

## Chapter 14

# Agricultural Transformation in Mountainous Areas of China

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### INTRODUCTION

For a long time agriculture has played an important role in the economy of mountain areas of China. Agriculture in mountain areas has supported the livelihoods of many people. However, the development of the agricultural economy in mountain areas is slow, and the living standard of the people is low. Hence, it is necessary to develop agriculture to revitalise mountain economies. This will require support for application of science and technology, improving social environments, and addressing regional specificities through appropriate policies and programmes.

### CHARACTERISTICS OF CHINA'S MOUNTAINOUS AREAS AND THEIR ECONOMIC SIGNIFICANCE

#### Distribution and types of mountainous land

In China, plains account for 36% of the land cover; and mountains, hills, and plateaux 64%. Areas below 500m account for only 25% of China's total land. High mountain areas with altitudes exceeding 3,000m account for 25% of the total land area.

Although the absolute extent of land resources in China is among the highest in the world, the per capita land is small. The population of China exceeded 1.2 billion in 1995, accounting for 21.5% of the world's population. The per capita arable land, forest land, and grassland are only 32, 14, and 33% of the world's per capita averages, respectively. The problem of a big population on small areas of land is a prominent feature in China.

Because of different climatic and regional environmental conditions, agricultural production varies greatly among mountainous areas. Crop production is mainly confined to hilly and middle-low areas, while areas with high altitudes are mainly used for livestock grazing and forestry.

## **Characteristics of mountainous areas**

Agricultural productivity in mountainous areas is low in most regions of China. Because of limited transportation and information facilities, agricultural production in mountainous areas is basically subsistence-oriented. Most of these areas are still poor and are listed among the poverty counties designated by national, provincial, or autonomous region governments. However, for mountainous areas producing cash crops and non-polluting agro-products, economic output is maintained at relatively high levels. Most of these mountain areas are characterised by:

- poor access, high cost of mobility, and transportation difficulties;
- shortage of agricultural resources such as suitable land and water;
- low technological input and low yield of crops;
- poor infrastructure and lack of ability to combat natural disasters;
- low levels of education of local farmers;
- poor facilities in terms of energy and communications;
- traditional agro-production systems with lower yields.

## **Economic significance of mountainous areas**

Not enough statistical information on the economy of mountainous areas is available. However, agricultural products from mountainous areas have gradually entered the market, and many products from non-polluting or low-polluting environments (i.e., organic products) are highly priced in the market. Many of these products, such as Chinese chestnuts, tea leaves, rare herbs, and edible fungi, as well as large amounts of wild plants and animal species, are found or produced only in mountainous areas. If all kinds of mineral resources and water resources were to be included, the contributions of mountainous areas to China's overall economy would be very high.

## **TRANSFORMATION OF AGRICULTURE IN MOUNTAINOUS AREAS**

The past economic development in mountainous areas, especially in rural areas, has been very slow. Agricultural production is largely backward and traditional, as illustrated by the practice of slash-and-burn in many parts of Yunnan Province. These labour-intensive agricultural production systems are not only low in productivity, but also cause great damage to natural environments. Irrational land cultivation has caused severe soil erosion in the Taihang Mountain areas, loess highlands, and Jiangxi's red soil areas. The Chinese government has paid significant attention to this issue and, since the early 1980s, has developed programmes such as 'forest protection in watershed areas in the upper reaches of the Yangtze

River' and 'eco-environmental restoration' by investing money and mobilising local governments for this purpose.

### **Modernisation of agriculture in mountainous areas**

With social and economic progress, agriculture in mountainous areas is changing. Improvements in physical and social infrastructure (roads, electricity, communications, education and health services, etc.) are being made in remote mountainous areas. Electricity is supplied to most of the mountainous areas in China. Through satellite TV, local people's awareness of new opportunities, including agricultural technologies, has improved. In some areas, e.g., Liangshan Yi autonomous state in Sichuan and Lijiang River in Yunnan, people have benefited through Internet and expert systems for raising agricultural production. To increase both the level and the quality of products various modern facilities have gradually been extended to mountainous areas. Education for children and youth has been improved; the number of school dropouts has decreased.

### **Impacts of science and technology on mountain agriculture**

Due to the improvement in infrastructure, ecological rehabilitation, and the development of a market economy, demands for inputs from science and technology in mountainous areas have increased. The improvements and changes range from new cultivars to balanced fertilisation, from water-saving technologies (such as drip-irrigation techniques) to bio-control or low chemical use in mountain areas. Production schemes involving 'forest and fruits in the upper hills, cereal and oil crops in the plains', rational planting of fuel forests, and biogas development leading to reduction in deforestation are other features of agricultural development in mountainous areas.

After more than 20 years' implementation of 'forest protection in watersheds in the upper reaches of the Yangtze River' and 'natural forest protection', soil erosion in the upper reaches of the Yangtze River has declined considerably. Slash and burn agriculture has been kept within limits. Upland rice cultivation is practised widely by people in the Lanchangjiang River valley. Production techniques such as film mulching, balanced fertilisation, and minimum tillage are accepted widely by small farmers.

