CHAPTER VI

HOUSEHOLD PRODUCTION STRATEGIES AS CHANGING PRACTICES OF ECOLOGICAL KNOWLEDGE

Local knowledge is expressed not only in the perceptions of people but also in their practices in the interaction between people and environment. Local ecological knowledge is developed through a process of synthesizing the practical experiences of local people. It is a process of learning by doing. Under the influence of many factors the perception of people changes over time, and in a similar way their practical strategies also change to adapt to new conditions. In chapter IV, I presented the local ecological knowledge of the Muong people in terms of perceptions. This chapter will discusses the practical dimensions of the ecological knowledge of the Muong people through the strategies used by different households in Mai village to apply their knowledge in land use, crop pattern, and forest management. I consider these strategies as the ways in which local people transform their perceptions into actions and therefore local knowledge become visible. Moreover, these strategies also reveal the adaptability of local peoples toward the changing natural and social context.

1. Classification of Household Strategies

Since land and forests are allocated to households according to state policy, which gives households the right to use and manage their resources by their own ways. This implies that different households make their own decisions about what different strategies to use in applying their knowledge to land use, crop pattern and resources management.

To classify the different household production strategies of Muong people in Mai village firstly I base on the criteria of human resource characteristics such as household size and type, number of laborers and education levels of the members in the household. Secondly I base on the farming resources such as land area (both agricultural land and forest land) and the number of cattle and machines. The human resources associated with farming resources affect on the way the households make their decisions in applying knowledge in land use crop pattern and forest management. Thirdly I base on the potential of households in accessing to government services such as credit, information and technology, health care, water and electricity. Fourth I observe the farming practices such as land-use and crops in the fields of different households. Fifth the access to the market is also indicator, which I use to differentiate household strategies in Mai village.

Mai village have 34 households, the one landless family[1] is excluded in this section. The following strategy types are found in Mai village: commercial strategy, semi-commercial strategy and subsistence strategy (table 6-1). In each strategy I concentrate on how different knowledge systems are applied in practical production activities of local peoples. By commercial strategy I mean the strategy which aims at commodity production, goods are produced to get cash rather than for subsistence livelihood. By semi-commercial strategy I mean the strategy that aims at both improving subsistence livelihood and producing goods for sale. By subsistence strategy I mean the strategy that pays special attention on producing goods for subsistence livelihood. The differentiation between these strategies is emphasized to understand the diversity and flexibility of local adaptability.

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[1]The wife in this family is a Luong Phong villager. Her parents and relatives moved to the Central Highlands due to the impacts of Hoa Binh Dam construction. She and her husband wanted to follow her parents, therefore they sold all their land. Unfortunately they could not go and allmoney from selling their land was spent. Presently they earn their living by working as wage labors for whoever hires them.

Table 6-1: Households Classification in Mai Village

Household Characteristics	Commercial Strategy (1)	Semi-Commercial Strategy (2)	Subsistence Strategy (3)
A. Human resources			
1. Number of H.H	14	13	6
2. H.H Size (person)	3-4	6-10	4-5
3. H.H Labor (person)	2	4-7	2
4. Type of H.H	Nuclear	Nuclear + kin	Denuded nuclear (+kin)
5. Education Level	6 years	2-4 year	2-4 years
B. Farm Resources			
1. Total land area (ha)	5-11	8-12	2-4
2. Agricultural land (ha)	0.4 - 0.6	0.7 – 1	0.5 – 0.6
3. Residential land (ha)	0.14	0.2	0.2
4. Forest land (ha)	5-10	7-10	0-3
5. Cattle (head)	3	5-6	1-2
6. Small Tractor or Machine	1	1	0
C. Access to Govt Service			
1. Credit	++++	++	+
2. Technical information	+++	+++	+
3. Health Care	+++	+++	+++
4. Water	+++	++ +	+++
5. Electricity	++++	++++	+++
D. Farming Practice			
1. Land use pattern			
Rice	+++	++++	+++
Maize	+++	++++	+++
Cassava	++	+++	++
Sugar Cane	++++++	+++++	++
Bean	+	++	++
Vegetable	+	+++	+++
2. Use of Chemicals	+++	++	No
3. Use of Pesticide	+++	++	No
E. Access to Market			
1. Village market	++	++	++
2. District Market	+++	+++	++
3. Provincial Market	++	+	No

Noted:

Frequency indicator:

(+ +) = low frequency; (+ + +) = medium frequency; (+ + + + +) = high frequency.

