

**IMPACTS OF CHANGES IN POLICY AND MARKET CONDITIONS ON  
LAND USE, LAND MANAGEMENT AND LIVELIHOOD AMONG  
FARMERS IN CENTRAL HIGHLANDS OF VIETNAM**

Dang Thanh Ha, Pham Hong Duc Phuoc, Nguyen Ngoc Thuy, Le Van Du, Pham Trinh Hung<sup>1</sup>,  
Ma. Victoria O. Espaldon and Annielyn O. Magsino<sup>2</sup>

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<sup>1</sup> *Senior Lecturer*, Faculty of Economics, University of Agriculture and Forestry, Ho Chi Minh, Vietnam and Project Team Members, SANREM/CRSP/SEA in Vietnam. Tel: 84 8 8961708, Fax: 84 8 8960713, E-mail: d.thanh.ha@hcm.vnn.vn

*Head*, International Relations Office, University of Agriculture and Forestry, Ho Chi Minh, Vietnam and Project Team Members, SANREM/CRSP/SEA in Vietnam. Tel: 84 8 8966946, Fax: 84 8 8960713, E-mail: phducphuoc@hcm.vnn.vn

*Lecturer*, Faculty of Economics, University of Agriculture and Forestry, Ho Chi Minh, Vietnam and Project Team Members, SANREM/CRSP/SEA in Vietnam. Tel: 84 8 8961708, Fax: 84 8 8960713, E-mail: nthuy@saigon.vnn.vn

*Senior Lecturer*, Faculty of Agronomy, University of Agriculture and Forestry, Ho Chi Minh, Vietnam and Project Team Members, SANREM/CRSP/SEA in Vietnam. Tel: 84 8 8961710, Fax: 84 8 8960713, E-mail: uafwatman@fmail.hcm.vnn.vn

*Lecturer*, Faculty of Forestry, University of Agriculture and Forestry, Ho Chi Minh, Vietnam and Project Team Members, SANREM/CRSP/SEA in Vietnam. Tel: 84 8 8974606, Fax: 84 8 8960713, E-mail: lnxh@hcm.vnn.vn

<sup>2</sup> *Assistant Professor*, School of Environmental Science and Management, University of the Philippines Los Banos and Principal investigator, SANREM/CRSP/SEA Project based at SEARCA, College, Laguna, 4031 Philippines. Tel. No. (049)-536-2251/2836, e-mail: mvoe@agri.searca.org

*Project Management Associate*, Sustainable Agriculture and Natural Resource Management –Collaborative Research Support Program in Southeast Asia (SANREM CRSP/SEA), SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA), College, Los Baños, Laguna, Philippines. Tel. 049-536-2363 to 67, Fax # (049) 536-4105/7097, e-mail: aom@agri.searca.org

## **ABSTRACT**

This study outlines the changes in agricultural policies and market conditions in Vietnam for the last 20 years characterized with gradual decentralization and integration in the global economy. Using a case study approach, the study examines how these institutional changes influence land use and land management and the impacts on the environment and the livelihood systems among members of a local community in the uplands of Vietnam.

Preliminary analysis at the local level shows that changes policies and market conditions result in a rapid transformation of the socio-economic and biophysical landscape in this upland community. Large forest area had been converted into commercial agricultural land. Results of the study also show that farmers base their decisions on short-term market expectations rather than on long-term market information. This lends them more vulnerable to greater economic losses in the long term as shown by the behavior of mulberry and coffee production in the study area. Farmers had not only opened new forest land for coffee cultivation but also shifted from mulberry to coffee after 1994 when the price of coffee beans increased. However, there are risks associated with coffee, as a monocrop in a large area such as fluctuation in market prices and environmental degradation. The study provides empirical evidence to the complex interplay of policies and market conditions on land use, land management and livelihood system of the Vietnamese upland farmers. The study raises issues relating to the promotion of sustainable agricultural practices and the need for agricultural land use planning that aims to deal with the fluctuating global market without compromising the welfare of small farmers and landholders.

## **I. INTRODUCTION**

Over the past two decades, the uplands of Vietnam have undergone rapid transformation of socio-economic and biophysical landscape. These rapid changes have been the results of government interventions over the past 25 years including the establishment of New Economic Zones, state farms and forest enterprises, and a program for long-term population re-distribution through a mass organized migration to the Central Highlands and more recently by institutional and policy reforms and changes in market conditions (Giang et al, 2001). Since the early 80's, a series of institutional and policy reforms that include decollectivization in agricultural sector and decentralization in resource management have been implemented when Vietnam moved from a centrally planned economy towards a state regulated, market oriented economy. With policy reforms, the country achieved a dramatic increase in agricultural outputs, particularly in rice production and higher diversification in agricultural production. Agricultural sector slowly shifted from self-sufficient mode of production to a commercialized production. However together with the rapid transformation of land use in the uplands of Vietnam, deforestation, high rate of immigration, degradation of soil and water resources and unsustainable agricultural production practices have also been observed in many parts of this region. There is really a concern regarding sustainable agricultural development in the uplands of Vietnam.

This paper examines the dynamics of resources management in the Central Highland of Vietnam using a case study approach. Specifically, it traces the changes in policies and market conditions and how these changes influence the way farmers use and manage their resources. It also analyzes the impacts of these changes on the environment and livelihood of the local people and raises some issues relating to the promotion of sustainable agriculture and natural resources management in the uplands based on the results of the case study.

The paper strives to examine two main hypotheses:

1. Changes in policies and market conditions influence land use and land management decisions of farming households.
2. Changes in land use create new risks to the environment and the livelihood of the farmers.

