Farming System and Settlements in Xishuangbanna, Yunnan Province, China

Wei-dong Xu*, Shigeru Shirasaka** and Takeo Ichikawa***

Abstract

The Xishuangbanna Dai Nationality Autonomous Prefecture is located at the end of the southwest part of the People's Republic of China. It borders on Burma and Laos. The tropical areas including Xishuangbanna, Hainan Island etc. in China are marginal tropical areas when compared to the typical humid tropical areas like Malaysia and Indonesia and other places in Southeast Asia.

In Xishuangbanna, we can find over eleven minority ethnic groups including Dai, Jinuo etc. and they practice many types of agriculture. In this paper, the authors discuss the characteristics and recent changes in agricultural land use and crop cultivation according to nationalities on the basis of the authors' field work.

In the 1980's, a Responsibility System for Agricultural Production was introduced in Xishuangbanna, and they are carrying out agricultural changes that they have never undertaken before. This is centered on the expansion of modern and intensive agriculture of rubber, tea and tropical fruits. Rubber tree growing has been introduced by many minorities, and the height limit of rubber tree growing is 1,350 meters above sea level.

In general, through the process of modernization in agriculture, the introduction of rubber and tea, the paddies in the basins and the slash and burn cultivation in the mountain regions have been receiving little attention in their agriculture. The result is that their cultural characteristics tend to slowly decline especially among the minorities who are non-Buddhist. We find that the minorities show a tendency to adapt to the Han people's culture.

Key words: Xishuangbanna, Yunnan, slash and burn cultivation, rubber tree, tropical agriculture, laurel forest cultural complex.

I. INTRODUCTION

It has been commonly accepted in the past that the humid tropics have a monthly mean temperature over 18°C and it is possible for people to cultivate crops without irrigation because of the large amount of precipitation (Gourou, 1969). Nevertheless, people cultivate and raise most tropical crops by way of experimentation. We can find crops in which the yield has been increased (Table 1). For example, it is said that 18°N is the northern limit of latitude for natural rubber plantation, but plantations occur at 24°N in China. However, the tropical zone in China is rather marginal compared with the typical humid tropics of Southeast Asia. Therefore, a great variety of agriculture is developed under complex natural conditions. For this reason we are interested in the tropical agriculture of China.

We can find many research papers on the development and present condition of tropical agriculture in China. Among the papers, representative examples are the one on the land evaluation of rubber planting areas by Huang (1980), the analysis of present conditions by the inquiry commission of the Tropical Agriculture Research Center of Japan (1981) and the overall study by Huang (1983).

On the other hand, a famous study on the regional division of the tropical areas of China is the geocological division study by Jia (1979) and Figure 1 was made in the light of the regional division by Jian Ai-liang and including

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Table 1. Cultivated Area and Production of Principal Crops in Xishuangbanna

<table>
<thead>
<tr>
<th>Type of Crop</th>
<th>Cultivated Area</th>
<th>Production</th>
<th>% of Yunnan (1986)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1978 (ha)</td>
<td>1986 (ha)</td>
<td>1978 (t)</td>
</tr>
<tr>
<td>Paddy</td>
<td>55,563</td>
<td>62,493</td>
<td>195,827</td>
</tr>
<tr>
<td>Early rice as double crop</td>
<td>14,667</td>
<td>16,496</td>
<td>35,015</td>
</tr>
<tr>
<td>Late rice as double crop</td>
<td>40,896</td>
<td>54,451</td>
<td>160,812</td>
</tr>
<tr>
<td>and single crop of rice*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other food crops**</td>
<td>13,337</td>
<td>15,032</td>
<td>24,703</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>1,716</td>
<td>2,782</td>
<td>63,415</td>
</tr>
<tr>
<td>Other short-term cash crops***</td>
<td>26,020</td>
<td>31,409</td>
<td>...</td>
</tr>
<tr>
<td>Tea</td>
<td>11,267</td>
<td>13,600</td>
<td>2,500</td>
</tr>
<tr>
<td>Fruits</td>
<td>2,571</td>
<td>5,285</td>
<td>3,900</td>
</tr>
<tr>
<td>Crude drugs (Amomum villosum)</td>
<td>...</td>
<td>4,921</td>
<td>...</td>
</tr>
<tr>
<td>Rubber</td>
<td>30,691</td>
<td>65,533</td>
<td>10,049</td>
</tr>
</tbody>
</table>

*Including upland rice.
**Maize, wheat, potatoes, yams, soybeans and millet.
***Vegetables, peanut, rapeseed, sesame and tobacco.


