DEVELOPMENT EFFICIENCY OF LEISURE AGRICULTURE BASED ON DEA MODEL IN THE BACKGROUND OF RURAL REVITALIZATION

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Development Efficiency of Leisure Agriculture Based on DEA Model in the Background of Rural Revitalization

Changjiang TAO[1]

Abstract

The rural revitalization strategy has injected vitality into the reform of the supply side of agriculture. In addition, leisure agriculture is the focus of rural supply-side reform. In order to break through the stalemate in agricultural development, Chinese leisure agriculture has gradually sprouted at the end of the last century. Nowadays, leisure agriculture, as a direction of agricultural modernization with Chinese characteristics, has important significance for the development of agricultural industrialization, the rise of agricultural economy, and the development of urban integration. First, we briefly introduce the relevant theories of leisure and sightseeing agriculture. Then we elaborated on the situation of rural revitalization and leisure agriculture development. This paper studies the current situation of leisure and sightseeing agriculture in Anhui Province through Data Envelopment Analysis (DEA). We evaluated the efficiency of leisure agriculture in Anhui Province. On this basis, we analyzed its current status and existing problems. We have put forward some suggestions, which have certain guiding significance for the improvement of leisure agriculture efficiency in Anhui Province. The research results show that the production level and development scale of leisure agriculture in Anhui Province are not optimal. Due to different production technology levels and resource endowments, there is a certain gap in the development of leisure agriculture between different regions in Anhui Province. These gaps are mainly reflected in the difference in pure technical efficiency. Therefore, we propose to reduce the scale of leisure agriculture development and carry out concentrated resource development. We suggest strengthening the construction of soft and hard facilities on the basis of reasonable planning. We believe that we can make full use of information technology to innovate agricultural development models to promote the development of leisure agriculture in Anhui Province.

Keywords: rural revitalization, DEA, Anhui Province, leisure agriculture, development efficiency, social economy, social development.

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Introduction

Since the reform and opening up, Chinese economic construction has developed rapidly, the income level of urban and rural residents has increased remarkably, and national consumption has shown a trend of diversification and upgrading. Consumer demand such as tourism, leisure and sightseeing has become fashionable. Traditional agriculture can no longer meet the diverse consumption needs of people, so leisure and sightseeing agriculture came into being. After working for a week, urban residents go to the countryside around the city to experience leisure agriculture in order to release the pressure of work or life. Under the background of the new normal of Chinese socialist economy, the development of agriculture has also entered a stage of transformation and upgrading (Adele, et al., 2015). Leisure agriculture began to flourish in Europe in the 19th century. At the end of the 20th century, leisure agriculture in China began to flourish. Various forms of leisure agriculture projects such as farmhouses, leisure farms, and leisure agricultural parks are everywhere. Leisure agriculture has greatly helped to solve the rural surplus labor and the upgrading of agriculture. The government has provided financial and policy support for the development of recreational agriculture. The development of leisure agriculture has driven the healthy development of agriculture, which helps us solve the problems of agriculture, rural areas and farmers (Thomas, & Bromley, 2017). The party and the state attach great importance to the development of leisure and sightseeing agriculture. On March 17, 2016, the Outline of the Thirteenth Five-Year Plan for National Economic and Social Development of the People's Republic of China (hereinafter referred to as the "Outline") was officially released (Tian, et al., 2016). The "Outline" pointed out that in order to promote the integration of rural one, two, and three industries and expand the multiple functions of agriculture, we must promote the deep integration of agriculture, tourism and leisure, education and culture, and health and wellness (Carboni, & Russu, 2015). We must develop new formats such as sightseeing agriculture, experience agriculture, and creative agriculture. We must accelerate the development of urban modern agriculture, activate rural factor resources, and increase farmers' property income.

