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How to Develop the Rice Industry in Wuchang City?

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Abstract The rice industry in Wuchang City has the advantages of improved varieties, well-known brands, technology management practices, and also the disadvantages of low coverage of farmer associations, single product variety, low level of deep processing and inefficient quality control. In this article, we analyze the current situation of the rice industry in Wuchang City, and point out some problems in the circulation system of Wuchang rice. Finally, we put forth the following recommendations: supporting the building of farmer associations and strengthening the farmers' bargaining power and status in the market; supporting the leading enterprises to develop many rice product varieties and improve the deep processing capacity; further improving the support service system.

Key words Circulation body, Farmer associations, Integrated processing, Rice industry

1 The current situation of rice industry in Wuchang City

1.1 The natural environment for the development of rice industry in Wuchang City The tillage layer for rice planting in Wuchang City contains 4.24% of organic matter on average, contains 0.010 8% of alkali-hydrolyzable nitrogen on average, 0.003 2% of available phosphorus on average, and 0.0215% of available potassium on average.

It has 110 to 160 frost-free days and 1070 to 1370 sunshine hours in the planting season. The average annual precipitation is 480 mm, and the river net density is 0.33 km/km². The average annual runoff is 3.21×10^9 tons, and exploitable groundwater reserve is 7×10^8 tons^[1].

The unique climate and geographical conditions, coupled with up to about 600 000 rice farmers and planting area of 1067–1200 km², make Wuchang City become one of the top five rice-growing counties in China, owing to its annual rice production of approximately 1.2 million tons.

1.2 The current status of circulation subject

1.2.1 Low level of organization of farmers and limited role of associations. Currently, there are only 3 industry associations related to rice circulation system in Wuchang City. Wuchang Rice Association established in 1997 has 3668 members, jointly constituted by Farm Bureau and other 12 government agencies, rice processing companies, and rural rice processing points.

The president and vice president are mostly chaired by civil servants or the leaders of large processing enterprises. Food Industry Association established in 2004 only has two 2 members, and Rice Industry Association established in 2011 has 72 members from processing, marketing, and research industries.

Thus, the association members are mainly government units

and the staff of processing and sales businesses, who greatly help the enterprises to develop new markets, connect enterprises and farmers, and implement "contract farming".

However, the coverage is low, and the proportion of farmer members and rice growers is up to 1:163.6, so it can not effectively organize the farmers to form group advantages.

1.2.2 Few leading production and processing enterprises. Currently, there are only two leading production enterprises in Wuchang City, Kuihua Yangguang Rice Industry Co., Ltd., and Zhongliang Meiyu Organic Cereal Products Co., Ltd. Kuihua Yangguang now has 20 000 mu of paddy fields, and adopts the business model of bundling the interests of enterprises and farmers, to achieve standardization and mechanization of production; the annual processing scale is 10 000 t, and the market covers 17 provinces and cities, achieving the integrated operation of production, processing, and marketing.

Taking Zhongmei Liangyu for example, 169 farmers in Minle Township practice the cultivation order of 430 hm² of antioxidant organic rice. There are about 20 000 people engaged in rice processing in Wuchang City, but there are only 12 leading processing of them^[2–3]. 377 processing enterprises are registered in the city^[2], with the overall annual processing capacity of 4 million t, but there are only 6 enterprises with the processing capacity of over 30 000 t; there are 44 enterprises with the processing capacity of more than 10 000 t; there are more than 100 enterprises with the processing capacity of 1 000 to 10 000 t; the rest are the family-owned factory.

In summary, the scale of leading production and processing enterprises in Wuchang City is at middle and lower level, far from achieving the exemplary role of integrated operation of production, processing and marketing.

1.2.3 Active cultivation of brokers. Wuchang Rice Association organizes the 130 brokers with annual sales of more than 500 t and absorbs them as members of the association, to carry out marketing, brand identity verification, quality inspection training, expand the Wuchang rice sales market, supervise and manage

Wuchang rice brand.

1.3 The current development situation of circulation object

1.3.1 Achieving industrial development of rice by contract farming. According to reports, the rice production of Wuchang City has achieved more than 90% of the "contract farming". For example, Zhongliang Meiyu purchased "Meiyu 1" organic rice at the price of 6 yuan per kilogram from 222 signed farmers in 2008, not only ensuring the rice production and processing, but also ensuring farmers' income^[4].