## **II. CHANGES IN POLICIES AND MARKET AT NATIONAL LEVEL**

After the re-unification of the country in 1975, the Central Highlands of Vietnam was seen as a frontier for economic development. New economic zones, state farms, and forest enterprises were established and a program for long-term population re-distribution through a mass 'organized migration' to the Central Highlands was initiated. As the result of these policies, the upland areas of Vietnam have undergone remarkable socio-economic and environmental transformations. The population has increased rapidly and large forest areas were replaced by agricultural areas, first for food subsistence and later for cash crop production (Giang, et al, 2001).

The early 1980's marked a series of institutional and policy reforms that led to a shift from a centrally planned to a state regulated market oriented economy. Key elements of the reform program included efforts to adopt a sound macroeconomic management, combined with dramatic

reforms in the agricultural sector by the government. Agricultural production had shifted from cooperatives and state farms to individuals. Major institutional changes in agricultural sector included the implementation of the contract systems embodied in Directive No. 100 in 1981. Under this system, lands initially allocated by the state to cooperatives were reallocated to individual households for family farming. Households were supplied with most of the farm inputs from cooperative and were obligated to submit output quotas.

The shift from cooperative to household management system continued with the implementation of Resolution 10 in 1988 and through decollectivization of agriculture after 1988. The key feature of the decollectivization policies are: (1) Recognition of the farm household as the main unit of agricultural production, (2) Liberalization of farm decision making with respect to purchase of inputs and sale of outputs, and (3) Privatization of land use rights. The period experienced a shift to market pricing system. Barriers to transportation and distribution of farm inputs and food products were lifted. Multi-sector institutions were encouraged to take part in free trade of food products. A decisive finale in the process of policy reform was the 1993 Land Law, allowing for five rights in agricultural land: the right to be leased, transferred, exchanged, inherited, and used as collateral. Households were secured with long-term land use-right certificates for period of 20 years for annual cropland, and 50 years for perennial cropland (Hayami, 1994). A large area of forestland has also been allocated to individual households for production, reforestation, and forest protection objectives.

With these policy reforms, the household becomes the basic unit of agricultural production and the principal actor who decides what crop and how much to grow based on market signals. Markets become the primary means for determining prices of farming inputs and outputs. The institutional and policy changes have brought the country to the third in 1989 and then the second place among the rice exporting countries in 1996 (Hainsworth, 1999). Together with rice, the production of perennial (industrial crops) such as rubber, coffee, tea, mulberry and other crops, as important sources of export earning has expanded rapidly.

Changes in policies and market conditions resulted in a dramatic change in land use in the upland areas of Vietnam as more and more Vietnamese were encouraged to develop commercial farms. This trend was well reflected in the Central Highlands. The high market price of coffee in the beginning of 1990s, especially in 1994, has motivated not only landless farmers but also better-off people to flock to the Central Highlands to seek land and develop them into commercial farms (Giang et al, 2001). A large area of forestland was converted into monoculture coffee plantations. Coffee production, which primarily concentrated in the Central Highland of Vietnam, expanded rapidly since 1993 (figure 1). As a result of the rapid expansion of coffee production, coffee landed as one of the major export crops of the country. In 1999, production of coffee green beans rose to 439, 000 tons, the highest since 1990 (General Statistical Office, 2000).

Concerns have been raised as to the economic as well as environmental risks associated with the rapid land use changes. Response to these unsustainable developments, Vietnam has adopted measures aiming at reversing deforestation and erosion. The Re-greening of the Barren Hills Program (Decision 327) was adopted in September 1991. In 1998, the government has promulgated the Decision 661 to reforest 5 million hectares by 2010 and the related Decree 2 on

the allocation of forestland to households. These programs recognize the potential to develop, reforest and protect a natural resource system through sound and careful management involving local households. The government has also released the new Water Law in 1998. Environmental protection for sustainable development became an important issue in Vietnam's economy in recent years.

### **III. CONCEPTUAL FRAMEWORK**

Based on these forces of change at national level, the study will examine empirical evidence for the changes at the local level using the following conceptual framework. (Figure 2). The driving forces of land use and management decisions include changes in policies, market conditions, biophysical condition and population. The consequences of land use changes will be changes in environmental quality, socio-economic conditions of local farmers, and institutions.

### **IV. RESEARCH METHODOLOGY**

The research team employed Participatory Landscape-Lifescape Appraisal (PLLA). PLLA is a rapid, iterative and system-oriented approach for an improved understanding of agro-ecological and socio-economic conditions prevailing in an area (Espaldon and Magsino, 2001). An interdisciplinary team was organized to conduct the PLLA. To generate the needed information, the PLLA team employed a combination of techniques such as oral history that reconstructs historical events, use of secondary data, key informants interviews, farmers profiling, maps and map analysis and focus group discussions. A total of 14 farmers which include 2 large, 4 medium, and 8 small farms were interviewed for farmers profiling. Meetings and workshop with farmers and decision makers from the commune, district, and province levels were also organized to be able to validate information and to generate an overview of farming systems among upland Vietnamese farmers and their major issues and constraints.

The study area is Dai Lao commune, Bao Loc District in Central Highlands of Vietnam (figure 3). It was selected because it represents a community in transition, both in terms of the biophysical aspects as well as in terms of its socioeconomic contexts. Dai Lao commune is an example of a village that is undergoing rapid changes as a result of multitude of factors. Over the past two decades, the landscape has been changing from dominantly natural forests to primarily agricultural production for different crops such as rice, mulberry, tea and coffee. Recently, as coffee declines its profitability starting 1999, farmers of Dai Lao exhibits different coping mechanisms to adapt to the new market and environmental conditions.