Anhui Province is located in the Pan-Yangtze River Economic Zone. It is connected to the Nanjing metropolitan area in the east and the Wuhan urban agglomeration in the west. The location advantage is remarkable. At the same time, Anhui has a variety of topography and cultural heritage. Anhui has many national 5A scenic spots and national nature reserves (Littke, et al., 2016). The superior location environment and strong culture laid the foundation for local leisure agriculture and rural tourism projects. The demand for leisure and holiday of urban residents with high surrounding height is huge consumption potential and broad market prospects. By the first half of 2019, the province's leisure agriculture and rural tourism operators had reached 16,072, and the industry employed 602,800 people, including 481,800 farmers, accounting for 80.26%. With the

government's emphasis on tourism product development and huge investment, the economic environment for the growth of leisure agriculture and rural tourism in the province is improving. The boosting effect on the tourism industry upgrade has been very significant, and the high employment elasticity has become a realistic path for farmers to increase their income and complete labor reproduction without leaving their hometown. However, due to different resource endowment conditions in different regions, there are also differences in the development level and development efficiency of leisure and sightseeing agriculture (Hein, 2016). In order to find gaps and problems to better promote the development of leisure and sightseeing agriculture, it is necessary to objectively evaluate the development efficiency of regional leisure and sightseeing agriculture. Based on this, this paper selects the leisure agriculture areas in Anhui Province as the research object, and uses the data envelopment analysis (DEA) method to evaluate the leisure and sightseeing agriculture efficiency in Anhui Province. We propose amendments to the status quo and existing problems, which has certain guiding significance for the improvement of leisure and tourism agriculture efficiency in Anhui Province.

Literature Review

With the acceleration of urbanization, urban development has brought about the deterioration of urban environment. Noise pollution and air pollution have made people pursue an ecological and natural living environment. This demand has promoted the rapid development of leisure agriculture. The development of leisure agriculture abroad mainly focuses on subject research, object research and intermediary research. Through research and development, Ying, & Fang (2018) found that the attitudes of aborigines in leisure agriculture areas are extreme, and this attitude also affects the participation of indigenous peoples in leisure agriculture. Kawashima (2016) studied the impact of leisure agriculture development on the natural environment culture of rural areas. Bowern (2016) believes that leisure agriculture not only benefits the protection of the natural environment, but also improves the living standards of the aborigines. Larsen and Fondahl (2015) proposes to develop recreational agriculture, and long-term financial and technical support from the government is essential. The development of domestic leisure agriculture can be summarized from two aspects of marketing and development types. In the study of the benefit sharing of rural residents in the development of rural tourism, Sterchele, & Saint-Blancat (2015) explored that leisure agriculture should draw on the development model of urban and rural tourism integration. While paying attention to the scale of leisure agriculture development, the government pays more attention to the connotation and quality of leisure agriculture development. Only by balancing the interests of rural residents, operators, governments, etc., leisure agriculture will develop better. Forga, & Gemma (2015) proposed that leisure agriculture can be divided into two categories:

natural resources and human resources. In the research, Johnson & Ali (2016) pointed out that the leisure agriculture business model can be divided into three modes: the business model with the owner's self-management as the main body, the business model with the enterprise development as the main body, and the government-led business model. Qu, Qu, & Chen (2016) found very few results by searching for the keyword "leisure agriculture efficiency" in HowNet. Only three of them use DEA to analyze the efficiency of leisure agriculture. In recent years, agricultural reforms have been continuously submitted to the national development process. The issue of agriculture, rural areas and farmers is urgently needed to be solved through industrial transformation. Therefore, the use of DEA to study the efficiency of leisure agriculture is very meaningful.

