

THE CHARACTER AND CHANGE TENDENCY OF AGRICULTURAL LAND USE IN THE ZHUJIANG DELTA—A CASE STUDY OF SHUNDE CITY

Zhang Luocheng (张落成)

*(Nanjing Institute of Geography and Limnology, the Chinese Academy of Sciences,
Nanjing 210008, PRC)*

ABSTRACT: In this paper, Shunde City is selected as a typical region standing for the Zhujiang Delta because of its excellent location and dike-pond system. There are three main characters of agricultural land use in this region. First, the most typical land use form is dike-pond system. It is a special form of artificial ecosystem of land-water interaction. Second, sandy field is also an important land type in this region. Third, land use is greatly influenced by export-oriented economy. Recently, with economic reforming and the opening up of the Zhujiang Delta, the structure of agricultural land use has been changed greatly. The area of mulberry dike has decreased and a variety of planting crops has increased. Various structure of dike-pond farming has emerged in the Zhujiang Delta such as “fruit dike-fish pond”, “flower dike-fish pond”, “grass dike-fish pond”, “vegetable dike-fish pond”. The area of water has slightly increased and its development tends to modernization due to the use of modern equipment and advanced breeding ways. The area for “three high”(high yield, high quality and high efficiency) agriculture has increased greatly.

KEY WORDS: land use, export-oriented economy, Zhujiang Delta

In this paper, we select Shunde City as a typical region standing for the Zhujiang Delta in order to understand the land use conditions of this region because of the following reasons: first, Shunde City is located in the core of the

Zhujiang Delta, second, dike-pond system and sandy farming are typical land use types, third, land use is greatly influenced by export-oriented economy. We can say that Shunde is a miniature of the Zhujiang Delta, the whole city occupies 806.6 km², the total population is 918,000.

I. THE REGIONAL BACKGROUND OF LAND USE

1. Geographic Location Beneficial to the Development of Export-oriented Agriculture

Shunde City is located in the center of the Zhujiang Delta Economic Zone and South China Economic Zone and Asia-Pacific Economic Zone, 38 km from Guangzhou on the north, 25km from Foshan on the northwest, 78km from

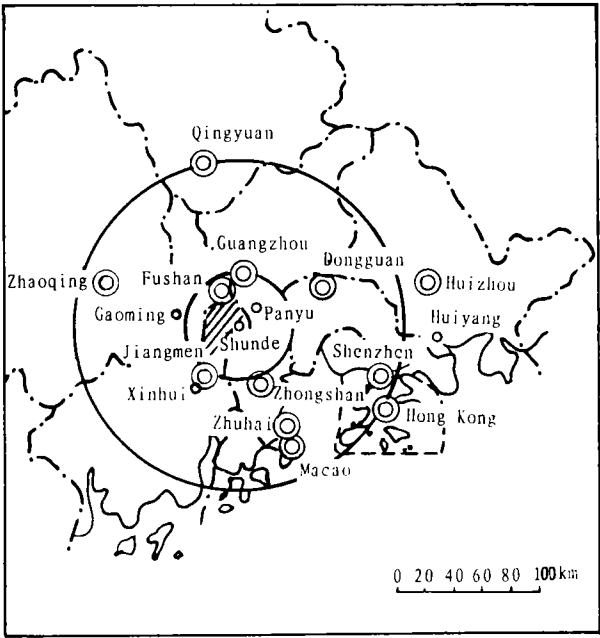


Fig. 1 Location of Shunde City in Zhujiang Delta

Macao on the south, 127km from Hongkong on the southeast (Fig. 1). The advantages of physical location make this region easy to accept the economic radiation of large and medium-sized cities, the competitive power of agricultural products and their side-line products is greatly increased. It is estimated that the survival rate of pig, cattle and fresh fish is 80%, 70%, 50% separately

if they are transported from inland to Hongkong, but they could survive completely if they are exported from Shunde City. The fresh fish can get to Hongkong market on the next morning from Shunde City^[1].

2. Abundant Heat and Energy Resources , Dense Water Network , and Favorable Agricultural Productive Condition

The climate of Shunde City belongs to south subtropic monsoon climate, the average annual temperature is 21.9℃, the frost-free period is 350 days, the annual precipitation is 1630mm, there are many rivers flowing through every agricultural regions and towns, the dense water network here is beneficial to the transportation of sugar cane, mulberry, silkworm cocoon, fish and various agricultural substances. Typhoon and frost are the mainly disasters, for example, banana will freeze to death if the temperature is below 4℃.

