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Evaluation and Countermeasures for the High Quality Development of Heilongjiang Agriculture

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Abstract: High-quality agricultural development is not only the overall goal of implementing the strategy of quality agricultural development, but also an important measure to implement rural revitalization. Based on the connotation characteristics of high-quality agricultural development, this paper constructs a set of evaluation system for the level of high-quality agricultural development containing 17 indicators in five dimensions, including product quality, green development, production efficiency, economic efficiency and policy support, in line with the actual Heilongjiang situation, using panel data from 2015 to 2019, and employing The "entropy value method" was used to scientifically measure the level of high-quality agricultural development in Heilongjiang Province, and the comparative analysis method was used to evaluate the level of high-quality agricultural development in Heilongjiang in a vertical and horizontal manner. The study concludes that the overall level of high-quality development of agriculture in Heilongjiang Province needs to be improved, and finally puts forward countermeasures and suggestions to accelerate the high-quality development of agriculture in Heilongjiang Province.

1. Introduction

The 19th Party Congress pointed out that China's economy has changed from a stage of high-speed growth to a stage of high-quality development, and that agriculture, as a basic sector of the national economy, should also move towards high-quality development in line with the requirements of the new era. 2018 has seen the Ministry of Agriculture and Rural Development release a series of relevant documents, clearly stating that 2018 is the "year of quality agricultural development" and putting forward specific requirements for high-quality agricultural development. "In 2020, the No. 1 document of the Central Government formally proposed to promote high-quality agricultural development, and in 2021, the No. 1 document of the Central Government further explicitly proposed to promote high-quality agricultural development. High-quality development of agriculture is both a concrete implementation measure of the high-quality development strategy in the field of agriculture and an important way to achieve rural revitalisation. Therefore, high-quality agricultural development has become the inevitable direction of China's agricultural development. Heilongjiang Province, known as the "Northern Warehouse", has made

rapid progress and remarkable achievements in the development process in recent years, with a total primary industry output value of RMB 643.81 billion and a provincial grain output of 75.408 million tons at the end of 2020, accounting for 1/9 of the country's grain output and maintaining the number one ranking in the country for 10 consecutive years. ranking. The contribution of Heilongjiang's agricultural economic development to the development of China's agricultural economy cannot be ignored either. Therefore, this paper not only has certain practical significance for the high-quality development of Heilongjiang agriculture, but also further expands and enriches the theoretical research content of high-quality agricultural development in China.

2. Review of the literature

Since the report of the 19th National Congress pointed out the transformation of China's economy to high-quality development, more and more scholars have begun to focus on research related to high-quality agricultural development, and the current main research includes the connotation, construction of evaluation index systems and pathways.

Research on the connotation of high-quality agricultural development. Different scholars have studied the connotation of high-quality agricultural development from different perspectives, on the one hand, they define its connotation from the perspective of the new development concept. Du Simeng et al. (2021) argue that high-quality agricultural development is a development with innovation as the first driving force, coordination as the endogenous feature, green as the universal form, openness as the necessary path and sharing as the fundamental purpose[1].On the other hand, the connotation of high-quality agricultural development is elaborated through the perspective of its characteristics. According to Zhong Yu (2018), high-quality agricultural development should include high-quality agricultural products, efficient agricultural industries, a perfect production management system and strong international competitiveness[2].Han Changfu (2018) and Huang Xiujie et al. (2020) argue that the elements of high agricultural quality should specifically include the "six highs" of product quality, farmers' income, agro-industrial efficiency, productivity, competitiveness and operator quality[3][4] . According to Zhang Lu et al. (2020), under the premise of protecting resources and the environment, improving the quality of the labour force and the production potential of the land, thus increasing productivity, and ultimately improving and broadening the functions of agriculture is the meaning of high-quality agricultural development[5].Zhang Mo et al. (2021) suggest that the structure of economic development, social life patterns, agricultural technological achievements and the level of human capital are the main connotations of the theory of high-quality agricultural development[6].