2. Commercial Strategies and the Adoption of Scientific Knowledge

This strategy is usually chosen by households with 3-4 people. These families are nuclear families, which consist of a husband, wife and their children. The size of the household reflects the impacts of the Family Planing Policy of the government, which allows each couple two children. Households, that choose this strategy are young husbands and wives not over 40 years old. The husband and wife are the main laborers, and their children help them in housework and in some other tasks in the fields. In some families, their children are schoolchildren. Fourteen out of a total of thirty-four households in Mai village are in this group (Group 1 in table 6-1)

In terms of landholding, each household in this group has a total of about 5 to 11 ha of land. Eight of these 14 households have received land allocations directly from the state. The other 6 households are new couples and their parents assigned land to them. According to state policies, residential land and home gardens for each household are supposed to be equal (0.04 ha for residential land and 0.1 ha for home garden). Actually, the distribution of residential land is based on the plots of land that used to be the families' houses and home gardens. Some families get more landholdings than others. These are the households located near forest or in the periphery of the village. Almost all new couples get less than 0.14 ha. They are newly separated from their parents houses. Their parents don't have enough land to give them the full 0.14 ha. Some others households also can not have enough the full 0.14 ha because their houses are located near roads or in the center of the village. The agricultural land was equally allocated amongst the number of persons in the village at the time when the latest land law is issued (1993). A child under 16 years of age gets half the land area that is allocated to an adult. The child that was born after 1993 can not get land. On average households in this group received 0.16 ha of paddy field and 0.42 ha dry fields. Forest land was allocated to households based on the ability of each household to carry out reforestation. In general, each household decides for themselves how much land they

can manage as plantation. Those 14 households are deficient in cultivatable land. Thus most of them try to get more forest land to do forest plantation and protection. The area of forest land that each household receives ranges from several hectares to 10 hectares.

The need to cope with the lack of cultivatable land combined with the mindset of young people leads these families to choose commercial strategies and adopt scientific knowledge. This strategy is expressed in their land - use systems, crop patterns and forest management.

Land Use and Crop Pattern

Similar to other households in Mai village, the land that households that choosing commercial strategies can be divided into three types following state land classification systems: agricultural land, forest land and residential land. In fact, these households, as well as other households in Mai village, use and manage their land based on a local land classification systems. Comparing between the local land use classification and governmental land use classification we can see that the local classification system is more diverse. Its land use classifications are based on the different purposes of land use and the different crop habitat values. Land is classified in a way which is suitable to the local natural and social conditions. The local system is more convenient for their production activities and management. However each household manages their land in varying ways. In particular, households which choose commercial strategies seek to manage their land and manipulate ecological resources in such a way that is useful to them mainly for commercial purposes and cash. In order to achieve that goal, they manage their land and arrange their crop patterns in particular ways.

The land use system of the households that choose commercial strategies involve more intensification. This can be found in all the kinds of land they are using. In

paddy land, for example, interviews and field surveys reveal that these families welcome new high yield rice varieties (HYV rice). They say that HYV rice brings high productivity. The growing period of HYV rice is shorter than that of local varieties therefore they can plant two rice crops per year in well irrigated land. In some plots that are near to water sources, besides planting two rice crops per year they also plant other vegetables, soybeans or maize in the dry season to get more cash.

These households were also the first people in Mai village to plant sugar cane, which is introduced by government as a cash crop to be grown in dry fields. Sugar cane has a long growing period. It is harvested only once a year. However in the first of few months when the sugar cane plants are still small, they plant maize, beans and sweet potato in between the sugar cane rows. It is clear that in the same area of land they get more than one harvest a year. This can be considered an intensification of land use.