3. Strong Commodity Consciousness, Long Commodity Production History

During the Ming Dynasty and the Qing Dynasty, Guangzhou was the important trade center of south China, Foshan was the important industry and commerce city. Shunde located in the suburbs of the two cities became naturally an important commodity production base. People of Shunde City has tradition of engaging in business. A large number of persons are brought up in the commodity production and circulation.

4. Large Number of Labours Absorbed by the Developed Industry and Tertiary Industry.

Shunde City is one of the “four little tigers” in Guangdong. By now , such high standard industry systems as household appliances, machinery, food, textile and furniture have formed, among which household appliances occupy the most important position, for example, the electric fan of Beijiao town is famous all over the country, the output takes up one fifth of the domestic market. The electric fans exported from Shunde City have taken up 20 percent of American market and 40 percent of Canadian market^[2]. After reforming and opening to the outside world, the number of labour engaging in farming have dropped to below 10 percent, the development of enterprises has led industry,

farming and the tertiary industry to the road of good circle.

II. THE PRESENT CHARACTER OF AGRICULTURAL LAND USE

Guangzhu (Guangzhou—Zhuhai) Road separates Shunde City into western dike-pond area and eastern farming area. This kind of structure had been formed in the middle of the Ming Dynasty. At present, vegetable area is distributed concentratedly around towns and along main roads, forestry is distributed in the mountains such as Guizi, Shunfeng and Dafeng mountains, the land use of this region has its evident character.

1. Typical Dike-Pond System

Dike-pond is the product that people reform low-lying land, the initial purpose was to use mud to build dike in order to prevent from flood, and use dike area. After many years, the previous dike-pond developed gradually into the following kinds according to the plants.

1.1 *Sugarcane dike*

The proportion of this kind is the highest, about 46%. Although the link between sugarcane and fish pond is less closer than mulberry dike-fish pond, sugarcane leaves could be used to breed fish. From the view of the utilization ratio of heat energy, sugarcane is 1.56%, mulberry is 0.6%. The average output here is above 10⁵t/ha. Averagely 1.13 ha of sugarcane can produce one ton of sugar. The average level of our country is 0.27 ha producing one ton of sugar. Since the output of new-planted sugarcane is greatly higher than that of perennial root sugarcane, the crop rotation period of sugarcane orchard is 5 years. The sugarcane is planted together with peanut and soybean. Recently straw mushroom planted in the dike together with sugarcane has come into fashion. The output of straw mushroom is high, the output value is about 20,000 yuan.

1.2 *Grass dike*

Previously, plants are more important in the dike-pond system, but recently fish breeding has risen to important position. It is investigated that planting grass on the dike is more common.

1.3 *Mulberry dike*

Banana is the traditional tropical fruit in this region. It is also an impor-

tant plant in the dike-pond system. The farmers use mud to make the dike rise in order to increase the banana output. The net income is about 30,000 yuan (RMB). Banana orchards can maintain for 30 to 40 years.

1.4 *Nothing planted on the dike*

The purpose is to prevent the fish from pollution. The fish breed such as eels have high value and good profit. The net income can reach 120,000 yuan per hectare. Slight pollution of chemical fertilizer and farm chemical would also influence the output and quality.

1.5 *Miscellaneous dike*

Chencun and Beijiao are the most typical towns. This is related to physical condition and economic profit, for example, Chencun Town was flower-concentrated area in the history. At present, the yearly income of flower farmers was several thousand yuan.

2. **Sandy Farming-Important Land Use Type**

Sandy field is mainly distributed in front of the Zhujiang Delta Plain, such as Xinhui, Zhongshan, Panyu counties, only Zhongshan County accounts for almost one-third of the whole sandy field in the delta. The sandy field of Shunde is over 6,000 ha. After 1949, land use tends to be intensive. Rice and sugarcane are dominant plants. At present, the rice output of sandy field has reached 12,000 kg/ha, which is almost equal to the output of the Chaoshan Plain. Sandy field can be divided into high sandy field, middle sandy field, low sandy field and salt field. Recently, the product level of low sandy field through comprehensive renovation has gradually come to the level of middle-high sandy field, the plant structure in most sandy fields is that rice accounts for 64% to 70% of the cultivated land, sugarcane accounts for 20% to 25%, peanut and other plants account for 10% to 15%, this structure is generally rational.

