The Construction of the Quality Evaluation System of China's Agricultural Economic Growth

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Abstract: China's Agriculture Has Changed from High-Speed Growth to High-Quality Development. How to Effectively Implement and Promote Efficient Agricultural Development is an Important Issue for the Chinese Government in the Future. This Paper Selects 23 Evaluation Indexes from Six Aspects of Agricultural Economic Structure, Efficiency, Stability, Rural Development, Agricultural Modernization, Agricultural Resources and Environment, and Constructs the Quality Evaluation System of China's Agricultural Economic Development. Taking Hubei Province as an Example, Entropy is Adopted. the Value Method Quantitatively Analyzes the Quality Characteristics of Agricultural Economic Development in Hubei Province from 2000 to 2017. Finally, in Order to Provide Reference for the High-Quality Development of Agriculture in Hubei Province and Other States in the Yangtze River Basin, the Main Problems Restricting the Improvement of Agricultural Economic Quality in Hubei Province Are Put Forward.

1. Introduction

China's Economy is Changing from a Stage of Rapid Growth to a Stage of High-Quality Development. This is a Major Judgment Made by the Party Central Committee in Light of Changes in the International and Domestic Environment, Especially in China's Development Conditions and Stages. in 2018, the Opinions of “Implementing the Strategy of Agricultural Reconstruction and Accelerating the Transformation and Upgrading of Agriculture” Are Clear. Agricultural Development Should Not Be Limited to the Overall Expansion, Nor to the Agricultural Structure and Farmers' Life. Level, Agricultural Production Methods, Ecological Environment and Other Coordinated Development to Promote Agriculture with Quality[1]. Therefore, It is Very Important to Carry out the Research on the Quality Evaluation of Agricultural Economic Development to Reveal the Characteristics of the Quality Development of Agricultural Economy and Ensure the High Quality Development of Agricultural Economy in China.

Domestic Researchers Did Not Study the Quality of Agricultural Economic Development. for the First Time, a Comprehensive Evaluation System of the Quality of Agricultural Economic Growth Has Been Established in Five Aspects: Stability, Sustainability, Science, Technological Progress, Structure and Farmers' Quality of Life.

Hubei Province is Located in the Middle Reaches of the Yangtze River, Known as “Thousand Lakes and Marshes Province”. the Domestic Production Base of Grain, Cotton, Oil and Other Important Crops. the Production of Fresh Water Products Has Entered the National Ranking for the First Time in 21 Consecutive Years[2]. That is the Real Agricultural Province in the Yangtze River Basin. This Study Focuses on the Comprehensive Evaluation of the Quality of Agricultural Economic Development, as an Example to Analyze Its Time-Varying Characteristics and Current Situation. the Research Results Will Contribute to the Steady Development of High-Quality Agricultural Development in Hubei Province and Be Used in Other Aspects of the Yangtze River Basin. the Development of Agricultural Quality in the State is of Great Significance.

2. Construction of Comprehensive Evaluation Index System of Agricultural Economic Quality

Based on the requirements of high-quality agricultural development and the characteristics of

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agricultural development in Hubei Province, and referring to the quality evaluation system of agricultural economic growth constructed by fan yuan, this paper studies six first-class indexes and 23 second-class indexes selected from six aspects of agricultural economic structure, efficiency, stability, rural development, agricultural production modernization, resources and environment, and constructs the comprehensive evaluation index of agricultural economic quality Standard system, in which the secondary indicators include 16 positive indicators, indicating that the indicator value is positively related to the quality of agricultural economic development; 8 negative indicators, indicating that the indicator value is negatively related to the quality of agricultural economic development (Table 1). The data of this study are from China Statistical Yearbook, China Rural Statistical Yearbook, Hubei statistical yearbook and Hubei Agricultural Machinery Bureau from 2000 to 2017 [3]. The missing values are supplemented by interpolation In order to eliminate the influence of dimension and unit of original data, the method of extremum is used in dimensionless processing.