Forest in Mai village is differentiated into natural forest and plantation. The natural forest in Mai village is primary forest of Da river watershed and protected forest. The natural forest is called *Rung tap the* (village's forest or community forest). This forest is demarcated by government forestry officers and managed by forestry department under state law. Peoples are strictly forbidden from cutting natural forest. Plantation is managed by household therefore Mai villagers often call this forest as household forest when they are ask to differentiate plantation and natural forest. Thus forest management in Mai village is practiced at both community and household level. Although some households do not receive the forest land for plantation but they also have access to community forest.

For households that choose commercial strategy they plant both annual and permanent crops in forest land, which is allocated to be used for forest plantation. Multi-cropping is again possible. In first few years of forest plantation, fruit trees, mostly new varieties, sweet potato, taro, arrow roots and cassava are planted together

with bamboo (*nua* and *luong*) or other kinds of reforestation trees such as eucalyptus and acacia. Those latter types of trees are sold as raw materials for paper production.

In the home garden, those using new economic models, use systems which combine gardening, fishery, and animal raising, which have recently been introduced to Mai villagers. This model is believed to be the best to improve household economy and it is famous in Vietnam. It is commonly called "V-A-C" (*Vuon-Ao-Chuong*). Presently, almost all households who choose commercial strategies follow this model. They claim that it is highly effective economically but costly in labor. Therefore they only plant fruit trees and raise animals (mostly high yield pigs) but neglect the fish fish pond component which needs more labor. Thus the purpose of house land is changed from use in subsistence to economic and cash purposes. There is a huge change in the focus of garden use compared to that of other households and in previous times.

The cropping patterns of these households are aimed at getting cash rather than feeding subsistence needs. High yield varieties and cash crops are commonly found in their crop patterns. Almost all local varieties are replaced by high yield varieties The area of land used for cash crops is larger than the area of land used for subsistence crops and larger than the area of cash crops households who have not chosen commercial strategies. The crop patterns tend to change from inter-cropping to mono-cropping.

Sugar cane is a short-term industrial crop that was introduced to Mai villagers in 1996. At first sugar cane was a plant that the government gave to villagers as a form of compensation for dam construction. The government did not compensate using cash because they were afraid that local people would spend it in short time. Instead they gave local people sugar cane shoots. Later, sugar cane came to be considered as the way to solve poverty problems and improve household economies. Those young couples were the first people who planted sugar cane. They hoped they would soon become rich . In the first few years, they only planted a limited area of sugar cane, and as a result of

the lack of good road access and the influences of the international sugar market, they had to suffer bad consequences from sugar cane. The price of sugar cane was too low and thecompany did not come to the village to collect sugar. The farmers had to carry their products alongthe road15 km to Tu Ly (the center of district) to sell it. They had to sell their sugar underprice even though they had carried it along way.. In recent years, the price of sugar cane has increased. The cash that they got from their sugar cane has increased. Thus these households have expanded the area of sugar cane they grow while reducing the area of other crops. In every plots of land that sugar cane can be grown, they plant sugar cane. As a result, sugar cane fields have replaced maize, sweet potato, cassava, bean and pumpkin fields. Sugar cane is the dominant crop in their dry fields and also in the home gardens of tne households that choose commercial strategy.

For young couples, the reasons for choosing high yield varieties are various. On the one hand, they are afraid of potential food shortages precipitated by fast population increase at a time when swidden field areas are no longer expanded. From this point of view they choose high yield varieties with high productivity simply to meet consumption levels.. On the other hand, the government encourages local people non-stop to plant high yield varieties by subsidizing seeds and other necessary inputs. As the consequence of these two factors, local varieties are replaced by high yield varieties. And methods of choosing and keeping seeds for next crops have been lost. Villagers no longer do seeds selection and storage because second generation crops of new varieties do not grow well.

Thus for the households that choose commercial strategy, sugar cane becomes the dominating crop on dry land, and high yield rice varieties become the dominating crop in paddy land. Therefore according to governmental land classifications, agricultural land means land that is used for commercial purposes and for cash rather than for subsistence demands. In forest land and as a part of home gardens, new varieties of fruit trees have replaced local varieties of fruit trees an vegetables. It is clear

that those following commercial strategies tend to adopt introduced knowledge or scientific knowledge rather than using traditional knowledge.

