

**Ministry of Agriculture and Rural Development,
Socialist Republic of Viet Nam**

**Master Plan Study
on
Improvement of Rural Living Conditions
in
Northwestern Mountainous Region in Viet Nam**

**Final Report
Summary**

September 2008

Japan International Cooperation Agency

Nippon Koei Co., Ltd.

Sanyu Consultants Inc.

FOREWORD

In response to the request from the Government of the Socialist Republic of Vietnam, the Government of Japan decided to conduct “Master Plan Study on Improvement of Rural Living conditions in Northwestern Mountainous Region in Vietnam” and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA dispatched a study team headed by Mr. KOYAMA, Masayuki of NIPPON KOEI, during the period from January 2007 to August 2008. The study team conducted the study with the Vietnamese counterpart team and held a series of discussions with the officials concerned of the Government of Vietnam. After the team returned to Japan, further studies were made and then the report was finally completed.

I hope that this report will contribute to the regional and rural development of the Northwest region of Vietnam, which will lead to poverty eradication of the country.

I wish to express my sincere appreciation to the officials concerned of the Government of Vietnam for their close cooperation extended to the study team.

September 2008

NAKAGAWA, Hiroaki
Resident Representative of Vietnam Office
Japan International Cooperation Agency

September 2008

Mr. NAKAGAWA, Hiroaki
Resident Representative of Vietnam Office
Japan International Cooperation Agency

Dear Sir,

LETTER OF TRANSMITTAL

We are pleased to submit herewith the Final Report on the Master Plan Study on Improvement of Rural Living Conditions in the Northwestern Mountainous Region in Vietnam. The Study aimed at (1) preparation of the Master Plan for four Provinces of the Region, namely Lai Chau, Dien Bien, Son La and Hoa Binh, (2) formulation of Action Plans for the priority programs selected from the Master Plan and (3) transfer of knowledge to the Vietnamese counterpart personnel. This report presents all the results obtained through the study activities in both Vietnam and Japan over 20 months from January 2007 to August 2008.

It is generally understood that the Region is behind the rapid development of the national economy of Vietnam in recent years. However, this does not mean that the Region is limited with development potentials. The Study has precisely assessed constraints, development needs and future prospects of the Region.

The Master Plan is formulated in line with eight strategies, namely Market-Oriented Agricultural Promotion, Food Security Improvement, Local Revitalization and Diversification of Income Sources, Environmental Conservation and Biomass Energy Development, Irrigation and Water Supply Development, Rural Road Development, Rural Electrification and Capacity Development.

We hope that the Master Plan would contribute to the improvement of farmers' income and living standard and further development of the regional economy.

We would like to express our deep appreciation and sincere gratitude to all the officials who extended their extensive assistance and cooperation to the JICA Study Team, in particular Provincial Peoples Committees and Ministry of Agriculture and Rural Development. We also acknowledge the officials of your agency and Embassy of Japan in Vietnam for their support and valuable advices in the course of the Study.

Very truly yours,

KOYAMA, Masayuki
Team Leader for the JICA Study Team
Master Plan Study on Improvement of Rural
Living Conditions in the Northwestern
Mountainous Region in Vietnam

Photos from Study (1/3)



Steering Committee Meeting on Inception Report (MARD, 13 Feb 07)



Discussion on Inception Report (DARD, Dien Bien Prov.)



Discussion on Inception Report (DARD, Son La Prov.)



Discussion on CDP (Hoa Binh, 10 Mar 07)



Progress Report to PPC (Lai Chau, Jul 07)



Exchange of Views on CDP (Muong Phang Commune)



Steering Committee Meeting on PR-1 (NIAPP, 7 Sep 07)



Ferry crossing the Da River (Son La)

Photos from Study (2/3)



Land Use Planning in CDP Workshop (Trung Minh)



Problem Analyses by Village Representative (Trung Minh)



CDP Review Workshop (Hoa Binh, 24 Jan 08)



Group Discussion on CDP (Hoa Binh, 25 Jan 08)



Site Inspection of Rural Infrastructure (Ma Quai Commune)



Walk Through in Remote Commune (Lai Chau)



Typical Villages in Mountainous Areas (Ma Quai)



Traditional Indigo-Dyeing by Dao Peoples

Photos from Study (3/3)



Terraced Paddy Fields near Dien Bien Phu



Small-scale Irrigation by Waterwheel (Dien Bien District)



Inland Valley along Route N6 (Son La-Hoa Binh)



Paddy Harvesting Practices (Dien Bien, Sep 07)



Buffaloes raised in Mountainous Areas (Lai Chau)



Paddy Fields in Mountainous Areas (Lai Chau)



Slash & Burn Culture for Upland Rice and Maize (Mar 07)



Export-oriented Tea Plantation (Lai Chau)

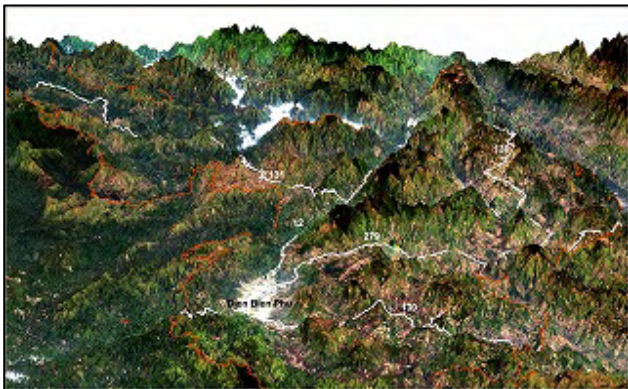
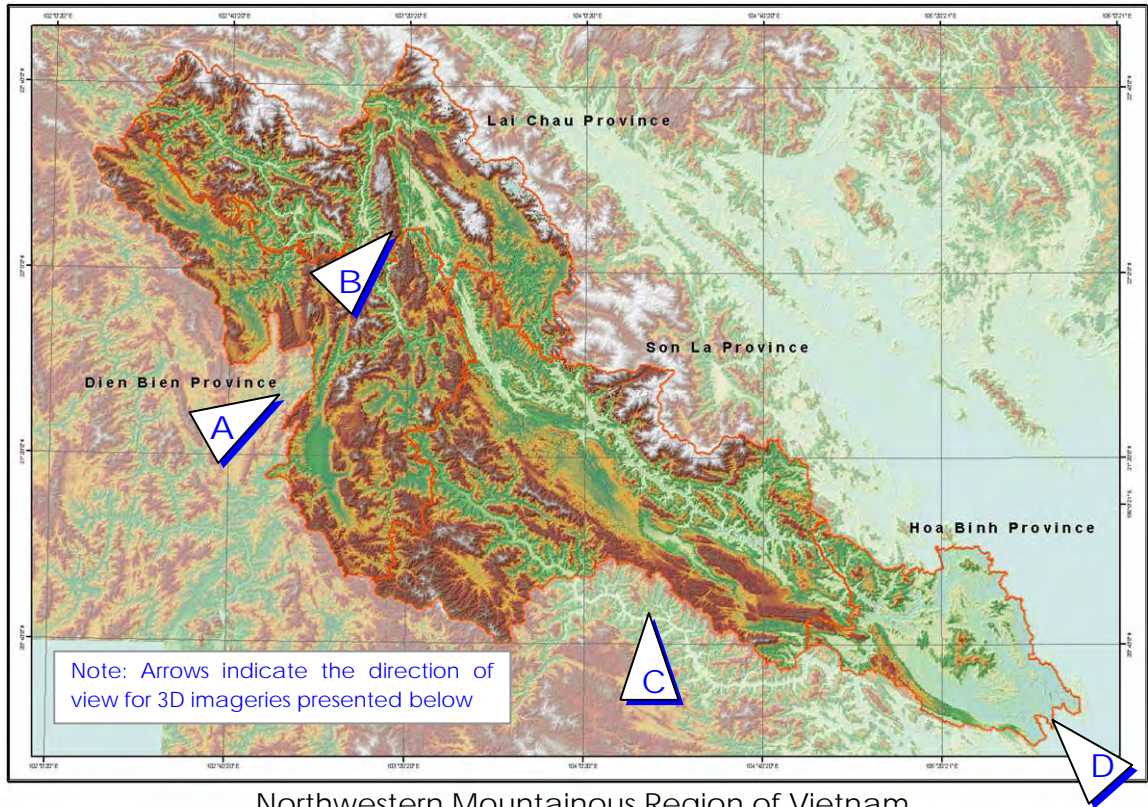
Master Plan Study on Improvement of Rural Living Conditions in Northwestern Mountainous Region in Vietnam

Executive Summary

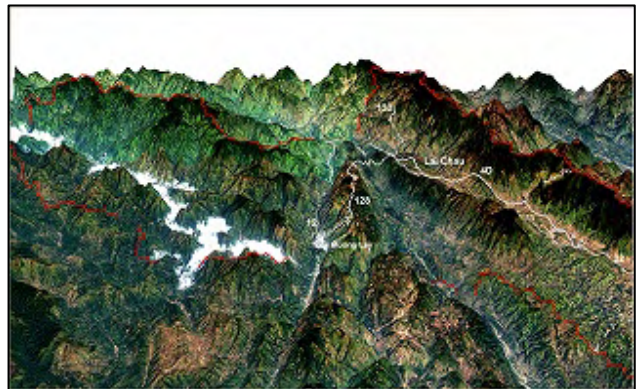
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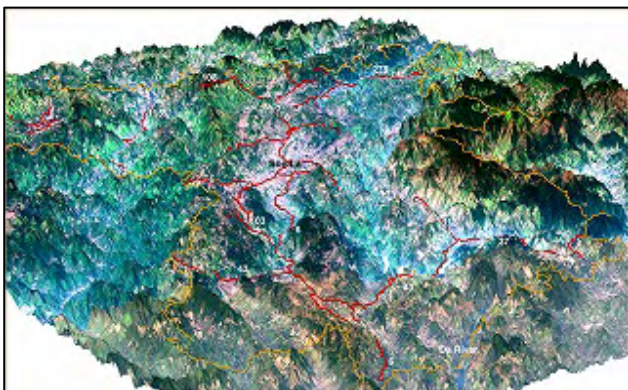
LOCATION MAP OF THE STUDY AREA



