species of fauna and flora are staying there as their habitats. Not only the nature reserves but also the whole areas of the Region are the habitats for te rare fauna and flora.

The Sub-Department of Forest Protection (Sub-DFP) of each province shall establish the management plan of those nature reserves, i.e. the special-use forests, and conduct management of those nature reserves, however, not for all the nature reserves the management plans have yet been compiled. Information of the rare fauna and flora of two (2) nature reserves in the Region, i.e. Sop Cop Nature Reserve and Ta Xua Nature Reserve, in the management plans, which can be obtained by now, are described below.

Fauna

Nearly 60 kinds of wild fauna are listed in the Vietnam Red Data Book[5] as the rare species in the Ta Xua Nature Reserve (Table 4.13.19).

Table 4.13.19 Number of Rare Animals which are Confirmed in Existing in Ta Xua Nature Reserve in Son La Province

Vietnam Red Data Book (1989)		Number of Species Listed in the Vietnam Red Data Book				
		Mammal	Avis	Reptile	Amphibia	Total
E	Endangered	5	3	1		9
V	Vulnerable	12		5		17
T	Threatened	7	7	4	3	21
R	Rare	8	1	2	1	12
	Total	32	11	12	4	59

Source: PROJECT 611 – Ta Xua Nature Reserve Area in Son La province

[5] As the Vietnam Red Book has been revised in 2007, the new criteria for the rare flora and faune are to be employed for the surveys on the special-use forests later on.

Main species include Bear Macaque (Khỉ mặt đỏ, *Macaca arctoides*), Phayre' Langur (Vọc xám, *Trachypithecus phayrei*), Black-cheeked Crested Gibbon (Vượn đen, *Nomascus (Hylobates) concolor*), Asiatic Black Bear (Gấu ngựa, *Ursus thibetanus*), Clouded Leopard (Báo gấm, *Neofelis nebulosa*).

Over 70 kinds of wild fauna are named as the rare species in the Sop Cop Nature Reserve in the Vietnam Red Data Book, IUCN Red Data Book, and Decree No.18/HDBT (1992). Out of over 70 species, those species below are listed in the Vietnam Red Book (Table 4.13.20).

Table 4.13.20 Number of Rare Animals which can be Confirmed in Existing in Sop Cop Nature Reserve in Son La Province

Vietnam Red Data Book (2000)		Number of Species Listed in the Vietnam Red Data Book				
		Mammal	Avis	Reptile	Amphibia	Total
CR	Critically Endangered	6	1	2	0	9
EN	Endangered	7	1	8	0	16
VU	Vulnerable	13	3	4	1	21
LR	Lower Risk	2	4	0	0	6
DD	Data Deficient	1	1	0	0	2
	Total	29	10	14	1	54

Source: Activity Management Plan for Sop Cop Nature Reserve Area Period 2006-2010(2005)

Out of those fauna, such species as Rufous-necked Hornbill (Niệc Cổ Hung, *Aceros nepanensis*), Phayre's Langur (Vọc xám, *Trachypithecus phayrei*), White-Cheeked Gibbon (Vượn bạc má, N*omacus leucogenys*), are recognized as severe rare fauna in Vietnam.

Flora

Nearly 60 kinds of rare species can be seen in Ta Xua Nature Reserve, and almost all the species are listed in the Vietnam Red Data Book and Decree No. 18/HDBT[6], and need to be conserved. Main species are listed in Table 4.13.21.

Table 4.13.21 Rare Flora Species which can be Confirmed in Existing in Ta Xua Nature Reserve

Family Name	Species Name	Vietnamese Name	Vietnam Red Book	IUCN (1997)
CUPRESSACEAE	*Fokienia hodginsii* A.H	Pơ mu	K	LR/nt
PODOCARPACEAE	*Podocarpus neriifolius* D.Don	Thông tre		LR/lc
MELIACEAE	*Chukrasia tabularis* Ajuss	Lát Hoa		LR/lc
BIGNONIACEAE	*Markhamia stipulate* (Wall.) Schum, *Markhamia pierrei* Dop	Đinh	V	
DIPTEROCARPACEAE	*Parashorea chinensis* Wanghsic	Chò chỉ		EN
LAURACEAE	*Cinnamomum balansae* Lee.	Vù hương	K	EN

Source: PROJECT 611 – Ta Xua Nature Reserve Area in Son La province

Among the 640 kinds of flora in the Sop Cop Nature Reserve, 27 kinds of flora are listed in the Vietnam Red Data Book (Table 4.13.22) and 15 kinds of flora are listed in the IUCN Red Book (1998). Main

[6] Decree o. 18/HDBT (1992/01/17): The former decree on management and protection of rare and precious species on the basis of the previous Law on Forest Protection and Development (1991). Decree No. 18/HDBT was revised by Decree No. 48/2002/ND-CP (2002/04/22) at once; furthermore, the list in Decree No. 48/2002/ND-CP was amended by Official Dispatch No. 3399/VPCP-NN (2002/06/21).

species are shown in Table 4.13.23.

Table 4.13.22 Number of Rare Flora Species which can be Confirmed in Existing in Sop Cop Nature Reserve

Vietnam Red Data Book (2000)	Endangered	Rare	Vulnerable	Threatened	Unknown	Total
	E	R	V	T	K	
Number of Plants	2	5	11	3	6	27

Source: Activity Management Plan for Sop Cop Nature Reserve Area Period 2006-2010 (2005)

Table 4.13.23 Major Rare Flora Species which can be Confirmed in Existing in Sop Cop Nature Reserve

Family Name	Species Name	Vietnamese Name	Vietnam Red Book	IUCN (1997)
CUPRESSACEAE	*Calocedrus macrolepis* Kurz	Bách Xanh	E	VU
BIGNONIACEAE	*Markhamia stipulata* (Wall.) Schum	Đinh	V	
PINACEAE	*Keteleeria evelyniana* Mast	Du sam	V	
TAXACEAE	*Amentotaxus argotaenia* (Hance) Pilg.	Sam bông	R	VU

Source: Activity Management Plan for Sop Cop Nature Reserve Area Period 2006-2010 (2005)

(3) Management of the special-use forests

As mentioned above, the special-use forests are managed by the Forest Protection Department (FPD) in MARD. In the provincial level, the provincial Department of Forest Protection was independent from DARD and directly managed by the PPC to manage and protect the special-use forests. However, controls of management of the special-use forests were complicated; supplementary planting was conducted by the Sub-DOF to the special-use forests, whereas protection and patrol for the special-use forests were by provincial DFP.

In order to unify management of the special-use forests, MARD has instructed to each province to merge the provincial DFP into DARD through Decree No.119/2006/ND-CP and Joint Circular No.22/2007/TTLT-BNN-BNV[7]. As the results, the provincial DFP in Hoa Binh has been merged into DARD in 2007, and in 2008 for Dien Bien, Lai Chau and Son La provinces. Therefore, the adequate management of the special-use forests are expected through cooperation with Sub-DOF and Sub-DFP in the provincial level.

4.13.4 Targets and Progress of 5 Million Hectare Reforestation Program (Program 661) in the Region

(1) Targets and progress

Each province of the Region has formulated the master plan for reforestation for each province and implements reforestation due to their plans. Targets and progress by 2005 on reforestation by each province are shown in Table 4.13.24.

[7] Government Decree No.119/2006/ND-CP of Octover 16, 2006, on organization and operation of the forest protection service. Joint Circular No.22/2007/TTLT-BNN-BNV on March 27, 2007, guiding duties, rights, and organization structure of Forest protection in localities (by MARD and Ministry of Internal Affairs)

Table 4.13.24 Targets and Progress of 5 Million Hectare Reforestation Program in the Region in 2005

Province		Whole plan (1998-2010)	Term-I (1998–2000)	Term-II (2001–2005)	Term-III (2006–2010)
National targets		Restoration of 5.0million ha forests	1.05 million ha	1.95 million ha	2.00 million ha
		Forest coverage ratio: 43%			43%(2010)
Dien Bien	Target			38%(2005)	50%(2010)
	Result		30.2%(2000)	39%(2005)	－
Lai Chau	Target			38%(2005)	45%(2010)
	Result			35%(2004)	－
Son La	Target				55%(2010)
	Result		23.6%(2000)	41%(2005)	－
Hoa Binh	Target		37%(2000)	45%(2005)	50-55%(2010)
	Result		38%(1999)	43.7%(2005)	－

Source: National Five Million Hectare Reforestation Programme (1998 – 2010), Master Plan for Social Economic Development for each province, and Master Plan for Forest Development for each province

According to the documents from Forest Department (MARD, 2007), the progress of the 5 Million Hectare Program of each province are shown in Table 4.13.25.

Achievement rates for the results of the special-use forests and protection forests in the Region are between 97% and 175%, totaling 132% in average. However, establishment of production forests and industrial forests in the Region have not been conducted so much as same as national level. Achievement rates for forest protection activities for the special-use forests and protection forests in Lai Chau and Dien Bien are on the 50%, whereas approximately 170% for Dien Bien and Son La, resulting to 103% in average for the Region.

Table 4.13.25 Details of Progress of 5 Million Hectare Reforestation Program in the Region in 2005

No.	Name of Provinces	New Plantation						
		Total	Special-use and protection forestation plan	Special-use Forest	Protection forest	Percentage	Production forest	Permanent industrial trees
The Region		132,366	58,990	913	77,344	132.7	53,886	223
1	Dien Bien	17,531	15,000	162	14,440	97.4	2,929	
2	Lai Chau	25,232	13,690		14,220	103.9	11,012	
3	Son la	43,148	15,800	358	27,419	175.8	15,371	
4	Hoa Binh	46,455	14,500	393	21,265	149.4	24,574	223

No.	Name of Provinces	Forest Protection			
		Total	In which: Special-use and protection forest		
			State plan	Result	Percentage
The Region		20,734	15,693	16,241	103.5
1	Dien Bien	1,276	751	1,276	169.9
2	Lai Chau	2,824	4,620	2,759	59.7
3	Son la	12,357	5,252	9,438	179.7
4	Hoa Binh	4,277	5,070	2,768	54.6

Source: Documents from Forest Department, MARD (2007)

(2) Shortcomings to 5 Million Hectare Reforestation Program and measures

Encouragement of participation of villagers by increasing the management costs

By the Program 661, the forest lands are allocated to the villagers by contract basis, and villagers conduct to plant seedlings which are delivered by the Sub-DOF and conduct to manage and control the planted forests. Management costs which are paid to the villagers by the Sub-DOF are 50,000 VND/ha/year, and the amount of the management costs are too low for the villagers to accelerate the participation to this program.

Under these circumstances, each Sub-DOF has taken into considerations to increase the management costs in order to encourage for the villagers to participate in this program, as follows:

- Dien Bien: increase to 100,000 VND/ha/year
- Lai Chau: increase to 100,000 VND/ha/year
- Son La: no change (50,000 VND/ha/year) (Decision No. 1265/2007/QD-UBND)
- Hoa Binh: increase to 100,000 VND/ha/year (Decision No.03/2007/QD-UBND)

Necessity to diversify planting tree species

Keo trees (*Acacia* sp.) are nowadays planted mainly as planting tree species for the production forests in place of Bạch đàn (*Eucalyptus* sp.), because commercial values of Keo trees are increasing recently, compared with Bạch đàn. Regarding for the production forests, it does not matter if single tree species is planted in case of planting on relatively small areas from the points of easiness of management and harvesting.

However, single tree species planting can be seen for the protection forests by using single tree species, such as Thông ba lá (*Pinus kesiya*), Keo lá tràm (*Acacia auriculiformis*). That is mainly because it is easy to produce seedlings at nurseries, and conduct planting and tending after planting. Single tree species planting is not desirable for protection forests from the viewpoints of sustaining biodiversity, preventing from natural calamities and producing NTFPs.

In case of Son La province, although the Sub-DOF supplies seedlings to villagers on free and indicates the place to plant to them, the Sub-DOF sometime leaves planting activity to villagers. Therefore, the villagers start planting at the places which are easy to access and to plant trees, so that many places in the forests can be seen without any planted trees, especially on the upper sides.

Accordingly, reforestation activities are implemented in each province under the Program 661 with responsibilities of DARDs. Although planted areas of forests have been increasing in quantity, large areas of forests are established with low quality of forests and biodiversity.

4.13.5 Forest Utilization in Timber Production

Plantation to the production forests

Keo (*Acacia* sp.) are mainly planted to the production forests. That is because that Keo can be harvested within 5 to 7 years after planting, and commercial values of Keo trees are increasing recently, compared with Bạch đàn (*Eucalyptus* sp.), which were used to be planted.

Bamboo plantation is also popular there. Nurseries at each province grow and nurse the bamboo seedlings and sell them to farmers.

Those considerations should be taken for timber production in the Region as follows:

Planting of tree species which meet market demands

Most of timbers used for wood processing factories in the Region are supplied within each province. However, some kinds of tree species, such as Pơ Mu (*Fokienia hodginsii*), which could be supplied within provinces before, are now imported from Laos in Dien Bien and Son La as harvesting those trees are now prohibited because of shortage of resources. According to the interview results to the wood processing factories in Dien Bien, it is desirable for them to procure those timbers within the region if those timbers can be supplied within this region.

Although recently single tree species, such as Keo, is planted for production forests in term of high commercial value, it is necessary to select and plant those tree species which have high demands by wood processing industries.

4.13.6 Forest Utilization in Production of NTFPs

Production areas of raw materials

As mentioned in the Forest Development Strategy of Vietnam, the Region have high potential to be the production areas of raw materials, and in fact those four provinces also produce many kinds of raw materials. In case of lac production, inhabitant of lac-producing insects, such as lac scale insects (*Laccifer lacca*), and stands of host trees, such as Cọ khiết (*Delbergia hupeana*), are the must. Vine trees, such as Máu chó, prevent for planted trees and trees in the natural forests from growing in healthy ways by climbing up and winding up the tree trunks. Therefore, cutting and collecting of vine trees can not only improve tree growth but also utilize cut vines as NTFPs. Those considerations should be taken for production of NTFPs in the North-western region, as follows:

Shortage of techniques, information and facilities on NTFPs

There are quite few facilities to conduct preliminary processing of many kinds of NTFPs in the Region, except for bamboos (edible purposes, construction materials and bamboo pulps) and reeds (materials for brooms). Therefore, in most cases, NTFPs are sold to middlemen as raw materials after collected and kept temporarily.

Even though villagers are collecting NTFPs, there can be found that even villagers do not know the destination of collected NTFPs and produced materials from NTFPs, because of lack of information.

Market and distribution

Brooms produced in Hoa Binh province are exported to Asian countries and European counties through middlemen in Hanoi. Moreover, broom manufacturing factories export brooms directly to China by themselves.

Bamboo pulps produced in Lai Chau are exported to China, and bamboo pulps in Hoa Binh are transported to the paper manufacturing company in Binh Phuc province.

In case of NTFPs which are sold to other provinces as raw materials other than bamboos and reeds, middlemen in neighboring cities and towns, such as Hanoi, come and visit at each villagers regularly and buy and collect NTFPs as raw materials directly from the villagers.

4.13.7 New Way of Utilization of Forests

Rubber plantation

The Government of Vietnam has formulated the Master Plan for rubber tree plantation for the whole country (General review of rubber, 2000). Detailed target areas of this plan are the Central Coast, Central Highland and South East Regions. Recently, the Government of Vietnam has started to consider the possibility to implement rubber plantation in the northern areas in Vietnam, and the conference on "Scientific Base and Development Orientation for Rubber Tree in North Mountainous Provinces" was held on May 2007. According to this Announcement, it was mentioned that rubber tree plantation would be promoted in the Region, which had been considered to be unsuitable for rubber tree plantation.

Under these circumstances, the Sub-DOF in Lai Chau province has started to nurse rubber tree seedlings from 2006, and implemented experimental planting of rubber trees (provenance: Vietnam) from 2007[8]. A private company in Lai Chau planted rubber trees (provenance: China) as experimental basis in 2006 in cooperation with Sub-DOF. The Sub-DOF has a plan to implement provenance tests of rubber trees and evaluate and select the suitable provenance of rubber trees.

Jatropha curcas L.

Bio-originated energies are highly paid attention globally as supplementary energy sources by the recent running-up of crude oil price. Accordingly, MARD has been beginning in earnest to try to consider planting *Jatropha curcas* L., namely physic nuts, as the raw materials of the biodiesel in nationwide according to the Prime Minister's Decision No. 177/2007/QĐ-TTg dated 20th November 2007 on approving "Project proposal on development of biofuel until 2015 and vision to 2025" and issuring the Minister's Decision No. 1842/2008/QD-BNN-LN concerning the approval of the program on research,

[8] Announcement No. 3029/2007/TB-BNN-VP dated on June 6, 2007 on Vice Minister Diep Kinh Tan's Conclusion Opinion at the Conference on "Scientific Base and Development Orientation for Rubber Tree in North Mountainous Provinces"

development and product use of *Jatropha curcas* L. in Vietnam in period 2008-2015 and vision until 2025" on June, 2008.

Jatropha curcas L., namely Jatropha or physic nuts, can be planted even on the bare lands and denuded lands in the Region below 1,400 m, yearly percipitation 480mm to 2,400 mm, and yearly mean temparature of 18 to 28 ^{o}C, and also taken no damage from livestock and less damage from insects by contained latex in trunks and leaves, and toxic substances in seeds. Oils can be extracted from the seeds, with nearly 30% oil contents, and can be used to produce biodiesel. The minimum capacity of small oil processing lines are said to be 3,000 ton/year, and 1,000 to 1,500 ha of Jatropha the minimum extent for that minimum capacity of the processing lines. Although it is not admireble to have the quite large areas of the uniform forests by single tree species on the points of view of biodiversity and disaster prevention, it is recommended to spread some amount of large areas of blocks of the single tree species in order for easy and efficient transportation of the taken fruits to the processing facilities.

Regarding research aspect, MARD assigned the Center for Biotechnology in Forestry (CBF) of FSIV to conduct the scientific research on Jatropha in four years (2007-2010). Contents of those theme include pilot demonstration plantations, testing seed provenances. The Experiment and Research Center of Thanh Tay University has established 1 ha seed orchard with 16 provenances from Vietnam and five foreign countries, including China, Thailand, Indonesia, India and Malaysia. In the experimental forests for seed provanance of Thanh Tay University, planted Jatropha trees show high growth with 3 to 4 m in height just after 15 months after planting and already have born fruits.

Regarding production aspect, there are ten domestic companies and five foreign companies planting Jatropha with small areas or promoting formulation of the investment projects in Lang Son, Son La, Ninh Thuan, Binh Thuan, Ninh Thuan, and so on. Those foreign companies include those from Germany, Malaysia, Canada, Korea and Japan.

As Jatropfa can be planted even on the denuded areas in the Region and can be the new income-generating materials for the rural people, plantation of Jatropha is recommendable for those rural mountaneous areas in the Region.

4.14 Handicraft

4.14.1 Introduction

(1) Objectives of the preliminary field data collection for handicraft

The development of primary industries in Vietnam was achieved as a result of rationalization of the business management. This has led to various issues such as excessive laborers in the rural areas and widening gaps in income levels. In Vietnam, handicraft inherits a wealth of traditional skills grounded in the people's way of lives, which could be considered as an advantage to develop local industries through creating opportunities for employment and income generation.

In recent years, substantial outcomes were observed in handicraft industries through export promotion and foreign investment. Such successful cases raised awareness towards the role and importance of the non-agriculture economic activities such as handicraft in rural development. In Vietnam, handicraft development has been recognized as a means to achieve poverty reduction and economic development. Various interventions have been implemented while the results are not yet visible.

This data collection on handicraft industries intends to assess the potentials and possible approaches for the development of handicraft industries in the Region and design a feasible development plan. In this study, handicraft is defined as productive activities utilizing the traditional skills which remain as part of the livelihoods in the rural areas and provides an important means of earning income either as full time or part time work of the rural households. Local industries are defined as the processes of management, marketing and production is managed by the locally organized industries and people.

(2) Methods of data collection

The field data collection was conducted between July and October 2007 in three stages. Firstly, the review of the relevant policy documents and project reports was conducted followed by the field visits in the South and Northwest regions. Lastly, the problem analysis was conducted with the stakeholders in handicraft industries in the Region to conclude the data collection. The outline of each stage of data collection is presented bellow.

1) Key informant interviews, documentary review and analysis

Key informants were identified among the government offices and local consultants. The interviews were conducted by NIAPP counterpart. The reports of preceding projects such as “The study on Artisan Craft Development plan for Rural Industrialization (JICA, 2004)”, “Basic Design Study on the Project for Improvement of Rural Bridges in Northern Mountainous Provinces” and draft report on “1 Village-1 Product Movement in Northwest Mountainous Rural Community” were reviewed to grasp the overview of the handicraft industries in Vietnam. he offices visited and items of data collection were summarized in Table 1 of Attachment 4.5.

2) Field Reconnaissance

Field visits were conducted three times between August and September 2007 in the Northwest, South and Central Regions. The purpose of field visits include was to investigate the current status of handicraft industries, supporting services and market environment in Vietnam. The JICA study team selected the government offices, organizations and vocational institutions which were considered to be representative of Vietnamese handicraft industries and visited them for interviews. The interview schedules were summarized in Attachment 4.5.

3) Problem Analysis

Towards the end of the fieldwork in the Region, the problem analysis was carried out with participation of stakeholders in the local handicraft industries. The objectives of the problem analysis include 1) to

gain insights on the problems of the handicraft industries in the Region from the local perspectives; 2) to reflect on the findings from the field work conducted by the study team, and 2) to select the most relevant and urgent issues to be dealt with in the long term development program for promotion of handicraft industries in the region. The results of the problem analysis are discussed in the Chapter 8. Supplementary study to investigate further details will be carried out after May 2008.

4.14.2 Overview of the Handicraft industries in Vietnam

(1) Overview of handicraft

Handicraft industries are mostly locally operated light industries or handicraft industries (*tieu thu cong nghiep*). According to the Statistical Yearbook of Vietnam issued by the Statistical Publishing House shows, those who engaged in handicraft are "non-governmental (*ngoai quoc doanh*)" organizations and individuals excluding state and foreign businesses. In other words, those who produce handicraft in Vietnam are mostly cooperatives, NGOs, private enterprises and households.

Main handicraft products in Vietnam include rash products, bamboo/rattan products, embroidery, textiles/weaving, wood processing and metal work. These are produced both as non consumable goods and souvenirs for the domestic and overseas markets.

The following section intends to provide the landscape of the handicraft industries in Vietnam based on the data from the report on the Study on Artisan Craft Development Plan for Rural Industrialization (JICA, 2004), which studied "craft village" in the country.

(2) Craft village and handicraft industries

In the national handicraft mapping conducted in 2002 (JICA/ MARD), "craft village" was defined as the village where 20% of the total households engaged in the local industries or where the handi- and artisan crafts were considered to be an important industries by the commune. According to this definition, 2,017 villages were identified as "craft village" in the country. In these villages, 1.35 million persons or 2.3% of the total population of "handicraft villages" solely depended on their income from hand and artisan crafts.

The average number of handicraft makers in these villages in Vietnam was 668 persons. Among regions, the Red River Delta region having the largest number of the handicraft makers of 929 persons per village followed by the southeast region with 928 persons. The same for other regions indicated far bellow the national average ranging between 300 and 500 persons per village. The basis and summary of this calculation is indicated in Table 4.14.1.

Table 4.14.1 The number of handicraft villages and households engaged in handicraft

Region	Craft village			Household engaged in handicraft			Households engaged in primary industries (%)
	The number of people engaged in handicraft	Number of village	The number of people engaged in handicraft/ village	Full time (%)	Part time (%)	Non farming (%)	
National	1,348,359	2017	668	7.6	50.6	41.8	75.6
1.Red River Delta	848,805	866	929	4.2	80.8	15.1	69.3
2.Northeast	35,044	164	302	13.1	48.4	38.5	89.7
3.Northwest	104,210	247	422	12.0	32.7	55.3	96.0
4.Northcentral coast	137,568	341	403	10.4	44.4	45.3	79.9
5.South central coast	44,730	87	514	17.3	47.2	35.5	72.7
6.Central highland	0	0	-	0.0	41.6	58.4	90.3
7.South east	93,716	101	928	3.6	27.8	68.6	57.3
8.Mekong Delta	84,286	211	399	9.8	21.7	68.4	73.6

Source: Compiled from JICA Study on development of local industries for regional development (Master Plan). 2004. Vol 1. p4-6,9.

In this JICA study, the handicraft makers were categorized into three; full time or part time farm household or non-farming household. In the Red River Delta, 80% of the handicraft makers were part time farm households and 15.1% were non-farming households. In the southeast region, the non-farming households who engaged in handicraft accounted for 68.6%, while 27.8% engaged in part time farming. Such differences seemed to have derived from the lower agriculture potential and development of the secondary industries. Further, since both regions are located near the Hanoi and Ho Chi Min, the percentage of handicraft makers whose main livelihoods was farming was low.

The number of handicraft villages and their main products were summarized in Table 4.14.2.

Table 4.14.2 Overview of the handicraft production in Vietnam (Unit: village)

Region	Rash	Bamboo/ Rattan	Embroidery	Textile/weaving,	Wood processing	Metal	Others	Total
National	281	713	341	432	342	204	658	2,9711)
1.Northwest	1	45	81	222	24	16	27	416
(%)	0.4	6.3	23.8	51.4	7.0	7.8	4.1	14.0
2.Redriver	108	337	225	67	182	108	341	1368
3.Northeast	5	77	12	42	20	19	44	219
4.Northcentralcoast	72	121	15	74	61	31	103	477
North	185	535	252	183	263	158	488	2,064
(%)	65.8	75.0	73.9	42.4	76.9	77.1	74.2	69.5
5.South central coast	22	34	0	5	5	9	25	100
6.Central highland	0	0	0	0	0	0	0	0
7.South east	6	26	2	11	17	6	51	119
8.Mekong Delta	67	73	6	11	33	15	67	272
South	95	133	8	27	55	30	143	491
(%)	33.8	18.7	2.3	6.3	16.1	14.6	21.7	16.5

Note: 1) The number of villages exceeds the actual number of handicraft villages as multiple products could be reported as main products of one village.
2) Other products include lacquer ware, ceramics, stone curving, hand made mulberry paper, wood block printings, rash woven products, products using small machineries/ equipments, fish nets, incense, and construction material (i.e. tiles and bricks).

Source: Compiled from JICA Study on development of local industries for regional development (Master Plan). 2004. Vol 1. p4-1.

The most common handicraft products throughout Vietnam were bamboo and rattan followed by textile/weaving, wood processing, and embroidery. Other products included lacquer ware, ceramics, and hand made mulberry paper, wood block printings in the Red River Delta and stone curving in the central

coast region.

(3) Policy and Government Support

The development policy for non-agriculture sector in Vietnam was issued in 1993 in order to achieve the following two objectives. One was to minimize the gap between the urban and rural areas by creating employment opportunities and increasing income in the rural areas. The second aim was to restructure the agriculture production system and rural economy through rural industrialization and modernization of agriculture. The excerpts of the relevant policy documents are provided bellow.

1) No.132/2000/QD-TTg, Prime Minister's Decision on Some Policies to Promote Rural Industrial Development (hereinafter referred as "The Prime Minister's Decision 132")

The Prime Minister's decision on some policies to promote rural industrial development was issued in 2000 and defined the rural industrialization policy. MARD proposed the policy and took an initiative in implementation. The policy recognized hand and art crafts as one of the rural development strategies in addition to agriculture, forestry and fisheries and declared to provide support in finance, consultation on advice, information sharing, marketing and designing of the projects. MARD also intended to promote research on technology development and to develop necessary infrastructures.

The Prime Minister's Decision 132 stated the following preferential treatment and policy.

i. Conversion and leasing of land
ii. Investment and credit
iii. Tax and other costs
iv. Identifying markets and marketing channel
v. Development and improvement of products and environmental consideration
vi. Human resource (handicraft makers and successors) development

As a result of this policy, traditional[9] and artisan crafts industries having high potential for exports had grown. On the other hand, agriculture and fisheries based industries, which were the main sources of livelihoods in the rural areas, did not mange to take advantage of this policy.

2) Protocol on development of rural industries No.134/2004/ND-CP (hereinafter referred as Protocol No. 134)

In 2004, the government issued a Protocol No 134 to implement strategies to develop diverse non-agriculture sector in the rural areas.

In achieving rural industrialization, a number of interventions to promote export and investment were proposed in the document by the Ministry of Industry. The protocol envisages industrial development

9 Traditional crafts originate in pre19th centuries. The skills to produce artifacts were succeeded from one generation to another and maintained up to present. Some may take advantage of the modern machineries though to the limited extent. Some of the traditional artifacts faces extinction due to the deterioration of the production system and may require conservation or further development due to the changes in socio/economic condition (MARD "Draft Circular on the Guidance of the Procedures for Approval and Acknowledgement of Traditional Artisan Craft, Craft Village and Traditional Craft Village").

Cooperative[11] and NGOs. They are expected to take the leadership of the development of handicraft industry in the future.

ii) Handicraft Makers: The handicraft makers include households and individuals who make crafts mostly for household use or to supplement their income during the non-farming season. The former type of handicraft makers is mostly women. In the latter case, the entire household is involved in the activities. They either sell the raw materials or sub-contract the production. The handicraft makers of this category are considered as an active stakeholder group and create the foundation of the handicraft industries.

(2) Main Handicraft Products

In the Region, the following products were commonly found as handicraft.

- Crafts using materials harvested in forest: Broom, Knitting (bamboo/ rattan products) , hand made mulberry paper, wood processing
- Crafts using traditional textile: Bag, blanket, garment, embroidered cloth, clothes dyed with indigo
- Others: farming tools, silver work

The above products utilize naturally harvest raw materials within the locality and require traditional skills. However, they were not unique to the locality and failed to take advantage of rarity. Only limited number of products was exported and sold as souvenirs while many of them were marketed as low quality –low value products. Furthermore, historically most of the handicrafts were produced at the households for their own use rather than to be marketed on the commercial basis. The skills were transferred and maintained within the community (commune, village, household).

The main products of the handicraft villages were summarized in Figure 4.14.1.

11 The cooperative collects the subscription fees from its members in order to carry out its activities. It is registered with National Centre for Agriculture Extension under the People's Committee. Association of cooperatives is established at each province; district and commune level by the People's Committee and provides supports and advice for establishing a cooperative and organizational management.

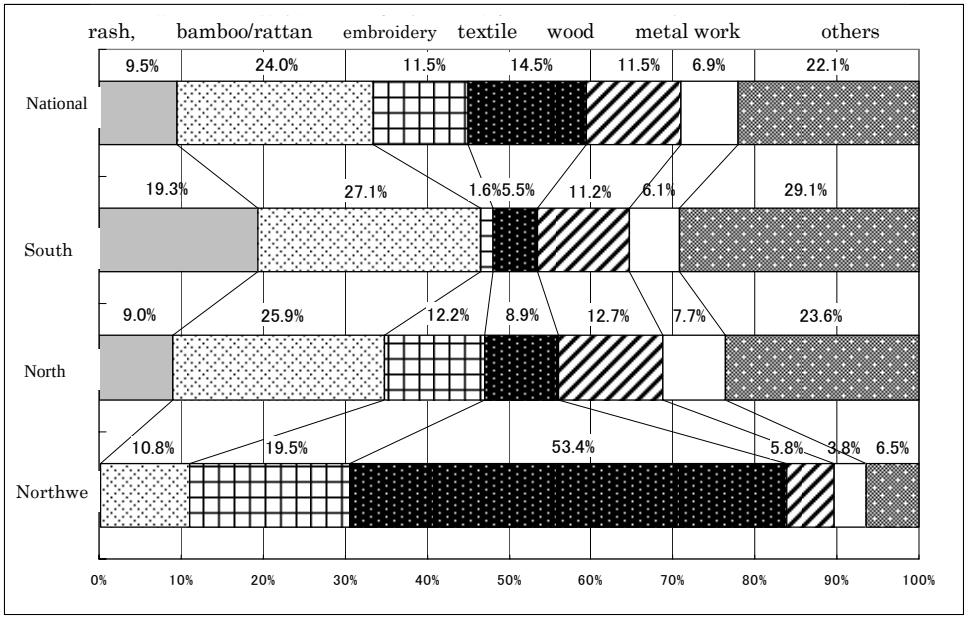


Figure 4.14.1 Main handicraft products in the Region and other regions

As a characteristic to the Region, textile and embroidery products are common handicraft products. As Figure 4.14.1 shows, 53.4% of the households engage in textile production which was much higher than other regions. The reason for this is that the handicraft makers in the Regions are mostly small ethnic groups who made textile/weaving, as their tradition. However, in general, these textiles/weavings, products are low in profit which creates the economic gap with other regions.

The average monthly income per capita in handicraft villages is compared by gender and products in Table 4.14.3.

Table 4.14.3 Income of the Handicraft makers in Vietnam

(Unit:1000 VND)

Region		Rush	Bamboo / Rattan	Embroidery	Textile/ weaving	Wood work	Metal	China	Average	North west
Average		296	288	212	222	589	666	658	366	181
	Male	271	333	251	365	599	759	560	396	246
	Female	304	258	207	187	551	467	326	311	116

Source: Compiled from JICA Study (2004) Vol1.3-11, 4-11

The average monthly income in the Region is 246,000VND for male and 116,000VND for female. The latter only accounts for 40-60% of the national average. Such gender difference in income level in the region could have been created by the objectives of making handicraft. Men mostly produce handicraft for selling and to increase the household income. Therefore, all the products that they produce are likely to be sold in the market. On the other hand, the products of women were meant for household use and only the remaining would be sold in the market. Therefore, the volume sold in the market varies between men and women are different and therefore, income differs between gender.

4.14.4 Cases Studies and Reflection on Handicraft Industries and in Vietnam

From the literature review provided in 4.14.2 and 4.14.3, some regional differences in structure and system of handicraft industries emerged. In the field visits, natures of such differences were further explored. In structuring the field work, three aspects of handicraft industries were investigated in the South, South Central and Northwest regions: 1) management of the enterprises/ organizations and problems; 2) overview of the technical extension system, and 3) the government support.

The findings from the interviews are presented in Attachment 4.5

1) Comparison of Enterprises/Organizations in South and North Regions

   The successful cooperatives, company and organization in the south has established export or fair trade oriented production system. On the other hand, the size of business and marketing in the North was rather considered to be premature. Further, in the south, the foreign language skills and market information are quickly introduced as essential part of their business operation. Such differences in skills and knowledge in running business seemed to have affected the motivation of the executives of the enterprises/ organizations.

2) Production and Marketing

   In the South region, various handicrafts from other parts of the countries are manufactured. The products from the north are often marketed as sub-contracted products of other regions. And there is a severe competition due to small-scale (niche) markets. Therefore, creating a status as a region in the market is challenging.

   In the Region, various types of production skills are available and therefore more variations in the types of textiles produced. It is unique in the Region and could become a means of income generation among the landless households. Once the textile is promoted as a regional handicraft, it will contribute to preserve the unique textile looming skills originated in the region, which has also been concerns of the government offices and other stakeholders. However, marketing of the traditional textile often depends on the preference of the consumers which leads to the fluctuating sales. The successful manufacturers such as Craft Link has overcame such difficulties by producing high quality products of good design based on the careful market analysis and targeting of the consumer group.

   Current consumers of the Vietnamese handicraft are mostly in overseas or among foreign community within the country. This may require mass production of the handicraft through mechanization or modernization of the production process. However, this could also mean the loss of the precious value derived from the traditional hand work, which cannot easily be recovered. Therefore, the viability of such modernization could be carefully examined before launching the intervention. Furthermore, existing products must be protected against illegal duplications. Their design and quality should be improved depending on the market. For this, long term advices are required.

   As an alternative means of livelihoods in the rural area, handicraft development may also embrace

household industries and food processing.

3) Considerations for Technical Extension

When planning a project to develop handicraft industries, assistance to extend production skills is not sufficient. Whether one industry to be sustained or not depends on the profitability. Therefore, the realistic cost benefit analysis shall be conducted and such skills must be transferred to the project beneficiaries. Furthermore, skills of marketing are also critical in developing industry, which requires some time to be acquired. If the project duration is not long enough to do so, assistance through NGOs, which can work at the grass roots for longer term, may be effective.

The CLC could also become an important provider of technical trainings. However, the current CMU members are not fully satisfied with the management system and the lack of funds to upgrade or extend their facilities caused as they lack the system to accumulate their own capital pose some challenges to the role of CLC in technical extension. In the long run, there is a concern that the capacity of CLC may not be sufficient to cope with diversified and advanced needs of the community members. Thus, the collaboration with the government offices and People's Committee is essential. Further, the opportunities for the community members to be exposed to the information should be created through technical and financial assistances from overseas donor organizations and NGOs.

4) Support from the Government Offices

In the urban areas, many of the government supports were extended as seen in the case of HCMC vocational training center. On the other hand, limited supports have been provided for non-agriculture sector development in Region. Handicraft development could be regarded as an effective intervention in the region which has not fully facilitated the employment of the local population.

Some policy interventions were implemented and proved to be effective in the Northeast Region and Red River Delta. Bat Trang Village (traditional artisan ceramic), Dong Ky village (Wood works), Van Phuc Village (Silk textile) in those regions benefited from the promotion of investment and export. Recently, small scale handicraft estates were established around the known production areas to strengthen and expand the production of the handicraft. The factors led to such successes could be summarized as following.

i. Accumulation of traditional skills and experiences
ii. Minimal initial investment
iii. Flexibility to meet the market demand
iv. Elastic development to cope with tourism sector which is not yet developed








1st : Marketing of the traditional textile (Zao)
2nd: Producing Lac and collection of lime stone
3rd: Only one shop sold goods of handicraft
4th: Local alcohol made by rice

Knitting (rattan products) by households
Indigo dye by households (H.Mong)
Embroidery/ tailoring in the rain (Thai)
Production of threshing tools

Figure 4.14.2 Handicraft making Rural area (Ma Quai Commune, Lai Chau)








1st: Ngoc Minh Cooperative producing brooms (Hoa Binh)
2nd: Producing textiles at the Cooperative (Lai Chau)
3rd: Training to preserve traditional craft skills in Noong ung village
4th: Ban Bo CLC (Established in 2001 with assistance from UNICEF)

Producing of textile (Support by the local government)
The problem analysis carried out with Cooperatives (DB)
The training on textile making for young women (DB)
Technical training on mushroom culture by NGO

Figure 4.14.3 Handicraft industries in Northwest (Cooperatives, Household, CLC)

4.15 Rural Tourism

Tourists to Dien Bien province count for approximately 200,000 yearly. Around 10% of them come from abroad and are equal to 0.5% of total number of foreign tourists to Vietnam. Majority of tourists to Dien Bien are from Australia and Europe, and the French are the most, whereas majority of tourists to the southern Vietnam are from Japan, South Korea and Republic of China. As there are many spots on ruins of the Battle of Dien Bien Phu between France Union forces and Vietnamese Viet Minh forces in Dien Bien Phu, those ruins and relics make many French people and Vietnamese visit at Dien Bien Phu. Museums and war ruins around Dien Bien Phu city are the main tourist points for the most of the tourists to Dien Bien.

As Dien Bien province is the frontier with China and Laos, the interchange and exchange of people and materials have been becoming active between those countries, including the tourists to/from China, Laos, and Thailand. According to the distribution situations of ethnic tribes in those countries, great expectations have been placed on economic exchanges such as trading and tourism with continuously developing neighboring countries. Therefore, many kinds of preparations on infrastructures, facilities, and trainings have been in progress in Dien Bien in order to become the hub areas for exchange of transportation.

The Trade & Tourism Department of Dien Bien province practiced the “Tourism Campaign” in 2004 and conducted public relations activities on the cultures, traditional performance arts, local food, history, accompanying with making the tourist maps, in accordance with the results of the Master Plan Sutudy for Tourism in Dien Bien (2003). The Department also has conducted many kinds of programs on the tourism development, trainings to ethnic minorities, and infrastructure development on tourism at some villages nearby the national borders and historical relics.

The study results are mentioned in detail in Atachment 4.6 and summarized below.

1) Although the rural-area-type tourism development can be found there by utilizing the natural environments and ethnic indigenous cultures, and so on, among the local resources, relationships between rural-area-type tourism development and primary industries, such as agriculture, animal husbandry, and inland fisheries, seem to be insufficient and should be strengthened. Provision of qualified foodstuffs, such as dairy products, hams/sausages, and so on, by promotion of primary industries, and development of special local products, such as original goods, can be the key factors to achieve great success in the rural area tourism development.

2) Material resources and human resources are insufficient for facilitating tourism industries. Necessities can be found in facilitating the participation of local residences and capacity buildings as well as assistances utilizing overseas capitals and management know-how of the private companies.

3) At implementation stage, monitoring activities and enlightening activities should be included in the program and conducted on consciousness and motivation of local residences, as no prosperous changes in their minds and activities can be come out after the training programs on tourism in 2005 as expected.

Chapter 5

Rural Infrastructure

5.1 Introduction

Rural infrastructure is one of the basic conditions to ensure economic development and livelihood improvement of local people. In recent years, the Government of Vietnam has directed their efforts to infrastructure development in line with nationwide poverty reduction programs such as Program 135. In the Region, public investment for infrastructure development is rather small despite the fact that its regional poverty rate is highest in the country. Although the Region needs more infrastructures, it was not given the priority for infrastructure construction. The main reason seems poor accessibility in and around the Region. In addition, cost performance of the development projects, i.e. development cost per beneficiary, is generally lower in sparsely populated areas. Construction costs tend to increase due to mountainous topographic conditions. Due to such reasons, the development priority of the Region is low even though a wider range of government supports is urgently required.

The Region faces several difficulties when diversification and modernization of livelihood of local people, of which approximately 80% are ethnic minorities, are envisaged. In the mountainous areas, large-scale crop production and animal grazing are not suitable because of limited farmland. Consequently, poverty rate of the Region is the highest in Vietnam. The Government of Vietnam carries out poverty reduction programs such as Program 135. The Region is one of the target areas of poverty reduction programs but its past achievement was not sufficient.

Poverty reduction programs in Vietnam focus on development of rural infrastructure, namely rural roads, irrigation, water supply, electrification, school, medical facilities, markets, etc. Chapter 5 deals with the progress in the rural infrastructure development in the Region and the future prospects toward 2020.

Disaster prevention is one of the crucial issues for local people in the Region. Past records/data of floods, land sliding and others were analyzed.

5.2 Rural Road

5.2.1 Major Road Networks in and around the Study Area

(1) Objectives of Transport Development

The development strategy of transport in Vietnam till 2020 was approved as the decision No.206/2004/QD-TTg on December 10, 2004. Road transport is to be developed, achieving the objectives of making Vietnam an industrialized and modernized country by 2020. The trunk road networks, i.e. national highways and most provincial roads, are to be upgraded to meet rapidly increasing transport demand by expanding the existing roads, extending new highways, and improving the roads to meet the official technical standards.

The rural road network will also be improved to link all the commune centers and to ensure year-round transportation the rural area. In 2020, both asphalt roads and concrete roads shall be over 50% of the total length of rural roads.

The road networks of the Region are strategically planned as parts of the northern key economic regions, in which all the provincial capitals and other important urban centers are linked. The highway passing from Hanoi to Lao Cai through Viet Tri and Yen Bai is prioritized as a main trunk road for border trading between Vietnam and China.

Major national roads passing through the Study Area, namely Nos. 4, 6, 12, 32, and 279, are to link with one another, and be fully upgraded as national highways in the northern belt road system to ensure borderline belt routes. Detours/Roads bypassing the reservoir of Son La hydropower plant are to be built.

The strategy on rural road development is:

1) To maintain, consolidate and upgrade the existing traffic networks according to the current technical standards.
2) To concentrate on building roads to central of communes and communes clusters where no road exists, and to agricultural and forestry farms, rural industrial zone.
3) To continue building the inter-villages and inter-communes road systems to establish overall traffic networks to villages and communes.
4) To connect the rural transport network with the national transport network and to build the system of approach bridges and flyovers at intersections of express ways, national highways and local roads.
5) To develop small-sized motorized transport such as tractors suitable with the conditions of rural infrastructure.

(2) Present Situation of Major Road Networks inside and outside the Study Area

Volume of transport of domestic goods in Vietnam between 1999 and 2005 shows that road transport remains the second highest following coastal transport, accounting for 8% of annual increase in ton-km. In passenger transport, road accounts for 65% of all the passenger-km, which is higher than railways, waterways, and aviation. Road is becoming the most important mode of transportation.

Present road networks in Vietnam consist of 17,300 km of national road, 17,449 km of provincial road, 36,372 km of commune road and 131,455 km of village road. The percentage of paved roads is a useful indicator of the quality of a country’s road networks. 83.5% of national roads, 53.6% of provincial roads, 20.2% of commune roads and 2.2% of village roads are paved (Data source: Vietnam Road Association, 2004).

The passenger transport volume in the Region is ranked the lowest at 367 million passenger-km that is only 1% of the whole country volume, 31,471.9 million passenger-km. The figure shows development of road networks is necessary for the four provinces.

National roads in the Region are inside road and out side road networks, connecting provinces and cities. National roads in the Region are divided into two groups: the group of national routes lying in North-South direction, consisting of No.6, No.12, No.32, No.70 that are directed toward Hanoi and the other group of national routes lying in East-West direction, consisting of No.4D, No.279, No.37. These national roads are indicated in Figure 5.2.1.

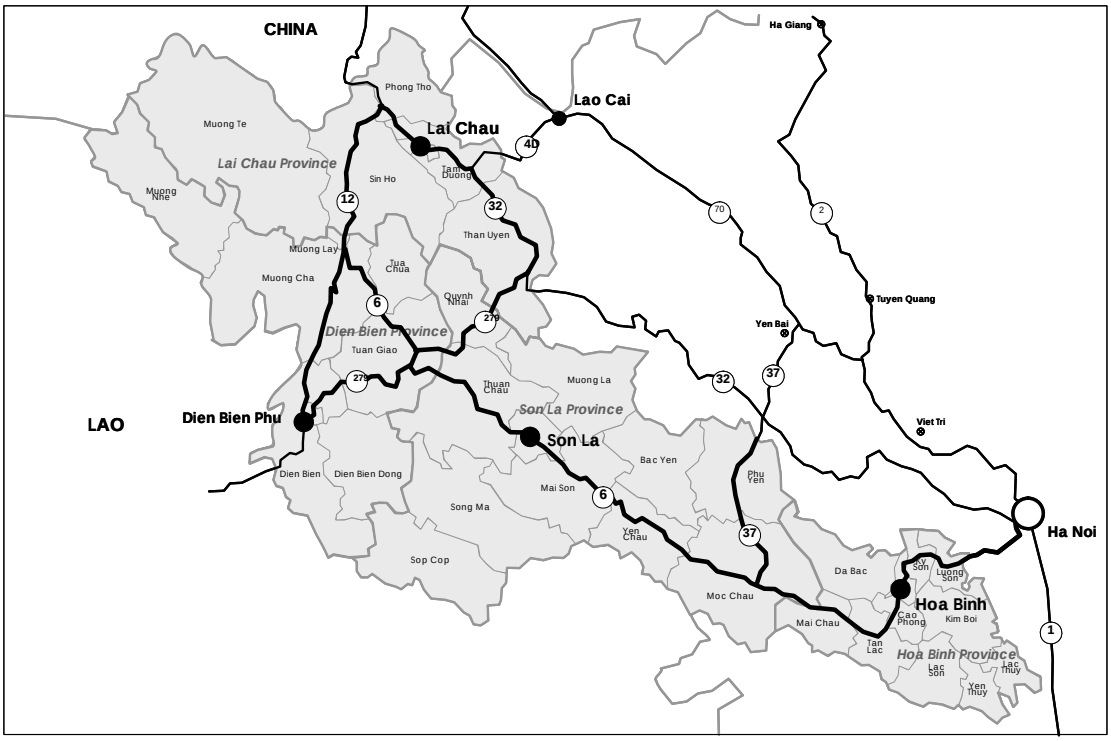


Figure 5.2.1 National Road Networks in Four Provinces

Roads are to be constructed at the right and the left banks of the Da River to connecting ports in Hoa Binh reservoir and Son La reservoirs. These roads are to avoid areas that were inundated due to the construction of Son La hydro-power plant, and play a role in improvement of socio-economic activities, social security and national defense.

Longitudinal direction: National roads No.6 and No.12 connecting the four provinces to Hanoi are important transportation routes of northwestern road net work. National roads No.32, No.70 and the Hanoi-Lao Cai railway support national road No.6 and No.12. As a result, the road No.6 ceases to be the only one route to connect the Region to the Red River delta.

Latitudinal direction: This Master Plan is to examine the linkage of road networks of all national roads belonging to northern ring roads. Study is to be also conducted to establish border ring roads and to avoid inundation of road networks due to building Son La hydro-power plant.

Ring road belt I national roads No. 4A, 4B, 4C, 4D, 4G and No.34
Ring road belt II national roads No.279 and No.12
Ring road belt III national roads No.37

5.2.2 Classification of Technical Grade of Auto-Road

In planning and design, technical grades of auto-road are based on Vietnam Standard TCVN 4054-2005 'Auto-Road Design Standard' in effect dated on 7th February, 2006. It was issued by MST according to Decision No.151/QD-BKHCN dated on 7th February, 2006. This standard specifies requirements on design of rehabilitation, improvement and new construction taking into consideration the master plan study of road networks until 2020 year for national roads, local roads including provincial roads, district roads, commune roads and village roads.

Table5.2.1 Technical Grade of Auto-Road

Designed grade of road	Designed vehicle discharge (vehicle/day-night)	Function of road
Highway	>25,000	Main route, designed according to TCVN 5729:1997
Grade I	>15,000	Main route connecting important economic, politic and cultural centers of country. National road
Grade II	>6,000	Main route connecting important economic, politic and cultural centers of country. National road
Grade III	>3,000	Main route connecting important economic, politic and cultural centers of country and regions. National road, provincial road
Grade IV	>500	Road connecting centers of regions, residential areas. National road, provincial road, district road
Grade V	>200	Road for serving regional transportation. Provincial road, district road, commune road
Grade VI	<200	District road, commune road

Figures of the discharge in the table are used for reference. Selection of designed grade of road is based mainly on function of road and topographic condition

Table 5.2.2 Minimum Width of Factors in Cross-Section for Plain and Hilly Area

Designed grade of road	I	II	III	IV	V	VI
Designed velocity, km/h	120	100	80	60	40	30
Minimum number of lane	6	4	2	2	2	1
Lane width (m)	3.75	3.75	3.75	3.50	2.75	3.50
Width of lane (m)	2x11.25	2x7.50	7.00	7.00	5.50	3.50
Width of division stretch(m)	3.00	1.50	0	0	0	0
Width of edge and protection edge(m)	3.50(3.00)	3.00(2.50)	2.50(2.00)	1.00(0.50)	1..50(0.50)	1.50
Width of road basement (m)	32.5	22.5	12.00	9.00	7.50	6.50

Figures in bracket are width of protected road edge. When possible all road edge should be protected, especially roads have no edge for rudimentary vehicles.

The design standard for rural road can be applied to appropriate road grades such as grades IV, V and VI in Vietnam Standard TCVN 4054-2005 'Auto-Road Design Standard'. District roads connecting to the commune centers are divided into two classes; Standards AH and AH_{MN} according to Decision No.1528/1999/QD-BGTVT dated on July 1st, 1999. Roads from commune to village, from village to village, and from village to farmland are divided into two classes A, and B according to Sector Standard No. 221CN210-92.