Agricultural technicians are encouraging farmers to apply practical and useful techniques originating from both new research and development (R & D) and traditional farming systems; these are contributing effectively to local development.

## **Commercialisation of mountainous agriculture**

The growth of market-led changes has helped to transform the primitive and simple agricultural production systems of mountainous areas. Trends towards commercialisation of agriculture through application of science and technology are quite visible. Due to the clean environment, products command high prices. Assisted with information and transportation, these local products reaching consumer markets contribute significantly to farmers' incomes.

Local farmers have greatly benefited from the development and popularity of Chinese traditional medicines, establishment of production and processing bases for Chinese herbs, and effective marketing of special medicinal products in both domestic and overseas' markets.

Application of food-processing technologies has further helped the economy of mountainous areas. Now local products are converted into value-added commodities such as carrot juice from Jimusaer, Xinjiang, and  $\pm$ -linolenic acid with perilla produced in Pengshan mountain in Sichuan.

## **ORGANIC AND POLLUTION-FREE AGRICULTURAL PRODUCTS**

In the context of rising worldwide concern for food safety, mountain areas have advantages due to the predominance of organic products and their pollution-free, non-chemical dominated production environment. If properly advertised and marketed, this is a potential source of significant income for farmers. The Chinese government has put great emphasis on this aspect in mountain areas. However, limited accessibility and poor links with rich consumer markets do reduce the potential gains to mountain farmers.

A related point is China's huge land area and rich tradition of indigenous medicinal systems. This offers vast potential for developing and harnessing herbs and other products. Mountain areas are the natural home for such herbal species. Many of them are domesticated and processed for market. This could serve as another area for promoting faster growth of mountain agriculture.

## **APPLICATION OF MODERN TECHNOLOGIES**

### **The impacts and problems of technological application in mountainous areas**

Routine agricultural technologies developed for the plains cannot be easily applied to mountainous areas due to the limitations of the environment.

Besides, it is difficult to popularise some technologies due to their high costs. Application of agricultural technologies is further hampered by poor transportation, communication, and information facilities.

With the improvement of transportation, communications, and education, technological innovations are slowly moving into mountainous areas. This is indicated by the spread of technologies such as detoxification of potato cultivation, cultivation techniques for Chinese herbs, rainwater harvesting and water-saving technologies, biogas development, nurseries for special tree species, and pastureland improvement techniques including bio-fencing, and so on. In response to market demand, technologies suitable for organic farming systems for tea, fruit, vegetables, etc. have also been applied in mountainous areas. In areas with better conditions, horticulture in controlled environments combined with fruit processing technologies has been developed. With the development of communication systems and community access to them, computerised agriculture and long-distance learning have also been introduced. However, this needs more government support.

### **Farmers' demand for and acceptance of technologies**

To develop the economy and increase income, farmers are naturally eager to apply new technologies, but they do not accept these technologies until demonstration shows their advantages. It is therefore necessary to conduct both indoor training and outdoor demonstration experiments. The Chinese Academy of Sciences has established a series of agro-ecological experimental stations across China. These stations are involved in introducing new germplasm, water-saving technologies, balanced fertilisation, and controlled environment production through greenhouse techniques.

### **POVERTY ALLEVIATION PROJECTS FOR MOUNTAINOUS AREAS**

To eliminate poverty and reduce the economic imbalance between the east and the west, the State Council decided to systematically enhance investment and improve manpower capacities over a seven-year period beginning 1994. This programme focused on solving the food security problem of 80 million people. The State Council has designated this as 'State 8.7 Action Plan for Poverty Alleviation'. This is treated as a blueprint for poverty alleviation in China and forms a part of the national development strategy.

### **The distribution of poverty in China**

Currently the distribution of poverty in China is characterised by localisation in terms of social groups and geographical areas. The poor population is

mainly distributed in ethnic minority areas, less accessible areas, previous communist revolutionary pockets, and remote areas in central and western China. Regionally, 62% are in western China, 32% in central China, and 5% in eastern China. Furthermore, the poor (in the units of villages and households) are scattered over 50% of the counties in China covering 9–20% of the Chinese territory.

### **Poverty alleviation policies in China**

Poverty alleviation in China is mainly driven by the state social security system and government policies. It is carried out through development programmes at different government levels. The key policy for poverty alleviation is focused on capacity building for poverty areas through improvements in land productivity, infrastructure, public utilities, ecological rehabilitation, and training local people to use science and technology. These improvements have helped local farmers to develop market-oriented production systems suitable for their local conditions such as the combination of cropping, livestock, and processing. These programmes have significantly improved productivity and farmers' incomes.

Since 1986, China has formed working networks at state, provincial, and county levels involving 10,000 officials. During 1986-2000, the state governments allocated about 154 billion RMB for poverty alleviation projects, besides the local governments' investment. The central government also attracted 1.4 billion USD from the World Bank, the International Fund for Agricultural Development (IFAD), and the World Food Programme. The '8.7' programme of the central government is directed towards solving the starvation problem of the poor. At the turning of this new century, China has set out to secure food supply and moderate incomes for about 90 million poor people.