Figure 1. Cultivated Areas of the Tropics in the Southern Parts of China

Data source: SHUEN et al., Economic Geography of Guangdong, Fujian and Guangxi, Xinhua Press.

The authors' field work and actual land use. Figure 1 shows that the south tropical zone of Yunnan Province, that is, Xishuangbanna, is placed in an important position and has potential for the expansion of tropical crops.

Xishuangbanna is located in the southwestern end and borders on Burma and Laos between 21.1 and 23.4°N (Figure 2). The area of Xishuangbanna is 20,000 square kilometers, and the population was 706,000 in 1986. The Ailao-shan Mountains, which lie to its north, and part of the Nu-shan Mountains serve as a screen against cold north winds. To the south, the adjacent Indian Ocean and the Bay of Bengal from which...
southwest monsoons arise, and the river network and basins, none of which are high, contribute to a warm, wet climate.

In Xishuangbanna, we can find over eleven minorities, of which the Dai people are a large part. Therefore, they made administratively the Xishuangbanna Dai Nationality Autonomous Prefecture. From a global point of view, Xishuangbanna is situated on the northern fringe of the tropical climatic zone. The natural vegetation of the area is not typical like in Malaysia and Indonesia, but Xishuangbanna, with Hainan Island, is nevertheless very important for typical crop cultivation. There is no winter here. The two words “ice” and “snow” do not appear in any of the local chronicles.

Xishuangbanna is said to be a treasure of natural resources, that is to say, crops and plants. We can find about 5,000 species of plants, and about 1,500 species of crops are cultivated according to the Yunnan Institute of Tropical Botany, Academia Sinica. Many scholars are interested in Xishuangbanna, because Xishuangbanna is the origin of rice of the Japonica type, tea trees, etc. There are many research papers on
the study of the laurel forest cultural complex (照葉樹林文化) that has been investigated by SASAKI (1984).

Xishuangbanna is located in Yunnan Province, and extends slightly from north to south. Jinghong, the capital of the prefecture, is located along the Lancang-jiang River (the upper reaches of the Mekong) in a basin 535 meters above sea level (the local name for such a basin is bezi (徠子) in Chinese).

In this paper, the characteristics of agricultural land use and crop cultivation according to nationalities are discussed on the basis of the authors' field work.

II. LAND USE AND SETTLEMENTS OF THE SHUI-DAI (水傣)

The Shui-Dai (水傣) live on the flood plains and river terraces in the intermontane basins, and their main occupation is paddy cultivation. The Shui-Dai are considered a group belonging to the laurel forest cultural complex that centers on paddy cultivation. The men plowed the paddy using buffaloes, while the women planted the rice. That is, the work was specialized by sex. They used almost no fertilizers.

After the revolution in 1949, they got the use of 238 reservoirs and 3,733 facilities to draw river water into the paddies. As a result, it is now possible to irrigate a paddy during the dry season and cultivate rice twice a year. The Shui-Dai began to cultivate two crops of rice a year in 1969.

Manjinbao (曼棱傣), one of the Shui-Dai villages, is located 12 kilometers south of Jinghong; it has 99 families and a population of 490 (1988). They cultivate 780 mu (畝) of paddies, of which they can cultivate 450 mu (60% of all paddies) for early rice. There is not enough water for irrigation of paddies in the dry season.

They generally seed early rice between the 20th and 30th of November, and transplant rice seedlings between December and January (Figure 3). The harvest is about the middle of May. Late rice is seeded in June, transplanted in July and harvested between October and December.

The yield per mu is 500 – 1,200 jin (斤), which is quite high considering that late rice is cultivated in all paddies but early rice is cultivated only in the paddies with good natural conditions. As glutinous rice is the staple food for the Shui-Dai people, nonglutinous rice used not to be cultivated. But nonglutinous rice production has increased due to the plan for rice delivery to the government; its yield accounts for three-fourths of all rice products.

Between December and May, they can send their buffaloes to graze freely upon any paddy lying fallow regardless of ownership. This is a kind of open field system.