Table 5.2.3 Main Technical Standards of Rural Roads

Main parameters	District road to commune center		Road in commune	
	Class AH	Class AH_{MN}	Class A	Class B
Designed velocity	25(20)	20(15)	15	10
Road surface width(m)	3.5x1	3.0x1	3.5(3.0)	3.0(2.5)
Road basement width(m)	5.5	5.0	5.0(4.0)	4.0(3.5)
Radius of minimum bend in topographic map(m)	25(20)	20(15)	15	10

Note: Figures in brackets are minimum figures in difficult condition or initial step of construction stage

5.2.3 Existing Rural Road Networks

(1) Consolidation of Rural Road Networks in the Four Provinces

According to road intensity per 1,000 residents in each district (unit: km/1000), Lai Chau province is 2.71, Dien Bien 2.54, Son La 1.80, and Hoa Binh 4.75. Road intensity in the Region is generally lower than that in the other regional provinces. Road intensity of all the districts in Lai Chau province do not vary, but that of Dien Bien province varies from 6.08 in Dien Bien Duong district to 0.56 at Muong Lay town, lowering the average intensity.

Based on Socio-Economic Statistical Data 2005, rural access to motor way leading to commune center shows more than 80 % of the total communes, but access to such road is only limited to the dry season. During the rainy season, most villages become isolated due to river flooding, landslide, erosion of road surface as they block the traffic with muddy road surface.

Existing conditions of rural road networks in four provinces are shown in Table 5.2.4 to Table 5.2.7.

(2) Existing Road Networks in Lai Chau Province

Provincial Road: At present, there are four lines of provincial road with total length of 216km, consisting of No.127, No.128, No.129 and No.130. Among these roads, asphalt macadam road is 131km length, accounting for 61% and gradation road is 85 km length, 39%.

Technical standard of most provincial road lines is low, mainly road grade VI with narrow road surface, poor quality, bridges and drains with 10 or 13 tons of low weighted-load. Moreover, road gradient is not sufficient to meet requirements of the technical standard because of high longitudinal slope. Accordingly, such negative elements result in frequent traffic accidents and restrict economic development in districts and towns. With regard to provincial road intensity per 100 km^2, Lai Chau province has the second lowest provincial road density with 2.38km/100 km^2.

For this reason, Lai Chau provincial road networks are required to improve. New roads should be built to replace the existing roads affected by construction of Son La and Nam Nhun hydropower plants.

Rural Road: Rural road networks consist of district roads, commune and inter-commune roads and village roads. The total length of district and commune roads is 912km, of which asphalt concrete road is 37 km

long accounting for 4%; asphalt macadam road is 40km long (4%), gradation road is 90km (57%) and the unpaved road is 319km (35%). The district road networks are unevenly distributed, mainly concentrated in economic areas such as Lai Chau provincial center, Tam Duong district, Phong Tho district where national, provincial and urban road networks were established in addition to favorable topographic conditions.

Muong Te, Sin Ho and Than Uyen districts, on the other hand, are mountainous, remote and boundary districts far from provincial administrative offices. Road densities per 100 km^2 in these districts are 6.6km, 10.7km and 9.1 km, respectively. Development of road networks in Muong Te district is not progressing smoothly due to the complicated topographical and weather conditions and high construction cost for rural roads to commune centers or among communes. The living conditions of people in Muong Te district are low and poverty rate is the highest in the province.

Table 5.2.4 Present Conditions of Rural Roads(Lai Chau Province)

Unit: km

Name of district	Population	Length of rural roads			Density of roads[1]
		Provincial	District	Total	
TX. Lai Chau	19,307	20.0	16.9	36.9	1.91
H. Muong Te	47,494	91.0	158.8	249.8	5.26
H. Phong Tho	50,785	27.0	128.3	155.3	3.06
H. Sin Ho	73,903	78.0	138.7	216.7	2.93
H. Tam Duong	43,451	-	102.5	102.5	2.36
H. Than Uyen	92,269	-	125.5	125.5	1.36
Total	327,209	216.0	670.7	886.7	2.71

Source: Master Plan Report for Road Development of Lai Chau Province, 2006, and Statistical Yearbook of Lai Chau Province, 2006

1: Density of roads is presented in km / 1,000 persons.

The total length of village road networks is 1,458.9 km, of which village road networks are not well consolidated with small road basement and narrow surface. Related structures such as drains, bridges and safety fences for roads are not only temporarily built but also insufficient to meet requirements of road grade. As road is not paved by gradation, vehicles can pass only during the dry season.

(3) Existing Road Networks in Dien Bien Province

Provincial Road: Dien Bien province has five provincial road lines consisting of No.126, No.129, No.130, No.131, and No.133, of which 79 km of asphalt gravel pavement account for 52%; 74 km of macadam pavement accounts for 48% of the total length.

Most provincial road lines were constructed based on a low technical standard, mainly grade VI with narrow width, poor quality of pavement, low-weighted – H13 or H10 bridges and drains. High longitudinal slopes do not comply with technical standard, leading to traffic accidents.

Rural Road: Total length of rural road networks including district, commune and village roads is 3,119.5 km of which 23.6 km is asphalt macadam road; 24.4 km concrete cement road: 640 km gravel road and 2,331.1 km earth road. The district road networks are distributed unevenly concentrated mainly in

districts located near a city. 12% of the total length of district roads is paved by asphalt and the remaining 88% is gravel and earth paved road.

Presently, most road lines are of only classes A and B of rural road standard; most bridges, spillway and drains along roads are constructed as temporary structures, therefore, traffic conditions are not safe. As road signs and safety equipments are not installed, management of traffic safety is not sufficient. If maintenance works is not carried out frequently, rural roads would be certainly degraded and deteriorated very fast. Urgent improvement of district networks is required within the coming years. Commune and village road networks consist of earth roads with poor quality of road surface and 1.3 to 3m wide roads. Vehicles for transport are only available in the dry season.

Table 5.2.5 Present Conditions of Rural Roads (Dien Bien Province)

(Unit: km)

Name of District	Population	Length of rural roads			Density of roads[1]
		Provincial	District	Total	
TP. Dien Bien Phu	46,954	-	68.9	68.9	1.47
TX. Muong Lay	14,009	10.0	2.6	12.6	0.90
H. Dien Bien	104,267	6.0	201.2	207.2	1.99
H. Dien Bien Dong	51,157	47.0	263.9	310.9	6.08
H. Muong Cha	46,322	30.0	47.9	77.9	1.68
H. Muong Nhe	36,834	40.0	102.5	142.5	3.87
H. Tua Chua	43,707	20.0	161.9	181.9	4.16
H. Tuan Giao	107,431	-	141.0	141.0	1.31
Total	450,684	153.0	989.9	1,142.9	2.54

Source: Master Plan Report for Road Development of Dien Bien Province, 2006, and Statistical Yearbook of Lai Chau Province, 2006

1: Density of roads is presented in km / 1,000 persons.

(4) Existing Road Networks in Son La Province

Provincial Road: There are 16 lines of provincial road with the total length of 589 km, consisting No.101, 103, 103A, No.104 to No.109, No.110 to No.117 of which asphalt concrete and macadam road is 311 km length, accounting for 53% and the remaining roads are unpaved. Most provincial road lines have low technical standard such as narrow road surface of 3.5 m, low-weighted load level of 13 tons.

Rural Road: The total length of district road is 1,214 km, of which asphalt macadam and gradation roads is 44 km length accounting for 4 % and the unpaved road is 96% of the total length. Four out of the total 189 communes are without roads to commune centre. Village roads of 1,012 km length are all unpaved, and in the dry season, only bicycles and motorbikes are used for transportation.

Due to topographical conditions in the mountainous areas, existing road networks have many difficulties in terms of transport and passengers such as low quality of road networks with narrow and unpaved surface and road blocking during the rainy season.

Table 5.2.6 Present Conditions of Rural Roads (Son La Province)

(Unit: km)

Name of District	Population	Length of rural roads			Density of roads[1]
		Provincial	District	Total	
TX. Son La	76,266	45.0	14.0	59.0	0.77
H. Bac Yen	51,220	55.0	139.0	194.0	3.79
H. Mai Son	126,064	103.0	96.0	199.0	1.58
H. Moc Chau	143,513	22.0	186.0	208.0	1.45
H. Muong La	83,861	29.0	167.0	196.0	2.34
H. Phu Yen	103,131	70.0	183.0	253.0	2.45
H. Quynh Nhai	66,818	75.0	22.0	97.0	1.45
H. Song Ma	111,658	30.0	154.0	184.0	1.65
H. Sop Cop	36,307	54.0	56.0	110.0	3.03
H. Thuan Chau	136,825	25.0	157.0	182.0	1.33
H. Yen Chau	63,902	81.0	40.0	121.0	1.89
Total	999,565	598.0	1,214.0	1,803.0	1.80

Source: Master Plan Report for Road Development of Son La Province, 2006, and Statistical Yearbook of Lai Chau Province, 2006

1: Density of roads is presented in km / 1,000 persons.

(5) Existing Road Networks in Hoa Binh Province

Provincial Road: There are 16 lines of provincial road with total length of 364 km, consisting of No. 431, No.432, No.433, No.434, No.435B, No.436, No.437, No.438, No.439, No.441, No.443, No.444, No. 445, No.446, No.447 and others. The asphalt and concrete road is 198 km length, accounting for 54% and the remaining macadam and earth road is 165 km length. Most provincial road lines are of low technical standard, mainly grade IV.

Rural Road: Total length of rural road networks including district, commune and village is 3,485 km of which 521 km asphalt or asphalt concrete road, accounting for 15% and 2,964 km macadam or earth road (85%). Since rural road networks mainly consist of roads to district towns and commune centers, access to communes and villages is very difficult especially during the rainy season. Rural road networks are not well maintained due to the lack of local fund.

Table 5.2.7 Present Conditions of Rural Road（Hoa Binh Province）

(Unit: km)

Name of District	Population	Length of rural roads			Density of roads[1]
		Provincial	District	Total	
TX.Hoa Binh	83,607	25	69	94	1.13
H.Cao Phong	41,014	33	175	208	5.07
H.Da Bac	51,800	81	416	497	9.59
H.Kim Boi	142,370	41	621	662	4.65
H.Ky Son	35,307	23	134	157	4.45
H.Lac Son	132,384	27	592	619	4.68
H.Lac Thuy	50,140	31	246	277	5.52
Luong Son	82,014	21	264	285	3.48
H.Mai Chau	49,670	22	255	277	5.58
H.Tan Lac	78,791	32	460	492	6.24
H.Yen Thuy	63,033	27	253	280	4.44
Total	810,130	363	3,485	3,848	4.75

Source: Master Plan Report for Road Development of Hoa Binh Province, 2006, and Statistical Yearbook of Lai Chau Province, 2006

1: Density of roads is presented in km / 1,000 persons.

5.2.4 Administrative Support on Rural Road Development

Administrative support on rural road development is given based on the organization law of Peoples' Council and PPC. Each provincial administration office in the northwestern areas prepares the rural road development plan, which will be implemented after the approval by PPC. In actuality, PPC assigns DOT to preside and collaborate with DPI and Department of Finances. The head of PPC, directors of DPI, Finance and Transportation, chairman of DPC, leaders of relevant departments and sectors have responsibility to implement the plan.

Provincial DOT has the following regulatory and oversight responsibilities for rural road.

- To develop provincial, district and commune transport strategies
- To plan and manage the construction of provincial road networks
- To maintain provincial road networks
- To support district and commune governments in planning the maintenance of their road net works

PPC has a responsibility of approving provincial strategies and plans. District Departments of Transport and CPC have responsibilities for a) approval of transport plans for districts and communes and b) maintenance of road net works.

5.3 Irrigation and Drainage

5.3.1 Existing Conditions of Irrigation Development

Growth in the agricultural sector in Vietnam depends largely on the contribution of irrigation development. Nonetheless, industrial and urban growth is straining available water resources. It is expected in the near future, that the need to manage water among competing users within river basins will increase. Under such circumstances, the dominance of irrigated rice production based on abundant water supplies will give way to more diversified cropping systems such as value-added industrial and horticultural crops that demand more efficient use of water resources. In addition, to cope with the increasing needs for double-cropping/two-time rice cropping, it becomes essential to develop irrigation systems, which can serve water throughout the year.

As of 2001, there were 8,265 hydraulic works of all kind, which consist of 743 medium and large-scale reservoirs, 1,017 weirs, 4,712 medium and large-scale irrigation and drainage intakes, approximately 2,000 pumping stations, about 8,000 km closure dyke for flood control in the Mekong delta and ten thousands kilometer length of canals and related structures with total investment costs at 100,000 billion VND (equivalent to approximately US$6.0 billion). This amount does not include investment costs of local budget, financial support from NGOs and local people's contribution at about 25% to 30% of total investment costs.

Irrigation systems presently being utilized include the facilities constructed during the colonial period in addition to the above. These are much deteriorated and many have exceeded their service lives. Due to

the shortage of funds for maintenance of these systems, no adequate maintenance has been conducted, and as a result, deterioration and damages of the irrigation systems have been accelerated. In addition, only the main portions of these deteriorated facilities have been renovated recently, and other important structures such as secondary and tertiary canals as well as on-farm structures were left behind renovation/rehabilitation.

According to the statistics recorded by DWRSM (at present, DI) under MARD, irrigated paddy area in 2002 was over 7.0 million hectares, of which winter-spring paddy area of 3,229,000 ha, summer-autumn paddy area of 2,340,000 ha, and rainy season paddy of 1,264,000 ha, industrial and upland crop area of 774,000 ha were cultivated.

Most of irrigation systems are designed to convey water by means of gravity. In some areas, however, irrigation is practiced by pumping up water from shallow wells, and by manually lifting water from drains or shallow wells. As a result, production cost becomes high and net income becomes low.

High priority should be given to improvement of the existing irrigation systems to raise water use efficiency in future, so as to increase irrigated area with such high efficiency, then the initial investment costs for new development for irrigation would be reduced. As s result, irrigation area can be increased with less expenditure.

In Vietnam, there are various problems regarding irrigation and drainage as stated hereinafter: (i) existing irrigated systems do not cover 100% of water demand of the designed irrigation area, that results in serious water shortage during the dry season, (ii) poor operation and maintenance of irrigation systems due to everlasting IMC fund shortage as discussed in the later paragraph, (iii) lack of transparency and accountability on management and financial matters, (iv) delay in maintenance of irrigation system and its accumulation, and (v) shortage of fund for rehabilitation and new construction of irrigation systems. On the other hand, irrigation and drainage sector has merits and properties such as (i) abundant water resources available for irrigation, (ii) capable professionals and farmers, (iii) competent government organization, (iv) energetic agriculture sector, and (v) strong will for reform and improvement.

5.3.2 Irrigation and Drainage Sector Institutional Arrangements

In Vietnam, management, construction, maintenance, and operation (distribution of irrigation water and collection of water charge) of irrigation and drainage sector are carried out by the following institutions.

(1) Central Government

At the central government level, MARD is responsible for the overall policy framework. The Department of Policy is in charge of overall adjustment for agricultural and rural development policies. Respective central ministries make adjustment of the local governments' strategies through their policies and guidelines. MPI is responsible for adjustment of overall plans and programs, allocation of national budget, and preparation of annual programs among central ministries, which are subject to approval of the Prime Minister.

Irrigation sector is supervised by Department of Planning, Department of Investment and Construction, DWRSM (dominated as DI). The central ministry is responsible for planning, examination of design and construction as well as budgetary allotment for dams, intake weirs, main canals, and laterals commanding more than 150 ha. The Institutes of Vietnam Water Resources Science, Water Resources Master Planning, and Policies and Strategy for Agriculture and Rural Development under MARD are responsible for project investigation, basic planning and basic design. The local government is responsible for the laterals commanding an area less than 150 ha in principle, however, the central government sometimes funds for the implementation for such small projects.

(2) Provincial Government

PPCs are responsible for the public irrigation systems within their boundaries. Their functions include decision making of policy, fund allocation, budgeting, setting irrigation service fees and managing personal affairs based on national guidelines of the central government. PPCs prepare an annual socio-economic development plan including agricultural and rural development. The plan thus prepared including budgetary allocation is subject to approval of the central government.

DARDs are responsible for irrigation sector. Their functions include construction, and operation and maintenance of irrigation and drainage infrastructures less than 150 ha (for operation and maintenance, DARD is responsible for the entire system more than 150 ha including dams). IMCs exist at the provincial or system level under the supervision of PPC acting through the DARDs.

(3) Irrigation Management Company (IMC)

IMCs are state owned enterprises (the self-supporting systems in principle) that work public benefits under the supervision of PPC, and in charge of operation and maintenance of all the irrigation systems in provinces. Annual budgets for IMCs are determined by the negotiation between the IMCs and the water users' associations, which are subject to approval of PPC. In case of shortage of budget, the PPC often subsidize the deficit to IMCs.

Organization and management systems of IMCs differ widely from each other. Their financial status depends on irrigation service fees, collection rates and total amount. In general, most of IMCs are not able to afford periodical maintenance, after deducting the pay for the employees and the expenditures for relatively large-scale emergency renovation. In addition, some of IMCs are not able to carry out their duties due to lack and deterioration of facilities and equipment of their company, vehicles, operation and maintenance machinery, etc.

IMCs are expected to conduct operation and maintenance of the irrigation systems based on the water distribution schedule, which are prepared by summing up each water demand from water users' associations. However, operation of the systems cannot be appropriately carried out due to limited capacity caused by sedimentation of canals, shortage of pumping capacity, frequent failure of electric power and equipment, etc. In addition, many areas are suffering from shortage of water because of

leakage of water from canals and structures and seepage of water from sandy earth canals, lack of control structures, etc.

Shortage of irrigation water is caused by deterioration of irrigation systems and inappropriate operation and maintenance. Collection of irrigation service fee is difficult due to shortage of irrigation water. Financial status of IMCs is worsened by poor collection rate of irrigation service fee, and as a result, their activities become no more appropriate for operation and maintenance of irrigation systems.

(4) Communes or Agricultural Cooperatives

Within the IMC systems, there are more than 10,000 communes and agricultural cooperatives (including water user's associations). The cooperative has both a production unit and an organization unit. In the production unit, some work such as plowing, sowing and irrigation is carried out collectively by teams. The leader of irrigation team is in charge of distribution of water to the paddy and perennial crop fields. Work of the production unit includes preparation of irrigation schedule, maintenance of field ditches, and collection of irrigation service fee instead of the IMC.

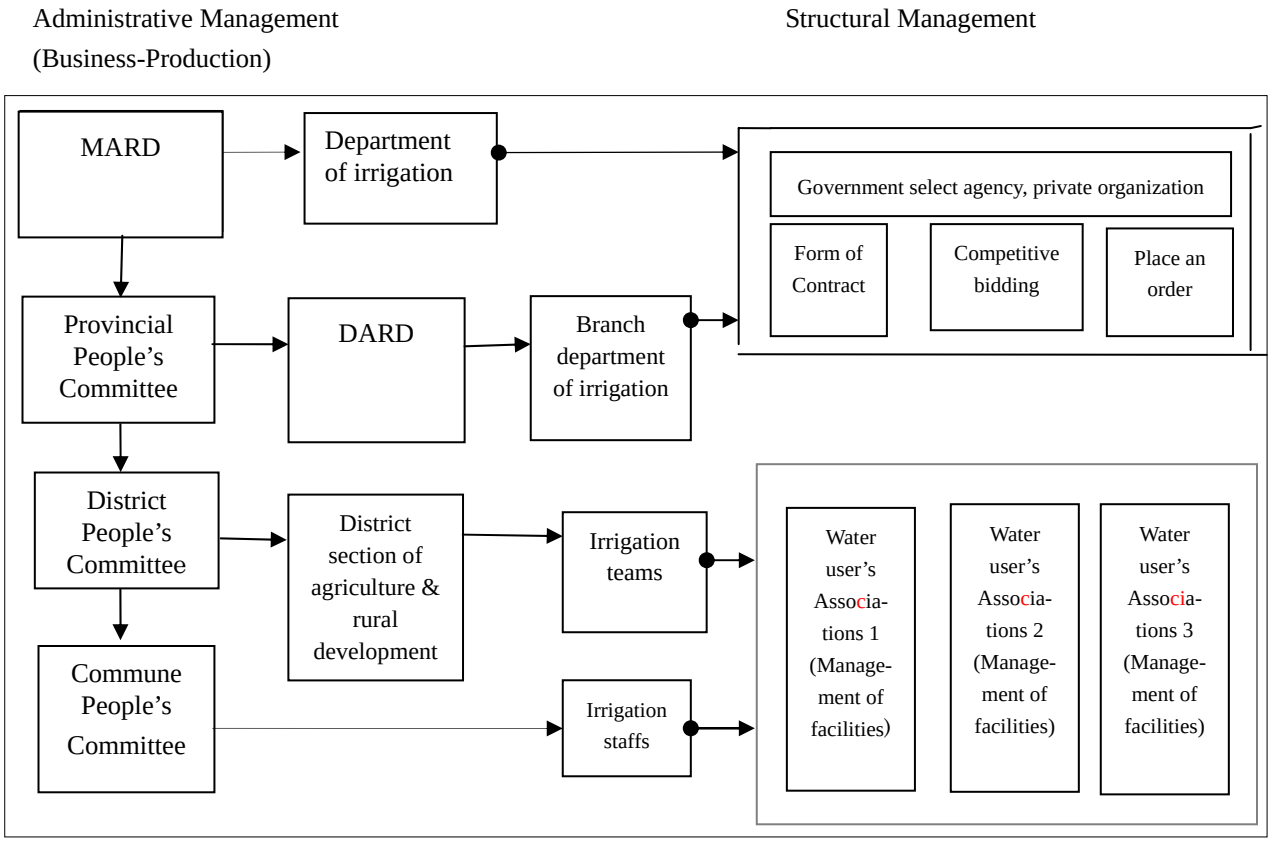
(5) Organizational and Institutional Constraints

The government management organization of irrigation sector from central level to local level is not unified (out of 64 provinces and cities, 17 provinces founded Branch Department of Irrigation, 3 provinces founded Branch Department of Water Resources and Hydraulic Facility Management, 24 provinces founded Branch Department of Water Resources Management and Flood and Typhoon Protection, 16 provinces founded Irrigation Sections). As a result, direction and management works that are implemented from central level to local one are very complicated and not unified. Figure 5.3.1 shows the management model of irrigation system from the central level (MARD) to the end users (water user's association).

Management fields of many IMCs are diversified, some IMCs that have managed from the headworks to the on-farm systems, especially in the northern provinces. Management has not been always comprehensively conducted, but restricted to lands of small pieces. As a result, farmers have not been managed irrigation water economically or efficiently.

The policy of all the IMCs is to distribute irrigation water equally in terms of quantity and quality to the paddy fields, but such efforts have not been reflected in the income of IMCs staffs, resulting in neglecting their duties. This status will reduce creating the works of IMCs staffs because the policy has not tied their duties to interest. Moreover, the scope of the work for the IMCs staffs is not clearly defined.

As the irrigation organizations have been formed (or imposed) spontaneously without uniformity, they have not played intermediary roles between the government and the farmers, resulting in limitation of local community's contribution in maintenance, management and protection of irrigation systems, which have produced a erroneous concept that "the ownership of irrigation systems is the government, so any of their damage is to be repaired by the government".



Notes: - Administrative management
- Administrative and technical management
- Production relationship

Figure 5.3.1 Management Model of Irrigation Systems

5.3.3 Development Investments by the Government and Irrigation Fees

(1) Development Investments by the Government

Government subsidies to IMCs are for (a) pumped drainage, (b) pumped irrigation exceeding planned norms, (c) overhauling and upgrading irrigation and drainage works, (d) fees which cannot be collected due to natural disasters, and (e) rehabilitating irrigation and drainage works destroyed by natural disasters. Costs of normal depreciation and replacement are also not recovered from beneficiaries. This trend to create a short-term perspective on the part of managers and farmers and to defer maintenance until it becomes "overhauling and upgrading" at which time Government subsidies can be obtained.

(2) Irrigation Fees

Irrigation fees paid by farmers ranged from 2-5% of rice production. However, only about half of the fees assessed were actually collected with the end result being just under half of annual O&M costs.

One fundamental problem with the fee assessment system was that it was not done with respect to the costs of operation and maintenance incurred in a particular system but was based on political factors for an entire region. Irrigation fees were determined regardless of amount of irrigation water and effectiveness of irrigation systems. Irrigation fee was specified by absolute and fixed figures, meanwhile all inputs or

productions depend on market fluctuation, thus were not suitable. Subsidies to the farmers were paid regardless of commodity prices, however there was no limitation in the amount of water, and hence waste of water occurred.

In Vietnam, funding for irrigation development was provided on a grant basis. O&M of the large and medium-scale systems were practiced by IMCs, not by the beneficiaries. In order to implement the policy of irrigation management, MARD issued Circular No. 75/2004/TT-BNN in 2004 and provided the guidelines on the establishment, strengthening and development of WUOs. Nonetheless WUOs are inactive. Some international donors are assisting in promoting strengthening of WUOs in the completed irrigation projects. The government issued Decree No. 154/2007/ND-CP in 2007 in which irrigation service fee was exempted. The decree also states that IMCs shall change their management modalities.

5.3.4 National Strategies for Irrigation and Drainage Sector

(1) Basic Strategy for Development

Basic strategies of irrigation and drainage development have been clearly mentioned in CPRGS (2006-2020). In particular, a priority has been given to the development of rural infrastructure, of which irrigation and drainage are included. CPRGS provides major policies and measures for agriculture and rural economy. It plans to create (a) increasing efficiency and diversifying agricultural production, (b) changing the structure of the economy and marketing agricultural products, (c) agricultural diversification and development of rural profession, (d) shift towards large-scale labor intensive production.

The Government places high priority on key sector issues such as irrigation modernization, dam safety, and improved water resources management. The overall "Strategy of Socio-Economic Development 2001-2010" presented by the Central Committee at the 9th National Congress highlighted the importance of these issues. One of the major objectives is "to speed up agricultural and rural industrialization and modernization geared toward forming a large-scale commodity agriculture relevant to market demands and ecological conditions of individual regions". Modernization of irrigation and drainage systems will result in more reliable, efficient, and equitable water services, which is indispensable for agricultural modernization.

Vietnam has a number of strengths on which to build an improved irrigation and drainage sector. A number of macro-level reform efforts provide a strong impetus for change. Another strength is the formal existence of the IMC corporate form. The formal separation of the service provider (the IMC) from the regulator resources manager (MARD/DARDs) is an important hallmark of a maturing water economy. Some important relationships, such as between the IMCs and the communes, are governed by formal constraints rather than informal agreements, which provide a sound base for future improvements.

No documentation has been made for the strategy of the function of water users' associations. However, an institute suggests that to strengthen participatory role of community, water users should be the independent and autonomous form. In short-term, small canals and structures with an irrigation area less

than 500 ha should be handed over to water users' community to manage, and they will select the form of proper management organization that will specify contents and means of activity, and balance of all costs, expenditures and revenue based on current relevant law and complying with local customs and regulations. The Government only specifies water charge policy for the parts managed by the Government. Water charge level for the parts managed by community of water users will be decided by themselves.

The irrigation-based management unit should be changed into organizational model of "Water User's Association." The water user's association is a community's organization consisting of farmer's households using water for irrigation and drainage on the same canals and irrigated area, they voluntarily cooperate each other for implementation tasks for management, operation and water distribution aiming at bringing highest economic effectiveness to water users. The water user's association can manage directly through an apparatus elected by members of the association or hire a private organization to manage through a management contract.

It can be said that the shortage of budget in the central and local governments caused the delay in adequate maintenance of irrigation and drainage systems, and deterioration and damages of the systems have been accelerated. As a result, distribution of the irrigation water into the terminal systems and collection of water service fees have become difficult, and hence the irrigation facilities have not been fully maintained and functionality of the facilities has declined.

In order to break this "vicious circle", the Government intends to improve the efficiency of the entire irrigation systems. This can be realized by improving (rehabilitating) the facilities with the aim of recovering the function of the irrigation schemes by applying the technical and financial assistance from the international donors. The Government has commenced to put in serious efforts to tackle the following issues:

1) To rehabilitate and upgrade the existing irrigation and drainage systems,
2) To promote participatory irrigation management (PIM) program for the strengthening of the water user's associations,
3) To upgrade the technical and management capabilities of the staffs of the central and local governments (MARD, DARDs, IMCs),
4) To promote the most appropriate water application systems and establishment of research institutes for the national program on "reinforcement and modernization of irrigation and drainage".

(2) Review of Irrigation and Drainage

The Vietnam Water Resources Sector Review (the 1996 WS Review) covers policy and planning, strengthening institutions, high priority investment and investment requiring further basin planning and management. The recommendations under policy and planning, and strengthening institutions give the framework for the recommended areas of focus under the investment. One of the recommended areas of focus under high priority investment is "Agricultural water control and rehabilitation projects that will

improve dry season water supply". On the other hand, "Irrigation projects that require additional dry season water" is put under investment requiring further basin planning and management.

The 1996 WS Review acknowledged the change in the food production status of Vietnam from a net importer to a net exporter of rice. Also, the low labor productivity of rice compared with those of other crops, and the needs for diversification to perennial and other annual crops were acknowledged. However, putting the emphasis on the food security and rice export, the 1996 WS Review accepted the need to double the annual paddy production over the 30 years through increasing the cropping pattern intensity. Hence accorded priority to increase the area to be cropped to paddy by rehabilitating irrigation and drainage infrastructure while qualifying that irrigation projects that required additional dry season water should be undertaken after the basin planning and management.

5.3.5 National Strategies on Priority Projects

The "Water Resources Management and Development Strategy (2000-2020)" covers the national strategies on (a) Improvement and modernization of hydraulic works systems, (b) Multi-purpose reservoir development, (c) Water resources development services for agriculture-rural area economic structure shifting, (d) Flood protection and disaster mitigation, (e) Water resources protection, (f) Water resources management. Strategies related to small irrigation and drainage development are as follows:

(1) Improvement and Modernization of Hydraulic Works Systems

Objectives

The objectives are to improve the stability of head-works and canals, decrease losses, save water and enhance the efficiency of water supply both designed capacity and performance of existing systems.

Contents

- Review existing structures and management of the systems,
- Study proper technical solutions for improvement and modernization of canals and head-works,
- Invest in the implementation of repairing, upgrading, improving and modernization of works and equipment,
- Enhance the capacity of effective management of systems.

(2) Water Resources Development Services for Agriculture-Rural Area Economic Structure Shifting

Objectives

The objectives are to develop water infrastructure to timely meet the demand on water in suitable and flexible way, serving for agriculture-rural area economic structure shifting in the immediate stage that does not contradict with developing demand in the long-term period in the process of economic structure strengthening and to ensure the sustainable development.

Contents

- Check, adjust and supplement socio-economic development planning, shifting of agriculture-rural area economic structure following the industrialization and modernization orientation at specific regions and provinces,
- Assess water source potential and existing condition of irrigation infrastructure at each area,
- Research and provide technical method on water supply and water resource protection for the development of the people and agricultural economy at each region,
- Arrange proper personnel source to exploit water supply works.

(3) Water Resource Protection

Objectives

The objectives are to protect water sources from pollution and exhaustion so as to ensure the sustainable development of water resources, meeting the requirements in the immediate time as well as in the long-term development of social-economic sectors.

Contents

- Investigate and assess water resource at both quantity and quality, real situation and forecasting of water pollution and exhaustion, flow requirement to ensure ecological environment,
- Research, propose and implement water resource protection measures for each river basin.

(4) Water Resource Management

Objectives

Good management of water resources at river basins, ensure the exploitation of water resources being carried out in sensible and economical way, effectively serve for the immediate development of socio-economic sectors without any reversed affect to the long-term development requirement.

Contents

- Improve legal documents relating water resource management, mechanism and policy,
- Strengthen organization mechanism in water source management. Reinforce and improve capacity for staff working in water resource management,
- Basic investigate water resource,
- Complete and periodically check and adjust water resource protection and development planning at river basin, economic zones and provinces so as to have a foundation for water resource management and formulate annual and the 5 year plans for irrigation investment.

5.3.6 Water Resources and Existing Irrigation Systems

Water resources for the irrigation in the Region consist of three major rivers, namely the Da River, Ma River and Nua River. Characteristics of these rivers are as follows (refer to Figure 5.3.2):

The Da River is an international river, which rises from Yunnan province of China. Total length of the Da River is 1,010 km, of which upper 45% is situated in China and lower 55% in Vietnam. The length of the river is 10 times of the width of the river basin. It joins the Red river at 70 km downstream the Hoa Binh hydropower station being operated at present. Major tributaries consist of, from the left bank, the Na River and Mu River, and from the right bank, the Po River and Muc River. Irrigation water is not drawn off these mainstream and tributaries, but drawn off the smaller tributaries meeting these rivers.

The Ma River originates from Dien Bien province, crosses the Son La province, enters into Laos at midstream, returns to Hoa Binh province, and flows into the Gulf of Tonkin. Total length of the Ma River is approximately 500 km, of which midstream 90 km is located in Laos, and upper stream and lower stream 410 km in Vietnam. The basin is long and narrow. Major tributaries consist of, from the left bank, the Thi River, and from the right bank, the Long River and Le River.

The Nua River is an international river, which rises from the north of Dien Bien province, crosses the Dien Bien city and basin, enters in Laos and finally flows into the Mekong. Slope of the Nua River in its upstream is very steep and flows down as many falls, and its slope becomes gentle in the Dien Bien basin. Major tributaries of the Nua River consist of the Phang River, Khua River, Hu River, Co River, etc.

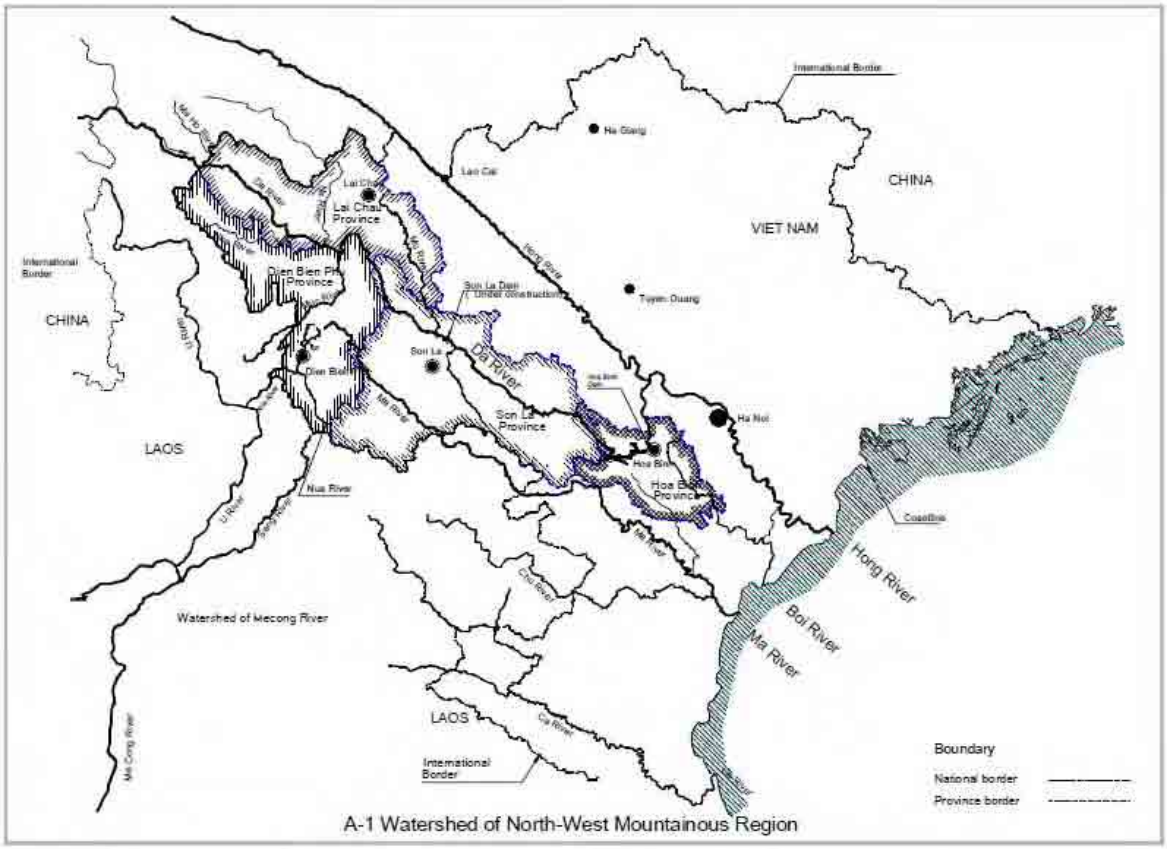


Figure 5.3.2 Major Rivers in and around the Region

Catchment areas of the rivers and tributaries of the respective provinces in the Region are shown in Table 5.3.1.

Table 5.3.1 Catchment Areas of Each Province in the Region

Unit: km^2

Name of river	Lai Chau	Dien Bien	Son La	Hoa Binh	Total
Song Da	9,065	5,904	8,913	1,605	25,488
Nam Ma		2,049	4,894	1,509	8,452
Nam Nua (Mekong tributary)		1,601			1,602
Nam Mua (Nam Hong tributary)			194		194
Nam Boi				1,040	1,040
Nam Hong tributarues				508	508
Total	9,065	9,554	14,001	4,663	37,283

Major rivers and river systems in the respective provinces are described in the following paragraphs:

(1) Lai Chau Province

Major rivers in Lai Chau province are the Da River and its tributaries, Nam Ma and Nam Na. These major rivers flow southward crossing the boundaries of province and district, but their minor tributaries are located within one district in the most case. In general, irrigation water is not taken from the three large rivers, but from the minor tributaries in the district level. Due to limitation of water and land resources, average irrigated area of one system is approximately 20 ha, and mostly less than 50 ha.

Main rivers, major tributaries, number of irrigation systems and irrigated area of each district in the Lai Chau province are as shown in Table 5.3.2.

Table 5.3.2 Water Resources and Irrigated Areas in Lai Chau Province

Name of District	Name of Main Rivers	Name of Major Tributaries	No. of Systems	Irrigated Area of Dry Season Paddy (ha)
TX. Lai Chau	Song Da/Nam Na	Song Mu, Song So, Nam Pat	18	15
H. Muong Te	Song Da	Nam La, Nam Ma, Nam Cum, Sg. Kha U, Nam Chau, Nam Xi Lung, Nam Bum, Nam Nha, Nam Mhat	220	862
H. Phong Tho	Song Da/Nam Na/Nam Ma	Meng La Ho, Nam Cum, Nam Lum, Nam Pat, Nam So, Nam Na, Nam Phin Ho	148	1,341
H. Sin Ho	Song Da/Nam Na	Nam Ban, Nam Cuoi, Nam Ma, Nam Cuoi	213	684
H. Tam Duong	Song Da/Nam Mu/Nam Na	Nam Mu, Nam So, Nam Ma	122	1,323
H. Than Uyen	Song Da/ Nam Mu	Nam Mu, Nam Ui, Nam Chit, Sg. Mit Luong, Nam Ma, Nam Kim	274	2,402
Total			995	6,627

Source: Master Plan Report for Irrigation Development of Lai Chau Province, 2005

(2) Dien Bien Province

River system in the Dien Bien province is divided into two, one is the Da River system, which flows into the Red River and the other is the Nam Nua River system, which pours into the Mekong River through Laos. Irrigation water for the northern agricultural lands in the Dien Bien province is taken from the

tributaries of the Da River meeting on the right bank, for the midland areas from the tributaries of the Ma River, and for the southern lands from the tributaries of the Song Ma. The Dien Bien basin is irrigated by the water of the Nam Rom dam constructed on the Nam Nua. In the Dien Bien province, large-scale irrigation is practiced only in the Dien Bien basin and approximate area of other irrigation systems is as small as 20 ha on average.

Main rivers, major tributaries, number of irrigation systems and irrigated area of each district in the Dien Bien Province are as shown in Table 5.3.3.

Table 5.3.3 Water Resources and Irrigated Areas in Dien Bien Province

Name of District	Name of Main Rivers	Name of Major Tributaries	No. of Systems	Irrigated Area of Dry Season Paddy (ha)
TP. Dien Bien Phu	Mekong River/ Nam Nua	Nam Nua, Nam Rom, Nam Lua, Nam Khau, Nam Hu	23	135
TX. Muong Lay	Song Da	Nam Na, Nam He	11	423
H. Dien Bien	Mekong River/ Nam Nua	Nam Nua, Nam Rom, Nam Khua, Nam Hu, Nam Rua, Nam Ngam, Song Ma	177	4,801
H. Dien Bien Dong	Song Da/ Song Ma	Song Ma, Nam He, Suoi Lu, Nam Man, Suoi Duong	86	463
H. Muong Cha	Song Da	Nam Nhat, Nam Po, Nam He, Nam Muc, Nam Chim, Nam Na, Nam Lay	167	423
H. Muong Nhe	Song Da	Nam Ma, Sg. Ban Bo Ho, Nam Nhat, Nam Nhe, Nam Po, Nam Cha	62	167
H. Tua Chua	Song Da	Song Ma, Nam Ma, Nam Bay	36	326
H. Tuan Giao	Song Da/ Song Ma	Song Ma, Nam Muc, Nam Sat, Nam Hua, Nam Ma	175	1,272
Total			737	8,010

Source: Master Plan Report for Irrigation Development of Dien Bien Province, 2005

(3) Son La Province

River system in the Son La Province is divided into two, one is the Da River system, which flows into the Red River and the other is the Ma River system, which pours directly into the Gulf of Tonkin. Approximately 70% of the total agricultural lands located in north, midland and east of the Son La province is irrigated by the tributaries of the Da River, and 30% of the total agricultural lands located in southeast of the province by the tributaries of the Ma River system. Average irrigated area of one system is about 10 ha. It is important to note that there exist two river systems in the Thuan Chau district, and hence careful study is necessary for the formulation of master plan.

Main rivers, major tributaries, number of irrigation systems and irrigated area of each district in the Son La province are as shown in Table 5.3.4.

Table 5.3.4 Water Resources and Irrigated Areas in Son La Province

Name of District	Name of Main Rivers	Name of Major Tributaries	No. of Systems	Irrigated Area of Dry Season Paddy (ha)
TX. Son La	Song Da	Mam Bu	74	335
H. Bac Yen	Song Da	Suoi Lum, Suoi Bon Lay, Suoi Chim, Suoi Luong, Suoi Be	165	295
H. Mai Son	Song Da	Nam Bu, Nam Pan, Suoi Hoc	162	690
H. Moc Chau	Song Da	Suoi Giang, Suoi Loi, Suoi Tan, Suoi Sap, Nam Ma, Suoi Dong	251	644
H. Muong La	Song Da	Nam Mu, Nam Chang, Nam Pam, Suoi Chien, Nam Pia, Suoi Lum	89	553
H. Phu Yen	Song Da	Suoi Be, Ngoi Lao, Suoi Toc, Suoi Lum, Song Mua	145	1,499
H. Quynh Nhai	Song Da	Nam Mu, Nam Kim, Suoi Tra, Nam Chen, Nam Gion	290	716
H. Song Ma	Song Ma	Nam Ma, Nam Soi, Nam Ty, Nam Cong, Nam Cat	356	1,108
H. Sop Cop	Song Ma	Nam Ma, Nam Soi, Nam Khoai, Nam Pac, Nam Con, Nam Ty	215	554
H. Thuan Chau	Song Da / Song Ma	Suoi Muoi, Nam Bu, Nam Tac, Nam Ty, Nam Ma	249	1,185
H. Yen Chau	Song Da	Suoi Sap, Nam Pan, Suoi Sap Viet, Suoi Sap	141	600
Total			2,137	8,180

Source: Master Plan Report for Irrigation Development of Son La Province (Summary Report)

(4) Hoa Binh Province

River system in the Hoa Binh province is divided into two, one is the Da River system, which flows into the Red River and the other is the Ma River system, which pours directly into the Gulf of Tonkin. Approximately 95% of the total agricultural lands located in north, midland and east of the Hoa Binh province is irrigated by the tributaries of the Da River, and 5% of the total agricultural lands located in Mai Chau district, southeast of the Province by the tributaries of the Ma River system. Average irrigated area of one system in this province is about 30 ha, which are fairly large compared to the average of the four provinces.

Main rivers, major tributaries, number of irrigation systems and irrigated area of each district in the Hoa Binh province are as shown in Table 5.3.5

Table 5.3.5 Water Resources and Irrigated Areas in Hoa Binh Province

Name of District	Name of Main Rivers	Name of Major Tributaries	No. of Systems	Irrigated Area of Dry season Paddy (ha)
TX. Hoa Binh	Song Da	Suoi Ngoi Su, Suoi Ca	30	215
H. Cao Phong	Song Da/Song Boi	Suoi Vang, Suoi Cai, Song Boi, Suoi Treo	56	518
H. Da Bac	Song Da	Suoi Cai, Suoi Lao	61	443
H. Kim Boi	Song Da/Song Boi	Suoi Buc, Suoi Loi, Song Ca, Song Boi, Suoi Treo	194	2,164
H. Ky Son	Song Da	Suoi Anh	56	940
H. Lac Son	Song Da/Song Day	Song Day, Suoi Song, Suoi Buoi, Suoi Sao, Suoi Cai	236	1,634
H. Lac Thuy	Song Da/Song Day	Song Day, Song Boi, Sg. Can Bau	104	856
H. Luong Son	Song Da/Song Hong	Song Hong, Song Con, Song Bui	81	1,180
H. Mai Chau	Song Da/Song Ma	Song Ma, Song Da, Suoi Thai, Song Ma	106	804
H. Tan Lac	Song Da/Song Day	Song Day, Suoi Sao, Suoi Cai	177	2,015
H. Yen Thuy	Song Da/Song Day	Song Day, Song Roc, Song Buoi	108	1,280
Total			1,209	12,049

Source: Master Plan Report for Irrigation Development of Hoa Binh Province, 2005

5.3.7 Existing Conditions of Irrigation in Four Provinces

Table 5.3.6 shows the cropped areas of summer-autumn paddy (wet season) and winter-spring paddy (dry season), the cropped areas in the improved systems and traditional systems for the respective wet and dry seasons, and proportional extent of irrigated area of the dry season paddy to the wet season paddy. Total cropped area in the four provinces of paddy in the wet season is 61,282 ha, and total cropped area in the dry season is 34,866 ha, totaling 96,148 ha. Percentage of cropped area in the dry season is 56.9% of the cropped area in the wet season. Ratio of cropped area of dry season paddy to wet season paddy in the improved systems is 64.8%, whilst that in the traditional systems is as low as 38.2%. The fact indicates that the irrigation systems which have been improved are much effective in increasing the efficiency of dry season irrigation. It is also important to note that the cropped area of paddy in the dry season to the wet season in Lai Chau province is as low as 48.8%, which is the lowest among the four provinces.

Table 5.3.6 Existing Conditions of Irrigation in Four Provinces

(Unit: ha)

Name of Province	Summer-Autumn Paddy (Wet Season)			Winter-Spring Paddy (Dry Season)			Proportional Extent[1] (%)
	Improved	Traditional	Total	Improved	Traditional	Total	
Lai Chau	9,393	4,180	13,573	5,385	1,242	6,627	48.8
Dien Bien	9,135	4,943	14,078	6,342	1,668	8,010	56.9
Son La	9,401	4,607	14,008	6,914	1,266	8,180	58.4
Hoa Binh	15,195	4,428	19,623	9,293	2,756	12,049	61.4
Total	43,124	18,158	61,282	27,934	6,932	34,866	56.9

Source: Master Plan Report for Irrigation Development of Lai Chau, Dien Bien, Son La and Hoa Binh Provinces, 2005
1: Percentage of irrigated area of winter-spring paddy (dry season paddy) to summer-autumn paddy (wet season paddy)

Alignment of most of the traditional irrigation systems are (a) temporary weirs constructed by piling stones across the river to raise water level, and (b) temporary earth canals excavated by manpower, and in some parts where canals are located in the river bed is constructed by piling stones. Both the weir and canals not functioning appropriately due to frequent corruption and leakage of large amount of water through the weirs and canals. As a result, the systems are not appropriately operated and maintained.

Improved weirs are divided into two types depending on dimension of the river basins. One (for large rivers) is fixed concrete weirs with intake facilities equipped with gates for controlling water. In some cases, main canals are concrete lined with water controlling facilities (Nam Rom Project in the Dien Bien basin). The other (for small rivers or streams) is fixed concrete weirs without water controlling structures which cannot be appropriately operated and maintained even after rehabilitation.

(1) Lai Chau Province

Geographical area of the Lai Chau Province is 9,112.3 km^2 (912,230 ha), out of which area of paddy field occupies 13,573 ha which is equivalent to only 1.5% of the geographical area. Area of paddy field is quite limited due to steep-sloped mountainous area. In such steep slope areas, where cultivation of paddy is difficult, the government recommends to cultivate perennial crops, and industrial crop such as tea.

Table 5.3.7 in the next page shows the cropped areas of summer-autumn paddy (wet season) and winter-spring paddy (dry season), the cropped areas in the improved systems and traditional systems for the respective wet and dry seasons, and proportional extent of irrigated area of the dry season paddy to the wet season paddy.

The table indicates that the conditions of irrigation in the Lai Chau Province are as follows:

1) Total cropped area of paddy in Lai Chau province in the wet season is 13,573 ha, and that in the dry season is 6,627 ha, totaling 20,200 ha. Percentage of cropped area in the dry season is 48.8% to that in the wet season. Ratio of cropped area of dry season paddy to wet season paddy in the improved systems is 57.3%, whilst that in the traditional systems is only 29.7%, which is the lowest among the four provinces.

2) Percentage of irrigated paddy field in the dry season to the wet season paddy field is 48.8% in the Lai Chau Province, varying from 66.2% to 3.5% among districts. As the resources of water and land are not well balanced, there are plenty of paddy fields depending on rain.

3) Average area of paddy field (wet season) in this province is as small as 13.6 ha per system, and it is difficult to consolidate these systems for efficient water management. As a result, number of irrigation systems is as large as 995 (improved systems: 264, traditional systems: 731).

4) In this province, there is no scheme such as stable irrigation system with large-scale reservoir or by pumping-up water. No underground water irrigation is practiced either.

Table 5.3.7 Existing Conditions of Irrigation in Lai Chau Province

(Unit: ha)

District	Summer-Autumn Paddy (Wet Season)			Winter-Spring Paddy (Dry Season)			Proportional Extent[1] (%)
	Improved	Traditional	Total	Improved	Traditional	Total	
TX. Lai Chau	345	78	423	15	-	15	3.5
H. Muong Te	795	1,036	1,831	500	362	862	47.1
H. Phong Tho	1,348	679	2,027	1,051	290	1,341	66.2
H. Sin Ho	1,221	824	2,045	648	36	684	33.4
H. Tam Duong	1,982	583	2,565	973	350	1,323	51.6
H. Than Uyen	3,702	980	4,682	2,198	204	2,402	51.3
Total	9,393	4,180	13,573	5,385	1,242	6,627	48.8

Source: Master Plan Report for Irrigation Development of Lai Chau Province, 2005
1: Percentage of irrigated area of winter-spring paddy (dry season) to summer-autumun paddy (wet season paddy)

(2) Dien Bien Province

Geographical area of Dien Bien Province is 9,562.9 km^2 (956,290 ha), out of which area of paddy field (wet season) occupies 14,078 ha which is equivalent to only 1.5% of the geographical area. Area of arable lands is quite limited due to steep-sloped mountainous area. In such steep slope areas, where cultivation of paddy is difficult, the government recommends to cultivate annual crops, industrial crops such as tea and coffee.

Table 5.3.8 shows the cropped areas of summer-autumn paddy (wet season) and winter-spring paddy (dry season), the cropped areas in the improved systems and traditional systems for the respective wet and dry seasons, and proportional extent of irrigated area of the dry season paddy to the wet season paddy. Especially in this province, most of the paddy fields are terraced due to unsuitable steep slope for paddy fields, except for the Dien Bien basin in which large-scale consolidated irrigation is practiced.