Cash crops and high yield varieties require high investments. Hence in managing the land and crop, households that choose commercial strategies invest highly in their crops both in term of financial and labor investments. The investment for sugar cane is higher than for other cash crops because sugar cane requires good fertilizer and land. Moreover, farmers cannot produce sugar cane shoots to seed their next crop themselves because sugar cane is not one of their local crop species. Although the inputs for planting sugarcane such as fertilizers, pesticides and the sugarcane plant tops are provided in advance by sugar-company these investments are not free to farmers. They pay the back the loan of these inputs after harvesting the sugar cane. If the price of sugarcane is cheap and the productivity as well as quality of sugar cane is low, the cash from selling sugar cane will not even cover the inputs that were invested. To avoid this situation, some households have decided reduce the amount of inputs, mostly the amount of fertilizer per sugar cane area. This helps them reduce their financial investment but their long term benefits are threatened as reduction in fertilizer leads to the soil being exhausted. This reveals that these households adopt scientific knowledge in flexible ways. Just like sugar cane, high yield rice also requires high inputs of seed, fertilizers and pesticides and impacts of soil fertilizers in paddy fields are similar to that of fertilizers dry land.

Besides the high financial investment, planting cash crops and high yield varieties also requires a high labor investment. The more land use is intensified, the more labor is needed. The labor of households that choose commercial type strategies is limited as mentioned so before, the young husband and wife are the main labor for their land.. To cope with the lack of labor, on the one hand they had to work harder than other people and on the other hand, they tend to use technical helps such as tractors, and

pumping machines in preparing the land. In harvest time, they had to hire labor from their neighbors.

The following specific household illustrates for the commercial strategy and the adoption of scientific knowledge in agricultural practices of Muong people in Mai village.

Case I: Mr. Tien's family

Mr. Tien family is a typical young household in Mai village that choose commercial strategy and scientific knowledge for their agricultural production. Mr. Tien is 35 year old. He finish his education at the secondary school (7 years). His wife is 32 years old. She finish her education at primary school (5 years). They have two children; the son is 13 and the daughter is 11 year olds. Their kids are studying in primary school. Mr. Tien receive 0.04 ha of residential land because his house is in the center of the village, and it is next to his parents' house. He also receive 0.4 ha of agricultural land (both paddy field and dry land). He tries get more forest land to do forest plantation. He explains:

> " I have received lesser residential land than that of other households. I do not have home garden. The agricultural land is divided equally to everyone. I have two children. I need more money to pay for their studying. Land is allocated in the period of 20 and 50 years. I am afraid that in the future my children do not have land to build their houses. Thus I need to have much money to buy another plot of land for them. I receive 7 ha of forest land to do plantation. I invest 2 million *dong* in planting seedless persimmon on that land. Now persimmon bears fruit. Last year I got 1 million *dong* from selling persimmon. I regret that I did not receive more forest land".

Mr. Tien's wife adds:

> " Sugar cane is new crop but we are taught how to plant it. I want to expand sugar cane area because sugar cane brings high economic benefit. Next year I will replace my cassava plot by sugar cane field. Now cassava is only used for feeding pig. However I also need to consider to the price of sugar cane. I prefer planting high yield rice varieties. In doing so I have more rice. Moreover high yield varieties have short growing time. The state subsidizes seeds for us so I do not need to select and keep seeds. However I know that the quality of high yield rice is not good. I also plant *lua nep dau* (a local sticky rice variety). It is good quality but yield is low ".

It is clear that Mr. Tien's family as well as other the households that choose commercial strategy find the way to cope with the changing context by adopting scientific knowledge in flexible way. On the one hand, choosing commercial strategies is necessary for new couples because they lack land for cultivation. On the other hand, young people have more alternative advantage in learning the new knowledge and new methods. This leads to the fact that most young couples in Mai village choosing to plant cash crops and high yield varieties in their fields in order to increase their living standard. As a result scientific knowledge is adopted and applied flexibly in their natural resources management.