Almost all of the upland fields switched to rubber production after 1960, and 12,000 rubber trees are planted on 400 mu today. The result is that rice is first, livestock breeding second, and rubber third among cash income resources. Rice
occupies 50 percent of all income. In the villages, a “Responsibility System for Agricultural Production” was introduced in 1982, and paddies were divided among the people, 1.62 mu per person, equally without distinction of age or sex. In general, people had an annual income of 3,000 yuan (Japanese 150,000 at 1988 rates) per household in 1988.

Cotton growing disappeared around 1980, but cotton is still woven by women in one-third of all farmhouses. Cotton is not only for home consumption but also for sale as souvenirs. They do not grow tea, but have food-culture like bamboo leaf-wrapped rice-dumplings (粽), rice-cakes (糭), and fish-sauce (魚露). Bamboo work is also done. All of these are common in the laurel forest cultural complex areas.

Manluandian (曼乱点) is a village of the Shui-Dai 550 meters above sea level; it had 620 people in 1988. They cultivate 530 mu of paddies, 120 mu of fields and breed 130 buffaloes, 5 yellow cattle and 500 pigs. They seed in general in mid-November, and transplant rice seedlings between the middle and the end of December. The harvest is in April. Late rice is seeded in June, transplanted in August, and harvested in November. The land is non-productive for three months between the harvest of early rice and the cultivation of late rice. This village suffers from a flood every year during this period, so that they cannot raise maize at this time. As they have an abundance of water for irrigation in the village, they can cultivate rice twice a year in most paddies. The yield per mu is 300 jin in the paddies with better conditions. 400 jin is possible in the best paddies, but if the native type is grown, the yield can reach 500 jin and the hybrid type, over 700 jin. Before the revolution of 1949, they cultivated only glutinous rice, but they had poor harvests. Therefore, nonglutinous rice takes up two-thirds of all harvests today. Glutinous rice is for home consumption and for offering at the village temple. Almost all nonglutinous rice is delivered to the government.

They cultivate mainly sugarcane and maize in the dry fields. They are self-sufficient in vegetables, and vegetable surpluses are carried to be sold in the market of Jinghong and the small roadside markets near their settlement.

300 mu of rubber trees are planted in the people’s commune (人民公社；鄉，xiang now). Rubber trees are ten or fifteen years old in this village. Rubber tree plantations are under the Responsibility System for Agricultural Production, and divided in small amounts to all families. But most families cannot tap; therefore, twelve families specialize in tapping. They make a good income (100 yuan per family per month, about ¥5,000) by tapping. This village’s authorities have a plan for expansion of rubber tree plantation.

The livestock industry, mainly pigs and chickens, occupies first place among cash income resources, rice is second, sugarcane third, and rubber is fourth now. Production for marketing is rapidly increasing. River fishing is not so popular in this area, but they use baskets and nets to catch some fish. There is a fish farm in this village. They used to drain a pond dry once a year and divide the fish equally among the families. At that time, they used to make fermented fish and rice in pots which is very similar to Japanese narezushi (鰤れ寿司). They do not yet cultivate cotton, but women spin thread and weave using raw cotton that they buy in the town.

Their settlement is situated on a natural levee, but a lot of houses are flooded above the floor level by the Lancang-jiang River and Liusa-jiang River, a tributary of the Lancang-jiang. The settlement is a village centered around a Buddhist temple, with an irrigation pond to the west. The flood plain around the settlement is paddies and the rubber trees are planted on the hill slopes to the west.

The houses are wooden of a high-floor style about one meter off the ground. The roofs, once thatched, were changed to tiled roofs in the 1970’s. Though the tiled roofs are durable, there is a disadvantage in that the temperature rises in the house because of the low specific heat of tiles. There are some public wells in the settlement and people carry drinking water to their houses by pole, although they keep some water supplies in every house. However women can often be found washing and bathing in the irrigation canal.

As they leave cattle, pigs and hens at large, they enclose their houses and kitchen gardens with fences. There are many houses that have pigsties
and henhouses under the high floor, and also a rice box of bamboo for storage.

III. LAND USE AND SETTLEMENTS OF THE HAN-DAI (漢傣)

The Dai people are divided into two groups the Shui-Dai and the Han-Dai\(^{10}\). It is a characteristic feature of the Han-Dai that the dry fields are given great importance, together with paddies. Their houses are not only of the high-floor style of the Shui-Dai but also one-story houses with brick walls.