Research on the measurement of high-quality agricultural development. Scholars have mainly constructed the indicator system from two perspectives: the new development concept and the connotation characteristics of high-quality agricultural development. The indicator evaluation system based on the new development concept is based on the 5 basic dimensions of "innovation, coordination, green, openness and sharing". Scholars who have constructed indicator systems based on these five dimensions include Liu Tao et al.[7] (2020), Du Simeng et al.[8] (2021), Liu Zhongyu et al.[9] (2021) and Zhang Invention et al.[10] (2021), all of whom have used the five aspects of the new development concept to construct their indicator systems and measured the level of high-quality agricultural development using the entropy value method, the hierarchical analysis method, the entropy weight method and the entropy TOPSIS method respectively. The indicator system based on the connotation characteristics is more specific and microscopic, and scholars based on this construction of the indicator system include: Xin Ling et al. (2019) constructed the indicator system from four aspects: green development, scale production, industrial integration and supply level[11].Dong Yanmin et al. (2021) added farmers' income to Huang Xiujie et al. to construct an indicator system using the entropy value method to measure the level of high-quality agricultural development in 31 provinces across China[12].Jiao Linhui et al. (2021) constructed an evaluation index system in terms of

greenness, coordination, efficiency, quality, scientific and technological innovation, and industrial integration[13].

A study on the realization path of high quality development of agriculture. Hao Yifan and Wang Zhengbing (2019) point out that the government should not only accelerate the scale of agricultural production and related service providers to promote high-quality agricultural development, but also pay attention to releasing the overflow dividends of its spatial agglomeration[14].Shi Baowei and Wang Tian Yue (2019) suggest that co-ordinating development, narrowing the gap between regional industrial structure upgrades and strengthening infrastructure construction can promote high-quality agricultural development[15].Xie Yanle et al. (2020) suggest that high-quality agricultural development and rural revitalization are mutually reinforcing[16].Leng Gongye (2021) argues that high quality agricultural development should be able to produce high quality products while saving resources and protecting the environment, and at the same time increase farmers' income[17].

To sum up, in China, there is a wealth of research results on high-quality economic development, which has implications for the study of this paper. In the process of reviewing the literature, it is found that there is less literature on the study of high-quality agricultural development in Heilongjiang Province, which is the largest grain production base in China and contributes to China's food security production, so it is necessary to take the initiative to practice and explore the evaluation system of high-quality agricultural development belonging to Heilongjiang.

3. Construction of indicators and research methodology

3.1 Construction of the indicator system

Based on the principles of science, comprehensiveness, data availability and operability, and with reference to the Heilongjiang 2020 policy documents on high-quality agricultural development and the research results of Yang Rui et al.[18] and Zhaorong Liu et al.[19]we finally obtained an evaluation index system that is consistent with the high-quality agricultural development of Heilongjiang, which includes five dimensions of product quality, green development, production efficiency, economic efficiency and policy support, and 17 specific indicators. The evaluation index system.①Product quality. The quantity of green food, green food processing enterprises, the proportion of green product production and the proportion of standardised production of green food raw materials are used to measure four aspects.② Green development is mainly characterised by 4 aspects: fertiliser application intensity, agricultural film use intensity, effective irrigation coefficient and pesticide use intensity. ③ Production efficiency. Agricultural labour productivity, grain yield and the level of agricultural mechanisation are characterised by 3 aspects.④Economic efficiency is mainly characterised by 4 aspects: the ratio of urban and rural residents' income, the proportion of the output value of agriculture, forestry, animal husbandry and fishery, the per capita net income of rural residents and the Engel coefficient of rural households.⑤Policy support is characterised by the level of financial protection and the level of agricultural insurance.

3.2 Research Methodology

This paper uses entropy to assign values to indicators with the help of existing research results (Huang Xiujie et al.[20]). The specific calculation steps are as follows:

Step 1: Normalisation of the raw data. The method is:

Positive indicator: $A_i = (X_i - \min(X_i))/(\max(X_i) - \min(X_i))$ +0.0001 (1)

Negative indicators: $A_i = (\max(X_i) - X_i)/(\max(X_i) - \min(X_i))$ +0.0001 (2)

In equations (1) and (2), $thea_{ij}$ denotes the firsti district of thej the original value of the

indicator.x_{ij} is thei is the standardised value of the j To avoid negative values or zeroes when quantifying without an outline, 0.0001 is added to the equation as a whole. Step 2: Normalize the data $y_{ij} \Big/ \sum_{i=1}^{m} y_{ij}$ (3).

Finally, calculate the indicator x_j of the entropy value e_j and the coefficient of variation d_j.

$e_i = -\frac{1}{\ln m}\sum_{i=1}^{m} p_{ij} \ln p_{ij}$ (4). $d_j = 1 - e_j$, it is known that the entropy valuee_j The smaller the entropy value, the greater the coefficient of variation between indicators d_j is greater, the more important the indicator is. Further calculation of the indicatorx The weights of the indicators: $w_j = d_{ij} \Big/ \sum_{j=1}^{n} d_{ij}$ (5).From this, we can obtain a composite score for the evaluation of quality agricultural development: $s_i = \sum_{j=1}^{n} w_j * p_{ij}$ (6).