Table 5.3.8 Existing Conditions of Irrigation in Dien Bien Province

(Unit: ha)

Name of district	Summer-Autumn Paddy (Wet Season)			Winter-Spring Paddy (Dry Season)			Proportional Extent[1] (%)
	Improved	Traditional	Total	Improved	Traditional	Total	
TP. Dien Bien Phu	202	119	321	98	37	135	42.1
TX. Muong Lay	449	1,092	1,541	254	169	423	27.4
H. Dien Bien	4,793	1,033	5,826	4,218	583	4,801	82.4
H. Dien Bien Dong	817	216	1,033	412	51	463	44.8
H. Muong Cha	449	1,092	1,541	254	169	423	27.4
H. Muong Nhe	741	-	741	167	-	167	22.5
H. Tua Chua	947	-	947	326	-	326	34.4
H. Tuan Giao	737	1,391	2,128	613	659	1,272	59.8
Total	9,135	4,943	14,078	6,342	1,668	8,010	56.9

Source: Master Plan Report for Irrigation Development of Dien Bien Province, 2005
1: Percentage of irrigated area of winter-spring paddy (dry season) to summer-autumn paddy (wet season paddy)

The table indicates that the conditions of irrigation in the Dien Bien Province are as follows:

1) Total cropped area of paddy in Dien Bien province in the wet season is 14,078 ha, and that in the dry season is 8,010 ha, totaling 22,088 ha. Percentage of cropped area in the dry season is 56.9% to that in the wet season. Ratio of cropped area of dry season paddy to wet season paddy in the improved systems is 69.4%, whilst that in the traditional systems is 33.7%.

2) Percentage of the irrigated paddy field in the dry season to the wet season paddy field is 56.9% in Dien Bien Province, varying from 62.4% to 22.5% among districts. As the resources of water and land are not well balanced, there are plenty of paddy fields depending on rain.

3) Average area of paddy field (wet season) in this province is 19.1 ha per system, and it is difficult to consolidate these systems for efficient water management, except for the Dien Bien basin (irrigation ratio in the dry season: 82.4%) where large-scale consolidated irrigation is practiced. As a result, number of irrigation systems is as large as 737 (improved systems: 280, traditional systems: 557).

4) In this province, there are 88 irrigation systems which have reservoirs aiming at stable perennial irrigation, and 14 irrigation systems which are irrigated by pumping up water. However no underground irrigation is practiced.

(3) Son La Province

Geographical area of the Son La Province is 14,174.4 km^2 (1,417,440 ha), out of which area of paddy field occupies 14,008 ha which is equivalent to only 1.0% of the geographical area. Area of arable lands is quite limited due to steep-sloped mountainous area. In such steep slope areas, where cultivation of paddy is difficult, the government recommends to cultivate perennial crops, industrial crops, such as tea and coffee.

Table 5.3.9 shows the cropped areas of summer-autumn paddy (wet season) and winter-spring paddy (dry season), the cropped areas in the improved systems and traditional systems for the respective wet and dry seasons, and proportional extent of irrigated area of the dry season paddy to the wet season paddy. Especially, in this province, most of the paddy fields are terraced due to unsuitable steep slope for paddy fields, except for the tributaries along the Song Da and Song Ma.

Table 5.3.9 Existing Conditions of Irrigation in Son La Province

(Unit: ha)

Name of District	Summer-Autumn Paddy (Wet Season)			Winter-Spring Paddy (Dry Season)			Proportional Extent[1] (%)
	Improved	Traditional	Total	Improved	Traditional	Total	
TX. Son La	537	63	600	320	15	335	55.8
H. Bac Yen	370	490	860	221	74	295	34.3
H. Mai Son	898	324	1,222	627	63	690	56.5
H. Moc Chau	1,185	595	1,780	474	170	644	36.2
H. Muong La	760	325	1,085	437	117	554	51.1
H. Phu Yen	1,400	350	1,750	1,349	150	1,499	85.7
H. Quynh Nhai	708	592	1,300	663	53	716	55.1
H. Song Ma	1,201	601	1,802	821	287	1,108	61.5
H. Sop Cop	443	458	901	553	1	554	61.5
H. Thuan Chau	1,113	508	1,621	892	293	1,185	73.1
H. Yen Chau	786	301	1,087	557	43	600	55.2
Total	9,401	4,607	14,008	6,914	1,266	8,180	58.4

Source: Master Plan Report for Irrigation Development of Son La Province (Summary Report)
1: Percentage of irrigated area of winter-spring paddy (dry season) to summer-autumn paddy (wet season paddy)

The table indicates that the conditions of irrigation in the Son La Province are as follows:

1) Total cropped area of paddy in Son La province in the wet season is 14,008 ha, and that in the dry season is 8,180 ha, totaling 22,188 ha. Percentage of cropped area in the dry season is 58.4% to that in the wet season. Ratio of cropped area of dry season paddy to wet season paddy in the improved systems is 73.5%, whilst that in the traditional systems is as low as 27.5%.

2) Percentage of irrigated paddy field in the dry season is 58.4% in the Son La Province, changing from 85.7% to 34.3% among districts. As the resources of water and land are not well balanced, there are plenty of paddy fields depending on rain.

3) Average area of paddy field (wet season) in this province is 6.6 ha per system, and it is difficult to consolidate these systems for efficient water management. As a result, number of irrigation systems is as large as 2,137 (improved systems: 1,193, traditional systems: 944). It should be noted that relatively large existing irrigation systems which are expected to be submerged in the Son La

reservoir have been excluded from the total irrigation systems.

4) In this province, there are 518 irrigation systems which have reservoirs aiming at stable perennial irrigation, 577 irrigation systems of which intake structures and canals are improved, 41 lift irrigation systems by utilizing water head, and 57 irrigation systems which are irrigated by pumping up water. However no underground irrigation is practiced.

(4) Hoa Binh Province

The administrative area of the Hoa Binh Province is 4,684.2 km^2 (468,420 ha), of which 19,623 ha or 4.2% are covered with paddy field. In the steep slope areas, where cultivation of paddy is difficult, farmers cultivate perennial crops, fruit trees and industrial crops.

Table 5.3.10 shows the cropped areas of summer-autumn paddy (wet season) and winter-spring paddy (dry season), the cropped areas in the improved systems and traditional systems for the respective wet and dry seasons, and proportional extent of irrigated area of the dry season paddy to the wet season paddy. Especially in this province, most of the paddy fields are terraced due to unsuitable steep slope for paddy fields, except for the flat lands located in the Da Bac and Lac Thuy Districts.

Table 5.3.10 Existing Conditions of Irrigation in Hoa Binh Province

(Unit: ha)

Name of District	Summer-Autumn Paddy (Wet Season)			Winter-Spring Paddy (Dry Season)			Proportional Extent[1] (%)
	Improved	Traditional	Total	Improved	Traditional	Total	
TX. Hoa Binh	297	30	327	195	20	215	65.7
H. Cao Phong	659	268	927	341	177	518	55.9
H. Da Bac	584	61	645	386	57	443	68.7
H. Kim Boi	2,538	660	3,198	1,688	476	2,164	67.7
H. Ky Son	1,217	186	1,403	805	135	940	67.0
H. Lac Son	1,261	1,193	2,454	801	833	1,634	66.6
H. Lac Thuy	1,234	17	1,251	846	10	856	68.4
H. Luong Son	1,261	526	1,787	801	379	1,180	66.0
H. Mai Chau	1,086	140	1,226	711	93	804	65.6
H. Tan Lac	2,538	424	2,962	1,688	327	2,015	68.0
H. Yen Thuy	2,520	923	3,443	1,031	249	1,280	37.2
Total	15,195	4,428	19,623	9,293	2,756	12,049	61.4

Source: Master Plan Report for Irrigation Development of Hoa Binh Province, 2005

1: Percentage of irrigated area of winter-spring paddy (dry season paddy) to summer-autumn paddy (wet season paddy)

The table indicates that the conditions of irrigation in Hoa Binh Province are as follows:

1) Total cropped area of paddy in Hoa Binh province in the wet season is 19,623 ha, and that in the dry season is 12,049 ha, totaling 31,672 ha. Percentage of cropped area in the dry season is 61.4% to that in the wet season, which is the highest among the four provinces. Ratio of cropped area of dry season paddy to wet season paddy in the improved systems is 61.2%, whilst that in the traditional systems is as high as 62.2%.

2) Percentage of irrigated paddy field in the dry season is 61.4% in Hoa Binh Province, ranging from 68.7% to 37.2%, which is the largest among the four provinces. As the resources of water and land are still not well balanced, there are plenty of paddy fields depending on rain.

3) Average area of paddy field (wet season) in this province is 16.2 ha per system, which are the largest among the four provinces, nonetheless it is difficult to consolidate these systems for efficient water management except for the Da Bac District (irrigation ratio: 68.7%) and Lac Thuy District (Irrigation ratio: 68.4%). As a result, number of irrigation systems is as large as 1,209 (improved systems: 543, traditional systems: 666).

4) In this province, there are 218 improved irrigation systems which have reservoirs aiming at stable perennial irrigation, 277 irrigation systems of which intake structures and canals are improved, 21 lift irrigation systems by utilizing water head, and 27 irrigation systems which are irrigated by pumping up water. However no underground irrigation is practiced.

5.4 Rural Water Supply

5.4.1 Existing Conditions of Rural Water Supply and Development Plans

(1) Percentage of Rural Water Supply

Table 5.4.1 shows the percentage of rural water supply for the respective regions in Vietnam in 2004 and estimated figures for 2005 (excluding large cities). In every region, percentage of rural water supply is steadily progressing. According to the actual result in 2004, ratio of rural water supply in the whole Vietnam was only 57.7%, and the rural water supply in the Red River Delta Region, which has the highest record, was 63.0%, and that in the Central Highlands Region, which has the lowest record, was 47.1%, less than one half of the population. Similar trend is observed in the estimated figures for 2005, and the average water supply ratio is 62.4% in the whole country. The combined region of Northeastern & Regions is the second lowest with water supply ratio of 56.1%, followed by the lowest Central Highlands Region of 52.3%.

Table 5.4.1 Comparison of Rural Water Supply in Each Region

Regions	Population in Rural Area	Year 2004		Year 2005 (Estimated)	
		Water Supplied	Percentage	Water Supplied	Percentage
North East & North West	9,903,500	5,267,300	53.2	5,559,500	56.1
Red River Delta	14,743,500	9,284,800	63.0	9,742,800	66.1
North Central Coast	9,420,000	5,287,600	56.1	5,707,700	60.6
South Central Coast	6,852,100	3,622,800	52.9	3,923,500	57.3
Central Highlands	3,048,000	1,434,900	47.1	1,593,700	52.3
South East	4,806,600	2,987,100	62.1	3,259,100	67.8
Mekong Delta	15,213,800	9,035,700	59.4	10,126,300	66.6
Total	63,987,500	36,920,400	57.7	39,912,600	62.4

Source: National Program on Clean Water and Rural Environmental Hygiene, 2005

(2) Major Rural Water Supply and Sanitation Policy

The Government of Vietnam issued major policies on rural water supply and sanitation consisting of short, middle and long-term strategies as shown in Table 5.4.2. According to the long-term National Rural Clean Water Supply and Sanitation Strategy (by 2020), the Government aims that 100% of rural population will have access to national-standard clean water of minimum 60 liters/day/person and use hygienic latrines.

NRWSS is clearly referenced in CPRGS. In particular, a priority is given in government spending to the development of rural infrastructure, of which Rural Water Supply and sanitation is a part of the strategies stated above.

Apart from the CPRGS, government policy is articulated through NRWSS. The underlying principle of NRWSS is sustainability as well as speed of implementation. Information, Education and Communication (IEC) activities have been recognized as a vital element of NRWSS and give particular emphasis to promoting construction of hygienic latrines and their proper use as well as on making people fully aware of the relationship between sanitation and facilities, water supply and health. The objectives call for the improved health and living conditions of the rural population as well as reduced environmental pollution from human and livestock excreta through active promotion of community participation and a demand responsive approach. NRWSS is underpinned by the principles of allocating decision-making and management at the lowest appropriate level, and emphasizing the participation of women in management.

At the national level, MARD is the lead ministry to coordinate all issues related to National RWSS. MARD has delegated this responsibility to CERWASS, which is a center under MARD. NTP on RWSS is the umbrella for all programs (region-transversal development programs) and projects (region-wise projects) within the RWSS sector and is considered as a tool to implement NRWSS.

Table 5.4.2 Major Rural Water Supply and Sanitation Policies

Main WSS Policies	Rural Water Supply	Sanitation
Strategies of the Government of Vietnam	The National Rural Clean Water Supply and Sanitation Strategy: By 2020, 100% of rural population having access to national-standard clean water of minimum 60 l/day and use hygienic latrines. By 2010, 85% of the rural population having access to national-standard clean water of minimum 60 l/day and 70% of rural households using hygienic latrines. By 2005, 50% of the country's households using hygienic sanitation facilities and 80% having "domestic quality water.	
Comprehensive Poverty Reduction and Growth Strategy (CPRGS)	By 2005, 60 l/day of the rural population with access to clean water with an average daily supply of 50 l/day/capita and by 2010, 85% of the rural population obtains 60 l/day/capita. Special emphasis in the short-term on providing clean water in nursery schools, kindergartens, schools and health clinics in rural areas	By 2005, 50% of rural households having toilets that meet basic sanitation standards. By 2010, 75% of rural households having toilets that meet basic sanitation standards. Special emphasis in the short-term on providing environmental sanitation in nursery schools, kindergartens, school and health clinics in rural areas.
Vietnam Development Goals (VDGs)	By 2005, 60% of the rural population having access to clean and safe water and by 2010, 85%	The VDGs do not yet include targets on rural sanitation
GOV 2010 Environmental Strategy	By 2010, 85%rural access to clean drinking water	

Source: Water Supply and Sanitation Strategy, Building on a solid foundation, World Bank in Vietnam, 2006

5.4.2 Water Resources and Water Quality

(1) Water Resources

Small scale rural water supply provision exists in Vietnam in rural and urban areas both as a sole source of drinking water and a less expensive addition to piped water consumption in order to decrease the total cost of supply to the household.

Traditionally, the rural areas would collect water from mountain streams, ponds, canals and other uncovered open wells in community locations or installed in their homes. Others will collect rain water. The rural water supply provision could also come from community-installed hand pumps.

The quality of water suffers excessive pollution in some areas or is questionable. Considering the health impact and time/cost forgone in obtaining water, the real cost of the rural water supply provision to a household is often higher than the connection to piped schemes.

(2) Water Quality

After 2006, it became necessary to pay special attention to management, assessment and monitoring of quality of water for the implementation of sustainable rural water supply systems. For the water supply systems targeting less than 500 persons, procedures and indexes for monitoring of quality of water have to be based on Decision No. 09/2005/QD/BYT. For the rural drinking water supply systems for more than 500 persons, indexes of the water quality based on Decision No. 1329/2002/QD/BYT issued by MOH is provisionally applied.

However, it is necessary to prepare comprehensive national guidelines commonly applicable to all the types of clean water supply systems, from the viewpoints of recent increase of water demand due to socio-economic development, and from the necessity of technical and administrative improvements.

5.4.3 Existing Conditions of the Existing Rural Water Supply

(1) Water Tariffs

Tariffs are set by PCs after the water supply company (WSC) submits their tariff proposal and often after the PCs obtain the consent of the People's Council. Tariffs are reviewed annually. The implementation of Circular 03/1999, stating local government must gradually increase water tariffs to fully recover costs, has been slow. In November 2004, MOF and MOC issued a joint circular stipulating the common tariff framework for the whole country, including rural areas, based on the principle of full cost recovery and a reasonable profit. MOF assumed the prime responsibility for enforcing the joint circular. Since then, the water tariffs have been increased or adjusted significantly in most WSCs in the country, helping to improve the financial status of the water sector.

Urban water tariffs are typically in the range VND 1,600 to 2,700/m^3 although there are examples outside this band. In 2003 the average residential tariff was VND 2,181/m^3, an increase of 4% over the previous year. There is a positive trend towards increasing tariffs,

Current district water tariffs in Vietnam range between VND 1,000 and VND 4,000 per m3 and domestic tariff are typically VND 2,000 to VND 2,500/m^3. This covers only the direct operating costs and does not usually include the full costs of depreciation. The connection fee ranges from VND 300,000 to VND 1 million or more. Cooperative and community-based water supply systems, funded with contributions from local residences or private sector investment, agree water prices amongst themselves. Still, the tariffs need to be endorsed by PC.

(2) Affordability

The average percentage of the cost of water and wastewater services in the total household income is usually used to measure the consumer ability to pay. For planning purposes, a rule of thumb of around 3% for water and 5% for water and sanitation is used. Current tariffs in Vietnam are typically below 2% of the average household income. Household that already have piped water are reluctant to pay more than the current tariff and conversely, communities that have no access to piped water are willing to pay much more than the current tariff.

Small Towns and Townlets[1] water supply affordability: Connection costs are a major obstacle to achieving greater coverage of water supply services in small towns and town lets. Although tariffs are well below 3% of the average household income, connection fees could reach as high as 10-35%. Cross subsidies may be useful in some cases but more research is needed to understand how the people can benefit from targeted external subsidies and/or cross subsidies. Furthermore, the removal of connection fees can also be considered as a way to reduce the connection barrier.

Rural water supply affordability: Surveys of time and money spent on obtaining drinking water in Vietnam[2] indicates that rural communities, including the poor, are willing to contribute to the capital and maintenance costs of water and sanitation, provided that they have made an informed choice for the service level provided. To some extent, rural communities have also demonstrated a willingness to support poorer members through cross-subsidies.

5.4.4 Operation and Maintenance of Rural Water Supply Systems

(1) Water Supply Utility Provision

There are four types of provision of water supply services in Vietnam:

1) Utility provision by state-owned WSCs

[1] In Vietnam, administrative division in the central part is made as follows: (1) Class 3; Provincial cities with population of 100,000-250,000, (2) Class 4; District towns with population of 50,000-100,000, and Class 5; Townlets with population of 4,000-50,000

[2] Water Supply and Sanitation Strategy, the World Bank in Vietnam, 2006

2) Small towns/townlets provision
3) Self-provision – households and communes that obtain water for themselves
4) Local private sector in rural areas

Over the past 10 years, the utility provision of water supply and drainage services has been decentralized from central to provincial level of the government and the utilities have been established as legally distinct state-owned economic entities. Despite decentralization, the level of autonomy of the water supply companies remains limited. Water supply tariffs are set by the provincial PCs at levels which cover O&M costs but are insufficient to fully recover the costs of capital needed by the utility. Key management and operating decisions such as overall production levels, capital investment and maintenance expenses, staff salary and benefits, and senior management appointments still require government approval. WSCs do not have ownership rights over water resources or public land usage. Although the province exercises ownership on the assets of WSC, there are no contractual relationships between the two parties to govern this right. Most of PWCs are Public Service Enterprises, operating under the Enterprise Law, except the water tariffs, as mentioned above, are set by the respective PPC.

(2) Small Water Supply Provision

WSS services are provided by a wide variety of management models in small towns with the diversity being much higher in townlets:

1) Direct management by Small Town People's Committee in small towns and Commune People's Committee in townlets,
2) Community management,
3) Cooperatives,
4) Provincial WSCs (pWSCs). They are responsible for providing water supply services to Class 4 towns, but recently have seen their mandate extended to also provide their services to small towns, Class5,
5) Other state-owned enterprises mainly consisting of district water supply companies and/or environmental service companies, and
6) Private water companies.

The PPC makes the decision on ownership for small towns water supply projects. The project owner is usually pWSC, pCERWASS, District PC or small towns' PC. Local agriculture cooperatives or private organizations may become the owners mainly in townlets and rural areas. For larger projects, project owner must obtain a water license. Private investors have participated in construction of a number of townlet projects in areas with good economic prospects, high demand for clean water, and scare water resources by investing sums of between VND 300 million to 1 billion.

5.4.5 Administrative Support in Water Supply

There are two types of funding of NTP-PR. The first is routine funds for construction of water systems and sanitation coverage/IEC. The second type of funding is investment subsidies for water supply, especially for schools and kindergartens, hospitals, Community Health Stations, and rural markets.

The levels of grants stated in National RWSS Strategy are 80% of construction costs for water supply of very poor households and 60% of construction costs for poor households. In addition, users can obtain loans up to 75% of total construction costs from the Government of Vietnam rural water and sanitation fund. For gravity water systems in high mountain areas, the subsidy cannot exceed 90%. For water piped schemes in a standard single village, the subsidy levels could reach 40% of the total construction cost, whereas for more difficult sites in mountainous, island and border areas, the national government subsidy can be as much as 60% to be supplemented by provincial government funds.

5.4.6 Water Resources for the Existing Rural Water Supply Systems

(1) Lai Chau Province

Major rivers in the Lai Chau province are the Da River and its tributaries, Nam Ma and Nam Na. These major rivers flow southward crossing the boundaries of province and district, but their minor tributaries are located within one district in the most cases. In general, water for rural supply is not taken from the three large rivers, but from the minor tributaries in the district level.

(2) Dien Bien Province

River system in the Dien Bien province is divided into two, one is the Da River system, which flows into the Red River and the other is the Nam Nua system, which pours into the Mekong through Laos. Water for rural supply in the northern areas in the Dien Bien province is taken from the tributaries of the Da River meeting on the right bank, in the midland areas from the tributaries of the Ma River, and in the southern lands from the tributaries of the Ma River.

(3) Son La Province

River system in the Son La province is divided into two, one is the Da River system, which flows into the Red River and the other is the Ma River system, which pours directly into the Gulf of Tonkin. Approximately 70% of the water for rural supply for the areas located in north, midland and east of the Son La province is served by the tributaries of the Da River, and 30% of the water for rural supply for the areas located in southeast of the province by the tributaries of the Ma River system.

(4) Hoa Binh Province

River system in the Hoa Binh province is divided into two, one is the Da River system, which flows into the Red River and the other is the Ma River system, which pours directly into the Gulf of Tonkin. Approximately 95% of water for rural supply for the areas located in north, midland and east of Hoa Binh

province is served by the tributaries of the Da River, and 5% of the water for rural supply for the areas located in Mai Chau district, southeast of the province by the tributaries of the Song Ma system.

5.4.7 Rural Water Supply in Four Provinces

Table 5.4.3 shows the total household, total population, number of persons who are supplied with rural water, number of persons who are not supplied with rural water and percentage of water supplied population to the total population of each province in the Region in 2005. Number of population in the four provinces is 2,587,588, population who are receiving water from the rural water systems are 1,054,225, number of rural water systems is 6,756, and percentage of water supplied population to the total population is 40.7%, which is much lower than the national target of 50% in 2005.

Table 5.4.3 Percentage of Persons supplied with Rural Water in Northwestern Mountainous Region

Unit: person

Name of province	Total household	Population	Rural water supplied or not		No. of systems	Percentage [1] (%)
			Supplied	Not supplied		
Lai Chau	59,460	327,209	126,181	201,028	3,420	36.8
Dien Bien	86,694	450,684	236,548	214,136	2,139	52.5
Son La	190,000	999,565	407,462	592,103	937	40.8
Hoa Binh	154,120	810,130	284,034	526,096	260	35.1
Total	490,274	2,587,588	1,054,225	1,533,363	6,756	40.7

Source: Master Plan Report for Rural Water Supply Development of four Provinces, 2005, and Statistical yearbook of four Provinces, 2005

1: Percentage of people who are supplied with rural water to the total population

(1) Lai Chau Province

Table 5.4.4 shows the total household, total population, number of persons who are supplied with rural water, number of persons who are not supplied with rural water and percentage of water supplied population to the total population of the Lai Chau province in 2005. Number of population in the province is 327,209, population who are receiving water from the rural water systems are 126,181, number of rural water systems is 3,420, and percentage of water supplied population to the total population is 36.8%, which is the second lowest in the region.

Table 5.4.4 Percentage of Persons supplied with Rural Water in Lai Chau Province

Unit: person

Name of district	Total household	Population	Rural water supplied or not		No. of systems	Percentage[1] (%)
			Supplied	Not supplied		
TX. Lai Chau	4,326	19,307	15,098	4,209	488	78.2
H. Muong Te	7,774	47,494	28,730	18,764	172	60.5
H. Phong Tho	9,320	50,785	22,228	28,557	759	43.8
H. Sin Ho	12,668	73,903	41,553	32,350	183	56.2
H. Tam Duong	8,166	43,451	17,327	26,124	1,072	39.9
H. Than Uyen	17,206	92,269	16,343	75,926	746	17.7
Total	59,460	327,209	126,181	201,028	3,420	36.8

Source: Master Plan Report for Rural Water Supply Development of Lai Chau Province, 2005, and Statistical yearbook of Lai Chau Province, 2005

1: Percentage of people who are supplied with rural water to the total population

The table indicates that the conditions of rural water supply in Lai Chau province are as follows:

1) Percentage of population who are supplied with rural water to the total population is 36.8% in Lai Chau province, ranging largely from 78.2% to 17.7% among districts.
2) Rural water supply systems consist of 2,400 of gravity surface water supply, and 1,020 of dug wells in the households, totaling 3,420. It should be noted that there is no deep well water supply system in this province.
3) As there are large variations in the water table of the dug shallow wells, it is not necessarily possible to supply water using shallow wells throughout the year.

(2) Dien Bien Province

Table5.4.5 shows the total household, total population, number of persons who are supplied with rural water, number of persons who are not supplied with rural water and percentage of water supplied population to the total population of the Dien Bien province in 2005. Number of population in the province is 450,684, population who are receiving water from the rural water systems are 236,584, number of rural water systems is 2,139, and percentage of water supplied population to the total population is 52.5%, which is the highest in the region.

Table 5.4.5 Percentage of Persons supplied with Rural Water in Dien Bien Province

Unit: household

Name of District	Total household	Population	Rural water supplied or not		No. of systems	Percentage[1] (%)
			Supplied	Not supplied		
TP. Dien Bien Phu	11,749	46,954	41,789	5,165	409	89.0
TX. Muong Lay	3,553	14,009	n.a.[2]	n.a.[2]	n.a.[2]	n.a.[2]
H. Dien Bien	21,535	104,267	58,240	46,027	436	55.9
H. Dien Bien Dong	8,000	51,157	33,229	17,928	184	65.0
H. Muong Cha	7,819	46,322	19,503	26,819	145	42.1
H. Muong Nhe	6,276	36,837	7,914	28,923	116	21.5
H. Tua Chua	7,602	43,707	24,448	19,259	125	55.9
H. Tuan Giao	20,160	107,431	51,425	56,006	288	47.9
Total	86,694	450,684	236,548	214,136	2,139	52.5

Source: Master Plan Report for Rural Water Supply Development of Dien Bien Province, 2005, and Statistical yearbook of Dien Bien Province, 2005

1: Percentage of people who are supplied with rural water to the total population

2: Muong Lay Town was recently separated from Muong Cha district, and water supplied population and number of systems is included in Muong Cha district

The table indicates that the conditions of rural water supply in the Dien Bien province are as follows:

1) Percentage of population who are supplied with rural water to the total population is 52.5% in Dien Bien province, varying largely from 89.0% to 21.5% among districts.
2) Rural water supply systems consist of 1,916 of gravity surface water supply, and 223 of deep wells, totaling 2,139. Other than the above, there are 11,174 dug wells by local people, water of which is lifted by man-power or hand driven pumps.
3) As there are large variations in the water table of the dug shallow wells, it is not necessarily possible to supply water using shallow wells throughout the year. However, water table of such dug wells by local people along the relatively large river seems to be stable.

(3) Son La Province

Table 5.4.6 shows the total household, total population, number of persons who are supplied with rural water, number of persons who are not supplied with rural water and percentage of water supplied population to the total population of the Son La province in 2005. Number of population in the province is 999,565, population who are receiving water from the rural water systems are 407,462, number of rural water systems is 934 except 15,000 dug wells by local people, and percentage of water supplied population to the total population is 40.8%, which is the second highest in the region, but still low.

Table 5.4.6 Percentage of Persons supplied with Rural Water in Son La Province

Unit: person

Name of District	Total household	Population	Rural water supplied or not		No. of systems	Percentage[1] (%)
			Supplied	Not supplied		
TX. Son La	18,030	76,266	61,232	15,034	21	80.3
H. Bac Yen	8,110	51,220	32,394	18,826	86	63.2
H. Mai Son	25,800	126,064	10,004	116,060	77	7.9
H. Moc Chau	31,200	143,513	42,993	100,520	106	30.0
H. Muong La	13,970	83,861	27,916	55,945	89	33.3
H. Phu Yen	20,480	103,131	72,061	31,070	178	69.9
H. Quynh Nhai	11,040	66,818	39,856	26,962	72	59.6
H. Song Ma	20,000	111,658	29,174	82,484	85	26.1
H. Sop Cop	5,400	36,307	7,625	28,682	36	21.0
H. Thuan Chau	22,300	136,825	43,775	93,050	109	32.0
H. Yen Chau	13,630	63,902	40,432	23,470	78	63.3
Total	190,000	999,565	407,462	592,103	937	40.8

Source: Master Plan Report for Rural Water Supply Development of Son La Province, 2005, and Statistical yearbook of Son La Province, 2005

1: Percentage of people who are supplied with rural water to the total population

The table indicates that the conditions of rural water supply in Son La province are as follows:

1) Percentage of population who are supplied with rural water to the total population is as low as 40.8% in Son La province, ranging largely from 80.3% to 7.9% among districts. Ratio of rural water supply is high in the flat basin of the Son La basin and low in the mountainous areas.
2) Rural water supply systems consist of 922 of gravity surface water supply, and 15 of deep wells, totaling 937. Other than the above, there are 15,000 dug wells by local people, water of which is lifted by man-power or by hand driven pumps.
3) As there are large variations in the water table in the dug shallow wells, it is not necessarily possible to supply water using shallow wells throughout the year. However, water table of such dug wells by local people along the relatively large river seems to be stable.

(4) Hoa Binh Province

Table 5.4.7 shows the total household, total population, number of persons who are supplied with rural water, number of persons who are not supplied with rural water and percentage of water supplied population to the total population of Hoa Binh province in 2005. Number of population in the province is 810,130, population who are receiving water from the rural water systems are 284,034, number of rural water systems is 260 except 2,954 dug wells by local people, and percentage of water supplied population to the total population is 35.1%, which is the lowest in the region.

The table indicates that the conditions of rural water supply in the Hoa Binh province are as follows:

1) Percentage of population who are supplied with rural water to the total population is 35.1% in Hoa Binh province, varying largely from 92.3% to 10.3% among districts. Ratio of rural water supply is high in the flat basins and low in the mountainous areas.
2) Rural water supply systems consist of 254 of gravity surface water supply, and 6 of deep wells, totaling 260. Other than the above, there are 2,954 dug wells by local people, water of which is lifted by man-power or by hand driven pumps.

Table 5.4.7 Percentage of Persons supplied with Rural Water in Hoa Binh Province

Unit: person

Name of District	Total household	Population	Rural water supplied or not		No. of systems	Percentage[1] (%)
			Supplied	Not supplied		
TX. Hoa Binh	16,080	83,607	8,608	74,999	4	10.3
H. Cao Phong	7,890	41,014	13,934	27,080	19	34.0
H. Da Bac	9,850	51,800	47,790	4,010	65	92.3
H. Kim Boi	27,380	142,370	42,135	100,235	9	29.6
H. Ky Son	6,710	35,307	7,476	27,831	12	21.2
H. Lac Son	25,170	132,384	37,275	95,109	21	28.2
H. Lac Thuy	9,640	50,140	16,290	33,850	2	32.5
H. Luong Son	15,600	82,014	22,099	59,915	3	26.9
H. Mai Chau	9,440	49,670	33,978	15,692	62	68.4
H. Tan Lac	14,900	78,791	37,069	41,722	45	47.0
H. Yen Thuy	11,460	63,033	17,380	45,653	18	27.6
Total	154,120	810,130	284,034	526,096	260	35.1

Source: Master Plan Report for Rural Water Supply Development of Hoa Binh Province, 2006, and Statistical yearbook of Hoa Binh Province, 2005

1: Percentage of people who are supplied with rural water to the total population

3) As there are large variations in the water table in the dug shallow wells, it is not necessarily possible to supply water using shallow wells throughout the year. However, water table of such dug wells by local people along the relatively large river seems to be stable.

5.5 Rural Electrification

5.5.1 Existing Conditions and Plan of Rural Electrification

The Government of Vietnam has been developing rural electrification in order to improve the living standard and income generation for people living in the rural areas. At present, 96% of districts, 82% of communes and 73.5% of rural households are receiving electricity through national grid. Out of eight regions, Red River Delta, Mekong Delta, Southeastern regions are 100% electrified, though the other regions still remain as low electrified areas, especially the Region is ranked at the lowest electrified area, accounting for 65% among the whole country.

In Vietnam, a commune is defined as electrified if its commune center receives electricity from the national grid or off-grid. In this definition, there remain non-electrified villages belonging to existing electrified communes.

Table 5.5.1 to Table 5.5.4 shows existing conditions of electricity supply in the four provinces.

1) Rate of electrification for each province is 42.6% of Lai Chau, 63.9% of Dien Bien, 74.7% of Son La, and 88.8% of Hoa Binh. Average rate of the Northwest Region is low, comparing with rate of the whole country (88%).
2) Rate of electrification in most of districts of Lai Chau province is less than 50% except Lai Chau town (89.5%) and Tam Duong district (67.4%).
3) Dien Bien Phu city and Muong Lay district of Dien Bien province were electrified at 100%. The rate of Muong Nhe district is exceedingly low at 5.5% due to difficult settings of power grid in mountainous areas bordering on Laos
4) Rates of electrification in Son La province are evenly distributed ranging from 70 to 97 % in most of districts excluding Quynh Nhai district (47%).
5) Comparing with the other provinces, Hoa Binh province has a high rate of electrification with over 80%, excluding 78.5% of Lac Son district.

(1) Lai Chau Province

Eighty percent (80%) of the whole Lai Chau province's households are to be electrified under the national grid before 2010. The remaining part of about 11,200 households in remote and mountainous areas has difficult access to the national grid, especially in Muong Te and Sin Ho districts. It is necessary to study the use of local energy sources such as small-scale hydropower or renewable energy for electric supply to those areas.

In such mountainous areas, the potential of hydropower is very high, taking into consideration that rivers and streams can be developed with abundant river discharge by 2,500 to 2,700 mm of annual rainfall. Lai Chau province planned 30 medium- and small-scale hydropower stations (total) with output capacity of one to 30 MW (total capacity: 281 MW). In addition, thousands of extremely small-scale hydropower stations with 300 to 500 W capacities are considered by the province to supply the electricity. In the past, 19 small hydropower stations with 1,438 kW capacities were built in the province. However, operation of these stations is inefficient due to unsystematic construction, deteriorated equipments, limitation of operation and maintenance.

In remote areas far from the national grid, about 5,000 extremely small- scale hydropower stations with 300 to 500 W capacities were installed by residents themselves, and are used for lighting and radio at home.

Before 2010, four hydropower stations are to be constructed and be connected to the national grid. MOIT is currently running a pilot project for electric supply to non-electrified remote communes (total of 1,200 households) in Muong Te district by constructing small-scale hydropower stations financed by World Bank. There are about 10,000 households in remote, mountainous villages where the national grid is unable to reach. Five thousand (5,000) extremely small-scale hydropower stations are needed to attain 100% of electrification.

According to the data on sunshine hours, it is not appropriate to set up solar power-generation system in place of hydropower generation system in Lai Chau. In respect to the construction cost, solar energy

stations requires larger cost than extremely small-scale hydropower stations. For this reason, this solar power-generation system can be established in villages where hydropower stations cannot be constructed due to topographical and river conditions.

Table 5.5.1 Present Condition of Electrification in Lai Chau Province

Unit: household

Name of District	Total household	Population	Electricity available or not		Percentage[1] (%)
			Available	Not available	
TX. Lai Chau	4,326	19,307	3,873	453	89.5
H. Muong Te	7,774	47,494	1,171	6,603	15.1
H. Phong Tho	9,320	50,785	3,141	6,179	33.7
H. Sin Ho	12,668	73,903	4,222	8,446	33.3
H. Tam Duong	8,166	43,451	5,507	2,659	67.4
H. Than Uyen	17,206	92,269	7,415	9,791	43.1
Total	59,460	327,209	25,329	34,131	42.6

1: Percentage of electricity available households to the total households

(2) Dien Bien Province

Eight (8) districts in Dien Bien province are 100% electrified at 100% by the national grid. As for communes, 65 out of total 98 have electricity supplied by the national electric networks. In term of households, 55,414 out of total 86,694 are electrified at 64% through the national grid. Two models of electricity supply management can be found, 1) to sell electricity directly to users 2) to manage electricity through cooperatives.

Table5.5.2 Present Condition of Electrification in Dien Bien Province

Unit: household

Name of District	Total household	Population	Electricity available or not		Percentage[1] (%)
			Available	Not available	
TP. Dien Bien Phu	11,749	46,954	11,749	0	100.0
TX. Muong Lay	3,553	14,009	3,553	0	100.0
H. Dien Bien	21,535	104,267	17,882	3,653	83.0
H. Dien Bien Dong	8,000	51,157	3,249	4,751	40.6
H. Muong Cha	7,819	46,322	3,449	4,370	44.1
H. Muong Nhe	6,276	36,837	345	5,931	5.5
H. Tua Chua	7,602	43,707	2,538	5,064	33.4
H. Tuan Giao	20,160	107,431	12,649	7,511	62.7
Total	86,694	450,684	55,414	31,280	63.9

1: Percentage of electricity available households to the total households

(3) Son La Province

Son La Electricity Agency has invested in construction of medium-voltage transmission lines and transformer stations covering all the 201 communes, and towns. Because of the shortage of investment capital for the provisions of low-voltage transmission lines, 21 communes do not receive electricity from the national grid. In June 2006, 128 out of the 201 communes in the province received electricity from the national grid system, reaching 89.6%. The number of households receiving electricity becomes 141,913 out of total households 190,000 reaching to 74.7%.

In rural areas, there are 168 (88.9%) out of the total 189 communes receive electricity. The number of household receiving electricity is 97,959 out of total of 161,401, accounting for 60.7%. Electricity Price

in Rural Areas: At present, electricity is sold to each household at the price of less than 700VND/kWh. Rural Electricity Supply Management: Son La province has completed the shift of rural electricity management. Rural electricity management systems in Son La province comply with Decision 27/QD-BCN issued by MOIT.

- Son La Electricity of Agency manages electricity trading in 157 communes consisting of 85,940 households, accounting for 89%.
- Electricity service cooperatives manage electricity sold to 9,855 households (accounting for 89%of total number of household being available for electricity) in 13 electrified communes in the following districts: Mai Son (6 communes), Yen Chau (5communes) and Moc Chau (2 communes).
- Private electricity trading households: Two organizations manage electricity sold to 789 households in two communes, Dong Sang and Van Ho in Moc Chau district.

Table 5.5.3 Present Condition of Electrification in Son La Province

Unit: household

Name of District	Total household	Population	Electricity available or not		Percentage[1] (%)
			Available	Not available	
TX. Son La	18,030	76,266	17,481	549	97.0
H. Bac Yen	8,110	51,220	7,789	321	96.0
H. Mai Son	25,800	126,064	20,431	5,369	79.2
H. Moc Chau	31,200	143,513	23,075	8,125	74.0
H. Muong La	13,970	83,861	7,673	6,297	54.9
H. Phu Yen	20,480	103,131	17,444	3,036	85.2
H. Quynh Nhai	11,040	66,818	5,186	5,854	47.0
H. Song Ma	20,000	111,658	11,927	8,073	59.6
H. Sop Cop	5,400	36,307	4,110	1,290	76.1
H. Thuan Chau	22,300	136,825	13,643	8,657	61.2
H. Yen Chau	13,670	63,902	13,154	516	96.2
Total	190,000	999,565	141,913	48,084	74.7

1: Percentage of electricity available households to the total households

(4) Hoa Binh Province

According to Electricity Agency in Hoa Binh province, all (100%) of the communes and precincts in the province were electrified by the national grid before 2003; 87% in terms of number of household. Regarding electricity price in rural areas, Hoa Binh province sells electricity to households at the price of 700 VND/kWh. From September 2004, Hoa Bin Province has two legal electricity models; one for agricultural use and the other for business cooperatives' services.

In the past, many local people spent their own money to install mini hydropower equipments to get electricity for their household because their villages were far from the national grid. Most equipments stopped operation due to instability of water discharge amount or faulty equipment. There are two types of mini hydropower generators.

Kaplan turbine: low water head ranging from one to four meters, discharge varying from 20 to 40 liters/s, capacity ranging from 200 to 1,000W. Capsule turbine: high water head ranging from four to eight meters, small discharge

Mini hydropower generation has been declining year by year according to the following reasons:

1) Water discharge is not available for nine months during the dry season.
2) In rainy season, it is difficult to maintain equipments in order to protect equipments from floods.
3) The river bed is very steep, leading to high velocity of river flow.
4) Installation of equipment is not complied with the technical standards and actual firm capacity is lower as compared to nominal capacity.
5) Spare parts such as flume, suction pipe are temporary and electric wires are not safe, easy to cause accidents.
6) Service life is short at only two to three years.

The above issues indicate that application of mini hydropower equipments has been more and more narrowed with expansion of national grid. According to the Hoa Binh Province Electricity Development Plan in the period of 2006-2010 with consideration to2015, Decision No.13/QD-BCN approved by the Ministry of Industry, the province has a plan to increase electricity rate on household level from 91 % to 95% in short term and to reach to over 98% in late 2010. Concerning solar and wind energies, the above plan mentions that commercial exploitation under Hoa Binh province is not feasible in connection with price of equipment, technical knowledge.

Table 5.5.4 Present Condition of Electrification in Hoa Binh Province

Unit: household

Name of District	Total household (A)	Population	Electricity available or not		Percentage[1] (%)
			available (B)	Not available	
TX. Hoa Binh	20,291	83,607	20,280	11	99.9
H. Cao Phong	8,827	41,014	8,189	638	92.8
H. Da Bac	11,460	51,800	9,653	1807	84.2
H. Kim Boi	29,453	142,370	25,967	3,486	88.2
H. Ky Son	7,919	35,307	7,851	68	99.1
H. Lac Son	25,282	132,384	19,839	5,443	78.5
H. Lac Thuy	11,876	50,140	11,579	297	97.5
H. Luong Son	18,975	82,014	17,584	1,391	92.7
H. Mai Chau	11,365	49,670	9,657	1,708	85.0
H. Tan Lac	16,591	7,791	13,877	2,714	83.6
H. Yen Thuy	14,718	63,033	12,414	2,304	84.3
Total	176,767	810,130	156,890	19,867	88.8

1: Percentage of electricity available households to the total households

5.5.2 Existing Electrical Facilities

(1) Lai Chau Province

There are two transformer stations in Phong Tho and Than Uyen with 110 KV which supply electricity of 35 KV to all the other districts in the province excluding Muong Te district. Electricity in Muong Te district is supplied from the Nam Si Luong hydropower station with the capacity of 500 KW. Each district has transformer sub-stations of 35/0.4 KV, where low-voltage electricity 400 V is supplied to households. In the province, 19 small hydropower plants were established with the capacity of 1,438 KW, but most of them have been ruined and only seven stations remain. There are about 5,000 extremely small-scale hydropower stations built by residents themselves in off-grid areas.

(2) Dien Bien Province

Electric supply facilities to districts in Dien Bien province consist of two transformer stations (the one in Tuan Giao 110 kKV/35 kV, and the other in Dien Bien 110 kV/35/22 kV) and three intermediary transformer stations (Muong Lay 35/10 kV, Tuan Giao 35/10 kV and Dien Bien 35/10 kV). Electricity is supplied to each district through middle voltage transmission line networks. Each district has transformer sub-stations which lower/change the voltage of the received electricity and supply electricity to each household. In addition, there are nine hydropower plants, four of which connects to the national grid with 10 kV or 35 kV networks.

(3) Son La Province

In 2005, total trading electricity outputs of the whole province reached 115.4 million kWh. Electric sources in the province consist of the followings:

1) Most of additional discharges are supplied from North national grid through Son La capital, Moc Chau, Muong La transformer stations 110 kV with total installed capacity of 66 MVA and supported from Nghia Lo transformer stations 110 V (Yen Bai province).
2) Small scale hydropower stations generating power to national grid:
   Chieng Ngam hydropower stations (Thuan Chau district) with capacity of 1.92 MW
   Nam Cong hydropower station (Song Ma district) with capacity of 250 kW
3) Power generation station belonging to Son La Sugarcane-sugar Company with capacity of 2 x 1500 kW, supplying electricity for production of the sugar factory and generating electricity to transmission network when surplus power is generated.
4) Diesel generator units of production bases in Moc Chau district with 6 units with total capacity of 1,364 kVA.
5) In remote mountainous districts, there are about 20 mini hydropower equipment units generating and supplying electricity for production requirement and domestic consumption. They are scattered in Thuan Chau, Quynh, Nhai, Son La capital, Moung La, Mai Son, Moc Chau, Song Ma, Bac Yen districts.
6) Transmission networks in the province consist of voltage levels as 110, 35, 22, 10, 6 kV.

(4) Hoa Binh Province

Hoa Binh province has the Hoa Binh Hydropower Plant with capacity of 8 x 240 MW, the biggest hydropower plant in Vietnam, supplying eight billion kWh/year of power output. Electricity generated by this plant is connected to the national grid through Hoa Binh transformer stations 220 V and 500 kV. Hoa Binh province has been receiving electricity from the national grid through 110kV transformer stations such as Hoa Binh, Lac Son and Luong Son. In general, power supply sources for Hoa Binh province is the national grid under favorable and highly reliable conditions.

Currently, there are 10 small-scaled hydropower plants with capacity of 205 kW. They were constructed

in combination with irrigation and drainage, but they generate electricity only during the rainy season for three months a year to supply to small residential areas located far from the national grid. In addition, there are over 2,000 extremely small-scale hydropower equipments with capacity of 0.3 to 0.5 kW per one unit for domestic use.

5.5.3 Operation and Maintenance of Electric Facilities

Establishment of electric distribution network in rural areas follows the principle of "joint action by the State and the People". The State invests in development of high-tension power grid lines, power transformations and master electricity meters. Communes, on the other hand, are responsible for arranging their own distribution network to sell power from the master electricity meters to each household. Such principle is managed under the following alternative manners:

- By a commune's Board of Electricity Management
- Directly by electricity companies
- By co-operatives
- By private entities/individuals selected
- By provincially managed state owned companies
- By centrally managed state owned companies

Power companies sell electricity to the above-mentioned entities at a wholesale price fixed by the State (VND 360/kwh). The electricity prices payable by households fluctuate between VND 500-900/kWh.

Once power distribution lines reach a commune, households are expected to invest in connecting the line from master electricity meters to their homes and acquiring other electric appliances. Since many poor households cannot pay these connection costs, it hampers access to electricity even though the distribution reaches the communes. In most of the poorest communes with access to electricity, the power lines reach only the commune center through one to two transformers, and power consumption often stands at a low level.

5.5.4 Administrative Support on Rural Electrification

In most rural areas, local communities own and operate the low-voltage electricity distribution systems. The basic approach adopted for rural electrification in Vietnam has been for EVN's Power Companies (PCs) to develop the medium-voltage network, and for local communities to develop the low-voltage system.

PPC has oversight for rural electrification in their provinces, and provide substantial financial support for the local share of investment. Until 2004, handling of local power distribution was made through informal commune electricity groups or other informal entities. According to Government regulations, however, all of these entities are now required to convert to formal entities, such as cooperatives or joint-stock companies. Developed initially at cooperatives or commune levels, but also as district-level joint stock companies in some cases even at this stage, these companies need to consolidate and expand, in

order to be important commercial actors in the overall power system.

5.6 Other Rural Infrastructure Facilities

5.6.1 School

(1) Number of Schools and Enrollment

According to the Vietnam Development Report (2005), primary school enrolment rate jumped from 88% in 1998 to 91% in 2002. During the same period, secondary school enrolment rate increased from 62% to 72%. Despite such rapid improvement, about 10% of school-age children do not enroll in schools, and 46% of those children who do not go to school are ethnic minorities. The rest of those who do not go to school are street children, migrant children, and children with disabilities. In terms of scholastic achievement/ability, a wide regional gap exists among the children in schools. Children with low scholastic achievement/ability are concentrated in northern mountain, central highland and Mekong delta regions where the poverty rate is very high.

MOET formulates and executes educational policies and manages higher education. While each province is to manage secondary schools and districts and communes are to manage primary schools and nursery schools/kindergartens, actual allocation of school management varies widely from province to province. With on-going decentralization of power from the central to local governments, educational assistance has been given out by local governments to children in mountainous areas and of ethnic minorities as a part of their poverty reduction measures.

The primary objective of Vietnam's educational sector strategies is to increase enrolment rate of lower and higher education especially in disadvantaged communities. The secondary objective of the sector is to improve the quality of education. As for primary and secondary school education, the goal of the primary school education is to achieve full (100%) enrolment rate among all the school-age children. For the secondary school education, the goal is to increase the number of pupils in the areas, where the school enrolment rate is lower than the national average, by school fee exemption, classroom construction and so on.