Tuguozai (土鍋寨), 740 meters above sea level, is one of the typical Han-Dai settlements in Mengyang Bezi, and has 69 households (55 of Han-Dai and 4 of Han or Chinese) of 345 people. They keep 625 mu paddies and double cropping of rice began in 1963 after the construction of the reservoir for irrigation. But they can cultivate only 200 mu of early rice, 32 percent of all paddies. The lack of irrigation is the most important factor resulting in little early paddy cultivation. They are afraid of cold weather damages. Amphibian rice (水陸両用稲) is grown in paddies that are apt to lack water.

Early rice is seeded at the end of November, and they can transplant it around the middle of January. The harvest is in general between April and May. They seed late rice in May, transplant in June and harvest in September. Early rice is all hybrid and nonglutinous rice that was introduced in 1984. One-third of late rice is glutinous. The glutinous rice is all red (赤米); violet rice (紫米) cannot be cultivated because of the lack of accumulated temperature.

The yield of early rice per mu is 300 – 500 jin for nonglutinous rice, about 400 jin for glutinous. That of late rice is 600 – 1,000 jin for nonglutinous hybrids and 600 jin for glutinous.

Slash and burn cultivation is also done on the slopes of a mountain; 1.5 kilometers to the west of their settlement. Before the revolution, they used to burn up the slopes of the mountain in April, and cultivate upland rice in the first year, maize in the second year, cotton in the third year. They abandoned the field from the fourth year. Today, slash and burn cultivation is decreasing year by year, because they plant rubber trees in the third year after the cultivation of upland rice and maize. Rubber planted areas have increased rapidly in Xishuangbanna, especially on the slopes of mountains under 1,000 meters above sea level. It is all glutinous rice that is cultivated in the slash and burn fields, and the yield per mu is 500 jin. Cotton cultivation disappeared in 1953.

In the past two years, planting of watermelons has increased as a second paddy crop. Two farmers contracted with a vegetable and fruit wholesaler of Anhui Province to grow watermelons in 1987, and at the same time, began to grow them. All households of this settlement contracted with the wholesaler to grow watermelons in 1988 over an area was 100 mu. They seed and use vinyl covers in December, and ship the watermelons to the Northeast region of China between March and April.

There are three points in the contract conditions as follows:
1) The capital is borne in equal shares by the wholesaler and farmers. But the wholesaler gives technical advice and assistance to the farmers who offer land and labor. They halve the profit.
2) The farmers pay 50 yuan per mu to the wholesaler for technical advice and assistance.
3) The farmer is given technical guidance from the Center for Agricultural Technology of the Province, and the wholesaler provides capital for the cultivation. The farmer pays 12% of the profit to his two backers.

The average farmer keeps one buffalo and two or three pigs. Before the revolution, the prosperous farmers kept a few horses, and used to ride. However, horses have disappeared completely. There are 16 two-wheel tractors in this settlement. The annual cash per-capita income averaged 500 – 1,000 yuan in 1988, rice taking the first place, livestock second, and rubber third.

Manlonggang (曼龍巖) is also a typical Han-Dai village, 770 meters above sea level, and has 46 households of 276 people. They cultivate paddies (360 mu in all) of only late rice, and cannot cultivate early rice because of the lack of irrigation. They seed rice between mid-May and mid-June, transplant rice seedlings between July and August, and harvest in October. The yield per mu is 400 – 500 jin in glutinous rice, 700 – 800 jin in the native kind of nonglutinous
and 1,000 jin in the hybrid and non-glutinous that were introduced in 1982.

The secondary paddy paddy crop is tobacco (120 mu, 33.3% of all paddies) and watermelons (96 mu, 26.7%). Watermelon cultivation has spread in this village too. Most paddies are two-crop paddies. Watermelon cultivation began in 1988 through a contract with the wholesalers of Juangdong Province.

The people cultivate 210 mu of rubber trees. They can take latex from 100 mu of them between early April and 15th November. After the start of the responsibility system for agricultural production in 1982, they devoted themselves to cultivation of rubber. The result has been that the average cash income per household is about 2,000 yuan and rubber provides a greater part of the income. Tapping is done individually in the village. All households work rubber plantations, and latex is shipped to the tropical crop enterprise that the town authority runs. Although slash and burn cultivation continued till 1984, the areas have all changed to rubber plantations.

