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Competitiveness of Characteristic Agriculture in Guangxi Zhuang Autonomous Region Based on Explanatory Indicators

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Abstract The five explanatory indicators of the competitiveness of characteristic agriculture are the agricultural science and technology, the cultural quality of agricultural labor force, the agricultural infrastructure, the resource endowment, and the agricultural management scale. According to these explanatory indicators, competitiveness of characteristic agriculture is relatively strong in Guangxi Zhuang Autonomous Region of China, which is mainly reflected in the resource advantage, irrigation degree, and road construction level. However, the agricultural technology level, the cultural quality of agricultural labor force, the agricultural mechanization, and the agricultural management scale have relatively poor competitiveness. Therefore, more attention should be paid in these aspects, in order to improve the competitiveness of characteristic agriculture in Guangxi.

Key words Explanatory indicators, Characteristic agriculture, Competitiveness, China

From the perspective of total quantity, agriculture in Guangxi Zhuang Autonomous Region has no advantage at all in China. In the year 2008, grain yield in Guangxi takes in the 15th place in the overall 31 provinces (cities, districts) of China, not including Taiwan, Hongkong and Macao, accounting for 2.6% of the total grain yield in China. However, output of other characteristic agricultural products takes a relatively great proportion. For instance, pineapple, longan, litchi, and mango are the particular crop varieties growing in Guangxi Zhuang Autonomous Region. Although it is hard to obtain the data of the national output, the total outputs of these agricultural products in Guangxi, Guangdong, Hainan, Fujian and Yunnan Provinces can basically represent those in China. Taking mango as an example, Nanning, Yongning, Bobai, Pingnan, and the area from Longzhou to Baise are all rich in mango and have relatively great outputs. Pineapple, longan, litchi, and mango are the agricultural products in Guangxi with unique geography and climate characteristics. Cane, orange, *Musa* spp., tea seed, bancoul nuts, turpentine, jute and kenaf, aquatic product, and freshwater product all take certain proportions in China; and the output proportions of the most of the characteristic agricultural products are greater than 10%. Taking the year 2008 as an example, cane yield of Guangxi accounts for 66.17% in China; and the turpentine yield occupies 49.75%^[1-3]. Therefore, studying on how to improve the competitiveness of characteristic agriculture is of great significance to promoting the development of agricultural economy in Guangxi Zhuang Autonomous Region of China.

1 Explanatory indicators of the competitiveness of characteristic agriculture in Guangxi Zhuang Autonomous Region, China

1.1 Agricultural science and technology The investment strength of agricultural science and technology (the proportion of government investment in agricultural research in GDP) is internationally used to evaluate the government investment level of agricultural science and technology. Bigger investment in agricultural science and technology leads to greater promotion effects on the agricultural production level^[4]. Besides, the investment in agricultural research, the financial expenditure on agriculture, the national investment in agricultural science and technology attained, and other indicators can also reflect the investment level of agricultural science and technology.

1.2 Cultural quality of agricultural labor force Cultural quality of agricultural labor force is an important factor affecting the productivity. Improvement of labor productivity has significant correlation with the cultural quality of labor force. And the cultural quality of labor force are mainly reflected in the proportions of labor forces who are illiterate, and who are graduated from primary school, middle school, high school, and junior college and above.

1.3 Agricultural infrastructure Agricultural infrastructure mainly includes the irrigation level, the degree of agricultural intensive management, and the level of highway construction^[5]. Firstly, irrigation level of agricultural production can be reflected by the effective irrigation rate of arable land. Secondly, the degree of mechanization can be represented by the number of tractors used in every one thousand hectares of arable land; and the agricultural intensive level can be reflected by the average quantity of chemical fertilizer application in every one thousand hectares of arable land. Thirdly, level of highway construction can be measured by the road density, the unit of

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which is kg/km².