Activities to achieve the above-mentioned goals and objectives have been continuously supported through public spending. Figures show that the share of government spending on education is higher for poor households than for wealthy households. However, these figures need to be examined with a caution because this may be due to a larger average number of children in a poor household. Household spending on education has been an economic burden to poor households in Vietnam, while at the same time such out-of-pocket spending is mitigating the public spending. Table 5.6.1 and Table 5.6.2 show the condition of education in the Study Area:

Table 5.6.1 Number of Schools and Pupils in the Four Provinces

	2000	2001	2002	2003	2004	2005
Lai Chau Province						
1. Number of Schools				179	210	259
Nursery/Kindergarten				26	42	64
Primary & Secondary				153	168	195
2. Number of classes				3,237	3,657	4,253
Nursery/Kindergarten				347	566	730
Primary & Secondary				2,890	3,091	3,523
3. Number of teachers				3,695	4,556	5,381
Nursery/Kindergarten				403	672	949
Primary & Secondary				3,292	3,884	4,432
4. Number of pupil				66,835	63,184	79,832
Nursery/Kindergarten				6,738	1,838	13,494
Primary & Secondary				60,097	61,346	66,338
Dien Bien Province						
1. Number of Schools		205	220	246	285	300
Nursery/Kindergarten		37	35	45	51	53
Primary & Secondary		168	185	201	234	247
2. Number of classes		4,145	4,549	4,850	5,215	5,413
Nursery/Kindergarten		329	387	463	485	770
Primary & Secondary		3,816	4,162	4,387	4,730	4,643
3. Number of teachers		5,415	5,973	6,545	6,656	7,754
Nursery/Kindergarten		589	601	631	698	1,113
Primary & Secondary		4,826	5,372	5,914	5,958	6,641
4. Number of pupil		100,389	106,761	113,931	118,473	122,384
Nursery/Kindergarten		7,357	7,717	10,954	11,789	17,050
Primary & Secondary		93,032	97,044	102,977	106,684	105,334
Son La Province						
1. Number of Schools	393	432	470	537	595	644
Nursery/Kindergarten	57	64	70	111	150	168
Primary & Secondary	339	368	400	426	445	476
2. Number of classes	9,544	9,605	10,420	10,623	11,034	13,812
Nursery/Kindergarten	1,261	1,352	1,527	1,620	1,724	1,866
Primary & Secondary	8,283	8,253	8,893	9,003	9,310	10,080
3. Number of teachers	11,794	12,726	13,327	14,135	14,516	15,147
Nursery/Kindergarten	1,508	1,696	1,801	1,954	1,992	2,084
Primary & Secondary	10,286	11,030	11,526	12,181	12,524	13,063
4. Number of pupil	243,959	253,194	261,178	266,394	268,296	234,463
Nursery/Kindergarten	23,203	24,455	29,330	31,523	34,818	3,745
Primary & Secondary	220,756	228,739	231,848	234,871	233,478	230,718
Hoa Binh Province						
1. Number of Schools	568	590	613	618	655	667
Nursery/Kindergarten	144	146	155	156	180	188
Primary & Secondary	424	444	458	462	475	479
2. Number of classes	9,228	8,900	9,225	10,488	7,802	8,257
Nursery/Kindergarten	2,283	2,043	2,562	2,913	1,363	1,969
Primary & Secondary	6,945	6,857	6,663	7,575	6,439	6,288
3. Number of teachers	12,651	13,362	3,876	14,407	12,850	13,915
Nursery/Kindergarten	2,578	2,641	2,840	2,863	1,772	2,958
Primary & Secondary	10,073	10,721	11,036	11,544	11,078	10,957
4. Number of pupil	233,262	226,047	214,785	220,793	196,454	195,863
Nursery/Kindergarten	39,801	36,867	32,025	40,028	25,374	31,353
Primary & Secondary	193,461	182,760	182,760	180,765	171,080	164,510

Source：Interview survey in each province（2005 Data）

Table 5.6.2 Number of Schools in Districts

District	Population	Number of Schools			Number of Schools per 1000 persons
		Nursery	Primary and Secondary	Total	
Lai Chau Province	327,209	64	195	259	0.79
Tx. Lai Chau	19,307	8			
H Muong Te	47,494	15			
H. Phong Tho	50,785	12			
H. Sin Ho	73,903	6			
H. Tam Duong	43,451	13			
H. Tam Uyen	92,269	10			
Dien BienProvince	450,684	53	247	300	0.67
TP. Dien Bien Phu	46,954				
TX. Muong Lay	14,009				
H. Dien Bien	104,267				
H. Dien Bien Dong	51,157				
H. Muong Cha	46,322				
H. Muong Nhe	36,834				
H. Tua Chua	43,707				
H. Tua Chua Giao	107,431				
Son La Province	999,565	168	476	644	0.64
TX. Son La	76,266	15	32	47	0.62
H. Bac Yen	51,220	7	29	36	0.7
H. Mai Son	126,064	19	74	93	0.67
H. Moc Chau	143,513	34	63	97	0.68
H. Muong La	83,861	11	34	45	0.69
H. Phu Yen	103,131	22	49	71	0.69
H. Quynh Nhai	66,818	4	26	30	0.45
H. Song Ma	111,658	9	41	50	0.45
H. Sop Cop	36,308	6	18	24	0.66
H. Thuan Chau	136,825	25	68	93	0.68
H. Yen Chau	63,902	16	42	58	0.91
Hoa BinProvince	810,130	188	479	667	0.82
Tx. Hoa Binh	83,607		38		
H. Cao Phong	41,014		28		
H. Da Bac	51,800		50		
H. Kim Boi	142,370		82		
H. Ky Son	35,307		23		
H. Lac Son	132,384		64		
H. Lac Thuy	50,140		28		
H. Luong Son	82,014		47		
H. Mai Chau	49,670		40		
H. Tan Lac	78,791		51		
H. Yen Thuy	63,033		28		

Source：Interview survey in each province（2005 Data）

(2) Field Observation:

A total of 15 communes in 11 districts, 4 provinces were visited for observation and interviews in the two time periods; from February to March 2007 and from May to June 2007 (Table 5.6.3).

In Muong Phang commune in Dien Bien Phu city primary and lower secondary schools are located in the commune center as in any other communes. While some communes have separate facilities/buildings for its primary and lower secondary schools, Na Son commune in Dien Bien Dong, Dien Bien province has one facility for both schools: Classrooms are used in the morning to teach primary school children, and in the afternoon they are used to teach lower secondary children.

As these schools are for the whole communes, school access rate of each commune is estimated to be 100% and, theoretically speaking, school enrollment rate can also be 100% as long as they do not have children with physical disabilities. Despite that, in reality communes are made up of villages, some of which may be more than 10km away from the commune centers, and many roads from villages and commune centers

suffer from bad conditions especially in the rainy season. The rate of children actually going to the school is likely to be different from the enrolment rate of that school.

Many villages have educational facilities called sub-schools which were built locally and provide nursery/kindergarten education or the first 2 or 3 grades (years) of primary education. Those sub-schools visited in Muong Phang Commune in Dien Bien Phu, Chieng Xom commune and Chieng Mai commune in Mai Son district, Son La province looked shabby with mud floor and mud walls. Despite such shabbiness, they are equipped with blackboards, desks, chairs, etc. and seem to have enough number of teachers provided by the government. In Chieng Coi commune in Son La town which is a small village with small number of children, a teacher taught two groups of children (= two grades) sitting back to back in a classroom by moving back and forth between the ends of classroom. According to Department of Education and Trainings in the 4 provinces, a sub-school is to cover a group of small villages as a cluster school.

Table 5.6.3 Districts and Communes Visited

Province	District	Commune/Ward	Other
Dien Bien	Dien Bien	Nua Ngam Commune	Special assistance by DARD and P.135
	Dien Bien Dong	Na Son Commune	Near district town, Semi-boarding school
	Dien Bien Phu Town	Muong Thanh Ward, Muong Phang Commune	No longer under P.135., Lower secondary school
Lai Chau	Lai Chau Town	Quyet Thang Ward	Nhang ethnic group, urban poor
	Phong Tho	Muong So Commune	Textile company, near Chinese borader
		La Nhi Thang Commune	Upland community with Dao, Hmong, etc.
	Tam Duong	Nung Nang Commune	All Hmong, in the mountains behind the Hotel and provincial gov't buildings
		Binh Lu Commune	Ba Be Village (Lu), textiles
Son La	Son La Town	Chieng Coi Commune	Na Co Village, Thai
	Mai Son	Chieng Mai Commune	Polyclinic, Thai
		Chieng Xom Commune	Very low poverty rate
Hoa Binh	Yen Thuy	Huu Loi Commune	Lowland Muong commune
	Da Bac	Cao Son Commune	Dao
		Tua Ly Commune	Lowland Dao village
	Tan Lac district	Dong Lai Commune	Muon Village (Muong) : 2nd farthest from the commune center

A sub-school constructed by P135 was visited in Cong Binh village in Nua Ngam commune, Dien Bien district; it had bamboo walls and a thatched roof, and a teacher slept in a room next to a classroom in the school building. This teacher fetched water from the near-by river just like other villagers did and cooked her meals at school. Sub-schools in Vietnam play a key role in education in remote areas, showing strong dedication and commitment to education by the government.

Sub-school was not mentioned in interview survey on education unless it was brought out as a special discussion topic. Similarly, the number of sub-schools could not be found in national census and provincial census data books. Such books deal only with schools that cover communes. Sub-schools may well be considered as branch schools of commune-wide schools.

As for the development needs of education, the following three were often mentioned by district and commune officers and teachers;

1) Construction of permanent buildings; Making temporary and semi-permanent buildings into permanent buildings: (In communes with no secondary school, construction of secondary schools with permanent buildings)
2) Improvement of teaching equipment and materials
3) Capacity building of teachers and administrators

The first topic is about primary and secondary schools in commune centers. A not-so-old concrete school building was explained as a non-permanent building as it had a corrugated metal roof. Teaching equipment and materials included photocopiers, projectors, computers, globes, etc. Development needs for sub-schools were not mentioned. Development of sub-schools seems to come after the improvement of buildings and equipments for primary and secondary schools that cover a commune,

Many officers of provincial education said that it was extremely difficult to equip primary and secondary schools in every village in places like the Region where the population density was very low. According to their plan, small children are to go on foot from their homes to sub-schools for 2 or 3 years. After that they are to go to village-cluster school or commune primary school for the 4th and 5th grades, and further on to the commune secondary schools. The officers said that they would like to have more village-cluster schools built.

Provinces and most districts in the Region have Ethnic Boarding School (EBS) which offer primary and secondary school education to ethnic minority children from remote areas. An EBS has about 250 students/residents and 2-story buildings that look similar to primary and secondary schools in communes. Living environment in some boarding schools was not very good with insufficient number of toilets, a dining room that is too small to hold all the students, difficulty in securing domestic water, a double-bunk bed holding 4 students, no space for relaxation, etc. As a countermeasure against such difficulties, some districts have plans to build or relocate EBS, which shows governmental efforts to improve the EBS.

School and accommodation fees for EBS are free, and each student receives 300,000 VND from the government when he/she enters the school. Every month, he/she receives 360,000 VND, out of which he/she pays for food and buys personal items such as beddings and clothing, etc. To enter EBS, one has to have a good educational record, be from an ethnic group other than the Kinh, have no experience of studying at EBS, have no other family members in EBS. Those who were not accepted by EBS go to semi-boarding schools (school with dormitories). A student at a semi-boarding school receives considerably less support from the government. Although the actual amount varies from school to school, each semi-boarding school student receives about 30,000 VND per month; one tenth of what an EBS student receives. Most expenses for the semi-boarding school students are thus covered by their families. According to interviews, some semi-boarding schools were built through NGO assistance, while some others, especially the dormitories, were built by local residents just like sub-schools.

The following comments on ethnic minority students were given by EBS teachers: that gender balance of Thai and Lue students is more equal than that of any other ethnic groups, that hilltribe students from remote

villages (e.g. in Lai Chau, from communes/villages near China) tend to drop out of school due to homesickness, that the drop out rate of the Hmong is high due to marriage in early age, that Nhang and Dao students are dedicated to education and get high academic records. Ethnic minorities, thus, have different attitudes and behavior toward education based on their unique socio-cultural backgrounds.

In thinking about development of the educational sector, living environment of teachers, who leave their families at home to live and work in their schools, needs to be taken into account together with educational environment of primary school, secondary school, sub-school, EBS and semi-boarding school. In an EBS in a district next to China in Lai Chau province was a young female teacher with a baby. The rest of her family was in Hoa Binh province where she went back only a few times a year. While the central and local governments play a major role in education in Vietnam, it is also supported by teachers like her.

5.6.2 Medical Facilities

(1) Medical Services in Vietnam and in the North-West

Condition of Vietnam's health and medical services is good, comparing its health indicators with those of countries of similar level of economic development. According to the World Health Organization, average life expectancies of Vietnam ranks 116th among 191 countries, almost reaching the level of developed nations'. Both infant mortality rate and under-five mortality rate of Vietnam have been constantly declining.

Until twenty years ago, the central government had a strong grip on health care. Proportion of medical payments borne by patients has been recently on the rise with rapid growth of the private sectors in the medical field and decentralization of public finances. As a part of the new public policy, public assistances on medical expenses and medical insurance to the poor households have started. Financing of these assistance come through two channels; one based on the size of population and the other by a national health care program, but the two are not well coordinated.

Wealthy households hold higher share of public spending on health care than poor households. This is probably because public hospitals are located in cities, towns and provincial capitals where the wealthy have easy access. Despite high administrative costs of hospitals in remote areas where poor people live, one third of public spending on health care is spent on people at the top layer of per capita income, who are only 25% of all the people in Vietnam and are likely to be in urban areas. In Vietnam a total of 96,604 medical staff are working in 116,359 villages, and only 1.4% of the communes lack a medical station.

(2) Medical Facilities in the 4 Provinces

Table 5.6.4 shows the number of medical facilities in the Region. Except for Dien Bien province, the number of health establishments increased from year 2000 to 2005. The number of beds and medical staff increased in all the provinces.

Table 5.6.4 Medical Facilities in Four Provinces

	2000	2001	2002	2003	2004	2005
Lai Chau Province						
1. Number of Health Establishments						
Hospital				5	7	8
Clinics				10	10	11
Sanatorium				0	0	0
Health Unit in Commune/Township				86	86	90
Total				101	103	109
2. Number of Beds				670	791	818
3. Number of Medical Staff						
excluding Pharmacy Staff						
Doctor				72	76	91
Others				559	844	992
Total				631	920	1,083
Dien Bien Province						
1. Number of Health Establishments						
Hospital		7	7	7	8	8
Clinics		16	17	18	18	20
Sanatorium		1	1	1	1	1
Health Unit in Commune/Township		87	91	87	82	88
Others		3	4	5	61	63
Total		114	120	118	170	180
2. Number of Beds		963	1,019	1,016	1,126	1,174
3. Number of Medical Staff						
excluding Pharmacy Staff						
Doctor		195	206	206	199	258
Others		1,109	1,006	897	904	968
Total		1,304	1,212	1,103	1,103	1,226
Son La Province						
1. Number of Health Establishments						
Hospital	12	12	12	12	15	14
Clinics	13	13	12	12	15	15
Sanatorium	1	1	1	1	1	1
Health Unit in Commune/Township	201	201	201	201	201	201
Others	8	8	9	9	9	12
Total	235	235	235	235	241	243
2. Number of Beds	2,585	2,575	2,555	2,560	2,815	2,905
3. Number of Medical Staff						
excluding Pharmacy y Staff						
Doctor	268	305	350	425	364	385
Others	1,747	1,840	1,803	1,781	1,843	1,888
Total	2,015	2,145	2,153	2,206	2,207	2,273
Hoa Binh Province						
1. Number of Health Establishments						
Hospital	12	12	13	13	13	13
Clinics	26	27	27	28	28	28
Sanatorium	0	0	0	0	0	0
Health Unit in Commune/Township	214	214	214	214	214	214
Total	252	253	254	256	256	256
2. Number of Beds	1,931	1,958	1,893	1,845	1,836	1,964
3. Number of Medical Staff						
excluding Pharmacy Staff						
Doctor	305	306	325	333	354	351
Others	1,851	1,690	1,569	1,578	1,651	610
Total	2,156	1,996	1,894	1,911	2,005	1,961

Note: Others include [cac tam trung tam chuyen khoa tinh]and [phong kham tu nhan].
Source：Interview survey in each province（2005 Data）

Medical establishments in districts are presented in Table 5.6.5.

Table 5.6.5 Medical Establishments in Districts

Name of District	Population	Number of Medical Establishments	Number of Establishments per 1,000 persons
Lai Chau Province			
TX. Lai Chau	19,307		
H. Muong Te	47,494		
H. Phong Tho	50,785		
H. Sin Ho	73,903		
H. Tam Duong	43,451		
H. Tam Uyen	92,269		
Total	327,209	109	0.33
Dien Bien Province			
TP. Dien Bien Phu	46,954	42	0.89
TX. Muong Lay	14,009	6	0.43
H. Dien Bien	104,267	32	0.31
H.Dien Bien Dong	51,157	17	0.33
H. Muong Cha	46,322	19	0.41
H. Muong Nhe	36,834	9	0.24
H. Tua Chua	43,707	19	0.43
H. Tua Chua Giao	107,431	36	0.34
Total	450,684	180	0.4
Son La Province			
TX. Son La	76,266	25	0.32
H. Bac Yen	51,220	16	0.31
H. Mai Son	126,064	28	0.22
H. Moc Chau	143,513	30	0.21
H. Muong La	83,861	17	0.2
H. Phu Yen	103,131	31	0.3
H. Quynh Nhai	66,818	16	0.24
H. Song Ma	111,658	24	0.21
H. Sop Cop	36,308	8	0.22
H. Thuan Chau	136,825	31	0.23
H. Yen Chau	63,902	17	0.27
Total	999,565	243	0.24
Hoa Binh Province			
Tx. Hoa Binh	83,607		
H. Cao Phong	41,014		
H. Da bac	51,800		
H. Kim Boi	142,370		
H. Ky Son	35,307		
H. Lac Son	132,384		
H. Lac Thuy	50,140		
H. Luong Son	82,014		
H. Mai Chau	49,670		
H. Tan Lac	78,791		
H. Yen Thuy	63,033		
Total	810,130	256	0.31

Source：Interview survey in each province（2005 Data）

5.6.3 Communication

(1) Communication in Vietnam

Communication network in Vietnam has been developing rapidly. The number of telephone subscribers grew nearly 3-fold from 1.16 million in 1996 to 3.28 million in 2000 with average annual increase of 37.3%. During the same time period, telephone subscribers in rural communes grew from 183,000 to 474,000 with annual increase of 27%. Telephone coverage rate of communes grew from 31.5% to 84.4% also. Post offices (POs) and Village Post and Cultural Points (VPCPs) are important information centers in rural areas of Vietnam. Their numbers grew from 2,825 in 1996 to 7,895 in 2000.

Vietnamese government's promotion of post and telecommunication has been bearing fruit, and people in rural areas have easier access to post and telecommunication services. Despite increasing public spending on post and telecommunication in rural areas, volume of usage and the rate of users are generally low.

As can be seen from Table 5.6.6, the numbers of communes with POs and VPCPs vary widely among different regions with poor regions having smaller number of POs and VPCPs. In Northern Upland where the Region is located and in Central Highlands, 53% and 51.2% of the communes have neither post offices nor VPCPs. Hence, postal and telecommunication infrastructures in the poor communes are still underdeveloped.

Table 5.6.6 Post Offices and Village Post and Cultural Points in Vietnam (April 2000)

Region	Number of Communes	Number of Communes		Number of Communes with no PO and VPCPS	Rate of Communes on the left	Average Population of commune on the left
		VPCPS	Post Office (PO)			
Northern Upland	2,637	850	392	1,398	53.0	8,906.4
Red River Delta	1,680	849	421	395	23.7	9,199.2
Central Coasts	2,456	1,016	465	837	36.1	9,157.6
Central Highlands	498	134	56	199	51.2	12,441.8
Southeast	458	223	289	185	26.5	12,416.4
Mekong Delta	1,201	457	467	2883	23.8	14,479.9
Total	8,930	3,529	2,090	3,302	37.0	10,394.7

Source: Enhancing Access to Basic Infrastructure (June 2002)

VPCPs provide people in remote areas not only postal services but also means of communication with the outside world, and serve as information center of the commune. Vietnam Posts and Telecommunications Group (VNTP) started savings services in 2000, giving access to reliable savings to poor people in rural areas. Increasing the numbers of post offices and cultural points is, thus, an effective way to provide the poor with easy access to communication.

(2) Communication in Study Area

Number of telephone subscribers grew fourfold in the period between 2000 and 2005. The number of telephone per 1,000 people in provincial capitals is 4 to 9 times the number of those in rural districts, showing a large rural-urban gap as in education and health care (Table5.6.7, Table 5.6.8).

Table 5.6.7 Number of Telephone Subscribers in Four Provinces

Province	2000	2001	2002	2003	2004	2005
Lai Chau						
Dien Bien	6,249	8,549	12,389	18,655	25,917	23,195
Son La	9,831	12,536	16,388	22,797	30,200	47,633
Hoa Binh	10,242	12,631	17,762	24,279	31,172	33,299
Total	26,322	33,716	46,539	65,731	87,289	114,262

Note: Data in the year 2000 to 2004 is based on Statistical Year Book of Vietnam.
Data in the year 2005 is based on Statistical Year Book of Each Province.

Table 5.6.8 Number of Telephone Subscriber in Districts (31/Dec/ 2005)

Name of District	Population	Number of Telephones	Number of Telephones per 1,000 population
Lai Chau Province			
TX. Lai Chau	19,307	5,403	280
H. Muong Te	47,494	832	18
H. Phong Tho	50,785	851	17
H. Sin Ho	73,903	868	9
H. Tam Duong	43,451	753	17
H. Tam Uyen	92,269	1628	18
Total	327,209	10,135	31
Dien Bien Province			
TP. Dien Bien Phu	46,954	12,548	268
TX. Muong Lay	14,009	1,339	96
H. Dien Bien	104,267	4,874	47
H.Dien Bien Dong	51,157	512	10
H. Muong Cha	46,322	703	15
H. Muong Nhe	36,834	11	0.3
H. Tua Chua	43,707	791	18
H. Tua Chua Giao	107,431	2,417	23
Total	450,684	23,195	51
Son La Province			
TX. Son La	76,266	20,762	272
H. Bac Yen	51,220	914	18
H. Mai Son	126,064	5,420	43
H. Moc Chau	143,513	7,689	54
H. Muong La	83,861	2,571	31
H. Phu Yen	103,131	2,457	24
H. Quynh Nhai	66,818	620	9
H. Song Ma	111,658	2,365	21
H. Sop Cop	36,308	452	12
H. Thuan Chau	136,825	2,700	20
H. Yen Chau	63,902	1,683	26
Total	999,565	47,633	48
Hoa Binh Province			
Tx. Hoa Binh	83,607	15,049	180
H. Cao Phong	41,014	750	18
H. Da bac	51,800	1,200	23
H. Kim Boi	142,370	2,963	21
H. Ky Son	35,307	1,750	50
H. Lac Son	132,384	1,920	15
H. Lac Thuy	50,140	1,835	37
H. Luong Son	82,014	3,000	37
H. Mai Chau	49,670	1,480	29
H. Tan Lac	78,791	1,700	22
H. Yen Thuy	63,033	1,672	27
Total	810,130	33,299	41

Source: Statistical Year Book of Each Province

5.7 Disaster Prevention

5.7.1 Natural Disaster in the Study Area

The Region is located in the watershed of Da river (tributary of Hong river), Ma river, Nua river (tributary of Mekong), Bua river (tributary of Hong river) and Boi river and has steep mountains. A small estuary alluvial plain is in Hoa Binh Province. Other plains are in valleys, small-scale alluvial fans, river terraces and high plains. The Dien Bien Basin, which is the largest plain in the Region, is about 10,000 ha.

The areas of land which can be used for commerce, industry, residence and farming are less than 20% of the total area in Hoa Binh Province, and less than 10% in the other 3 provinces. The remaining are steep slopes which are difficult to make into land with high added values.

As for disasters, the Region has no plains which are easily and widely inundated for a long time. Sizes of the major watersheds are calculated based on 1:50,000 topographic maps and summarized by province in

Table 5.7.1

Table 5.7.1 Watershed of Major Rivers in Four Provinces

Name of river	Catchment Area (km^2)
Dien Bien province	
Da river	5,904
Ma river	2,049
Nua river (Tributary of MeCong)	1,601
Total	9,554
Lai Cha province	
Da river	9,065
Son La province	
Da river	8,913
Ma river	4,894
Mua river (Tributary of Hong river)	194
Total	14,001
Hoa Binh province	
Da river	1,606
Buoi river (Tributary of Ma river)	1,509
Boi river	1,040
Tributaries of Hong river	508
Total	4,663

Many small and medium river streams in the Region have riverbed slope of over 10% where flash floods and mudflows occur frequently.

The population density of Hoa Binh Province is 177 persons/km^2, and those of the other three provinces are between 36 to 72 persons/km^2. These figures are very low, compared with the 257 persons/km^2 of the national average. Eighty (80) to 90% of the population in the Region lives in agricultural villages. A few small-scale disaster preventing facilities exist.

Each province has FASC (Flood and Storm Control Steering Board) and action plans on disaster prevention for each department, district and commune. Disaster records compiled by FASC compiled are shown in Table 5.7.2 to 5.7.5.

In consideration of prevention measures against disasters as shown in the tables, special attention should be paid to the followings:

1) Slope collapse on the sides of roads:
   Most slope collapse is due to road construction methods. As slope protection work is not carried out, slope collapse may occur easily with the ordinary rain. To prevent slope collapse, road construction methods and O&M need to be examined carefully for improvement.
2) Weirs and canals that are considered to be temporary structures:
   Irrigation weirs and canals, which are constructed with an assumption of collapse in every rainy season because of fund shortage, etc., are mentioned. Such weirs and canals should be handled not as disaster item, but as O&M issues.
3) Wind damage to roofs:
   For the wind damage to roofs of ordinary houses, an issue arises as to what extent public fund should be used.

Based on the above considerations, half of the amount of damage listed in the tables is likely to be reduced

by infrastructure improvement (Table5.7.2 to Table 5.7.5).

Table 5.7.2 Damage Caused by Natural Disaster in Lai Chau Province (2001-2005)

Item		Damage
Human	Dead	19
	Injured	16
House	Totally Collapsed	65
	Partially Collapsed	803
Agriculture	Paddy	277 ha
	Cereal、Fruit	9331 ha
	Aquaculture	20.5 ha
Irrigation Facility	Canal	5.6 km
	Water supply	5 location
Transportation	Sliding	221,000 m^3
	Slope protection	821 m^3
	Bridge, drainage	419 nos.
	Suspension bridge	47nos.
Amount of Damage (2 years)		47 billion Dong
Average (2005-2006)		23.5 billion Dong

Table 5.7.3 Damage Caused by Natural Disaster in Dien Bien Province (2001-2005)

Item		Damage
Human	Dead	2
	Injured	19
House	Collapsed	188
	Roof	25030
Agriculture	Paddy (Total)	1,020 ha
	paddy (Partial)	1,246 ha
	Cereal、Fruit	738.5 ha
	Aquaculture	64.45 ha
	Livestock	45 heads
Irrigation Facility	Headworks (Low Quality)	491 nos.
	Water supply	85 locations
Transportation	Sliding	772,000 m^3
	Slope protection	821 m^3
	Bridge, Drainage	419 locations
Amount of Damage (5 years)		155 billion Dong
Average (2001-2005)		31 billion Dong

Table 5.7.4 Damage Caused by Natural Disaster in Son La Province (2001-2005)

Item		Damage
Human	Dead	62
	Injured	119
House	Collapsed	523
	Flooded	9,708
	Evacuated	169
Agriculture	Corn	21,199 ha
	Coffee	272 ha
	Tea	26 ha
	Sugarcane	105 ha
	Fruit	1,362 ha
Irrigation Facility	Headworks	9 nos.
	Gabion	234 nos.
	Dry masonry	1,593 nos.
	Intake	21nos.
	Canal	209 km
Transportation	Sliding	1,018,000 m^3
	Silting	281,000 m^3
	Surface erosion	127 m^2
	Drainage culvert	535 nos.
	Suspension bridge	47nos.
Amount of Damage (5 years)		106.9 billion Dong
Average (2001-2005)		21.4 billion Dong

Table 5.7.5 Damage Caused by Natural Disaster in Hoa Binh Province (2001-2005)

Item		Damage
Human	Dead	7
	Injured	17
Building	House	2,228
	Office	13
	School	100 class rooms
Agriculture	Paddy	9,000 ha (500ha totally damaged)
	Cereal	3877
	Tree	733
Irrigation Facility		90 locations
Transportation	Sliding	40,000 m^3
Others	Fisher boat	16
	Post for electricity	8 nos.
	Telephone posts	100 nos.
Amount of Damage (5 years)		85 billion Dong
Average (2001-2005)		17 billion Dong

5.7.2 Disaster Prevention Measures

Each FASC of the 4 provinces formulates annual and long-term policies on disaster control. Works on disaster control are mostly on fixing of damages reported by villages and communes.

Damages of disasters are generally divided into 5 groups as follows. As the self-sufficiency rate of daily necessities is high in the Region, 1) and 3) apply to the disasters in the Region. 2), 4) and 5), on the other hand, do not apply as they occur most often in urban areas.

1) Existence of victims
2) Danger to life/existence due to shortage of food and daily necessaries
3) Damage to goods/assets
4) Damage and losses of public assets
5) Suspension of public services necessary for human existence

Main features of natural disasters in the Region are as follows:

1) Disaster area is limited
2) Duration of inundation is comparatively short
3) Many slopes on the sides of roads collapse
4) Mud and oil flashings cause damages. However, areas affected by the damages are not big/wide due the topography of the Region and site conditions of villages/communes.

Characteristics of the local communities in the Region are as follows:

1) Public and personal assets as well as infrastructures are not formed/established
2) Rate of improvement of infrastructure such as roads and bridges is very low

Based on the above characteristics, disaster prevention measures should combine the measures to 1) deter damages and 2) reduce damages, and A) measures on hardware and B) measures on software. Measure appropriate for the Region should be considered by examining regional characteristics, costs, rational management, etc.

As mentioned earlier, improvement of infrastructure is much likely to prevent disasters.

One of the important issues on disaster prevention is physical isolation of villages. When a village is isolated, appropriate measures cannot be carried out in times of emergency. For this reason, securement of road access is an essential element of disaster prevention. As the road network in the Region is not well developed, some villages become isolated during the rainy season. If items of public investment are not prioritized, an incident may happen in which people injured by increase of river water cannot be transported even if flash flood was prevented. In the Region, improvement of road network is essential in terms of not only area development and economic development, but also disaster prevention.

As mentioned earlier, cost-effectiveness of investment in facilities to prevent disasters in a wide area is often low in the Region where social assets are not well established. In order to maintain balance with infrastructure, large-scale disaster prevention works are not needed. In terms of hardware, damage reduction measures that are small-scale and focused on specific areas are required.

For example, a small reservoir has a function to prevent mud/soil flow that is harmful to paddies in the downstream. By introducing low cost methods that can be carried out by tools used in everyday life, people's awareness of disaster prevention is improved.

According to the local residents, disaster by mud and rock flow occurred 20 years ago. The sum of damage cost and rehabilitation costs was about US$10,000. If erosion control work had been carried out then, it would have cost US$500,000. This mud and rock flow was not due to extremely heavy rainfall that occurs every 20 to30 years. Instead, it was caused by a strong rain when accumulated mud and sand were easy to flow. In this respect, forecast of flush flood and mud and rock flow is extremely difficult. Dam against mud and rock flow is an effective measure, but large investment in hardware cannot be expected due to low cost-effectiveness in the Region. Disaster protection and reduction can be carried out by improvement of software.

According the questionnaire survey, irrigation offices in many districts organized a group which regularly observes river conditions. This system of observance at the district level should be strengthened and extended to the commune level. By combining the findings from the observance and action plans, disaster prevention and reduction become more effective. For example, when accumulation of sand and mud is observed in the upper stream, disaster can be forecasted. Furthermore, removal of accumulated sand mud is likely to bring the minimal damage.

As small-scale alluvial fans are formed by a series of mud and rock flow and flush flood, disaster is much likely to occur unless prevention facilities are constructed.

Damage by disaster can be reduced by teaching the local residents about the mechanisms of disaster outbreak.

The following disaster prevention measures should be taken in the Region:

1) Improvement of roads and bridges
2) Strengthening organizations for disaster prevention in districts and communes
3) Publicity to local residents
4) Introduction of construction method for disaster prevention/mitigation, using tools used in everyday life and materials found/obtained in the area

5.8 Resettlement Program under Son La Hydropower Project

5.8.1 Introduction

Government of Vietnam is putting great effort into energy development to attain the annual economic growth rate of 7-8%. While the need for energy is expected to increase rapidly, hydropower generation, for which Vietnam's rich water resources are utilized, is to play the central role in energy development. The annual electric power consumption in 2020 is expected to reach 250 billion kWh/ year, and this rate is about 4 times that of 2005.

The potential of hydropower generation in Vietnam is estimated to be 300 billion kWh/year, and the economically feasible hydropower generation is estimated to be 72billion kWh/year in 360 locations. With great expectation for the development of hydropower power generation, the Government of Vietnam plans to boost the hydropower power generation to 60billions kWh/ year (25billion kWh/ year in 2007,) by 2020. In line with such policy, the Son La hydropower project with designed electric generating capacity of 2.4Mw and annual supply of 10 billion kWh is currently under way as one of the largest state project with a budget of 37 trillion VND. This project will be completed in 2012.

To assure stable economic growth, energy policy on electric power is essential. In hydropower development, relocation of inhabitants may make social impacts. In relocation/resettlement, those who come (resettlers) and those who receive (hosts) are both affected materially and psychologically. Resettlement may result in mixing people of different cultures and different habits, which may cause friction if not managed properly.

Sites whose inhabitants are to relocate because of the Son La hydropower project are along the Da River. Poverty rates of those sites are as high as 70 %. The project must be managed properly so that the relocation will not increase the poverty level. In addition to short-term compensation for relocation, poverty reduction should be pursued with a long-term perspective.

5.8.2 Basic Approach of Government of Vietnam to Resettlement for the Son La Dam

The Government of Vietnam proclaimed a basic law to resettlement operation, "Prime Minister's Decision 459/QD-TTg" in 2004. Later in January 2007, "Prime Minister's Decision No. 02/2007/QD-TTg" was proclaimed as a revised version.

According to a presentation document of the ADB Project TA 4690 published in October 2007, 10.2 trillion VND, which is equal to 28% of the total project cost (37 trillion VND), is allocated for resettlement

operation. Out of this 10.2 trillion VND, 540 million VND is spent on each household as compensation for relocation.

MARD made a draft review report in December 2006 on the integrated resettlement plan (Decision 196, February 2004). As of September 2007, it is still awaiting for the official approval by the Government. According to the draft report, the number of the households by province which are to resettle is as shown in Table 5.8.1.

Table 5.8.1 Number of Relocating Households (Draft Review, Dec. 2006)

Province	Total (till 2010)	Completed by Dec. 2006	2007	2008	2009	2010
Total Household	19, 729	3, 139	6, 855	5, 181	3, 286	1, 268
% (Each Year)	100	16	35	26	17	6
% (Cumulative)	100	16	51	77	94	100
1. Điện Biên	3, 900	85	1, 020	1, 330	1, 175	290
2. Lai Châu	3, 350	468	1, 335	827	611	109
3. Sơn La	12, 479	2, 586	4, 500	3, 024	1, 500	869

Source: NIAPP

Son La Province accounts for 63.3% (12,479 households) of all the households concerned. As for the schedule, 50.7%, 76.9%, and 93.6% of all the households will be relocated by 2007, 2008, and 2009, respectively. Relocation is to be completed in 2010.

As for the destination sites, 26.0% of the households will resettle in urban areas, and 74.0% of the households in rural areas (Table 5.8.2). The urban-rural ratio is different among the provinces. In Dien Bien Province, 83.4% of the households will resettle in urban areas, while 80.2% and 88.8% in rural areas in Lai Chau and Son La Provinces, respectively.

Table 5.8.2 Number of Households Resettling in Urban Area/ Rural Area
(Draft Review, Dec. 2006)

Province		Urban	%	Rural	%	Total	%
	Total	5,132	26.0%	14,597	74.0%	19,729	100.0%
1	Dien Bien	3,000	84.3%	560	15.7%	3,560	100.0%
2	Lai Chau	732	19.8%	2,958	80.2%	3,690	100.0%
3	Son La	1,400	11.2%	11,079	88.8%	12,479	100.0%

Source: NIAPP

The resettlement master plan is formulated by MARD which is the head of Steering Committee for resettlement. Practical management of the resettlement work is commissioned to 3 provinces and 14 districts. District governments have carried out small projects on small budgets, but they do not have enough management experience with a big project like the Son La hydropower project. Their management capacity for large projects has not been fully developed. How much resettlement operation can be carried out as proclaimed by the central government, and how the needed capacity development is carried out are the two main essential matters.

5.8.3 Progress of Resettlement

According to the resettlement schedule, 91,000 people of 19,000 households will be relocated to 260 resettlement sites in 3 provinces by 2009. As of may 2007, 5,100 households in Son La Province, 1,400 households in Lai Chau Province, and 200 households in Dien Bien Province (total: 6,700 households) were relocated to the resettlement areas.

Not only dam/hydropower works, but also public works which involves relocation of people have wider social impacts. In order to analyze social impact of resettlement of the Son La hydropower project, it needs to be examined whether such impacts are attributed specifically to a) relocation projects, b) conditions of the resettlement/destination areas, or c) conditions that can be found throughout Vietnam. Without such examination, the real nature of the impacts cannot be understood. In addition to the present impacts that can be easily observed, impacts which may come out in the future also need to be studied and analyzed.

(1) Earthworks in resettlement sites

Land development of the resettlement sites is mainly earthwork. Appropriate land development requires earthwork based on the quality standard. For this, the followings are recommended:

1) In this region, slopes are generally not protected. Many slopes are eroded, so that slope protection (protection of cut earth and earth fill) should be carried out to prevent disasters and secure the minimum safety.

2) Waste soil of the earth work is dumped in the valleys. This might lead to the secondary disasters caused by rivers such as slope sliding, silting, mud flow and flash flood. Waste soil should be moved to a safe area where no secondary disasters are likely to occur. Protection wall should be built if necessary.

3) Houses built on embankment with insufficient compaction may collapse due to unequal settling. To prevent from such collapse, compaction of embankment should be carried out based on the design standard.

(2) Water Supply

One of the big issues in resettlement sites is water shortage. This water issue is caused by wrong estimation of available water due perhaps to a mistake in calculation.

(3) Work Schedule Control

In some resettlement sites, people move into the sites before the completion of physical construction, i.e. in this case, school construction is incomplete and water supply system is not fully operating. Monitoring system is needed to harmonize the resettlement project management and construction schedule control/management.

5.8.4 Human Resource Development Project by ADB

(1) Project purpose

ADB is carrying out Strengthening Institutional Capacity of Local Stakeholder for Implementation of Son La Livelihood and Resettlement Plan. This is a poverty reduction project targeting those who are concerned with the resettlers and the hosts.

As many as 91,000 and 5,000 people are going to be displaced in Son La and Huoi Quang hydropower projects respectively. For effective planning and implementation of such large-scale resettlement works, this ADB project aims to develop institutional and technical capacity of national/ministerial, provincial, district and commune officers.

As for the fund contribution, ADB provides $ 1,000,000 from the Poverty Reduction Fund, and the Government of Vietnam provides $ 250,000.

(2) The outline of the project

Resettlement is scheduled to complete by 2009. Pilot resettlement sites were established in three province and 3,375 people were resettled there in 2004. Some resettlement issues surfaced including 1) inappropriate system to estimate the compensation values, 2) inadequate information disclosure on livelihood assistance, 3) friction between resettlers and hosts, and 4) defective system to process and respond to claims.

With understanding of the above resettlement situation, the project hires experts on 1)resettlement planning, 2)land use, 3)upland farming and 4) fishery and natural resource management and conducts a series of training of national/ministerial, provincial, district and commune officers. The training is to strengthen the local government support on livelihood through improvement of a) local government services, b) their technical capacity, c) on-going resettlement activities and construction, and d) agriculture.

Chapter 6
Legal Framework on Environmental and Social Considerations

6.1 Introduction

The Master Plan which will be formulated by this Study does not target for the large magnitude of development by using the land resources and water resources as mush as possible. Therefore, there seem to be a small scale of burden on the natural environment. However, there can be some amount of negative impacts on the ethnic minorities by implementing the Master Plan, because of the large portion of ethnic minorities in the Region. There are also the region with many kinds of rare fauna and flora. Therefore, the detailed environmental impact assessments should be conducted only for the prioritized projects, which would be implemented promptly, simultaneously formulating the feasibility study reports for those projects, according to the Vietnamese regulations related to the environmental and social considerations, and the negative impacts from those projects should be minimized as much as possible. Accordingly, the organizations and regulations on the environmental and social considerations, which should be considered in formulation of the Master Plan, and results of preliminary examination on the environmental and social considerations at this stage for the Master Plan, are summarized and organized in this Chapter.

6.2 Environmental and Social Consideration

6.2.1 Legislations, Standards and Regulations regarding Environmental and Social Consideration

(1) International treaties and multilateral treaties

1) International treaties

The Government of Vietnam setup the frameworks on the international treaties by establishing the Ordinance on the Conclusion and Implementation of International Treaties in 1993. According to this ordinance, the Government of Vietnam ratified many kinds of international treaties. The international treaties which are ratified by the Government of Vietnam regarding the environmental and social considerations are listed below.

- Convention Concerning the Protection of World Cultural and Natural Heritage (Oct., 1987)
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), (Jan., 1989)
- Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (Aug., 1991)
- Montreal Protocol on Substances that Deplete the Ozone Layer, 1987 (Jan., 1994)
- Vienna convention for the protection of the zone layer, 1985 (Apr., 1994)
- United Nations Framework Convention on Climate Change (UNFCCC or FCCC) (Nov., 1994)
- Convention on Biological Diversity (Biodiversity Convention) (Nov., 1994)

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington Convention/CITES) (Apr., 1994)
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention) (Mar., 1995)
- International declaration on cleaner production (Sep., 1999)
- Kyoto Protocol to the United Nations Framework Convention on Climate Change (Sep., 2002)
- Cartagena Protocol on Biosafety to the Convention on Biological Diversity (Jan., 2004)

2) Multilateral treaties

GMS (Greater Mekong Sub-region) is the organization for discussion and coordination on the environmental and social impacts around the Mekong river watershed. Member countries include Vietnam, Cambodia, Laos, Myanmar and China.

Vietnam has signed for and joined in the ASEAN Declaration on Heritage Parks on December 2003, which targets conservation and management of the ASEAN Heritage Parks in order to assist and support for development and implementation of the regional action plan for conservation and management in the ASEAN.

(2) Legislation systems in Vietnam

1) Natural environmental issue

- Environment Protection Law (enforced in 1994. Revised in July 2006)
- Decree on Detailing and Guiding the Implementation of a Number of Articles of the Law on Environmental Protection (Decree No. 80/2006/ND-CP, August, 2006)
  This law and decree stipulate the object projects, strategies and plans that are subject to preparation of EIA reports and SEA reports, and relevant organizations and authorities which have responsibilities for reviews and approvals, and so on. Under the new Law on Environmental Protection, there are no need to conduct Preliminary Evaluation of Environmental Effect and/or Initial Environmental Examination (IEE), which were obliged to conduct by the former law on environmental protection.

- Circular on Guiding the implementation of the contents of strategic environmental assessment, environmental impact assessment and environmental protection commitment (Circular No. 08/2006/TT-BTNMT, September, 2006)

- Decree No. 21/2008/ND-CP dated February 28 amending and supplementing a number of the Government Decree No. 80/2006/ND-CP dated August 9, 2006, detailing and guiding the implementation of a number of articles of the Law on Environmental Protection.
  The list of projects subject to making of environmental impact assessment reports included in Appendix I of Decree 80/2006/ND-CP was replaced.

- Vietnam Environmental Standards (TCVN: Tiu Chuen Vietnam)

  Vietnam Environmental Standards are those standards for environment related issues and emission in the industries. The Vietnam Environmental Standards have been established one by one, according to setting up of the former Law on Environmental Protection 1993 and Decree No. 175/1994/CP[1], and publicizing by the Decision No. 35/2002/QD-BKHCNMT[2]. However, as it has passed long time after establishing the standards, many of them are now not well-adapted to the current environmental conditions. Therefore, many of them are now under revision. In 2005, standards on air quality and industrial waste water were revised.

- Guideline for Preparation and Appraisal of Environmental Impact Assessment Reports

  The specific guidelines for preparation and appraisal of Environmental Impact Assessment Reports were prepared in 1999 for nearly 15 kinds of sector projects, i.e. the hydropower, thermal power plants, urban development, industrial zones, and so on, respectively. All the guidelines are now under revision according to enforcement of the new Law on Environmental Protection in July, 2006.

- Law on Forest Protection and Development (No. 29/2004/Q11)
- Decree No.23/2006/ND-CP of March 3, 2006, on the Implementation of the Law on Forest Protection and Development

  This law is object for the sustainable development and protection of the forests in Vietnam. The law also stipulates the three (3) types of forests, including the special-use forests for the protected areas in Vietnam.

- Decree No. 32/2006/ND-CP of March 30, 2006, on Management of Endangered, Precious and Rare Forest Plants and Animals

  Specific species of flora and fauna, which should be protected in Vietnam, are stipulated by this decree, according to the listing up of target protection species under the Law on Forest Development and Protection.

- Decree 109/2003/ND-CP on the conservation and sustainable development of wetlands areas (Decree No. 109/2003/ND-CP, Sep., 2003)

  This decree is the first regulation in Vietnam to set down the protection and development of wetland ecosystems.

2) Social environmental issue

- Law on Land (No. 13/2003/QH11)

  This Law governs the powers and responsibilities of the State as representative of the ownership of land by the entire people. The Law also stipulates the registration of land inventory, land use

1 The Government's Decree No. 175/CP guiding the implementation of the Law on Protection of the Environment
2 Decision No. 35/2002/QD-BKHCNMT of June 25, 2002 Publicizing the List of Vietnamese Environmental Standards for Compulsory Application

right, certificate of land use right, and so on.

- Decree No. 197/2004/ND-CP of December 3, 2004 on Compensation, Support and Resettlement when Land is Recovered by the State (Decree No.197/2004/ND-CP, December, 2004)
  This Decree provides for the compensation, support and resettlement when land is recovered by the State for defense and security purposes, for national interests, public interests and economic development purposes.

- Ordinance on Protection and Usage of Historical, Cultural Heritage and Scenery for Sustainable Development (1984)
  This ordinance stipulates the authorization, conservation and usage of the historical, cultural heritage and scenery areas in Vietnam.

6.2.2 Concerned Organizations

(1) Concerned organizations on environmental and social consideration

The section for review and appraisal of EIA was transferred from ex-MOSTE (Ministry of Science, Technology and Environment) to newly set-up MONRE (Ministry of Natural Resources and Environment) in 2003. MONRE has now responsibility to approve the EIA reports against the proposed projects which would be large in quantity and have great impacts on the environment (Decree No.80/2006/ND-CP). DONRE (Department of Natural Resources and Environment) in each province has responsibility for approval on the EIA reports for other kinds of projects. MONRE has the sole responsibility for management and inspection on the activities for the SEA (Circular No. 08/2006/TT-BTNMT).

(2) Responsibility of project owners

Project owners have the responsibility to prepare and submit environmental impact assessment reports for review and approval by the competent State agencies, together with the feasibility study report. The project owners[3] have all the responsibilities for conducting the compensations on and procedures for the involuntary resettlement, loss of property, degradation of land, and so on.

6.3 Environmental and Social Consideration on Formulation of the M/P

6.3.1 Evaluation of Environmental Impacts

Three (3) kinds of evaluation methods of environment are laid down by the Law on Environmental Protection; i.e. i) Strategic Environmental Assessment (SEA), ii) Environmental Impact Assessment (EIA) and iii) Environment Protection Commitment.

(1) Strategic Environmental Assessment (SEA)

Strategic Environment Assessment (hereinafter referred to as “SEA”) means the analysis and prediction of potential environmental impacts of strategic projects and development planning and plans prior to approval

3 For example, the Electricity of Vietnam (EVN), shall be the project proponent for the construction of power plants.

in order to ensure the achievement of sustainable development. Strategies, planning and plans which have responsibility to prepare the Strategic Environmental Assessment Reporting are those strategies and plans on national socio-economic development, the sectoral development, and so on (Table 6.3.1). The Law on Environmental Protection stipulates the details of the SEA, such as the objects that are subject to SEA reporting. In terms of legislative documents relating to SEA in Vietnam, although some documents, such as Decree No.80/2006/ND-CP, Circular No. 13/2006/TT-BTNMT, and Circular No. 13/2006/TT-BTNMT mentioned above, have been issued to operate SEA, no legal guidance on financial mechanisms and costs of SEA, and stakeholder participation for SEA and no technical guidance on SEA have not yet prepared. Such documents, which have not yet prepared, will be issued and the existing documents will be revised and modified, according to the trial operations and technical assistances by donors.

Table 6.3.1 Objects that are Subject to Strategic Environment Assessment Reporting

1.	National socio-economic development strategies, planning and plans
2.	Sectoral development strategies, planning and plans of national scale
3.	Socio-economic development strategies, planning and plans of provinces and cities directly under the Central Government (hereinafter called "Provincial Level") and regions
4.	Land-use planning; forest protection and development; other natural resource exploitation and use at least at inter-provincial and inter-regional levels
5.	Focal economic zone development planning
6.	Integrated river basin planning at inter-provincial level

Source: Article 14, Law on Environmental Protection

In terms of assistance on SEA operation in Vietnam, the process of donor coordination and harmonization has commenced in April, 2006, with the SEA coordination meeting between MONRE and donors/NGOs[4]. The main output of the meeting was the "Road Map" for SEA capacity building in Vietnam and it has also bee proposed that the "Road Map" would be developed into an agreed "Framework for Donor Coordination and Cooperation on SEA Capacity Building in Vietnam". The objectives of the SEA coordination framework are as follows:

i) Finalize legal and technical guidance for SEA in Vietnam.
ii) Support SEA capacity building through SEA training and curriculum development and pilot projects.
iii) Support information dissemination and communications networks for SEA.

In case of the SEA operations, the World Bank and the ex-Ministry of Industry (current Ministry of Trade and Industry) examined the impact assessment methods on the biodiversity for the hydropower generation as one of the pilot studies[5], and the Asian Development Bank conducted the SEA as one of the pilot studies for the hydropower sector in Vietnam[6]. According to the framework above, more than 13 pilot projects for preparing SEA reports are being conducted on hydropower development plan, social-economic development plan, land use plan, and so on, with supports by the World Bank, ADB, GTZ, Swiss

4 Strategic Environmental Assessment in Vietnam: A Framework for Donor Coordination & Cooperation (Draft version), MONRE, Aug. 2007. The SEA coordination meeting consists in representatives from the World Bank, German Technical Cooperation (GTZ); Swedish International Development Agency (SIDA); Danish International Development Agency (DANIDA); World Wide Fund for Nature (WWF); the International Centre for Environmental Management (ICEM); and the Strengthening Environmental Management for Land Administration in Viet Nam (SEMLA: SIDA supported Project).
5 SEA Pilot Study: Methodology for analysing the biodiversity impacts of Vietnam's hydropower plan (draft), World Bank, 2006
6 Strategic Environmental Assessment of the Hydropower Master Plan in the Context of the PDP VI (draft), ADB, 2007

Development Cooperation (SDC) and SIDA (via SEMLA). Apart from the donor-supporting projects, the SEA reports on fishery sector, and so on, have been prepared only by Vietnamese side[7].

As the SEA had been conducted as pilot-study base, the SEAs had not been conducted before even for the projects, such as those listed in Table 6.3.1. According to the officials in the competent department on EIA of MONRE (Department of EIA and Appraisal) in reply to the inquiry from the JICA Study Team through the C/P organization, the SEA studies were/are to be conducted after formulating the plans for the necessities of the SEAs when getting approval by the Government[8,9]. Moreover, in order to obtain approval by the Government of Vietnam for this Master Plan, the SEA should also be conducted for this Master Plan as same as the other Master Plans pursuant to the Law on Environmental Protection. However, further consideration of implementing the SEA study for this Master Plan should be taken into account; when, who, and how.

(2) Environmental Impact Assessment (EIA)

Environmental Impact Assessment means the analysis and prediction of potential impacts of specific investment projects on the environment in order to propose measures to protect the environment when the implementation of projects takes place. The projects that are subject to Preparation of Environmental Impact Assessment Reports were categorized in two (2) categories in the former law of environmental protection, whereas, the new Law on Environmental Protection stipulates seven categories which are subject to preparation of Environmental Impact Assessment Reports as shown in Table 6.3.2. The 102 kinds of projects subject to making of environmental impact assessment reports were stipulated in the list in the Decree No.80/2006/ND-CP. Thereafter, the list of 102 number of projects included in the Appendix of Decree No.80/2006/ND-CP are to be replaced with the list in the Appendix of Decree No. 21/2008/ND-CP with 162 numbers of the projects. Lists of projects subject to making environmental impact assessment reports and those with environmental impact assessment reports to be appraised and approved by MONRE are shown in Attachment 6.1.

Table 6.3.2 Objects that are Subject to Preparation of Environmental Impact Assessment Reports

1.	Projects of national importance
2.	Projects that use part of land of, or are likely to cause adverse impact to, natural reserves, national parks, historical-cultural relics, natural heritage and famed beauty spots that are designated
3.	Projects that are likely to impose risks of adverse impacts on water resources of river basins, coastal areas and protected ecosystem areas
4.	Projects on infrastructure development in economic areas, industrial parks, hi-tech parks, export- processing zones and craft village clusters
5.	Projects on new urban center and centered residential area development
6.	Projects on large-scale groundwater and other natural resources exploitation and use
7.	Other projects that may impose potential risks of adversely environmental impacts

Source: Article 18, Law on Environmental Protection

7 SEA for Planning for culturing sea fishes by 2015, vision to 2020, Institution of Fisheries Economics and Planning (IFEP), 2007

8 As of Feb., 2008.

9 For example, although "Master Plan for Socio-Economic Development in Bac Giang Province for the Period 2006 to 2020" was formulated in 2005, the SEA report had not been prepared. The SEA report for the Master Plan was prepared by the Bac Giang PPC in July, 2007, and was submitted to and proved by MONRE.