2.1 Calculation Formula

$$X = \frac{X_{ij} - \min\{X_{ij}\}}{\max\{X_{ij}\} - \min\{X_{ij}\}} \tag{1}$$

$$X = \frac{\max\{X_{ij}\} - X_{ij}}{\max\{X_{ij}\} - \min\{X_{ij}\}} \tag{2}$$

$$P_{ij} = \frac{x_{ij}}{\sum_{i=1}^{m} x_{ij}} \tag{3}$$

$$e_j = -k \sum_{i=1}^{m} p_{ij} \ln p_{ij} \tag{4}$$

$$e_j = -k \sum_{i=1}^{m} \frac{1}{m} \ln \frac{1}{m} = k \ln m \tag{5}$$

$$W_j = \frac{d_j}{\sum_{j=1}^{n} d_j} \tag{6}$$

$$v_i = \sum_{j}^{n} w_j p_{ij} \tag{7}$$

2.2 Result Analysis

Based on the first step to the sixth step of the above calculation method and the data of agricultural economic development in Hubei Province, the entropy value, utility value and weight in the evaluation index system of agricultural economic development quality in Hubei Province are obtained According to the distribution results of the first level index weights, the two indexes of resources and environment and rural development level have the largest weights in 2000-2017, both of which are more than 0.2, indicating that they have the most significant impact on the development of agricultural economic quality in Hubei Province; the three indexes of agricultural modernization level, agricultural economic structure and agricultural economic efficiency have a weight between 0.1-0.2, which has a significant impact on the development of agricultural economic quality Weak[4]; the weight of agricultural economic stability is the smallest, only 0.051620, which has the least significant impact on the quality of agricultural economic development in Hubei Province, but also exposes the lack of stability of agricultural economic growth in Hubei Province. On this basis, combined with the sixth calculation method, the comprehensive evaluation index of agricultural economic development quality of Hubei Province

from 2000 to 2017 is calculated.

Table 1 Comprehensive Rating Index System of Agricultural Economic Development Quality

First level index	Two level index	Measurement method	Attribute
Agricultural economic structure	Proportion of output value of agriculture, forestry, animal husbandry and fishery	GDP of agriculture, forestry, animal husbandry and fishery / GDP	+
	Proportion of agriculture, forestry, animal husbandry and Fishery Services	GDP of agriculture, forestry, animal husbandry and Fishery Services / GDP of agriculture, forestry, animal husbandry and fishery	+
	Sowing proportion of grain crops	Sown area of grain crops / sown area of crops	+
	Proportion of fishery output value	Fishery output value / agriculture, forestry, animal husbandry and fishery output value	+
Agricultural economic efficiency	Agricultural labor productivity	Total output value of agriculture, forestry, animal husbandry and fishery / rural employees	+
	Yield of cultivated land	Total agricultural output value / cultivated land area at the end of the year	+
	Productivity of aquatic products	Aquatic product yield / aquaculture area	+

Based on the calculation results in Table 3, the change characteristics of the first level index of agricultural economic quality evaluation in Hubei Province from 2000 to 2017 are further analyzed.

Agricultural economic structure index: from 2000 to 2017, the agricultural economic structure index of Hubei province gradually increased from 0.006 311 in 2000 to 0.012751 in 2007, then decreased to 0.006 040 in 2011, and finally steadily increased to 0.021062 in 2017 The main reasons are as follows: after entering the 21st century, Hubei Province's agricultural economic structure planning has always been based on food security as the bottom line, with the goal of promoting agricultural economic growth and people's income, making full use of the advantages of local natural endowment, focusing on the development of characteristic industries, and the fishery output value has been significantly improved[5]; at the same time, the third industry of agriculture has been vigorously developed, and the output value of agriculture, forestry, animal husbandry and fishery services has been continuously improved From 2008 to 2011, the index of agricultural economic structure in Hubei Province declined. On the one hand, due to the ice disaster in the south of China in 2008, Hubei agriculture was seriously damaged, resulting in the overall decline of agricultural economy In 2009, the output value of agriculture, forestry, animal husbandry and fishery was 298.519 billion yuan, almost zero growth compared with 2008. On the other hand, Hubei Province issued opinions on water pollution prevention and control at the end of 2008, increased the supervision of extensive agriculture, and focused on the treatment of fishery pollution in agriculture, resulting in a short-term decline in the output value of fishery. Agricultural economic efficiency index: from 2000 to 2017, the agricultural economic efficiency index rose from 0.003 558 to 0.013472, an increase of 278.64%.