3. Semi-Commercial Strategies and The Articulation of Scientific and Local Knowledge

A general characteristic of households that choose the semi-commercial strategies is that their household size is larger than that of other households. The number of members in their families varies from 6 to 10 persons. Families pursuing semi-commercial strategiesare the families of the old couples. The age of the husband and wife is usually over 50 years old. Some households in this group are nuclear families which include a couples and their single children. Others are extended families made up

of a nuclear family plus one or more close relatives: e.g. grandchildren, parents of either the husband or wife, a sibling of the husband or wife, a child of a sibling. These households have a large number of laborers because their children are grown up. There are normally 4 to 7 main laborers and the rest are a subordinate laborer.

In terms of landholding, semi-commercial strategy households have received larger areas of land than other household did. They have totally about 5 to 12 ha. They also are the households that directly received land allocations from the state. A household in this group receives about 0.3 ha paddy land, about 0.7 ha dry land and more than 0.14 ha residential land. They also receive a large areas of forest land. Some households receive 5 ha and some others receive 10 ha of forest land. Thus compared to other households in Mai village, households that choose semi-commercial strategies have rich amounts of labor and large areas of land. This gives them an advantage in developing their household economy.

Land Use and Crop Pattern

Although the area used by these households is larger than that in other households, they also choose to intensified land use but they used semi-commercial strategies They hope that using these strategies they will have enough food to feed the large number of people in their households.. Thus similar to the first group, which choose commercial strategies, this second group also find the way to improve their economic status by intensive using land. This land use technique is practiced in all the land that they receive.

In well irrigated paddy fields, they plant two rice crops per year. Most rice varieties that they plant are high yield varieties. They keep only one local sticky rice variety. The high yield varieties have a short growing period: 3 months compared to the 5 months of local varieties, which allows them to plant two rice crops all year round.

Other crops such as maize, vegetables, beans and taro were planted in paddy fields in the dry season. Thus in one year in paddy land, they can harvest two rice crops and a maize crop or several vegetable or bean crops. Those crops contribute to their subsistence needs and cash needs as well.

In dry lands, they used some plots, suitable for planting inter-crops of maize and vegetables such as pumpkin, taro and other local vegetables to feed their subsistence food demands. The other plots were used for planting sugar cane. In recent years, the area of sugar cane they plant has been expanded as the price of sugar cane has increased. They interplant other crops such as arrowroots, taro, sweet potato, and maize in the sugar cane fields when the sugar cane has not grown up.

In general, households that choose semi-commercial strategies have larger land area than other households. Because they have a rich labor force so they want to receive more forest land for forest plantations and protection. In the first few years of forest plantation they can plant fruit trees, cassava, maize, and other vegetables in their forestland. They get a significant income from these crops alongside the income from planting forests that the government pays them. They tend to manage forest land that allocated to them in a way that favors their subsistence demands.

In home gardens, many types of fruit trees and vegetables are planted. Apricot, plum, banana, jackfruit, grapefruit, pineapple, longan and lychee are normally all found in their home gardens. These plants are mostly for household consumption although in some years when they get a good harvest they also sell the fruits to small traders to get cash. Unfortunately the traders who go to the village to buy these fruits pay very low prices so even though the villagers have got a good harvest they gain low benefits. In recent years, many new fruit varieties have been introduced to villagers. New varieties of plums are already bearing fruit but since the price of this type of plum has decreased in recent years (nearly 1000VND/kg), villagers are not interested in planting this tree

anymore. Some households have cut down these fruit trees to plant others. A seedless variety of persimmon has been successfully planted but its price is not encouraging: 400VND per fruit. Last year, the automobile road was reconstructed at the same time as the seedless persimmon harvest. Villagers could not sell their products because no trade men came to their village. The area of new varieties of longan and lychee are expanding but not yet bearing fruit. Villagers also report that since Hoa Binh dam has been built, apricots have not grown well because the weather has turned warmer. They lost a great deal of money through this change, because apricots are favorite fruit for lowland peoples.

Unlike the cropping patterns of the first group, the cropping of semi- commercial households included both subsistence crops and cash crops but their cropping patterns favored subsistence demands rather than commercial purposes. The households that chose the semi-commercial strategies had the big numbers of members. Food security was the most important issue to them. Their cropping patterns first aim was keeping food security just like subsistence farmers and so their cropping was arranged in a similar way too.