### **V. CASE STUDY DESCRIPTION - THE DAI LAO VILLAGE**

The commune is located about 10 km from Bao Loc town and about 180 km from Ho Chi Minh City. The total population of this commune is 10842 persons in 1999, with a population density of 183 persons per square kilometer. The topography of this commune is characterized small valley surrounded by slopping hills and mountain. Lands on hill sides have medium to steep slopes. This area is one of the upper watersheds providing water for an hydropower reservoir located in Binh Thuan Province. The climate in the area is characterized by a wet season from April to the end of October and a dry season in the remaining months. Average monthly rainfall

in the study area is presented in figure 4. There is a high risk of soil erosion due to the topographical condition and the high average rainfall of about 2700 mm per annum. The major crops planted in this area include tea, coffee, mulberry and fruit trees. Annual food crop is cultivated only on small area. Currently, 16.7% of the total land area of the commune is forest land. But local authorities have estimated that actual forest cover is less than 15% of the total land area, mainly located on the top of the mountain and some steep sloping hills surrounded the commune. Land use type in Dai Lao commune is presented in table 1.

## **VI. CHANGES IN POLICIES AND MARKETS AT THE LOCAL LEVEL**

Dai Lao commune of Lam Dong province is a reflection of the national level. After the reunification of the country in 1975, this area was mainly covered with forest and very sparsely populated. Following government program for economic development in the Central Highlands, Dai Lao State Farm was established in this area in 1977 with the objective of producing food for self-sufficiency. The state farm was under the management of the Provincial People Committee and was allotted 263 ha of land, mostly secondary forests for agricultural development. At the beginning, personnel of this state farm included 300 youth volunteers from northern provinces.

### **a. Policy for mulberry development and population re-distribution**

The biophysical and climatic conditions in Lam Dong Province, especially in areas around Bao Loc District, were considered by decision makers to be favorable for mulberry cultivation. A program for the sericulture industry in Lam Dong province was developed with the establishment of a sericulture station in Bao Loc in 1980. The Dai Lao State Farm was renamed Blau Sre State farm in 1980 and was allotted a total area of 700 ha of forestland for mulberry cultivation. At the same time, another state farm specializing in mulberry cultivation was also established in this commune. Both belonged to the sericulture station of Bao Loc.

Together with the establishment of state farms specializing in sericulture production, people were again encouraged to move to this area for the development of new economic zone. In response to this, groups of youth volunteers and families from the crowded northern provinces came to this area to clear the forest and established new villages. The number of farm workers reached to 650 persons in 1981. The second planned immigration of households from northern provinces occurred in 1984 with 300 additional labors. From 1985 to 1987, another 300 new labors arrived to the state farm.

### **b. Shift of focus from state farm to households**

The main task of the state farm was to specialize in mulberry cultivation and raise silkworm for providing silk cocoon to the silk industry located in Bao Loc. Its operation was mainly based on plan setup at the higher management levels and financial management mainly based on a bookkeeping system. Laborers of the state farm received monthly salary. Due to the inefficiency this payment system, the state farm had implemented a payment system based on actual output of farm operations for some of its workers in 1985 and later to all workers in 1987. It was reported during the discussion with the director of the board of the state farm that the state farm received subsidies from the government but operated inefficiently. It was then reorganized several time

through merging with other state farm but after operation for some years without improving in efficiency, it was again split.

Farm workers were also allowed to open forestland on their own for agricultural production. They were not required to grow mulberry on this land but had to pay land use tax to the state farm. According to the plan, all land allotted to this state farm should be cultivated with mulberry. However, not all lands in the state farm were suitable for mulberry cultivation. The largest area planted with mulberry was achieved with only about 160 ha in the period from 1990 to 1992.

Because of the inefficiency in its operation, the state farm has implemented a program to sell mulberry plantation to its workers in 1993 but none of its workers was willing to buy the plantation due to the low income from mulberry. The mulberry plantations eventually declined. In the year 1994-1995, the state farm shifted to the contract system under which farm workers received credit from the state farm but were obligated to pay back credit, land tax and administrative cost at fixed level and output quotas based on average yield level. However, because of low price of silk cocoon, most of the workers did not grow mulberry as contracted but opted to grow other profitable crops such as tea or coffee.

Starting in 1996, land use right certificates were provided to farmers as long as they have fulfilled all obligations to the state farm such as repayment of all loans or credits provided by the state farm before. The years 1994 and 1995 displayed poor performance of the sericulture industry. Local farmers reported that the price of silk cocoon was extremely low with about 0.9-1.0 USD per one kilogram of cocoon. A large number of workers have left the state farm to work on their own land. Until 2000, the total land area of this state farm officially covers over 2000 ha but actual land area being managed by the state farm is only about 102 ha. The remaining land areas were under cultivation of individual households, mainly farm workers' family and the later incoming farmers. Currently, the operation of the state farm mainly concentrates on providing technical service to support sericulture production of individual households and collection of land tax. The personnel of this state farm were reduced to only 17 persons in 2001, mainly for administrative work.

### **c. Change in Market Conditions at the Local Level**

Free markets coexisted with the central planning system in this area before 1989, but their role in resource allocation was limited. The improvement in infrastructure and better access to markets through the lifting of market barriers since 1989 had made the supply of agricultural inputs such as fertilizers and pesticides and cheap rice produced from the Mekong Delta available in the local markets that encouraged local farmers to specialize and intensify in crops which have comparative advantage in this upland area such as tea, coffee, and mulberry. There were also some changes in the market of tea from Lam Dong Province. Some traditional markets such as countries belonging to the former Eastern Block, the former Soviet Union has shrunk while new markets from Central East Asia, Northern European countries, the US, France, and Japan were being explored.