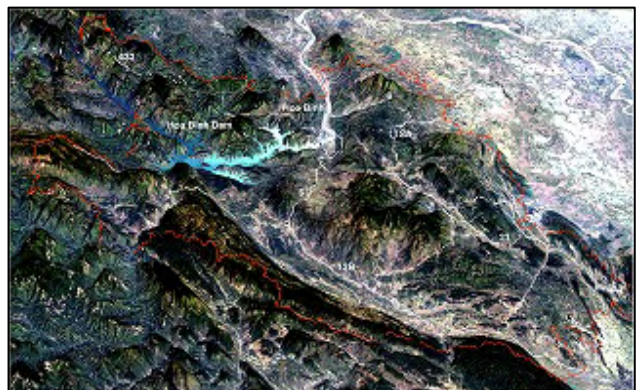
A. Dien Bien Province



B. Lai Chau Province



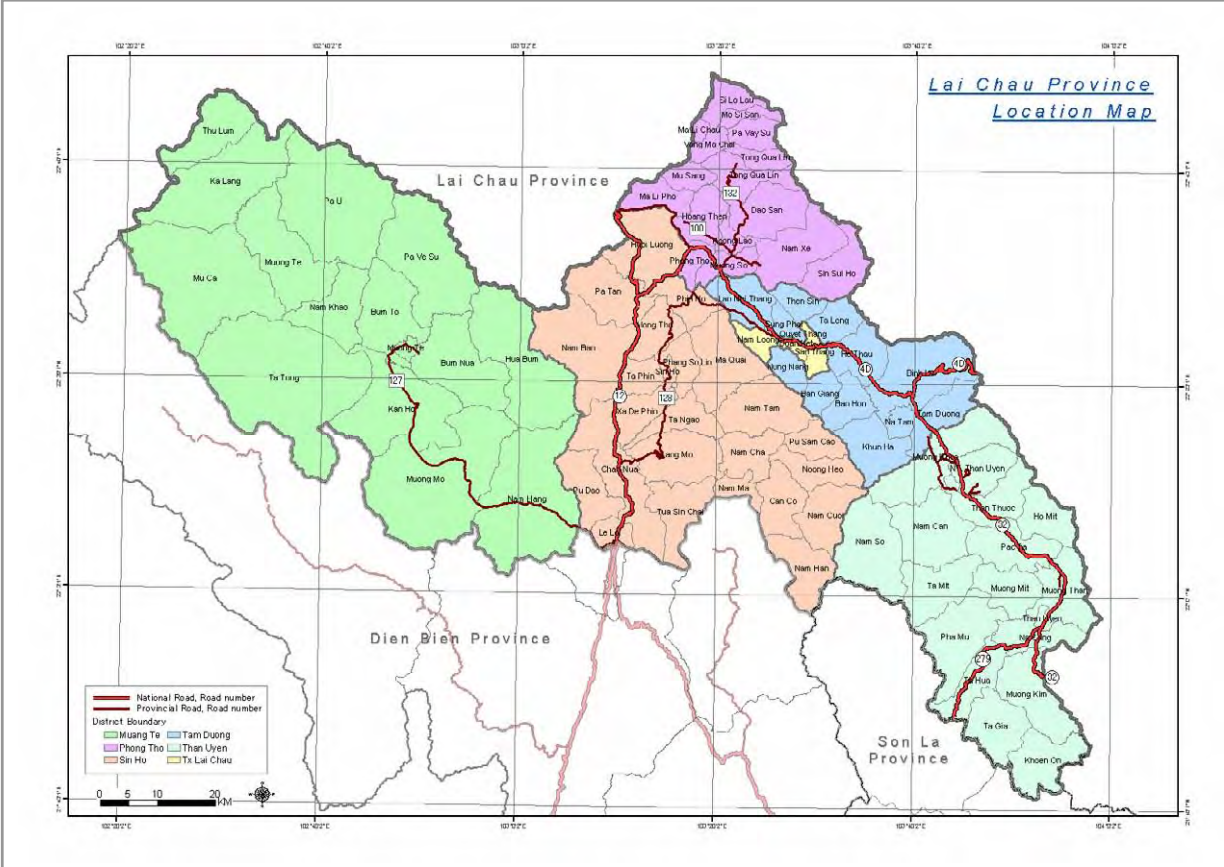
C. Son La Province



D. Hoa Binh Province

Summary of Northwestern Mountainous Region

Aspects	Description	Source
1. Geographical Position	Latitude 20°20'N~22°40'N, Longitude 102°40'~102°50'E	
2. Land Area	37,533 km ² (11.3% of the national land)	Statistical Yearbook of Vietnam 2007
3. Administration	Lai Chau, Dien Bien, Son La and Hoa Binh Provinces consisting of 2 cities, 3 towns, 33 districts, 608 communes (August 2008)	Interview Survey in Province
4. Population	2.65 million (3.1% of the national population) with a density of 71 persons per km ² (national average: 257 persons per km ²)	Statistical Yearbook of Vietnam 2007
5. Ethnic Minority	Approximately 80% of the regional population (national average: 26.0%)	Ethnic Committee, Statistical Bureau
6. Ethnic Groups	Thai(33%), Hmong(23%), Kinh(20%) Lai Chau:20 groups, Dien Bien:22, Son La:12, Hoa Binh:7	Ethnic Committee, Statistical Bureau
7. Present Land Use	Agricultural land(60%), Houses and other public uses (3%), Non-used land (36%)	Agricultural Statistics of respective 4 provinces,(2006)
8. Topography	Suitable land (less than 30% slope gradient) :40%	ASTER satellite imageries, GIS software
9. Provincial GDP(GRDP)	US\$6.67 billion (1.3% of GDP)	Statistical Yearbook of Vietnam 2005
10.Per capita GDP	US\$259(national average: US\$634)	Statistical Yearbook of Vietnam 2005
11. Per Capita Income	Monthly incomes of the Provinces of the Region are the lowest in Vietnam. National average : 636,500 VND in 63 provinces Lai Chau: 273,000 VND (64th in rank), Dien Bien: 305,000 VND (63th), Son La: 394,000 VND (61th), Hoa Binh:416,000 VND (55th)	Household Living Standards Survey 2006
12.Sector Share of GDP	Primary:44%, Secondary:22%, Tertiary:34%	Statistical Yearbook of Vietnam 2005
13.Population by Economic Sector	Primary:338,700, Secondary:16,500, Tertiary:44,300	Statistical Yearbook of Vietnam 2005
14.Family Members	5.15 persons per household, National average:4.36 persons	Household Living Standards Survey 2004
15.Poverty Rate	49%, National average: 15.9% (General poverty rate by WB-GSO)	Household Living Standards Survey 2006
16. Literacy Rate (Vietnamese)	78%, National average: 98%	Cooperation for International Education (2007, Hiroshima Univ.)
17.Education Facilities	Number of primary & secondary schools: 1,397 Enrolment: primary 91% (2002) and secondary 72%	Vietnam Development Report 2005
18.Medical Facilities	Hospitals : Lai Chau:8, Dien Bien:8, Son La:14, Hoa Binh:13	Interview Survey in Province
19.Rice Supply per Person	137kg (milled rice), National average: 168kg	Study Team Statistical Yearbook of Vietnam 2005
20.Access to Domestic Water	67.5%, National average: 88.0%	National Program on Clean Water and Rural Environmental Hygiene, 2005
21.Access to Electricity	67.5%, National average: 88.0%	Power Strategy - Managing growth and reform (World Bank in Vietnam, 2006)
22.Road Density per 1000 Persons (km)	Lai Chau: 2.71, Dien Bien: 2.54, Son La: 1.80, Hoa Binh: 4.75	Master Plan Report for Road Development 2006, Statistical Yearbook 2006
23.Communication	Communes with Post Offices : 47%, National average:63%	Enhancing Access to Basic Infrastructure (June 2002)
24.Crop Production	Paddy : 540,676 ton (Share in Vietnam: 1.5%) Maize : 402,448 ton (10.7%) Tea : 24,817 ton (23.2%) Coffee : 3,369 ton (0.4%) Sugarcane : 549,727 ton (3.7%)	Agricultural Statistics of respective 4 provinces,(2006)
25.Animal Population (heads)	Cattle: 198,900, Buffalo: 425,900, Pig: 1,146,300, Poultry: 7,965,200 Share in Vietnam: 16% for buffalo and 3% for others	Statistical Yearbook of Vietnam 2005
26.Fish Production	6,988 ton, Share in Vietnam:0.2%	Statistical Yearbook of Vietnam 2005
27.Enterprises	Number of Enterprises: 1,044 (Share in Vietnam: 1%) Investment:: 1,966 billion VND(Share in Vietnam:0.3%) Employees: 51,000 (Share in Vietnam:1%) Net Sale: 1,719 billion VND(Share in Vietnam: 0.3%)	Statistical Yearbook of Vietnam 2005
28.Border Trade	Trade with China: US\$3.7 million, with Laos:US\$0.26 million	A Report on Vietnam Northwest Border Trade Situation, JICA Viet Nam, 2007



Lai Chau Province is located at the northernmost end of the Northwestern Region, covering an area of 9,112 km². Its population is 331,000 in 2005, giving a sparse density, i.e. 36 persons per km², is the lowest among the Provinces in the Region. Ethnic groups found in the Province include Thai (35% of the provincial population), Hmong (21%), Kinh (13%), Dao (12%) and Hanhi (5%). Eighty-six percent (86%) of the workforce is engaged in agriculture. Per capita GDP of the Province was US\$212 in 2005.

The road from Hanoi to Lai Chau via Hoa Binh and Son La is 550 km long (National Roads No. 6, 279 and 32). Another way to Lai Chau is to fly from Hanoi to Dien Bien Phu, and then take the National Road No. 12 to Lai Chau. In either way, road conditions in mountain areas interrupt smooth transport of passengers and goods.

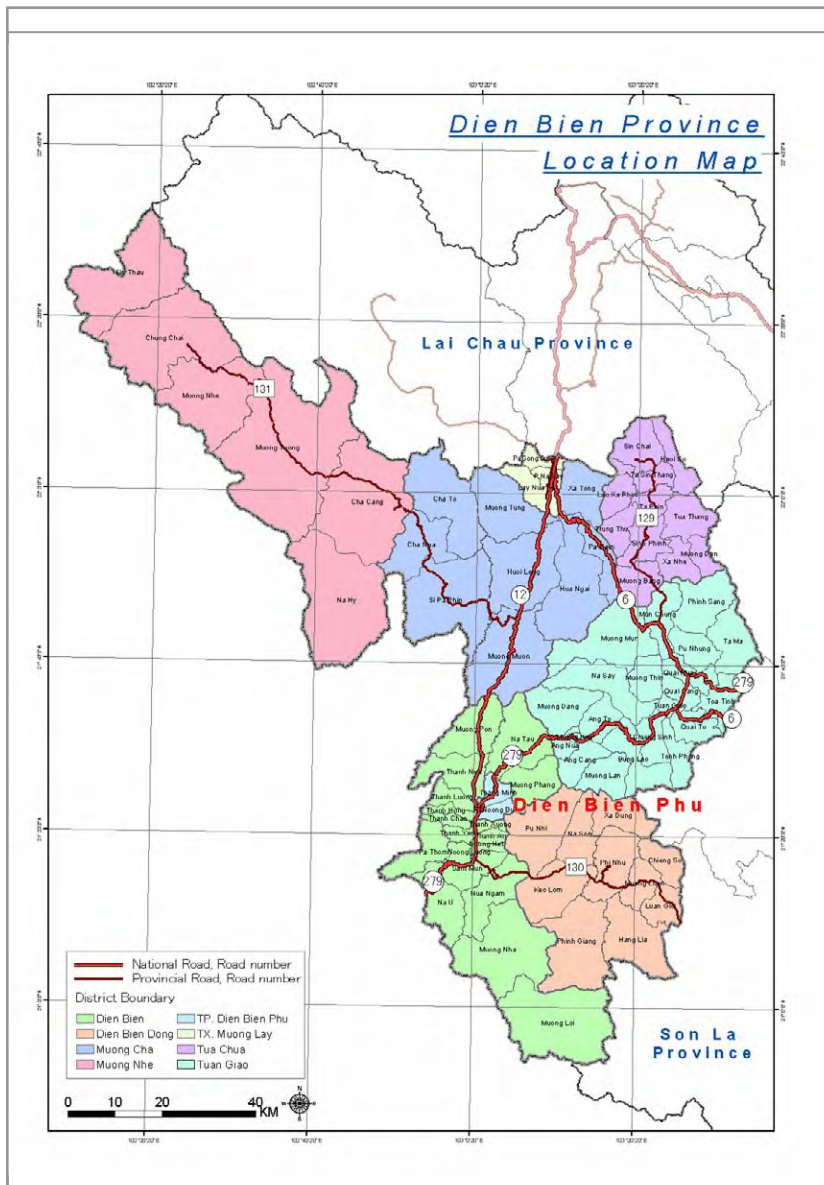
Many mountains in Lai Chau Province are over 2,000m high. Sixty-nine percent (69%) of the provincial land ranges between 500m and 1,500m above sea level. Sixty-seven percent (67%) of the land has mountainous topography with slope gradient over 30%. Over 90% of the provincial land is part of the Da River basin. Watershed conservation is an urgent issue as a) its forest coverage ratio is only 37%, the lowest among the Provinces in the Region and b) 30% of the provincial land is covered with sparse vegetations resulting in high susceptibility to soil erosion.

Provincial GDP in 2005 was 1.058 trillion VND, which was equivalent to 10% of GDP of the Region for the year. Lai Chau Province relies heavily on agriculture as the primary industry, which accounts for 46% of the provincial GDP. Cultivated area occupies only 78,000 ha or 8% of the provincial land, which consists of upland field (57,000 ha), paddy field (14,000 ha) and orchard (7,000 ha), accounting for 73%, 18% and 9% of the cultivated land, respectively.

The total production of both lowland and upland paddy amounted to 93,000 tons in 2005. This was equivalent to 192 kg of milled rice per person, which is higher than the national average of 168 kg. However, there are areas that experience rice shortage, although these are supplemented by maize and tuber crops. The major cash crop is tea of which cultivation area is 4,200 ha; the largest among the four Provinces in the Region. Some tea produced in Lai Chau Province turned successfully into a brand.



Lai Chau Town (900m asl)



Dien Bien Province was newly established in 2004 by separating from Lai Chau Province. The province covers 9,563 km². The provincial population was 468,000 in 2005, with a density of 49 persons per km². Ethnic groups in the Province are represented by Thai (40% of the provincial population) followed by Hmong (31%), Kinh (20%), Khomu (4%) and Lao (1%). Nearly 80% of the workforce in the Province is engaged in agriculture. Per capita GDP of the Province was US\$273 in 2005, which is the highest among the four Provinces in the Region.

The roads from Hanoi to Dien Bien via Hoa Binh and Son La are 470 km long (National Roads No. 6 and 279). On the other hand, two regular flights a day are available from Hanoi to Dien Bien Phu. Owing to its good accessibility, about 200,000 tourists visit the historical sites of Dien Bien Phu every year.

Over 90% of the provincial land ranges between 500m and 1,500m above sea level, while 54% of the land is rolling to mountainous with

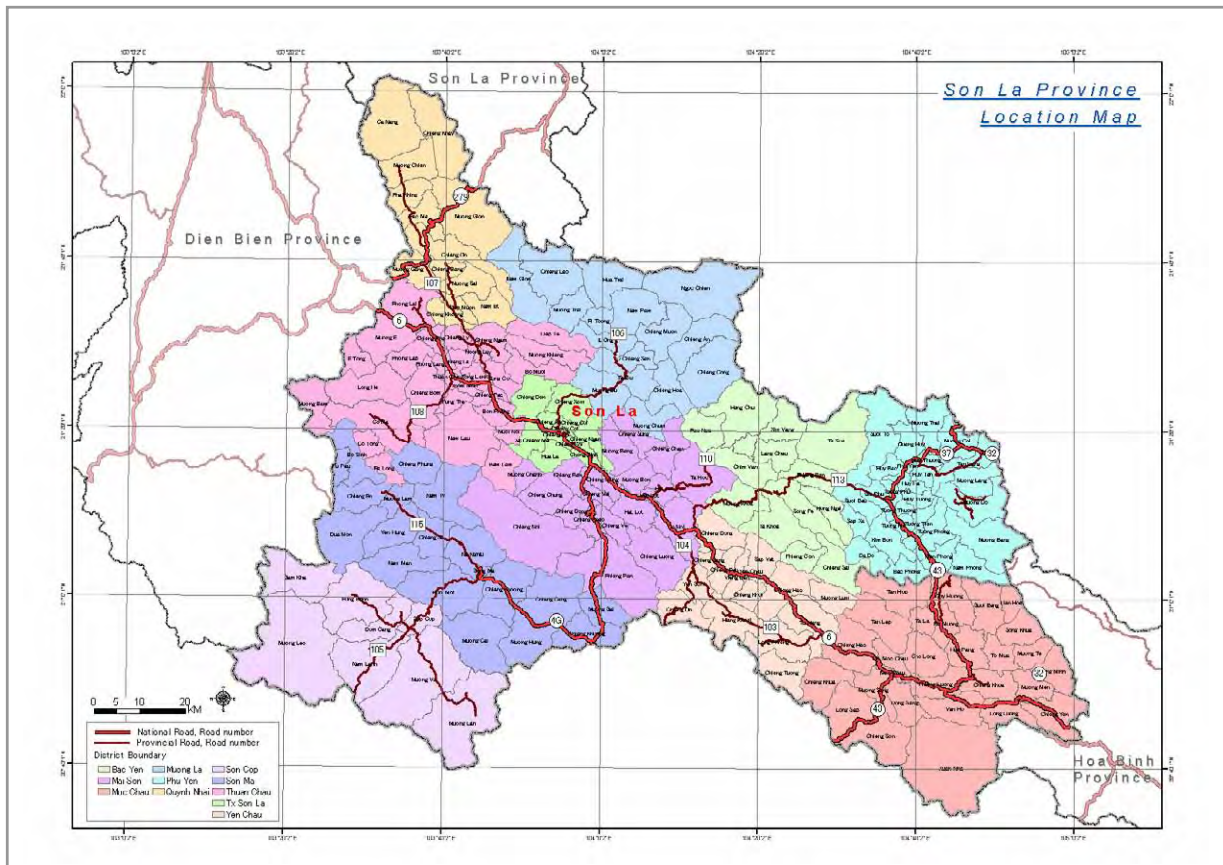
slope gradients of over 30%. Three major rivers, namely the Da, Ma and Nua Rivers, flow through the Province. About 60% of the provincial land belongs to the Da River basin. Watershed conservation is an urgent issue as the forest coverage ratio is limited only to 39% of the provincial land.

Provincial GDP was 1.951 trillion VND in 2005, accounting for 18% of the total GDP of the Region. The primary industry accounts for 37% of the GDP. Cultivated area occupies 118,000 ha or 12% of the whole provincial land, which consists of upland field (100,000 ha), paddy field (14,000 ha) and orchard, etc. (4,000 ha), accounting for 85%, 12% and 3% of the cultivated area, respectively.

The total production of lowland and upland paddy amounted to 128,000 tons in 2005. This was equivalent to 185 kg of milled rice per person, which is above the national average of 168 kg. Many kinds of industrial crops including tea, coffee, cotton, and soy bean are cultivated. Dien Bien rice is a famous local specialty product of the Province.



Dien Bien Phu City (450m asl)



Son La Province is the largest Province in the Northwestern Region with a total coverage of 14,174 km² and the provincial population of 1.024 million, which occupy 38% of those of the Region. The population density is 72 persons/km². Ethnic groups in the Province include Thai (55% of the provincial population), Kinh (17%), Hmong (13%), and Muong (8%). Eighty-seven percent (87%) of the workforce is engaged in agriculture. Per capita GDP was US\$266 in 2005.

The road from Hanoi to Son La through Hoa Binh, is 315 km long (National Road No. 6). Moc Chau District, which is located at the southernmost edge of the Province, is 200 km away from Hanoi.