1.4 Resource endowment Resource endowment includes three aspects. The first aspect is the per capita arable land of agricultural labor force, which is the arable land area calculated according to the per capita labor force. Land is the basic element of supply in agricultural production. And per capita arable land of agricultural labor force reflects the constraint degree of land resources on agricultural production development in Guangxi Zhuang Autonomous Region of China. The second factor is the per capita forest area and per capita water resources. Forest and water are also the basic elements of agricultural production. Per capita forest and water reflects the constraint degree of forest and water resources on the agricultural production development in Guangxi Zhuang Autonomous Region of China. The third aspect is the proportion of characteristic agricultural products on national agricultural products, which reflects the owning amount of characteristic agricultural products of Guangxi^[6].

1.5 Agricultural management scale Scale management of characteristic agriculture is mainly reflected in the agricultural cooperative organizations and the agricultural industrialization leading enterprises. Both agricultural cooperative organizations and the agricultural industrialization leading enterprises have positive impacts on the agricultural production. On the one hand, they strengthen the negotiation skills of farmers in the market, and resolve the conflicts between small production and big market. On the other hand, the management mode of "enterprise + cooperative + farmer" can help to realize the intensification and industrialization and large scale of agriculture, to improve the brand effect of agriculture, to develop characteristic agriculture and to promote the modernization of agriculture in Guangxi Zhuang Autonomous Region of China.

2 Analysis on the competitiveness of characteristic agriculture in Guangxi Zhuang Autonomous Region based on explanatory indicators

2.1 Low investment in agricultural science and technology Since a stable growth mechanism of agricultural science and technology investment has not yet formed, there is a serious shortage in the total investment. In the year 2006, investment strength of agricultural science and technology is only 0.3% in Guangxi Zhuang Autonomous Region, which is lower than the average levels of both China (1.49%) and the whole region (0.38%). Among the investment in agricultural science and technology, government investment strength is only 0.17%, which is lower than the total investment strength in all social scientific researches (0.21%)^[7]. In the year 2007, the Three Funds allocated by the provincial government is only 50 million yuan in Guangxi, which is less than Hunan Province (90 million yuan), Yunnan Province (90 million yuan) and Guizhou Province (70 million yuan). And its proportion in the Three Funds allocated by the provincial government is 33%, which is also lower than Hunan Province (41%), Yunnan Province

(36%) and Guizhou Province (42%). According to the financial expenditures on agriculture, Guangxi is lower than Hunan and Yunnan Provinces in the years 2005 and 2008, less than Huizhou Province in the years 2005 and 2006, and only a little more than Guizhou Province in the years 2007 and 2008. Besides, in recent years, national investment in agricultural science and technology has been the least in Guangxi. In the years 2006 and 2007, national investments are only 60 million and 80 million yuan, and those of Hunan are 210 million and 250 million yuan, those of Guizhou are 70 and 110 million yuan, respectively. This indicates that both provincial and national financial investments in Guangxi are few in the aspect of agricultural science and technology. Therefore, agricultural science and technology plays little role in promoting the agricultural production level in Guangxi Zhuang Autonomous Region.

2.2 Poor cultural quality of agricultural labor force In general, cultural quality of agricultural labor force is poor in Guangxi. In the year 2008, proportion of illiteracy is 5.56% among the people at the age of six or above, which is a little lower than the national average. Proportions of people graduated from high school, junior college and above are both less than 3%, which are lower than the national level. Proportions of people graduated from primary school and middle school are the highest, which are both more than 80%^[1-3]. This indicates that people at the age of six or above have received relatively low education degree in Guangxi Zhuang Autonomous Region. Therefore, it can be concluded that labor force quality of Guangxi is relatively low and its cultural quality of labor force is relatively poor, compared with other provinces in China.