Rice is paid special attention by these households even though the area of their paddy fields is smaller than the area of their dry fields or forest in Mai village. The reason is that rice has stable productivity and directly serves daily demands. In the past, they normally planted many dry rice and wet rice varieties and keep seeds after harvesting for their next crop. Its richness in rice varieties helped them to maintain food security and reduce risk in the bad harvests. In recent years, local rice varieties have been replaced by high yield rice varieties. However, the purpose of Muong farmers in growing rice is still mainly subsistence.

Mai village has very limited rice area, so their rice production is not enough to feeding its population all year round. The villagers report that the locally produced rice

is only enough to support them for 3 or 4 months. Thus maize plays an important role in the subsistence livelihood of the Muong people as well. Maize is not staple food of Muong peoples but isused mainly for feeding animals. Maize is also used to exchange for rice. However in some periods of shortage they have had to eat maize instead to rice. Maize is planted mostly in dry land areas where water cannot reach. In Mai village, making up for the limited of wet rice land, there is much maize land. The Muong people have experiences that where bananas grow well the soil is suitable for planting maize. Maize is planted mainly on *nuong* and *bua bai.* In flat, dry areas, with large fields, land is terraced by using buffaloes. Maize is planted in the larger fields on it's own or together with, soil bean, sweet potato or other kinds of vegetables. On the hillsides, they plant maize together with cassava and pumpkin to prevent weed and soil erosion. Muong peoples have many local maize varieties. *Ngo nep* (sticky maize) is used in the daily meals of the villagers. Maize is harvested and hanged in the rooves of their houses or their kitchens. The Muong chose seed every season and kept it for the next crop. Nowadays, they plant very little local varieties. High yield maize varieties from China have been introduced to farmers. People have accepted them because the state subsidizes seeds and they have no choice due to the consumption needs of their big population.

Cassava, bean and other vegetables are planted both in the fields and in the home gardens of those households who choose semi-commercial strategies. These crops are paid special attention and contribute a significant proportion of the subsistence demands of these families. These crops are used to raise animals such as pigs and poultry, which further increases the food security for these families with their many members and the food security of Mai villagers as well. These households produce the most of their food necessities.

Sugar cane has recently occupied a large area of the villager's dry fields. Households that choose semi-commercial strategies get the most advantage from

planting sugar cane because they have the larger area of dry field and also a larger labor force. They can expand the area of their sugar cane using their household labor without the need for hiring tractors or wage labor. Thus the capital investment of these households is lower to that of the first group but they still earn the same stable income.

The following case provides the concrete example of a household that chooses semi-commercial strategy and mixing scientific and local knowledge in their farming practices.

Case II: Mr. Ngo's family

Mr. Ngo's family is typical of the group of households that choose semi-commercial strategy for their production activity. Mr. Ngo is 64 years olds. He finished his education at primary school (5 years). He worked as the commune cadre for quite a long time (9 years). His wife is 58 years old. She finished her education of 3 years at primary school. They have ten children, six sons and four daughters. Three of them (a son and two daughter) got married and they have their own family. Presently Mr. Ngo and his wife live with 7 children. The smallest daughter is 16 years old. She and her brother are studying at high school.

Mr. Ngo's house and home garden locate in a land area of 0.3 ha. He got more residential land than other households did because his house is near the forest. He receive 1 ha agricultural land (both dry field and paddy field) because his family have large number of labors. He receive 10 ha forest land to do plantation. He plants a lot of fruit trees such as banana, plum, grapefruit and persimmon in that land. Besides fruit trees he also plant other crops such as sweet potato, taro, pumpkin and other vegetables. He assigns a son for taking care fruit trees and raising poultry in that garden.

Mr Ngo explains:

"I have many children, they are growing up and I need to offer jobs for them. If the price of sugar cane is stable planting sugar cane brings high economic benefit. A main part of my land area is for planting sugar cane. I normally plant sugar cane together with maize, taro and cassava. These latter crops, especially maize fill the lack of rice in our village. I can exchange maize for rice. One month my family consumes 200 kg rice while sugar cane is harvested only once a year. So that firstly I had to consider to our daily consumption. I try to plant many crops so that I can harvest products all around the year. I also need to save money to organize weddings for my children and build houses for them too. I encourage my children work hard. My family is assumed as the rich family but in reality we had worked hard and we are not as rich as they thought ".