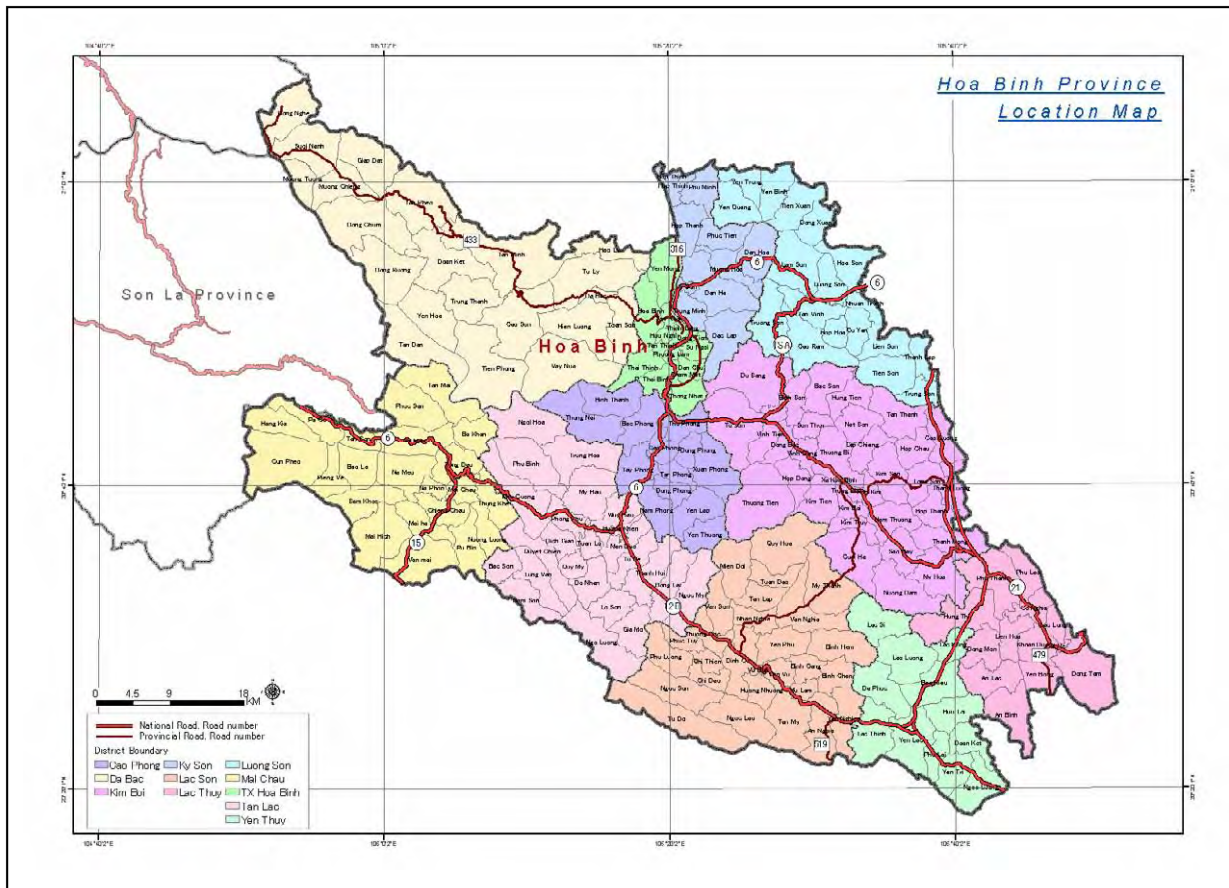
Compared to Lai Chau and Dien Bien Provinces, Son La Province is lower in elevation. Some 70% of the provincial land lies between 100m and 1,000m above sea level, while 57% of the land is mountainous with slope gradient of over 30%. Sixty-four percent (64%) of the provincial areas belongs to the Da River basin, while 35% is in the Ma River basin.

Provincial GDP was 4.177 trillion VND in 2005, which was 39% of the GDP of the Region. The provincial economy relies highly on primary industry accounting for 43% of the provincial GDP. Cultivated area extends over 254,000 ha or 18% of the provincial land. Out of the cultivated area, 198,000 ha (78%) are planted with upland crops, while only 14,000 ha (6%) is for paddy. The ratio of paddy field is significantly smaller than those of other Provinces of the Region. Due to the unbalanced distribution of land and water resources, the development potential for paddy is limited. In contrast, orchard fields prevail with a total coverage of 42,000 ha (16%).

The total production of lowland and upland paddy amounted to 128,000 ton in 2005. This is equivalent to 85 kg of milled rice per person, which is only 51% of the national average of 168 kg. Maize substitutes for rice. The maize production in the Province is 288,000 tons, which is 57% of the total production in the Region. Many industrial crops such as tea, coffee, cotton, soy beans, etc. are cultivated. Moc Chau District is the most famous agricultural area in the Province owing not only to good soil and climatic conditions, but also to a good geographical position, which is five hours by car from Hanoi?? Tea, dairy products and premium vegetables produced in Moc Chau District are bound for markets in Hanoi.



Son La Town (550m asl)



Hoa Binh Province covers 4,684 km² or only 12% of the Northwestern Region. The provincial population totals 830,000 with a high population density of 177 persons per km². Ethnic groups in the Province are represented by Muong (63% of the provincial population), Kinh (28%), Thai (3%), and Dao (2%). Eighty-two percent (82%) of the workforce is engaged in agriculture. Per capita GDP was US\$262 in 2005.

The road from Hanoi to Hoa Binh is 85 km long (National Road No. 6). It takes only two hours by car. The Province is expected to be developed as the outskirts of the Hanoi economic zone.

Among the four Provinces in the Region, Hoa Binh Province is the lowest in elevation. Seventy-seven percent (77%) of the provincial land lies between 101m and 500m above sea level. The provincial land is flat to undulating. Some 24% (113,000 ha) of the provincial land is less than 8% in slope gradient. The natural environment of the Province differs from those of the other provinces in the Region. Three rivers, namely Da, Ma and Boi, flow throughout the Province. Nearly 90% of the provincial land belongs to the Da River basin, while the rest is in the Red River basin. The forest coverage ratio is 44 % which is slightly higher than those of the other Provinces in the Region. The Province has production forests of 66.000 ha or 53% of 124,000 ha of the total production forests in the Region.

Provincial GDP was 3.389 trillion VND in 2005, which was equal to 32% of the total GDP of the Region. The primary industry accounts for 46% of the GDP. Existing cultivation area is 100,000 ha, which is 21% of the provincial area. Expansion of agricultural land is thus limited. Among the cultivated area are upland field (59,000 ha), paddy field (20,000 ha) and orchard, etc. (21,000 ha), accounting for 59%, 20% and 21%, respectively. The ratios of paddy field and orchards are large.

The total production of lowland and upland paddy amounted to 192,000 tons in 2005. This is equal to 153 kg of milled rice per person, which is 91% of the national average of 168 kg. Sugar cane is a major industrial crop of the Province with annual production of 389,000 tons accounting for 71% of the total production in the Region (549,000 ton).



View from Hoa Binh Dam (50m asl)

1. Objectives of the Study

1. The Northwestern Mountainous Region of Vietnam (hereinafter referred to as “the Region”) is located along the international borders with China and Laos. The Region administratively consists of four (4) provinces, namely Lai Chau, Dien Bien, Son La and Hoa Binh, with a total coverage of 37.5 thousand km² or 11.3% of the national land. The regional population totals 2.65 million, accounting for only 3.1% of the national population. The Region is sparsely populated with a density of 71 persons per km² as compared to the national average of 257 persons per km². Ethnic minorities comprise over 80% of the regional population. The 2007 Household Living Standard Survey by General Statistics Office (GSO) verified the poverty rates of the Region to be 39.4% according to the government’s criteria and 49% according to the international standard on the basis of daily calorie consumption, respectively. (Section 1.1)
2. The Government of the Socialist Republic of Vietnam (hereinafter referred to as “the Government of Vietnam”) requested the Government of Japan to conduct a Master Plan Study on Improvement of Rural Living Conditions in Northwestern Mountainous Region of Vietnam (the Study). In response to the request of the Government of Vietnam, the Government of Japan, through the Japan International Cooperation Agency (JICA), dispatched the Preliminary Study Team and agreed upon the Scope of Work (S/W) for the Study with the Ministry of Agriculture and Rural Development (MARD) on November 6, 2006. The JICA Study Team commenced the Study in February 2007 and completed it in September 2008. (Section 1.2)
3. The National Institute of Agricultural Planning and Projection (NIAPP) had cooperated with the JICA Study Team in the day-to-day operation of the Study as the counterpart agency. A Steering Committee was organized at the central level by the Ministry of Planning and Investment (MPI), MARD and NIAPP, while at the respective provincial level, by the Provincial People’s Committee (PPC), Department of Planning and Investment (DPI), and Department of Agriculture and Rural Development (DARD). (Section 1.4)

2. Policy Background

4. Vietnam has achieved the economic growth as high as 7.5% per annum on average in the five-year period of the Socio-Economic Development Plan (SEDP) from 2001 to 2005. Family income has increased at 12.1% per annum during the same period, resulting in significant improvement of socio-economic indicators such as the Human Development Index (HDI). Encouraged with such remarkable achievements, the Government of Vietnam set up the new SEDP for 2006-2010, envisaging further poverty reduction as well as economic development. The development priority of SEDP (2006-2010) is

linked to economic structure reform, competitiveness in international trade, improvement of urban-rural imbalance, etc. (Section 2.3.2)

5. The SEDP (2006-2010) places great emphasis on modernization of the agricultural sector through: 1) industrialization in the rural areas including diversification of manpower for the industrial sector, 2) establishment of strengthened structure of the sector including food security, crop diversification, expansion of livestock industry, export-oriented fishery and afforestation, 3) improvement of farming techniques through capacity building of agricultural extension workers, and 4) irrigation development. Special attention was paid in SEDP to the well-balanced development of the Region. The region-specific targets directed by SEDP are: 1) promotion of market-oriented crops, fruits, medicinal trees, cattle raising and processing, etc., 2) rural electrification by micro-hydropower and safe water supply, 3) security control of the border gates and promotion of border trade, 4) improvement of living conditions and family income of ethnic minorities through extension of sustainable agriculture. (Section 2.3.2)

3. Regional Visions

6. Although the Region is behind in the rapid economic development of Vietnam in recent years, this does not mean that its development potentials are limited. The Study recognizes the advantageous features and prospects of the Region from several points of view. Referring to comments by stakeholders who are knowledgeable about the Region and from information found in various literatures, the Study drew future visions of the Region as described in the following paragraphs. (Section 3.1)
7. Regional Vision 1 - Clean Energy Promotion Region: The Region is richly endowed with hydropower potentials and will continue to play a pivotal role as the clean energy supplier to the nation. There exist many hydroelectric dams, such as Hoa Binh Dam and Son La Dam, including planned dams as Huoi Quang Dam, Ban Chat Dam, Nam Nhun Dam, and so on, in the Da River watersheds. To ensure sustainable hydropower generation in long-term, the watershed management of the Da River becomes more crucial since soil erosion and sedimentation are widely observed due to expansion of slush and burn following irresponsible deforestation. The afforestation program is implemented with the introduction of tree species of high value such as rubber. Energy crops, including *Jatropha curcas* L., are also suggested for promotion of biomass energy. The Region will thus lead the energy sector of Vietnam as clean energy promotion region in the future. (Section 3.2)
8. Regional Vision 2 - Supplier of Safe Food: Food safety is becoming one of the worldwide issues in accordance with globalization of the food trade. Vegetable production in the Region is currently limited to only 1.6% of its national production. However,

vegetables produced in the Region already have value-added from the food safety point of view. Use of agro-chemicals in the Region is limited. No signs of air and water pollutions were observed in the Region. These facts can appeal to consumers with brand image of clean and safe crops. There is a future prospect in a change of the marketing and distribution system of local vegetables and fruits. The crops of high value to be produced in the northern parts of the Region will be collected at the Dien Bien Phu airport and transported to major cities of Vietnam and other international markets. (Section 3.3)

9. Regional Vision 3 - Diversified Regional Resources: A wide range of local resources are identified in the Region. Local farmers have wisely but limitedly utilized these resources under their traditional lifestyle, mainly for the purposes of agriculture, livestock, fishery and forestry activities. If these unexploited resources are assessed with the right business strategies, more entrepreneurs will be drawn to the Region. (Section 3.4)

4. Socio-Economy of the Region

10. The 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 for only 1.3% of the GDP in 2005. The per capita GDP of Vietnam was US\$634 in 2005, while that of the Region was US\$ 259 or only 40% of the national average. Under the *Doi Moi* economic reform, the primary sector's shares in the national economy have been decreasing due to the rapid expansion of the secondary sector, which contributes to 42% of the GDP in 2005. In contrast, the regional economy is highly dependent on the primary sector of which share was 44% in 2005, while 22% is from the secondary sector and 34% from the tertiary sector. (Section 4.1.2)
11. Vietnam is the second largest rice exporting country in Southeast Asia. It is estimated that the national paddy consumption is 21.48 million ton, excluding paddy processed 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 regional paddy production was limited to 0.54 million ton or only 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 (168kg - 137kg) less than, or only 82% of, the national average. Furthermore, the demand-supply balance of rice is different by province in the Region. The per capita rice availability of Lai Chau was 192 kg, which is followed by 185kg for Dien Bien, 153 kg for Hoa Binh and 85 kg for Son La. Although the per capita rice availability of Lai Chau and Dien Bien exceed the national average, rice is often in shortage in remote communes. (Section 4.1.3)

12. The Study made a review on prospects of the border trade with the countries of China and Laos so as to verify necessary measures to promote export-oriented products. Improvement of the balance of payment is one of the most important issues for the national economy of Vietnam. There is the border gate to China at Ma Lu Thang of Lai Chau province. The total trade at Ma Lu Thang is limited 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, cardamon, bamboo-pulp, etc. The total export amount is equivalent to 9.4% of the GRDP of Lai Chau province. Although the amount is small, impact of the border trade to the regional economy is not negligible. (Section 4.1.4)

13. Vietnam is a multi-ethnic country with 54 different ethnic groups, of which 23 groups live in the Region, while Kinh accounts for about 20% of the population and number-wise. The ethnic composition of the Region is thus very unique and different from the overall ethnic structure in Vietnam. Indigenous people of Lai Chau, Dien Bien and Son La Provinces are Thai. In these provinces, Thai have the largest population of over one-third of the regional population in each province. On the other hand, the original inhabitants of Hoa Binh are Muong who belong to the same language group as Kinh. Today, more than 60% of the population of Hoa Binh is Muong. (Section 4.3)