Research Design

Data Source

The rural revitalization strategy is not only an important opportunity to develop rural productivity, but also an important measure to promote agricultural mechanization and modernization. The specific details of rural revitalization are shown in the *Figure 1*. Under the background of rural revitalization strategy, agricultural economic development also faces important opportunities. The optimization of industrial structure and the improvement of farmers' comprehensive quality have promoted the development of agricultural modernization. Since the reform and opening up in 1978, Chinese economy has developed rapidly. China has become the second largest economy in the world after the United States. The level of urbanization is compatible with the level of economic development. Chinese urban population has already accounted for a large proportion. However, nearly half of the people will still live in the countryside in the future, which determines that the country is still an important social space. General Secretary Xi Jinping proposed that agricultural modernization and new rural construction should be developed in parallel to complement each other (Parker, 2017; Mattson, 2015). The fundamental measure to promote urban-rural integration is to eliminate urban and rural barriers. The "Central No. 1 Document" has repeatedly focused on the issue of agriculture, rural areas and farmers. Building a new socialist countryside with Chinese characteristics is the goal of our rural reform. The fundamental measure for beautiful rural construction is to promote the sustainable development of the rural economy. We must not only pay attention to rural environmental protection, but also focus on improving rural soft power. In 2018, the No. 1 Document of the Central Government clearly pointed out that it is necessary to adhere to the priority development of agriculture and rural areas.
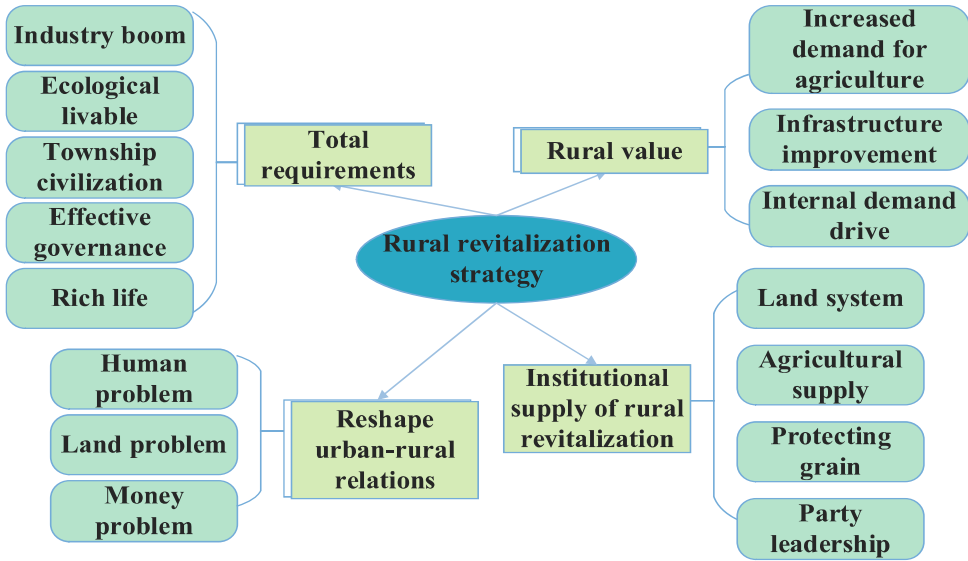
Figure 1. Details of rural revitalization

Against the background of government guidance and active participation of farmers, Chinese rural areas will have a beautiful vision of strong agriculture, rural beauty and peasant wealth. In the report of the 19th National Congress, the issue of "agriculture, rural areas and farmers" is a fundamental issue concerning the national economy and the people's livelihood (Cuevas, et al., 2015). On this basis, the "implementation strategy for rural revitalization" was put forward. The rural revitalization strategy is a major historical task for decisively building a well-off society and a socialist modernized country. Today, with the rapid development of information, the combination of information technology and all walks of life provides opportunities for the development of many industries.

Leisure agriculture is a modern multi-purpose agriculture. It combines natural environmental resources and agricultural management activities to enhance the agricultural management activities of the people's experience of the countryside. It is an important way to develop modern "two-type" agriculture (resource-saving and environmentally friendly). In recent years, with the development of the economy and the improvement of the income level of residents, the content of leisure agriculture activities has become increasingly rich, and the management methods are constantly innovating and improving. In the process of development, there are also problems such as low level of development, unreasonable planning, and serious homogenization (Al-Ansari, et al., 2016). At the same time, they also face impacts and constraints on land, resources, environment, scale and

technology. This makes leisure agriculture have six characteristics, which we are now promoting (*Figure 2*).
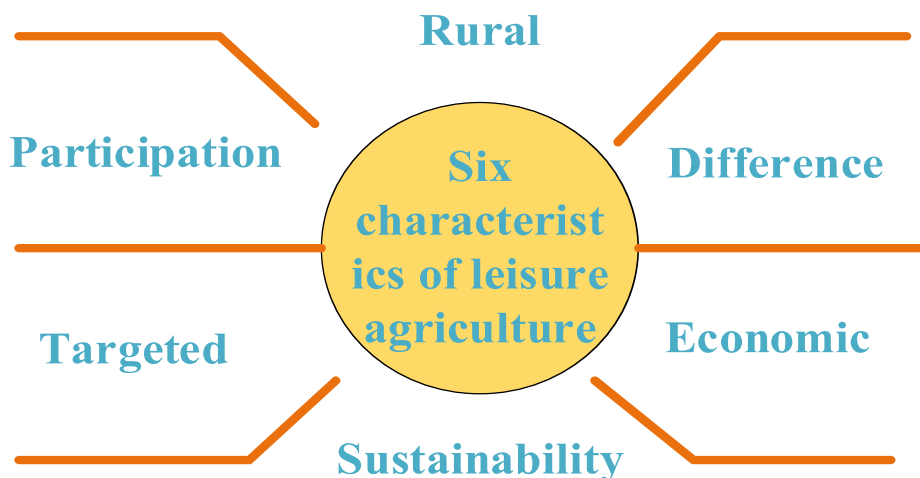