1.3.2 Actively cultivate high-quality and high-yield rice varieties to ensure the quality of Wuchang rice from the source. There were more than 80 rice varieties previously in Wuchang City. Due to poor disease and insect resistance capacity, the varieties are not conducive to the modern large-scale, standardized, and intensive production. Rice Research Institute of Academy of Heilongjiang Land Reclamation and other research institutes, universities and enterprises, have cultivated 23 excellent rice varieties in line with GB4404.1 requirements, suitable for being grown in Wuchang City.

Wuyou 1 and Wuyou 3 are chosen by the U. S. Food and Nutrition Association and Japan's Food and Nutrition Association as standard products, successfully entering into the markets of the United States, Canada, Germany and other European countries. "Wuchang Rice" takes some high-yield rice varieties as raw material such as Songjing 9, 12, 15, Dongnong 427, 429, Longdao 5, 10; "Wuchang Scented Rice" takes Songjing 2, Wuyou 4 as raw material; "Wuchang Glutinous Rice" takes Songnian 1, Tongnian 1 as raw material; "Wuchang Black Rice" takes Heizhenzhu, Longmian 1 as raw material.

It effectively ensures the needs of the above four product brands for high quality raw materials. Meanwhile, placing the "second generation ID card" of growers in the package of agricultural products for sale can ensure the origin of brand rice.

1.3.3 Actively building brand and registering the certification mark of origin. Wuchang City actively integrates the rice resources and brands. Formerly, Wuchang municipal government graded and integrated 148 rice brands into 2 brands, and high-quality rice used the brand "Wuchang Rice"; the above four products were registered in accordance with different types of rice; general rice used the brand "Changlifeng".

By brand integration, Wuchang rice has been awarded "Chinese Geographical Indication Protection Product", "Geographical Indication Certification Trademark of Agricultural Products", and "Chinese Famous Brand"; in addition, it is certified by State General Administration for Quality Supervision as "Chinese Geographical Origin Protection Product for Wuchang Rice", and 1000 km² of area is clearly defined to use the certification trademark^[3-4].

Owing to the brand effect, Wuchang rice has entered the supermarkets and wholesale markets of more than 30 cities in China, Hong Kong, Macao, and Taiwan, and it is exported to Japan, South Korea, Russia, Singapore, Malaysia, Canada and other

countries.

1.3.4 Single product variety and low level of deep processing. Currently, around the four rice brands in Wuchang City, the rice processing enterprises mainly process different grades and different packaging specifications of rice. The needs of different consumer groups are met and the brand effect is achieved, but the drawbacks of single products and low level of deep processing are obvious.

1.3.5 Lack of awareness of brand protection. With the rise of "Wuchang Rice" brand and good sales of products, the brand protection is gradually neglected, and there are the bad behaviors of buying the rice from other places to blindly expand sales, and illegally selling the bags printed with the green product identification and origin certification of "Chinese Famous Brand" and "Wuchang Rice".

Only about one million tons of rice is annually commercialized in Wuchang City, but the amount of "Wuchang Rice" sold by the processing enterprises in Wuchang City is up to 10 million tons, with fraud rate of about 90%^[3-4].

1.4 Relatively complete system of support services

1.4.1 Establishing a relatively complete technical service network. Wuchang City has set up an advanced technology team and a perfect agricultural technological extension network. The city has more than 200 agricultural scientific technicians; the agricultural technological extension stations are set up in the city's 24 towns, to carry out science and technology training and television lectures according to the rice planting season.

1.4.2 Establishing the regulations, technical specifications and standard system for the links of production, processing and marketing. In the link of rice planting, *Technical Specifications for Rice Seedling on Upland Field by Large and Medium-sized Greenhouse and Technical Specifications for Cultivating High-quality Rice* are developed; in the link of processing, NY/T5190-2002 *Technical Specifications for the Processing of Pollution-free Food and Rice* is implemented; in the link of sale, *Management Approach for the Use of Origin Product Sign of Wuchang Rice* is developed.