Table 1 Comparison of the education degree between Guangxi and China in the year 2008 %

Area	Illiteracy	Primary school	Middle school	High school	Junior college and above
China	7.50	31.17	40.94	13.69	6.70
Guangxi	5.56	35.40	45.27	10.48	3.29

2.3 Relatively good agricultural infrastructures According to the irrigation degree, proportion of effective irrigation area of Guangxi is 2.60% in the year 2008, ranking the 16th in the 31 provinces (cities, districts) in China. The effective irrigation rate is 51.38%, which is greater than the national level of 41.83%. According to the degree of mechanization (Table 2), agricultural mechanization level in Guangxi is relatively low. In the year 2008, farm machinery used in every ten thousand hectares of arable land in Guangxi is far lower than the national average; but the agricultural irrigation and drainage diesel engine and chemical fertilizer application are a little greater than the national average. Road construction level of Guangxi is far higher than the national level. The length of railways in operation, length of navigable inland waterways, and highway mileage in Guangxi are all longer than the national average, as well as the classified highway, expressway, second-class highway, and substandard highway. But construction of first-class highway is relatively backward in Guangxi at present. In the year 2008, the road density of Guangxi is only 0.003 kilometer per

square kilometer, which is lower than the national average of 0.006 kilometer per square kilometer (Table 3)^[1-3].

2.4 High resources endowment of agricultural resources

According to the data in the years 1999–2008, there is certain fluctuation in the per capita arable land of agricultural labor force in Guangxi Zhuang Autonomous Region. After the year 2000, the fluctuation becomes relatively small, but the per capita arable land in Guangxi is still far lower than the national average in general. Per capita seawater area suitable for aquaculture in Guangxi is also far lower than the national level; but its per capita forest area and per capita water resources are greatly higher.

According to the proportion of agricultural products outputs

of Guangxi in the national agricultural products outputs in the year 2008, Jute and kenaf, cane, silkworm cocoon, mulberry cocoon, orange, and banana have relatively great proportions, which all have passed 10%. Especially, the output of cane is as high as 66.17%. Among all the forest products, turpentine, bancoul nuts, tea seed, and wood have relatively high proportions of more than 10%. Among them, proportion of turpentine output is as high as 49.75%. In the livestock products, proportions of meat, pork, beef, and mutton are relatively high, but they are all less than 5%, indicating that livestock products has no significant advantages in Guangxi. In the aquatic products, proportion of marine products is relatively high. And the proportion of the output of shrimp and crab are even close to 10%^[1-3].

Table 2 Comparison of the agricultural mechanization level between Guangxi and China in the year 2008

set/hm²

Area	Large and medium agricultural tractors	Small agricultural tractors	Accessories for large tractors	Accessories for small tractors	Agricultural irrigation and drainage diesel engine	Chemical fertilizer application
China	246.1	1 415.1	357.7	2 296.0	738.1	4 304.3
Guangxi	40.5	704.2	59.3	1 004.4	999.6	5 277.5

Table 3 Comparison of the road construction level between Guangxi and China in the year 2008

km/km²

Area	Length of railways in operation	Length of navigable inland waterways	Highway mileage	Classified highway	Expressway	First-class highway	Second-class highway	Substandard highway
China	0.008	0.013	0.389	0.289	0.006	0.006	0.030	0.099
Guangxi	0.012	0.023	0.419	0.309	0.009	0.003	0.034	0.111

Table 4 Proportion of agriculture, forestry, livestock and aquatic products of Guangxi in those of China in the year 2008

%

Product	Proportions	Product	Proportions	Product	Proportions
Grain	2.64	Silkworm cocoon	24.48	Meat	4.82
Cereal	2.75	Mulberry cocoon	26.79	Pork	4.73
Paddy rice	5.77	Tea	2.65	Beef	2.03
Maize	1.25	Fruit	4.45	Mutton	0.77
Pea green	1.13	Orange	11.39	Milk	0.2
Potato	1.83	Pear	1.34	Cow milk	0.21
Cotton	0.03	Grape	2.39	Poultry egg	0.66
Oil-bearing crops	1.27	Banana	12.38	Bee honey	2
Peanut	2.48	Wood	13.75	Aquatic product	5.11
Rapeseed	0.09	Rubber	0.06	Freshwater product	4.61
Sesame	0.91	Turpentine	49.75	Marine product	5.54
Bast-fibre plants	1.83	Raw lacquer	0.32	Fish	4.95
Jute and kenaf	11.98	Bancoul nuts	18.6	Shrimp and crab	9.16
Cane	66.17	Tea seed	12.85	Shellfish	6.17
Tobacco leaf	1.02	Walnut	0.08	Alga	0
Flue cured tobacco	0.92	Wood	13.75	Others	6.43

