
Chapter 4

Human Factors Influencing Agro-Ecosystem Diversity in the Hengduan Mountains of China

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Introduction

The agrobiodiversity of different mountain agricultural systems includes not only the diversity of crop species or varieties, but also the diversity in the farming systems evolved and maintained by different mountain communities (ethnic groups). In different ethnic communities the production systems are changed to reflect differences in natural environments and traditional cultures. Ethnic diversity provides a fundamental base for diversification of agricultural practices and the development of a variety of coexisting economic systems.

Sichuan is a multi-ethnic province. There are over 20 nationalities (ethnic groups) in the province but minority nationalities account for only four per cent of the total population and the majority of these belong to only six groups, the *Yi*, *Tibetan*, *Qiang*, *Tujia*, *Miao*, and *Hui*. The minority communities inhabit the western and southern parts of Sichuan such as the Garze Tibetan Autonomous Prefecture, the Aba Tibetan and Qiang Prefecture, the Liangshan Yi Autonomous Prefecture, and the Qionjiang Tujia and Miao Prefectures. The mountain villages inhabited by minority nationalities in Sichuan are rich in natural resources. The natural forest resources in western Sichuan, for example, are the third largest in China: the forested area is 66 per cent of the total in Sichuan and the timber capacity 74 per cent. Minority nationalities also live in pastoral areas, the rangelands which cover 58 per cent of the province.

More than 60 species of plants and 100 species of animals in the national minority areas are listed in the National Protected Animals and Plants' Books

respectively. Maybe it is for this reason that more than 20 natural reserves have been established in Sichuan during the last two decades, most of which are located in these ethnic areas.

Before the 1950s the rural areas had a closed economy. Barter was the only means of trading and marketing. The agrobiodiversity available in the traditional agro-ecosystem was sufficient to sustain the subsistence household economies. There was a well-developed system of barter exchange for the produce of these traditional farming systems which was used to procure household necessities such as salt, tea, and clothes.

In this paper, the farming systems and agrobiodiversity managed by three minority nationalities in the Hengduan mountains of China are studied in order to discuss issues of agrobiodiversity conservation from the perspective of local ethnic farming communities. The agricultural systems of the *Yi*, *Tibetan*, and *Qiang* nationalities are compared in terms of management and use of agrobiodiversity. Figure 4.1 shows the relative economic dependence of the three minority nationalities on different farming and other activities. Animal husbandry is an integral part of the *Tibetan*, *Qiang*, and *Yi* nationalities' farming systems besides arable farming.

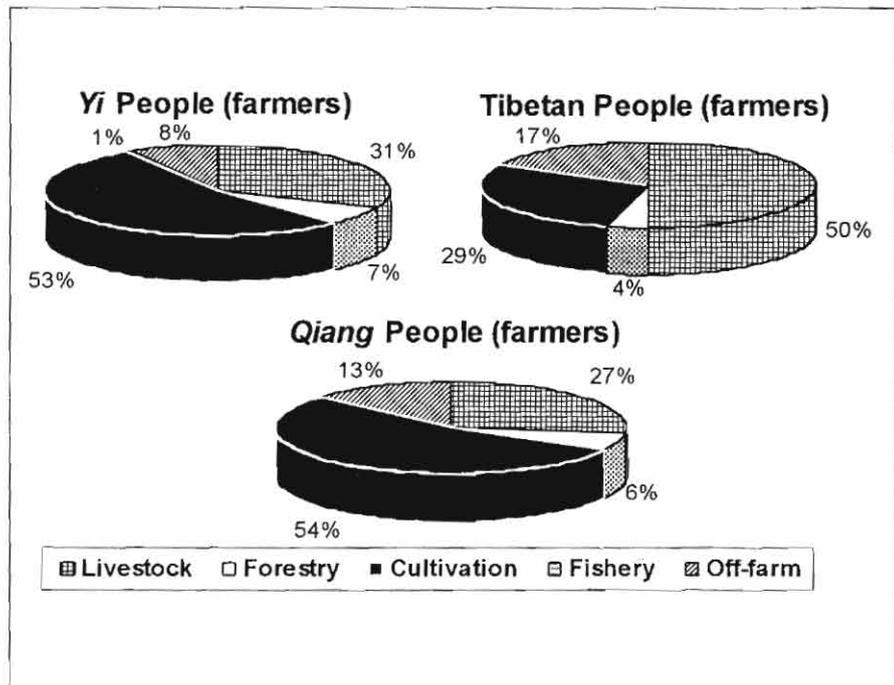


Figure 4.1: Livelihood Distribution (%) of the Three Ethnic Groups

The Yi Farming Community

The Yi people are the dominant minority nationality in Western Sichuan. They are concentrated in Liangshan Yi Autonomous Prefecture. Before the 1950s the Yi community was divided into *Tushi* (rulers), *Heiyi* (black Yi), *Baiyi* (white Yi), *Ajia*, and *Jiayi*. *Tushi* and *Heiyi* were the lords of slaves, *Baiyi* were subjects of the rulers, and *Ajia* and *Jiayi* were slaves. The Yi people are predominately engaged in agriculture followed by animal husbandry.