Figure 2. Six characteristics of leisure agriculture

Therefore, the development efficiency of scientific research and leisure agriculture has important practical guiding significance for promoting the healthy development of leisure agriculture industry. Chinese leisure agriculture started late and is still in the initial stage of development. There are still few evaluations and empirical studies on leisure agriculture efficiency. Different scholars have different evaluation methods and it is difficult to unify the evaluation criteria. We mainly use expert consultation, analytic hierarchy process, fuzzy evaluation method, etc. The weight of these evaluation methods has human factors and the results are subjective (Ose *et al*., 2015). This paper uses the DEA data envelopment analysis method. It is based entirely on objective information on the indicator data, which eliminates the effects of human error. This method can effectively solve the complex problem of multi-indicator interaction in leisure agriculture. It can objectively compare and analyze the development of leisure agriculture in different business modes in different regions, which has important theoretical and practical guidance value. In recent years, Anhui Province has taken leisure agriculture as an important starting point for implementing the rural revitalization strategy and promoting the prosperity of rural industries. At present, the province has established 14 national demonstration villages for leisure agriculture and rural tourism, 22 beautiful leisure villages in China, 4 important agricultural cultural heritages in China, and 10 five-star leisure agriculture and rural tourism parks. It is reported that there are currently more than 1.39 million people in leisure agriculture

and rural tourism in Anhui Province (Mariotti, et al., 2017). Leisure agriculture has driven the employment of farmers to nearly 1.2 million. Therefore, based on the data of Anhui leisure agriculture (in *Table 1*), this paper uses DEA evaluation method to study the development efficiency of leisure agriculture. Based on this, we put forward reasonable suggestions to promote the development of leisure agriculture. The table below shows the leisure agriculture places that we have chosen to operate in Anhui.

Table 1. Selected areas of Anhui Province for the development of leisure agriculture

City	District	Name
Hefei City	Changfeng County	Anhui Shuoran Ecological Manor
Huaibei City	Duji District	Shuanglou Village, Gaoyue Street
Quzhou City	Guoyang County	Anhui "Fang Xinyuan" Ecological Agriculture
Suzhou City	Lingbi County	Modern Agriculture Expo Park
Bengbu	Wuhe County	Guldong pear garden
Fuyang City	Linquan County	Muyi Expo Park
Quzhou City	Quanjiao County	Longshan Ecological Park
	Fengyang County	Jiutian Ecological Park
Lu'an City	Shucheng County	Tengxiang Ecological Park
Wuhu City	Wuwei County	Xianggu Ecological Park
Huangshan City	Qimen County	Sky Red Manor

Evaluation and Measurement

The DEA data envelopment analysis method was proposed by A. Charnes, W. W. Cooper and E. Rhodes of the University of Texas. It is a model method for evaluating the relative effectiveness of production in a unit. The DEA model does not combine simple data. When evaluating the efficiency of a decision unit, it no longer needs to perform a dimensional calculation of the original data. For an invalid decision unit with a relative efficiency value less than 1, we can calculate the difference between the ineffective unit and the production effective frontier surface by using the dual theory method. The distance between the differences is the adjustment space of the decision unit. This allows the decision unit to achieve optimal production efficiency by adjusting the configuration of the production inputs. The traditional DEA model is divided into CCR model and BCC model. The CCR model was obtained from Charnes, Cooper and Rhodes (Moll, 2015).

The BCC model was obtained from Banker and Charnes. The CCR model assumes that the production process is a fixed-scale gain. It satisfies the conditions for increasing or decreasing the ratio of output to input. But it does not take into account the increase or decrease in the scale of returns. The BCC model takes into account the changes in the compensation of the evaluation unit. Taking the input model as an example, we expressed the dual problem of the CCR model and the BCC model as follows.

