agri benchmark

Cash Crop Report 2008

Benchmarking
Farming Systems Worldwide

Sponsored by ufop TOEPFER INTERNATIONAL

4.2 China: many small farms but very productive

China: Global player in agriculture

With a wheat production of 108 million t and a share of 18 % in world wheat production, China is one of the top three wheat-producing countries in the world. At the same time, more than 95 % of agricultural products are produced on very small farms with an average size of less than one hectare.

As a new partner in the ***agri benchmark*** Cash Crop network, the Chinese Academy of Agricultural Science (CAAS) presents in the following section some key information about Chinese agriculture — and more specifically, about the first typical Chinese farm CN-5XID. Respective economic results can be found in Chapter 2.

Agricultural land and trade

Total arable land in China covered about 122 million ha in 2006, which is a decrease of 8.2 million ha in 10 years. Since 1978, rapid expansion of the national economy and rapid expansion in the size of cities has lead to a significant reduction of arable land, which very often is high-quality grain land.

Due to the growth of the entire Chinese economy, agricultural contribution to the national GDP has decreased from about 30 % in the mid-1980's to 11 % in 2007.

In 2006, China's agricultural imports totaled an estimated 30.6 billion USD while its agricultural exports totaled 20.9 billion USD. Most of its exports go to neighboring countries in Asia.

Key features of the farming sector

The average family size per farm has decreased from 4.01 members in 1990 to 3.87 members in 2007. The major reason for the reduction of rural family size is a decrease in the number of births.

Introduced about 30 years ago and adopted regularly, the "Household Contract Responsibility System" (HCRS) is the major political initiative for rural areas. Within the HCRS, land is still collectively owned, but land use rights are distributed to rural households for independent operation. The land is distributed according to the total number of people in the village and the available labor force of the individual households within the village. Households have become the main economic unit of the agricultural production system in rural China. This has resulted in fragmented land units and difficulties in creating economies of scale.

Although China's total cultivated land area is huge, per capita arable land is only 0.1 ha which is equal to 42 % of the world average. This ultra small-scale model stands in contrast to the large-scale farm sizes represented by China's state farms. Around 2,000 state farms with an average of roughly 3,000 ha cover 6 million ha. This compares to more than 116 million ha cultivated by small household farms.

In 2007, the number of young farmers who migrate in order to earn money outside agriculture was 226 million. Their average annual wage was approximately 13,000 Yuan (1,700 USD), half of which was sent back home. Those unspent earnings were mainly used for savings, to build new houses and for investment in children's education.

In 1990, the agricultural income accounted for 66 % of the farmers' family income. By the year 2007 this share dropped to 42 %.

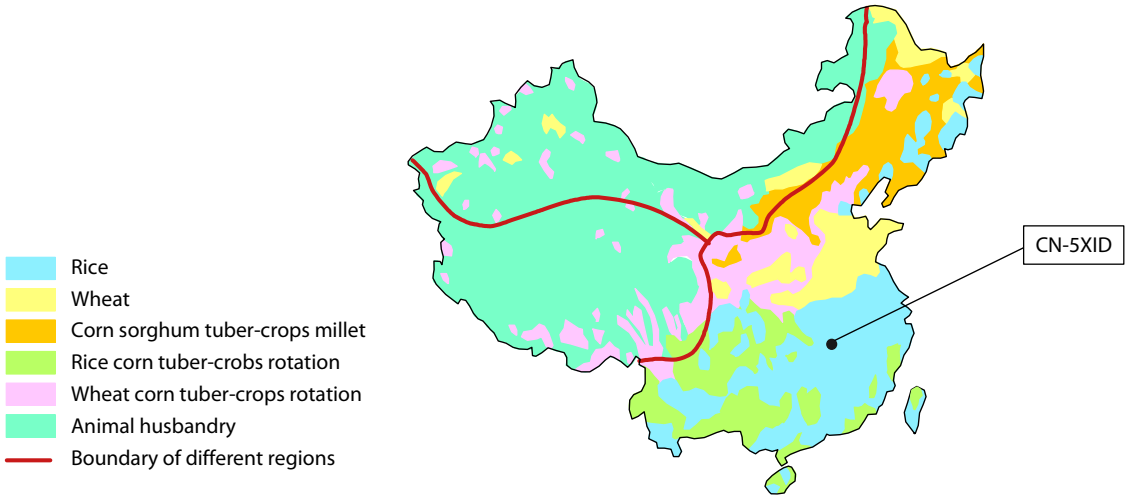
Location of the typical farm CN-5XID

The Hubei province in central China is in the main region of crop production. Within this province, the typical farm is located in the Xinzhou District on the north shore of the Yangtze River, which is in the northeastern part of Wuhan city (see Figure 4.2.1).