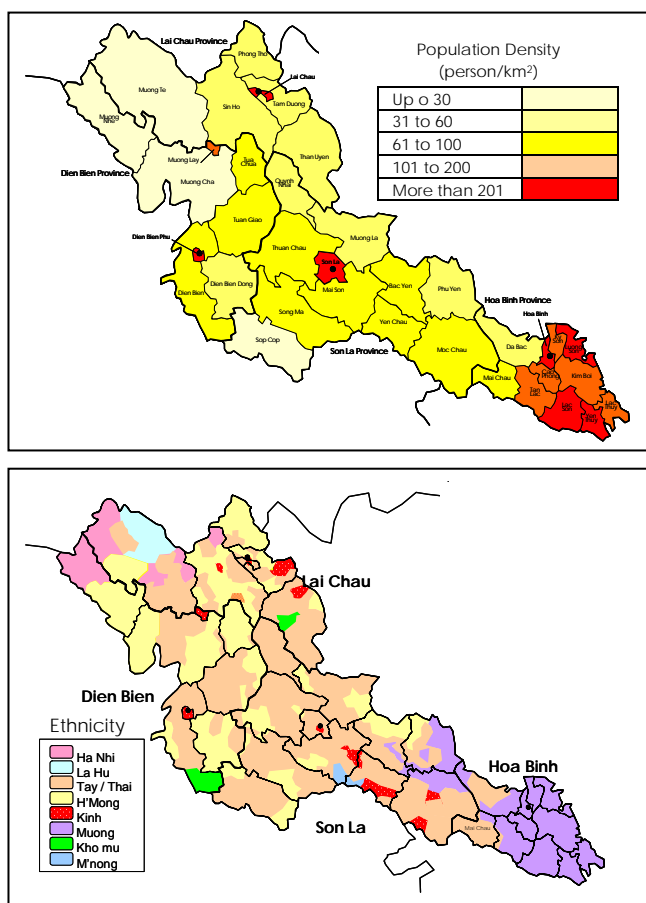


Figure 4.1 Population Distributions and Ethnicity

14. The poverty rate of ethnic minorities is declining more slowly than that of Kinh and Hoa. Economic gap between both groups is thus widening, and this is one of the reasons why poverty reduction programs target the ethnic minorities. Due to its mountainous topography, rural accessibility of the Region is generally poor, resulting in stagnant economic activities behind the rapidly growing national economy. However, the Region has fostered cross-border culture with ethnic minorities in China and Lao. (Section 4.4.1)

15. Vietnam ranks 109th out of 177 countries in UNDP's human development index (2006). In the ASEAN region, Vietnam stands out for its success in closing gender gaps in the last two decades. It ranks 80th out of 136 countries on the Gender Development Index (GDI). A considerable gap is recognized in 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 and Chinese group. (Section 4.4.4)
16. Out of 3.78 million ha of the regional land, 2.29 million ha or 60% are agricultural land including arable land, forests, grazing land and pastures, water bodies for inland fishery and others. Arable land, including paddy fields, upland fields, orchards and others, covers 0.55 million ha or 15% of the regional land. The extent of arable land varies between the provinces, i.e. 0.08 million ha in Lai Chau, 0.12 million ha in Dien Bien, 0.25 million ha in Son La and 0.10 million ha in Hoa Binh. Land holding size of an average farmer is currently as low as 0.5ha to 0.7ha. (Section 4.5.1)
17. The farming systems of the Region are classified into three categories, namely (i) slash and burn culture on higher parts of the mountainous lands, (ii) terraced farmland on lower parts of mountainous lands, and (iii) paddy fields on low-lying land. Under *Doi Moi*, commercialization of agricultural products has been encouraged in the Region. Currently, crops in the Region consist of food crops including cereals and tuber crops, followed by industrial crops such as tea, coffee, sugarcane, soybeans, groundnuts, sesame, spices, medical herbs, etc. (Sections 4.7.3 and 4.7.4)
18. Farmers' unions are organized in the provinces of the Region as a branch of the Vietnam Farmers' Union (VFU). Furthermore, cooperatives play an important role to manage community-based economic activities, although their memberships are still limited. Youth unions and women unions are internal organizations which function for group and/or gender activities under the farmers' unions. Informal groups are also organized on temporary basis for a particular purpose such as farm credit operation. (Section 4.8.1)
19. The training programs for provincial extension officers are held for five or six courses every year. Subsequently, the provincial extension staff transfer their extension technologies down to the extension staff at the district and commune levels. Further, the training programs are conducted for farmers on the demonstration farm although activities are not satisfactory due to limited operation budget. Extension personnel are not employed on full time basis but only on temporary basis at the commune level. Their tasks are limited to monitoring of agricultural information, including crop production, outbreak of disease and insects and hazards due to climatic changes. (Section 4.9.2)

20. Animal population of the Region is counted at 199 thousand heads of cattle, 425 thousand heads of buffaloes, 1,146 thousand heads of pigs and 7,985 thousand heads of chickens (2005). Animals, except for poultry, steadily increased in number in recent years. The Region is characterized by buffalo population occupying 14% of the national total. Cattle and buffaloes are raised as source of animal power as well as for animal products. Since the Region is located along the national borders, it suffers from the cross-border outbreak of animal diseases, particularly foot-and-mouth disease and avian influenza. Animal health control is therefore one of the most crucial issues in the Region. (Section 4.10)
21. Fish production in the Region is limited to 6,988 ton per year (2004) or only 0.2% of the national total. Aquaculture produces 5,503 ton or 79% of the regional fish production, while the production of capture fisheries totals only 1,486 tons. Son La is the leading province in the fishery sub-sector in the Region, followed by Hoa Binh. Both provinces produce 4,397 ton or 80% of the regional aquaculture production. Capture fisheries are prevailing in both provinces as well. In contrast, fish production in Lai Chau and Dien Bien Provinces are limited. (Section 4.11)
22. The industrial sector in the Region is still developing. Apart from agro-industry, a limited number of small enterprises are operational in sand and aggregates quarry, wooden products (furniture), daily commodity production, pulp, etc. The total number of enterprises and employees are 1,044 and 51,000, respectively, which account for 1% of the national figure. (Section 4.12)
23. The Region is located on the eastern slope of Annamite Mountains, so that main parts are high mountainous areas where large natural forests are distributed. Forests cover 1.47 million ha or 39.6% of the total area of the Region in 2005. Forest coverage ratio of the Region is gradually increasing. Natural forest coverage ratios are between 30% and 40%. With regard to artificial forests, Hoa Binh province has 11% of artificial forest ratio, whereas the other three provinces have only 1% of artificial forest ratios. Main activities in the Region are planting of protection forests and production forests. (Section 4.13.2)
24. Timber production of the Region is 171,400 m³ in volume or 6% of the national production volume. Typical non-timber forest products (NTFPs) 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 Trau*, and vine trees, such as *Huyet giac* and *Thien nhien kien*, for extracting oil for cosmetics and lac for materials for making lacquer, are also produced. Fewer facilities process the materials in the Region and almost all materials are currently transported to the neighboring provinces. (Section 4.13.2)

25. Environmental and social considerations have to be taken for special-use forests, which consist of national parks, nature conservation areas, and landscape protection areas in Vietnamese forest classification. The Region takes main responsibilities for protection of special-use forests including 10 nature conservation areas, one landscape protection area, three national parks and four wetlands where rare species of fauna and flora range over. The Department of Forestry (Sub-DOF) of each province shall establish the management plan of these nature reserves, i.e. the special-use forests, and conduct management of those nature reserves. However, management plans have not yet been compiled for all the nature reserves. (Section 4.13.2)
26. Individuals engaged with the handicraft industry in the Region totaled 104,210 persons or 7.7% of the national total. In the Region, the products commonly found as handicraft are (i) crafts using materials harvested in forest: broom, knitting (bamboo/ rattan products) , hand-made mulberry paper, wood processing, (ii) crafts using traditional textile: bag, blanket, garment, embroidered cloth, clothes dyed with indigo, (iii) others : farming tools, silver work. These products are made of raw materials locally available by traditional skills. However, these were not unique to the locality and their rarity were not taken advantage of. Only a limited number of products was exported and sold as souvenirs while many were marketed as low quality - low value products. Furthermore, most of the handicrafts were historically produced at households for their own use rather than to be marketed on commercial basis. The skills were transferred and maintained within the community (commune, village, household). It is expected to develop handicraft making by linkage with rural tourism in the Region. (Sections 4.13.3 and 4.15)

5. Rural Infrastructure

27. Rural infrastructure is one of the basic conditions to ensure the economic development and the livelihood improvement of local people. In recent years, the Government of Vietnam has promoted infrastructure development in remote areas in line with the nationwide poverty reduction program such as Program 135. In the Region, however, public investment for infrastructure development is limited, although its regional poverty ratio is highest in the country. The Region needs more infrastructures, but priority was not always given by the national government. The main reason seems to be the poor accessibility in and around the Region. In addition, the cost performance of the development projects, i.e. development cost per beneficiary, is generally lower in the sparsely populated areas. Construction costs tend to be higher due to the mountainous topographic conditions. Due to such reasons, the development priority for the Region is lower even though more assistance is urgently required. (Section 5.1)

28. The passenger transport volume in the Region is calculated to be 367.4 million passengers/km, which is only 1% of the national total. National roads in and around the Region are aligned to connect not only to other provinces and cities but also to the international borders with China and Laos. They are broadly divided into two groups: 1) national routes such as No.6, No.12, No.32 and No.70 passing with longitudinal direction toward Hanoi, and 2) national routes such as N.4D, No.279 and No.37 with latitudinal direction to receive goods transported from No.6, No.12, No.32 and No.70 to ring roads and border roads. (Section 5.2.1)
29. Motorways leading to commune centers are available in more than 80 % of the total communes of the Region. During the rainy season, however, most of villages become isolated due to floods, landslides and road surface erosion, resulting in traffic interruption because of muddy surface. In 2004, the Government of Vietnam approved the development strategy of transport in Vietnam up to 2020. Road transport will be increased as a result of expansion of commodity distributions under industrialization toward 2020. Under the strategy, the rural road network will also be improved to interlink all commune centers and to ensure year-round transportation. In 2020, it is envisioned that over 50% of the total length of rural roads are paved with asphalt and concrete. (Section 5.2.3)
30. Small-scale irrigation schemes with less than 30 ha of irrigated area occupy over 80% in terms of both number of schemes and total irrigation area in the Region. Cropping systems under irrigated conditions are represented by double-cropping of paddy. Upland crops are not commonly irrigated. The total paddy field of the Region totals 61,282 ha, of which 34,866 ha are irrigated even in the dry seasons giving an estimated irrigation ratio of 56.9%. In the Region, construction of intake weirs and canal lining are the major works under irrigation development within the framework of poverty reduction programs. (Section 5.3.7)
31. Maintenance of the irrigation facilities constructed by the Government of Vietnam has been under the responsibility of Irrigation Management Company (IMC). The Government officially approved the decision No. 154/2007/ND-CP for water charge collection in which IMC no longer takes responsibility for the water charge collection, while main irrigation facilities such as intake weirs and main canals are handed over to communes and cooperatives. Their management capacity becomes crucial for the sustainable operation and maintenance of irrigation facilities. Although MARD prepared the guideline for water users organization (WUO) establishment in 2004, its implementation is still just a prospect. (Section 5.3.2)
32. The long-term National Rural Clean Water Supply and Sanitation Strategy sets up the development target in which every Vietnamese will have access to national-standard

clean water of minimum 60 lit/day and use hygienic latrines. The national average water supply ratio was 62.4% in 2005. That of the Northeastern and Northwestern Regions combined was the second lowest with a water supply ratio of 56.1%, followed by the Central Highlands Region with 52.3%. (Section 5.4.1)

33. Rural people in the Region collect water from mountain streams, ponds, canals, and other uncovered open wells in community locations or installed in their homes. Others collect rain water. Rural water supply provision could also come from community-installed hand pumps. Quality of water suffers from excessive pollution in some areas or at best, is questionable. Considering the health impact and time/cost foregone in obtaining water, the real cost of rural water supply provision to a household is often higher than connection to piped schemes. Due to lack of data for groundwater potential as well as insufficient inputs including pumping facilities, the useful life of the water facilities are generally short. (Section 5.4.2)
34. In Vietnam, rural electrification is defined such that commune centers or central villages are electrified by the national grid or off-grid. In this definition, there remain non-electrified villages belonging to existing electrified communes. Villages located far from the commune center are so called 'outsirt villages'. Electrification rates in the Region are 42.6% in Lai Chau, 63.9% of Dien Bien, 74.7% of Son La, and 88.8% of Hoa Binh, while the national rural electrification rate is 88%. (Section 5.5.1)

6. Poverty Reduction Programs

35. 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, the 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 aimed at poverty reduction in the poorest communes of ethnic minorities in the mountainous areas. Phase I (Program 135-1) lasted until 2005. Currently, Phase II (Program 135-2) is under implementation. (Section 7.1.1)
36. Japan has continued to extend financial assistance for the 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 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 engaged in rural development activities. (Section 7.1.5)

37. There are many poverty reduction programs and projects are under implementation for infrastructure construction such as the road construction that connect some villages, school construction, and irrigation system , the soft components such as agricultural training, and etc. It is commonly understood that the programs contribute to poverty reduction. However, the impacts and effects of the program are usually not sufficiently assessed due to lack of a monitoring and evaluation system. The JICA Study Team conducted a fact-finding survey on the poverty reduction projects implemented in the Region and examined the need for a monitoring and evaluation system of the poverty reduction programs. (Section 7.2)
38. In the current practice of poverty reduction programs, it is difficult to know whether a project has achieved its target or still require further intervention in particular areas, because project accountability of the implementation agencies and related line ministries are not clearly defined and project information is not managed through a unified system. Geographic Information Systems (GIS) enable the integration of various types of data into a unified system. GIS is an effective tool for monitoring and evaluation of poverty reduction programs in Vietnam, where a number of small-scale infrastructures are dispersed nationwide. (Section 7.2.2)

7. Problem Analyses and Development Needs

39. Within the framework of the Study, the applicability of bottom-up approach to plan formulation of agricultural and rural development was examined. The trial was made in the formulation of a Commune Development Plan (CDP) for all 32 Districts of the Region. Each district selected one commune and organized a series of workshops. For the development approaches of the province and districts, the participants showed strong inclinations toward construction of infrastructure facilities. Participants recognized further the necessity of capacity building about participatory development for the district and commune staff. (Section 8.2.3)
40. They, on the other hand, did not show much concern for operation and maintenance of such facilities. Their ideas of the participatory approach seemed to be limited only on development planning instead of covering the whole project cycle that includes facility operation and maintenance. Considering the fact that development assistance by the donors has been focused more on construction of infrastructure facilities, it is perhaps inevitable that they put a stronger emphasis on the facility construction. (Section 8.2.3)
41. Poverty problems in the Region have arisen from undeveloped living conditions as well

as various problems encountered in the farmers' economic activities. Therefore, improvement of just economic productivity and profitability or rural infrastructure development alone cannot be promising measures for substantial solution of the poverty issues. It requires taking an integrated approach to the various problems in cause-and-effect sequence and promoting a long-term strategy to the overall development. Then, sustainable development will require appropriate resource management. Furthermore, it is necessary to minimize the social risk taking into full consideration that the Region comprises a unique social structure where most farmers are ethnic minorities. (Section 9.2)

8. Master Plan

42. The Region is richly endowed with natural resources as mentioned in Chapter 3 on Regional Vision. On the other hand, it faces several constraints against future development as explained in Chapter 9. The Master Plan is formulated so as to meet the development needs from both points of view. (Section 10.1)