3. **Land Use Greatly Influenced By Export-Oriented Economy**

Today the hot spot of world economy has turned to the Pacific Ocean from the Atlantic Ocean. This has brought good chance for the Zhujiang Delta, but also a challenge. The location of Shunde City enable it to develop export-oriented economy. They are over 400,000 overseas Chinese who have deep feel-

ing to their hometown and are happy to support the people there to develop export-oriented economy. By the end of 1990, Shunde City invested 300,000,000 yuan to build agricultural and side-line products enterprises, gradually forming the export-oriented economy^[3]. Owing to the influence of export-oriented economy, the land use of this region came into market adjustment, for example, mulberry dike-fish ponds decreased slowly and the plant types were renewed gradually.

III. THE CHANGE TENDENCY OF LAND USE

The general change trend of Shunde City's land use is that two sectors of dike-pond and farmland, and water area have changed slightly, "three high" agriculture has increased greatly, traditional ecological system has evolved into new open ecological system.

1. Dike Plants Tending to Diversification

Before 1949, 95 percent of the cultivated land was used to plant mulberry. After 1930, mulberry area began to decrease, mulberry was replaced by sugarcane, the farm land of Shunde in 1957 was 47,000 ha, fish pond accounted for 38.5%, sugarcane for 25.4%, rice for 19.26%, mulberry for 10.3%. After 1949, especially the last 10 years, because of the development of industry, the environmental pollution increased greatly, the comparative advantage of breeding silkworm cocoon is getting lower and lower. In the old mulberry dike-fish pond area such as Leliu and Lunjiao, mulberry dike has been changed completely. There are only 130 ha of mulberry dike-fish ponds kept in Jun'an Town, which was regarded as travel landscape. Today, mulberry model in Guangdong has transferred to such regions as Xijiang and the Beijiang where there are a great deal of labour force but the economy remains backward.

The law of dike adjustment is that those mulberry field close to towns and main road were used to plant vegetables and flowers, those far from town plant grass and fruit trees, those along the river plant sugarcane. In 1978 the ratios of mulberry, sugarcane, flower, fruit, vegetable were 25%, 4.3%, 2.4%, 0.4%, 3.8% separatively. But in 1986, the ratio of mulberry was 6.7%, sugarcane 55.3%, the ratios of flower, vegetable and fruit increased greatly. This adjustment is significant.

2. Water Area Slightly Increased, Its Use More and More Scientific

Since reforming and opening to the outside world, the water area of Shunde has increased by 1,300 ha compared with that of 1978. In the past, fish were breed with grass, most ponds harvested once a year, the annual output was only 1,500 to 3,000kg/ha. Today, not only breeding ways and equipment but also types have changed greatly.

2.1 *Breeding ways improved*

Previously, people seldom breed variegated carps, this way was a kind of low-standard use, today, people in Jun'an Town and Longjiang Town are breeding more silver carps in summer and more variegated carps in winter, the output has increased.

2.2 *Four main kinds of domestic fish changed into good but scarce types.*

For example, there are 233 ha of good quality fish in Chencun Town, the average price increased 38 year per 100 kg, the output value is 10,000,000 yuan.

2.3 *Modern equipment being used*

Today, 45 percent of fish ponds are using increasing-oxygen machines, more and more ponds are using clean-mud machines, the expense of this kind of machine is 500 yuan less than that of handwork.

3. “Three High” Agriculture Developing Quickly

Shunde City concentrates their energy on developing high quality aquatic products and vegetables to achieve the target of “three high” agriculture, for example, the good quality rice of Beijiao Town accounts for 84%, sugarcane accounts for 60%, the product value is 2,900,000 yuan, which accounts for 79.5 percent of the agricultural products. In 1991, 5,000,000 yuan was invested to 184 ha of eel ponds. In 1992, 100,000,000 yuan was invested again to build a forage factory with capacity of 300,000 t and to exploit eel ponds of 667 ha. The comprehensive agricultural commodity ratio has reached 92.4%, the commodity ratio of aquatic, flower and fruit has come to 100 percent^[4].

Today, the area of rice and sugarcane of the Zhujiang Delta is able to remain and the rotation pattern of rice and sugarcane is basically unchanged due to the country's administrative interposition. Under the market economic system, the government could shorten the administrative interposition to the rice

and sugarcane through subsidy. It can be predicted that the agricultural land use of the Zhujiang Delta will develop towards the direction of “three high”.

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