In this region, precipitation varies significantly with the season. The average precipitation per year is 1,200 mm. More than 45 % of that takes place in summer, 30 % in spring, 15 % in autumn and 10 % during winter. The annual average temperature in Xinzhou is 17 ° C and the monthly minimum temperature is 4 ° C in January, the maximum is 29 ° C in July.

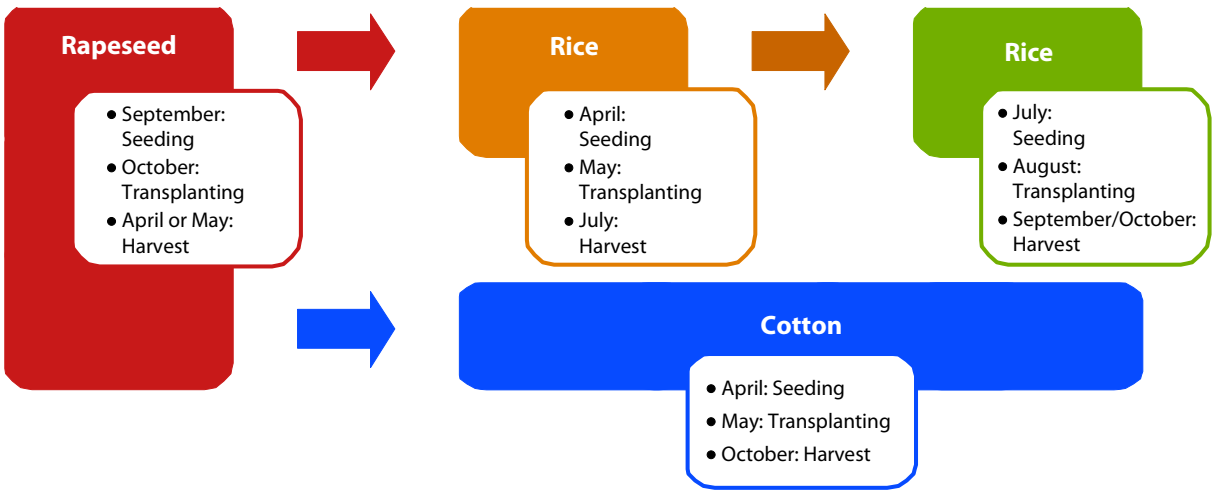
In Xinzhou, there are about 50,000 ha of cultivated land, of which 42 % is non-irrigated farmland and 57 % are rice fields, while unused land covers 1 %. Only a few fields which are nearby the water reservoir depend on pumps for drawing water for irrigation. Another main method of irrigation is diverting water from rivers and lakes.

4.2.1 Main regions of agricultural production in China



Rice production and cotton harvest

4.2.2 The crop rotation of the typical farm



4.2 China: many small farms but very productive

Production system of the farm

Typical farmers have 0.4 ha of arable land, mainly cultivated with rice-rapeseed or cotton. The typical rotation is rapeseed-rice-rice or rapeseed-cotton (see Figure 4.2.2). The production system mainly relies on hand labor.

Rapeseed production requires two major production steps: in late summer, after the cotton and the second rice harvest is done, rapeseed is sown on very small farm plots. In October, these seedlings are sorted and transplanted to the main fields. After this, rice seed is sown on the small plots and in April/May, after rapeseed is harvested, rice plants are transplanted to the fields.

In 2007 the typical farm generates the highest profit from cotton production (see Figure 4.2.3), while rapeseed and rice production were almost break even. The yield in rice is about 6 t/ha, rapeseed 2.6 t/ha and cotton 4.5 t/ha. The level of mechanization in China's crop production is very low. The labor cost accounts for 50-70 % of total cost. Figure 4.2.5 gives an impression of the level of intensification showing high fertilizer inputs for all crops.

Farms rely on labor input from family members (see Figure 4.2.4). During busy farming seasons, farmers help each other to complete harvesting and planting. Young farmers working in the urban regions come back home during the farming seasons. But if they do so, they have to consider the high cost of travel and the wages forgone. For example, a young farmer whose hometown is Sichuan province in the southwest of China typically earns 50 Yuan/day (7 USD) in Shanghai. When he comes back home for two weeks to work on his parents farm, he has to consider his opportunity cost (wages and travel) of about 1,500 Yuan (200 USD). Based on these considerations, labor cost of the typical farm in 2007 is assumed to be 2,500 Yuan per year.

Most farmers do not own agricultural machinery because their plots are very small and the farmers do not have enough money to purchase machinery. They may rent machinery from other farmers and from specialized organizations. In 2007 in the Xinzhou district the rent for a tillage machine was about 450 to 600 Yuan/ha (60-80 USD/ha); the rent of harvester (mainly used for rice) was about 1,200 to 1,500 Yuan/ha (160-200 USD/ha).