With the changes in policy of the government, the tea and coffee processing industry in Bao Loc developed rapidly, especially in the period from 1995 to 1999. Besides 7 state owned large tea processing plants, there are 98 private tea processing enterprises and a number of private coffee processing enterprises in and around Bao Loc town. Currently, the local tea processing industry could be able to absorb all fresh tea leaves harvested in this area, making tea price more stable. However, until now, there is usually no contract between tea farmers and the tea processing plants. The fresh tea leaves supplied to the processing plans come mostly from private traders who brought tea from local farmers. The price received by farmers has also been under the control of private traders, especially in more remote areas.

## **VII. IMPACTS ON LAND USE AND LAND MANAGEMENT**

Changes in policy and market conditions resulted in rapid changes in land use and cropping pattern in this area as illustrated in the changes of forest resources and areas planted with major crops.

### **a. Changes in forest resources**

Before 1975, this area was sparsely populated. According to local authorities and people living in this area since 1975, forestland covered about 85% of the total land area of the commune. With the increasing agricultural activities of the state farm and timber harvesting activities of the state forest enterprise in the period from 1980 to 1984, the forest cover reduced rapidly to about 45% in 1984 (figure 5). As the state farm continued to expand its agricultural land, the remaining forest areas decreased at a rate of about 5% per annum in the period from 1985 to 1987. From 1988 to 1990, only limited forest area located near water sources was opened by the state farm for mulberry cultivation. Both the state farm and families of its workers had participated in the process of converting forestland into agricultural land.

The poor resource management of the state farms and forest enterprises in the area has made forest an open access resource. Under this condition, the number of spontaneous migrants increased rapidly with the shift to the market economy. Local authorities reported that the highest rate of deforestation by spontaneous migrants occurred during the period from 1989 to 1992. Until 1995, most of the forestland suitable for agricultural cultivation were cleared and cultivated. As reported by the People Committee of Dai Lao commune, in the year 2000 the actual forests remained in less than 15% of the total land area in this commune, mainly as poor quality forests located on the top of the mountain or very steep and rocky hills and not suitable for agricultural cultivation.

The situation in this commune showed that not only small farmers but also state farms and forest enterprises are stakeholders causing rapid deforestation and changes in land use. There was a rapid change from forestland into mulberry, tea, and coffee plantations in this commune as well as in other parts in Lam Dong Province. While the operation of the state farms were planned, operated according to government program, and was subsidized, small farms were spontaneous and market driven.



## **b. Change in agricultural areas for major crops**

The institutional and market forces have not only lead to rapid deforestation for the expansion of agricultural area but also affected the cropping patterns in the area. The expansion of tea, coffee and mulberry illustrates this transformation well. Figure 6 show the changes in price of tea, coffee, and mulberry in the study area over the last decade. While there was a stable increase in the price of tea, a large fluctuation in the prices of coffee and mulberry was recorded. The price pattern has a significant effect on changes in area of major crops planted in the commune. Since there is only statistical data recorded for both Loc Chau and Dai Lao, as they were one commune before split into two in the end of 1998, data for both communes was used to trace the changes in area planted with major crops over time.

From 1980 to 2000, the total area of major crops was increased by 7,6 times (i.e. from 733 ha in 1980 to 5584 ha in 2000). Changes in area of major crops are shown in figure 7. The area expansion was highest for both coffee and tea. Area planted by mulberry increased at much lower rate than that of coffee and tea. The area planted to mulberry reached to 240 ha in 1995 but then declined due to the low price. Even when there was a favorable price for mulberry production and strong support from the government in 1992-1993, in the form of subsidies and financial support, the area planted to this crop increased slowly, mainly due to the biophysical constraints.

Tea and coffee are the two major crops in this area, but received much less support from local authorities as compared to mulberry. The area of both crops did not change much during the time period before 1994 due to unfavorable market conditions and low prices. The area planted with tea had expanded rapidly since 1994, reaching up to 4212 ha in 1999, about 4 times higher than that of 1994. Before 1994, the area planted with coffee was limited to only 300 ha, but reached to 1291 ha in 1999. With the high price of coffee, many local farmers have incentive to invest into coffee. A bandwagon effect in coffee planting was observed in this area. Many farmers have planted coffee even when they do not have experience in cultivating this crop or do not know about the variety and soil condition suitable for coffee. Many of them even planted coffee on very slopping hillsides or on the top of the hill where the soil and water condition were not suitable for coffee. As a result, the yield was very low and at the same time, this practices causing high soil erosion.

The large expansion of area planted with tea and coffee since 1994 was achieved not only by the transformation from forestlands that were cleared before by illegal logging but also by a shift from mulberry area. According to local authorities, there was different direction of shifting from one crop to another due to the fluctuation in market prices. Because of the low price of coffee and a high price of mulberry in 1987-1988, some farmers had destroyed their coffee to plant mulberry. As price of mulberry went down in 1994-1995, farmers again cut down mulberry for coffee or tea. Crop choice of farmers is usually based on current market value, but no information on the long-term value, that lead them to be more vulnerable to market changes.

### **c. Current trend in farming system of the commune**

Results of the survey of 14 sample farms in the study area show that farm size varies among farmers, ranging from 5 to 23 ha for large farms, from 1.0 to 2.5 ha for medium farms, and less than 1 ha for small farms. All farms have been currently involved in tea and coffee cultivation. The level of diversification in farming is higher for both large and medium farms with 3 to 5 crops and animal enterprises. Among 8 small farms surveyed, 4 farms have 3 to 4 crops and animal enterprises, while the remaining have only 2 crops enterprises (e.g. coffee and tea). These farmers, however, have also income source from off-farm work.