(3) Environment Protection Commitment

For household scaled production, business and service units and objects that have no responsibilities to prepare the EIA reports, Proponents of projects shall have responsibility to prepare the environmental protection commitments to show their undertakings on the environmental protection. After the registration of the commitment of environmental protection, the project proponents will be allowed to operate their production, business and service units.

6.3.2 Implementation Process of the Strategic Environmental Assessment (SEA)

(1) Organizations to make SEA reports

Agencies/organizations that are assigned to formulate projects subject to Strategic Environmental Assessment Reporting shall have the responsibilities to prepare the strategic environmental assessment reports. Agencies/organizations that should conduct SEA report have the responsibility to establish the SEA mission group including environmentalists, related scientists who have professions and qualifications to the characteristics of the project in order to conduct the strategic environmental assessment (Chapter 14 and Chapter 15 of the Law of Environmental Protection, and 2.1, Circular No. 08/2006/TT-BTNMT).

(2) Contents of the SEA reports

Structures and contents of the SEA report are defined as follows (Appendix 1, Circular No. 08/2006/TT-BTNMT). Detail contents of the SEA report are shown in the Attachment 6.2.

Introduction
Chapter 1: General Introduction about the Aim, Scale and Characteristics of the Environmental-Related Project
Chapter 2: General Description of Natural, Socio-Economic and Environmental Conditions related to the Project
Chapter 3: Forecast of Possible Negative Environmental Impacts during the Project Implementation Process
Chapter 4: Guidance on Sources of Statistic, Data and Assessment Methods
Chapter 5: The Proposal of General Orientation, Solution to Environmental Problems during the Implementation of the Project
Conclusions and Recommendations

(3) Appraisal Councils for the SEA reports

The SEA reports shall be appraised by the appraisal councils. The Appraisal Councils shall be organized by the competent appraising agencies by the kinds of the projects (Table 6.3.3).

Table 6.3.3 Agencies/Organizations that Shall Have Responsibilities to Establish the Appraisal Councils of the SEA Reports (Competent Appraising Agency)

Kinds of Projects	Competent Appraising Agencies which Comprise Appraisal Council
Projects that are subject to the approval of the National Assembly, the Government and the Prime Minister	MONRE
Projects that are subject to the approval of the line ministries, ministry-level agencies and Government body	Line ministries, ministry-level agencies and Government body
Projects that are subject to the competence of the provincial level People's Committee and same level People's Committee	Provincial level People's Committee

Source: Law on Environmental Protection, Article 17

Compositions of the Appraisal Councils are shown in Table 6.3.4. A membership of the Appraisal Councils as stipulated in Table 6.3.4 must comprise at least 50% of their members who are qualified in terms of their professional knowledge of environmental protection and of other relevant fields relating to the contents of the projects. Those who participate in the preparation of the SEA reports shall not be eligible to the membership of the Appraisal Council.

Table 6.3.4 Compositions of the Appraisal Councils of the SEA Reports

Kinds of Projects	Compositions of the Appraisal Council
Projects of national and inter-provincial scale	Representatives from the agencies that are responsible for the project approval; representatives from relevant ministries, ministry-level agencies, Government bodies and provincial-level People's Committees; qualified experts whose specific professions are appropriate to the contents of the projects, and representatives from other organizations and individuals decided by the competent agencies
Provincial-level projects	Provincial level People's Committees; specialized agencies of the environmental protection and other relevant provincial departmental qualified experts whose specific professions are appropriate to the contents of the projects, and representatives from other organizations and individuals decided by the competent agencies

Source: Law on Environmental Protection, Article 17

(4) Evaluation and Appraisal of the SEA reports

The project owners shall have responsibility to send documents to require the appraisement of the SEA reports to the competent appraisal councils listed in the Table 6.3.3. Numbers and forms of document required for are listed in Table 6.3.5 (Circular No. 08/2006/TT-BTNMT). In case that the competent appraisal councils exceeds seven (7) members, or in other necessary cases as the requirements for the appraisement, the project owners shall have responsibility to complement the number of the reports on strategic environmental assessment as required by the councils. The flowchart of appraisal of the SEA reports is shown in Figure 6.3.1.

Table 6.3.5 Document Required for Appraisement of the SEA reports

Kinds of Documents	Sets	Remarks
Application requiring the appraisement of the SEA reports	1 set	-
SEA reports	7 sets	Signed by the project owner with full name and position together and sealed by the agency on supplementary cover of each copy
Draft strategy/planning/plan	1 set	-

Source: Circular No. 08/2006/TT-BTNMT, 2.2

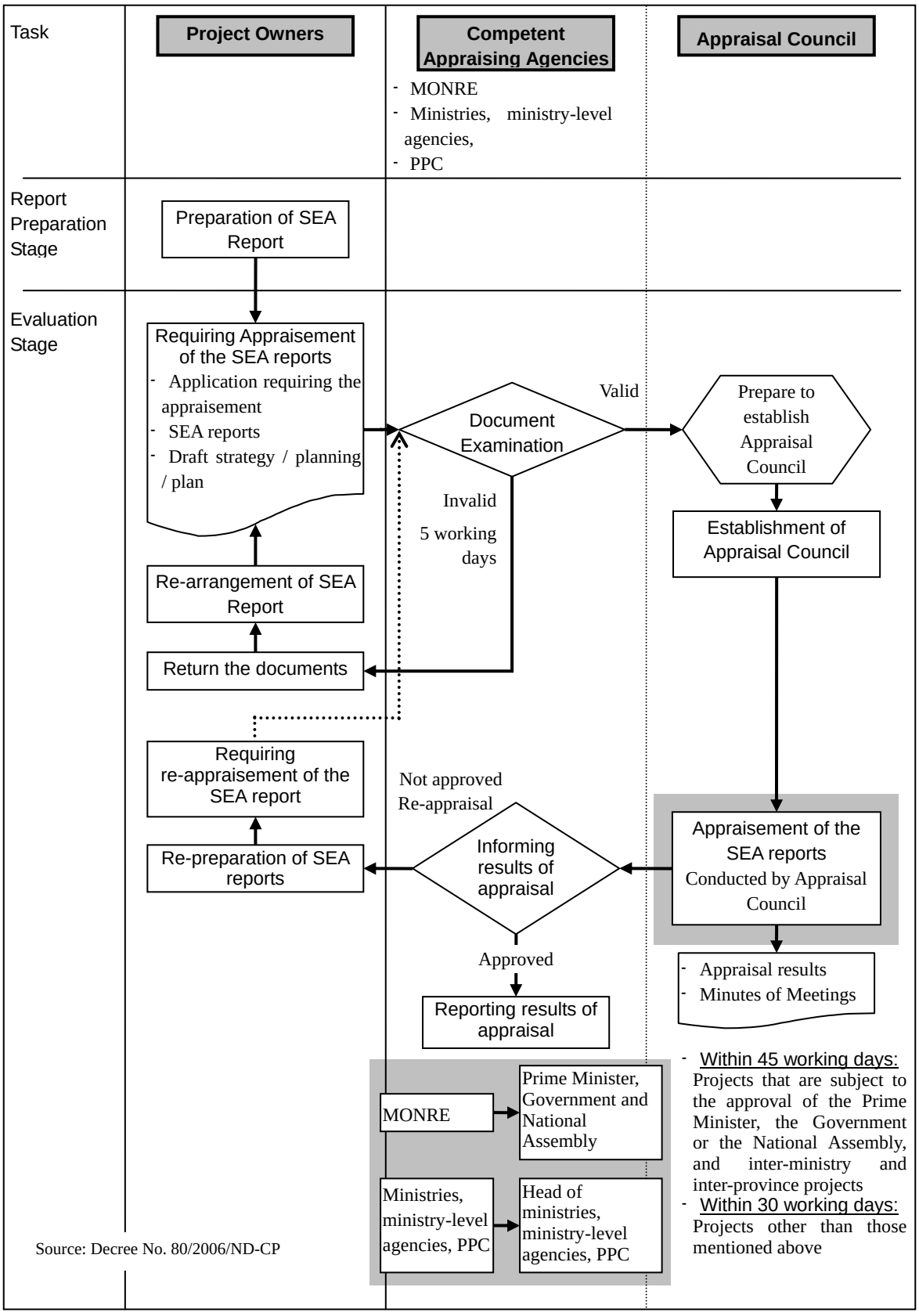


Figure 6.3.1 Flowchart of Appraisal of the SEA Reports

(5) Organize and implement the appraisement of the SEA reports

After receiving sufficient documents requiring the appraisement as mentioned above, the Permanent Appraising Agency will process the following processes (Circular No. 08/2006/TT-BTNMT, 2.3):

i) In case of invalid, insufficient documents as the requirement for the appraisement:

Within five (5) working days since receiving the documents mentioned above, the Permanent Appraising Agency shall report to the competent appraising agency to inform the project owner by document about the reasons and return the documents.

ii) In case of the documents are valid and meet with the requirement for the appraisement:

The Permanent Appraising Agency shall carry out the preparation of the establishment of the Appraising Council and submit for the decision of the competent appraising agency.

Results of the appraisal of SEA reports shall be expressed in the form of minutes of meetings of the appraisal councils, which shall fully content the meeting proceedings, conclusions and signatures of the council's chairman and the secretary. The MONRE shall report to the Prime Minister, the Government and the National Assembly on results of appraisal of the SEA reports of projects, together with the minutes of meetings of the appraisal council. Specialized environmental protection agencies of ministries, ministry-level agencies, government-attached agencies and provincial/municipal People's Committees shall report the heads of ministries or agencies who are competent to approve projects on results of appraisal of the SEA reports of the projects, enclosed with the minutes of meetings of the appraisal councils (Decree No. 80/2006/ND-CP, Article 10).

Duration for appraisal of the SEA reports is shown in Table 6.3.6. In case the SEA report is not approved and thereafter needs to be re-appraised, the duration for re-appraisal shall be as provided in Table 6.3.6.

Table 6.3.6 Duration for Appraisal of SEA Reports

Kinds of Projects	Duration for Appraisal
Projects that are subject to the approval of the Prime Minister, the Government or the National Assembly, and inter-ministry and inter-province projects	Within 45 working days since receiving the documents that are valid and meet with the requirement for the appraisement
Projects other than those mentioned above	Within 30 working days since receiving the documents that are valid and meet with the requirement for the appraisement

Source: Decree No. 80/2006/ND-CP, Article 12

(6) Violation of regulations on the SEA reports

Fines of between VND 30,000,000 and VND 40,000,000 shall be imposed for acts of failing to make a SEA report, for cases where the SEA reports are required (Decree No. 81/2006/ND-CP, Article 9). Thereafter, the project owner shall prepare the SEA reports to submit to the competent appraising agencies for approval.

6.3.3 Implementation Process of the Environmental Impacts Assessment (EIA)

(1) Organizations to make EIA reports

The project owners shall have the responsibilities to prepare and submit the environmental impact assessment reports for approval by the competent appraising agencies concurrently with the formulation of the project feasibility study reports. The project owners may conduct by themselves or contract out the preparation of environmental impact assessment reports to consultancy service organizations (Chapter 19, the Law of Environmental Protection).

(2) Contents of the EIA reports

Structures and contents of the EIA report are defined as follows (Appendix 4, Circular No. 08/2006/TT-BTNMT). Detail contents of the EIA report are shown in Attachment 6.3.

Introduction
Chapter 1: Brief Description of the Project
Chapter 2: Natural, Environmental and Socio-Economic Conditions
Chapter 3: Environmental Impact Assessment
Chapter 4: Measures to Reduce Harmful Impacts, Prevent and Cope with Environmental Incidents
Chapter 5: Commitment of Implementing Measures for Protection the Environment
Chapter 6: Environmental Treatment Constructions and environmental Management and Monitoring Program
Chapter 7: Budget Estimation of Environmental Construction
Chapter 8: Public Consultations
Chapter 9: Guidance on Sources of Statistic, Data and Assessment Methods
Conclusions and Recommendations

(3) Appraisal Councils for the EIA reports

The appraisal of the EIA reports shall be conducted under the responsibilities of the Competent Appraising Agencies and conducted by an Appraisal Council or an Appraisal Service Organization. The Appraisal Councils shall be organized by the competent appraising agencies by the kinds of the projects (Table 6.3.7).

Compositions of the Appraisal Councils are shown in Table 6.3.8. A membership of the Appraisal Councils as stipulated in Table 6.3.8 must comprise at least 50% of their members who are qualified in terms of their professional knowledge of environmental protection and of other relevant fields relating to the contents of the projects. Those who participate in the preparation of the EIA reports shall not be eligible to the membership of the Appraisal Council.

Table 6.3.7 Agencies/Organizations that shall have Responsibilities to Establish the Appraisal Councils of the EIA Reports (Competent Appraising Agency)

Kinds of Projects	Competent Appraisal Agencies	Remarks
Projects that are subject to the approval of the National Assembly, the Government and the Prime Minister, and inter-branch or inter-provincial projects	MONRE	MONRE shall have the responsibility to establish the Appraisal Council or select the Appraisal Service Organizations
Projects that are subject to the approval of the line ministries, ministry-level agencies and Government body	Line ministries, ministry-level agencies and Government body	Organizations listed in the left column shall have the responsibility to establish the Appraisal Council or select the Appraisal Service Organizations
Projects that are subject to the competence of the provincial level People's Committee and same level People's Committee	Provincial-level People's Committee	Provincial-level People's Committees shall have the responsibility to establish the Appraisal Council or select the Appraisal Service Organizations

Source: Law on Environmental Protection, Article 21

Table 6.3.8 Compositions of the Appraisal Councils of the EIA Reports

Kinds of Projects	Compositions of the Appraisal Council
Projects of national and inter-provincial scale	Representatives from the agencies that are responsible for the project approval; representatives from relevant ministries, ministry level agencies, Government bodies and provincial level People's Committees; qualified experts whose specific professions are appropriate to the contents of the projects, and representatives from other organizations and individuals decided by the competent agencies
Provincial-level projects	Provincial level People's Committees; specialized agencies of the environmental protection and other relevant provincial departmental qualified experts whose specific professions are appropriate to the contents of the projects, and representatives from other organizations and individuals decided by the competent agencies

Source: Law on Environmental Protection, Article 21

(4) Evaluation and Appraisal of the EIA reports

The project owners shall have responsibility to send documents to require the appraisement of the EIA reports to the competent appraisal councils listed in Table 6.3.7. Numbers and forms of document required for are listed in Table 6.3.9 (Circular No. 08/2006/TT-BTNMT).

Table 6.3.9 Document Required for Appraisement of the EIA Reports

Kinds of Documents	Sets	Remarks
Application requiring the appraisement of the EIA reports	1 set	-
EIA reports	7 sets	Signed by the project owner with full name and position together and sealed by the agency on supplementary cover of each copy
Draft of the feasibility study reports or investment report of the project	1 set	-

Source: Circular No. 08/2006/TT-BTNMT, 3.3

(5) Organize and implement the appraisement of the EIA reports

After receiving sufficient documents requiring the appraisement as mentioned above, the Permanent Appraising Agency will process the following processes (Circular No. 08/2006/TT-BTNMT):

i) In case of invalid, insufficient documents as the requirement for the appraisement:

Within five (5) working days since receiving the documents mentioned above, the Permanent Appraising Agency shall report to the competent appraising agency to inform the project owner by document about the reasons and return the documents.

ii) In case of the documents are valid and meet with the requirement for the appraisement:

The Permanent Appraising Agency shall carry out the preparation for the appraisement by the Appraisal Council or selected Appraisal Service Organization.

The Permanent Appraising Agency shall inform the project owner by document about the result of the appraisement and requirements for the completion of the EIA report.

Duration for appraisal of the EIA reports is shown in Table 6.3.10. In case the EIA report is not approved and thereafter needs to be re-appraised, the duration for re-appraisal shall be as provided in Table 6.3.10.

Table 6.3.10 Duration for Appraisal of EIA Reports

Kinds of Projects	Duration for Appraisal
Projects that are subject to the approval of the Prime Minister, the Government or the National Assembly, and inter-ministry and inter-province projects	Within 45 working days since receiving the documents that are valid and meet with the requirement for the appraisement
Projects other than those mentioned above	Within 30 working days since receiving the documents that are valid and meet with the requirement for the appraisement

Source: Decree No. 80/2006/ND-CP, Article 12

(6) Completion of the EIA reports

According to the announcement of the Permanent Appraising Agency and in case the EIA report needs to be completed, the project owner shall complete the EIA report. And the project owner shall send the EIA reports to the competent Appraising Agency in order to consider and approve them (Circular No. 08/2006/TT-BTNMT, 3.4 and 3.5).

(7) Organize and implement approval of EIA reports

In case the EIA report meets the requirement to be approved, the chief of the competent appraising agency must approve the EIA report of the project, within 15 working days since receiving the documents.

In case that the EIA report does not meet the requirement to be approved and the approving decision has not been made within the time limit, the competent appraisal agency must have documents or commission the permanent appraising agency to inform the reasons to the project owner by document (Circular No. 08/2006/TT-BTNMT, 3.6).

(8) Conduct, appraisal and approve the supplementary EIA report

The supplementary EIA reports shall be prepared in the following cases (Decree No. 80/2006/ND-CP, Article 13):

i) There are changes in the location, size, design capacity and technology of the project,

ii) The project fails to be executed within 24 months after approval of its EIA report.

In case of there are no change in the design capacity, technology and ambient environment, project owners do not have to prepare the supplementary EIA but shall have to send explanation document to the competent appraising agency.

The appraisement of the supplementary EIA reports is carried out by collecting opinions in documents from scientists, managers who have appropriate qualifications. In case the supplementary EIA report meets the requirement to be approved, the competent appraising agency shall examine and approve the supplementary EIA report within 30 working days since receiving the valid documents.

(9) Violation of regulations on the EIA reports

The project owner shall be fined for the following acts on the EIA reports (Decree No. 81/2006/ND-CP, Article 9).

Table 6.3.11 Violations on Regulations on the EIA Reports and Fines

Contents of Violations	Fines (mil. VND)	Forcible Measures
Acts of improperly realizing one of contents in an approved EIA report and other requirements in the decision approving such EIA report	8 – 10	- Forcible realization of contents in approved EIA reports and other requirements in decisions approving such EIA reports, - Forcible application of measures to remedy the environmental pollution
Acts of failing to fully realize contents in an approved EIA report and other requirements in the decision approving such EIA report	11 – 15	- Forcible realization of contents in approved EIA reports and other requirements in decisions approving such EIA reports, - Forcible application of measures to remedy the environmental pollution
Acts of proceeding with the construction of a work or putting a work into operation without any EIA report, for cases that EIA reports are required	20 – 30	- Forcible making of EIA reports for submission to a competent appraising agency for approval within 45 working days after receiving the administrative violation sanctioning decisions, in case that projects has not yet put into operation, - Forcible treatment of environmental elements to attain the standards within 180 working days after receiving the administrative violation sanctioning decisions, in case that projects has already put into official operation, - Forcible application of measures to remedy the environmental pollution

Source: Decree No. 81/2006/ND-CP, Article 9

Fines between 5,000,000 and 40,000,000 VND shall be imposed for the consultancy services for practicing the EIA and preparing the EIA reports in case that i) practicing the consultancy service for the EIA or appraisal services at variance with practice licenses, ii) practicing the consultancy service for the EIA without permits of the competent appraising agency, and iii) practicing the appraisal services of the EIA without permits of the competent appraising agency (Decree No. 81/2006/ND-CP, Article 28).

Cheaper 7

Poverty Reduction Programs

7.1 Policy Background of Poverty Reduction

7.1.1 Historical Background

Before 1990 Vietnam had no special programs on poverty reduction. It was the 7th Congress of the Communist Party of Vietnam in which poverty was first recognized as a stumbling block to economic development. The Congress called the government to pay more attention to provide more social services and infrastructure improvement. In the following year, the administration of Ho Chi Minh City made an action plan on hunger eradication and poverty reduction and, with support from the central government, started their activities. Ho Chi Minh City's experience in hunger eradication and poverty reduction quickly spread to other provinces. In 1995, 45 out of 53 provinces had activities on hunger eradication and poverty reduction with their own fund and donations by individuals.

Between 1992 and 1995 the Government of Vietnam took actions on poverty reduction in 14 national development programs on reforestation, job creation, provision of credit, literacy education, reduction of child malnutrition, etc. The government spent a total of 2.855 trillion VND on these national development programs. Out of this amount, 47% were spent on provision of credits to households, 29% on infrastructure construction including roads, electricity, irrigations, schools, and clinics, and 22% on provision of essential goods such as food, salt, clothing, blankets, and kerosene. In addition to the national fund, 425 billion VND was donated by local individuals, and in 1995 Bank for the Poor (presently Bank for Social Policies) was established.

The National Target Program for Hunger Eradication and Poverty Reduction (HEPR) was established by the government in 1996 to coordinate poverty reduction activities and mobilize more resources. In 1998 program activities for the first phase started. For the period between 2001 and 2005, job creation component was added and became the National Target Program for Hunger Eradication, Poverty Reduction and Job Creation (HEPR-JC or Program 143). In 2006, it changed its name again to the National Target Program for Poverty Reduction (NTP-PR), and has been going to last until 2010. As the central government just approved this program in 1997, the details are still unknown.

The Program for Socio-Economic Development in Communes Faced with Extreme Difficulties, which has been a pillar of Vietnam's poverty reduction programs, was promulgated in 1998. This program is called Program 135. Soon after the promulgation, national target projects for support to especially disadvantaged households of ethnic minorities, sedentarization, and construction of inter-commune centers were integrated into Program 135. From 2000 Program 135 dealt with poverty reduction in the poorest communes of ethnic minorities in the mountainous areas. Phase I of the Program 135 (Program 135-1) lasted until 2005, and Currently, the Phase II of that (Program 135-2) is going on.

In addition to HEPR and Program 135, Vietnam has many other programs and projects on poverty

reduction which are on social protection, health insurance, exemption of educational fees, support for improvement of private housing, supply of safe water, allocation of land, support for ethnic minorities, etc. National Target Programs that deal directly with poverty reduction are as follows:

Table 7.1.1 National Target Programs in Vietnam

National Target Program	2001－2005 Investment (billion VND)	Ministry that Plays Major Role
1 HEPR-JC	2,700-2,800	Ministry of Labour Invalid and Social Affairs (MOLISA)
2 Clean water and hygienic rural environment	8,000-8,500	MARD
3 Population and family planning	3,500-4,000	MOH
4. Prevention of communicable and dangerous diseases and HIV/AIDS	5,000-5,500	MOH
5. Cultural development	1,500-2,000	Ministry of Culture and Information
6. Education and training	6,500-7,000	MOET
7. Program .135	8,500-9,000	CEMA
8. Five million hectare forestry	10,000-11,000	MARD
Total	70-75 trillion VND (=US$5.0-5.5 billion)	-

Source：www.mpi.gov.vn

7.1.2 National Target Program for Hunger Eradication and Poverty Reduction (HEPR)

Objectives of HEPR for the period between 2001 and 2005 were 1) reduction of poverty rate from 17% in 2001 to lower than 10% in 2005 with an average annual reduction of 1.5 to 2.0% through the provision of essential infrastructure to poor commune, and 2) reduction of urban unemployment rate of 5 to 6% and increase of employment time in rural areas to 80% by creating 1.4 to 1.5 million new jobs. HEPR is not a program in which activity implementation is at its core, but is a planning and management mechanism for coordination of activities and resource use. HEPR consists of the following 12 projects and 6 policies:

Table 7.1.2 Overview of HEPR

Projects	Outcome Targets (2001-2005)	Budget (2001-2005) Billion VND	Implementing Agency
HEPR total		9,110	
Poverty Reduction Component		4,240	
1. Credit	5 million loans (average loan/household = 2.5 to 3.5 million VND)	750	State Bank, Bank of Social Policies
2. Extension services (business, agriculture, fisheries, forestry, etc.)	4,000 extension workers trained 1.5 million poor households attended training courses	100	MARD
3. Establishment and replication of HEPR models in poor communes	Good models replicated in minority, coastal and disaster prone regions	100	MOLISA
4. Basic infrastructure for poor communes	700 communes not covered by Program 135	1,400	MARD
5. Production assistance and promotion of trade/off-farm occupations in poor communes	15 models tested and transferred	90	MARD

Projects	Outcome Targets (2001-2005)	Budget (2001-2005) Billion VND	Implementing Agency
6. Training of HEPR staff	10,000 staff trained (province/ district) 40,000 staff trained (commune)	100	MOLISA
7. Resettlement to new economic zones	70,000 hhs voluntarily resettled 50,000 ha of forest recovered 130,000 hhs voluntarily relocated to new economic zones	1,400	MARD
8. Sedentarization of ethnic minorities	150,000 ethnic minority households settled	700	MARD
Job Creation Component:		3,270	
9. National credit fund to support small-scale employment projects	1.5 to 1.6 million jobs created in 5 years	3,000	MOLISA
10. Strengthening of employment service centers	1 million free consultations Vocational training for 1 million people Job placement for 40,000 to 50,000 people	210	MOLISA
11. Labor market survey and information system	Statistical data available	30	MOLISA
12. Training for staff involved in employment management	Training	30	MOLISA
Support Policies		1,600 (non-refundable)	
1. Low cost, easier access and better quality medical care for the poor	Free medical care (treatment, health insurance) Improvement of local medical services (infrastructure and staff capacity)	500	MOH
2. More opportunity for education	Reduced or exempted school fees Free textbooks and notebooks Free scholarships and vocational training	-	MOET
3. Special support for ethnic minorities in poorest regions	Provision of basic needs, production inputs, technical extension and technology transfer	-	Provinces
4. Special support for vulnerable people (those affected by natural disasters, migrants, etc.)	Provision of basic needs, housing repair, production inputs, technical extension and technology transfer	150	CEMA
5. Support for housing improvement	Provide materials and money for poor households, especially in flood areas, high mountainous regions	250	Provinces
6. Support with production tools and cultivated land	Reclaim, recover and reallocate cultivated land, supply boats, fishing nets, hand tools, etc.	700	MOLISA

Source：Implementation of the National Program for Poverty Reduction by Vu Tuan Anh

HEPR makes a decision on budget structure and directs program implementation. It is managed by its national steering committee which is chaired by one of the Vice Prime Ministers. Committee members include ministers and vice ministers of the related ministries such as MPI, Ministry of Finances, MOLISA, MARD, MOH, MOET, CEMA, etc. MOLISA is the standing agency which is in charge of committee management. On the local level in provinces, districts and communes, People's Committees are the implementing agencies, and Committees for Hunger Eradication and Poverty Reduction are established on each level. Local committees for HEPR play the role of consultant and monitor implementations. Committee members include leaders of the related government agencies and mass organizations such as Communist Party of Vietnam, Fatherland Front, Women's Union, Youth Union, Farmers Union, etc. Many HEPR projects are implemented by districts in which Project and Construction Management Board are established.

7.1.3 Program 135

Program 135 was authorized in July 1998 and was called "Support Program for the Communes in the Most Difficult and Remote Areas". It consists of projects whose main aim is infrastructure construction for poverty reduction in mountainous, remote and ethnic minority areas. The difference between HEPR/NTP-PR and Program 135 is that the target base of the former is a poor household while the latter is based on geographical areas.

Originally Program 135 aimed to 1) reduce poverty rate in communes faced with extreme difficulties to less than 25% in 2005, and 2) ensure provision of adequate clean water, over 70% school-age children attend school, give further training on production for the poor, control dangerous and social diseases, construct/improve roads to inter-commune centers, and develop rural markets. In 1998, Program 135 was implemented in 1,715 communes of which 1,568 were in mountainous regions and 147 in lowland while its beneficiaries were 6 million individuals in 1.1 million households. In 2001, it was extended to 2,362 communes. The funding of Program 135 mainly comes from the central government, provinces, various investments, and local communes. Many international aid agencies and donors have been planning their development projects alongside Program 135.

Similar to HEPR, Program 135 is managed by its national steering committee whose chair is a Vice Prime Minister. Committee members are leaders of the related government agencies, and CEMA (ex-CEMMA) is in charge of coordination and management. Management Boards are established in Program 135 target communes, districts and provinces.

Phase I of Program 135 (Program 135-1) lasted until 2005 in which 95% of the program cost was spent on infrastructure construction at the commune and inter-commune levels, 3% on production development (agriculture), and less than 1% on sedentarization and capacity development of commune cadres. Weaknesses of Program 135-1 have been pointed out that the program fund was equally divided among the target communes without any regards for the development needs of the communes, and that some communes which had escaped poverty kept receiving the program assistance due to lack of proper monitoring. Despite such weaknesses, many infrastructure facilities were constructed and the project was highly evaluated by international donors. Furthermore, Program 135 receives much attention by other countries because of its large-scale nation-wide development assistance to minority ethnic groups, which rarely exists in other places.

Since 2006, Phase II (Program 135-2) has been taking place to which more and more international donors including WB, AusAID, IFAD, SIDA, Ireland, and Finland give sector budget assistance instead of the program assistance like before. Currently, financial assistance by the international donors is about to reach 30% of the whole program budget (2006 to 2010) of 850 million dollars[1]. In addition to the financial assistance UNDP has been giving technical assistance to CEMA on program coordination. With much interest in program monitoring and evaluation, coordination of the related agencies, and sustainable

1 Brief Eight - The impact of budget support and future of program 135: Sector Budget Support in Vietnam (www.sbsvietnam.org)

operation and management of infrastructure facilities, the donors assist Program 135-2 in setting up the monitoring and evaluation framework and the communication strategies, and offer comments and advices to CEMA.

In Program 135-2, 1,644 poor communes were selected from the Phase I communes as target communes. These communes are going to be monitored regularly so that communes which escaped poverty will be excluded from the project and the total number of target communes will decrease. The government of Vietnam has been showing their intention that this will be the last phase of Program 135 and that there will be no Phase III starting from 2010.

Program 135-1 may be called as a infrastructure construction program. Although the percentage of the program budget on infrastructure construction is still high in Program 135-2, their program activities cover wider field than that in Phase I. Program 135-2 places new emphasis on operation and maintenance of constructed facilities, monitoring and evaluation and capacity building. Program 135-2 not only defines development and progress in terms of the number of constructed facilities, but also makes much of understanding people's lives, especially the effects of program activities on people's lives. Hence, in addition to counting "quantities", Program 135-2 looks at "qualities" of people's lives and tries to understand people's reactions through the bottom-up perspective.

Alongside the Grassroots Democracy emphasized by the Government of Vietnam, Program 135 makes much of participatory development and ownership of constructed facilities by communes. It is, however, not clear who analyzes the development situations and needs of the communes or who formulates the plan of activities. As the guidelines for participatory planning is to be published this year, such matters are likely to be included in the guidelines.

Similarly, despite much emphasis on capacity building, it is also unclear how the level of commune and district staff's capacity and needs for capacity building are determined. It looks as if commune and district staff's capacity is strengthened only if they participate in training for program management. It also looks as if the number of participants in the training reflects the improved capacity. This matter will also be clarified when Program 135-2's capacity building framework is introduced in the near future. Details of the two phases of Program 135 are as follows:

Table 7.1.3 Overview of Program 135

	Phase I	Phase II
Duration	1998～2005	2006～2010
Target Commune	2,410 Communes（52 provinces）in 2005 - 1,938 extremely poor / difficult communes (Mainly in mountainous and underprivileged zones, and partially include temporary stable zone below the mountainous zone) - 389 border communes - 83 war foundation communes (contribution to the war)	1,644 communes (45 provinces) in 2006

	Phase I	Phase II
Duration	1998～2005	2006～2010
Commune Selection Criteria	1. More than 70% households are poor and fulfill at least three of the followings; A. More than 25% of households have temporary houses B. More than 10% of households are those of migrants C. More than 50% of households lack domestic water D. More than 50% of households have no electricity 2. Fulfills at least two of the followings; A. More than 20% of households do not have enough land for cultivation B. More than 50% of households do not have agricultural irrigation C. Inappropriate cultivation methods (No visit by extension workers) 3. No B-level roads between villages and the commune center, and fulfills at least two of the followings; A. Not enough primary school classrooms B. Commune center does not have a radio station to broadcast towards villages C. No culture houses in villages	Based on the results of studies of Phase I communes, under developed communes were selected Target communes will be evaluated every year to release non-poor communes, which decreases the overall number of the target communes.
Program Components and Investment Allocation	(Allocation of Investment by the Central Government) Infrastructure construction in communes 72.30% Inter-commune infrastructure construction 23.00% Sedentary agriculture (relocation) 0.66% Production development 3.11% Training of commune staff 0.91%	Investment 1.Basic infrastructure development 67.56% Operation and maintenance 6.75% 2. Production development 17.18% 3. Improvement of life 4.05% 4. Capacity development 4.05% 5. Management and monitoring 0.38% Share (Item 1 through 4 above) Central government 75% Local government 10% Local contribution 5% Int'l donors 10% (Item 5) Central government and Int'l donors 50% Local government 25% Local contribution and others 25%
Outputs/ Targets	Number of Infrastructure Constructed up to Y. 2004 Road 6,652 Irrigation 3,608 School 4,654 Rural water 2,346 Electricity 1,298 Medical centers 487 Market 237 Others 426 Percentage of target communes that had infrastructure improvement Small-scale irrigation 81% Primary school 86% High school 73% Health center 96% Electricity 84% Post office 60% Radio Station 84% Plan of safe water 58% Market 44%	- Radically accelerate production - Promote an agro-economic structural shift in the direction of market-driven production - Sustain improvement of spiritual and material living conditions of ethnic people in extremely difficult communes and villages - Narrow the development gap between ethnic groups and other regions - By 2010, basically there are no hunger-stricken households in the targeted areas and the number of poor households drops below 30% of the poverty line
Characterizes-tics and Remarks	• Selection of target communes was weak (some poor communes were not selected) • Those communes that escaped poverty during the program implementation stayed on the target commune list • Concentration on infrastructure construction • Not much participation by people • Some facilities were constructed without matching the needs and condition of the communes (insufficient planning) → Market structures without stores, cultural centers without any activities, etc. were constructed • Investment fund was equally divided among the target communes regardless of their needs • Very weak in monitoring (supervision of construction), feedback and evaluation. • Activities were assigned to various government agencies without communication and information sharing among them • EU, WB, IFAD, etc. carried out their poverty reduction projects in target communes (parallel projects) • Despite its weaknesses in planning and implementation, it was evaluated highly by international donors because it was a rare program that deals with poverty among ethnic minorities and a significant number of infrastructure facilities were constructed.	• Rate of investment on infrastructure decreased, but still high compared with other components • Investment is allocated based on commune needs • Aims for participatory development activities and improved planning, monitoring, evaluation and operation and management • Ethnic Committee in each province is leading the activities in the province • Aims for planning, implementation and financial management by each commune (Full Ownership) • Increased number of international donors are giving financial assistance (to the common basket) as well as suggestions and advices to CEMA • UNDP is coordinating the donors • Some donors choose to give out project support instead of budget support • Many key words and expressions of socio-economic development such as self-help, self-reliance, democracy, transparency, auditing, ownership, participatory planning, and monitoring & evaluation are used in reports, which seems to reflect the donors' viewpoints/ conditions for financial assistance • Baseline study has been taking place, the results of which are to be used for monitoring and evaluation

7.1.4 Poverty Reduction Programs by International Agencies

The poverty reduction programs with financial assistance by the international agencies are listed in Table 7.1.4.

Table 7.1.4 Poverty Reduction Programs by International Agencies

Project/Program	Finance (US$ million)	Approved
World Bank	1,222.3	
Poverty Reduction Support Credit	250.0	2001
Community Based Rural Infrastructure	103.8	2001
Northern Mountainous Poverty Reduction Project (NMPRP)	110.0	2001
Second Rural Finance Project	200.0	2002
Second Poverty Reduction Support Operation	100.0	2003
Third Poverty Reduction Support Operation	100.0	2004
Forest Sector Development Project	39.5	2004
Second Rural Energy Project	220.0	2004
Fourth Poverty Reduction Support Credit	100.0	2005
Asian Development Bank	359.0	
Provincial Roads Improvement	70.0	2001
Second Red River Basin Sector Project	70.0	2001
Central Region Livelihood Improvement	43.1	2001
Third Provincial Towns Water Supply and Sanitation	60.0	2001
Support to Implementation of Poverty Reduction Program	6.4	2004
Central Region Transport Networks Improvement Sector Project	94.5	2005
Support to Implementation of Poverty Reduction Program II	15.0	2005

Source : JBIC Hanoi Office

Northern Mountainous Poverty Reduction Project (NMPRP) was implemented by obtaining financial assistance from World Bank in 2002-2007. The project covered 368 communes of 44 districts under four (4) provinces. Out of 368 communes, 98% are categorized into poverty communes under Program 135. The total project cost for Phase I amounted to US$132.5 million, of which US$110 million was financed by World Bank IDA and US$ 10.5 million was financed by DFID for capacity building. Investment to communes was ranged between US$28,000 and US$560,000. The total investment was US$ 27 million to Lao Cai, US$17 million to Son La and Yen Bai each, US$15 million for Bac Giang, Phu Tho and Hoa Binh.

NMPRP Phase II is to be implemented under Program 135 with the following framework.

1) Objectives
   i. Extension of government services and sustainable infrastructure development in NMPRP
   ii. Capacity building of Districts and Communes in NMPRP
2) Project Components
   i. markets and roads
   ii. small scale irrigation, drinking water supply and extension
   iii. health, education, capacity building of teachers and medical staff
   iv. commune development
   v. capacity building and training

vi. project formulation and management

7.1.5 Poverty Reduction Programs by Japan Bank for International Cooperation (JBIC)

Japan has continued financial assistance to Rural Infrastructure Development and Living Standard Improvement / Small-Scale Pro-poor Infrastructure Development Project called Sector Project Loan (SPL) since 1995. The objective of this project is to strengthen the agricultural and industrial sectors, to enhance infrastructures in rural areas and, eventually, to improve people's living standards, by the way of developing such rural infrastructures as road network, water supply systems and power distribution systems. The proceeds of the loans are for civil works, equipment, and consulting services. The project also includes financing for partnership arrangements with NGOs engaging in rural development activities. The general features of SPL are summarized in Table 7.1.5.

Table 7.1.5 Summary of SPL

Project	Year of Commencement	Commit-ment (million yen)	Component	Performance
SPL I Rural Infrastructure Development and Living Standard Improvement (I)	1995	7,000	• Rural Roads • Rural electrification • Rural water supply	• Rural Roads:154 projects with a total length of 1,140.82 km(provincial roads 1,381 km、district roads 628 km、others 185 km) • Rural electrification: 168 projects, distribution lines 8,381.3 km, transformers 221,546 kVA • Water supply：13 urban centres
SPL II Rural Infrastructure Development and Living Standard Improvement (II)	1996	4,000	• Rural Roads • Rural electrification	• Rural Roads:142 projects with a total length of 1,056.25 km • Rural electrification: 191 projects, distribution lines 3,632 km 、transformers 71,952 kVA
SPL III Rural Infrastructure Development and Living Standard Improvement (III)	1998	12,000	• Rural Roads • Rural electrification • Rural water supply • Irrigation • Forestation	• Under implementation in 44 provinces • Forestry : central 5 provinces
SPL IV Small-Scale Pro-poor Infrastructure Development Project (I)	2003	10,562	• Rural Roads • Rural electrification • Rural water supply • Irrigation • NGO partnership arrangement	• Under implementation in 22 provinces
SPL V Small-Scale Pro-poor Infrastructure Development Project (II)	2005	14,788	• Rural Roads • Rural electrification • Rural water supply • Irrigation • NGO partnership arrangement	• Under implementation in 41 provinces
Total		48,350		

Source：JBIC Hanoi Office

SPL is allocated to important provinces and districts selected in accordance with Vietnam's poverty lines and HDI. Candidate projects are selected among SEDP, which are prepared by DPI, and studied for preparation of F/S. Projects among the candidate projects are finally selected by MPI. The selection criteria of the SPL projects are summarized in Table 7.1.6.

Table 7.1.6 Selection Criteria for SPL

Sector	Selection Criteria	
General	• Candidates projects requested to MPI with approval by PPC • Data and information necessary for assessment are available. • Project without large-scale resettlement (50HH)	
Roads	• Road categories • Priority roads • Maximum length of roads • Daily traffic • Priority bridges • Conditions of design • Unit cost optimum	• Provincial and district roads • Roads not passable during the rainy seasons and roads between district and commune centres • 20 km • 150 (PCU/day) or more (vehicles) • bottleneck bridge within road network • Not over-invested design • Roads: 2.0 billion VND or less、Bridge： 10 million VND per m^2
Electrification	• Project owner • Project component • Project cost • Power source • Not feasible projects	• Provincial Department of Industry r DPI • New installation of middle and low voltage lines or installation/rehabilitation of transformers • 25.0 billion VND or less • EVN grid • Projects including large-scale resettlement and deforestation for transmission of 220 kV or more or 15 km or longer
Water Supply	• Target area • Water sources • Beneficiaries • Water volume • Total Project Cost • Cost per beneficiary	• Urban centers within district • Confirmed by F/S or summary sheets • 4,000 persons or more • 1000ton per day • 25.0 billion VND or less • 1.35 million VND or less
Irrigation	• Project scale • Not feasible projects • Priority project	• 50ha or more、25.0 billion VND • Project including tunnels and construction of new reservoir of 15 m high, 100ha and 10 million m^3 • Rehabilitation projects including reinforcement of canals and embankment of reservoir, etc.

Source：JBIC Hanoi Office

7.1. 6 Other Programs on Poverty Reduction

(1) Health Care

The Government of Vietnam has various healthcare policies including free medical examination and treatment, free medical insurance for the poor, subsidizing the cost of transporting medicine to the mountainous areas, and infrastructure improvement of grassroots healthcare in districts, communes and villages. Provincial health care fund was established based on the Decision No. 139/2002/QD-TTg which had been issued in 2002 with an aim to increase the number of poor individuals receiving medical services. This fund is used to pay for the medical insurance and out-of-pocket costs for the poor.

(2) Education

In addition to the policies on school construction, training of teachers, increased salary for the teachers working in the difficult areas, Vietnam has policies to support children from the poor households. These policies include lending or giving out textbooks, exemption from or reduction of school tuition and other fees on education, scholarships to students from mountainous areas, etc. In 1999 MOET received funds from the National Target Program for the Improvement of Education Facilities which was used to construct or repair schools in 1,000 communes throughout the country. Each of the communes received 50 million VND. The National Project for Primary Education with loan from the World Bank provided 1 million US dollars for the provision of textbooks to the poorest communes.

Vietnam is allocating 18 billion VND from its state budget every year to distribute newspaper and books for children in the poorest communes. According to MOLISA, 150 billion VND is allocated every year for education support to the poor. This support includes 3 million children being exempt from paying school tuitions or paying reduced fees and 2.5 million children receiving free textbooks and notebooks.

(3) Housing Improvement

According to MOLISA, more than 40% of the poor households live in low-quality housing. Assistance on housing improvement includes preferential credit, free provision of construction materials, and mutual aid for housing construction. Funds come from various sources including the local government, banks, and contributions by enterprises, local individuals and international agencies. Free provision of support to the most vulnerable people or to those who lost housing due to disasters are more common than loans.

(4) Credit for Poverty Reduction

Provision of low-interest loan or loan without collateral to the poor households is one of the key poverty reduction measures of Vietnam. Between 2002 and 2004, the Bank for Social Policies gave loans to about 3 million households (equals to 15.8% of all the households in the nation) with a total of 9.655 trillion VND. Average amount of loan was 3.1 million VND per household in 2004, and the rate of delinquency was only 1.71%.

(5) Allocation of Agricultural Land to Landless Households and Credits

Many ethnic minorities in the mountainous regions of the Northwestern and the Central Highlands received benefits from reclamation and allocation of lands including the state-owned farms. From 2002 to 2004, 5,140 hectares of land were allocated to 10,455 households. In the Mekong Delta region, 4,325 landless households received preferential credit to purchase land.

(6) Rural Water and Sanitation

The National Target Program for Rural Water and Sanitation has been carried out since 2000 by MARD, MOH and MOET. With its focuses on safe water and sanitation, this program constructs rural water facilities and toilets, and promotes the use of toilets. Many poor households, especially those in the

mountainous regions, experience extreme difficulties in obtaining safe water. As a result, diarrhea and water-borne diseases are common. Many poor communes do not have toilets.

Many programs and projects for poverty reduction are taking place in Vietnam, showing strong determination and commitment by the government to reduce poverty as a way to bring socio-economic growth. Despite this, it is very difficult to understand the poverty situations because there are so many similar policies, programs and projects whose activities overlap one another. Like in the cases of HEPR and Program 135, the existence of many similar programs and projects makes each of the relevant government offices participates in many different steering committees, boards, and councils at the same time. Such existence of similar projects also makes some offices implement the same types of development activities under different projects. Under such circumstances, each office is likely to be experiencing difficulties and complications in arranging and organizing the poverty reduction programs and activities they are involved in.

In addition to Program 135 activities, many non- Program 135 activities also take place in Program 135 communes such as provision of free medical insurance and roofing tiles by MOLISA, reduction of medical fees or improvement of medical facilities by MOH, provision of free textbooks by MOE, provision of low-interest credit to the poor, etc. Due to the presence of so many development activities and not enough numbers of district and commune staff, local government officers seem to have their hands full with required day-to-day administrative work for the on-going activities. It is rather understandable that they hardly have time or energy to overview the entire development plan of their areas and check the development progress.

7.2 Monitoring and Evaluation in the Poverty Reduction Programs

As for the poverty reduction programs in Vietnam are executed such as “National Targeted Program for Hunger Eradication and Poverty Reduction (HEPR)”, “Program for Socio-Economic Development in Communes Faced with Extreme Difficulties (Program 135)” which were established by the Government of Vietnam and a lot of support programs with financial assistance has been done so far by donors and international agencies. Each project is used for the infrastructure construction such as the road construction that connect some villages, the school construction, and the irrigation system, the soft components such as agricultural training, and etc. It is commonly understood that the program contributed somehow to poverty reduction. However, it is of understanding that the impacts and effects of the program is not sufficiently assessed due to lack of monitoring and evaluation system. Accordingly, the JICA Study Team conducted fact finding survey on the poverty reduction projects implemented in the Region and examined needs for a monitoring and evaluation system of the poverty reduction programs.

7.2.1 Present Conditions of Project Monitoring and Evaluation System under the Poverty Reduction Program

In this sub-clause, the present conditions and issues on Program 135, one of the largest poverty reduction program implemented by the Government of Vietnam are overviewed.

(1) General Background of Program 135 (P135)

Primary target of P135 is on the communes in socioeconomic difficulty, particularly on improvement of living standards on the ethnic minorities. During 1998-2005, various infrastructures such as intra and inter commune roads, small-scale irrigation systems, schools, clinics, water and electricity supplies were developed under the management of Committee for Ethnic Minority and Mountainous Areas (CEMMA).

P135-Phase I completed in 2005, and Phase II for the next five years are now ongoing with assistance of World Bank. Under P135-Phase I, VND 8,434 billion (US$562 million) by 2005 were spent and 25,000 communal infrastructure facilities and 498 inter-communal infrastructures facilities were built throughout 2,412 communes with special difficulties in 52 provinces. It is considered that this achievement, somehow, created necessary conditions for the poverty reduction in ethnic minority and mountainous areas.

(2) Commune Selection and Funding Process under P135-Phase I

The initial target communes of the two programs (P135 and NTP managed by MOLISA) were 1,715 communes with special difficulties, of which 1,000 communes were given the highest priorities. The list of communes with special difficulties was prepared by CEMMA and was used for P135 Phase-I, while selection criteria and procedures were unclear and not transparent.

Under Program 135, capital funds are allocated to poor communes according to the number of eligible communes in each province and according to requirements specified in the Ministry of Planning and Investment Circular 66. Each eligible commune receives a fixed sum (VND 500 million in 2004) and usually districts are delegated to manage investment projects. The DPC determined type of projects for each commune according to household poverty rate and the level of infrastructure developments.

As mentioned above, project funds were allocated to communes as revenue share for regional development. The main drawback of the funding mechanism can be listed as follows:

1)	Rationale for Selection Criteria:	Communes with a larger number of poor people receive less funding per poor person. Communes with relatively low poverty rate on average but a lager number of poor households are less likely to be selected.
2)	Geographic Conditions:	Disadvantages for remote areas due to lump sum allocation of fund per commune
3)	Fund Allocation Issue:	It is difficult to ensure that the funds reach the poorest of the poor or the remotest village
4)	Clarification of Accountability:	Unclear procedure of disbursement at district level was not clear and insufficient accountability

(3) Monitoring and Evaluation System of P135-Phase I

According to the previous research[2], some of the issues in Monitoring and Evaluation (M&E) system were observed. There was lack of legal / regulation framework about coordination between line ministries and the province in running the Monitoring and Evaluation tasks. The organization of the Monitoring and

2 Nguyen Van Cuong, Research Report to propose community- participatory M&E mechanism for Socio-Economic Development Programme for Ethic and Mountainous Communes with Special Difficulties, July 2005

Evaluation system and institutional arrangement in roles and responsibilities have been not clear. The program has a set of Monitoring and Evaluation indicators to some extent. These indicators are introduced in Circular No.894/2001 Guidance on Statistical Data Collection. In reports from provinces and districts, the following indicators were collected.

Table 7.2.1 M&E Indicators in P135-Phase I

Types of Indicator	Contents of Indicator
Input indicators	Name of sub-project / civil work, total investment (planned and disbursed) by commune
Output indicators	Number of sub-projects/civil works, name of households receiving assistance in forestry/agricultural extension services, number of trainings and trainees, total area of forestation (total investment and total disbursement)
Impact indicators	Poverty rates and other statistical data

Source：JICA Study Team

These indicators are mostly quantitative. There were few indicators reflecting the quality and time of implementation. In addition, the indicators set were not assigned clearly to each management level. The following table summarizes the critiques on Monitoring and Evaluation system under the Program 135-I.

Table 7.2.2 Critical Points of M&E System under P135-Phase I

Items	Observation
M&E Indicators	- Indicators were not well defined and not well designed to capture the project impacts. - At provincial level, the disbursement rate was only emphasized as an indicator to monitor the overall program progress.
Reporting system	- A reporting system was set up at commune, district, provincial and central levels. - However, it seemed there was no common outline being used consistently across provinces, and even across communes in a province. - Feedback from upper management levels to lower levels was very limited, affecting the quality of the reports.
Baseline survey	- Comprehensive baseline survey was not conducted. - Project review was done. However, it was not satisfactory in terms of internationally accepted standards. - Monitoring indicator was limited to only project output and project impact assessment was not done.

Source: Nguyen Van Cuong, 2005.

7.2.2 Underlying Issues and Improvement Measures

(1) Application of Geographic Information System to Project Monitoring and Evaluation

It can not be judged whether the project has achieved its target or still required further intervention in particular areas, duly because project accountability of the implementation agencies and related line ministries are not clearly defined and the project information is not managed through a unified system in the current practice of poverty reduction programs.

This exacerbates difficulties in procurement of the past details and accurate information regarding the implemented poverty reduction projects without ground truth at the project site. In order to mitigate such difficulties in data and information management, it will be necessary to establish a unified information

system for monitoring and evaluation.

Geographic Information Systems (GIS) can offer to enable to integrate various type of data into unified system. GIS is an effective tool for monitoring and evaluation of poverty reduction programs in Vietnam, where number of small-scale infrastructures disperse nation-wide. GIS application can offer the following specific benefits for information management:

i) To clarify project objectives and target beneficiaries and enable to ensure collaboration among the project as well as to avoid duplication,
ii) To enable to prepare rural development planning smoothly and effectively for districts and communes,
iii) To enable easier project management and progress monitoring.