According to estimations of the Xinzhou County Bureau of Agriculture, the proportion of the arable land in the district, which is managed by farms similar to the typical farm, is about 45 %. There are some big families who have more arable land, but the production system is more or less the same as on the typical farm.

Driving forces and future challenges

Government policy for agricultural development is an important factor. The Chinese Government has always attached great importance to agriculture. For example, in order to cope with declining food self-sufficiency, China is now implementing the "Newly-Added 50 billon Kilogram Food Production Capacity Program". This scheme will be handed down to all major grain-producing areas so that each region will make the appropriate policies to encourage grain production to satisfy the central government's plan. To a certain extent, these measures have already promoted the development of output.

These political aims are confronted with some significant challenges which can be summarized as follows:

1) Limited water resources restrict the growth of agriculture

Increasing water demand by industry, agriculture, and a growing population, is occurring in the face of decreasing total water resources. In addition, the pollution of water resources is expanding rapidly, which leads to further diminishment of usable water.

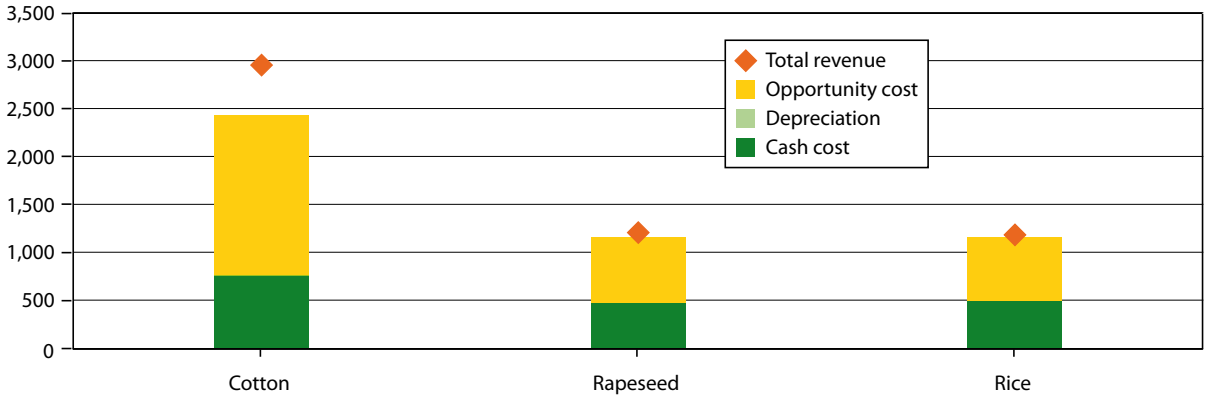
2) Development of rural areas

Although there are many farmers, most of the young people are moving into the cities for work. The majority of the rural people who are farming in the countryside are women, children and old men.

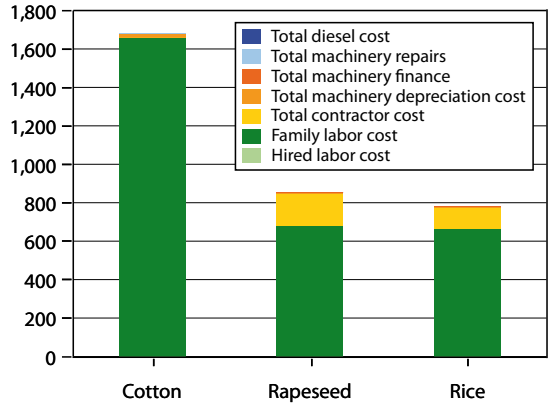
It remains to be seen how Chinese agriculture will cope with these structural challenges and what kind of farms will evolve. The Chinese Agricultural Academy of Science (CAAS) together with ***agri benchmark*** will follow this development closely by establishing more typical farms and by improving the understanding of the driving forces and options for changes at the farm level.

Hu Xiangdong
xdhu20021@yahoo.com.cn

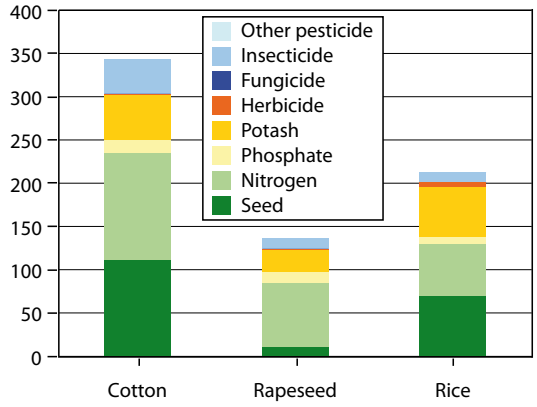
4.2.3 Typical farm CN-XID5: Total costs and revenues (USD/ha)



4.2.4 Operating costs (USD/ha)



4.2.5 Structure of direct costs (USD/ha)



Labor intensive production system: applying pesticides and transplanting rapeseed seedlings