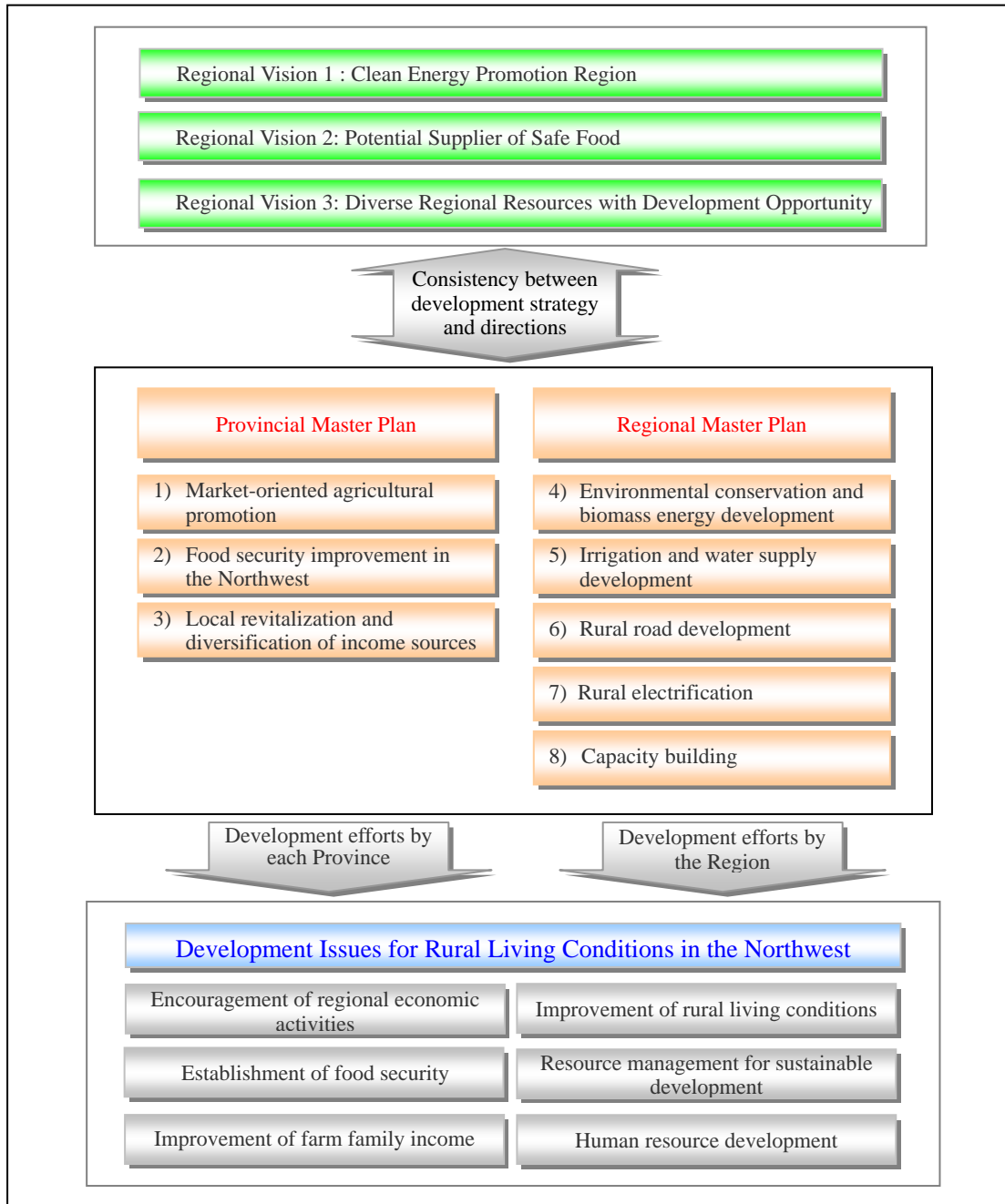


Figure 8.1 Regional and Provincial Master Plans

43. For sustainable development of the Region, each of the four Provinces needs to have its own development scenarios based on its local natural conditions and socio-economic circumstances. At the same time, the four Provinces need to unite and embark on addressing common development issues. The above-mentioned eight strategies of the Master Plan are presented in Figure 8.1. Strategies from 1) to 3) are to be handled by each Province according to its own priority. On the other hand, the strategies from 4) to 8) will be dealt with by joint efforts of the Region. Each of the eight strategies that make up the Master Plan consists of 19 programs. (Section 10.2)

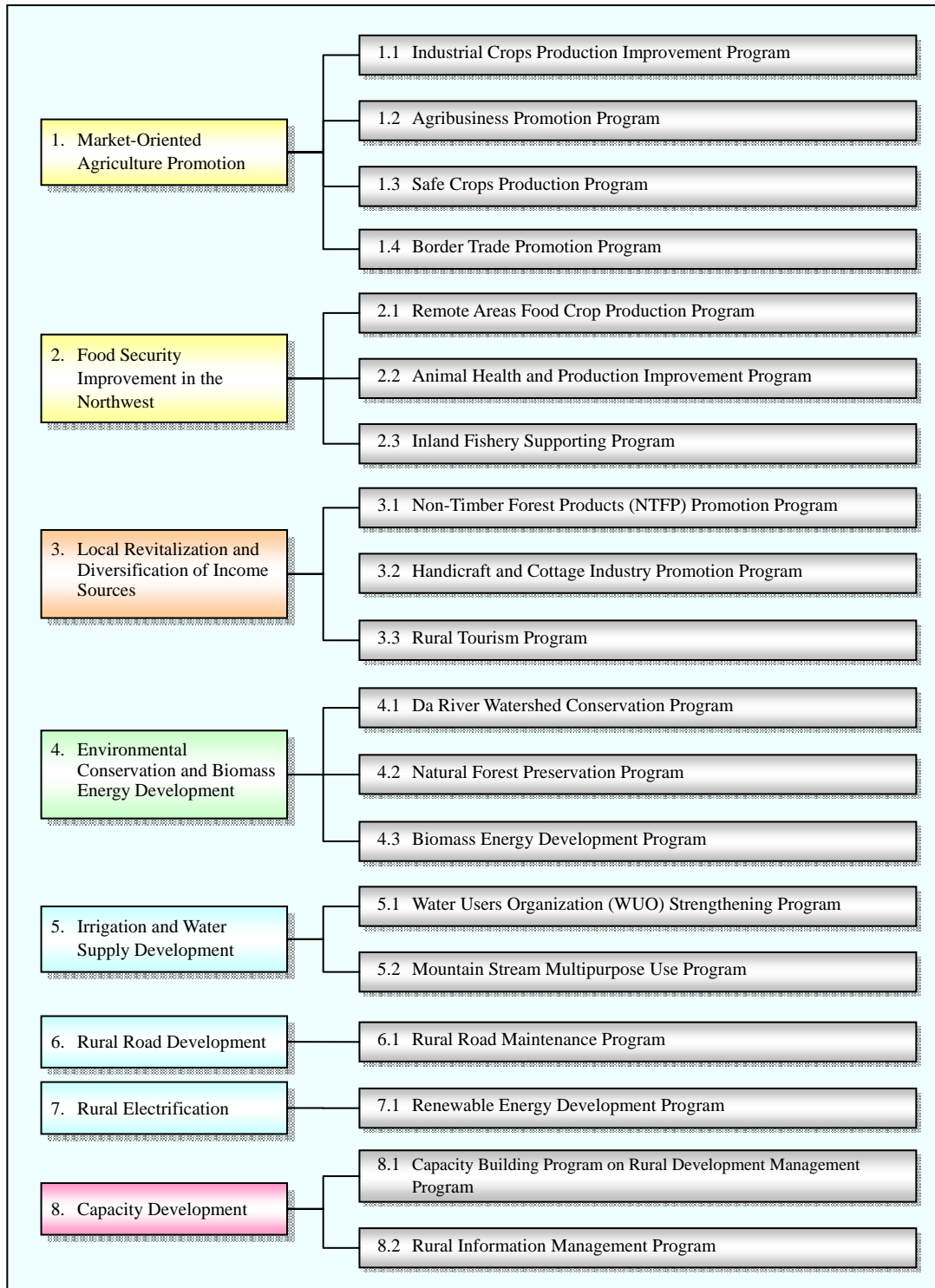


Figure 8.2 Components of the Master Plan

44. Industrial Crop Production Improvement Program

Tea and coffee are the typical industrial crops of the Region. The program will be started with the in-depth study on the commercialization systems from production to marketing. The program firstly aims at establishing a value-chain in which quality improvement, including variety selection, e.g. more green tea and more Arabica coffee,

will be emphasized. Secondly, necessary support will be extended to local processors who are the first purchasers of tea and coffee produced in the Region. Moreover, the program will assist to establish and popularize the regional brands through campaigns. (Section 10.2.1)

45. Agribusiness Development Program

Promotion of agribusiness relies highly on investment from outside the Region. Investors outside the Region will be motivated and encouraged through the clear commitment by the Government in several forms, e.g. favorable taxation, etc. Improvement of institutional banking services is also crucial. In the broad sense, agribusiness is defined as a local industry and business as shown below;

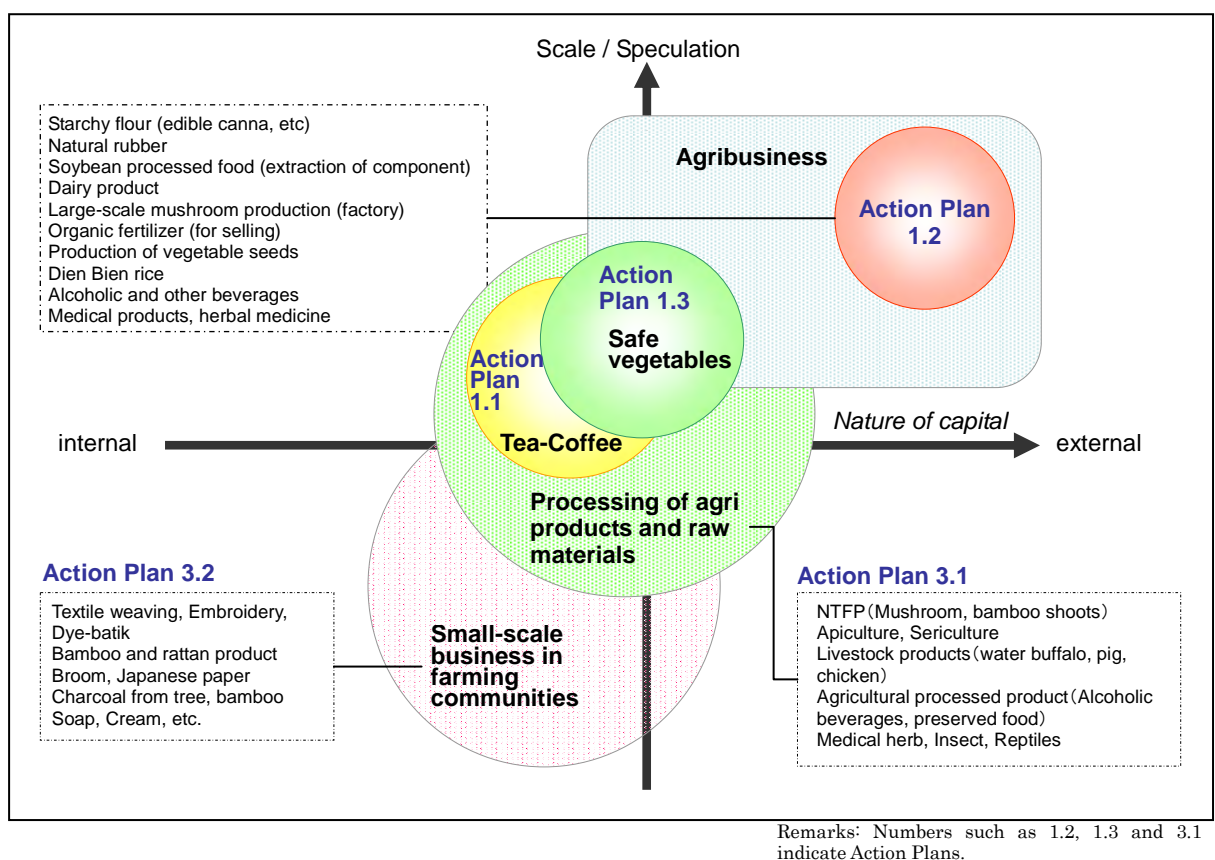


Figure 8.3 Categorization of Local Industry in the Region

The regional economy will be encouraged by the introduction of new agribusiness. Foreign investors are interested not only in profitability from the business but also in their contribution to the Region as a social responsibility. This program aims at promoting diversification of local products with regional brands. (Section 10.2.2)

46. Safe Crops Production Program

MARD keeps its pace with the international efforts on "food safety" by participating in the establishment of ASEAN GAP. The Region is endowed with clean land and water

resources of low chemical contamination, which is prerequisite for safe foods. On the other hand, stable supply system (stable shipment of fixed amount of products of fixed quality), has not been established in the Region. This program focuses on introducing a safe vegetable production system at the soonest possible time. For this purpose, a “Clean Vegetable Center (CVC)” will be established through governmental support. (Section 10.2.3)

