How to Optimize the Structure of Agricultural Products in the Context of Reform of the Supply Front?

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Abstract Based on reform of the supply front, this paper analyzes the main constraints on China's current structure of agricultural products, including irrational allocation of resources between agricultural products, prominent problems concerning agricultural product quality and safety, disconnection between market demand and agricultural product R&D, and low processing capacity of agricultural products. Based on summing up the experience of the countries with developed agriculture, this paper proposes the path and mechanism for the optimization of structure of agricultural products in China: optimizing resource allocation of agricultural products; improving the quality of agricultural products; enhancing the R&D capacity of agricultural enterprises; promoting the processing and conversion capacity of agricultural products; perfecting the policy support and subsidy mode.

Key words Reform of the supply front, Structure of agricultural products, Optimization and upgrading

1 Introduction

In recent years, China's agricultural development has been impressive, and food production has been stabilized at 600 million tons or more for three consecutive years. At the same time, China's grain imports rapidly increase, exceeding 100 million tons for two consecutive years; total food stock also reaches a record high, and there is a serious backlog of corn and other food varieties. The increase in China's food production, imports and stocks fully demonstrates that the current China's structure of agricultural products is irrational, production does not match market demand, and there is something with the supply side. Based on the consideration of agricultural competitiveness enhancement, the Central Rural Work Conference in 2015 first proposed focusing on the agricultural supply-side structural reforms, and required conducting production based on people's needs, and improving agricultural supply system quality and efficiency, in order to ensure more adequate supply of agricultural products, make variety and quality well answer consumer needs, and truly form the effective supply of agricultural products. In this context, this paper explores the path and mechanism for the optimization of China's structure of agricultural products, which is of great significance to increasing the agricultural quality and efficiency in the new era and promoting China's agricultural modernization.

2 Literature review

The domestic literature lacks the definition and classification on the adjustment of agricultural product structure. Sun Jian and Li Chongguang (2003) [1] believe that the structural adjustment of agricultural products include the macro and micro structural adjustment. The macro structural adjustment means that the government uses policy, finance, taxation and prices to adjust the total supply and demand of agricultural products, so that the total social demand and supply of agricultural products meet the basic balance and the sustained development of agricultural economy is achieved; the micro structural adjustment means that the producers use marketing of agricultural products to achieve the purpose of production and exchange, and individuals or enterprises' sustained agricultural production, objectively leading to the supply and demand balance of agricultural products on the market. Domestic scholars are committed to finding the problems in China's agricultural structure. Wang Feng (2011) [3] affirms that the current economic efficiency of agriculture is not high, and the growth of farmers' income is slow, mainly due to the deviations in the strategic adjustment effect and target of agricultural structure. Xiang Ai (2012) [4] uses scatter plot and nonparametric kernel density statistical method to analyze China's agricultural trade structure and comparative advantages, and find that most of China's agricultural products lose the comparative advantage. Cao Hui, Zhai Xueling *et al.* (2013) [5] believe that China's food has been converted from basic supply and demand balance to tight supply and demand, and the international market is increasingly becoming an important supplement. Domestic scholars have tried to explore ways to optimize the structure of China's agricultural products. From the microscopic point of view, Sun Jian, Li Chongguang (2003) [1] discuss how the producers or enterprises use the marketing means of agricultural products to make the agricultural structural adjustment obtain sustained further momentum. Fu Guoji (2006) [2] employs the ecological footprint theory and method to analyze the optimization of Hainan's agricultural structure, and proposes the deep processing of agricultural products and ecological and characteristic brand management to increase the economic efficiency of agricultural products and reduce output value foot-

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prints. Wang Feng (2011) [3] believes that to ensure the safety of agricultural products with Chinese characteristics, we must pay attention to food security, farmers' interests, quality and safety of agricultural products, agricultural product price, origin and safety of agricultural products, and structure of agricultural products. Cao Hui, Zhai Xueling *et al.* (2013) [5] point out that the key points to ensure the future structural balance of major agricultural products: the main cereals must adhere to the basic self-sufficiency, with the international market as a necessary complement; there is a need to rationalize the consumption structure of domestic edible vegetable oil; the key to cotton industry lies in stabilizing domestic production and taking full advantage of the international market. Zhang Bei, Huang Zhiping, Yang Bingcheng (2014) [6] argue that in the quality and safety management of agricultural products, it is necessary to play regulatory function of government while establishing efficient, safe and high quality supply chain of agricultural products. From the existing research results, there is little domestic literature on the optimization of the structure of agricultural products, and a lot of literature pays attention to the industrialization of agriculture. It only takes the optimization of agricultural structure as one way to realize the industrialization of agriculture, but never conducts objective in-depth analysis of China's structure of agricultural products. Therefore, based on the reform of the supply front, we carry out the study on the issues concerning optimization path and mechanism of China's agricultural structure.

