Chapter VII

SUMMARY, CONCLUSION AND RECOMMENDATION

7.1 Summary and Conclusion

This study concentrated on describing the land use changes as well as identifying the driving forces of changes and their role at village level in Xishuangbanna. The study took three villages with different ethnic groups as a sample. The picture of the area can be seen through these three representatives. The systematic perspective approach was applied for the entire study, mapping was mainly used to describe the land use and its changes. Meanwhile, the area response function was estimated to demonstrate farmers' response to market force in terms of land use as well as using Chow Test to identify the response difference and/or identical among different ethnic groups.

The study reviewed different traditional land use patterns of three ethnic groups. As the dominant ethnic group in Xishuangbanna, Dai occupied the valleys, and had a very long history of paddy rice cultivation, some small scale shifting cultivation on upland was also practiced for supplementary purposes. Fifteen glutinous and 3 non-glutinous traditional varieties of rice were found in the sample village. The Hani, Jinuo and other hilltribe minorities were governed by Dai before 1950, when the Communist Party liberated Xishuangbanna. Both of them traditionally practiced shifting cultivation on upland, and upland rice and maize were their staple foods. They had different forms of traditional land tenure. For Hani, all the land was community property, and households could cultivate freely under the community arrangement. Jinuo people had three types of land tenure -- collective, clan and individual ownership. However, both of these two ethnic

groups had strict regulation for forest protection. They had different indigenous knowledge on land classification and cultivated arrangement of each type of land.

Present land use patterns of different ethnic groups are also presented in this study carefully. All three ethnic groups plant hybrid paddy rice on paddy land now, and two of them apply fertilizer. Some cash crops like water melon and chili are planted on paddy land in winter season especially in Dai village. On upland, shifting cultivation is still practiced in all three villages. It is only practiced on a small part of upland for supplementary subsistence in Dai village while it is still a main subsistence source for Hani and Jinuo villages. Permanent cultivation with plantation trees like rubber takes a big part on upland cultivation and household income in all the villages. Production activities in the forest notably increased in the last 15 year especially in Hani and Jinuo villages.

Comparison of traditional and present land use patterns illustrated that, great changes on land use happened within any ethnic groups in the last 45 years. These changes can be divided into two stages, one is from shifting cultivation to permanent cultivation, and another is from subsistence to market-oriented. However, these changes were directly and indirectly caused by the great changes of socio-economic conditions in the area.

The first and most significant factor is the institutions related to land tenure. Before 1950, all the land in Xishuangbanna belonged to the highest ruler of the Dai, and most of the cultivated land was allocated to individual farmers in different ways, all the farmers of different ethnic groups made their decision on land use in their traditional way, and pay tax to the ruler for production. During the period of 1950 to 1982, land use was completely controlled by the government and farmers' had no right to make any decision on land use. In the same period, the government tried to change the production mode of hilltribes from

shifting cultivation to permanent agriculture, and this is the most direct cause which led the first stage change from shifting cultivation to permanent agriculture in Xishuangbanna. As the result, almost all the hilltribes in Xishuangbanna had the paddy land for paddy rice cultivation till the end of this period, this increased the stability of the cultivation system of hilltribes. Meanwhile, some swidden land was cultivated over the regular cultivation period which led to land degradation to such an extent that some swidden land could not be cultivated any longer. From 1958 to 1960, a campaign called "The Great Leap Forward" was initiated by the government, the farmers' were asked to grow more rice and to smelt iron, and a large amount of forest land was degraded. In the beginning of 1980s, the government applied the land reform policy called "Household Responsibility Production System" throughout the country, and almost all cultivated land and some of the forest were allocated to each household. Since then, the households became the real land users, and they could make the decision on land use to a great extent according to their own need even though sometimes the government still gave them some crop production quota. Establishment of the Natural Reserve in the area also had the impact on land entitlement. Some households in the sample villages lost their cultivated land in the Natural Reserve, especially the land for Chinese cardamon. This affected Baka greatly because Chinese cardamon was the main cash income source in this village, so farmers had to search for other sources to substitute for it.

As with any other place in the world, population increase gave more and more pressure on land, but this problem seems comparatively more serious in China. Even through there are no long term statistics to show the population pressure in the sample villages, its impact on land use was well recognized by farmers, and the significant indicator

they pointed out was shortening fallow period and extending cultivated period on the swidden.