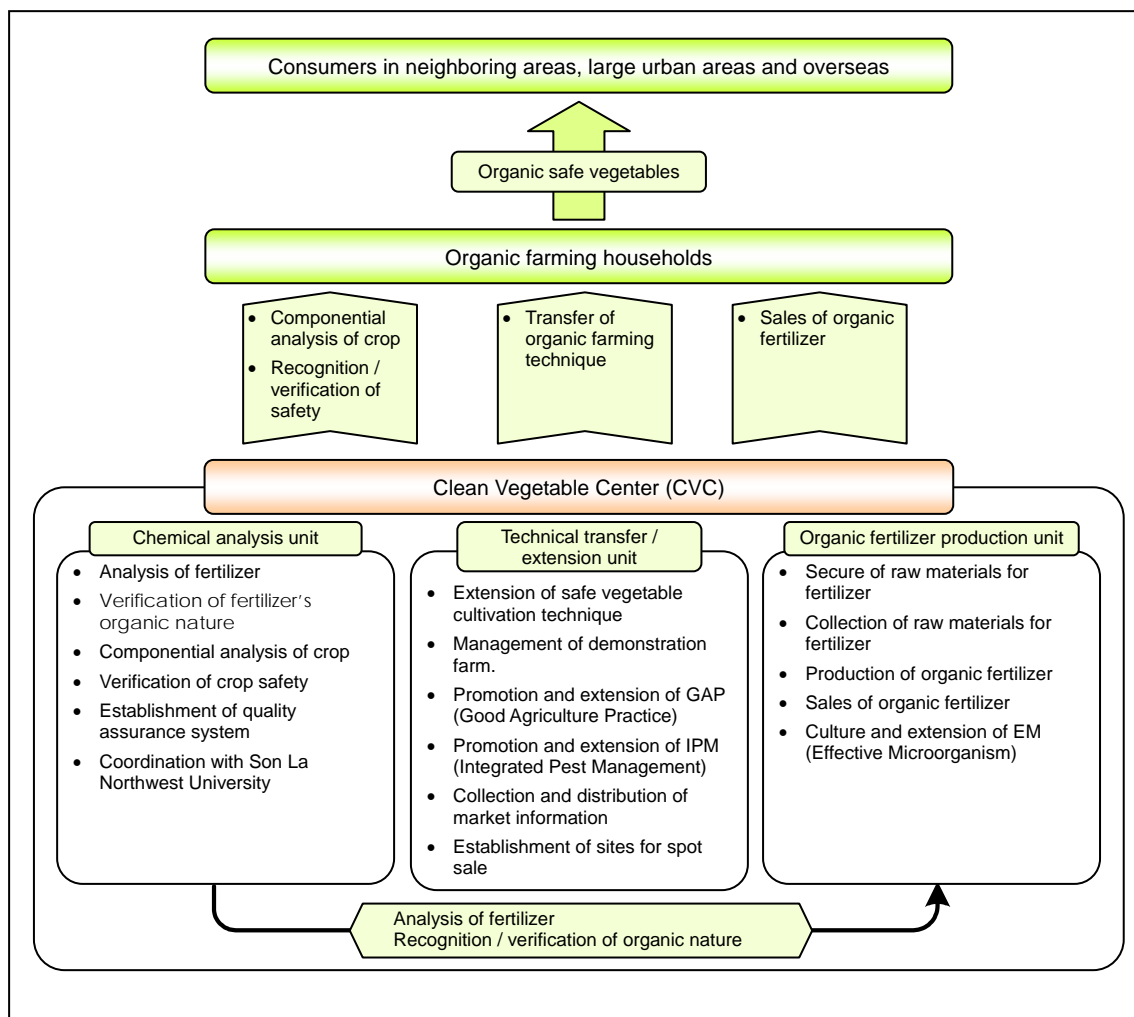


Figure 8.4 Conceptual Diagram of Clean Vegetable Center (CVC)

47. Border Trade Supporting Program

The border trade from the Region to China and Laos will stimulate regional agriculture by increasing the export volume of local products and by diversifying the products. Currently tea, litchi and cardamom are the major products for export. Except for these three, more products will be studied. Border trade in the Region is not just an economic activity, but human and cultural exchange among people of the same ethnic groups who live on opposite sides of the border. It is of paramount importance that these people share the same concern toward local residents and the conservation of local resources.

As sustainable program implementation needs cooperation and participation of local residents, the improvement of living conditions and environmental conservation are to be implemented. (Section 10.2.4)

48. Remote Areas Food Crop Production Program

Supply and demand of food crops in the Region are more or less balanced as a whole, although rice production is less than the national average. Nonetheless, shortage in food supply happens from time to time within the Region due to poor accessibility and distribution system. The difference in the food habits among ethnic minorities should be taken into account. Thai and Muong, who occupy 30% and 23% of the regional population, respectively, practice paddy cropping in the lowland areas, whilst Hmong and Dao, 15% in total, cultivate upland paddy and maize in the mountainous areas. The program aims to support increased production of rice and other food crops through improvement of farming practices and additional infrastructure development, including irrigation and terraced field. (Section 10.3.1)

49. Animal Health and Production Improvement Program

Disease control is of utmost importance for the animal husbandry in the Region. The program aims at promotion of enlightenment and demonstration for hygiene of livestock. Specifically, it is vital to establish quarantine, to prepare a “prevention map on livestock” by utilizing the resource map based on GIS, to organize coordination teams among the four Provinces for the evaluation of public sanitation, to improve sanitation conditions in the meat distribution system, to establish a stronghold for vaccine production, to report to international organizations, and to issue certification of the Region as a non-polluted area. In addition, the program proposes the expansion of community pastures to provide grazing sources to local cattle and introduction of an improved breed of water buffaloes linked with the market promotion of their milk and meat products. (Section 10.3.2)

50. Inland Fishery Supporting Program

Per capita consumption of fish in the Region is limited only to 2.9 kg a year, while the national average is 20 kg a year. Aquaculture is prioritized more than capture fisheries in the Region. Support required for aquaculture includes nursery centers, environmental protection of fish ponds and demonstration of aquaculture techniques. It is also necessary to secure water resources for aquaculture by constructing ponds in the mountainous regions. In parallel with aquaculture, stocking paddy fields with nursery for paddy field culture is being considered. Likewise, the program focuses on conservation of fishery resources of the Da River with special attention to the Hoa Binh dam reservoir. Creating awareness among the local fishermen community will be made

in order to control illegal capture fisheries. The lesson learned will be applied to other water bodies where fishery activities are intensified. (Section 10.3.3)

51. Non-Timber Forest Products (NTFP) Promotion Program

There are limited numbers of enterprises and organizations to process NTFP and fewer infrastructures for NTFP. Both Sub-DOF and producers of NTFP do not recognize the market destination of NTFP. The management capacity of NTFP in the Sub-DOFs is very limited. The program aims therefore at i) inventory surveys for NTFP in the Region, ii) technical transfer of stable production, iii) technical transfer for improvement of value-added, and establishment and improvement of the preliminary processing facilities, and iv) exploitation of new NTFP. Consistent with the National Plan on Non-Timber Forest Product Development and Conservation 2005-2020, such measures would be implemented as the inventory surveys for the existing volume of NTFP, development of the production systems of NTFP, establishment and extension of production techniques of NTFP, expansion of markets, establishment of producers' unions, and introduction of new kinds of NTFP, including seedlings, raising, processing and so on. (Section 10.4.1)

52. Handicraft and Cottage Industry Promotion Program

Handicraft industries in the Region, which have entered the market later, are compelled to compete with those in advanced regions located near large cities. Comprehensive support is thus required for technical guidance, procurement of materials, establishing distribution system and management consultation. The program will provide a wide range of assistances required through implementation of pilot projects by applying past experiences. The program will carry out capacity building both for government staff and farmers. (Section 10.4.2)

53. Rural Tourism Program

Tourism is expected to bring about rural development. Dien Bien Province accommodates 200,000 tourists every year, both locally and from abroad. The historical sites of the Vietnam-France War especially attract many tourists. The program aims to introduce rural tourism such as culture villages and green tourism. Several tourist spots were identified by the Vietnam Tourism Master Plan Study (Department of Trade and Tourism, 2004). They include the border gate to Lao with hot springs, the lake among forests with beautiful natural scenery, and villages with interesting culture of ethnic minorities, etc. The program will expand the business chances of agriculture and the local industry, and increase the income of local women and ethnic minorities by offering services and goods as well as developing value-added products such as local dishes, peculiarities of the Region, etc. (Section 10.4.3)

54. Da River Watershed Conservation Program

This program targets to utilize the renewable energy facilities in a sustainable way through the conservation of forests on the upstream watersheds of the dams. As people are living in these watershed areas, it will not be advisable to remove them from their livelihood areas away for the sustainable utilization of hydroelectric dams. It is quite important therefore to ensure both the improvement of livelihood of the rural people and the conservation of forest soil. To address the issue, the program will introduce plantation of rubber trees in the watershed areas of water reservoirs from the viewpoints of watershed conservation and long-term livelihood improvement, and agro-forestry under the rubber trees from the standpoint of short-term livelihood improvement. Hence, it can be expected that the hydroelectric dams would be utilized in a sustainable manner since sedimentation to the dam reservoirs will decrease, and livelihood of the rural people would be improved accordingly. (Section 10.5.1)

55. Natural Forest Conservation Program

The Region is located in mountainous areas, where a diversity of rare species of fauna and flora are identified. This program aims to establish management boards for special-use forests, to formulate investment and management plans, and to upgrade the management capacity for special-use forests among the officials of Sub-DFPs. It is urgently required to demarcate borders between forest lands and agriculture lands through coordination among the organizations/authorities concerned. Inventory surveys on fauna and flora will also be implemented for formulating investment plans and management plans of the special-use forests. Thereafter, co-management of the special-use forests, cf. supplementary planting and tending, will be undertaken with participation of the rural people such that the special-use forests and livelihoods of rural people can coexist. (Section 10.5.2)

56. Biomass Energy Development Program

Biodiesel production was already introduced in Vietnam although its scale is still limited. The project proposal on development of biofuel until 2015 and the vision to 2025 was officially approved by the Prime Minister's Decision No. 177/2007/QĐ-TTg in November 2007. Then, MARD embarked on promotion of *Jatropha curcas* L., physic nuts for extracting biodiesel in line with the strategy for *Jatropha* development issued in January, 2008. The program will thus encourage plantation of *Jatropha* in the Region, not only for biodiesel production but also for protection of bare and denuded lands which are abandoned after slash and burn. The minimum economic scale of oil processing lines is known to be 3,000 ton/year for which 1,000 to 1,500 ha of *Jatropha* field is required. This program consists of i) the examination and introduction of

adequate varieties, viz. provenances, of Jatropha, ii) planting of Jatropha, iii) development and construction of oil processing plants, and iv) extraction and purification of biodiesel from seeds of Jatropha. Investment by the private sector is highly expected. (Section 10.5.3)

57. Water Users' Organization (WUO) Strengthening Program

The four Provinces of the Region have their respective rehabilitation and upgrading plans of medium-scale irrigation schemes with more than 30 ha. The short-term target by 2010 is set to rehabilitate and upgrade 550 ha with beneficiaries of 2,700 households in total. To develop the management capacity of WUOs is of utmost importance since irrigation facilities are to be handed over to WUOs after completion of the construction works. The program aims to establish and train WUOs through the participatory development approach. Firstly, the action plan will be directed more to capacity building of the DARD staff through learn-by-doing the assistance to WUOs. The program aims also at the implementation of on-farm development through farmers' participation. (Section 10.6.1)

58. Mountain Stream Multipurpose Rural Water Supply Program

The program aims at development of small-scale irrigation systems (less than 30 ha), which are not covered by the Water Users' Organization (WUO) Strengthening Program. The basic concept of the multipurpose rural water supply by using mountain streams is illustrated below.

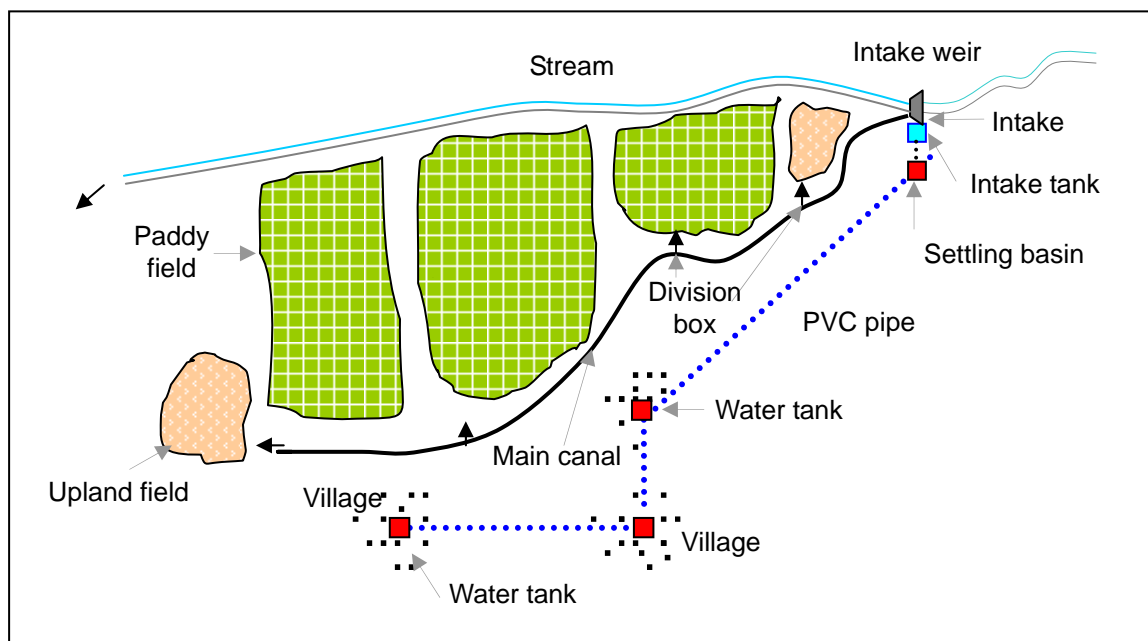


Figure 8.5 Example of Multi-Purpose Water Facility Using Mountain Stream

In the Region, small-scale irrigation systems occupy 80% of the existing irrigation areas (5,000 systems with 40,000 ha). These facilities are also used as water sources for rural

water supply, and some of them are simple and constructed by the farmers themselves using funds from Program 135, etc. Due to lack of ownership, the systems are not appropriately operated and maintained. As a result, frequent repair and rehabilitation are required. The program aims at re-establishment of such projects in order to improve the sustainability through the farmers' participation. By this method, it is possible to promote implementation of projects with decreased costs. In promoting participatory development, it is preferable to implement projects in such a way that farmers are motivated to accomplish the projects based on their own proposals. (Section 10.6.2)

59. Rural Road Management Program

The national and provincial roads in the Region are maintained under the responsibility of central and provincial governments. Repairs at disaster sites and regular maintenance works are carried out by allocating their budgets. On the other hand, maintenance works for rural roads are limited only to minor works such as patching of potholes, mowing, side ditch cleaning etc. Moreover, in case of inter-commune and village roads, the work is performed only by local residents with their own labor force due to lack of budget and management funds. This program will therefore be implemented to develop management system and capacity building in terms of operation and management of rural road networks; 1) to propose new rural road management system in collaboration with road management officers of the Department of Transport, 2) to establish a database of existing and proposed rural road networks, 3) to prepare an operation and maintenance manual for rural roads in terms of regular inspection, countermeasures to cope with natural and man-made disasters, traffic volume, regulations etc., 4) to build joint networks of database on operation and maintenance among communes, districts, and provinces, and 5) to build capacities of road maintenance personnel in the district and commune levels through workshops, mastery of management manual and technical maintenance. (Section 10.7.1)

60. Rural Electrification Program for Availability of Renewable Energy

Rural electrification covering remote, mountainous areas is now facing development constraints such as complicated topography, scattered and thinly population, communes being far from transmission lines, and low income of farmers. Construction of power transmission lines and distribution facilities require a lot of investment. EVN has been giving development priorities to non-electrified rural areas to be easily accessible to existing national electric networks or to electrified areas where energy losses are increasing due to deterioration of electrical equipment. The Department of Industry in the province has been implementing prioritized projects by mobilizing diversified fund resources procured in domestic and foreign countries in accordance with the above criteria. Objectives of this program are to demonstrate rural electrification by applying

renewable energy such as micro hydropower, solar energy and wind power to non-electrified communes, which create independent local power sources. (Section 10.8.1)

61. Capacity Development Program on Rural Development Management

This program aims to develop the capacity of DARD officers in formulating development plans that are sustainable and meet the needs and goals of the local residents. The focal point of the program is participatory development as it supports the planning reform in the ongoing administrative decentralization of the Government of Vietnam. In the future, participatory development concepts and methodologies are to be applied not only in the formulation of development plans but also in rural facility construction, organizing facility users for O&M, implementation of development activities, and project monitoring. Four types of capacity development are to be carried out; 1) comprehensive understanding of development activities in the province, 2) formulation of provincial agricultural development plan, which is to be the basis of the SEDP, 3) monitoring and evaluation, and 4) participatory development methods for agricultural development planning. (Section 10.9.1)

62. Rural Information Management Program

Many poverty reduction projects have been carried out in Vietnam. It is generally understood that these projects have significantly contributed to poverty reduction by improving infrastructures. Due to lack of monitoring system, however, the projects are not properly followed up. More interventions on project monitoring, therefore, are urgently required. This program is to introduce a) a rural information management system with the aid of the GIS techniques, and b) a project cycle management for planning, screening, monitoring and evaluation of poverty reduction projects by using the established GIS database. Capacity development of the government staff will also be carried out. (Section 10.9.2)

9. Action Plan

63. The Action Plans were prepared to achieve the initial targets of the ultimate development goals toward 2020 set up under the Master Plan, which consist of 19 programs in eight sectors. The Action Plans are expected to start in 2010 and will be implemented in the 5-year period from 2011 to 2015 of the next SEDP period, which will be divided into two phases. The proposed 19 programs are categorized into programs for the Provincial Master Plan and Regional Master Plan. As presented in Table 9.1, 40 Action Plans are formulated under the Provincial Master Plan and 10 Action Plans are under Regional Master Plan.