An average farmer in this village, who gave an interview to the authors, keeps one buffalo, fourteen pigs (including four female for mating) and fifteen hens. Feed for pigs is maize, rice bran, buds of banana plants, waste vegetables, the nuts of rubber trees, etc.11).

There is little intermarriage between Han-Dai and Han (Chinese) people. The influences of the Han people are felt in aspects of Han-Dai life. They do not share an identical culture with the Shui-Dai. Therefore, for example, Han-Dai society does not have the water splashing festival (潑水祭) that is very famous in Shui-Dai society.

IV. LAND USE AND SETTLEMENTS OF MOUNTAIN PEOPLE

Xinsitu (新司土) Village, 880 meters above sea level, is located in the mountain region 30 kilometers from Mengyang Bezi to the southwest. This settlement is one of the typical Jinuo (基諾) nationality settlements and has 46 households of 241 people (1988). They farm paddies of 100 mu, 128 mu of upland fields, 845 mu of saren (Amomum villosum), 105 mu of tea and 206 mu of rubber trees, in addition to keeping 36 buffaloes, 23 yellow cattle, 192 pigs and 372 hens. Two or three dogs are kept for hunting and eating.

They began to cultivate paddies in the bottom of the valley, 1,000 meters away from their settlement. They cultivate only late rice, seed rice in April, transplant in June and harvest between the midle of September and early October.

They newly open 200 mu of slash and burn cultivation areas every year. As the deep black soil is fertile,they look about for such areas and manage the cultivation even if the land inclination is over 50 degrees. Nevertheless, along the ridges they keep forest that they never cut down. They call these forests retto in their language and the Dai people call their forests bahyao.

Upland rice is a very popular crop in slash and burn cultivation, also maize, buckwheat, kaoliang (sorghum), soy bean, taros, cotton, a kind of perilla (荏胡麻, Perilla ocymoides), peanuts and some vegetables.

In slash and burn cultivation, the fallow period used to be over twelve years, but the period was shortened to seven or eight years after 1980. Therefore, the period of cultivation has been shortened to three of four years from five or six years. Moreover, the government has strongly encouraged the change from slash and burn cultivation to other cultivation, mainly of rubber, tea, coffee and upland rice, that is to say, the change to permanent arable lands.

Their slash and burn cultivation is fairly intensive. There are fields within a radius of three kilometers from their settlement. The first year, they till the soil by hoe to seed upland rice in stripes on the gentle slopes, but on the steep slopes, they make holes with bamboo poles for seeding the fields. From the second year, they plough the fields using buffaloes on the gentle slopes, and till with hoes to weed the crops. Harvest is in two stages: in the first, only the ears of precocious rice are reaped, while in the second, all stems bearing rice are gathered in. The yield of upland rice by slash and burn cultivation is 300 – 400 jin per mu. Saren (Amomum villosum) began to be grown in the forests in 1964, because the plants like shades. Three or four years after planting, the seeds can be harvested13). In addition to tea, saren is an important cash crop14). As rubber trees began to
Photo 1. Young rubber trees after slash and burn cultivation, 1,100 meters above sea level, near Xinsitu Village, Jinuo settlement.
(Taken by S. SHIRASAKA, Dec., 1989)

Photo 2. Slash and burn cultivation by the Jinuo people. Young rubber trees are planted in the background, 1,100 meters above sea level.
(Taken by S. SHIRASAKA, Jan., 1989)
be planted only in 1987, latex has not yet been gathered (Photos 1 and 2). But the income from latex is expected to increase quickly in the near future. Livestock breeding is given little attention: it makes up only 10% of their cash income\(^{15}\). The religion is not only Buddhism but also a very traditional polytheism.

Banpozai (半坡寨) is a village of Sanda people (山达人) on a slope facing south, in the north part of Jinghong Bezi, that has 26 households of 155 people. The settlement is about 1,000 meters above sea level. The entire population of Sanda is only about 3,000, so that they are one of the smallest minorities in China. They speak Chinese well and the central government does not formally recognize them as a minority. Banpozai Village has arable lands of rubber (800 \textit{mu}) and bananas (70 \textit{mu}) and areas of slash and burn cultivation (about 840 \textit{mu}). There are no paddies because the settlement is located on a ridge. Livestock breeding has been slack, and they keep only two buffaloes and ninety pigs in the settlement. But they keep three or five dogs per household. The areas of slash and burn cultivation are about three kilometers distant from their settlement. They used to deforest the mountains in December and fire them in the middle of February. The fields used to be given up after a cultivation of three years.