2.5 Agricultural scale management still requiring improvement

At the end of March 2010, there are 6 495 peasant specialized cooperatives with more than 5 billion yuan of capital and 71 660 members, 9 512 agricultural industrialization organizations, and 5 876 leading enterprises in Guangxi. Among them, 7 enterprises have more than 1 billion yuan of annual sales volume; 130 enterprises are selected as the district-level key leading enterprises; and 21 enterprises are national key leading enterprises. There are also a number of leading enterprise groups, such as Nantang Group, Jinyuan Company, Huahong Group, and Wuzhou Turpentine Company.

3 Conclusion and suggestion

According to the five aspects of explanatory indicators,

characteristic agriculture of Guangxi has certain competitive advantages in resources endowment, irrigation level, and road construction level at present. However, agricultural science and technology level, agricultural mechanization, agricultural scale management, and cultural quality of agricultural labor forces have relatively weak competitive strength in Guangxi.

According to the competitive advantages, both per capita forest area and per capita water resources of Guangxi are far greater than the national level, which is a great advantage for the development of characteristic forest industry in Guangxi. Besides, Guangxi has great advantages in jute and kenaf, cane, mulberry cocoon, orange, banana and other agricultural products, as well as turpentine, bancoul nuts, tea seed, wood and other forest products; meet, pork, beef, mutton and other livestock products; shrimp and crab and other seawater prod-

ucts. Except for the competitive advantages of resources endowment, irrigation degree and road construction level in Guangxi are both far higher than the national level. The improved irrigation facilities, and highway, railroad, shipping and other transportation facilities can promote the sales of agricultural products, improve the living conditions of farmers, and enhance the extension of characteristic agricultural industry chain in Guangxi Zhuang Autonomous Region.

According to the competitive disadvantages, a stable growth mechanism of the investment in agricultural science and technology has not yet formed in Guangxi. And there is a serious shortage in the overall investment. The Three Funds allocated by the provincial government is far lower than the national average. And the proportion and total amount the Three Funds allocated by the provincial government for agricultural scientific research are also the lowest in China. Agricultural research investment intensity of Guangxi is lower than the national level and the average value of the research investment intensity of all industries in the whole region. Financial expenditure on agriculture and the national financial investment are both lower than other provinces. Moreover, cultural quality of agricultural labor forces in Guangxi is generally poor. For instance, among the people at the age of six and above, proportions of people graduated from primary school and middle school are the highest, which are both higher than 80%. And most of these people live in rural areas. At the same time, mechanization level of Guangxi is far lower than the national level, which leads to the competitive disadvantages in the agricultural scale management in Guangxi. Although the agricultural industrialization leading enterprises and the peasant specialized cooperatives have developed rapidly in recent years, their qualities are poor and the scale of leading enterprises is small. For instance, there are only 7 enterprises having more than 1 billion yuan of annual sales volume. And peasant specialized cooperatives have the disadvantages of funds shortage, loan difficulties, small scale, relatively low organization degree, few management talents, and highly irregular internal management.

Therefore, in order to enhance the competitiveness of characteristic agriculture, Guangxi Zhuang Autonomous Region of China should, on the one hand, improve its irrigation facilities, and highway, railroad, and shipping facilities, strengthen the competitive advantages in cane, jute and kenaf, mulberry cocoon, turpentine and other agricultural and forest products. On the other hand, Guangxi should form a growth mechanism for the agricultural science and technology investment, increase

the total investment quantity, reinforce the technical training and overall quality training of agricultural labor forces by the mode of agricultural extension, support the agricultural industrialization leading enterprises and the peasant specialized cooperatives from the aspects of finance and taxation, and expand the scale and improve the quality of agricultural industrialization leading enterprises and the peasant specialized cooperatives.

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