The interviews with sample farms revealed that generally farmers now find tea as a more secure crop. With the decrease in coffee price, the cultivation of coffee is no longer profitable. Large coffee farmers stopped intensive investment in coffee. Medium to small farmers even want to shift to tea if coffee price continue to decrease or remain at low level. As the prices of mulberry go up, many farmers found an incentive to expand mulberry again, mainly in areas suitable for this crop.

The changes from coffee to other crops are expected to occur not only because of price fluctuations but also due to degradation of the soil. Farmers also said they may also have to shift from coffee to tea, because of biophysical constraints for coffee cultivation like poor soil, sloping land with high risk of soil erosion, and difficult in water access. To cope with the fluctuation in market price, some local farmers diversify their farming activities by planting more than one crop and investing in other livelihood activities such as animal production. The survey of selected small, medium, and large farm cases show that to secure a stable income, most of them are to diversify their farm. However, the level of diversification in farm activities among farmers is still limited.

## **VIII. IMPACTS OF LAND USE CHANGES**

Changes in land use and vegetation cover described above have significant impacts on the socio-economic and the ecosystem in the study area.

### **a. Socio-economic affects of policy and market changes**

With the changes in institutions, particularly in land tenure towards individual land use right and changes in market conditions, farmers have incentive to intensify cash crop production. The PLLA conducted in the commune showed this change has lead to an increase in cash income of local people. During the farmer's group discussions, all farmers reported to gain benefit from better access to market. However, the level of welfare improvement was different among local farmers. About 70% of the farmers reported that their welfare has much improved since early 1990 while 30% reported that their well fare have improved but at a much lower level.

While there is a perception among local farmers that living standards of the poor in this area have improved, the results of the PPLA showed that poverty is still a predominantly problem in the study area. Despite a rapid growth in agricultural production in the area since the late 1980s, the per capita income of local farmers was still very low. Table 2 shows the average monthly per

capita by wealth categories of farmers in this commune. It was reported that currently, that average income of the farmers was estimated at about US\$200 per capita per year. Based on the poverty threshold of an income equivalent to entitlement of 25 Kg of food per capita per month set by the government for moderate poverty (Ut and Hossain, 2000), it was reported during the discussions with local authorities and farmers that nearly 50 percent of the population is considered as poor farmers.

Results of the PLLA also show that many poor farmers feel extremely vulnerable to market and environmental risks. Failure of a crop due to pests or weather condition or a fall in output prices, for example fall in price of mulberry price in 1994-1995 and of coffee in 2000-2001, caused severe stresses to them. Limited resources, degradation of soil fertility, fluctuating market prices, and difficulties in access to water, appropriate credit and information on improved techniques were reported by poor farmers as major problems that they have to face in making decisions regarding land use and income diversification.

#### **b. Soil erosion and other environmental problems**

The topographical condition in the study area is subject to high risk of soil erosion. It was reported that about 36% of the total land area in this commune has a slope of more than 30 degree. High risk of soil erosion was observed in both tea and coffee plantations located on the side and top of the hills. Some farmers reported that the rate of soil erosion is even visible as they could see on the foot of tea or coffee plants. In many tea plantations, soil erosion is so high such that farmers have to replant tea each year. According to local authorities, lands on the side of the hills and mountain around the commune with a slope of over 30 degree are not be allowed for agricultural cultivation. However due to poor management of forest resources and weak enforcement of regulations, many farmers still occupied the land and cultivate with tea or coffee illegally. Their agricultural production activities on these land plots yield not only poor harvest but also result in high soil erosion and loss of forest cover.

The commune has also experienced serious problem of soil erosion in the past when the state farm implemented a program during the period from 1987 to 1990 to expand mulberry plantation to the hills. However, due to high erosion and loss of soil nutrients, the yield of mulberry decreased rapidly after cultivating for about 3 years. Average yield of mulberry planted on the top of the hills was less than 2,5 tones of fresh mulberry leaves per hectare while the yield on flat land was from 7 to 10 tones per hectare. Plots with high soil loss yield even only less than 1 tones per hectare. The rapid reduction in mulberry yield due to high soil and nutrient loss forced the state farm to stop cultivating mulberry on land at the top and hillsides. Farmers also reported that due to soil erosion, tea and coffee planted on steep sloping land could only achieved a yield level of less than 50% of those planted on the on flat land. The average yield of coffee planted on sloping hillsides is less than one tone per hectare while that on flat land is about 3 tones per hectare. Even for tea, a crop considered by local farmers as much less risky subject to soil erosion, the yield also reduced significantly with increasing slope of the land.

With the rapid expansion of coffee over a large area, especially into fragile and steep sloping areas, the problems of soil erosion, loss of soil nutrient, and degradation of water resources were found to be more profound than those that occurred in the past. The increasing intensive farming

also lead to the problem of soil degradation and contamination of surface and ground water as a result of an inappropriate or mismanaged agricultural intensification, such as inefficient application of chemical fertilizers and overuse of pesticides.

It was revealed from farmer group discussion that most of the farmers are aware of the soil erosion problem and its impacts but few of them realized the actual levels of soil loss. Only few farmers reported or claimed to effectively manage or control soil erosion.