In the last 15 years, marketing development had direct and significant influence on land use. Economic reform in the beginning of 1980s caused the second stage change from subsistence to market-oriented. Under widening marketing condition, farmers had to arrange their production and surplus to meet the demand of the market in addition to their subsistence need. With the similar natural conditions in the area, some new cash crops such as watermelon, chili, passiflora etc. were introduced into the area. Rubber especially expanded rapidly in the area, and has become the most important income source for all the households. The result of the area response function revealed that all the farmers of different ethnic groups are very sensitive to the price of cash crops. It confirmed the hypothesis that farmers made their decision on land use according to the market demand; and the planted area of one crop not only was influenced by its price, but also was influenced by the price of its competitive crop(s). The result of Chow Test showed that farmers of different ethnic groups had similar response in terms of planted area to market opportunities, in particular, the result reflected that differences in land use among different ethnic groups disappeared gradually with the land use change from subsistence to market-oriented.

Technological transformation was also a very important factor which influenced land use greatly. The government had paid more attention to agricultural technical improvement and transformation throughout the country. Some techniques were introduced into the study area successfully. For instance, hybrid paddy rice which was well accepted by the farmers, and it now occupies all the paddy land. Introduction of watermelon and chili increased the intensive use on paddy land. Rubber was planted by

every household with large area on upland; and some chemical inputs such as fertilizer also were applied widely. This increased the farm productivity significantly, but it also led to the loss of traditional varieties.

Changes on infrastructural conditions in the area also had the impact on land use change. Transportation improvement which were planned and invested in by the government in the last 45 years brought great convenience to the area. Consequently, numerous new means of production were brought to farmers. After the implementation of land reform policy and economic reform policy especially, the transportation condition played great role on the change of production orientation from subsistence to market. Meanwhile, this development also led to resource degradation to certain extent because of over exploitation of some natural resources like timber. The Government irrigation development program during the period from 1950 to the beginning of 1980s improved irrigation conditions in the study area greatly, and led to the increase of productivity, especially on paddy land. However, the lack of investment in the irrigation development program from the government after the land reform policy created the difficulties for farmers to improve and maintain the irrigation system This influenced the land use directly by creating water constraints in dry season and floods in rainy season.

The study area is famous for its scenic beauty and interesting customs of different ethnic groups, so tourism was developed rapidly in the last 15 years, and it became a more and more important sector of the local economy. This development brought a great marketing opportunities for farmers to sell farm and forest products. It increased the commercialization rate of local products to a great extent, and it also provided more and more employment opportunities to the young people in the villages. Some problems such

as decrease of labor for agricultural sector and natural resources degradation possibly may arise in the near future due to tourism development.

7.2 Recommendations

Some findings in this study pointed to some land use measures potentially useful to sustainable development and issues for further study.

(1). Deforestation is a serious problem in Xishuangbanna. It was well recognized by both the government and farmers, and some measures were adopted by the government in the last 45 years. At present, state forest and natural reserves were strictly protected by the government and any farming activity is prohibited in these forests. However, problems like over logging still exist in community forests. Relevant research and projects are urgently needed to solve the problem of over exploitation of community forests.

(2). The result of the study revealed that land degradation, especially on swidden land, is more and more significant in the area. The evidence showed that the productivity of some area is declining due to decreased soil fertility. A soil conservation project should be introduced into the area as soon as possible.

(3). Introduction of new techniques increased the productivity and commercialization rate of agricultural products greatly and rapidly. However, farmers can not use these new techniques with high efficiency, For example, most of the farmers in the sample villages are unskilled in tapping of rubber trees which influenced the yield directly. The essential training must be conducted at household level to ensure the high efficiency of new techniques.

(4). Ignorance on irrigation system improvement also had an impact on productivity. Floods in the rainy season and lack of irrigation water in dry season were directly result of this. A project of participatory irrigation practices at community level should be conducted to help the villagers establish needed cooperation on irrigation improvement. On the other hand, government's investment on irrigation system should be targeted to small scale projects.

(5). At the present, all the farmers participate in market activities, and more and more products are produced for commercial purposes, but they can only judge the market demand according to the price. Some researches on market demand and price fluctuation should be conducted to provide the information to guide farmers' production decisions. The rapid extension of rubber showed the potential marketing risk in the future.

(6). Because of the uncertainty of changing government policy, farmers have difficulty in making sustainable production decisions. For example, Baka has almost half of the Chinese cardamon planted in the Natural Reserve, once the government takes it away, farmers will loose a big part of their cash income. Some projects which can reduce this uncertainty and the impact of Chinese cardamon to the Natural Reserve as well should be conducted.

(7). The impact of institution on land use can be considered as the most important socio-economic factors in this study. Especially, any change on land tenure policy led to great change on land use. This issue requires further study on stability of land tenure policy and its impact on land use.

(8). The influence of ethnic differences or difference of land use traditions is still visible in present land use pattern even though land use patterns of different ethnic groups

changed greatly with the same changes of socio-economic conditions in the area. Detail and in dept study on impact of ethnicity on land use is worth to be conducted in the future.