CCR:

$$\min \theta$$

$$s.t \sum_{j=1}^{n} x_j \lambda_j + s^- = \theta X_{j0}$$

$$\sum_{j=1}^{n} Y_j \lambda_j - s^+ = Y_{j0}$$

$$\lambda_j \geq 0, s^+ \geq 0, s^- \geq 0, j = 1,2,\Lambda\ ,n \tag{1}$$

BBC:

$$\min \delta$$

$$s.t \sum_{j=1}^{n} x_j \lambda_j + s^- = \delta X_{j0}$$

$$\sum_{j=1}^{n} Y_j \lambda_j - s^+ = Y_{j0}$$

$$\sum_{j=1}^{n} \lambda_j = 1$$

$$\lambda_j \geq 0, s^+ \geq 0, s^- \geq 0,\ j = 1,2,\Lambda\ ,n \tag{2}$$

Based on the principle of comprehensiveness, independence and orientation, this paper provides a preliminary basis for the selection of input and output indicators of this paper by consulting the relevant literature of the evaluation index system of leisure agriculture. We use DEA to evaluate the performance of the industry. The input and output items selected must have the same relationship. Therefore, this study uses the Pearson correlation coefficient to observe the relevant situation of input and output items. This research is mainly based on the research of domestic and foreign scholars on the evaluation index system of leisure agriculture. We screen and modify it based on the actual situation. According to Table 1, the selection of evaluation indicators mainly refers to the relevant literature on the evaluation index system of leisure agriculture. The final summary is shown in *Figure 3*.
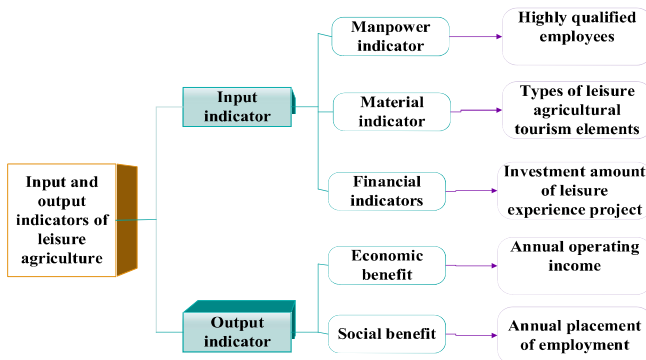

Figure 3. Input and output indicators of leisure agriculture

Table 2 shows the results of Pearson correlation analysis of input and output factors. We can see from the table that the input of talent indicators, the income of the output indicators and the number of employed people are positively correlated at a significant level of 0.01. Their correlation is 0.719 and 763 respectively. There is a positive correlation between input and income at a significant level, with a correlation of 0.601. It is positively correlated with the number of employed people at a significant level of 0.01, with a correlation of 687. The income and employment figures of financial input and output indicators are positively correlated at the significant level of 05. Their correlation is 554 and 0.5 respectively. The above analysis fully demonstrates that the input and output indicators have the same relationship. At the same time, this also reflects the rationality of the selection of indicators.

Table 2. Correlation between input and output factors

			Output indicator		Input indicator		
			Substitute	Number of people employed	Talent investment	Material input	Financial investment
Output indicator	Substitute	Pearson relevance	1	.478	.719	.601	.554
		Significant (bilateral)		.098	.006	.030	.049
		N	13	13	13	13	13
	Number of people employed	Pearson relevance	.478	1	.763	.687	.595
		Significant (bilateral)	.098		.002	.010	.032
		N	13	13	13	13	13

Input indicator	Talent investment	Pearson relevance	.719	.763	1	.715	.520
		Significant (bilateral)	.006	.002		.006	.068
		N	13	13	13	13	13
	Material input	Pearson relevance	.601	.687	.715	1	.120
		Significant (bilateral)	.030	.010	.006		.697
		N	13	13	13	13	13
	Financial investment	Pearson relevance	.554	.595	.520	.120	1
		Significant (bilateral)	.049	.032	.068	.697	
		N	13	13	13	13	13

Significantly correlated at the 0.01 level (both sides)
Significantly correlated at the 0.05 level (both sides)