This is mainly due to: since entering the 21st century, Hubei Province has vigorously developed modern agriculture. By accelerating the construction of modern agricultural infrastructure, training modern agricultural talents and other measures , the mechanization of agricultural production in the whole region has been comprehensively improved, and the rate of land production and labor productivity has been greatly improved. Agricultural economic stability index: from 2000 to 2017, the agricultural economic stability index has been at a low level, almost zero growth Among them, in 2005, 2007 and 2009, the agricultural economic stability index showed a sudden decline, with a minimum value of 0 Main reasons: on the one hand, during the research period, natural disasters such as ice disaster and flood disaster were frequent in Hubei Province. In addition, the disaster protection ability was weak, the agricultural economic structure was simple, and the disaster resistance ability was weak. In 2008, the continuous impact of ice disaster and flood disaster resulted in the agricultural GDP nearly zero growth in 2009. On the other hand, after 2006, Hubei vigorously developed modern agriculture and adjusted agricultural development In the way of exhibition, the agricultural economic growth shows adaptive fluctuation, coupled with domestic inflation, the price index of agricultural products and the rural consumption index show dramatic fluctuation, which leads to the low level of agricultural economic stability index. Rural

development index: in addition to abnormal fluctuations in 2007, the overall rural development index showed an upward trend from 2000 to 2017 This is mainly due to[6]: after 2003, Hubei's agriculture accelerated development and the proportion of farmers going out to work increased, farmers realized income increase, and the rural Engel coefficient decreased; in 2006, the state increased direct agricultural subsidies (implemented in 2007), the net income of rural residents increased significantly, and the difference coefficient of urban and rural areas in Hubei suddenly decreased to 2.198, resulting in the rural development index suddenly increased in 2007; 2010 Years later, Hubei accelerated the development of urbanization, implemented targeted poverty alleviation, continued to increase the net income and urbanization rate of rural residents, and entered a new stage of rural development [7].

Table 2 Utility Value And Weight in the Evaluation Index System of Agricultural Economic Development Quality

First level index	Weight	Two level index	Utility value	Weight
Agricultural economic structure	0.17677	Proportion of output value of agriculture, forestry, animal husbandry and fishery	0.077 19	0.033 70
		Proportion of agriculture, forestry, animal [8]husbandry and Fishery Services	0.132 92	0.058 02
		Sowing proportion of grain crops	0.072 36	0.031 59
		Proportion of fishery output value	0.122 50	0.053 47
Agricultural economic efficiency	0.14038	Agricultural labor productivity	0.133 13	0.058 11
		Yield of cultivated land	0.120 97	0.052 80
		Productivity of aquatic products	0.073 68	0.032 16

Agricultural modernization index: from 2000 to 2017, the agricultural modernization index continued to rise from 0.000687 to 0.021748, with an increase of more than 30 times in 18 years, the largest increase among all first-class index indexes This is mainly due to: Hubei Province vigorously develops modern agriculture, increases investment in modern agricultural infrastructure, mechanization, electrification, informatization and other investment in agricultural production, sales and other links, and rapidly improves the overall power of machinery and the comprehensive mechanization level of cultivation and income In 2013, Hubei province put forward the modern agriculture development plan (2013-2017), focusing on the construction of agricultural modernization system, accelerating the deep integration of primary, secondary and tertiary industries in rural areas, accelerating the development of agricultural products processing and circulation industry, and effectively improving the development level of modern agriculture in Hubei Province.

Resource and environment index: from 2000 to 2017, the change of resource and environment index in Hubei Province showed a process of first rising, then falling and then rising. The highest value was 0.024316 in 2003, and the lowest value was 0.005 196 in 2007 Main reasons: before 2003, the agricultural economy of Hubei Province still maintained the development mode at the end of the 20th century, with less damage to the ecological environment; after 2003, in order to solve the “three rural” problem, realize the increase of people's income, develop agriculture vigorously at the expense of the ecological environment, the quality of cultivated land decreased, the use intensity of pesticides and fertilizers continued to increase, leading to the sharp decline of agricultural resources and environmental index After 2006, the sustainability of agricultural development has attracted much attention. Through a series of development measures, such as returning farmland to forest and lake, Hubei Province has made the agricultural resources and environment index gradually rise after the trough of 2007.

Furthermore, the change trend of comprehensive evaluation index of agricultural economic quality in Hubei Province is analyzed The evaluation results show that in early 2000, the quality of agricultural economy in Hubei Province declined slightly, and the comprehensive score reached the lowest value of 0.031400 in 2006, and then rose steadily after adjustment, reaching the highest value of 0.099400 in 2017 The development of agricultural economic quality in Hubei Province from 2000 to 2017 can be divided into two stages: the period of fluctuation (2000-2009) and the

period of steady improvement (2010-2017).