### **c. Impacts on institutions**

Rapid changes in land use and the associated environmental problems had made local decision makers recently realized that achieving higher growth in agricultural production alone will not ensure a sustainable economic development. Local authorities have undertaken some efforts to protect and enrich the forest resources and to control soil erosion. The commune has a program for allocating 300 ha of forestland to individual households for forest protection, reforestation, and practicing agro-forestry. However, the implementation of this program is still at the beginning stage and lack of full participation of local people. Therefore, it does not result in much positive impact on the local resources. Some efforts have also been undertaken by research institutions, universities, and NGO, and local institutions in supporting farmers to control soil erosion more effectively, however the number of farmers benefited from such supports are still very small.

## **IX. LOCAL ISSUES AND CONCERNS**

It was revealed from several discussions with farmer groups and local authorities and from a workshop organized to present preliminary results of the PLLA to local farmers and decision makers at commune, district, and provincial levels that major concerns of local community and decision makers are: (1) sustainability of the production systems; (2) poverty alleviation; (3) decline in crop productivity; (4) problem of population increases, especially spontaneous immigration; (5) market price fluctuation; (6) diversification of farming activities; (8) deforestation; and (9) soil erosion and degradation of soil resource.

Some issues have been raised regarding improvement of the sustainability of the agricultural production system in this area such as: (1) in the context that market is the major force influencing farmers' crop choice, how can existing institutions and local policies promote sustainable agriculture?; (2) how can local institutions better assist farmers, particular poor farmers, to practice farming systems that considers long-term economic and ecological benefits?; and (3) what sustainable agricultural production systems or techniques available for farmers to select from and how can the current farming systems or production practices in this area be modified to be more sustainable?

Local stakeholders have also raised the need for participatory land use planning and resource management that aims to deal with the fluctuating global market without compromising the welfare of small farmers and landholders.

## **X. SUMMARY AND CONCLUSIONS**

Results of the PLLA conducted in the study area showed that land use and vegetation covers in the study area have undergone rapid changes over the last two decades. Agricultural development policy implemented after the re-unification of the country including the establishment of state farms for sericulture industry and mass planned immigration has focused mainly on economic development without a clear assessment of environment and social impacts. Due to the poor management practices of the state farms and forest enterprises, the forest resources have become an open access resources resulting to a rapid deforestation.

The PLLA conducted also described how the changing access to land influence farm management decisions. A shift from state farm to individual land use right has made the farmers more flexible in the choice of crops to cultivate. Better access to markets has provided farmers incentive to turn to most profitable crops and more efficient allocation of resources for individual farmers. While this process has led to increase in total farm output and income of local villagers, it also brought new risks to farmers. Farmers have become susceptible to losses due to the abrupt drop in the prices of major crops, particularly poor farmers.

The transformation of the landscape in this study area has also indicated some changes in environmental quality, particular soil erosion, losses of soil nutrients and water availability for irrigation and other uses. Both planned and spontaneous migration from densely populated provinces to this upland village brought new pressures on the natural resource base, leading to rapid resource depletion and unstable cash crop farming systems. Achieving economic growth without excessive environmental degradation remains a major challenge for this upland community as well as other communities in the upland area of Vietnam. If the resource base in this upland commune is not used in an effective manner, desirable living standard of people will not be achieved, the environmental and land, resource degradation that are linked to poverty may never be arrested.

Table 1. Land use type in Dai Lao commune in the year 2000.

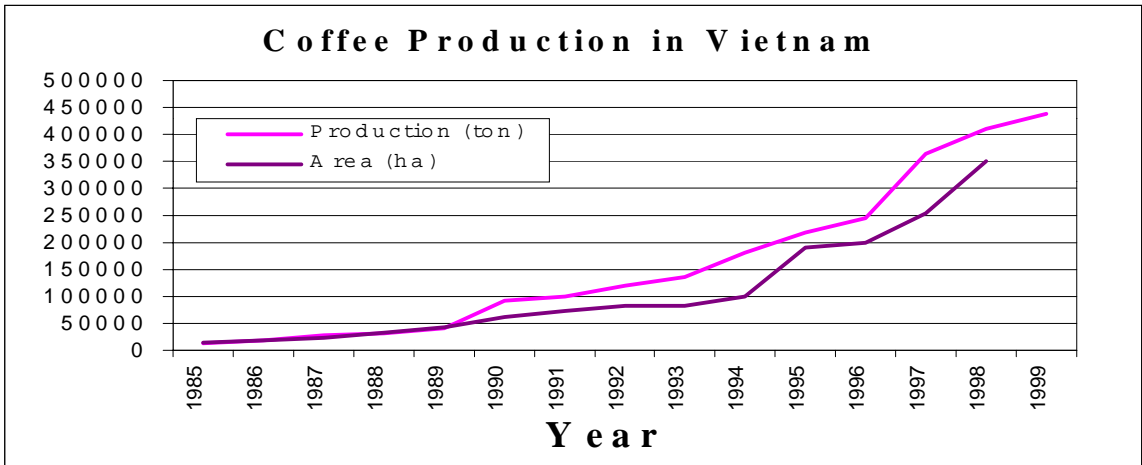
<b>Type of land</b>	<b>Area (ha)</b>
Total land area	5940
I. Agricultural land	3832
1. Annual crops	66
2. Perennial crops	3756
3. Surface water for fishery	9
II. Forest land	994
1. Natural forest	953
2. Planted forest	41
III. Other land (residential, other use)	183
IV. Non use land	931

Source: Statistical Office of Bao Loc, 2000.

Table 2. Average monthly income per capita and percentage of farmers by wealth category, in Dai Lao commune in 2001.

<b>Farmers' wealth category</b>	<b>Average monthly income per capita (USD)</b>	<b>Percentage of farmers (%)</b>
Better-off farmer	> 29	5
Medium farmer	11	45
Poor farmers	5.4	50

Source: Farmers group discussions and estimation from key informants.