Through the research on the existing literature, we find that the input indicators used in the evaluation of leisure and sightseeing agriculture are mainly human resources, capital and technical equipment. They specifically include the number of employees, floor space, and investment in agricultural machinery. Based on the existing literature, this paper determines the following input indicators according to the specific research objectives: total number of employees, floor space, and total power of agricultural machinery. The total power of agricultural machinery can reflect the level of industry development and affect the efficiency of the industry (Jung, & Shin, 2016). In the existing literature, the main output indicators are total output value, annual operating income, and per capita income of employees. Because the total output value and annual business income cannot accurately reflect the development of leisure and sightseeing agriculture in various places in Anhui Province, this paper selects the per capita income of employees as the output index. The per capita income of employees is a good indicator to evaluate the development level of tourism agriculture in different places. According to the development status of leisure and sightseeing agriculture in Anhui Province, we use data from 10 places for analysis. The data comes from the Anhui Statistical Yearbook and field research. The data contains a comprehensive scale and has certain reference value. Based on the above analysis, the input-output indicator system is determined as shown in *Table 3*.

Table 3. Input-output system

Indicator type	Indicator code	Indicator name	Indicator description
Input	X1	Total number of employees	Reflect the size of the labor input
	X2	Floor area	Reflect the size of the investment in the land
	X3	Total power of agricultural machinery	Reflect the level of money input elements
Output	X4	Per capita income of employees	Measuring the output level of tourism agriculture

In this paper, we have learned about the Anhui Agricultural Statistical Yearbook, and the output indicators data are shown in *Table 4*.

Table 4. Data Table of Input and Output Indicators of Leisure Tourism Agriculture in Anhui Province

No	Place name	Per capita income of employees(yuan)	Total number of employees	Floor area(ha)	Total power of agricultural machinery(kw)
1	Changfeng County	15320	2820	869	8054
2	Duji District	14255	2561	666	6189
3	Guoyang County	14484	2315	870	662
4	Lingbi County	12876	1465	422	3996
5	Wuhe County	14156	2346	552	5634
6	Linquan County	13698	1367	267	2297
7	Quanjiao County	14216	1233	216	2356
8	Fengyang County	14306	2417	476	4977
9	Shucheng County	13634	1151	316	3001
10	Wuwei County	15245	2756	855	7866

This paper uses DEAP2.1 software to calculate the data, and uses the input-oriented VRS model to directly obtain the comprehensive efficiency, pure technical efficiency and scale efficiency of each sightseeing agricultural enterprise.

We bring the data from the above table into the DEA model and get the following formula:

$$\text{s.}t\begin{cases} 2820x_1 + 2561x_2 + \cdots + 2756x_0 \leq 2820\theta \\ 869x_1 + 666x_2 + \cdots + 2756x_0 \leq 2820\theta \\ 0.8054x_1 + 0.6189x_2 + \cdots + 0.7866x_0 \leq 0.8054\theta \\ 15320x_1 + 14255x_2 + \cdots + 15245y_0 \leq 15320 \end{cases}$$

The calculation is consistent with the above model, and the calculation results of all the sightseeing agricultural land involved are shown in *Table 5*.

Table 5. Data Sheet of Anhui Leisure Agriculture Income and Output Indicators

Serial number	Area name	Comprehensive efficiency	Pure technical efficiency	Scale efficiency	Scale income stage
1	Changfeng County	0.459	1	0.459	Decrement
2	Duji District	0.473	0.503	0.94	Decrement
3	Guoyang County	0.528	0.699	0.756	Decrement
4	Lingbi County	0.742	0.786	0.944	Increment
5	Wuhe County	0.515	0.522	0.986	Decrement
6	Linquan County	0.988	1	0.988	Increment
7	Quanjiao County	1	1	1	Constant
8	Fengyang County	0.51	0.567	0.901	Decrement
9	Shucheng County	1	1	1	Constant
10	Wuwei County	0.467	0.984	0.475	Decrement
	Average	0.668	0.806	0.845	