Table 9.1 List of Action Plans

Sector	Master Plan Programs	Action Plan			
		Lai Chau	Dien Bien	Son La	Hoa Binh
1. Market-Oriented Agricultural Promotion	1.1 Industrial Crop Production Improvement Program	Quality and Yield Improvement of Tea	Quality and Yield Improvement of Tea	Quality and Yield Improvement of Tea	Quality and Yield Improvement of Tea
			Quality Improvement of Coffee	Quality Improvement of Coffee	
	1.2 Agribusiness Promotion Program	Production and marketing of natural rubber	Production and marketing of high quality Dien Bien Rice	Production and distribution of high quality dairy products	Development of farm implements
		Production and marketing of mushroom			
1.3 Safe Crop Production Program	Production of Clean Fruits	Establishment of Clean Vegetable Center (CVC)	Establishment of Clean Vegetable Center (CVC)	Establishment of Clean Vegetable Center (CVC)	
1.4 Border Trade Promotion Program	Infrastructure Development in Border Area	Infrastructure Development in Border Area	Infrastructure Development in Border Area		
2. Food Security Improvement	2.1 Remote Area Food Crop Production Program	Rice Production Improvement in Remote Areas	Rice Production Improvement in Remote Areas	Maize Production Improvement in Remote Areas	Rice Production Improvement in Remote Areas
	2.2 Animal Health and Production Improvement Program	Animal Health Control			
		Community Dairy Farm Development	Community Dairy Farm Development		Introduction of Improved Water Buffalo Breed
2.3 Inland Fishery Supporting Program	Rice Field Aquaculture Pilot Project	Pond Aquaculture Pilot Project		Fishery Resource Management in the Hoa Binh Dam Reservoir	
3. Revitalization and Diversification of Income Sources	3.1 NTFP Promotion Program	Integrated NTFP Management	Introduction of Medicinal Plants	Integrated NTFP Management	Promotion of Multi-Purpose Trees and Medicinal Plants
	3.2 Handicraft and Cottage Industry Promotion Program	Promotion of Handicraft and Food Processing at CLC	Community-based Handicrafts and Food Industry	Promotion of Specialty Products	Roadside Stations Sales Promotion Campaign
	3.3 Rural Tourism Program	Green Tourism Promotion	Tourism Village Promotion	Tourism Village Promotion	Tourism Village Promotion
4. Environmental Conservation and Biomass Energy Development	4.1 Da River Watershed Management Program	Afforestation with Rubber and Other Tree Species and Agroforestry Promotion			
	4.2 Natural Forest Conservation Program	Management of Special-Use Forests and Establishment of New Nature Reserves			
	4.3 Biomass Energy Promotion Program	Introduction of Biomass Energy Production			
5. Irrigation and Water Supply Development	5.1 Water User Organization Strengthening Program	Water Use's Organization (WUO) Strengthening Pilot Project			
	5.2 Mountain Stream Water Use Program	Mountain Stream Multipurpose Use Pilot Project			
6. Rural Road Development	6.1 Rural Road Maintenance Program	Rural Road Operation and Maintenance Pilot Project			
7. Rural Electrification	7.1 Reusable Energy Rural Electrification Program	Renewable Energy Development Pilot Project			
8. Capacity Building	8.1 Provincial Staff Training for 5 Year Plan Preparation	Formulation of 5-Year Agriculture and Rural Development Plan			
	8.2 Rural Information Database Establishment Program	Northwestern Region GIS Establishment Project			

64. Action Plans for Lai Chau Province

Increased food production and improved diet in remote areas

Food security in Lai Chau Province is an important issue as roads within the province and roads to outside are not in good condition. Action plans are proposed to increase food crop production in the remote areas through a) development of small-scale irrigation in valleys and terrace field by using mountain streams, and b) coordination of agricultural extension and provision of rice and maize seeds.

Efforts to supplement the diet of local residents through the assistance on livestock industry and fishery are also needed. Lai Chau Province has a cool climate where water buffaloes are widely used as draft animals. Production of buffalo milk and meat will be increased. Improved service to maintain animal health and stable supply of feeds are also required. Therefore, action plans for water buffalo milk and meat production, and animal health service are proposed.

Large-scale pond aquaculture is less suitable in Lai Chau Province where water sources and land are limited. Instead, paddy field aquaculture for household consumption will be carried out. Action plans are proposed to establish and extend practices for diversification of additional income sources for poor farmers and women's groups.

Adoption and extension of agricultural products for border trade

Lai Chau Province shares a border with Yunnan Province of China. Border trade with China is carried out in Ma Lu Thang, Phong Tho District. Its total trade in 2006 amounted to US\$3.7 million, which is equivalent to 9.4% of the provincial GDP. Contribution of the border trade to the provincial economy is not meager. The major export items to China include tea, cardamom, bamboo pulp, and iron-ore. Amount of tea export to China is increasing. In 2006 alone, 1,900 tons of tea leaves were exported to China. The province has another border gate in U Ma Tu Khoang, Muong Te District, although it is currently closed. With these two border gates, border trade is likely to play a major role in the agricultural development of the Province. Stabilization of people's livelihood in the border area is important in promoting sound border trade. For this, infrastructure development is needed.

Diversification of specialty products with a view on border trade is required. Safe agricultural products from the province have potentially high market competitiveness. In the Action Plan, high priority is given to fruit production by promotion of agro-forestry. The Action Plan also proposes quality improvement of tea, which brings immediate effects.

Although Lai Chau Province has disadvantages making it difficult to have private firms

operate in the area, promotion activities to attract agribusiness beyond 2020 is important. An action plan proposes production and sales of natural rubber and mushrooms as a local industry based on the unique characteristics of the province.

Utilization of forest resources and development of handicraft industry

Promotion of NTFP is an important development strategy of Lai Chau Province. This is because adoption and extension of production activities are sought that do not rely much on land resources. Bamboos, rattan, lac, Trau trees, etc. are already widespread in the Province, thus needing only an action plan to establish a comprehensive management system.

Diversification of income sources through the development of the handicraft industry and tourism is expected for women and farming households with not enough land for cultivation. Based on the actual track record of farmers' education carried out in CLCs, the Action Plan proposes a pilot project for training of cooperatives and micro enterprises on handicraft and food processing. Since Lai Chau Province has abundant natural resources, another action plan is proposed for the development of tourism/culture village and green tourism in which tourists can experience cultures and traditions of minority ethnic groups. The Action Plan is based on the experience and lessons learned from tourism development in Sa Pa in Lao Cai.

65. Action Plans for Dien Bien Province

Establishment of safe vegetable production model in the Region

Except for the traditional industrial crops and rice, Dien Bien Province does not have any high value-added commercial crops. One of the Province's challenges, therefore, includes finding and adopting commercial crops that greatly contribute to the regional development. If a crop, whose sales price is comparable to the airborne cost between Dien Bien Phu and Hanoi airports, is found and produced, it will be a case example of modern agriculture with high added values for not only Dien Bien Province but the whole Region as well.

Based on the increasing needs for safe agricultural products in Hanoi, an Action Plan is formulated to promote production of clean vegetables. Production and sales of safe vegetables are proposed, not as agribusiness promotion but a way to reduce production cost through cutting back the use of chemical fertilizers and agrochemicals, and to promote awareness of safe food. In order to have the farmers accept this new agricultural technique, commitment by the government is necessary. The Action Plan proposes government-led organic fertilizer production which utilizes by-products from the agro-processing industry and livestock manure.

Agribusiness with immediate effects: Improvement of rice milling

Agribusiness in Dien Bien Province consists of processing factories of cooking oil, starchy flour, bamboo pulp, soy bean products and coffee. The Action Plan focuses on the improvement of value-added of Dien Bien rice which is already established as a local brand. Quality improvement of milled rice can be achieved by preventing both the degradation of stored paddy grains after an incomplete drying process, and increased broken rice due to deteriorated rice mills. Unless these things are done, rice farmers cannot fully benefit from high quality rice. A value chain needs to be established through the cooperation of private rice mills and farmers. On an experimental basis, the Action Plan proposes to introduce a high-grade rice milling machine to know the market reactions through a pilot project under the leadership of the local government.

Increased food production and improved diet in remote areas

Food security in Dien Bien Province is an important issue, as roads within and outside the province are not in good condition. Food production should be developed around the basic concept of “local production for local consumption”. An Action Plan is proposed to increase food crop production in the remote areas through the combination of a) development of small-scale irrigation in agricultural lands in valleys and terrace fields, and b) provision of quality seeds.

Livestock farming of cows for meat, buffalo, pigs, chickens, etc. is widely practiced in Dien Bien Province. Because of its location near the national border, prevention of livestock disease is a major challenge for the Province. Strengthening of services for livestock health is proposed as a region-wide action plan. To carry out this local government service, province-wide promotion of livestock farming is proposed. Under this promotion, communal livestock farms that utilize idle land are established to provide livestock feed and offer livestock services.

In Dien Bien Province, small-scale pond aquaculture for household consumption is practiced in areas where water sources and land are available. As good fries are scarce, the Action Plan proposes a pilot project to establish a hatchery and to strengthen pond aquaculture techniques.

Development of diverse local industries

In Dien Bien Province, production activities that do not rely on land resources should be adopted and promoted. For this reason, promotion of NTFP is very important. The Action Plan is proposed to strengthen the comprehensive management system of NTFP such as medical herbs, spices, rattan, lac and bamboos.

Dien Bien Province has the greatest number of tourism resources in the Region.

Tourism development leads not only to expansion of profits of the tourism sub-sector, but also to the creation of business opportunities for related industries. Focusing on handicraft production and food processing, Action Plans are aimed to support development of souvenirs for tourists and establishment of market channels as the side jobs of local farmers and women's groups. Activities to preserve cultures and traditions of minority ethnic groups are also included.

66. Action Plans for Son La Province

Increased production of food and improved diet

Although the rice shortage in Son La Province is compensated by marketed rice from the other provinces/regions, attainment of food security through stable production of rice is still a basic issue for the agricultural policy of the province. Intensification of rice cultivation, through increased production and improved rate of cultivation, needs to be carried out. Because of the province's limited resources for irrigation development, the issue calls for multi-faceted efforts.

As the rice shortage is partially compensated by maize, the Action Plan aims for improved production of maize. Road access within Son La Province is likewise not good. During the rainy season, many places cannot be accessed by vehicles. Because smooth distribution of crops require improved access, improvement and operation and maintenance (O&M) of rural roads are essential. Development of agriculture under the theme of "local production for local consumption" is also important. The Action Plan proposes increased food production in remote areas through the combination of small-scale irrigation development in field and paddy terraces and provision of quality seeds.

Support of safe vegetable production

Son La Province is one of the major tea and coffee production areas. Son La tea was successfully established as a brand. The Action Plan proposes a pilot project to promote quality improvement of tea and coffee. Efforts should be made in finding and adopting commercial crops. As a candidate for such commercial crops, production of safe vegetables is included in the Action Plan. In Moc Chau District, whose agricultural sectors are developed due to its easy access to Hanoi, protected/greenhouse horticulture is carried out by private firms. They send the vegetables directly to large supermarkets in Hanoi as well. The Action Plan proposes a government-led guidance on agricultural techniques, and production of organic fertilizer in order to learn from experiences of Da Lat, Lam Dong Province, support self-reliance efforts of the private firms, and offer local farmers the chance to engage in safe vegetable production.

Conservation and utilization of forest resources

Planting of rubber trees has been promoted in Son La Province on denuded land with altitudes of less than 600m above sea level and slope less than 30 degrees. As will be explained later, the Action Plans propose watershed conservation and bio-energy development. They are aimed to be developed into region-wide activities and adopt energy crops such as Jatropha. Comprehensive management system of NTFP, including medical herbs, spices, rattan, lac, and bamboos, is to be developed because production activities that do not rely on land resources are needed.

Promotion of specialty products of Son La Province and rural tourism

In Son La Province, various products are already in the market as a result of the government-supported development of specialty products. Focusing on handicraft and food processing, the Action Plan supports development of local industries, and promotion of products and marketing channels. In rural tourism, development of a small-scale industry in areas around the reservoir of the Son La Dam, which is to be completed in 2012, is to be the key.

67. Action Plans for Hoa Binh Province

Supports to profit-oriented agriculture in the suburbs of Hanoi

In Hanoi, consumers' interest in food safety has been gradually increasing. Safety of perishable food cannot be easily ignored even in the production areas. Profit-oriented agriculture is carried out in the suburbs of Hanoi. Under this agriculture, protected/greenhouse horticulture is carried out with the aim to produce highly safe vegetables. MARD started technical guidance on clean vegetable cultivation in order to establish the process management system for safe vegetables through the adoption of GAP.

Based on the lessons learned from Da Lat, Lam Dong Province, the Action Plan proposes adoption of contract farming of city-bound safe vegetables in Hoa Binh Province that involves private firms and local farmers. The Action Plan promotes direct distribution of safe vegetables to first-class restaurants and large supermarkets in Hanoi. As for the establishment of production areas, cooperatives are to play the major role in producing specialized vegetables which are unique only to the province and establishing their market channels. Commitment by the government is necessary for this action plan. The Action Plan also proposes government-led guidance on agricultural technology and organic fertilizer production.

Supports to Agribusiness

In Hoa Binh Province, development of agribusiness, which makes the best of Hoa Binh's good accessibility as a part of the Hanoi economic zone, has been greatly expected. The agro-processing industry on sugar and tea is already established. For the future, finding and adopting industrial crops which can be used as raw materials for processing are required so that a new industry could be established.

Promotion of livestock industry is likely to supplement the diet of local people and contribute to poverty reduction in Hoa Binh Province. Based on the experiences of Ha Tay Province, the Action Plan proposes production of premium dairy products made from milk with high fat content through the adoption of improved species of water buffalo which are highly resistant to diseases and produce more meat and milk.