(2) Future Monitoring and Evaluation System to be established

Considering the existing problems and issues in M&E, the following suggestions can be made.

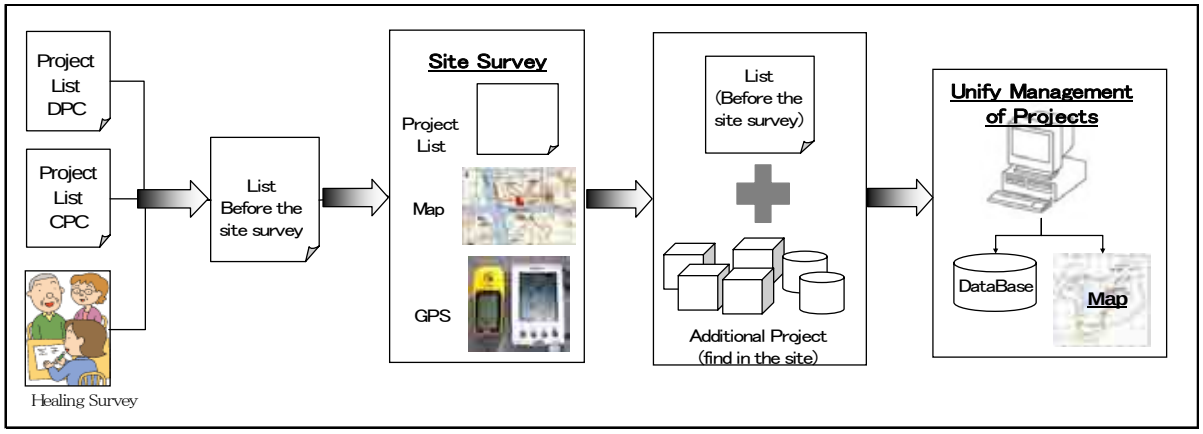
Table 7.2.3 Recommendable M&E System

Items	Remarks
1. Setting clear objectives and project scale	Preparation of logical framework can provide comprehensive project management framework.
2. Preparation of commune resource maps as basis for development programs	This could basically be done nation wide. However, maps could be prepared gradually as government programs extend in the poverty areas.
3. Participatory project planning	In planning to assist poverty areas, community needs should be assessed carefully based on the above-mentioned commune resource maps, which are expected to tell all about what are needed.
4. Baseline survey	In the targeted areas, baseline survey should be conducted at early stage of the programs. Baseline data should include qualitative and quantitative data. Once data are collected, these should be incorporated in the commune resource map.
5. Participatory project monitoring	It is necessary to establish communication channels so that commune residents can report to either commune or district officers about problems of infrastructures and facilities (i.e. card survey for village people)
6. Unified project data and information management	There is a need to assign specific tasks of monitoring and updating resource maps to an authorized and capable institution (i.e. NIAPP)

7.3 Case Study of GIS Application in Project Monitoring and Evaluation

7.3.1 Objectives and Methodology

This is a preliminary practice to clarify validity of GIS application in monitoring and evaluation. The figure below illustrates the general procedures of this case study.



Source: JICA Study Team

Figure 7.3.1 Procedures of the Case Study for GIS Application in Project Monitoring and Evaluation

The following four (4) communes were selected among 32 communes for which the trail formulation of Communes Development Plan (CDP) was carried out as mentioned in Chapter 8.

1) Dien Bien Province : Muong Phang Commune
2) Lai Chau Province : Ma Quai Commune
3) Son La Province : Chieng Khoang Commune
4) Hoa Binh Province : Cao Son Commune

First, the Study Team collected the project list of the poverty reduction programs implemented for the target commune in the past from DARD, DPC, and CPC, and also conducted the interview survey to the government officers. Past programs were arranged in a project list according to village units. However, information in the list is very limited and do not include necessary basic information for project monitoring such as specification of the facilities, number of beneficiaries. Moreover, there is no appropriate map which shows the exact position of the villages and the correct village name, and even DPC and CPC officers were not able to point a village position on the map.

Therefore, in reference to 1:50,000[3] scale topographical maps (update in 2004) that officially published in Vietnam, the survey required to visit all villages using GPS to confirm the exact position, accessibility of all villages, and the current status of all facilities installed by the poverty reduction program.

The results of the field survey are presented in the following sections from Sections 7.3.2 to 7.3.5.

7.3.2 Muong Phang Commune in Dien Bien Province

(1) Basic information organized by GIS application

The Study Team arranged exisitng key information of socioeconomic conditions in the commune, and

3 As a result of the field survey, the description mistakes were confirmed in Muong Phang Commune (17 places), in Ma Quai Commune (7 places), in Chien Khoang Commune (8 places) and in Cao Son Commune (1 place) in the official published topographical map (Scale 1:50,000).

collected a list of rural infrastrucutres provided by poverty reduction programs from DARD, DPC and CPC with interviewing to local government officers. Then, the Study Team prepard a GIS database, while exact position of the villages and facilities were verified by visiting each location using GPS. The collected data and information are presented in the following pages.

(2) Result of GIS Based Field Survey

The poverty reduction programs in the commune provided various types of assistance such as provisions of roof top for poverty households, water tanks, school construction, domestic water supply, small-scale irrigation facilities, and access roads. Thus, although there are differences in scale and quality of the provided facilities, all villages in the commune received more than one facility. Key findings can be summarized as follows.

1) Gap of project distributions according to accessibility

   The commune has relatively good access located near Dien Bien Phu and most of villages are accessible by vehicle. The commune received relatively large scale projects funded by foreign donors such as EU and NGO (Action Aid Vietnam). However, these projects are limited to the villages adjacent to major access roads, while the villages in the remote areas received assistance only from government of Vietnam.

2) Negative impacts caused by project implementation per village unit

   31 villages are registered in the commune administration, while the actual numbers of villages are 44. This is due to the fact that some villages were subdivided into several villages because of population growth (i.e., Long Luong village was divided into two and Cang village into four.)

   As for subdivided villages, they are officially one village, and the poverty reduction programs are introduced at original village unit bases, although residential areas and production units are different and dispersed in subdivided villages. This implies that if water supply facility is installed in a subdivided village, it can be considered that water is provided with the entire village (before

subdivided village). This could be a prevailing example that insufficient information management potentially creates a gap in interpretation of the project impacts between project management level and the actual ground level.

3) Facility conditions in post-project implementation

It was observed that some facilities provided by poverty reduction program were not in use or already malfunctioned as presented in Figure 7.3.9. In particular, eight water supply facilities out of 23 are already broken. There were water supply facilities which are not used by beneficiaries due to contamination of water sources. Therefore, there is a high possibility that water supply rate of the commune is officially recorded based on misinterpretation that all 23 facilities are effectively used.

Table 7.3.1 Outline of Muong Phang Commune

NO	Village Name	Ethnic Group	Total HH	Poverty HH	Poverty Rate(%)	Electricity Supply	Project
1	Long Hay	Mong	42	21	50.0		4, 12
2	Long Luong I	Mong	29	17	58.6		4, 6, 9, 12
3	Long Luong II		20	11	55.0		
4	Long Nghiu	Mong	27	16	59.3		3, 12
5	Co Duong	Thai	25	15	60.0	O	2, 12
6	Khau Cam	Thai	29	17	58.6		3, 12
7	Cang 1	Thai	34	18	52.9	O	1, 6, 12
8	Cang 2		23	12	52.2		
9	Cang 3		31	18	58.1		
10	Cang 4		13	8	61.5		
11	Yen 1	Thai	27	14	51.9	O	1, 12
12	Yen 2		43	20	46.5		
13	Yen 3		16	12	75.0		
14	Co man 1	Thai	39	18	46.2	O	1, 12
15	Co man 2		17	11	64.7		
16	Ban Banh	Thai	41	19	46.3	O	12
17	Phang 1	Thai	42	12	28.6	O	6, 7, 11, 12
18	Phang 2		33	18	54.5		
19	Phang 3		21	14	66.7		
20	Tan Binh	Thai	28	12	42.9		12
21	Khau	Thai	30	14	46.7		11, 12
22	Che Can	Thai	75	37	49.3	O	1, 7
23	Trung Tam	Kinh	29	7	24.1	O	11
24	Bua	Thai	41	28	68.3	O	2, 6, 7, 11, 12
25	Dong Met 1	Thai	48	21	43.8	O	1, 6, 11, 12, 13
26	Dong Met 2		52	26	50.0		
27	Co Thon	Thai	23	12	52.2	O	1, 11, 13
28	Xom 1	Thai	48	18	37.5		5, 6, 11, 12
29	Xom 2		51	29	56.9		
30	Xom 3		43	21	48.8		
31	Keo	Kho Mu	33	20	60.6		1, 6, 10, 11, 12
32	Cong	Kho Mu	23	11	47.8		1, 6, 11, 12
33	Ten	Kho Mu	26	12	46.2		1, 11, 12
34	Nghiu 1	Thai	33	9	27.3		5, 11, 12
35	Nghiu 2		30	14	46.7		
36	Muong	Kho Mu	19	15	78.9		2, 12, 13
37	Ha	Thai	40	21	52.5		2, 6, 7, 12
38	Phieng Sang	Thai	20	10	50.0		2, 12
39	Bo	Thai	23	11	47.8		6, 12
40	Co Cuom	Kho Mu	38	19	50.0	O	1, 12
41	Pu Sung	Kho Mu	46	29	63.0	O	2, 7, 10, 12
42	Vang 1	Kho Mu	35	13	37.1	O	1, 6, 8, 12
43	Vang 2		45	25	55.6		
44	Pa Tra	Thai	15	9	60.0		6, 12
45	Co Liu	Thai	15	11	73.3		7, 12
Total			1,461	745	52.5		

Ethnic Group	Total HHs	Ethnic Rate (%)	Poverty (HH)	Poverty Rate (%)	Electricity Supply (HH)	Electricity Supply (%)
Mong	118	8.1	65	55.1	0	0.0
Thai	1,049	71.8	529	50.4	644	61.4
Kho Mu	265	18.1	144	54.3	164	61.9
Kinh	29	2.0	7	24.1	29	100.0
Total	1,461		745	52.5	837	57.3

Project :

1: Water Supply Project - Completed
2: Water Supply Project (Program 134) - Completed
3: Water Supply Project (Program 252)
4: Water Supply Project (ActionAidVietnam)
5: Water Supply Project (Program 134) - Planning Stage
6: School Construction Project (Kindergarten, Primary and Upper Primary School)
7: Irrigation System
8: Irrigation System (Program 135)
9: Irrigation System (Program 252)
10: Wair and Irrigation channel
11: Transportation Road
12: Rooftop Provide (Program 134)
13: Bridge Construction
14: Hydro dam Construction

Table 7.3.2 Project List of Poverty Reduction Programs in Muong Phang Commune (1)

Updated by August 2007

NO	Village Name	Ethnic Group	Project	Year	Memo
1	Long Hay	Mong	- ActionAid Vietnam (AAV); Water Supply		4 or 5 HHs / 1 Tap
			- Program 134; Rooftop Provide	2005	5 HHs
2	Long Luong I Long Luong II	Mong	- ActionAid Vietnam (AAV); Water Supply		4 or 5 HHs / 1 Tap
			- Program 134; Rooftop Provide	2005	4 HHs (Luong I), 4 HHs (Luong II)
			- Program 252; Irrigation System	2003	Weir Construction
			- PEDC Project; School Construction	2002-2004	Primary Education for Disadvantaged Children Project Funded by EU and Vietnam Gov.
3	Long Nghiu	Mong	- Program 134; Rooftop Provide	2005	5 HHs
			- Program 252; Water Supply	2007	
4	Co Duong	Thai	- Program 134; Rooftop Provide	2005	6 HHs
			- Program 134; Water Supply	2007	Total 6 tanks
5	Khau Cam	Thai	- Program 134; Rooftop Provide	2005	3 HHs
			- Program 252; Water Supply	2007	Well-digging
6	Cang 1 Cang 2 Cang 3 Cang 4	Thai	- Program 134; Rooftop Provide	2005	3 HHs (Cang 1), 4 HHs (Cang 2), 3 HHs (Cang 3), 3 HHs (Cang 4)
			- Water Supply (by Vietnam Govt)	2002-2003	**Not Working**
			- School Construction; Sub School		
7	Yen 1 Yen 2 Yen 3	Thai	- Program 134; Rooftop Provide	2005	5 HHs (Yen 1), 9 HHs (Yen 2), 6 HHs (Yen 3)
			- Water Supply (by Vietnam Govt)	2002-2003	**Not Working**
8	Co Man 1 Co Man 2	Thai	- Program 134; Rooftop Provide	2005	1 HH (Co Man 1), 2 HHs (Co Man 2)
			- Water Supply (by Vietnam Govt)	2002-2003	**Not Working** (Total 3 tanks)
			- Irrigation channel		1.3 km (Co Liu to Co Man)
9	Ban Banh	Thai	- Program 134; Rooftop Provide	2005	4 HHs
10	Phang 1 Phang 2 Phang 3	Thai	- Program 134; Rooftop Provide	2005	7 HHs (Phang 1), 5 HHs (Phang 2), 2 HHs (Phang 3)
			- Transportation Road	2004	Phang to Khau 1.6 km
			- Irrigation channel		Bua to Phang 1.3 km
			- Japan-Vietnam Oil fund; Primary School		Nippon Oil Cooperation fund
11	Tan Binh	Thai	- Program 134; Rooftop Provide	2005	5 HHs
12	Khau	Thai	- Program 134; Rooftop Provide	2005	3 HHs
			- Transportation Road	2004	Phang to Khau 1.6 km
13	Che Can	Thai	- Water Supply (by Vietnam Govt)		**Not Working**
			- Weir and irrigation channel	2004	
14	Trung Tam	Kinh	- Transportation Road; EU fund		6.5 km; Trung Tam - Bua - Dong Met - Co Thon - Xon - Keo - Ten - Cong
15	Bua	Thai	- Program 134; Rooftop Provide	2005	4 HHs
			- Program 134; Water Supply		Well-digging
			- Irrigation channel		Bua to Phang 1.3 km
			- Program 159; Kindergarten	2004	
			- School Construction; Sub School		
			- Transportation Road; EU fund		6.5 km; Trung Tam - Bua - Dong Met - Co Thon - Xon - Keo - Ten - Cong
16	Dong Met 1 Dong Met 2	Thai	- Program 134; Rooftop Provide	2005	5 HHs (Dong Met 1), 6 HHs (Dong Met 2)
			- Program 327; Water Supply		**Not Working**
			- Upper Primary School		
			- Bridge Construction		Domg Met - Co Thom
			- Transportation Road; EU fund		6.5 km; Trung Tam - Bua - Dong Met - Co Thon - Xon - Keo - Ten - Cong
17	Co Thon	Thai	- Bridge Construction		Domg Met - Co Thom
			- Program 327; Water Supply		**Not Working**
			- Transportation Road; EU fund		6.5 km; Trung Tam - Bua - Dong Met - Co Thon - Xon - Keo - Ten - Cong

Table 7.3.2 Project List of Poverty Reduction Programs in Muong Phang Commune (2)

Updated by August 2007

NO	Village Name	Ethnic Group	Project	Year	Memo
18	Xom 1 Xom 2 Xom 3	Thai	- Program 134; Rooftop Provide	2005	2 HHs (Xom 1), 2 HHs (Xom 2), 3 HHs (Xom 3)
			- Program 134; Water Supply (Prannning Stage)	2007	Start from September 2007 (Total 17 tanks)
			- PEDC Project; School Construction	2002-2004	Primary Education for Disadvantaged Children Project Funded by EU and Vietnam Gov.
			- Training Program		Agro-forest, Aquaculture program
			- Transportation Road; EU fund		6.5 km ; Trung Tam - Bua - Dong Met - Co Thon - Xon - Keo - Ten - Cong
19	Keo	Kho Mu	- Program 134; Rooftop Provide	2005	19 HHs
			- Water Supply (by Vietnam Govt)		**Not Working**
			- School Construction; Sub School		Primary School No2; Keo-Nghiu Communes
			- Weir and irrigation channel		
			- Transportation Road; EU fund		6.5 km ; Trung Tam - Bua - Dong Met - Co Thon - Xon - Keo - Ten - Cong
20	Cong	Kho Mu	- Program 134; Rooftop Provide	2005	6 HHs
			- Water Supply (by Vietnam Govt)	2002	Total 4 tanks. (3 tanks are out of order)
			- PEDC Project; School Construction	2002-2004	Primary Education for Disadvantaged Children Project Funded by EU and Vietnam Gov.
			- Transportation Road; EU fund		6.5 km ; Trung Tam - Bua - Dong Met - Co Thon - Xon - Keo - Ten - Cong
21	Ten	Kho Mu	- Program 134; Rooftop Provide	2005	6 HHs
			- Water Supply (by Vietnam Govt)	1989	**Not Working**
			- Water Supply (by Vietnam Govt)	2006	Total 6 tanks
			- Transportation Road		6.5 km ; Trung Tam - Bua - Dong Met - Co Thon - Xon - Keo - Ten - Cong
22	Nghiu 1 Nghiu 2	Thai	- Program 134; Rooftop Provide	2005	4 HHs (Nghiu 1), 3 HHs (Nghiu 2)
			- Program 134; Water Supply (Prannning Stage)	2007	
			- Transportation Road; EU fund		6.5 km ; Trung Tam - Bua - Dong Met - Co Thon - Xon - Keo - Ten - Cong
23	Muong	Kho Mu	- Program 134; Rooftop Provide	2005	8 HHs
			- Program 134; Water Supply	2004	Total 4 tanks
			- Bridge Construction (by Vietnam Govt)		
24	Ha	Thai	- Program 134; Rooftop Provide	2005	15 HHs
			- Program 134; Water Supply		
			- School Construction; Sub School		Ha Newarea
			- School Construction		Ha Original area
			- Irrigation System	2002-2003	
25	Phieng Sang	Thai	- Program 134; Rooftop Provide	2005	3 HHs
			- Program 134; Water Supply	2004	Total 5 tanks
26	Bo	Thai	- Program 134; Rooftop Provide	2005	1 HH
			- School Construction (by Vietnam Govt)		
27	Co Cuom	Kho Mu	- Program 134; Rooftop Provide	2005	13 HHs
			- Water Supply (by Vietnam Govt)		Total 2 tanks
28	Pu Sung	Kho Mu	- Program 134; Rooftop Provide	2005	13 HHs
			- Program 134; Water Supply	2007	Total 7 tanks
			- Dam Construction (Small hydro)	2004	2MW
			- Weir and irrigation channel (by Vietnam Govt)	2002	
29	Vang 1 Vang 2	Kho Mu	- Program 134; Rooftop Provide	2005	4 HHs (Vang 1), 3 HHs (Vang 2)
			- Program 327; Water Supply	2000	Total 5 tanks
			- Program 135; Irrigation channel and ditch		4.0 km; 2/3 Concrete
			- School Construction; 3 fund sources		1. Program 327 (1999), 2. PEDC Project (2005), 3. EU (2002)
30	Pa Tra	Thai	- Program 134; Rooftop Provide	2005	3 HHs
			- School Construction (by Vietnam Govt)		Rooftop and 1ton of concrete
31	Co Liu	Thai	- Program 134; Rooftop Provide	2005	1 HH
			- Irrigation System (by Vietnam Govt)	2004	1.3 km (Co Liu to Co Man)
			- Irrigation Sysytem (by EU)		

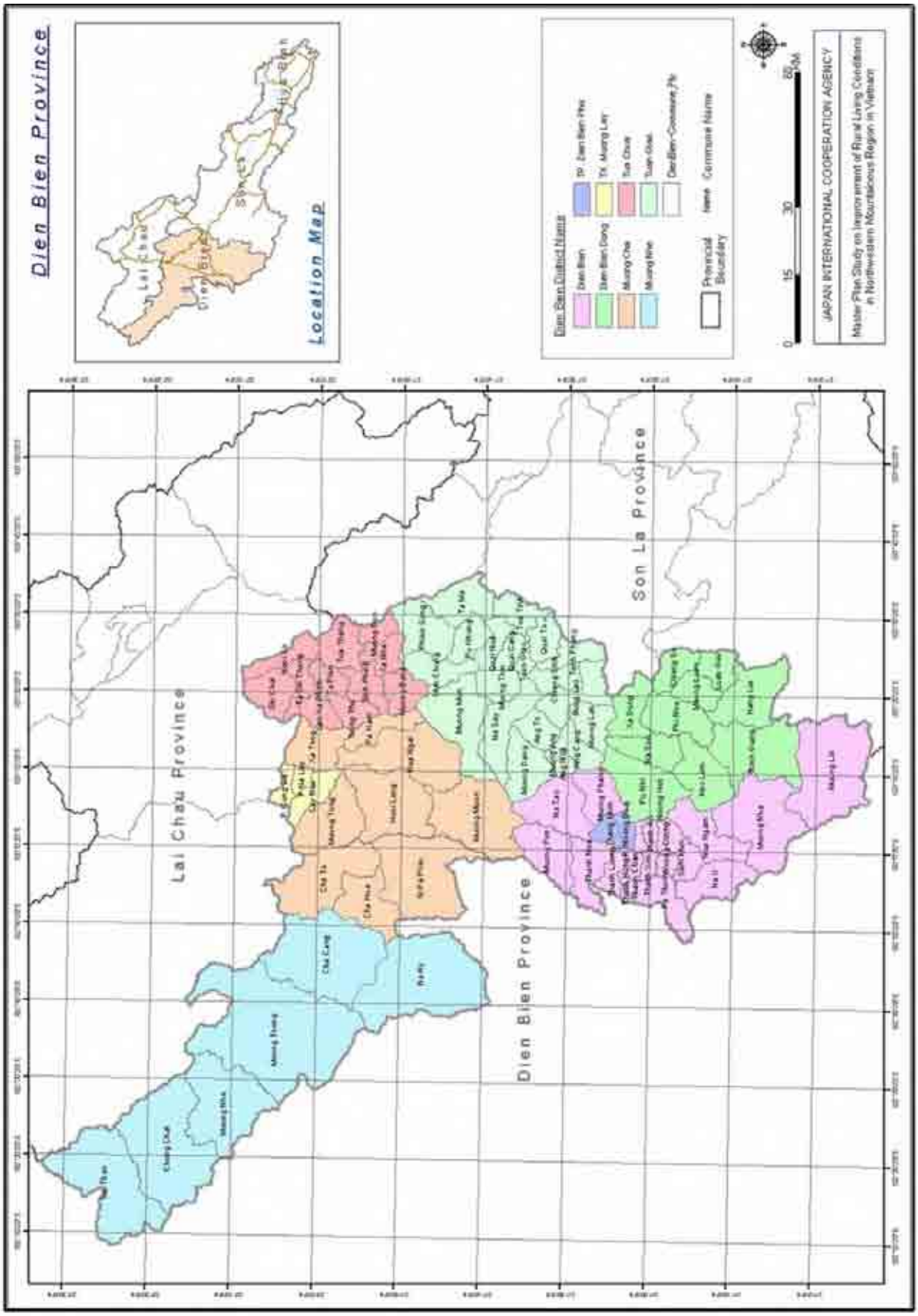
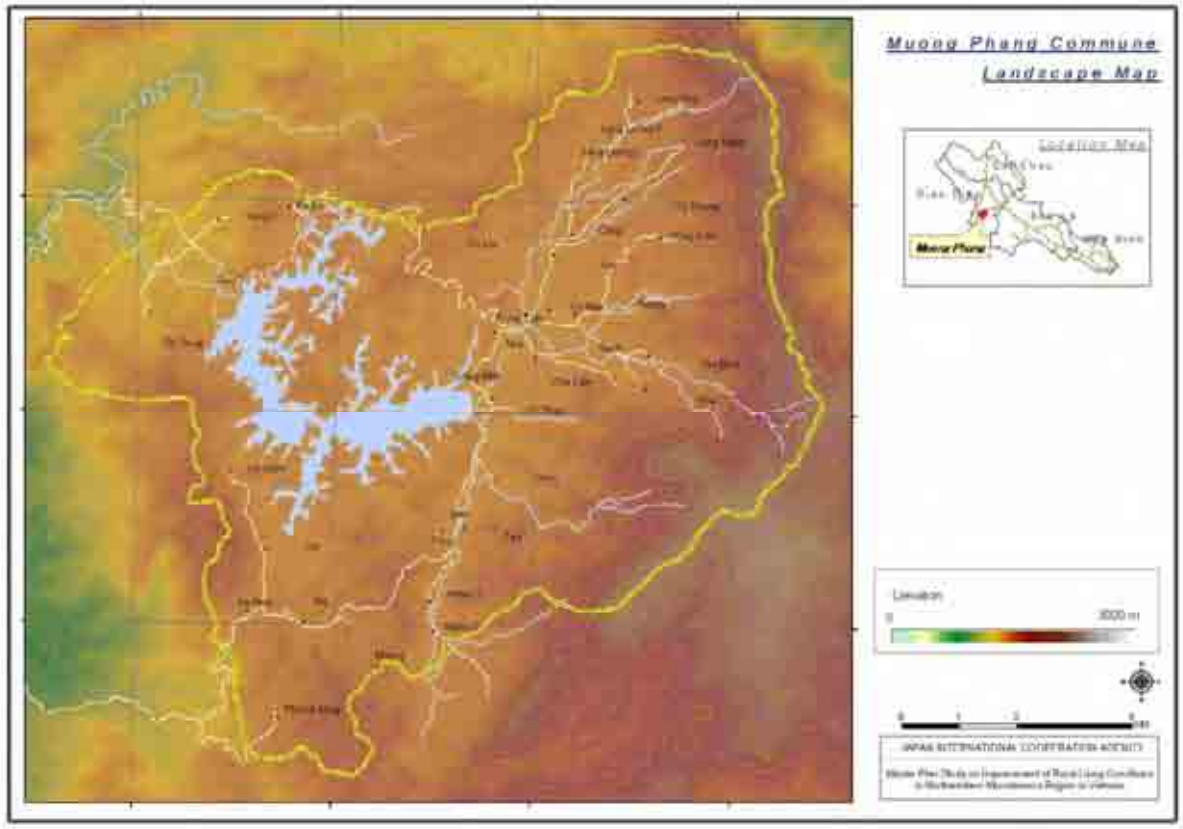


Figure 7.3.2 Location Map of Communes in Dien Bien Province



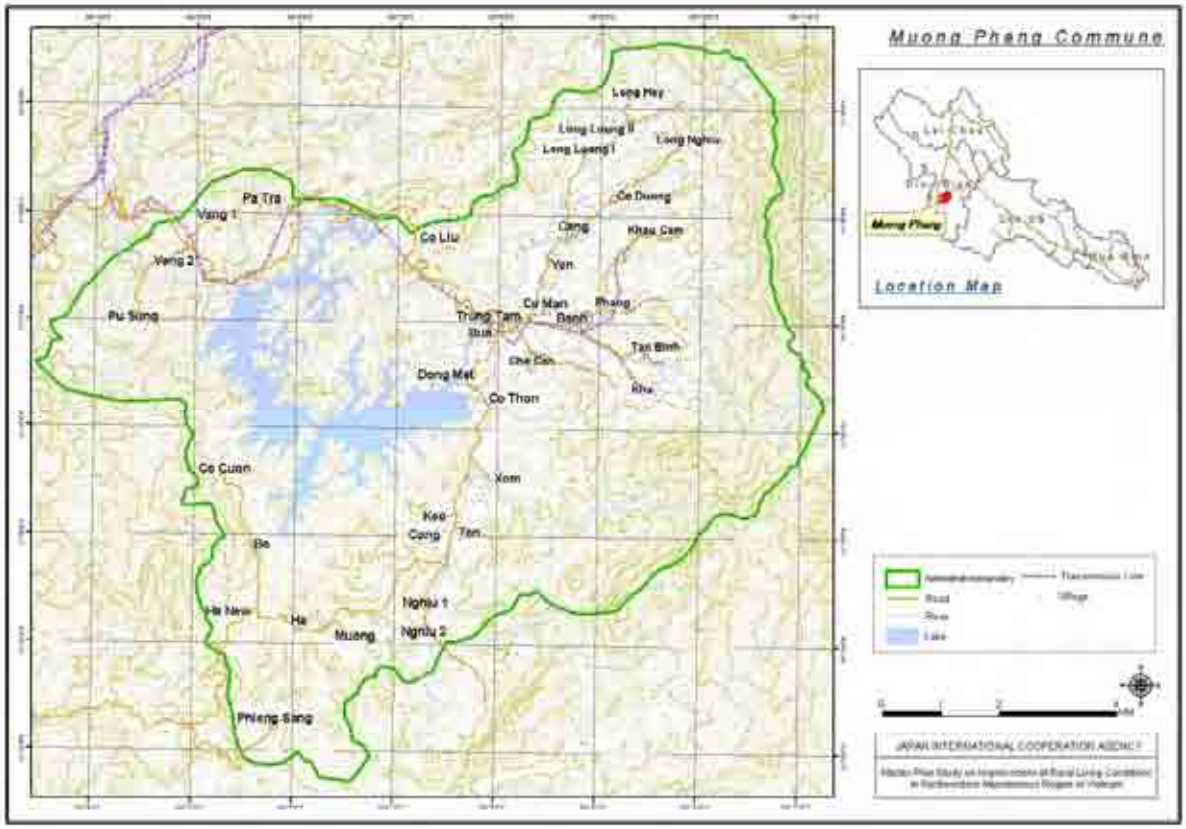


Figure 7.3.3 Topographic Map and Village Location Map of Muong Phang Commune

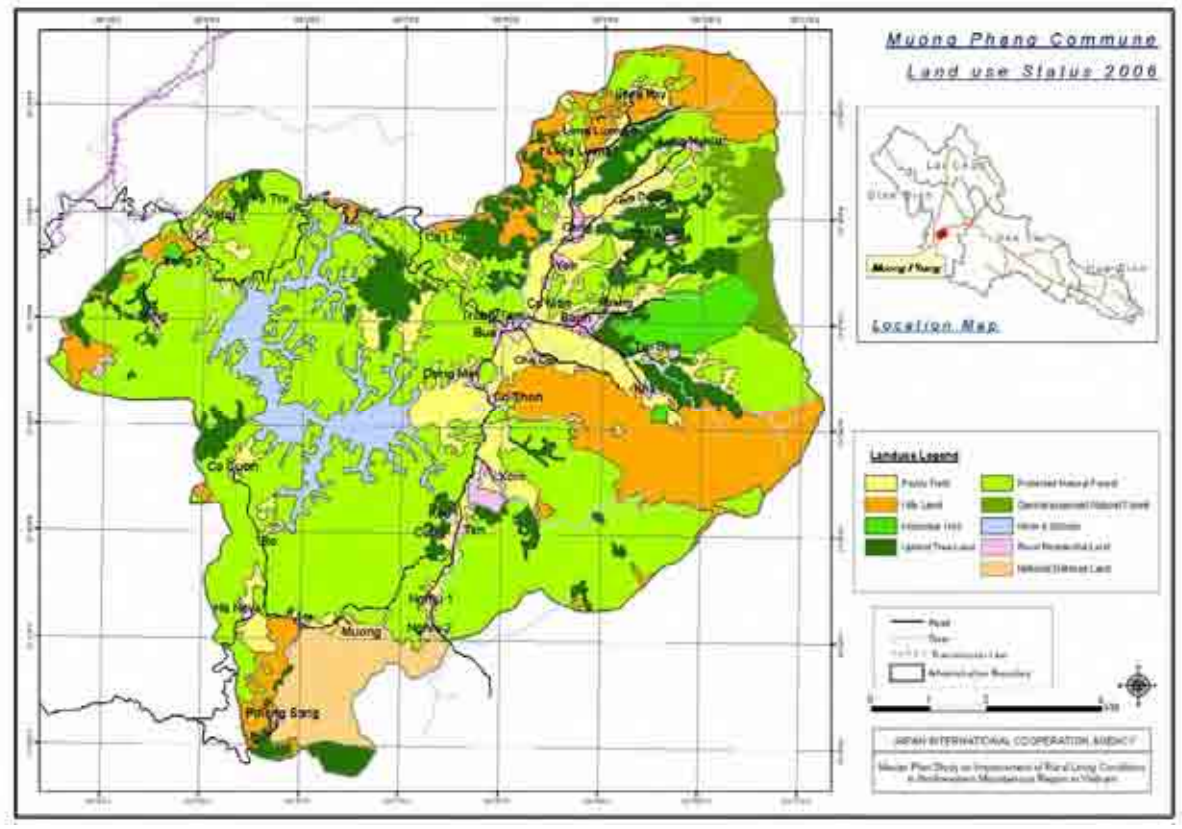


Figure 7.3.4 Present Land Use Map (2005)

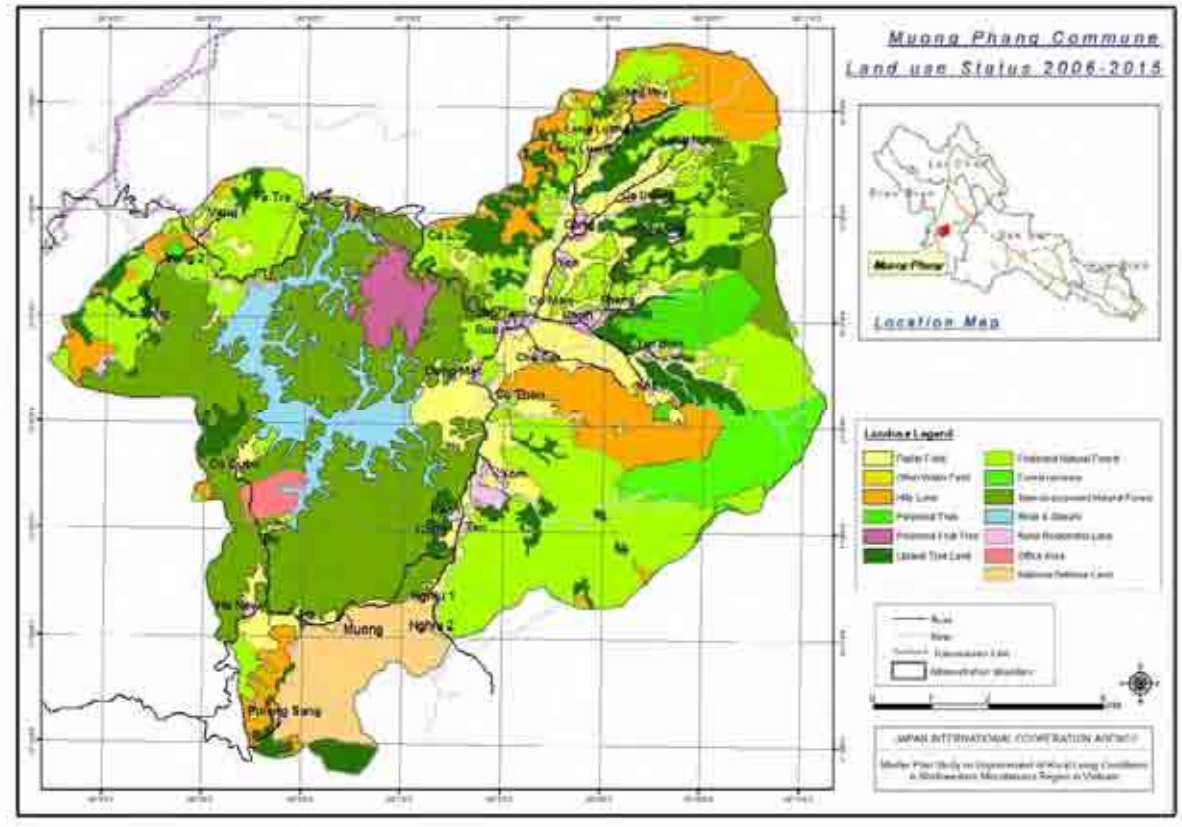


Figure 7.3.5 Land Use Planning Map (2015)

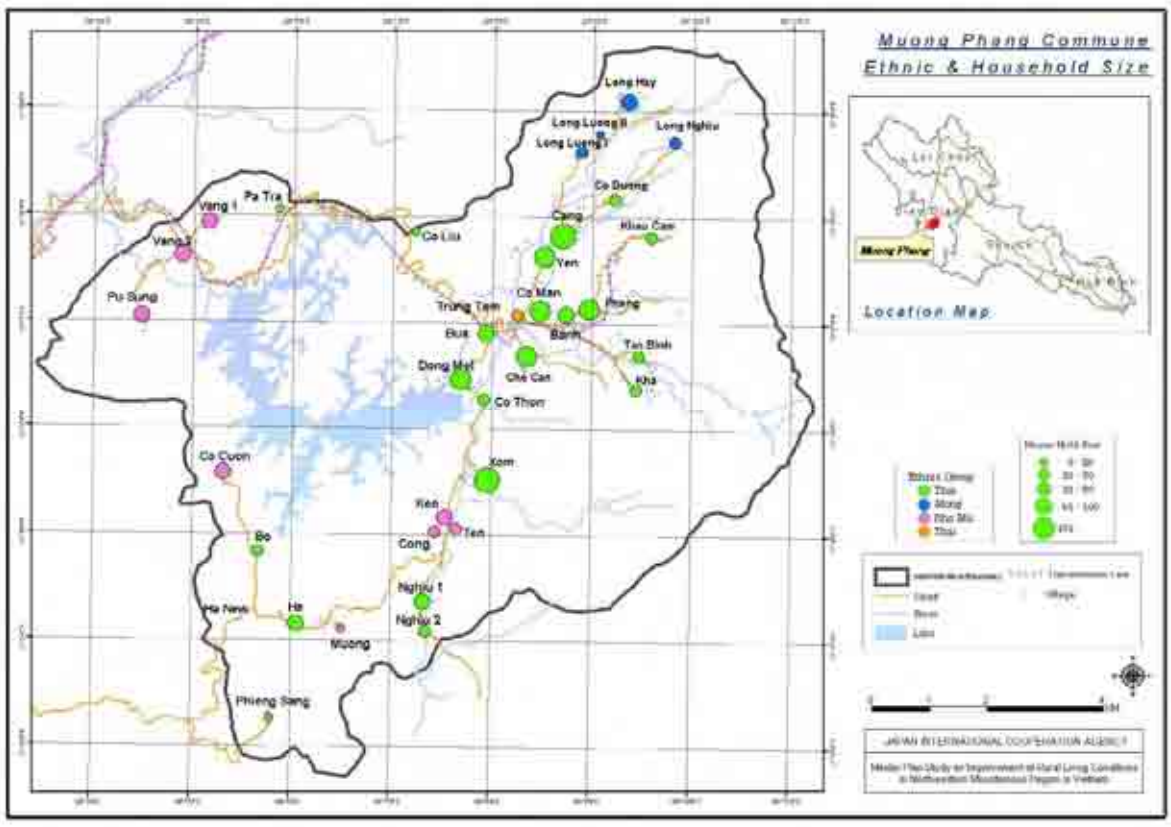


Figure 7.3.6 Ethnic Group and Number of Household Map

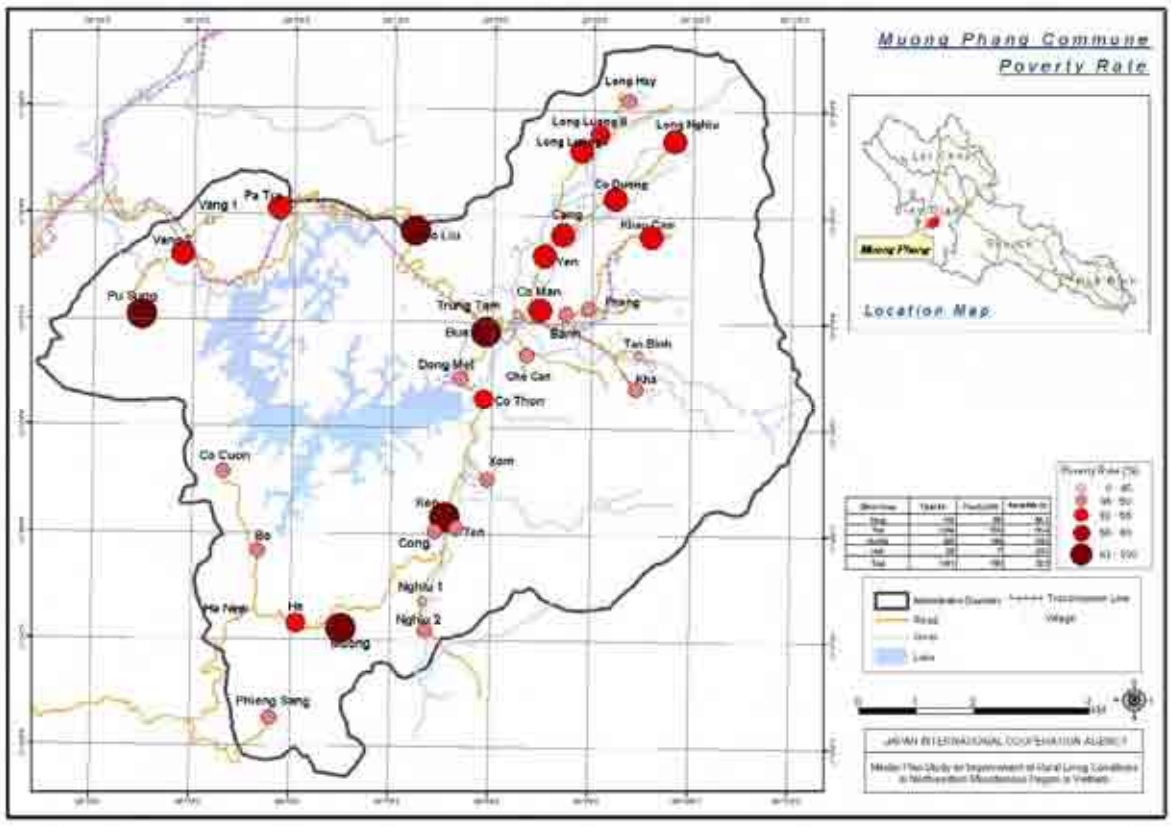
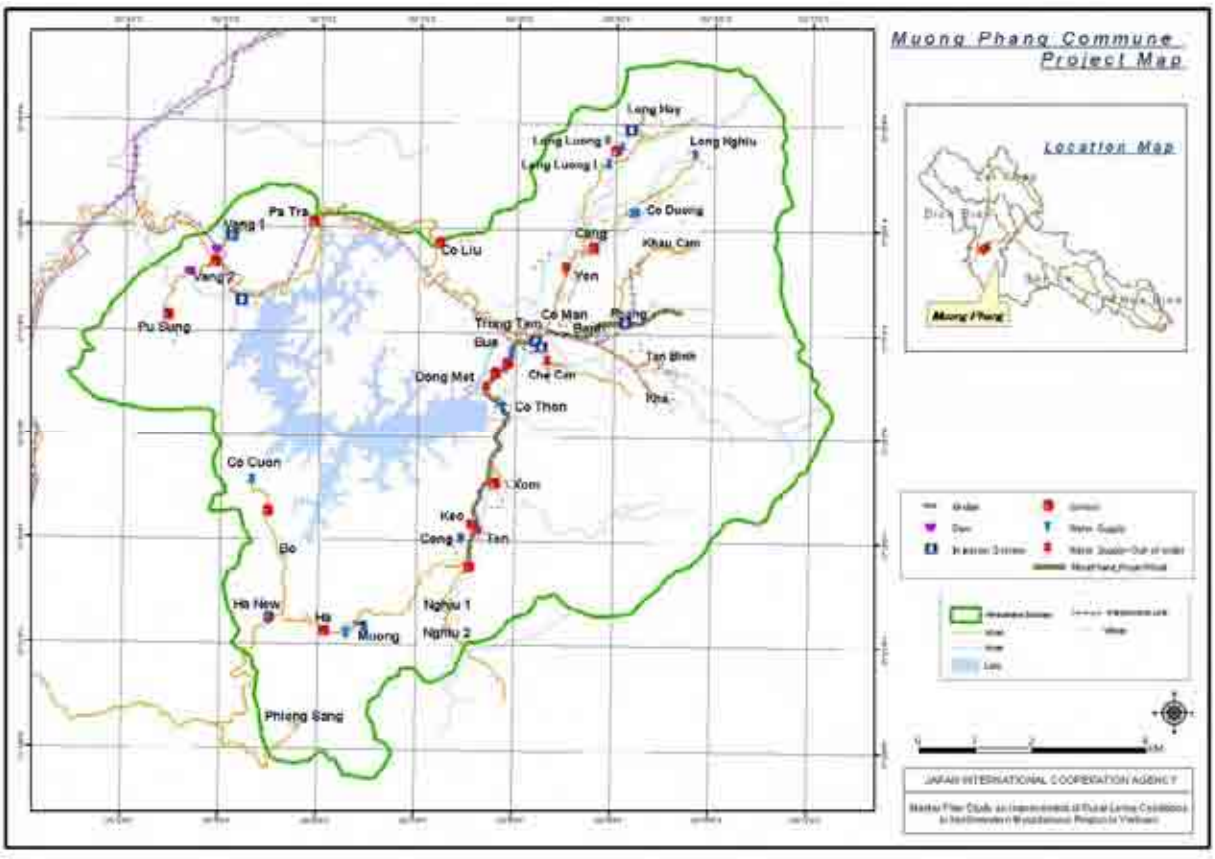


Figure 7.3.7 Village Poverty Rate Map



NO	Village Name	Ethnic Group	Project
1	Long Hay	Mong	- ActionAid Vietnam (AAV); Water Supply - Program 134; Rooftop Provide
2	Long Luong I Long Luong II	Mong	- ActionAid Vietnam (AAV); Water Supply - Program 134; Rooftop Provide - Program 252; Irrigation System - PEDC Project; School Construction
3	Long Nghiu	Mong	- Program 134; Rooftop Provide - Program 252; Water Supply
4	Co Duong	Thai	- Program 134; Rooftop Provide - Program 134; Water Supply
5	Khau Cam	Thai	- Program 134; Rooftop Provide - Program 252; Water Supply
6	Cang 1 Cang 2 Cang 3 Cang 4	Thai	- Program 134; Rooftop Provide - Water Supply (by Vietnam Govt) - School Construction; Sub School
7	Yen 1 Yen 2 Yen 3	Thai	- Program 134; Rooftop Provide - Water Supply (by Vietnam Govt)
8	Co Man 1 Co Man 2	Thai	- Program 134; Rooftop Provide - Water Supply (by Vietnam Govt) - Irrigation channel
9	Ban Banh	Thai	- Program 134; Rooftop Provide
10	Phang 1 Phang 2 Phang 3	Thai	- Program 134; Rooftop Provide - Transportation Road - Irrigation channel - Japan-Vietnam Oil fund; Primary School
11	Tan Binh	Thai	- Program 134; Rooftop Provide
12	Khau	Thai	- Program 134; Rooftop Provide - Transportation Road
13	Che Can	Thai	- Water Supply (by Vietnam Govt) - Weir and irrigation channel
14	Trung Tam	Kinh	- Transportation Road; EU fund
15	Bua	Thai	- Program 134; Rooftop Provide - Program 134; Water Supply - Irrigation channel - Program 159; Kindergarten - School Construction; Sub School - Transportation Road; EU fund
16	Dong Met 1 Dong Met 2	Thai	- Program 134; Rooftop Provide - Program 327; Water Supply - Upper Primary School - Bridge Construction - Transportation Road; EU fund
17	Co Thon	Thai	- Bridge Construction - Program 327; Water Supply - Transportation Road; EU fund

NO	Village Name	Ethnic Group	Project
18	Xom 1 Xom 2 Xom 3	Thai	- Program 134; Rooftop Provide - Program 134; Water Supply (Prannning Stage) - PEDC Project; School Construction - Training Program - Transportation Road; EU fund
19	Keo	Kho Mu	- Program 134; Rooftop Provide - Water Supply (by Vietnam Govt) - School Construction; Sub School - Weir and irrigation channel - Transportation Road; EU fund
20	Cong	Kho Mu	- Program 134; Rooftop Provide - Water Supply (by Vietnam Govt) - PEDC Project; School Construction - Transportation Road; EU fund
21	Ten	Kho Mu	- Program 134; Rooftop Provide - Water Supply (by Vietnam Govt) - Water Supply (by Vietnam Govt) - Transportation Road
22	Nghiu 1 Nghiu 2	Thai	- Program 134; Rooftop Provide - Program 134; Water Supply (Prannning Stage) - Transportation Road; EU fund
23	Muong	Kho Mu	- Program 134; Rooftop Provide - Program 134; Water Supply - Bridge Construction (by Vietnam Govt)
24	Ha	Thai	- Program 134; Rooftop Provide - Program 134; Water Supply - School Construction; Sub School - School Construction - Irrigation System
25	Phieng Sang	Thai	- Program 134; Rooftop Provide - Program 134; Water Supply
26	Bo	Thai	- Program 134; Rooftop Provide - School Construction (by Vietnam Govt)
27	Co Cuom	Kho Mu	- Program 134; Rooftop Provide - Water Supply (by Vietnam Govt)
28	Pu Sung	Kho Mu	- Program 134; Rooftop Provide - Program 134; Water Supply - Dam Construction (Small hydro) - Weir and irrigation channel (by Vietnam Govt)
29	Vang 1 Vang 2	Kho Mu	- Program 134; Rooftop Provide - Program 327; Water Supply - Program 135; Irrigation channel and ditch - School Construction; 3 fund sources
30	Pa Tra	Thai	- Program 134; Rooftop Provide - School Construction (by Vietnam Govt)
31	Co Liu	Thai	- Program 134; Rooftop Provide - Irrigation System (by Vietnam Govt) - Irrigation Sysytem (by EU)

Figure 7.3.8 Location Map of Facilities provided by Poverty Reduction Programs








1st : General View of Muong Phang Commune (left & right)
2nd : Water Supply Facilities(properly working: left & right)
3rd : Water Supply Facilities (broken after installation: left & right)

Figure 7.3.9 Photograph of Field Survey in Muong Phang Commune

7.3.3 Ma Quai Commune in Lai Chau Province

(1) Basic information organized by GIS application

The Study Team arranged exisitng key information of socioeconomic conditions in the commune, and collected a list of rural infrastrucutres provided by poverty reduction programs from DARD, DPC and CPC with interviewing to local government officers. Then, the Study Team prepard a GIS database, while exact position of the villages and facilities were verified by visiting each location using GPS. The collected data and information are presented in the following pages.

(2) Result of GIS Based Field Survey

Ma Quai commune is located in undulating mountain area, where altitudes are ranging between 250 m-1,600 m. Farm roads within the commune is about 24 km, of which 4km is paved and transportation during rainy season becomes considerably difficult.

The poverty reduction programs in the commune provided various types of assistance such as provisions of roof top for poverty households and water tanks provided by the government, road and school construction by EU. Thus, although there are differences in scale and quality of the provided facilities, all villages in the commune received more than one facility. Key findings can be summarized as follows.

1) Gap of project distributions according to accessibility

   Six villages (Co Cooc, Bang Ban, Can Ho, Pa Pao, Luong Thang, Ma Quai Thang) are located along or near the roads, which are fully passable by vehicle and supported by EU. These villages received various assistances such as school, irrigation facilities by the government and EU. The roads connecting these six villages were initially constructed by the village residents through provision of labor. Meanwhile, EU provided a fund for expansion of the roads in 2003. Relatively large scale projects were implemented by EU fund for these six villages, while other villages located in remote area within the commune received only government support.

2) Definition of poverty rate

   The definition of the poverty household in Muong Phang commune is monthly income less than

200,000VND/person according to the new MOLISA guideline. In Ma Quai commune, it is defined as less than 80,000VND/person for more detail definition for the poorest of the poor. In Ma Quai commune, Program 05 by the government provided the roof top material and the water tank to the poor household defined by the latter standard (80,000VND/person).