Table 6 shows the specific values of comprehensive efficiency, pure technical efficiency and scale efficiency of sightseeing agriculture in various places in Anhui Province. The average overall efficiency is 0.668, the average pure technical efficiency is 0.806, and the average scale efficiency is 0.845. If the comprehensive technical efficiency=1, it indicates that the model is on the effective production frontier surface, and the technology is effective. The production mode and structure of the model are reasonable and reach the optimal state. If the comprehensive technical efficiency is <1, it indicates that the model has not yet reached the effective production frontier, the technology is invalid, and the model needs to be improved and adjusted. Actual comprehensive technical efficiency = pure technical efficiency $\times$ scale efficiency. The overall efficiency is determined by the product of pure technical efficiency and scale efficiency. It can be seen from Table 6 that the average efficiency of tourism agriculture in various cities and counties in Anhui Province is 0.668, indicating that the overall efficiency of tourism agriculture is general. The average scale efficiency of cities and towns is 0.845, and the scale efficiency is generally high. Therefore, in order to obtain more output, we must rely on improving technical efficiency. The relatively small scale of leisure and sightseeing agriculture can continue to expand the scale of investment to achieve more output and benefits. The pure technical efficiency equal to 1 indicates that the model achieves the optimal resource allocation efficiency, and the input-output management of the model is reasonable and effective. If the pure technical efficiency is less than 1, it indicates that the model has not yet reached the optimal configuration efficiency. And it is necessary to improve the technical and management level to improve its pure technical efficiency value (Tajima, 2018). The DEA method can not only explain whether a decision unit is in a valid state, but also give a specific improvement strategy. Table 6 gives a reference for the improvement of production factor inputs for non-effective units. Through the DEA software, the specific value of the excess or insufficient output of the non-effective towns in the leisure and sightseeing agriculture in Zhongli County can be calculated. The specific adjustment results are shown in *Table* 6.

Table 6. Slack in input and output of non-effective units

Location name	Output\input project	Original value	Radial adjustment	Relaxation adjustment	Target value
Hefei	Per capita income of employees(yuan)	14255	0.000	0.000	14255.000
	Total number of employees	2561	-1272.000	0.000	1289.000
	Floor area(ha)	666	-330.773	-96.159	239.068
	Total power of agricultural machinery(kw)	6190	-3070.000	-560.000	2560.000
Huaibei	Per capita income of employees(yuan)	14484	0.000	0.000	14484.000
	Total number of employees	2315	-697.000	0.000	1618.000
	Floor area(ha)	870	-261.846	-233.636	374.518
	Total power of agricultural machinery(kw)	6660	-2010.000	-920.000	3740.000
Bengbu	Per capita income of employees(yuan)	12876	0.000	758.000	13634.000
	Total number of employees	1465	-314.000	0.000	1151.000
	Floor area(ha)	422	-90.449	-15.551	316.000
	Total power of agricultural machinery(kw)	4000	-860.000	-140.000	3000.000
Fuyang	Per capita income of employees(yuan)	14516	0.000	0.000	14516.000
	Total number of employees	2346	-1121.000	0.000	1225.000
	Floor area(ha)	552	-263.871	-61.819	226.310
	Total power of agricultural machinery(kw)	5630	-2690.000	-520.000	2420.000

Suzhou	Per capita income of employees(yuan)	14306	0.000	0.000	14306.000
	Total number of employees	2417	-1047.000	-7.000	1363.000
	Floor area(ha)	476	-206.246	-0.520	269.234
	Total power of agricultural machinery(kw)	4980	-2160.000	0.000	2820.000
Huangshan	Per capita income of employees(yuan)	15245	0.000	0.000	15245.000
	Total number of employees	2756	-44.000	0.000	2712.000
	Floor area(ha)	855	-13.592	-16.769	824.639
	Total power of agricultural machinery(kw)	7870	-130.000	-70.000	7670.000

Among the six non-effective decision-making units, Hefei's pure technical efficiency reached 0.984, which is the highest among all non-effective units. This shows that Hefei City has a better structure in the investment of leisure and sightseeing agriculture. The pure technical efficiency of Huaibei, Fuyang and Suzhou is low. There is a large amount of redundancy in the total number of employees, the floor area and the total input of agricultural machinery, which results in a large waste of input factors.