Source: Statistical Yearbook of Vietnam, 2000.

Figure 1. Coffee production in Vietnam, 1985-1999.

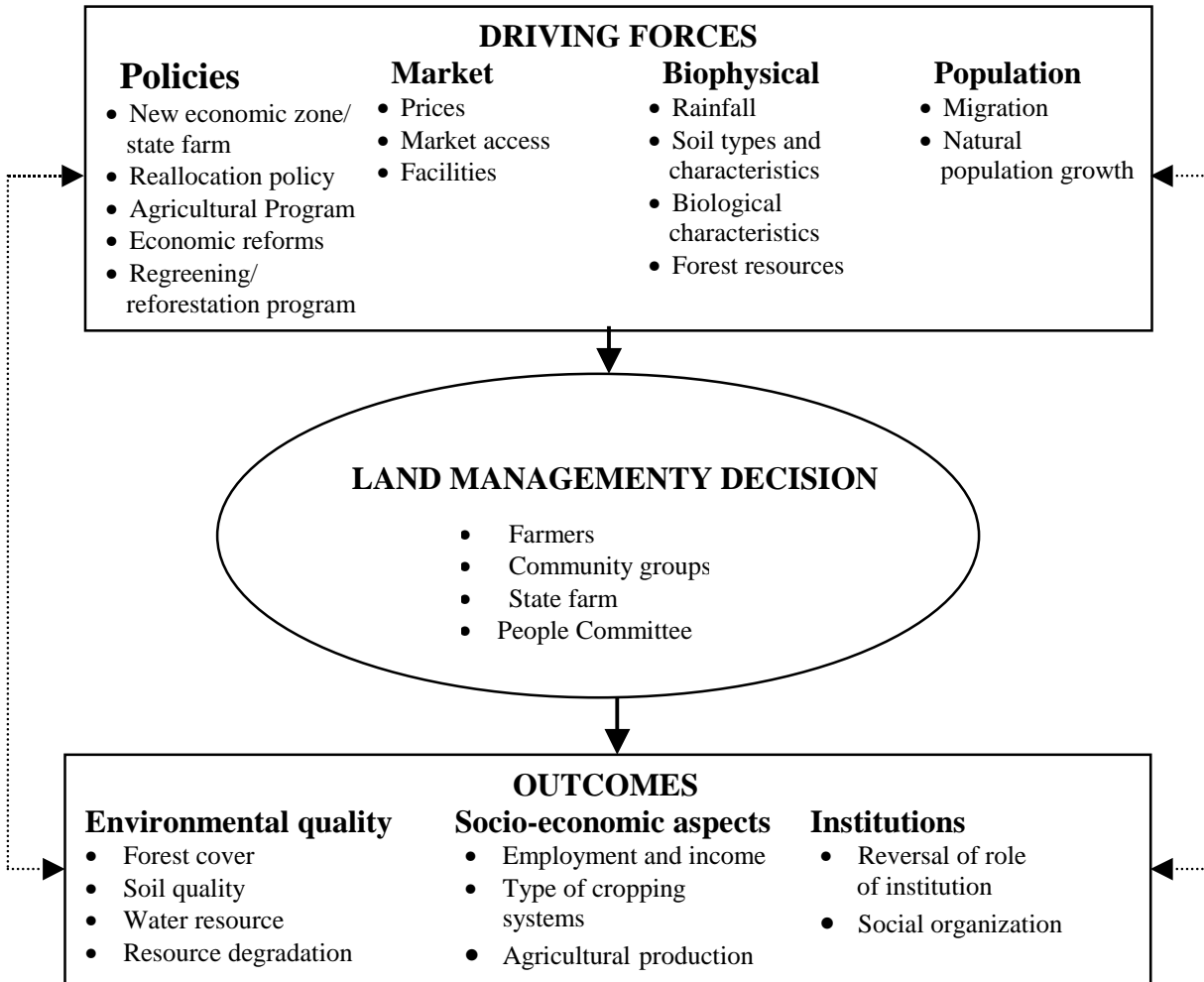
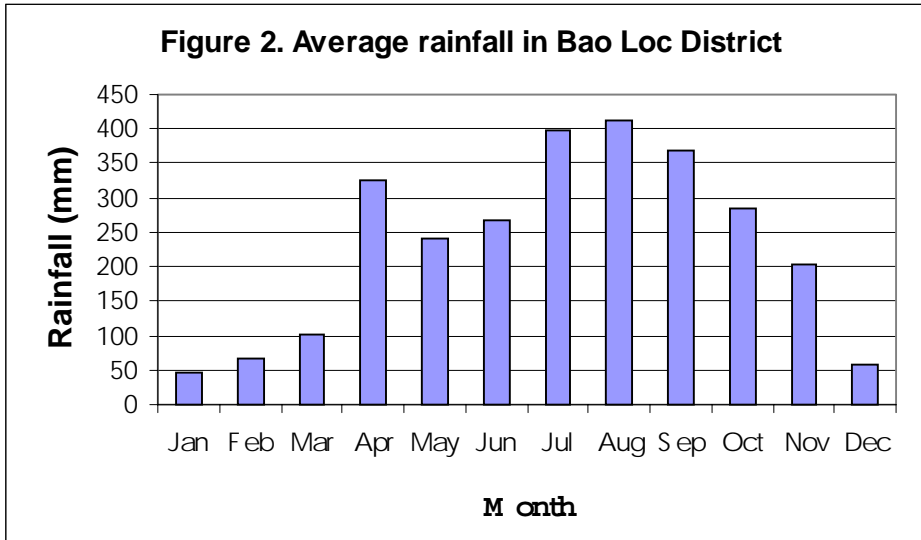