4. Analysis of evaluation results

The data used in this paper were obtained from the Heilongjiang Statistical Yearbook and the Heilongjiang Rural Statistical Yearbook for the years 2016-2020. The evaluation index of the first-level indicators of high-quality agricultural development in Heilongjiang Province from 2015-2019 can be derived from the formula on the above calculation, as shown in Table 1.

Table 1 Comprehensive evaluation index of high-quality agricultural development in Heilongjiang Province, 2015-2019

	Product quality	Green	Production efficiency	Economic benefits	Policy Support	Overall score
2015	0.005395	0.00122	0.046177	0.002822	0.000003	0.055618
2016	0.02922	0.015925	0.013255	0.016512	0.010306	0.085218
2017	0.023377	0.027356	0.032934	0.063479	0.017365	0.164512
2018	0.056656	0.082434	0.058217	0.074069	0.02538	0.296756
2019	0.062949	0.185707	0.02376	0.092036	0.033443	0.397896

Based on the results calculated in Table 2, further analysis of the characteristics of the changes in the indexes of the first-tier indicators of high-quality agricultural development in Heilongjiang Province from 2015 to 2019 shows that the index of green agricultural development is the highest, followed by the index of economic efficiency and product quality, and the index of policy support and production efficiency is the lowest.

Analysis of the Agricultural Product Quality Index. During the time period selected for the study, the overall image showed a trend of increasing, then decreasing and then increasing again, and after a decline in 2016, it basically maintained an upward trend. This is mainly due to the fact that in the past five years, the government has actively put forward the slogan of "quality in agriculture", from the cultivation base of agricultural products to the market of agricultural products at all levels, to raise to a new level; agricultural green development index analysis. The Green Development Index of agricultural quality development in Heilongjiang Province has been rising and then declining for a short period of time before continuing to rise. This result not only shows that in the last five years Heilongjiang Province is continuously improving the production volume, production area and production level of green food, but also can prove the fact that the qualification rate of Heilongjiang Province's agricultural products has been maintained above 99% and therefore the quality and brand influence of agricultural products ranked first in the country; Analysis of the agricultural production

efficiency index. The changes in the industrial productivity index for the high-quality development of agriculture in Heilongjiang Province show an overall fluctuating downward trend. This is because in recent years, due to the outflow of population and migrant workers, most of the farmers engaged in agricultural production in Heilongjiang Province are old, weak and disabled, and the level of agricultural labour in all aspects is low and cannot meet the needs of industrial development; Analysis of the agricultural economic efficiency index. The economic efficiency index has been increasing year after year, showing a linear upward trend, which indicates that farmers in Heilongjiang Province have various ways to improve their income and the rural economy has been better developed; analysis of the policy support index. Although the policy support index is not high, it shows a straight upward trend, which can prove that the Heilongjiang provincial government's investment in agriculture is not very strong, but precise and effective.

5. Conclusion and suggestions for countermeasures

This paper constructs a set of indicator system including 5 dimensions and 17 specific indicators, and uses the entropy weighting method to calculate the weights of the criterion layer to analyse the vertical and horizontal evaluation of the level of high-quality development of agriculture in Heilongjiang Province, and the results show that: in terms of the comprehensive evaluation score, the comprehensive score of high-quality development of agriculture in Heilongjiang increased from 2015 (0.055618) to 2019 (0.397896) by 7 times. We know that the level of Heilongjiang's high-quality agricultural development has been continuously improved, and the trend of high-quality agricultural development is good. From the characteristics of the changes in the indexes of the primary indicators, the index of agricultural product quality then declines and then continuously rises; the changes in the index of green development of the exhibition first continuously rises and then experiences a brief decline before continuing to continuously rise; the changes in the index of industrial production efficiency show an overall fluctuating downward trend; the index of economic efficiency shows a linear upward trend; the index of agricultural economic efficiency roughly maintains a fluctuating upward trend; the policy The policy support index shows a straight-line upward trend. Based on this, this paper makes the following recommendations: Firstly, to improve the output potential of land and the productivity of labour. Secondly, we should insist on producing high-quality and green agricultural products, and further improve the standardisation of production processes and the quality of agricultural products supplied. Third, improve the management and supervision mechanism of investment funds, pay attention to the post-use performance evaluation of financial support for agriculture, and improve the efficiency of the use of funds.

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