During the fluctuating period, the quality of agricultural economy in Hubei Province alternates. The average value of the comprehensive evaluation index of agricultural economic quality is 0.039700, and the overall quality of agricultural economy is low Up to 2009, the comprehensive evaluation index of agricultural economic quality is only 0.040900, which is still slightly lower than that in 2000 During the period of fluctuation, the quality of Hubei's agricultural economy is still in a steady state The main reasons are as follows[9]: at the beginning of 2000, in order to promote the increase of farmers' income, Hubei vigorously developed agriculture, and the total agricultural economy grew rapidly. However, due to the restriction of traditional agricultural development mode, the rising effect of indicators such as agricultural labor output rate, agricultural real estate output rate, and comprehensive mechanization level of farming income was not good. On the contrary, the fluctuation rate of agricultural economic growth, the change range of agricultural product price index, urban and rural areas However, a series of negative indicators, such as the coefficient of difference and the intensity of application of pesticide and chemical fertilizer, increased significantly, which led to the decline of agricultural economic stability, rural development level, resources and environment, and the overall decline of agricultural economic quality in Hubei Province After 2006, the national agricultural and rural development has entered the new socialist rural construction period, which requires the coordinated development of rural economy, culture, infrastructure, ecological environment and other aspects During this period, Hubei Province, through vigorously developing modern agriculture, developing various functions of agriculture, promoting the optimization and upgrading of agricultural structure and the transformation of agricultural growth mode, through innovation driven, increasing investment in talent construction, consolidating the foundation of all aspects of rural development, and promoting the four indicators of agricultural economic structure, agricultural economic efficiency, rural development level and agricultural modernization level The quality of industrial and economic development has gradually recovered However, due to the frequent fluctuation of agricultural economy and the lag of ecological environment restoration, the quality of agricultural economic development after 2007 is still in a state of fluctuation.

During the period of steady improvement, the quality of agricultural economic development in Hubei province continued to improve[10]. The comprehensive evaluation score from 2010 to 2017 increased from 0.040900 to 0.099400, with a large increase and a fast speed Specifically, the growth rate of agricultural economic quality has gradually expanded since 2010, and gradually slowed down and remained stable after reaching the peak in 2014 Main reasons: after 2010, the achievements of new rural construction began to show, and the stability and sustainability of agricultural economy increased; in 2013, the 10-year comprehensive poverty alleviation strategy kicked off, 25 counties in Hubei received key support from the state, Engel coefficient, urban-rural difference coefficient and other indicators plummeted, and the indicators of rural development level increased rapidly; in 2015, the background of structural reform of agricultural supply side Next, Hubei Province adjusted the agricultural industrial structure, vigorously developed the characteristic industries such as agricultural tertiary industry and fishery, further improved the rationality of agricultural economic structure, more emphasized the quality and efficiency of agricultural supply side, improved the quality and safety level of agricultural products, and finally ensured the steady improvement of the quality of agricultural economic development in Hubei Province.

3. Conclusion

However, compared with the central and eastern regions of China, there are still some factors that restrict the improvement of the quality of Hubei's agricultural economy, such as the unreasonable structure of agricultural industry, the fragile ecological environment and the backward development of agricultural modernization In view of this, the following suggestions are put forward around the development of agricultural economic quality in Hubei Province :

Adjust and optimize the structure of agricultural industry, improve the stability of agricultural economy through the combination with local industry, extend the agricultural industry chain,

vigorously develop the processing industry of agricultural products, develop other agricultural functions, broaden the channels of agricultural economic growth, and enhance the stability of agricultural economy; implement the structural reform of agricultural supply side, and promote the construction of quality brand agriculture, such as “three products and one standard”, improve the supply of agricultural products Quality and efficiency of the feed end.

Strengthen the construction of agricultural infrastructure, improve the level of agricultural modernization, increase the investment in agricultural infrastructure construction, accelerate the promotion and application of agricultural mechanization and informatization, and use the Internet of things, big data, rural e-commerce and other information technology means to realize the informatization of agricultural production and management, so as to improve the efficiency of agricultural production.

On the one hand, to improve the sustainable development level of agriculture and ensure the improvement of agricultural quality and efficiency, we should vigorously promote the green production mode, improve the green production awareness of farmers, accelerate the promotion and application of high-efficiency slow-release fertilizer, water-soluble fertilizer, low toxicity and low residue pesticide, and the popularization of green environmental protection knowledge, so as to achieve the reduction of chemical products, and prevent or slow down the occurrence of agricultural environmental pollution events On the other hand, we should strengthen the protection and ecological restoration of agricultural resources and environment, and gradually reduce the pressure of agricultural resources and environment through ecological incentive policies and measures such as returning farmland to forests and lakes.

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