Figure 2. Conceptual framework



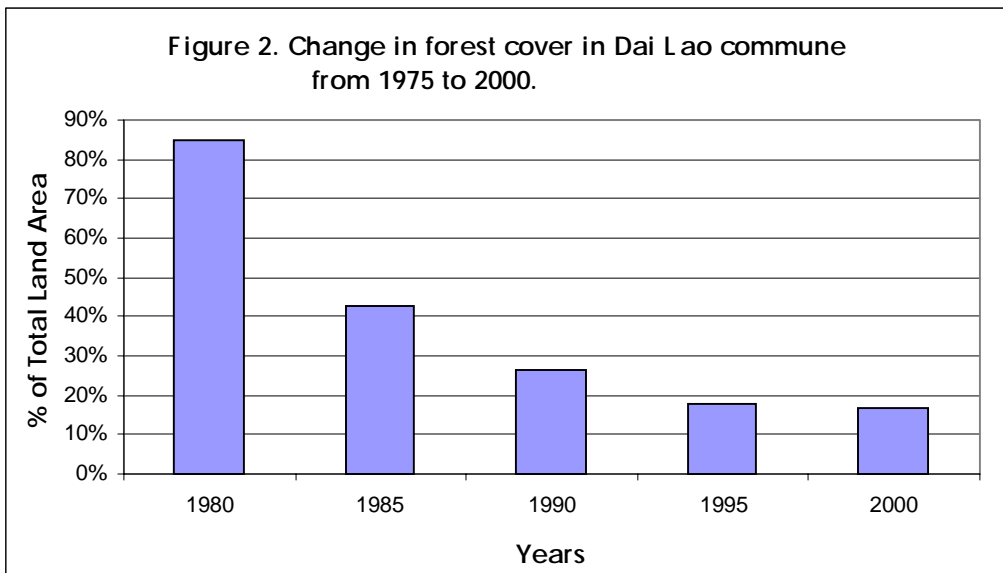
Figure 3. Location of the study area





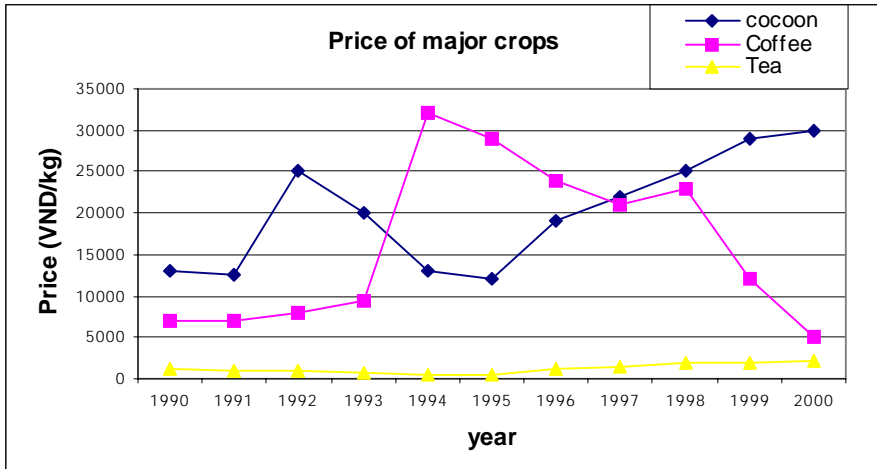
Source: Statistical Yearbook of Bao Loc, 2000.

Figure 4. Monthly rainfall distribution in the study area.



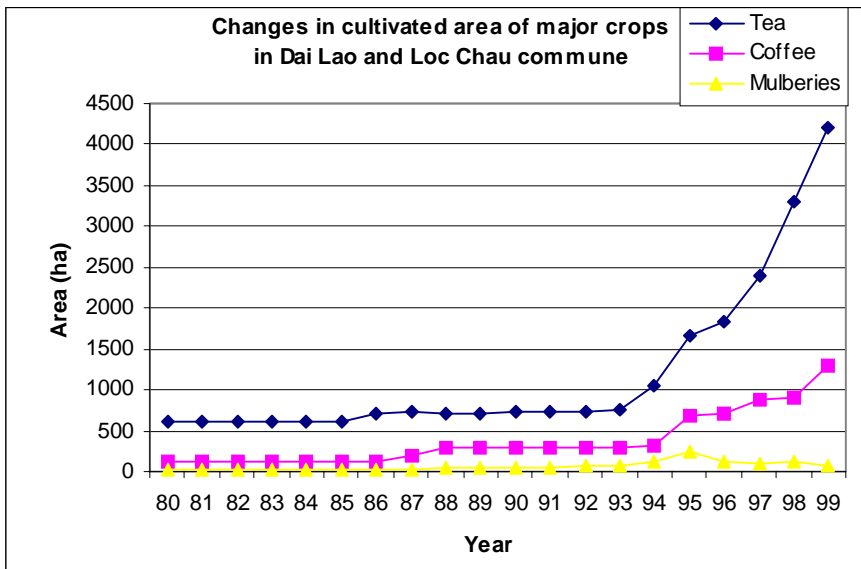
Source: Data collected during interview with leaders of Dai Lao state farm and People Committee of Dai Lao, 2001.

Figure 5. Changes in forest resources in Dai Lao commune from 1975 to 2000.



Source: Data collected during interview of farmers and local authorities.

Figure 6. Changes in prices of major crops.



Source: Statistical Office of Bao Loc, 2000.

Figure 7. Changes in area of major crops

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