3 Main problems in China's structure of agricultural products

3.1 Irrational allocation of resources between agricultural products In terms of planting, the data from National Bureau of Statistics show that as of the end of 2014, China's total sown area of crops was 165446000 ha. The total sown area of land-intensive agricultural products accounted for 80.32% while the total sown area of vegetables accounted for only 12.94%. In terms of cultivation, the total number of authorized new varieties about corn, rice, soybeans and wheat accounted for 60.95% of total number of authorized crop varieties in 2014, while the authorization amount was very small for vegetables, accounting for only 5.8% of the total authorization amount in 2014. However, the comparative benefit of land-intensive agricultural products has been extremely low in China. The data released by National Development and Reform Commission show that the average net profit of vegetables in 2014 was 2069.78 yuan/mu, 10.1, 23.6 and 25.3 times that of rice, wheat and corn, respectively. The net profit of cotton, sugar, soybeans and other land-intensive agricultural products is even negative [7]. This fully shows that China's agricultural resources are irrationally allocated among land-intensive agricultural products, labor-intensive agricultural products, and technology-intensive agricultural products, and China's comparative advantage in agriculture has not been fully realized.

3.2 Some problems in quality and safety of agricultural products In 2015, the Ministry of Agriculture organized quarterly routine quality and safety monitoring of agricultural products four times, covering China's 31 provinces (autonomous regions and municipalities), 152 large and medium-sized cities, 5 categories of products, 117 varieties, 94 indicators, and 43998 testing samples, with the overall pass rate of 97.1%. The routine monitoring qualification rate of vegetables, fruits, tea, livestock products and aquatic products is 96.1%, 95.6%, 97.6%, 99.4% and 95.5%, respectively. The safety situation of agricultural products is stable and good, but there are still some problems in quality and safety. Since 2002, China has promoted the construction of agricultural product quality safety traceability system, but now the system is not perfect. Meanwhile, the traceability information is asymmetrical among departments, regions and enterprises, lacking a unified national sharing and exchange mechanism of traceability data.

3.3 Disconnection between agricultural R&D and market demand The teaching and research units are mainly responsible for China's agricultural product development, while the development consciousness of agricultural enterprises is relatively weak. According to China's Agricultural Intellectual Property Creation Index Report in 2015, 89.84% of authorized agricultural varieties were from home, while 10.16% from abroad. The authorizing amount of domestic teaching and research units accounted for 54.90% of total domestic authorizing amount, an increase of 36.06% over the same period last year; the authorizing amount of enterprises accounted for 39.68% of total domestic authorizing amount, a decrease of 35.06% over the same period last year, indicating that the domestic research institutes occupied a dominant position in the number of authorized varieties in 2014. The authorized varieties of foreign enterprises accounted for 92.86% of total foreign authorized varieties, much higher than the proportion for teaching and research units and individuals (1.02% and 6.12%, respectively). Different agricultural R&D entities at home and abroad to a certain extent reflect the disconnection between China's agricultural R&D and market demand.

3.4 Small agro-processing capacity According to Survey and Research Report on China's Agricultural Product Processing Industry Development (2015), China's agricultural processing rate was only 55% in 2014, lower than the 80% level of developed countries. And the fruit processing rate was only 10%, lower than the 30% level of the world; the meat processing rate was only 17%, less than 60% level of the developed countries. The initial processing has caused a post-production loss of about 300 billion yuan per year in China, equivalent to an input-output waste of 150 million mu of arable land. More than 60% of farming byproducts and processing byproducts have not yet been recycled and efficiently used in China, and the average power consumption and water consumption of processing enterprises in China are twice and thrice as high as in developed countries, respectively. The poor agro-processing capacity not only causes the agricultural resources to be inefficiently used, but also leads to the low added value of agricultural products, which is not conducive to enhancing the competi-

tiveness of China's agriculture.

4 Successful experience in the countries with developed agriculture

4.1 Paying attention to the agricultural advantages The typical countries with developed agriculture in the world are adept at bringing into full play their comparative advantage to ultimately realize their own characteristics. At the beginning of agricultural modernization, the United States focused on the advantages of considerable arable land and fertile soil, and took vigorous development of land and planting of land-intensive agricultural products as the starting point for the agricultural modernization of the United States. As for Japan with scarce land resources, it seizes its advantage of rich agricultural labor resources to plant labor-intensive agricultural products, eventually forming a unique "multi-labor and multi-manure agriculture". As a country with limited land resources, the Netherlands deliberates its own national conditions and climate characteristics, and decides to take advantage of flat terrain and abundant pasture resources, to vigorously develop animal husbandry, dairy and horticultural crops with high added value.