Mr. Ngo's son gives his point of view:

"I want to replace maize and cassava plots by sugar cane field but my father is decision- maker. I think that if we plant only sugar cane we could save a lot of labors. However my father is right. My family's daily consumption is high so we choose inter-cropping pattern".

Mr. Ngo's wife says:

"I still do seeds selection and keeping (for local varieties). Some other households come to ask me for seeds when they want to plant local varieties. For me the local varieties are easy growing well in Mai village's land. The quality of local varieties is better than that of high yield varieties".

It is possible to say that Mr. Ngo's family as well as other households that choose semi-commercial strategies balance the demand for food security and the demand for cash in their cropping pattern. They pay attention in both subsistence crops and cash crops. Their own knowledge is combined with scientific knowledge and the

introduced knowledge in their farming practice. This creates a situation in which local knowledge is articulated to scientific knowledge to create a new form of knowledge that mingles both local and scientific elements. The advantages of a large land area, and labor force combined with a rich experience in using land and cultivation method allow those households achieve a stable income.

3. Subsistence Strategies and the Reproduction of Local Knowledge

There are 6 households in Mai village who have chosen subsistence strategies. In term of human resources these households are poor. They have a small number of members, from 4-5 persons. These are the denuded families, nuclear families in which one parent is in absence. Some of these denuded families are also responsible for taking care of their disabled or unmarried siblings. Others households are the families of the old couples with disabled children. The lack of labor is a common characteristic of these families because their children are small or disabled or they are the older couples. They normally have two main laborers, but in some families there is only 1 laborer even though the number of members in their families is 4 or 5 (Group 3 in table 6-1).

In terms of landholding, each household in this group receives an average total of 3-5 ha of land of which 0.4-0.6 ha is agricultural land, residential land is about 0.14 ha and the rest is forest land. However not all households in this group receive 3 –5 ha of land. These households landholdings are small because they have received very little forest land compared to other households in Mai village. Some households receive up to 1 –3 ha of forest land, but others receive none. The reason these families receive so little forest land is that they lack the labor to do forest plantation and protection. Also in the beginning there was a low understanding of the state's land allocation policy. Interviewees reported that latter on they wanted to receive more forestland but there was no more land available for them.

Land Use and Crop Patterns

Unlike the two previous groups, the households that choose subsistence cropping did not use their land in an intensive way. Their lack of labor and capital did not allow them to overuse their land, exceeding it's natural capacity, or beyond their family labor situation. In paddy lands they also planted two rice crops per year, but they did not plant other crops in the dry season. Thus in the dry season their paddy land is fallowed and the soil fertility naturally recovers. This use of land is seen as more effeminate because it is less forceful. For this reason they are nicknamed lady farmers. In dry fields, they plant mostly maize, cassava, arrow roots, bean, taro, pumpkin and other vegetable. Sugar cane occupies only a small area. They do inter-cropping of maize in sugar plots, maize in beans or maize in pumpkin. They cannot afford to invest in fertilizer and other agricultural inputs for their fields. So they enrich soil fertility using their personal understandings of traditional knowledge and experience to enrich the soil fertility. The fallow dry plots are seldom found in the fields of group 1 and 2 but can be found commonly in the fields of group 3. Especially in the dry season when plants cannot grow well, fallowed dry plots become the grazing land for their cattle.

The home garden is paid special attention by households that choose subsistence strategy. They plant mostly fruit trees including both local and new varieties. Fruit trees are used for both household consumption and for cash. In some good harvests, the traders come to their gardens to buy fruit. Although the price of their fruit is cheap, they get a significant income from their gardens. If the price of fruit increases they reduce their consumption so that more is left over to be sold to get more cash to cover their daily needs. Besides fruit trees, vegetables are also planted in the home gardens of these households. It provides a rich source for their daily meals.

Although subsistence households do not receive much forest land, they still have access to both community forests and natural forests. And they enter the forest to collect

bamboo shoots and other non-timber forest products (NTFPs), mostly for their own consumption. If they work hard they can get cash from selling these products.