Discussion

This paper uses the DEA method to empirically analyze the production efficiency of leisure and sightseeing agriculture in Anhui. The analysis results show that: overall, the comprehensive efficiency of leisure and sightseeing agricultural production in Anhui is 0.668, the pure technical efficiency is 0.806, and the scale efficiency is 0.845. This shows that the production level and development scale of leisure and sightseeing agriculture in Anhui Province are not optimal, and there is still room for improvement. Due to the level of production technology, there is a certain gap in the development of leisure and sightseeing agriculture between different regions of Anhui Province, which is mainly reflected in the difference in pure technical efficiency. Due to the different scales of leisure and sightseeing agricultural production in various cities, the scale of leisure and sightseeing agriculture in different towns is also different. The scale returns of most cities

show a decreasing state, which indicates that the development of leisure and sightseeing agriculture in most cities and counties in Anhui Province is large. Correspondingly, we need to reduce the scale of investment so that resources can be used more efficiently. Through the analysis of the non-effective units, it can be seen that among the three input indicators, the redundancy of the floor space is the largest. Anhui Province should focus on reducing the production area of leisure and sightseeing agriculture, thereby improving technical efficiency. In terms of the factors affecting efficiency, there are two main factors that have a large impact, namely geographical location and technical level. Leisure and sightseeing agriculture is a combination of traditional agriculture and modern service industry. The crops are mainly based on fruits and vegetables of economic crops. This technical level is higher than that of traditional food crops. Due to different natural environments, some areas are suitable for growing economic crops, while others are not suitable for planting. For different regions, the factor resources used to grow the same cash crops are different. Areas that are not suitable for growing cash crops consume more manpower and material resources, which has a great impact on the productivity of leisure and sightseeing agriculture. In the sale of crops, "Internet + leisure agriculture" is a new consumption trend that meets the needs of the current market economy. Infrastructure is the basic premise for the development of leisure agriculture. Traditional transportation facilities, health conditions and other infrastructure will have a greater impact on the quality of tourism services. Modern information technology, information platform and other infrastructure directly affect the development of leisure agriculture. Therefore, government departments should strengthen their attention, improve infrastructure and promote the safeguard system. Under the background of "Internet +", e-commerce enterprises play an important role in the development of regional leisure agriculture, which can provide a platform for regional leisure agriculture development, cultivate talents, and lead regional leisure agriculture development.

Conclusion

In order to promote the development of agricultural economy, increase the income of farmers, and improve the living standards of farmers, we should comply with the requirements of the rural revitalization strategy and take targeted countermeasures against the existing deficiencies. We must attach importance to the promotion and application of new agricultural production technologies, promote the process of agricultural mechanization and modernization, improve the overall quality of farmers, and strengthen rural environmental protection. Starting from various aspects, we will promote the healthy and sustainable development of the agricultural economy, thereby effectively improving the level of modernization of agricultural production and the quality of life of farmers. Leisure agriculture is a major measure for rural supply-side reform. As a fusion product that adapts

to the development of the times, leisure and sightseeing agriculture has a rapid development speed and a broad development space. Based on the input-oriented DEA model, this paper analyzes the allocation efficiency of leisure agriculture information resources in Anhui Province in 2018. We have comprehensively evaluated the efficiency level of each city from the three levels of comprehensive efficiency, pure technical efficiency and scale efficiency. For the cities where the overall efficiency reaches the frontier of production, the efficiency is sorted by the super-efficiency DEA model. This provides a reference for the local cities to objectively understand and accurately evaluate their own resource allocation efficiency. At the same time, we use the redundancy analysis of slack variables to point out the relative advantages of cities. This will help localities to improve their input and output levels in a targeted manner in order to improve the allocation of agricultural information resources. For the local cities where the comprehensive efficiency does not reach the production frontier, the redundant analysis of the slack variables can provide a reference for further improvement of the efficiency of the region, which has strong practical significance. This paper is based on DEA's research on the efficiency evaluation of leisure and sightseeing agriculture in Anhui Province, involving many aspects of theory and methods. Due to the limitations of personal knowledge level and research ability, there are still some problems in this paper that are not sufficiently deep. For example, the research on leisure and tourism agriculture theory is not comprehensive and in-depth, especially for theoretical research abroad. More indicators can be selected for analysis in the selection of indicators for DEA efficiency evaluation. In the context of big data, we have not fully considered the dynamic role of information technology in rural economic development. Internet technology can explore new agricultural development models through land custody. It can promote the transformation and upgrading of rural consumption. The formation of a new model of rural supply chain can help us modernize the agricultural economy. These shortcomings required to accumulate and improve in practical applications in the future.

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