The most important crop is upland rice, and the area cultivated is about 400 \textit{mu}, that is, one-half of all the slash and burn cultivation areas. They repeat the cultivation of upland rice the next year in the fertile fields. The upland rice is almost all nonglutinous rice; the amount of glutinous rice is very small. That feature marks the Sanda people off from the Dai people. Upland rice has a poor harvest now. The yield was once 300 jin per \textit{mu}, but has been 200 jin in recent years, even if in a good year. The fallow period has been shortened to three or four years from the over eight years it once was, because of an increase in population. Therefore, they are given free rations by the government. We can find several varieties of upland rice such as violet rice (only glutinous), red rice (both glutinous and nonglutinous) and white rice (both glutinous and nonglutinous). Nonglutinous red rice is the staple and makes up 80% of all the yield of rice, but they use glutinous white and red rice for sake brewing. Taros, melons, sorghum, maize and buckwheat are the crops next to upland rice in the slash and burn cultivation. Maize, sorghum and buckwheat are for forage\(^{16}\).

Rubber was introduced in 1985. Terraces are made two meters wide and four meters high for the rubber fields on the slopes of over 30° (Photo 3). They say that they will become rich (万元戸, farmers with an income of 10,000 yuan or more a year) because of the rubber in the near future. Bananas, coffee, cashew nuts and pineapples are intercropped in rubber fields\(^{17}\).

As this settlement is only 17 kilometres from Jinghong, the people can visit it to sell their produce in the market at Jinghong and to buy meat and daily necessities. There is intermarriage between the Sanda people and Han people,
V. CONCLUDING REMARKS

It was in 1956 that the first state farm was established with rubber at the center of agricultural management using the Han people as the core of the labor force. The Jinghong State Farm has been developed since then and consists of eight rubber farms, two wetland paddy farms and one tea farm. However, the minorities do not participate in the management of the state farm. It is said that the minority population is only one percent of all the state farm population.

The rubber growing areas of the state farm amount to 702,000 mu. Moreover, the area is increasing by 20,000 mu a year. What is more rubber growing is riding the crest of a boom as a market-oriented economic section in the private management areas, that is, an addition to state farms operated under the Responsibility System for Agricultural Production. Their growing areas amounted to 210,000 mu, 1985. The area had expanded five times since 1980. The income from rubber growing was already 80% of the cash income for 1980 in the private management areas of Jinghong County. Also, the Xishuangbanna Prefectural Government gives financial assistance, and the Jinghong State Farm teaches the skills needed in rubber tree growing, and they divide the work between the two.

It was pointed out that formerly typhoons had no bad effects but the rubber trees of Xishuangbanna were easily damaged by cold weather. In fact, the height limit for rubber growing is 1,350 meters above sea level, but the height of economically marginal land is about 800 meters above sea level. It is the driving force of not only plant breeding and its proper operation but also land use in adaptation to microclimate and microtopography, that is, sunny or shady slopes and temperature inversion. The main kinds of rubber tree formerly were the wind-resistant PR 107 from Indonesia and the anti-fertile PRIM 600 from Malaysia, but now drought-resistant GT 1 has been planted for development in Xishuangbanna. In Xishuangbanna, generally speaking, they are continuing rapid, large-scale agricultural change. Representative of this is the expansion of modern and intensive agriculture centered on rubber, tea and tropical fruits.

Through the process of modernization in agriculture, paddies in the basin and slash and burn cultivation in mountain regions have lost their significance in the area's agriculture. Moreover, the people's cultural characteristics tend to slowly decline, especially among the minorities who are not Buddhist. The result is that the minorities show a tendency to adapt themselves to the Han people's culture.

Acknowledgements

The authors would like to express most sincerely their gratitude to Mr. WANG Ke of the Research Institute of Tropical Crops of Yunnan (云南省热带作物科学研究所), and Prof. YOSHINO Masatoshi of Tsukuba University, for their comments and kind advice. In addition, the assistance of Prof. Ernest A. Richter of Tokyo Gakugei University, and Prof. Emeritus, Dr., and Mrs. Karl A. SINNHUBER, Wirtschaftsuniversitat Wien, in providing invaluable critical comments during the preparation of the manuscript is also deeply appreciated.