4.2 Strictly controlling the quality and safety of agricultural products Agriculturally advanced countries, without exception, have a remarkable number of agricultural products, but they also pay close attention to the quality and safety of agricultural products. Germany is in a phase of adjustment of agricultural structure, and by developing ecological agriculture standards and prohibiting the application of chemical fertilizers, pesticides and herbicides, it advocates the development of environment-friendly agriculture, bio-agriculture and ecological agriculture, to achieve sustainable development of agriculture. After learning from the past soil structural damage due to excessive use of fertilizers, Japan no longer uses chemically synthetic pesticides, fertilizers, growth regulators, feed additives and other substances, but turns to the development of ecological agriculture, which not only gradually improves the soil structure, but also ensures the quality of agricultural products. The EU and the United States have also enacted a series of legal documents to implement traceability system so as to ensure the quality of agricultural products.

4.3 Emphasizing agricultural research and technology extension In the agricultural modernization process, some enterprises in the countries with developed agriculture attach great importance to agricultural research capacity and agricultural technology extension, and the private investment in agricultural innovation also has an increasing share in the total investment in agricultural innovation. In the United States, enterprise is the principal investment entity of agricultural research funding, and they build their own research institutions and experiment stations to enhance their own competitiveness. The number of research institutions in Israel is second only to that in the United States, and its research virtually covers all aspects of agriculture. France places top-down emphasis on the application of technology in agriculture, and the private companies are mainly responsible for the agricultural technology extension.

4.4 Focusing on deep processing of agricultural products The countries with developed agriculture focus on the extension and expansion of the agricultural industry chain, and are actively working to improve the level of processing of agricultural products. The United States uses its advanced deep processing technology and sound industrial organization system, to fully use the agricultural resources. It not only processes the corn into more than 4000 products, but also is good at extracting useful substances from discarded citrus and grapes and form large-scale production. Japan also uses its sophisticated deep processing equipment and advanced technology to successfully develop over 300 processed rice varieties, and enhance the comprehensive utilization value of related byproducts.

4.5 Making full use of agricultural subsidies The developed countries' agricultural modernization is inseparable from the state's strong support and encouragement. Governments in developed countries generally implement agricultural price subsidies, provide extensive guarantee for the agricultural loans issued by cooperatives and private banks, and subsidize the financial institutions that offer low-interest agricultural loans. Since 2014, the United States has abolished the direct agricultural subsidies, but it expands the scope and coverage of agricultural insurance programs, thus improving the flexibility in farmers' choice of different insurance according to their own situation. Japan attaches great importance to the protection of agriculture, and there are a total of 470 kinds of agricultural subsidies. It also divides the subsidies into software subsidies and hardware subsidies, covering all aspects of farming, forestry, animal husbandry and fishery.

5 Policy recommendations

5.1 Optimizing the allocation of agricultural product resources On the one hand, due to the constraints of population base and limited per capita land area, the planting of land-intensive agricultural products does not have comparative advantages. Therefore, under the premise of ensuring grain self-sufficiency and food security, it is necessary to increase food production, moderately decrease the sown area of land-intensive agricultural products, especially moderately reduce the planting of corn in non-dominant region, and vigorously support fruits, vegetables and other labor-intensive agricultural products. On the other hand, due to great differences in geography and climate and carrying capacity of environment in different regions, it is necessary to take full account of these regional factors in the adjustment of agricultural structure; focus on the combination of breeding and farming based on continuing to tap and play regional features and advantages, and vigorously develop efficient characteristic agricultural products in line with regional environment; step up the large-scale production, and build the production base of high quality agricultural products with characteristics under the leadership of the leading enterprises, in order to achieve the comprehensive benefits of

regional superior agricultural products.

5.2 Improving the quality of agricultural products On the one hand, it is necessary to accelerate the development of technical norms and standards to ensure quality and safety of agricultural products while strengthening the technical guidance and services for the related production and operation entities. On the other hand, it is necessary to improve the agricultural quality and safety supervision capacity and law enforcement level; effectively increase funding efforts, introduce foreign advanced detection technology and equipment, strengthen inspectors' professionalism, and enhance the daily inspection; improve agricultural product quality and food safety control system from farm to fork, continuously strengthen accountability mechanism, and deal a serious blow to someone for criminal acts such as selling fake goods.