3) Issues in provision of roof top materials

As mentioned above, Program 05 provided roof top materials to the classified poverty households. It is found that the provision has following issues and problems.

i) The provision is limited to only those who satisfy the standard (80,000VND /month/person). There are many cases that the provided roof tops are not used and left piled up (the reason are iii, iv, v, vi).
ii) Provided quantities are sometimes insufficient, thereby they become useless.
iii) There was no explanation, training, guidance for installation of the materials. The recipients had to install by themselves.
iv) Since the houses of real poor household are not strong enough to be installed, the materials are unused and left piled up.
v) Some real poor households are likely to receive some sort of benefits by renting the provided materials to other households.
vi) The households living in remote area had to visit at the central commune (Can Ho) and collect the provided materials by themselves.

Table 7.3.3 Outline of Ma Quai Commune

NO	Village Name	Ethnic Group	Total HH (2007/09/20 Fax)	Total HH 2007	Poverty HH 2006*1	Poverty Rate(%) 2006	Poverty HH 2007*1	Poverty Rate(%) 2007	Electricity Supply*2	Project
1	Co Cooc	Thai	40	44	15	34.1	14	31.8	×	4, 7, 12, 14
2	Vang Bon	Dao	41	43	21	48.8	14	32.6	×	4, 5, 6, 12, 14
3	Nam Bo	Thai	20	91	10	11.0	9	9.9	×	2, 5, 11, 12, 14, 15
		Lu	15							
		Mong	36							
		Dao	4							
		Nhang	5							
		Hoa	2							
		Lao	1							
4	Can Ho	Lu	90	97	17	17.5	14	14.4	×	2, 6, 8, 9, 12, 14
		Thai	5							
5	Lung Thang	Thai	45	47	29	61.7	29	61.7	×	7, 12, 14
		Mong	5							
		Dao	1							
6	Ma Quai Thang	Lu	70	71	4	5.6	4	5.6	×	4, 5, 12, 14
7	Lung Cu	Mong	13	80	26	32.5	26	32.5	×	7, 10, 12
		Thai	52							
8	Song Con	Thai	26	26	11	42.3	8	30.8	×	12, 15
9	Ding Danh	Thai	21	22	13	59.1	10	45.5	×	12, 13, 15, 17
10	Phin Ho	Lu	81	94	24	25.5	19	20.2	×	7, 12, 13, 15
11	Nam Ma Thai	Thai	85	89	20	22.5	14	15.7	×	5, 8, 12, 13, 15, 16
12	Nam Ma Dao	Dao	52	49	7	14.3	6	12.2	×	-
13	Can Ty 1	Mong	37	37	3	8.1	3	8.1	×	12, 13, 17
14	Can Ty 2	Mong	39	36	4	11.1	4	11.1	×	2, 8, 12, 13
15	Can Ty 3	Mong	35	40	4	10.0	4	10.0	×	2, 8, 12, 13, 15
16	Pa Pao	Mong	18	19	7	36.8	2	10.5	×	12, 14, 15
Total			839	885	215	27.6	180	22.0		

*1: Poverty Households = 80,000VND/Month/Person

*2: Electricity Supply = Some individual Households installed Pico-Hydro

Ethnic Group	Total HHs	Ethnic Rate (%)
Thai	294	35.0
Dao	98	11.7
Mong	183	21.8
Lu	256	30.5
Hoa	2	0.2
Lao	1	0.1
Nhang	5	0.6
Total	839	

Project :

1: Water Supply Project - DCDC
2: Water Supply Project (Program 135)
3: Water Supply Project (Program 500)
4: Water Supply Project (EU)
5: Primary School Construction Project (EU)
6: Primary School Construction Project (Program 135)
7: Primary School Construction Project (Program 159)
8: Other School Construction Project (Kindergarten, Upper Primary School)
9: Health Center Construction Project (Program 135)
10: Irrigation System (Program 135)
11: Irrigation System (EU)
12: Rooftop Provide Project (Program 05)
13: Household Water Tank Provide Project(Program 05)
14: Transportation Road
15: Program 05 for Poor Household
16: Hang Bridge Construction
17: One set of TV

Table 7.3.4 Project List of Poverty Reduction Programs in Ma Quai Commune

Updated by September 2007

NO	Village Name	Ethnic Group	Project	Year	Memo
1	Co Cooc	Thai	- EU, Water Supply Project	2004	Total 5 Water Tanks
			- Program 135; Primary School Construction	2005	School, Water Tank (Out of Order), Toilet
			- Program 05; Rooftop Provide		Provide Rooftop for poor households
			- EU, Transportation Road	2003	Ma Quai Thang, Can Ho, Vang Bon, Co Cooc, Pa Pao
2	Van Bon	Dao	- EU, Water Supply Project	2004	Total 4 Water Tanks
			- Program 135; Primary School Construction	2005	
			- EU, School Construction	2006	Class room, Water Tank
			- Program 05; Rooftop Provide		Provide Rooftop for poor households
			- EU, Transportation Road	2003	Ma Quai Thang, Can Ho, Vang Bon, Co Cooc, Pa Pao
3	Nam Bo	Thai Lu Mong Dao Nhang Hoa Lao	- Program 135; Water Supply Project		One Water Tank
			- EU, Irrigation System	2005	2Km
			- EU, School Construction	2004	Class room, Water Tank, Toilet
			- Program 05; Provide fertilizer		
			- Program 05; Rooftop Provide		Provide Rooftop for poor households (15HH)
			- EU, Transportation Road	2003	Ma Quai Thang, Can Ho, Vang Bon, Co Cooc, Pa Pao
4	Can Ho	Lu Thai	- Program 135; Water Supply Project		Total 5 Water Tanks (One tank is out of order)
			- Program 135; Primary School Construction	1999	157m2, 6 compartment, 3 classrooms
			- Program 135; Upper Primary School Construction	2005	
			- Program 135; Kindergarten Construction	2007	3 Classrooms, 1 teacher room,
			- Program 135; Health Center	2006	210.6m2
			- Program 186; House of Health Office	2004	54.26m2
			- Resolute 37; Teachers House	2007	Under Construction, Upper Primary School No1, No2
			- Program 05; Rooftop Provide		Provide Rooftop for poor households
			- EU, Transportation Road	2003	Ma Quai Thang, Can Ho, Vang Bon, Co Cooc, Pa Pao
5	Lung Thang	Thai Mong Dao	- Program 159; Primary School Construction	2003	
			- Program 05; Rooftop Provide		Provide Rooftop for poor households
			- EU, Transportation Road	2003	Ma Quai Thang, Can Ho, Vang Bon, Co Cooc, Pa Pao
6	Ma Quai Thang	Lu	- EU, Primary School Construction	2003	Class room, Water Tank, Toilet (Out of Order)
			- EU, Water Supply Project		Total 5 Water Tanks (Include School Water Tank)
			- Program 05; Rooftop Provide		Provide Rooftop for poor households
			- EU, Transportation Road	2003	Ma Quai Thang, Can Ho, Vang Bon, Co Cooc, Pa Pao
7	Lung Cu	Mong Thai	- Program 135; Irrigation System	2002	35 ha
			- Program 159; Primary School Construction	2003	
			- Program 05; Rooftop Provide		Provide Rooftop for poor households
8	Song Con	Thai	- Program 05; Rooftop Provide		Provide Rooftop for poor households
			- Program 05; Training		Agricultural Training
9	Ding Danh	Thai	- Program 05; Rooftop Provide		Provide Rooftop for poor households
			- Program 05; Domestic Water Tank for Poor HH		Provide 500 liter Water Tank for poor househods
			- Program 05; TV set		One set of TV
			- Program 05; Training		Agricultural Training, etc (13 HH)
10	Phin Ho	Lu	- Program 159; Primary School Construction	2004	
			- Program 05; Rooftop Provide		Provide Rooftop for poor households
			- Program 05; Domestic Water Tank for Poor HH		Provide 500 liter Water Tank for poor househods
			- Program 05; Training, etc	2004-2006	Agricultural Training, etc (24 HH), Total 3 times (2004, 2005, 2006)
11	Nam Ma Thai	Thai	- Primary School; by Government	2006	Education for the special difficult area
			- EU, Primary School Construction	2005	Class room, Water Tank, Toilet (Out of Order)
			- Program 05; Rooftop Provide		Provide Rooftop for poor households
			- Program 05; Domestic Water Tank for Poor HH		Provide 500 liter Water Tank for poor househods
			- Program 05; Training, etc		Agricultural Training, etc
			- Program 135; Bridge	2006	
12	Nam Ma Dao	Dao	No Information		
13	Can Ty 1	Mong	- Program 05; Rooftop Provide		Provide Rooftop for poor households
			- Program 05; Domestic Water Tank for Poor HH		Provide 500 liter Water Tank for poor househods
			- Program 05; TV set		One set of TV
14	Can Ty 2	Mong	- Program 135; Water Supply Project		Total 4 Water Tanks (One tank is out of order)
			- Program 500; Primary School Construction	2006	2 Classrooms
			- Program 05; Rooftop Provide		Provide Rooftop for poor households
			- Program 05; Domestic Water Tank for Poor HH		Provide 500 liter Water Tank for poor househods
15	Can Ty 3	Mong	- Program 135; Water Supply Project		Total 4 Water Tanks (3 tanks are out of order)
			- Program 186; Primary School Construction	2006	3 Classrooms
			- Program 05; Rooftop Provide		Provide Rooftop for poor households
			- Program 05; Domestic Water Tank for Poor HH		Provide 500 liter Water Tank for poor househods
			- Program 05; Credit Loan		7,000,000VND/H in 3 year, interest rate 0.6%/year. Gov support 70% interest
16	Pa Pao	Mong	- Program 05; Rooftop Provide		Provide Rooftop for poor households
			- Program 05; Training, etc		Agricultural Training, Provide fertilizer, medicine, etc.
			- EU, Transportation Road	2003	Ma Quai Thang, Can Ho, Vang Bon, Co Cooc, Pa Pao

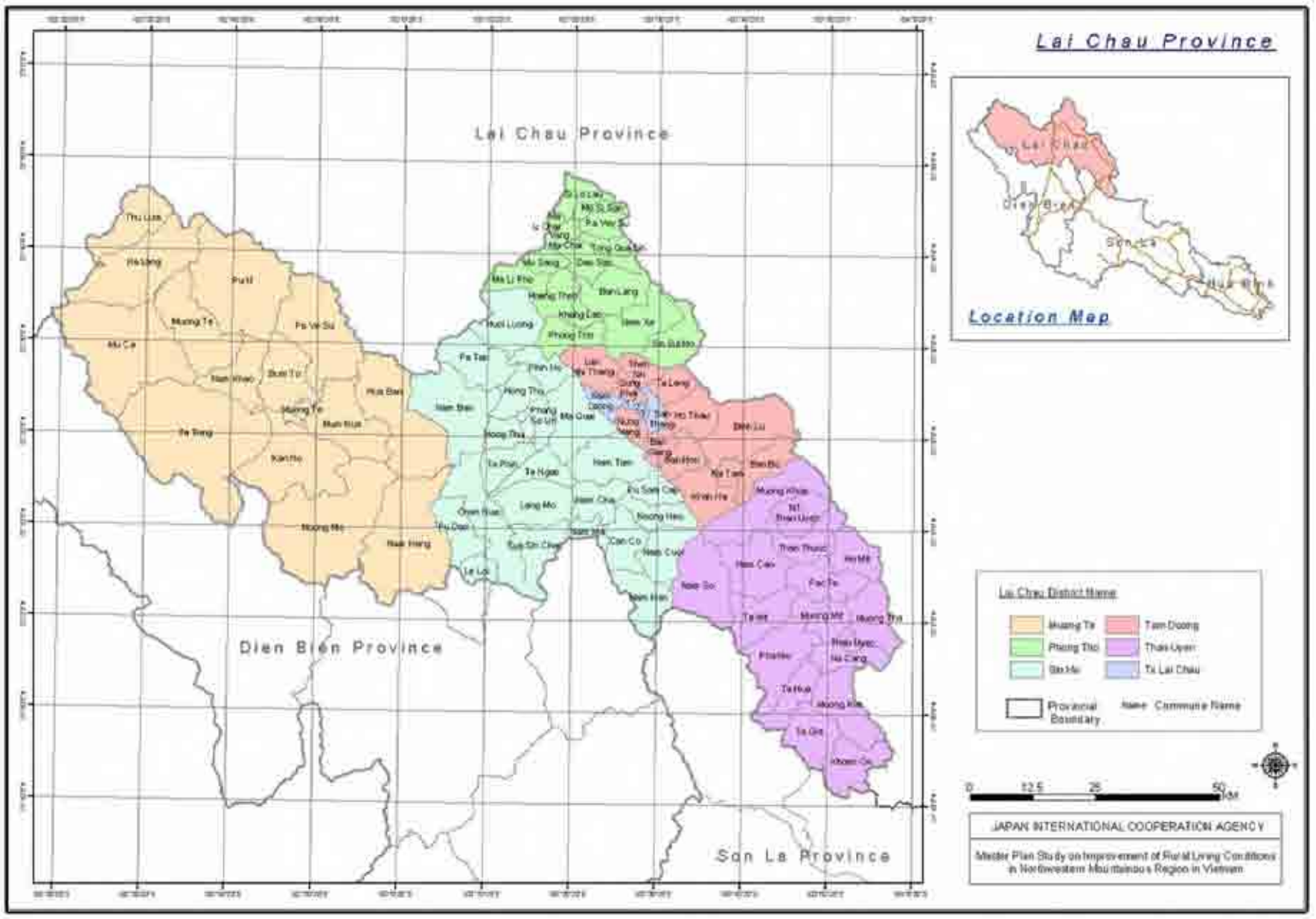


Figure 7.3.10 Location Map of Communes in Lai Chau Province

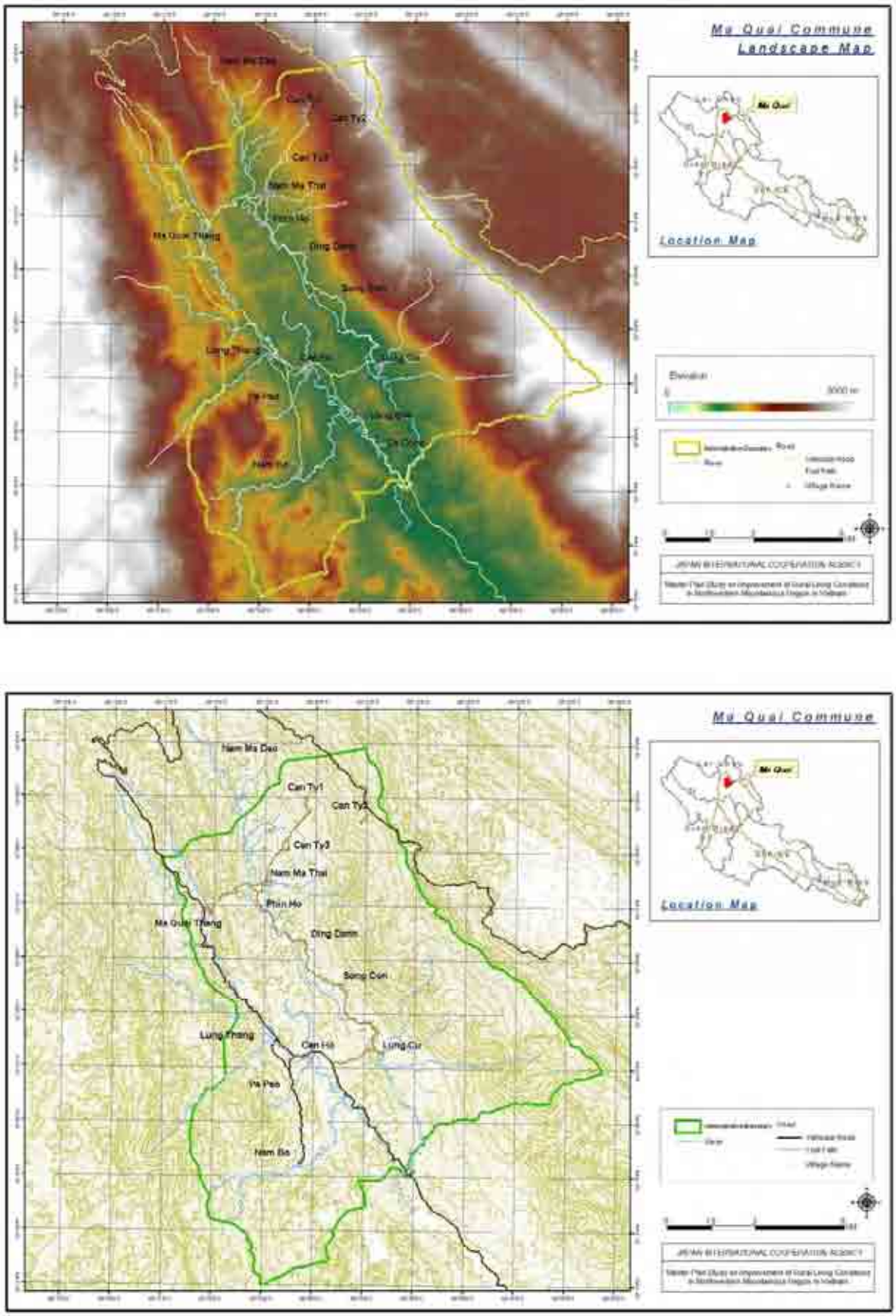


Figure 7.3.11 Topographic Map and Village Location Map of Ma Quai Commune

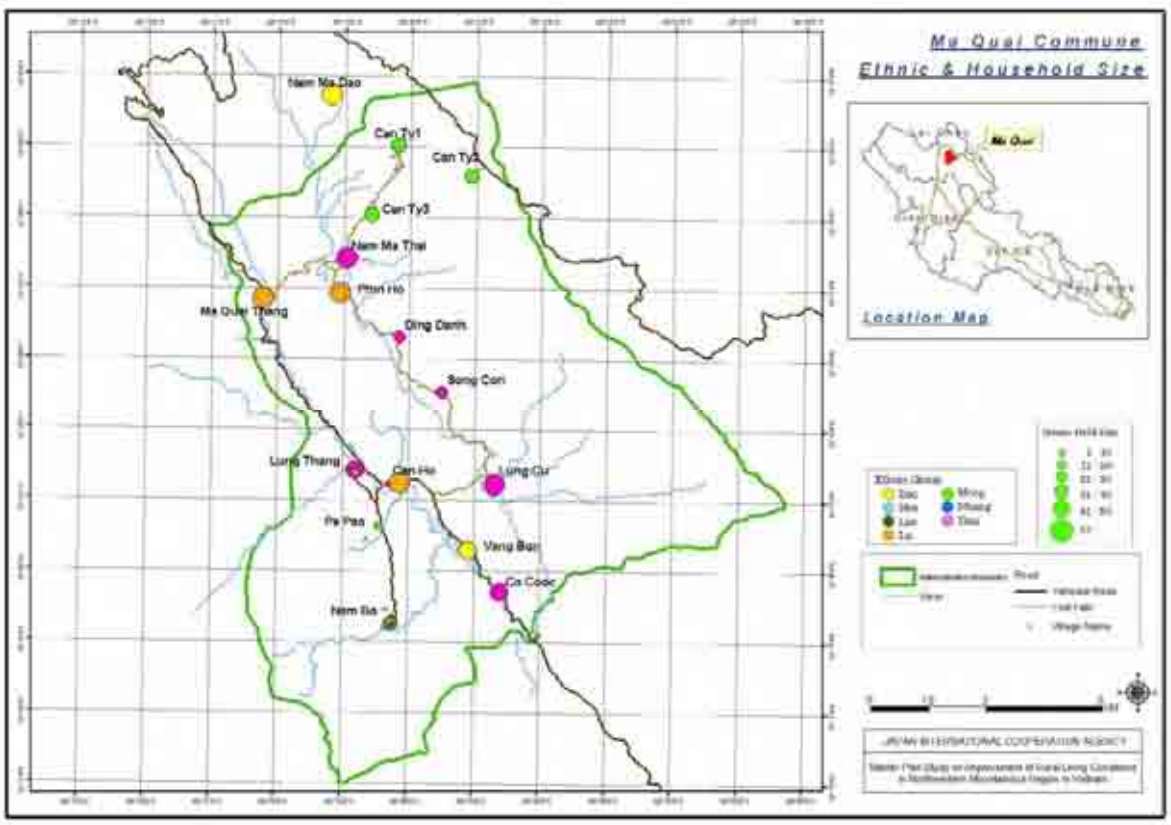


Figure 7.3.12 Ethnic Group and Number of Household Map

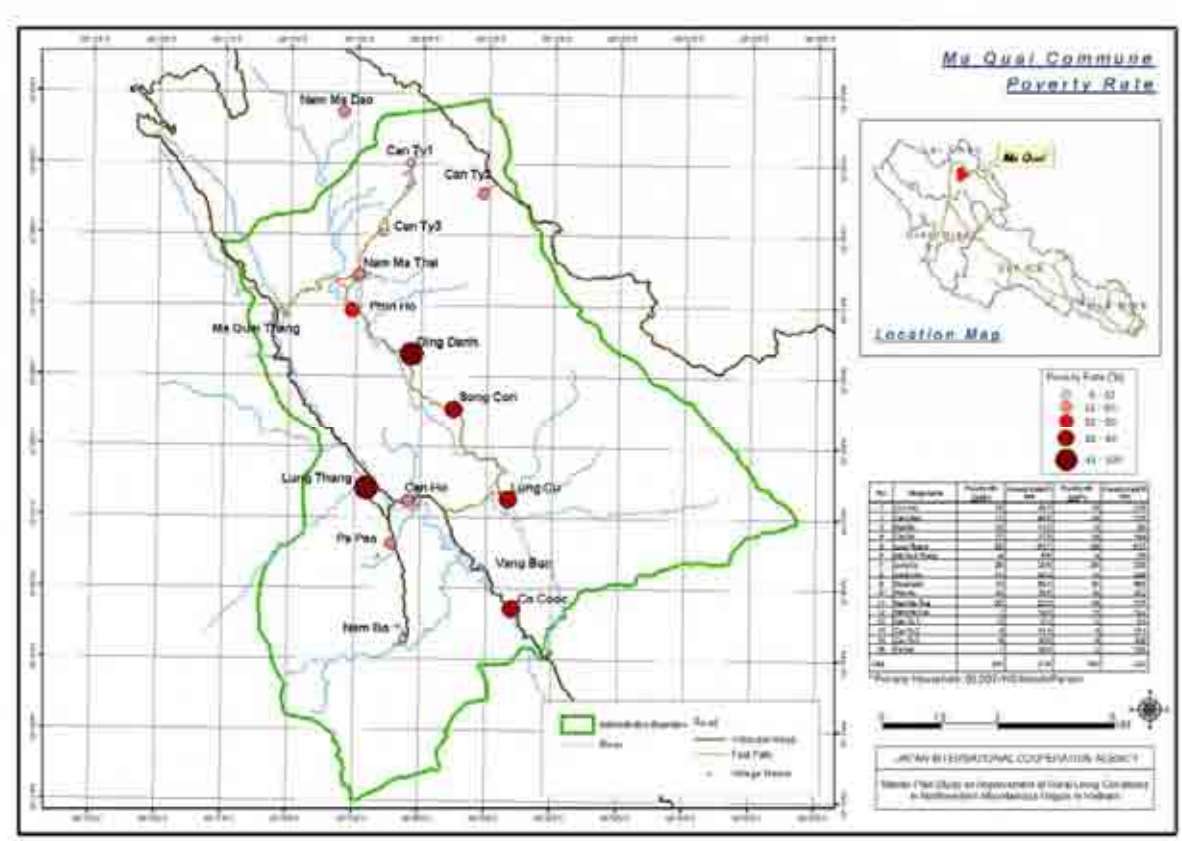
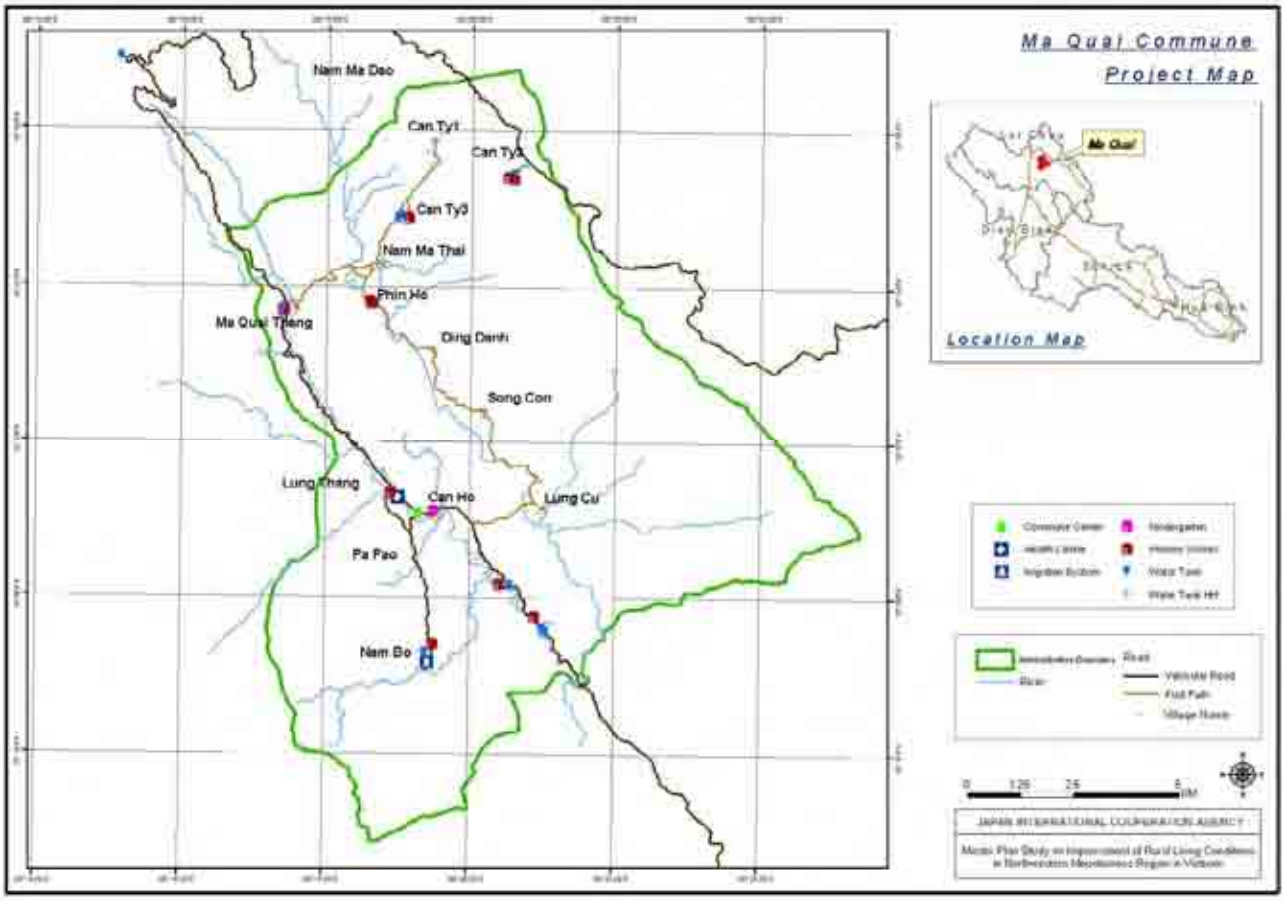
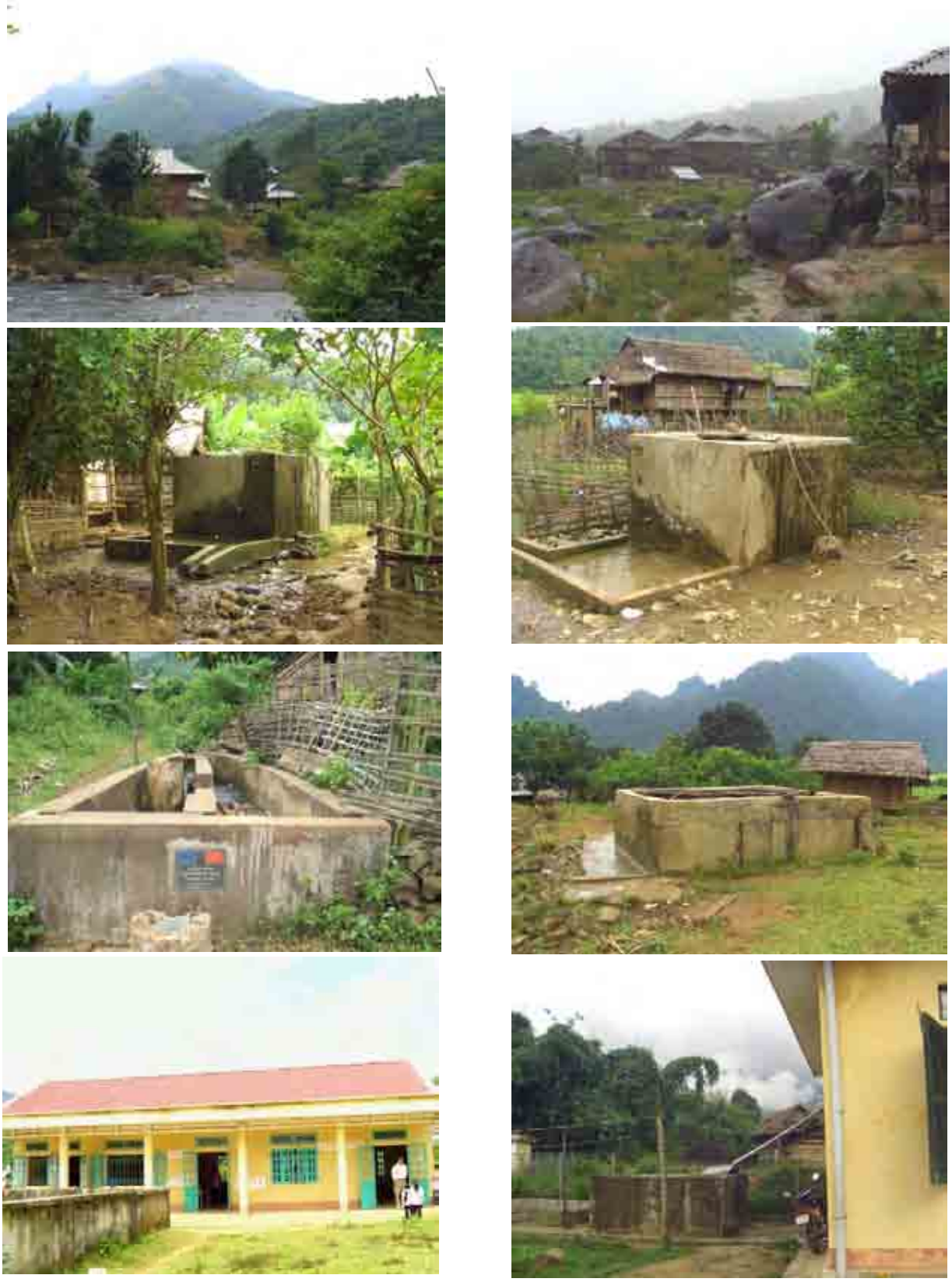


Figure 7.3.13 Village Poverty Rate Map



NO	Village Name	Ethnic Group	Project
1	Co Cooc	Thai	- EU; Water Supply Project - Program 135; Primary School Construction - Program 05; Rooftop Provide - EU; Transportation Road
2	Van Bon	Dao	- EU; Water Supply Project - Program 135; Primary School Construction - EU; School Construction - Program 05; Rooftop Provide - EU; Transportation Road
3	Nam Bo	Thai Lu Mong Dao Nhang Hoa Lao	- Program 135; Water Supply Project - EU; Irrigation System - EU; School Construction - Program 05; Provide fertilizer - Program 05; Rooftop Provide - EU; Transportation Road
4	Can Ho	Lu Thai	- Program 135; Water Supply Project - Program 135; Primary School Construction - Program 135; Upper Primary School Construction - Program 135; Kindergarten Construction - Program 135; Health Center - Program 186; House of Health Office - Resolute 37; Teachers House - Program 05; Rooftop Provide - EU; Transportation Road
5	Lung Thang	Thai Mong Dao	- Program 159; Primary School Construction - Program 05; Rooftop Provide - EU; Transportation Road
6	Ma Quai Thang	Lu	- EU; Primary School Construction - EU; Water Supply Project - Program 05; Rooftop Provide - EU; Transportation Road
7	Lung Cu	Mong Thai	- Program 135; Irrigation System - Program 159; Primary School Construction - Program 05; Rooftop Provide
8	Song Con	Thai	- Program 05; Rooftop Provide - Program 05; Training
9	Ding Danh	Thai	- Program 05; Rooftop Provide - Program 05; Domestic Water Tank for Poor HH - Program 05; TV set - Program 05; Training
10	Phin Ho	Lu	- Program 159; Primary School Construction - Program 05; Rooftop Provide - Program 05; Domestic Water Tank for Poor HH - Program 05; Training, etc
11	Nam Ma Thai	Thai	- Primary School; by Government - EU; Primary School Construction - Program 05; Rooftop Provide - Program 05; Domestic Water Tank for Poor HH - Program 05; Training, etc - Program 135; Bridge
12	Nam Ma Dao	Dao	No Information
13	Can Ty 1	Mong	- Program 05; Rooftop Provide - Program 05; Domestic Water Tank for Poor HH - Program 05; TV set
14	Can Ty 2	Mong	- Program 135; Water Supply Project - Program 500; Primary School Construction - Program 05; Rooftop Provide - Program 05; Domestic Water Tank for Poor HH
15	Can Ty 3	Mong	- Program 135; Water Supply Project - Program 186; Primary School Construction - Program 05; Rooftop Provide - Program 05; Domestic Water Tank for Poor HH - Program 05; Credit Loan
16	Pa Pao	Mong	- Program 05; Rooftop Provide - Program 05; Training, etc - EU; Transportation Road

Figure 7.3.14 Location Map of Facilities provided by Poverty Reduction Programs



1st : General View of Ma Quai Commune (left & right)
2nd : Water Supply Project (properly working: left & right)
3rd : Irrigation project (left), Water supply project (right)– EU funded projects
4th : School by EU Fund (left), School and water tank by the Government of Vietnam (right)

Figure 7.3.15 Photograph of Field Survey in Ma Quai Commune

7.3.4 Chieng Khoang Commune in Son La Province

(1) Basic information organized by GIS application

The Study Team arranged exisitng key information of socioeconomic conditions in the commune, and collected a list of rural infrastrucutres provided by poverty reduction programs from DARD, DPC and CPC with interviewing to local government officers. Then, the Study Team prepard a GIS database, while exact position of the villages and facilities were verified by visiting each location using GPS. The collected data and information are presented in the following pages.

(2) Result of GIS Based Field Survey

Chieng Khoang Commune extends from east to west long, and 15 villages including Khoang that is the commune center are located along the road No. 107 on the east side of commune. On the other hand, four villages located on the west side are connected with the accsess road which come from Phong Lai Commune, Thuan Chau district. Phong Lai Commune is connected not the road No. 107 but No. 6, therefore the east side and the west side of Chieng Khoang Commune are belonged to the different livelihood sphere. There are ranges of mountain between villages in east and west, and when intercommunicate commune, it is necessary to use inner-commune footpath of two or three hours walk or to use 50km way by motorable road.

To sum up the matter, Chien Khoang Commune is one commune, however the actual condition of this commune is devided into parts to the east side and the west side, and it can be said that the livelihood sphere of both sides are totally different.

The poverty reduction programs in the commune provided various types of assistance were executed as same with other communes that the Study Team conducted in other province. However, the all poverty reduction programs were supported by the government, and there is no support program of foreign donors such as EU and NGOs. Key findings can be summarized as flows.

1) Gap of eastern side and western side of Commune

Four villages (Son, Phieng Tau, Ban Ly, Hua Ly) are located near the road No. 6 which is close to Chieng Pha Commune, Thuan Chau district than the commune center of Chieng Khoang Commune, therefore these four villages are set their life based on Chieng Pha Commune. It seems that enough support had not been received in these four villages because it was away from the center of commune though four remote area villages were under Chieng Khoang Commune on the administration. As for the poverty reduction programs actually executed in four villages were only small scale projects such as provided the roof top material and the water tank to the poor household though it can be said that this four villages are classified into the poverty area in Chieng Khoang Commune, the electrification rate is 0% and the average of poverty rate is exceeding 50%.

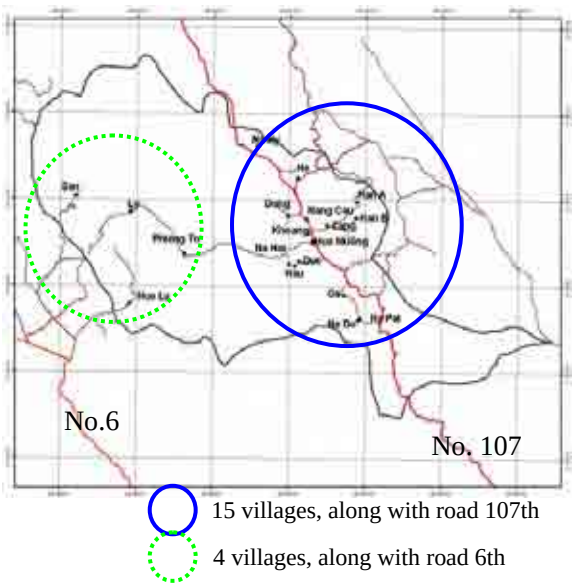


Figure 2.3.16 Chieng Khoang

2) Issues in construction of school

There are only two schools are constructed in Chieng Khoang Commune, one school is located in the commune center (eastern side) for 15 villages and the other is in Ban Ly village (western side) for four villages though the primary school was constructed in almost every village by the support of the government or other donor agencies in Muong Phang Commune, Dien Bien province and Ma Quai Commune, Lai Chau province. Therefore, some students are forced on one hour or one and a half hour walk to school every day.

3) Demand for electrification project

The Study team conducted the interview survey to each village that the priority project of this village in the future. Many villages answered that they need the electrification project. Such an opinion was able to be understood for six villages including four villages on western side because of 0% at a present electrification rate of these areas, yet there were same opinions to hope for the electrification project with electrification rate never low villages. The reasons to hope for the electrification project are as follows.

i) Electricity is not stably supplied in the electrified villages
ii) The reasonable amount of electricity is not supplied in the electrified villages
iii) There are some households where electricity cannot be used though their villages has already been electrified

Thus, the issues shown in the above-mentioned has been exposed in the electrified villages, however such issues are not reported to the government under the present situation. It is difficult for electrified villages to introduce the new electricity project in the future. This can be said that there are issues in the lack of monitoring and evaluation sysytem of the project, and in an absence of villagers who are beneficiary of the project.

Table 7.3.5 Outline of Chieng Khoang Commune

Chieng Khoang commune

No.	Name of village	Ethnic Group	Total HH	Population	Poverty HH	Poverty Rate (%)	Electricity Supply (%)	Project
1	Na Do	Thai	56	325	24	42.9		1, 2, 3
2	Na Pat	Thai	60	351	23	38.3		1, 3, 9
3	Ca	Thai	60	368	25	41.7	80.0	1, 2, 3
4	Duc	Thai	63	398	30	47.6		1, 2, 3
		Kinh	1	5	0	0.0		
5	Hua	Thai	68	356	29	42.6	45.0	1, 3, 5, 6
6	Na Hoi	Thai	41	221	18	43.9	48.8	1, 3, 5, 6
7	Hua Muong	Thai	43	257	23	53.5	93.0	3, 4, 7
		Kinh	15	72	0	0.0	100.0	
8	Khoang	Thai	44	214	20	45.5	65.9	3, 6, 7
9	Nang Cau	Thai	45	245	20	44.4	33.3	1, 3, 4, 7
10	Cang	Thai	44	232	18	40.9	56.8	1, 3, 4, 7
11	Han A	Thai	77	425	30	39.0	50.0	1, 3, 4, 6
12	Han B	Thai	79	438	30	38.0	25.0	1, 3, 4, 6, 8
		Kinh	1	1	0	0.0		
13	He	Thai	62	369	16	25.8	47.6	1, 3, 4, 5, 6
		Kinh	1	2	0	0.0		
14	Na Hy	Thai	57	309	25	43.9	0.0	1, 3, 8
15	Dong	Thai	72	409	30	41.7	0.0	3, 6
16	Phieng Tau	Thai	35	915	16	45.7	0.0	3
17	Ly	Thai	105	597	45	42.9	0.0	1, 3, 6
18	San	Thai	78	438	35	44.9	0.0	1, 3
19	Hua Ly	H'Mong	9	47	8	88.9	0.0	3, 10
Total			1,116	6,994	465	44.8	34.0	

Ethnic Group	Total HHs	Ethnic Rate (%)	Poverty (HH)	Poverty Rate (%)	Electricity Supply (%)
Thai	1,089	97.6	457	42.0	40.3
Kinh	18	1.6	0	0.0	100.0
H'Mong	9	0.8	8	88.9	0.0
Total	1116		465	41.7	39.6

1	Program 925:	Water Supply (Water tank or Well)
2	Program 925:	Irrigation Program
3	Program 135:	Rooftop Provide
4	Program 134:	Sanitation Program (Loan)
5		Father Land Front Fund (Loan)
6	Road Construction	Government Program
7	Irrigation and Weir	Rural Infrastructure Sector Project
8	Training Program	Agricultural Training or Provide seed, fertilizer
9	Plantation Program	Oil, Rubber
10	Program 135:	Water Supply (Water tank or Well)

Table 7.3.6 Project List of Poverty Reduction Programs in Chieng Khoang Commune

Project List of Chieng Khoang Commune

Updated by December 2007

NO	Village Name	Ethnic Group	Project	Year	Memo
1	Na Do	Thai	- Program 925; Irrigation Program	2004	Na Do -> Ca -> Duc -> Na Hoi -> Hua (total 2 km)
			- Program 135; Rooftop Provide		2 HH
			- Program 925; Water Supply	2000	**Not Working** (water tank and connection pipe)
2	Na Pat	Thai	- Program 925; Water Supply	2000	**Not Working** (water tank and connection pipe)
			- Program 135; Rooftop Provide		2 HH
			- Planntation Program; Oil Seed	2008	2.7 ha in Na Pat Village
			- Planntation Program; Rubber Tree	2008	(Plannning) 15 ha in Na Pat Village, 540ha in Commune
3	Ca	Thai	- Program 925; Irrigation Program	2004	Na Do -> Ca -> Duc -> Na Hoi -> Hua (total 2 km)
			- Program 925; Water Supply		**Not Use** (Bad Water quality)
			- Program 135; Rooftop Provide		2 HH
4	Duc	Thai Kinh	- Program 925; Irrigation Program	2004	Na Do -> Ca -> Duc -> Na Hoi -> Hua (total 2 km)
			- Program 925; Water Supply		30 HH (Water tank material)
			- Program 135; Rooftop Provide		3 HH
5	Hua	Thai	- Program 925; Irrigation Program	2004	Na Do -> Ca -> Duc -> Na Hoi -> Hua (total 2 km)
			- Program 135; Rooftop Provide		5 HH
			- Program 925; Access Road		950 m village road (Government provide material, Hua and Na Hoi)
			- Father Land Front Fund; Loan	2006	6,000,000 VND (Interest charge 0.65%), 2HH (Toilet, Bathroom, Water Tank)
			- Program 925; Irrigation Sysytem	2004	4 ha irrigation, Weir and water channel for Hua and Na Hoi village
6	Na Hoi	Thai	- Program 925; Irrigation Program	2004	Na Do -> Ca -> Duc -> Na Hoi -> Hua (total 2 km)
			- Program 925; Access Road		950 m village road (Government provide material, Hua and Na Hoi)
			- Program 135; Rooftop Provide		1 HH
			- Program 925; Irrigation Sysytem	2004	4 ha irrigation, Weir and water channel for Hua and Na Hoi village
7	Hua Muong	Thai Kinh	- Rural Infrastructure Sector Project; Irrigation and Weir	1970/2004	This system cover Cong, Hua Muong, Khoang and Nang Cau
			- Program 135; Rooftop Provide		5 HH
			- Program 134; Sanitation Program		6,000,000 VND (Interest charge 0.65%), 6HH (Toilet, Bathroom, Water Tank)
			- Sub station		Provide electricity Cang, Khoang, Nang Cau and Hua Muong
8	Khoang	Thai	- Accsess Road Construction		Village Center to Han A
			- Rural Infrastructure Sector Project; Irrigation and Weir	1970/2004	This system cover Cong, Hua Muong, Khoang and Nang Cau
			- Program 135; Rooftop Provide		10 HH
			- House Provide		1 HH. Gov supply one house
			- Water Pomp Station		Under construction, supply 15 villages
9	Nang Cau	Thai	- Rural Infrastructure Sector Project; Irrigation and Weir	1970/2004	This system cover Cong, Hua Muong, Khoang and Nang Cau
			- Program 134; Sanitation Program		6,000,000 VND (Interest charge 0.65%), 3HH (Toilet, Bathroom, Water Tank)
			- Program 135; Rooftop Provide		4HH
			- Program 925; Well	2001	2HH use.
			- Program 92; Well	2000	Rural Water Supplyu Program ; Not for drinking
			- National Grid Connection; Loan		2,000,000 - 2,500,000 VND / HH, Connect to the National Grid
10	Cang	Thai	- Program 925; Well	2000	**Not Use** (Bad Water quality)
			- Program 135; Rooftop Provide		4HH, 1HH from Fatherland Front Program, 1 or 2 HH / Year
			- Rural Infrastructure Sector Project; Irrigation and Weir	1970/2004	This system cover Cong, Hua Muong, Khoang and Nang Cau
			- Program 134; Sanitation Program		6,000,000 VND (Interest charge 0.65%), 2 HH (Toilet, Bathroom, Water Tank)
11	Han A	Thai	- Accsess Road Construction		Village Center to Han A
			- Program 925; Water Supply	2000	1 Water source share with Han B
			- Irrigation + Water Supply	2004	Government Program, Irrigation Sysytem + Public Bath + Water Supply
			- Program 135; Rooftop Provide		5HH, 1 family / Year (5 years)
			- Program 134; Sanitation Program	2006	6,000,000 VND (Interest charge 0.65%), 12HH (Toilet, Bathroom, Water Tank)
			- Extension Program (Training)	2000, 2007	Agricultural Technical Training (include provide seed)
12	Han B	Thai Kinh	- Accsess Road Construction		Village Center to Han A
			- Program 135; Rooftop Provide		8HH, 1HH from Fatherland Front Program, 1 or 2 HH / Year
			- Program 925; Water Supply	2000	1 Water source share with Han A
			- Program 134; Sanitation Program	2006	6,000,000 VND (Interest charge 0.65%), 6 HH (Toilet, Bathroom, Water Tank)
			- Father Land Front Fund; Loan	2006	6,000,000 VND (Interest charge 0.65%), 1HH (Toilet, Bathroom, Water Tank)
13	He	Thai Kinh	- Program 925; Water Supply	2002	**Not Working**, 3 Water tank and 1 pipe line (6 months)
			- Program 135; Rooftop Provide		3 HH, 1 family / Year
			- Program 134; Sanitation Program	2006	6,000,000 VND (Interest charge 0.65%), 5 HH (Toilet, Bathroom, Water Tank)
			- Father Land Front Fund; Loan	2006	6,000,000 VND (Interest charge 0.65%), 1 HH (Toilet, Bathroom, Water Tank)
14	Na Hy	Thai	- Program 925; Water Supply	2000 / 2002	4 Well
			- Extension Program (Training)	2000, 2007	Agricultural Technical Training (include provide seed)
			- Program 135; Rooftop Provide		4HH
15	Dong	Thai	- Program 135; Rooftop Provide		5 HH, 1 family / Year
			- Program 925; Accsess Road	2003	Government provide material
16	Phieng Tau	Thai	- Program 135; Rooftop Provide		1 HH
17	Ly	Thai	- Program 925; Water Supply	2000	Government provide material of Water tank, bathroom and toilet
			- Program 135; Rooftop Provide		19 HH
			- Road update; Paved and Wide		Government provide material, Update the accsess road from Ly to Commune Center
18	San	Thai	- Program 925; Water Supply		Water Tank, Government provide material
			- Program 135; Rooftop Provide		12 HH
19	Hua Ly	H'Mong	- Program 135; Rooftop Provide		3 HH
			- Program 135; Water Supply	2006	2 Water tank
			- Water supply; material provide		5 Water tank material
			- Small Bridge construction	2005	3 small bridges in this village
			- Health; Mosquito Net		Government provide one mosquito net for each household