After the 1950s, social systems changed resulting in the extinction of slavery and government implemented land reforms. Every farming household was given fields, livestock, and farm tools. The government invested in rural infrastructure, and modern technologies were extended. In the 1960s the government placed more emphasis on afforestation and fruit farming. The Yi nationality in Liangshan Prefecture added a diverse range of cash crops as part of an agro-enterprise development scheme. A variety of cash crops, harnessing of non-timber forest resources, animal husbandry, and off-farm employment replaced traditional agriculture-based livelihoods. Within the last decade the rural economy of the Yi nationality changed from a subsistence to a market-oriented economy. Plants such as sugar cane, tobacco, and mulberry trees have become the pillar of well-being of this rural minority. Since the 1980s the Yi area has become a production base for the sugar industry. This area also produces the best quality tobacco and cigarettes in China. Sericulture has become another important cash-generating enterprise. The silk is so fine that its length can be as much as 10,000 metres. Introduction of new crops into the agro-ecosystem of the Yi has increased the income of Yi farmers. However, there are still highland areas maintained under a fallow system where Yi farmers produce grain once every three years in rotation. This is the locally evolved, sustainable way of adapting to the fragile, high mountain environment.

The Tibetan Farming Community

Tibetans are the main ethnic group in southwestern China. They practice a mixed agro-pastoral system. The *Tushi* sub-ethnic group represents landlords, and it owns most of the land, forests, and livestock. The overall production capacities of agricultural systems in Tibetan areas are dependent on crop diversity. Animal husbandry is the main activity; timber, wild mushrooms, and medicinal herbs are the main sources of off-farm income. The knowledge and skills of this ethnic farming community have turned western Sichuan into the most important source of valuable medicinal plants such as *Fritillaria crithosa*, *Rheum officinale*, *Nardostachys chinensis*, *Cordyceps sinensis*, and *Gentiana scabra*.

As a result of the harsh mountain conditions, such as inaccessibility, marginality, and fragility, in Tibetan areas, promotion of introduced commercial crops is

restricted. *Tushi* and other Tibetan farmers are custodians of the gene pools of Tibetan barley and bitter buckwheat, a treasure house of barley and buckwheat crops. Animal husbandry is an integral part of Tibetan life. Animals provide the butter, milk, cheese, and milk tea for daily life, whereas barley and buckwheat form the basis of food security.

The Qiang Farming Community

Historically the *Qiang* was an influential nationality occupying a vast area in the west of China. Their numbers are now declining. At present they inhabit the upper reaches of the Minjiang River. Since they are distributed close to the Sichuan Basin, their culture, economy, and farming system are greatly influenced by the majority *Han* Chinese, and very little of their original farming culture, knowledge, and skills are still practised. It is a good example of change in a farming culture over a period of time under the influence of a dominant majority.

Conclusions

These case studies of the three nationalities *Yi*, *Tibetan*, and *Qiang*, illustrate the diversity of farming systems, crops, and animal species that exists among different ethnic farming communities (see Box 4.1). These mountain communities have also evolved conservation strategies to ensure sustainable use of natural mountain resources, and they are the custodians of genetic resources. Some farming communities still maintain the crop and animal diversity on which their livelihoods depend within the agro-ecosystems. For example, *Yi* people live in the high mountains and sheep farming is an integral part of their life. Their lifestyle changes seasonally with the migratory sheep flock, and this is reflected in their clothing and food habits. *Yi* people like to wear a mantle made from sheep wool, which is locally known as *Chaerwa*.

There are cases in which *Yi* farmers have abandoned the traditional slash and burn system of agriculture and moved to market-oriented agriculture. This change in farming practice has increased the crop diversity because of the introduction of new crops, although there has also been some substitution of indigenous crops. The *Yi* ethnic groups traditionally maintained over 10,000 wild mulberry bushes in their villages. These were not used to breed silkworms, but rather the leaves were gathered to feed the pigs. The Liangshan *Yi* nationality in Sichuan is known for being the custodian of a bitter type of buckwheat (*Fagopyrum tataricum*) germplasm. These examples have highlighted the issue that on-farm management of agricultural biodiversity cannot be detached from its cultural context.

Box 4.1

Ecological Niches Occupied by the Different Nationalities and Their Present Crops

Minority nationality	Eco-zone	Major crops
Yi	Valley and low mountains	Cereals, sugarcane, mulberry, tropical fruits, vegetables
	Mid mountains	Cereals, tobacco, mulberry, temperate fruits
	High mountains	Potatos, cereals, livestock, forestry
Tibetan	Mid mountains	Cereals, fruits, forestry, medicinal herbs, wild mushroom
	High mountains	Barley, medicinal herbs, semi-migratory animal husbandry
Qiang	Valley and low mountains	Cereals, livestock, fruit, vegetables
	High mountains	Cereals, forestry, pepper, livestock, medicinal herbs