5.3 Enhancing R&D capacity of agricultural enterprises Firstly, it is necessary to increase fiscal support, channel agricultural enterprises' capital into R&D of agricultural products, and improve enterprises' awareness of science and technology innovation; give full play to the guiding role of scientific research departments at all levels, cultivate the R&D capacity of small and medium enterprises, and encourage original innovation. Secondly, it is necessary to promote sharing of agricultural science and technology resources; effectively play technical human resource advantages of domestic teaching and research units; encourage teaching and research units and enterprises to carry out regular in-depth knowledge, technology and human resource exchanges based on agricultural enterprises' practical experience and farmers' demand. Thirdly, it is necessary to accelerate scientific and technological achievement conversion of agricultural enterprises, constantly find new problems in practice, and sum up new strategies, to enhance R&D capacity of agricultural enterprises.

5.4 Enhancing the processing and transforming capacity of agricultural products Firstly, it is necessary to introduce foreign advanced agricultural processing equipment, draw on science and technology and operational experience to gradually improve the processing level of agricultural products, vigorously promote technological innovation and extension, and develop the technological equipments with independent intellectual property rights. Secondly, it is necessary to foster a number of leading deep processing enterprises of agricultural products, give full play to the leading role of agricultural processing demonstration enterprises and bases, and guide agricultural processing enterprises to gradually gather in processing parks, development zones and small towns, to form industrial clusters and achieve economies of scale. Thirdly, it is necessary to moderately reduce the original utilities for agricultural product processing enterprises, encourage and guide enterprises to use technological innovation to improve product quality and save water and electricity resources, and focus on the incentives and subsidies to environment-friendly processing enterprises.

5.5 Optimizing policy support and subsidy On the one hand, according to the actual situation, it is necessary to moderately reduce agricultural utilities for ecological farm and green production base; continue to promote the subsidies to high quality agricultural products, and assist producers of high-quality agricultural products in actively expanding marketing and creating high-quality brand. On the other hand, it is necessary to further reduce agricultural financing cost, encourage and guide more financial, industrial and commercial capital to agriculture, expand agricultural credit guarantee range, increase agricultural insurance coverage, develop new types of insurance based on regional characteristics and farmers' needs, and offer awards and subsidies to the financial institutions which are good for agriculture.

References

[1] SUN J, LI CG. Deepening structural adjustment of agriculture using the marketing of agricultural products[J]. Commercial Research,2003(3):178-181. (in Chinese).

[2] FU GJ. Ecological footprint analysis on agricultural products composing optimization in Hainan Province[J]. Research of Agricultural Modernization, 2006(5):389-392. (in Chinese).

[3] WANG F. The agricultural products safety with Chinese characteristics and its orientation holden[J]. Reform,2011(4):76-81. (in Chinese).

[4] XIANG A. Analysis on the comparative advantages of Chinese agricultural product dynamic and trade structure[J]. Agricultural Outlook,2012, 8(2): 51-54. (in Chinese).

[5] CAO H, ZHAI XL, XU XG, *et al*. Study on the balance of main agricultural products in China[J]. Macroeconomics,2013(6):9-14. (in Chinese).

[6] ZHANG B, CAO ZP, YANG BC. An empirical analysis on quality security control willing of agricultural product supply chain core enterprises[J]. Chinese Rural Economy,2014(1):62-75. (in Chinese).

[7] WU ZJ. Grain de-stocking should keep vigilance on drastic decline of production[N/OL]. Farmers' Daily,2016-01-23(03). (in Chinese).

[8] LI R, HAO QS, GAO K, *et al*. The experiences and enlightenments of foreign agricultural product deeply processing enterprises[J]. Heilongjiang Animal & Veterinary Sciences,2015(2):4-6. (in Chinese).

[9] SU F. Study on comparison of China and foreign agricultural modernization [D]. Taiyuan: Shanxi University,2010. (in Chinese).

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[15] LE GA, XUE T, CHEN J. A primary discussion on network crowd behavior and classifying framework[J]. Journal of Chinese People's Public Security University:Social Sciences Edition, 2011 (6): 99-104. (in Chinese).

[16] DENG XQ. Study on the main characteristics of network crowd behavior and its occurring mechanism[J]. Social Science Research, 2010(1): 103-107. (in Chinese).

[17] DU JF, WEI J. On the political sociology of network crowd: Essence, types and utility[J]. Journal of Southeast University(Philosophy and Social Science), 2010, 12(1): 43-50. (in Chinese).

[18] QI ME, RONG Y. Sociology: Study on the forms of socialization[M]. Beijing: Huaxia Publishing House, 2002. (in Chinese).

[19] ZHENG B, WEI HY. Research on the cause mechanism of brand crisis based on the perspective of consumers psychological contract breach[J]. Enterprise Vitality, 2011 (5): 41-44. (in Chinese).

[20] Bandura A. Self-ef? cacy: The exercise of control[M]. New York: Freeman, 1997.