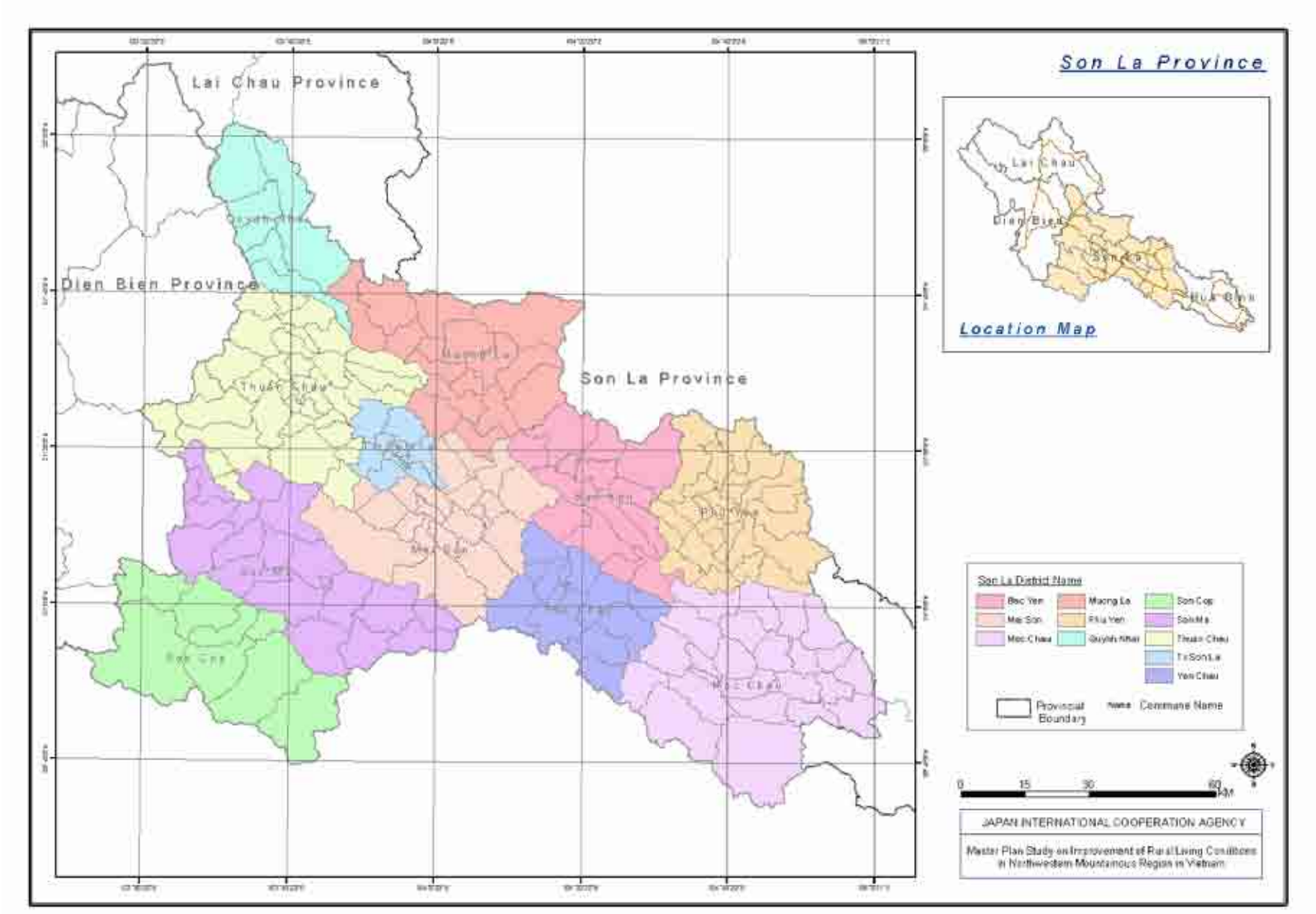


Figure 7.3.17 Location Map of Communes in Son La Province

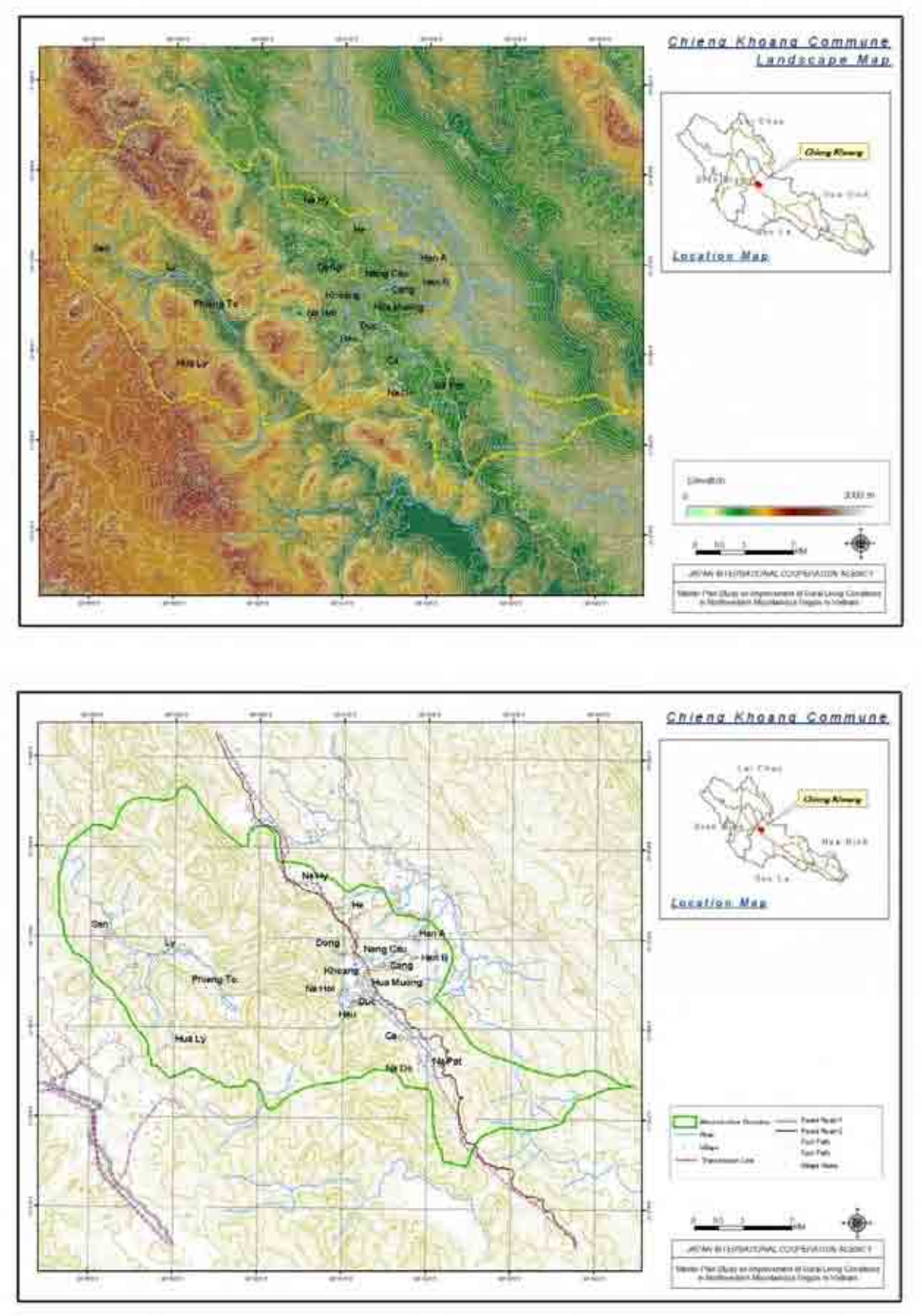


Figure 7.3.18 Topographic Map and Village Location Map of Chieng Khoang Commune

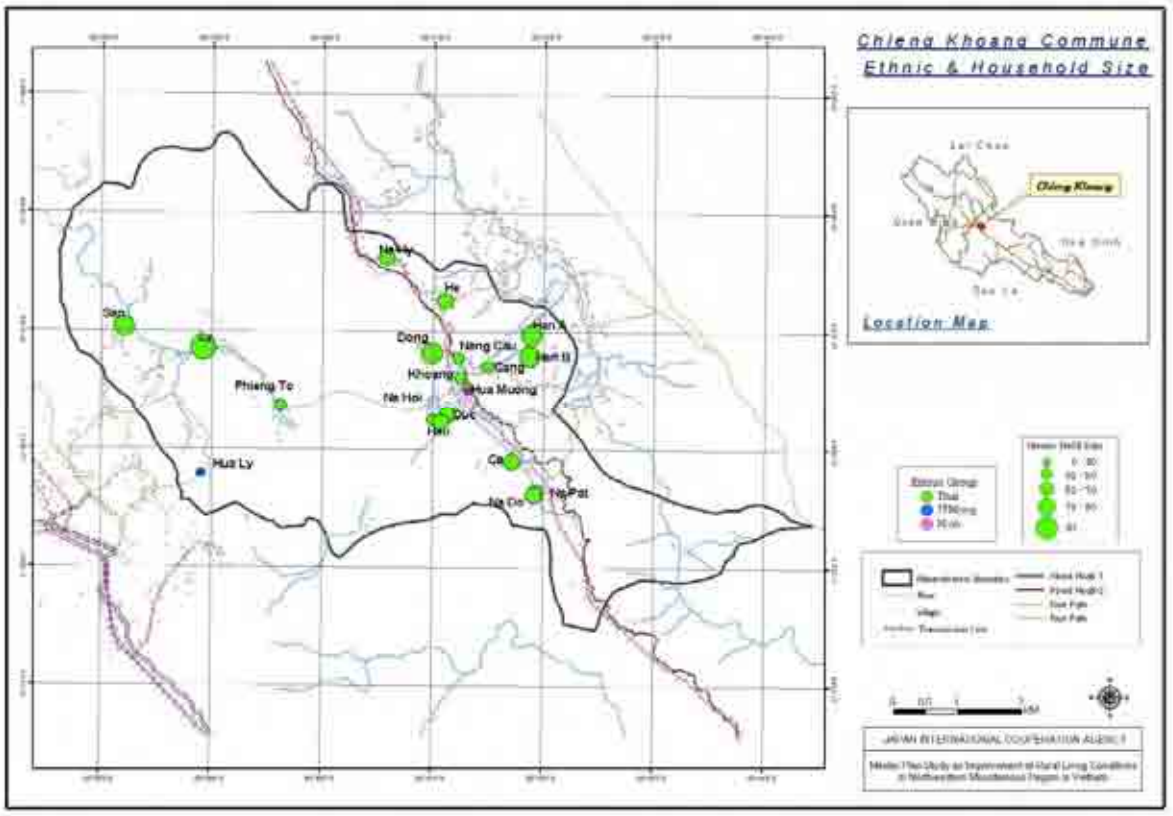


Figure 7.3.19 Ethnic Group and Number of Household Map

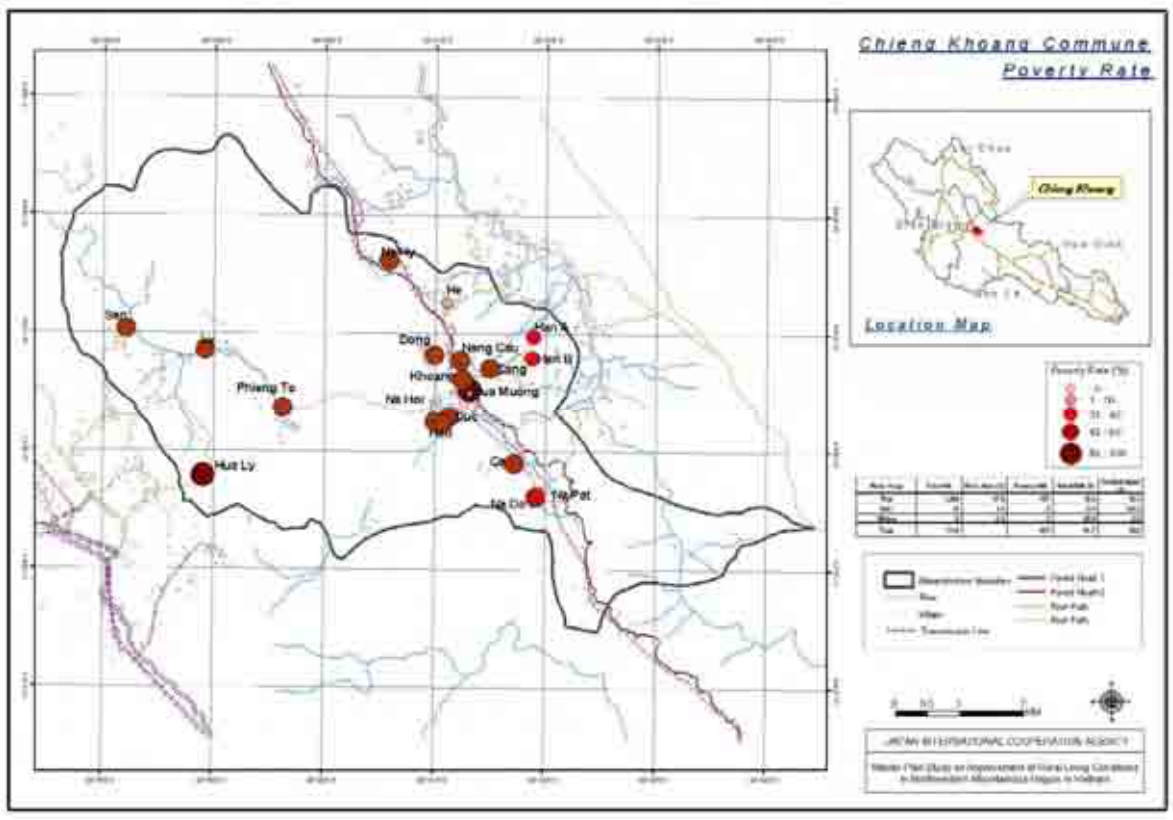
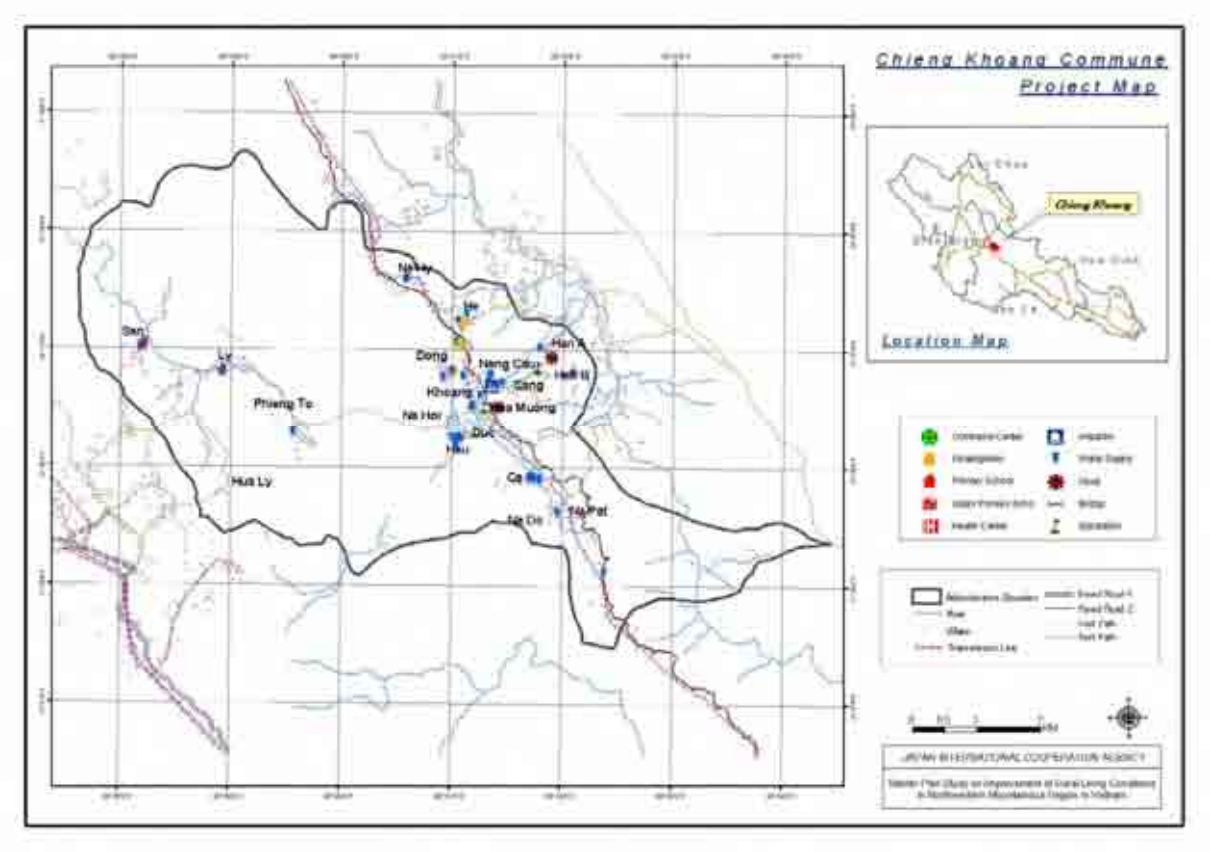


Figure 7.3.20 Village Poverty Rate Map



NO	Village Name	Ethnic Group	Project
1	Na Do	Thai	- Program 925; Irrigation Program - Program 135; Rooftop Provide - Program 925; Water Supply
2	Na Pat	Thai	- Program 925; Water Supply - Program 135; Rooftop Provide - Planntation Program; Oil Seed - Planntation Program; Rubber Tree
3	Ca	Thai	- Program 925; Irrigation Program - Program 925; Water Supply - Program 135; Rooftop Provide
4	Duc	Thai Kinh	- Program 925; Irrigation Program - Program 925; Water Supply - Program 135; Rooftop Provide
5	Hau	Thai	- Program 925; Irrigation Program - Program 135; Rooftop Provide - Program 925; Access Road - Father Land Front Fund; Loan - Program 925; Irrigation Sysytem
6	Na Hoi	Thai	- Program 925; Irrigation Program - Program 925; Access Road - Program 135; Rooftop Provide - Program 925; Irrigation Sysytem
7	Hua Muong	Thai Kinh	- Rural Infrastructure Sector Project; Irrigation and Weir - Program 135; Rooftop Provide - Program 134; Sanitation Program - Sub station
8	Khoang	Thai	- Accsess Road Construction - Rural Infrastructure Sector Project; Irrigation and Weir - Program 135; Rooftop Provide - House Provide - Water Pomp Station
9	Nang Cau	Thai	- Rural Infrastructure Sector Project; Irrigation and Weir - Program 134; Sanitation Program - Program 135; Rooftop Provide - Program 925; Well - Program 92; Well - National Grid Connection; Loan

NO	Village Name	Ethnic Group	Project
10	Cang	Thai	- Program 925; Well - Program 135; Rooftop Provide - Rural Infrastructure Sector Project; Irrigation and Weir - Program 134; Sanitation Program
11	Han A	Thai	- Accsess Road Construction - Program 925; Water Supply - Irrigation + Water Supply - Program 135; Rooftop Provide - Program 134; Sanitation Program - Extension Program (Training)
12	Han B	Thai Kinh	- Accsess Road Construction - Program 135; Rooftop Provide - Program 925; Water Supply - Program 134; Sanitation Program - Father Land Front Fund; Loan
13	He	Thai Kinh	- Program 925; Water Supply - Program 135; Rooftop Provide - Program 134; Sanitation Program - Father Land Front Fund; Loan
14	Na Hy	Thai	- Program 925; Water Supply - Extension Program (Training) - Program 135; Rooftop Provide
15	Dong	Thai	- Program 135; Rooftop Provide - Program 925; Accsess Road
16	Phieng Tau	Thai	- Program 135; Rooftop Provide
17	Ly	Thai	- Program 925; Water Supply - Program 135; Rooftop Provide - Road update; Paved and Wide
18	San	Thai	- Program 925; Water Supply - Program 135; Rooftop Provide
19	Hua Ly	H'Mong	- Program 135; Rooftop Provide - Program 135; Water Supply - Water supply; material provide - Small Bridge construction - Health; Mosquito Net

Figure 7.3.21 Location Map of Facilities provided by Poverty Reduction Programs








1st : General View of Chieng Khoang Commune (left & right)
2nd : Water Supply Project (left & right)
3rd : Irrigation project (left), Water supply project (right)
4th : School for 4 villages (left), Commune road supported by villagers (right)

Figure 7.3.22 Photograph of Field Survey in Chieng Khoang Commune

7.3.5 Cao Son Commune in Hoa Binh Province

(1) Basic information organized by GIS application

The Study Team arranged exisitng key information of socioeconomic conditions in the commune, and collected a list of rural infrastrucutres provided by poverty reduction programs from DARD, DPC and CPC with interviewing to local government officers. Then, the Study Team prepard a GIS database, while exact position of the villages and facilities were verified by visiting each location using GPS. The collected data and information are presented in the following pages.

(2) Result of GIS Based Field Survey

Cao Son Commune accepted the residents from the Hoa Binh dam reservor area and three villages out of nine, in other word, 40% of residents of this commune were resettlemente people. The ressetlment project have gradually carried out since 1982, and 20 years has already passed from the project start. Some support projects including the electricity install were bing excuted in this commune as for accepting the relsettlement people commune named “Resettlement Area Support Project” by the government”. In addition, school construction, water supply, and afforestation project, etc. were excuted as in return the residents who lived originally in this commune who offered their land to the government. Except two World Bank fund project, more than 90% implemented projects in this commune were supported by the government though this commune located near the capital city of Hoa Binh province and most of villages are bounded to the traffic road. Key findings can be summarized as follows.

1) The government support program for commune which accepted the resettlement people

   The government conducted the support program to this commune for accepting the resettlement people from Da reservoir area named “Project on socio-economic stabilization and development for resettles from Da reservoir”. This project provided 100% electricity not only middle voltage distribution line but also low voltage in-house line, water supply system and reforestation project, etc.

2) Issues in government programs of supporting for the resettlement people

Agricultural training was executed to the resettlement people as a part of social economic program for their stability of new land. This training finished in two years, and after training ended, the crops were reaped from the training fields and other crops were planted by residents. According to the CPC officer, residents would select and judge the crops which were more appropriate for their new land and high value as a commercial crop than the training crops. One problem of agricultural training by guidance of the government was brought into relief.

3) Issues in water supply project

Typhoon No.5 hit the Hoa Binh province in October, 2007, and it dealt a serious blow to Cao Son Commune. This typhoon gave serious damage to water supply facilities in Cao Son Commune. Thirty one facilities out of 57 which were installed by the government program 474 were broken of the water pipe that connects to the water source to tank, however there is no plan to repair of these facilities. Moreover, in the water supply facilities operating now, it is impossible to use them as a drinking water but use for only the washing and bathing because agricultural chemicals, the fertilizer, and the wastewater get mixed with the water tank. The officers of Cao Son Commune mentioned that the priority project of this commune is the water supply project including the repair and enhancing existing water supply facilities. Now they try to request the support to the government and also to Japanese Government.

4) School construction project

As for Cao Son Commune that has dispersed villages, one primary school is set up in each village except Seo village; however students in Seo village are able to walk to the commune center primary school. Six out of eight primary schools were constructed with support of the government or other foreign donor's and two remainders were constructed by the resident's contribution in the village. The primary school in Rang village which is supported by the Vietnamese government is located at the entrance of the village touched in the traffic road. The center of this village is 2 km away from the entrance; therefore it takes one and a half hours to go to school everyday for students. Then there was a village where a new primary school was constructed by the support of a Japanese private company.

Figure 7.3.23 Old school building (left) and new school building (right) supported by Japanese private companey

In Tam village, a new school building was constructed with the support of the project which construct of schools in regions in Vietnam lacking such facilities.

(refer to web page, http://web.canon.jp/scsa/education/vietnam_aid/index.html)

Table 7.3.7 Outline of Cao Son Commune

Cao Son commune

No.	Name of village	Ethnic Group	Total HH	Poverty HH	Poverty Rate (%)	Electricity Supply	Resettlement	Project
1	Sung	Dao	52	38	73.1	100%		6, 7, 8
2	Bai	Dao	56	42	75.0	100%		6, 7, 8
3	Son Lap	Muong	49	27	48.9	100%	100%	6
4	Tam	Dao	75	41	54.7	100%		2, 6
5	Lanh	Tay	51	37	72.5	100%		2, 6, 7
6	Na Chieu	Muong	112	40	35.7	100%	100%	2, 6
7	Son Phu	Muong	190	100	52.6	100%	100%	6
8	Rang	Tay	85	60	70.6	100%		2, 6
9	Seo	Muong	83	83	100.0	100%		6
		Kinh	90	0	0.0			
Total			843	468	55.5	100%		

Ethnic Group	Total HHs	Ethnic Rate (%)	Poverty (HH)	Poverty Rate (%)	Electricity Supply (HH)	Electricity Supply (%)
Kinh	90	10.7	0	0.0	90	100.0
Dao	183	21.7	121	66.1	183	100.0
Muong	434	51.5	250	56.9	434	100.0
Tay	136	16.1	97	71.3	136	100.0
Total	843		468	55.2	843	100.0

1 Program 134:	Support programs for cultivation land, residential land, house and domestic water
2 Program 135※1:	Support programs for electricity supply , roads, schools, health stations, inter-commune centers, and training.
3 Protection of soil erosion on slope land	Technical transfer on plantation and forest plantation.
4 Aquaculture Development in the Northern Uplands of Vietnam (VIE/98/009/01/NEX)	Support for aquaculture cultivation
5 FFI Vietnam Program	Support program for protecting limestone range and its wildlife
6 Project 472※2:	Project on socio-economic stabilization and development for resettlers from Da reservoir
7 Project 661	National Targeted Project on Reforestation of 5 million ha
8 Plantation	Program for Fixed cultivation and permanent settlement
9 World Bank Project:	Road upgrade

Table 7.3.8 Project List of Poverty Reduction Programs in Cao Son Commune

Project List of Cao Son Commune

Updated by December 2007

NO	Village Name	Ethnic Group	Project	Year	Memo
1	Sung	Dao	- Gov; Health Center	2002	27m2, 1 or 2 time/month
			- Primary School	2000	Government provide material and labor fee
			- Prigram 747(472); Water Supply	2002	Total 6 Tanks
			- Program 135; Access Road	2003	Total 4km Accsess road, Bai to Sung
			- Program 661; Plantation		Forest Plantation total 8ha
			- Program 135; Plantation	2003-2005	Tea Plantation; 15ha(2003), 10ha(2004), 15ha(2005)
			- Irrigation System		300m irrigation channel, 3ha irrigated
			- World Bank; Water Supply Project		Update the existing water supply system
2	Bai	Dao	- Program 135; Access Road	2003	Total 4km Accsess road, Bai to Sung
			- Program 134; House Construction Support		6,000,000 VND , 6 HH
			- Poverty Reduction Program; Kindergarten	2006	
			- Poverty Reduction Program; Primary School	2006	
			- Prigram 747(472); Water Supply		Total 5 Tanks, Not Working (All tanks were destroyed by the typhoon in Oct, 2007)
3	Son Lap	Muong	- Prigram 747(472); Water Supply	2002	Total 5 Tanks (3 tanks were destroyed by the typhoon in October, 2007)
			- Program 134; House Construction Support		6,000,000 VND , 6 HH
			- Prigram 747(472); Forest Plantation		36ha Bamboo
			- Kindergarten		Under-construction
4	Tam	Dao	- Prigram 747(472); Water Supply		Total 6 Tanks (3 tanks are working and 3 tanks are not working)
			- World Bank; Road Project	2004	Upgrade the existing access road (Rang to Tanm)
5	Lanh	Tay	- Poverty Reduction Program; Kindergarten	2006	Kindergarten + 1 Water Tank
			- Program 134; House Construction Support		6,000,000 VND , 4 HH
			- Prigram 747(472); Water Supply		Total 6 Tanks (3 tanks are working and 3 tanks are not working)
6	Na Chieu	Muong	- Education Program; Upper-Primary School	1998	Education Program for resettlement area
			- Program 134; House Construction Support		6,000,000 VND , 6 HH
			- Prigram 747(472); Water Supply	2002	Total 5 Tanks (2 tanks are working and 3 tanks are not working)
7	Son Phu	Muong	- Program 135; Healthcare Station		
			- Program 134; House Construction Support		6,000,000 VND , 8 HH
			- Program 135; Primary School		
			- Prigram 747(472); Water Supply	2002	Total 7 Tanks (5 tanks are working and 2 tanks are not working)
8	Rang	Tay	- World Bank; Road Project	2004	Upgrade the existing access road (Rang to Tanm)
			- Program 135; Primary School		2km away from the village center
			- Prigram 747(472); Water Supply		Total 11 Tanks (1 tanks are working and 10 tanks are not working, by the typhoon in Oct, 2007)
9	Seo	Muong	- Program 135; Primary School	2006	
			- Program 135; Kindergarten	2006	
			- Prigram 747(472); Water Supply	2002	Total 7 Tanks (5 tanks are working and 2 tanks are not working)

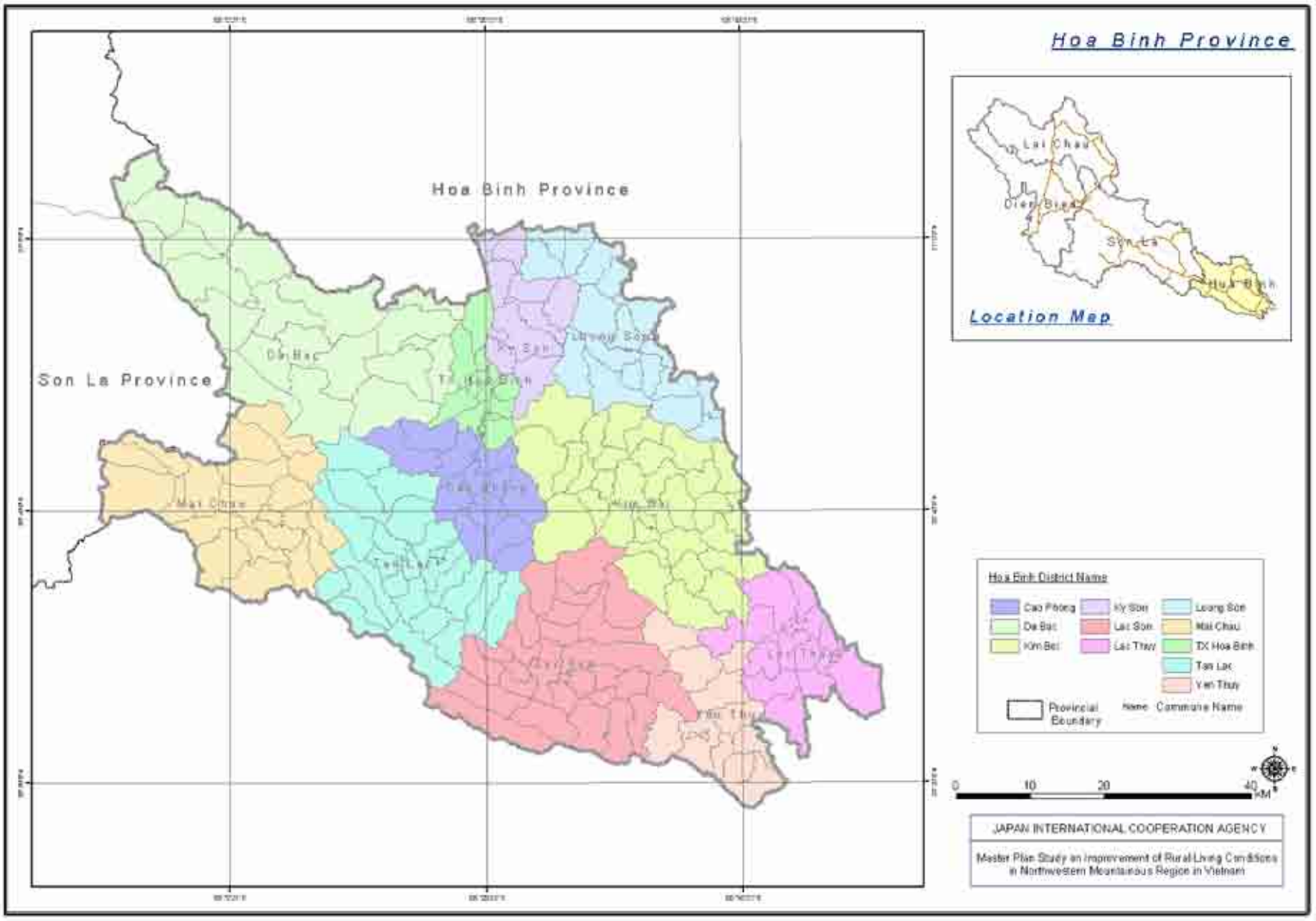


Figure 7.3.24 Location Map of Communes in Hoa Binh Province

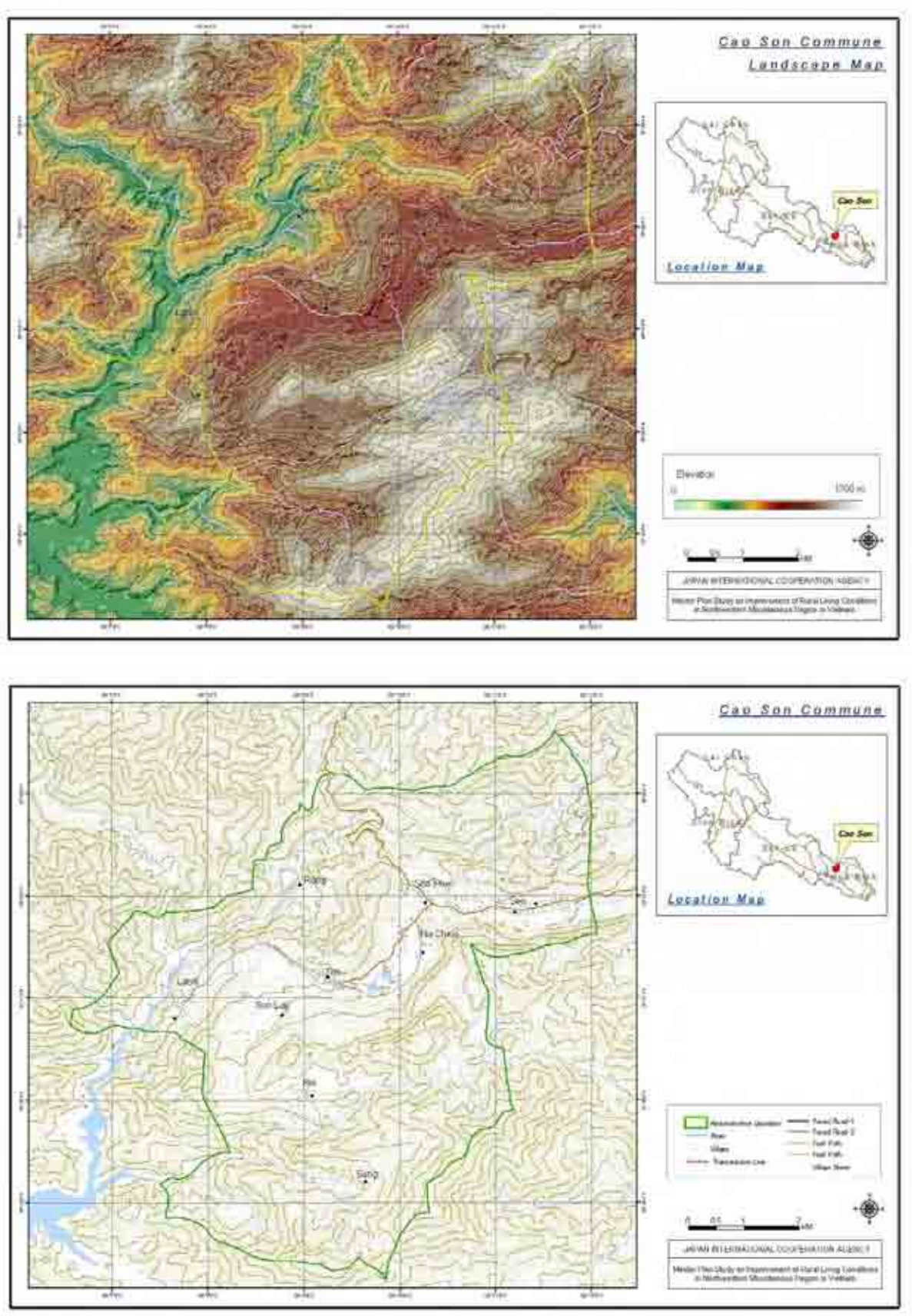


Figure 7.3.25 Topographic Map and Village Location Map of Cao Son Commune

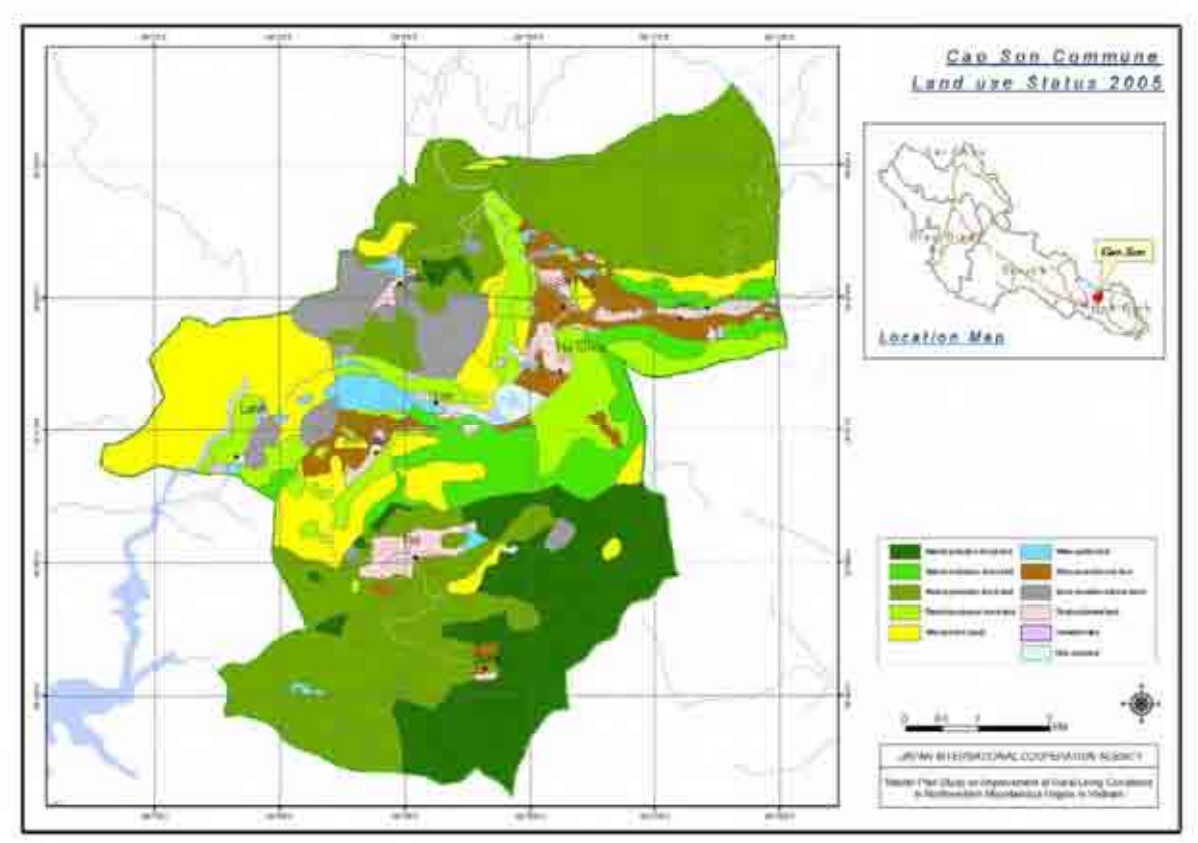


Figure 7.3.26 Land Use Map (2005)

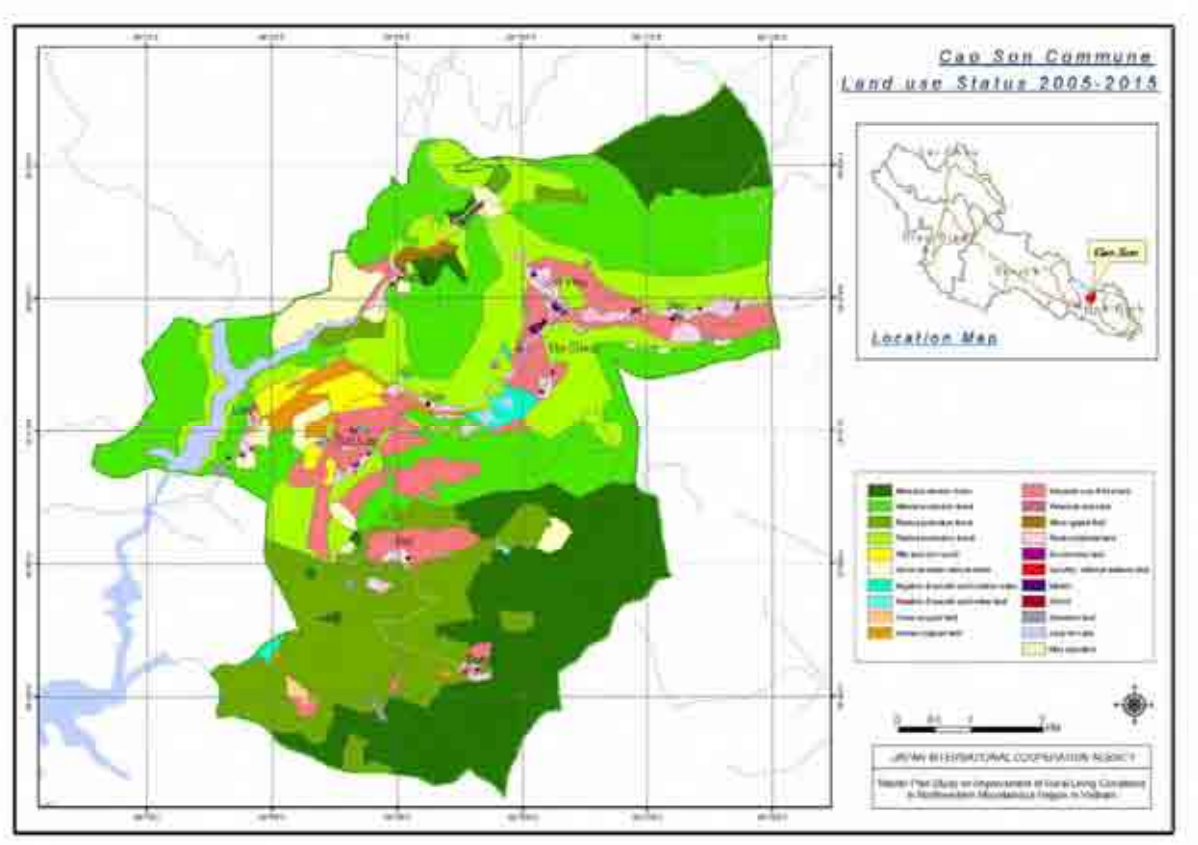


Figure 7.3.27 Land Use Planning Map (2015)

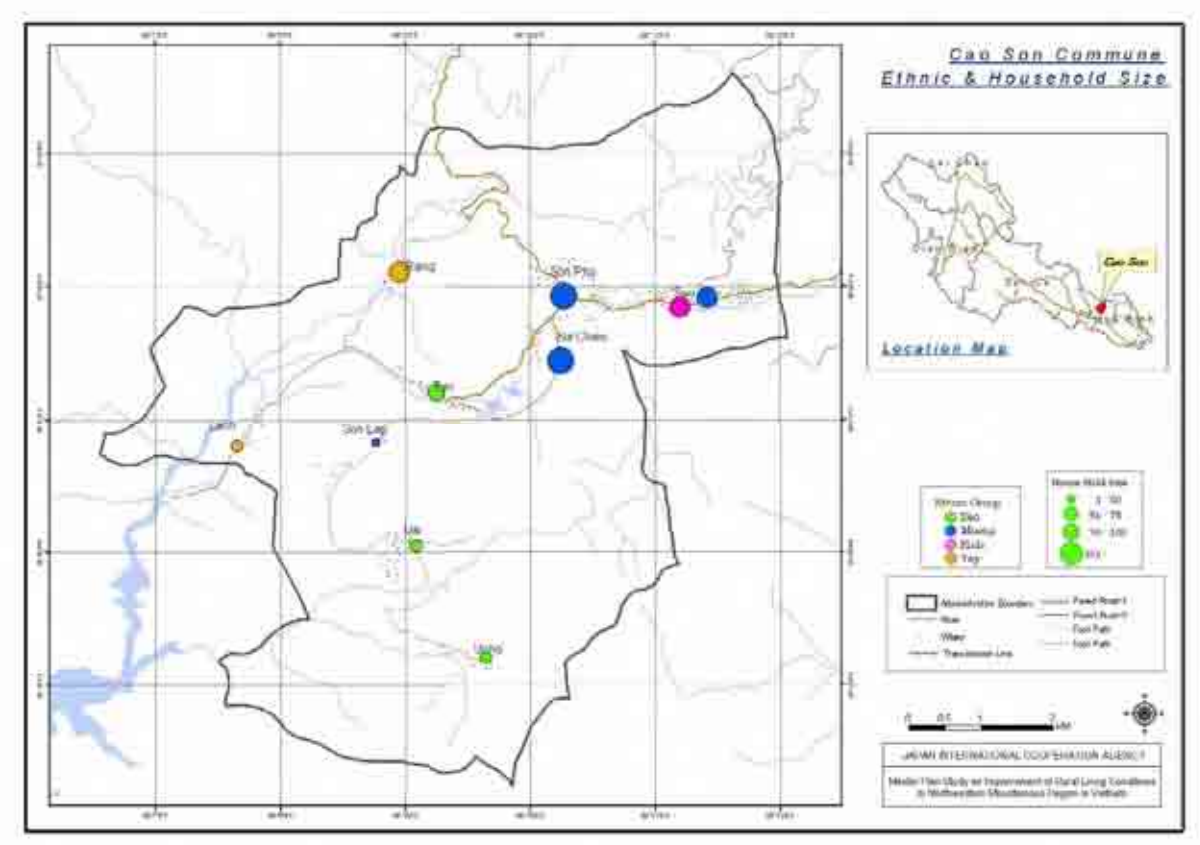


Figure 7.3.28 Ethnic Group and Number of Household Map

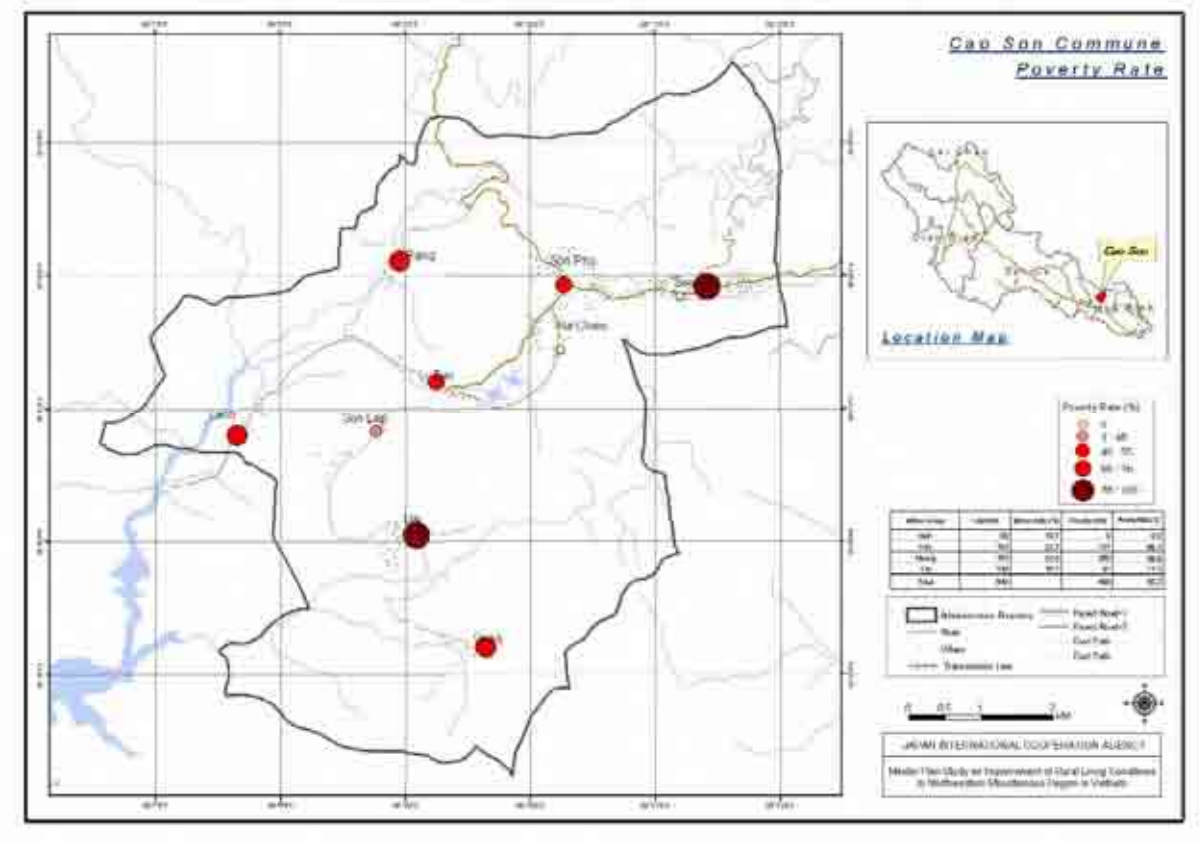
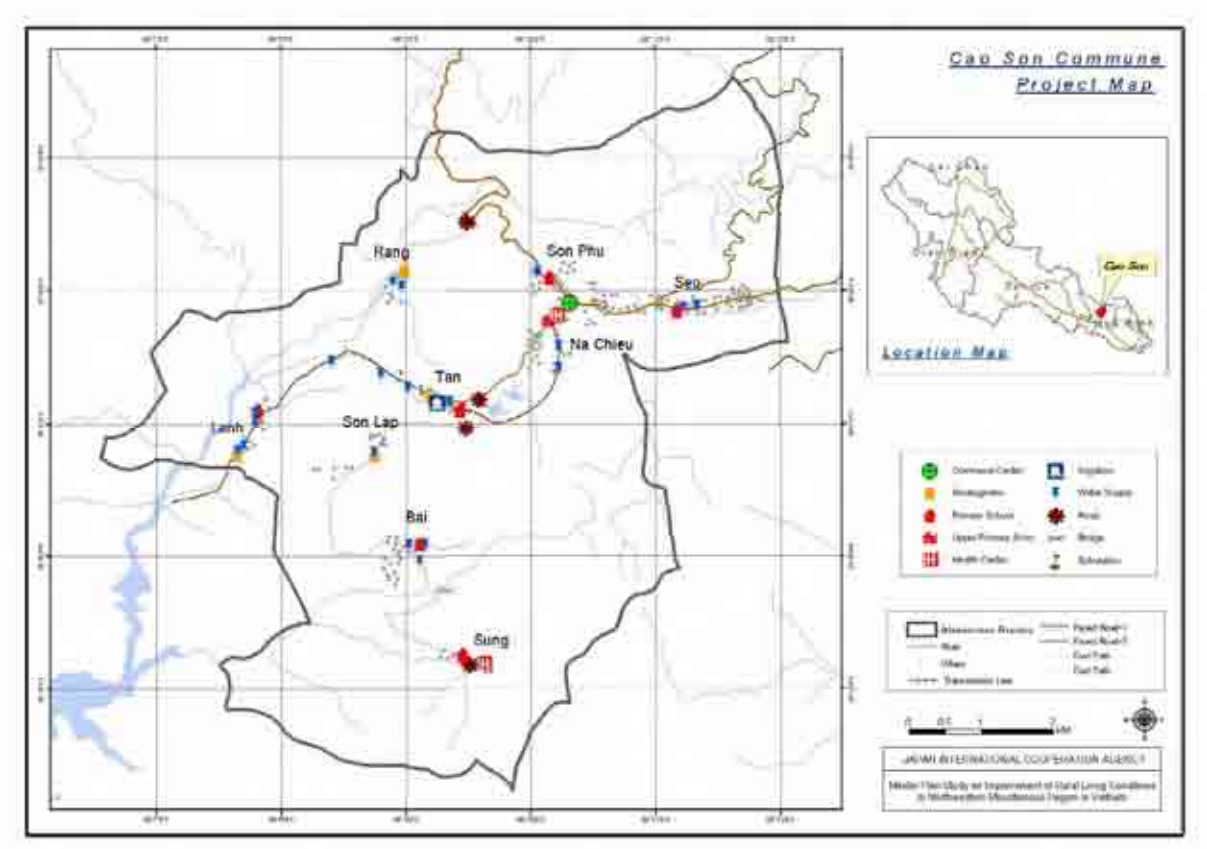


Figure 7.3.29 Village Poverty Rate Map



NO	Village Name	Ethnic Group	Project
1	Sung	Dao	- Gov; Health Center
			- Primary School
			- Prigram 747(472); Water Supply
			- Program 135; Access Road
			- Program 661; Plantation
			- Program 135; Plantation
			- Irrigation System
			- World Bank; Water Supply Project
2	Bai	Dao	- Program 135; Access Road
			- Program 134; House Construction Support
			- Poverty Reduction Program; Kindergarten
			- Poverty Reduction Program; Primary School
			- Prigram 747(472); Water Supply
3	Son Lap	Muong	- Prigram 747(472); Water Supply
			- Program 134; House Construction Support
			- Prigram 747(472); Forest Plantation
			- Kindergarten

NO	Village Name	Ethnic Group	Project
4	Tam	Dao	- Prigram 747(472); Water Supply
			- World Bank; Road Project
5	Lanh	Tay	- Poverty Reduction Program; Kindergarten
			- Program 134; House Construction Support
			- Prigram 747(472); Water Supply
6	Na Chieu	Muong	- Education Program; Upper-Primary School
			- Program 134; House Construction Support
			- Prigram 747(472); Water Supply
7	Son Phu	Muong	- Program 135; Healthcare Station
			- Program 134; House Construction Support
			- Program 135; Primary School
			- Prigram 747(472); Water Supply
8	Rang	Tay	- World Bank; Road Project
			- Program 135; Primary School
			- Prigram 747(472); Water Supply
9	Seo	Muong	- Program 135; Primary School
			- Program 135; Kindergarten
			- Prigram 747(472); Water Supply

Figure 7.3.30 Location Map of Facilities provided by Poverty Reduction Programs








1st : General View of Cao Son Commune (left), Move resident's new house by Hoa Binh dam construction (right)
2nd : Road Construction Project, already paved road (left), The vehicle cannot pass unpaved road after raining (right)
3rd : Water supply project, however, because the water quality is bad, it is not used as a drinking water. (left & right)
4th : Kindergarten & Primary school (left), Primary school constructed near the road (right)

Figure 7.3.31 Photograph of Field Survey in Cao Son Commune