The other characteristics in the land use and crop patterns of the households that choose subsistence strategies is that their crop patterns aim to favor their subsistence demands rather than their cash demands. The field surveys reveal that the households in group 3 keep almost all of the traditional local varieties and they tend to plant several varieties of the same crop in each field at the same time. They arranged their fields in the ways that were useful for their need for subsistence. Food security is their first priority. They have less advantages than other people therefore they want their daily consumption to be assured. Local knowledge continues to be reproduced to meet their demands.

The households that choose subsistence strategies do not invest much in their fields because they lack capital and labor as well instead they tend to rely on their experience and their traditional knowledge to exploit the land for their needs.

The following case gives a detail example of a household that choose subsistence strategy and reproducing local knowledge to improve their livelihood.

Case III: Mrs. Com's family

Mrs. Com is single mother. She is 41 years old. She finish her education at primary school (4 years). She had to take care a disable sister and three children (one daughters and two sons). Her youngest son is 5 years old. He and his bother are studying in primary and secondary school. Mrs. Com receive 0.1 ha of residential land including house and home garden. She also receive 0.5 ha of agricultural land. She do not receive forest land for plantation. She says:

"I did not know that forest land is allocated to households for 50 years. I simple think that they will change that policy every several years. Moreover my family do not have much labor force. If I receive forest land I am afraid that we can not manage it in the effective way. Although I do not have household forest I can gather forest products in community forest. I do not have much money to invest in agricultural production. Chemical fertilizer and pesticide are too expensive to me. I use dung and leaves to manure my field. I plant many kind of crops. Those crops provide enough food for my family. I no need buy vegetables, rice and many other necessities. I also plant sugar cane in my home garden and in a small dry plot. I plant some fruit trees that are mainly for our consumption. I can not carry fruits to sell in Tu Ly market (district market). For me I had to pay special attention on our daily consumption. However I also need cash to cover my children's school fee and other expenses".

Mrs Com's family as well as the other poor people have not much alternative advantage to improve their life. They want to choose the way that brings high security to them. They want to keep their self-reliance and avoid the risk. They produce goods in order to cover their own consumption. It is clear that subsistence strategy is adaptable to the poor people in Mai village. At the same time local knowledge is applied in their land use, crop – pattern and forest management. The traditional local-derived perception about resources and resource management still goes a long with Muong people in Mai village. The traditional moral principles in land and forest management still play the important role in controlling and adjusting their farming practices. Thus through exercising the traditional customs local knowledge is reproduced in the new conditions.

5. Summary

In this chapter I have presented the practical dimensions of the ecological knowledge of the Muong people. I focus on analyzing the different strategies that households choose to apply their knowledge to land use, crop patterns and forest management. It is clear that the younger generation in Mai village tends to choose

commercial strategies, older generations choose semi-commercial strategies and poor people tend to choose subsistence strategies because they do not get much advantage in the development process. This study shows that commercial strategies are risky because they increase dependence on outside forces. Semi-commercial strategies seem to be more stable and sustainable because they brings both higher productivity and high security. The subsistence strategy brings high security but lower productivity and exploits nature more. The subsistence strategies are adaptable for the poor people.

It is necessary to remember that the farm resources, especially the land area, plays a big role in the improving the livelihood of the local peoples. The study shows that in fact the land allocation policy divides only agricultural land equally while residential land and , even more, forest land are not divided equally among the households. Moreover information about the policy was not well understood by the local people. Some households were lucky to receive forest lands while others could not receive that land. Thus the implementation of land allocation policy at the local level retains many social and economic problems.

Presentation of the different strategies that the various types of household in Mai village practice to cope with the social, economic and natural changes proves that local ecological knowledge is dynamic and diverse. Local people, based on their practical experiences and their livelihood-derived purposes, construct their knowledge in ways that are suitable for their condition. They sometimes choose adopt scientific knowledge, sometimes to articulate scientific and local knowledge, and sometimes to reproduce local knowledge in order to cope with the changing context. Thus it is impossible to find the supposed unchanging pure local knowledge anywhere.