(Received Oct. 14, 1989)
(Accepted Jan. 15, 1990)

Notes

1) According to JIAN Ai-ling, the subtropical area is between 12.5°C – 15.0°C in mean temperature of the coldest month, and the tropical area of China is over 15.0°C. He subdivides subtropical areas into three parts, that is, the south subtropical, mid-subtropical and north subtropical zones.

2) When the Xishuangbanna Dai Nationality Autonomous Prefecture was formed in 1953, the Dai nationality made up over 40% of the total population. According to the Population Census of China, 1982, the Dai people amounted to 238,000 (37.3%) of the total population, the Han people 232,000 (36.3%), and other minorities 168,000 (26.4%). Therefore, the Dai language is official along with the Han language.

3) “Shui” means water in Chinese; therefore the Shui-Dai are the main cultivators of wetland paddies in the lowland.

4) One mu (亩) is about 760 m²; therefore, 15 mu makes approximately 1 hectare.

5) One jin is about 0.5 kg.

6) They take three meals a day, and the meat is mainly pork. They eat fish every day. Television was introduced in 1981, and has spread to 78% of the households as of 1989.

7) The Dai people are devout Buddhists. A male has to serve at the village temple for one year in his youth. During
that period, he studies Buddhist Scripture and Dai writings.
8) The local people call this fermented fish and rice *barson*. It can sometimes be found in the Jinghong market.
9) There is no lavatory in the house, but there is a public lavatory in the settlement.
10) *Han* means "dry" in Chinese. The Han-Dai lives mainly in the uplands.
11) Only one household cultivates 50 tea trees in this village. There are no silk worm raisers. All households have kitchen gardens, 0.2—0.3 *mu* per house. There is fish breeding in their irrigation ponds.
12) An ingredient of the very famous Chinese herb medicine for digestive disorders.
13) The yield of *saren* is 10—100 jin per *mu*. The average is 25—30 jin. The government drug company buys the seeds at 25 yuan per kg. They make a large profit on the transaction. The yield in 1988 was 9,777 jin for 122,26 yuan.
14) The yield in 1988 was 3,000 jin for 8,400 yuan.
15) This area is the habitat of wild animals; wild boars, elephants, pangolin (anteaters), wild oxen, etc. Wild boars frequently appear in the neighborhood of the village, and not a little damage is done to the crops in the slash and burn cultivation areas, especially in the harvest season between August and September. All wild animals are hunted except the wild elephant, which is a protected animal in China. Men used to carry their guns with them for hunting purposes.
16) They have no food taboos. We can find prototypes of cultural elements of the laurel forest cultural complex, for example, fermented fish and rice cooked in pots, buckwheat noodles, parched green tea, cotton cloth, etc.
17) In addition to agricultural activities, they hunt wild boars but they have no fishery. They eat insects, as do other minorities.
18) Only those over fifty years of age can now speak the San-da language.

**References**

(C: Chinese, J: Japanese)


中國、西双版納における農業と集落

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雲南省、西双版納傣族自治州は、中華人民共和国の南西端に位置し、南はラオス、ビルマと国境を接しています。西双版納は植物資源の宝庫といわれ、中国だけではなく、ひろく外国の研究者にも興味深い地域である。

西双版納は東南アジアのマレーシアやインドネシアのような、典型的な熱帯多雨林地域と比べると、熱帯の環境の性格が強く、それ故に複雑な自然条件に対応した様々な農業や集落がみられる。

西双版納傣族自治州には、傣族をはじめ、基諾族など10を越す少数民族が独特の生活様式を持って生活している。本稿では、筆者の実地調査をもとに、西双版納における集落立地を含めた農業的土地利用と近年の変化を、民族別に考察した。

1980年代に入るとともに、西双版納では農業において生産責任制が採り入れられたこともあり、かつてない急速な農業変革が進められている。その中心は、西双版納の自然環境に基づいたゴム、茶そして熱帯果樹を中心とした換金性の高い近代的集約農業の拡大である。中でもゴム栽培は、多かれ少なかれ、ほとんどの民族に取り入れられ、その高限境界は海拔1,360メートルにもおよんでいる。この、いわゆる“近代化”農業への移行過程で、盆地においては水田耕作の比重が増し、山地においては焼き畑の比重が低下し、仏教文化を持たない少数民など、伝統的農法や固有の農耕文化要素が衰退し、漢民族化・漢文化化が速いテンポで進んでいる。