### **Causes of poverty and key tasks**

Poverty in the mountains of China is mainly caused by harsh natural conditions and the non-enterprising attitude of the local population. Therefore the key steps for alleviating poverty include: (i) changing poor people's expectations and building their confidence; (ii) improving their education; (iii) improving local production and livelihood options; (iv) reorienting their production structure; and (v) helping farmers by enhanced capacity to develop market-oriented agriculture.

### **Multiple approaches to poverty alleviation**

At present, different approaches towards poverty alleviation are being carried out at the national level. These include the association of a particular

poverty area with a particular government agency, co-operation between the west and the east within China, alleviation through export of workers from poverty areas to developed regions, and small credit programmes. There are also social programmes, such as the 'Hope Project', 'Golden Bridge Project', and volunteer donation. Small credit programmes have been successful in improving farmers' ability to gain more benefits through a market-oriented economy. Active participation of the local farmers in these programmes has contributed to the success of poverty alleviation initiatives.

### **Training programmes for poverty alleviation**

The Ministry of Organisational Planning, the Central Committee of the Communist Party, the Ministry of Finance, and the Office of Poverty Alleviation of the State Council have jointly launched a nationwide training programme. It aims to train the directors of Offices of Poverty Alleviation of 22 provinces and 592 counties in the next five years. Training programmes will also be carried out for local women and ethnic minority officials. The state government will allocate about 18 million RMB for these programmes. In the meantime, training courses will be offered to local farmers and officials, mainly focused on state poverty-alleviation policies and science and technology.

## **AGRICULTURAL ADMINISTRATIVE AFFAIRS AND COMMUNITY DEVELOPMENT**

### **Administration and community**

Rural administration in mountainous areas is relatively backward, particularly in the field of formal community culture and public science education; and this is exacerbated by the scattering of villages in these areas. In the last few years, with economic reform, rural administration has improved greatly with more active participation of local farmers. The openness of administrative and financial affairs has speeded up the changes in rural economies.

The improvement of rural administration has several aspects. The policy of 'farmer's self-administration' offers opportunities for farmers to participate in village-level affairs, closely related to their well-being. Through this, farmers' confidence in developing their local economy and rural democracy have improved gradually. Since poverty is closely associated with ethnic minority groups, this concept is well adapted to the 'autonomous administration' system initiated for ethnic minority populations across China, mainly in the central and western parts.

## **Establishment and development of collective agricultural systems**

The establishment and development of a collective agricultural system were initiated by the market-oriented economy. This system is different from the collective system that prevailed during the early stage of the new China. The old system was characterised by collective working, sharing production materials, and working for hourly wages. The current collective system is based on specialisation and diversification of the workforce and is characterised by allocation of resources according to individual farmers' expertise and capacity in the production process such as land cultivation, storage, transport, and marketing and processing. Farmers have the freedom to choose positions suitable for them in this integrated production process, achieving higher overall efficiency in resource use and economic returns.

According to a survey by the Ministry of Agriculture, up to 1994 there were about 30,000 collective economic units at township level (64% of the townships in China); 670,000 at village level (84% of the total villages in China); and about 1.5 million below the village level (54% of the total rural working groups in China). At the operational level, there are three types of collective unit: (i) community-based family businesses; (ii) freely operated family businesses with minimal community support; and (iii) village-based collectively operated enterprises. After nearly 10 years of endorsement from different levels of governments, the rural collective system is developing rapidly; it is promoting the local economy through a chain of primary production, processing, storage, and transport-marketing units.

## **IMPACTS OF AGRICULTURAL CHANGES ON THE RURAL LABOUR MARKET AND ENVIRONMENT**

Due to the slow rate of urbanisation in poverty affected areas, there was a slight increase in farming population during the ninth five-year plan period compared to the eighth plan. In recent years, there have been trends towards workforce migration from rural to urban areas due to declines in agricultural prices and decreases in farm income. A survey by the Ministry of Agriculture in 13 provinces showed that in 2001 the out-migrated workforce accounted for 23% of the total workforce. Within this, inter-province out-migration accounted for 46%. Since 1997, income from out-migrants made a major contribution towards the incomes of the poor, particularly in the central and western parts of China. The transfer of the farming population to the non-agricultural sector is an effective step towards promoting urbanisation, improving farmers' living standards, and improving the structure of the regional economy.

Recent experience shows that transfer of the farming workforce is constrained by several factors. In many municipalities, farmer's job opportunities are confined to low paying jobs. Too much bureaucratic procedure involved in getting permits to work outside is another obstacle preventing farmers from getting stable jobs in urban areas. In many parts of China farmers working in cities have to pay various fees, e.g., population control fee, family planning fee, urban environment fee, and commission fee for administrative personnel. New policies are being formulated to facilitate the transfer of the farming population to the urban workforce. They form part of the 'Outline of the national economy and social development in the tenth five-year period'. This focuses on the need to break the rural-urban separation system, integrate labour markets for both urban and rural areas, and establish new relationships between rural and urban areas under the market-oriented economic system. Establishment of small townships/market towns is an effective way to absorb the surplus rural workforce and provides a linkage between rural and urban areas.