As part of agribusiness promotion, the Action Plan proposes creation of materials and equipment for protected/greenhouse horticulture and agriculture in Hoa Binh Province. Expansion of protected/greenhouse agriculture requires pipes for irrigation and nets against insects. Improvement of agricultural tools is likewise necessary to increase the efficiency of agricultural work. Development and production of agricultural tools based on interviews with farmers and the soil conditions are likely to be promising agribusiness.

Increased production of food and improved diet

Although the rice shortage in Hoa Binh Province is compensated by marketed rice from the other provinces/regions, self-sufficiency in rice in the province is diminishing continuously. Increased production of rice is therefore a basic issue for the agricultural policy of the province. For increased production, increase of yield and rate of cultivation (increase of areas for double cropping) and improvement of the existing irrigation facilities are necessary.

Because smooth distribution of food require improved access, improvement and O&M of rural roads are essential. Development of agriculture under the theme of "local production for local consumption" is also important. The Action Plan proposes increased food production in remote areas through a combination of small-scale irrigation development and provision of quality seeds.

Conservation of aquatic resources

Basic conditions for aquaculture extension in Hoa Binh Province are already met as they have hatcheries. The Action Plan proposes awareness-raising activities for fishing people and development of a legal system to conserve aquatic resources and improve administrative capacity. Prohibition of illegal fishing and limiting fish catching through establishment of non-fishing areas and time/season, are big challenges. For effective

implementation of the action plan, coordination with Son La Province should be carried out.

68. Action Plans for Northwestern Region

The Master Plan focuses on common strategies that cut across the local government boundaries. These strategies are put together and made into seven programs. The programs are likely to be more efficient and effective because each common issue is not handled independently by each province, but handled in a unified manner across the region.

Various development projects are already taking place in Vietnam, including Program 135, which is a nationwide poverty reduction program and 5-Million Hectare Reforestation Program, which is an environmental and forest conservation program. The Master Plan tries not to overlap with these ongoing programs. Instead, it tries to harmonize and supplement these programs. Programs based on new concepts with awareness on regional visions are proposed as well.

Region-wide environmental conservation

Action Plans are proposed to promote a) conservation of Da River watershed, b) development of biomass energy and c) conservation of special-use forests. These three are essential items of development prioritized by the Master Plan.

Reforestation and agroforestry are urgently needed to increase the income of local farming households and conserve the Da River watershed (reduction of flow of soil and sand into the Hoa Binh Dam and the Son La Dam). Lately, China's import of natural rubber has been increasing, which is positively affecting the Region. Rubber tree planting is expected to have a big effect in terms of promotion of agribusiness and border trade.

In the Region, ethnic minorities have been using Trau trees as raw material for oil. Demand for biofuel is growing due to the increase of crude oil prices. Jatropha is much expected to be used in forestry activities as it leads to watershed conservation and poverty reduction.

Rural infrastructure development projects, and coordination-supplementation

Action plans on major rural infrastructure involve proposed pilot projects on irrigation, rural water, roads and rural electricity.

For irrigation, technology transfer of irrigation software will be part of priority irrigation projects that are likely to start in the near future. As a way of assistance to cooperatives, this technical transfer will facilitate smooth transfer of irrigation facilities to cooperatives,

and improve the farmers' capacity to carry out operation and maintenance of the facilities. In the Region, irrigation development is mainly carried out in the low plains located between mountains. Focusing on mountain streams, the Action Plan proposes the multi-purpose use of the streams by combining provisions of a) irrigation water to terrace field and terrace paddies in the mountain areas, and b) safe drinking water to villages through pipes.

For roads, projects based on the national road plan have been implemented continually. Thus, the Action Plan proposes a pilot project on road operation and maintenance that supports the ongoing projects/activities to improve road networks. Rural electrification in the Region is likely to have low cost-effectiveness as the cost of power distribution is expected to be high due to the Region's low population density. In the Action Plan, establishment of facilities for off-grid power generation and distribution is considered.

Capacity building of local government officers

A human resource development program is to be carried out for smooth planning, implementation, management and monitoring of agricultural and rural development projects/activities. As the next 5-year socio-economic development program of Vietnam starts in 2011, the Action Plan proposes some technical transfer to DARD staff in each province so that they can play active roles in the formulation of the agricultural-sector plans for the SEDP.

Monitoring of activities is not usually given high priority because monitoring itself does not produce direct benefits. Collecting and organizing basic information on agricultural and rural development are essential in carrying out various projects that do not overlap. The Action Plan proposes establishment of database through the use of GIS and training on application of the data in project monitoring.

10. Environmental and Social Consideration

Environmental and Social Consideration for Implementation of Master Plan

69. The Master Plan is formulated not to target a large magnitude of development by optimizing the use of land and water resources. Therefore, there may seem to be only a small scale of burden on the natural environment. However, there can be some negative impacts on the ethnic minorities by implementing the Master Plan, because of their large population in the Region. Moreover, the Region is located in the border area, where many kinds of rare fauna and flora are identified. Therefore, the detailed environmental impact assessments should be conducted according to the Vietnamese regulations related to the environmental and social considerations, and the negative impacts from these projects should be minimized as much as possible. (Section 6.1) In

addition, a Strategic Environmental Assessment (SEA) at the earliest stage also needed to be conducted in due course. (Section 6.3.1)

Environmental and Social Consideration for Implementation of Master Plan

70. Assumed problems based on environmental and social considerations and their countermeasures for each of the 50 Action Plans were assessed in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2004) (Section 12.2.1) The assessment verified the necessity to pay particular attention to negative impacts such as the effects on poor, indigenous and ethnic people, unfair distribution of benefits and damages, local conflicts of interests, sanitation, water pollution and waste.
71. The Action Plans, which should be taken into account in the environmental and social considerations during implementation of the Action Plan include: Agribusiness Promotion Program , Safe Crop Production Program, Border Trade Promotion Program , Rural Tourism Program, Natural Forest Conservation Program, and Biomass Energy Promotion Program (Section 12.2.2)

Analysis of Alternative Plans (including a “Without Project” Situation)

72. The comparison of potential impacts between “with” and “without” the Project was analyzed. Taking the mitigation measures into consideration, the Master Plan will increase positive impacts related to social environment, such as local economy, the poor/indigenous/ethnic people, unfair distribution of benefits and damages. Although some negative impacts on the natural environment and pollution would be expected in the case of “with the Project” condition, those impacts would be reduced and decreased by conducting mitigation measures. On the other hand, under the “without the Project” condition, not only the social environment, such as local economy, the poor/indigenous/ ethnic people, unfair distribution of benefits and damages, but also the natural environment, especially fauna, flora and biodiversity, would be impacted negatively by the continuous disorderly utilization of the natural environment. (Section 12.4.1)

11. Assessment of Master Plan

Assessment of Master Plan Programs from Several Viewpoints

73. Qualitative assessment of the 19 programs was undertaken in order to select priority programs, which will be studied in depth in the following study stage in and after April 2008. The following 14 aspects were selected for the assessment; 1) Contribution to Regional Economy, 2) Investors' Incentives, 3) Contribution to Poverty Reduction, 4) Urgency among rural communities, 5) Adaptability to Development Needs among

Farmers, 6) Adaptability to DARD's Mandate, 7) Adaptability to Other Agencies' Mandate, 8) Technical Capacity of Farmers, 9) Fund Requirement, 10) Cost Performance, 11) Time Requirement, 12) Benefits to Ethnic Minorities in Higher Mountainous Areas, 13) Social Impacts, and 14) Environmental Impacts. The analytical results are summarized in the following paragraphs. (Section 13.1.1)

74. Programs prioritized from the viewpoint of regional economic development - Favorable economic impacts to the regional economy are expected through implementation of three programs under the Market-Oriented Agriculture Promotion Plan, namely Agribusiness Promotion Program, Export-oriented Horticultural Development Program and the Border Trade Promotion Program. They are followed by the following four (4) programs, i.e. Industrial Crops Production Improvement Program, Non-Timber Forest Products (NTFP) Promotion Program, Da River Watershed Conservation Program and Biomass Energy Development Program. (Section 13.1.2)
75. Programs prioritized from the viewpoint of private investors - The above-mentioned seven programs will motivate the private sector. Private investors will be encouraged to finance agribusiness for food processing and the export-oriented horticultural production around the concept of food safety, i.e. safe vegetables, in the Region. In addition, private investors will also recognize their business opportunity in jatropha production through the Biomass Energy Development Program. Apart from agricultural production, two programs will also be interesting to private investors in the future, namely Handicraft and Cottage Industry Promotion Program, and the Culture Villages and Green Tourism Program. (Section 13.1.2)
76. Programs prioritized from the viewpoint of poverty reduction - Poverty reduction in the Region should be approached both from the viewpoint of food security and income generation of local farmers. The Master Plan will mainly promote increased food production for home consumption under the Regional Food Security Improvement Plan, and improvement of farm family income under the Market-Oriented Agriculture Promotion Plan. The Remote Areas Food Crop Production Program and Animal Health and Disease Control Program are also expected to be urgently introduced. Both programs are crucial for ethnic minorities, who make their livelihood from higher mountainous areas. The Inland Fishery Supporting Program is also important, although the program can be introduced only to a limited extent where water resources are available throughout the year. Therefore, this assessment gives higher priority to animal husbandry rather than to fishpond culture. (Section 13.1.2)
77. Programs prioritized from the viewpoint of improvement of rural living conditions - The study for the Commune Development Program verified that development priority is always given to four infrastructural components such as irrigation, rural roads, water

supply and rural electrification in almost all of districts of the Region. The ongoing poverty reduction programs, especially for SPL of JBIC, attach the highest priorities to these components. It is expected that infrastructural development in the Region is more encouraged at the earliest phase. Four programs consisting of WUO Strengthening, Mountain Stream Multipurpose Rural Water Supply, Rural Road Maintenance and Renewable Energy Development will support and supplement the ongoing rural infrastructure programs. (Section 13.1.2)

78. Programs prioritized from the viewpoints of Fund Requirement and Cost Performance - Fund requirement for the programs under the Market-Oriented Agriculture Promotion Plan and Non-Timber Forest Products (NTFP) Promotion Program are rather low since large facilities are not required. Their cost performance, i.e. benefit-cost ratio, is also higher than others. In contrast, cost implication of the Border Trade Promotion Program and the Remote Areas Food Crop Production Program tends to be large due to higher transportation cost through limited accessibility of such areas as the Region. The Culture Villages and Green Tourism Program is advantageous in terms of the cost performance. but requires a rather budget allocation. (Section 13.2.2)
79. Programs Prioritized prioritized from the viewpoint of Environmental and Social Consideration - The Environmental Conservation and Biomass Energy Development Programs will directly contribute to environmental conservation and mitigate negative impact to local people. It is important to formulate the programs under the Market-Oriented Agriculture Promotion Plan, Food Security Improvement Plan, Revitalization and Diversification of Income Sources. Social consideration is also prerequisite to minimize negative impacts to the environment of the Region. Although there are no direct benefits to be obtained from the Natural Forest Conservation Program, it is important to create awareness among local farmers that environmental conservation will make their agricultural benefit more stable and sustainable. The program should be implemented under governmental initiative. (Section 13.1.2)
80. Programs prioritized from the viewpoint of capacity building among Local Government Staff - Two (2) Capacity Building programs, namely, the Provincial Staff Training for 5-Year Plan Preparation (8.1) and Rural Information Database Establishment Program (8.2) will contribute to environmental and sociological impacts. These programs will introduce systematic training programs for participatory development from planning, implementation and operation and management. (Section 13.1.2)

Assessment of Program Impacts on Farm Income

81. In order to assess project benefits, impacts on farm income are assessed for the following programs. The farmers in the Region are generally classified into the following four

types. (Section 13.2.1)

Table 11.1 Typical Farm Household Types in the Region

Type	Family Size	Share %	Typical Farming Patterns	Irrigation Facilities	Type No.
Swidden / Upland Cultivation Farms in Higher Mountain Area	5-7	30%	Swidden and upland cultivation in slope land areas	Not Available	1
Terrace / Upland Cultivation Farm in Lower Mountain Area	5-6	60%	Rice terrace and upland crop cultivation in lower mountain areas (one crop of paddy or upland rice)	Not Available	2
Lowland Paddy Cultivation Farm	4-6	10%	Lowland paddy and upland crop cultivation (two crop of paddy)	Available	3
			Lowland paddy and upland crop cultivation (one crop of paddy)	Available but Limited	4

82. Farmers of Type 2, who operate semi-intensified upland farming, can largely increase farm income from safe vegetable production supported by the action plans for establishment of Clean Vegetable Centers (CVC) and improvement of quality and productivity of tea plantation. With the action plan for promotion of high quality Dien Bien rice, rice farmers of Type 3 can gain significant benefits under irrigation farming. On the other hand, rice farmers of Type 4 can generate little benefit since rice surplus for sale is limited due to rainfed farming. (Section 13.2.2)
83. Farmers of Types 1, 2 and 4 can benefit from stable and increased food production under the action plans for food security support. However, these action plans will contribute little increase in farm incomes. Impacts of livestock industry support are significant in terms of income generation for small farmers as far as they can access market channels of milk and meat. It is noted that farmers' financial load to meet initial investment of animal husbandry is rather larger than one for crop production. The government support programs for animal health and fodder crop production are prerequisite.

12. Recommendations

84. All of the 19 Master Plan programs formulated through the Study will contribute to both regional development and improvement of rural living conditions. It is obvious that the food security is one of the most important issues of the Region. The government supports are required in several technical fields and financial assistance. Apart from the regional food security, enhancement of farm family income is also another crucial issue. The Government's commitment for promotion of agribusiness and safe food production in the Region is important to motivate local farmers.

85. It is expected that the Government continues to allocate development budget for infrastructure in the Region. For sustainable and efficient infrastructure development, which will generate anticipated project benefits, suitable techniques and adequate budget are required at each stage of the project cycle, i.e. plan formulation, design, construction, O & M and monitoring. Systematic project implementation is needed. In this regard, it is recommended to facilitate the establishment of a database.
86. Planning and design criteria applied to other regions of Vietnam will not be introduced to the Region, taking into account its unique natural and social conditions. More research and technical consideration will be required for justification of small scale infrastructure, e.g. intakes and distribution of mountain stream and off-grid electrification equipment.
87. The Region is richly endowed with ample water resources, clean land, local resources such as traditions and unique cultures of ethnic minorities, natural forests, beautiful landscape, etc. It is high time to assess unexploited resources in the Region for wise utilization to improve the livelihood of local farmers and promote economic development. Since land resources for further expansion of farms is limited, more efforts have to be directed to select additional income sources for farmers, with less dependence on land resources. These include handicrafts, cottage industry, NTFP, rural tourism, etc.
88. Coordination between government agencies is essential for successful management of the Master Plan programs, e.g. DARD and DIT under PPC. Further study is required to consider intervention of technical and financial cooperation from stakeholders, including international agencies, donors, universities and NGOs. In this regard, the results of the Study to be established in the Final Report will be shared among a wide range of stakeholders.