2 Analysis of rice circulation system in Wuchang City

2.1 Important advantage for rice circulation system in Wuchang City

It has cultivated high-yielding varieties, and set up four products under the unified trademark "Wuchang Rice" when integrating the brands, thus creating a unique brand "Wuchang Rice" integrating three laurels of "Chinese Geographical Indication Protection Product", "Certification Trademark for Geographical Indication of Agricultural Products", and "Chinese Famous Brand".

Through the integrated regulations, technical norms and standards and technology team, the quality and reputation protection system of Wuchang rice is established in various links of the whole industry chain. It has cultivated leading companies of rice industry, and high-level brokers to open market and protect the brands, thereby making indelible contribution to exporting

Wuchang rice to Europe, America and Hong Kong, Macao and Taiwan.

2.2 Outstanding problems in the rice circulation system in Wuchang City

2.2.1 The development of industry associations is not coordinated, and especially the low level of organization of farmers makes it difficult to effectively safeguard the interests of farmers. As mentioned earlier, there are only three rice industry associations in Wuchang City, and many scattered farmers are neglected, causing industry chain imbalance, so it is difficult to protect the interests of farmers timely and effectively merely by governmental administrative intervention and enterprise discipline.

For example, the paddy purchase price in Wuchang City was only 3.8 yuan per kg in 2010, the processing cost was only 0.4 to 20 yuan per kg, and rice was priced at 60 yuan to 388 yuan per kg, indicating that the rice processing enterprises made more than 10 times profit. Due to the low level of organization of farmers, more than 90% of the production orders have the fulfillment rate of less than 20%, and the processing enterprises are united to jointly demand a lower price, seriously damaging the interests of rice farmers^[4].

2.2.2 There are many processing enterprises, but the deep processing capacity is low. The annual output of Wuchang rice is only 1.2 million tons, but there are 450 enterprises processing more than 10 million tons of rice^[4]. The processing enterprises' production needs can not be met merely by improving the rice production in Wuchang City, and it results in vicious competition and a lot of adulteration and fraud behaviors.

2.2.3 The law enforcement efforts of the relevant government departments are insufficient. Wuchang City has developed detailed rules and regulations in the links of production, processing and sales, but the law enforcement efforts of the relevant government departments are insufficient. In 2005, a rice base sold fake seeds, reducing the production of more than 800 farmers' 2 000 hm² of paddy, but after being reported, it was not shut down for rectification.

In early 2010, some members of Wuchang Rice Association did not perform the inspection process, and arbitrarily sold the bags printed with "Wuchang Rice" and "Chinese Famous Brand", but they were not investigated and punished. These behaviors from processing, marketing and other links do a serious damage to the rice quality and brand reputation in Wuchang City^[5].

3 Recommendations for the development of rice distribution system in Wuchang City

3.1 Focusing on supporting the building of farmer associations and strengthening the farmers' bargaining power and status in the market There is "trade off" in the circulation system of agricultural products^[6]. Ignoring the construction of farmer associations, will make the farmers engaged in rice cultivation fail to form group advantages and negotiate with processing enterprises

about pricing, so the farmers make little profit, and then abandon rice cultivation switching to other crops, thereby subverting the Wuchang rice industry from the foundation.

Thus, supporting the development of farmer associations is of important strategic significance to the development of the rice industry.

3.2 Supporting the leading enterprises to develop many rice product varieties and improving the deep processing capacity

Rice straw can be used for making paper and producing biogas; rice bran has 64% of the nutrients of rice, rich in protein, fat, dietary fiber, sugars, vitamins, minerals, etc., and it can be developed into rice bran oil, tocopherol, oryzanol, inositol and other products. The rice can also be developed into instant rice, rice noodles, rice cakes, and other products, and broken rice can be used for rice wine brewing^[7-9].

It is necessary to guide the leading rice processing enterprises to undertake comprehensive development of rice, which can not only meet the diverse needs and increase value-added, but also avoid the rice processing enterprises' malicious competition under the realistic conditions of limited rice production.

3.3 Further improving the support service system It is necessary to strengthen the quality inspection agency functions to force the enterprises or individuals with illegal behaviors in cultivation, processing and marketing out of the market; establish the Wuchang rice information center, and cooperate with television and radio to build the release and consulting platform for rice market information and quality control information.

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