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Analysis of Factors Influencing the Development Effect of Characteristic Agriculture in Henan Province

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Abstract Based on 303 questionnaires of farmers in different types of areas of Henan Province, we analyze the impact of various factors (different types of areas, types of characteristic agriculture, sales of characteristic agricultural products, risk management of characteristic agricultural products, science and technology reliance, and improvement in farmers' life) on the development of characteristic agriculture in Henan Province, using Logistic model. The results show that improving farmers' living standards, expanding the sales channels, increasing scientific and technological input and perfecting risk management mechanism of agricultural products, is of great significance to promoting farmers' satisfaction, and improving the development effect of characteristic agriculture. Finally, the relevant policy recommendations are put forth for the development of characteristic agriculture: increasing the government support; relying on scientific and technological progress to improve the quality of characteristic agricultural products; cultivating and improving the market system; perfecting risk management system.

Key words Characteristic agriculture, Satisfaction, Logistic model, Influencing factors

The development of characteristic agriculture is an important way to adjust the agricultural structure and increase farmers' income, and the best choice to give play to the advantages of resources, products and markets^[1]. Chinese scholars' studies on characteristic agriculture started in the 1980s, and the research focus was primarily on the concept and characteristics of characteristic agriculture, the significance of development, and the development experience and countermeasures in various regions. Characteristic agriculture, relative to conventional agriculture, is the agricultural industry, on the basis of unique resource conditions in specific areas, with distinct regional characteristics and special product quality. There are many factors affecting the development of characteristic agriculture, such as the endowment of natural resources, farmers' education level, degree of industrialization of agriculture, agricultural technology and agricultural machinery equipment, development model, government support, and the development of characteristic agriculture enterprises. Based on local agricultural natural resources, product variety, infrastructure advantages and industrialization, the development of characteristic agriculture needs to strengthen planning layout, integration of resources, and management, so as to form certain characteristics and large scale of production and operation^[2]. At the same time, characteristic agriculture, based on the market demand, aims to pursue the best benefits (*i. e.*, the greatest economic benefits and the optimal ecological benefits, social benefits) and improve the market competitiveness of products, with a certain particular production object or a certain production purpose as the goal, to form non-equilibrium agricultural production system with moderate scale, prominent features, good benefits and strong market competitiveness of products^[3].

Characteristic agriculture, a systematic production project, is the market agriculture with industrialization operation as characteristics, the high-efficiency agriculture with quality and efficiency as standards, and the fine agriculture highlighting the brand effect. It not only includes the industrial scale, but also includes institutional and organizational innovation^[4]. Based on the analysis of agricultural production factors, characteristic agriculture includes six patterns: characteristic product agriculture, landscape agriculture, location agriculture, engineering agriculture, demonstration agriculture, and circular agriculture. Each development pattern has its own law of development^[5].

Large-scale development and base operation of characteristic agriculture can not be separated from the industrialized operation of agriculture. The development of characteristic resources also touches upon scale issue, and this large-scale development is often achieved through the base operation^[6]. The scale agricultural operation in Henan Province is not only restricted by resource endowments, with not much room for growth, but also restricted by the current stage of development and choice of system. From the development prospects, it may eventually take the road of relying on the development of the farmers' cooperatives. Reasonable and healthy development pattern of characteristic agriculture must be the pattern of sustainable development. Product quality, production scale, technology level, production level, market development and farmers' quality are all factors that affect sustainable agricultural development of characteristic agriculture^[7]. To develop characteristic agriculture, it is necessary to strengthen industry choice according to the resource advantages, formulate the industry development plan of characteristic agriculture, and foster industrial base of characteristic agriculture^[8].

By field survey in plain areas, mountainous areas, hilly areas and other different types of areas in Henan Province, we select the following aspects as variables: the terrain where the

farmers' hometown is situated; development type of characteristic agriculture; reliance on science and technology; sales of characteristic agricultural products; risk management; changes in farmers' living standards in the past five years. Using Logistic regression model, we conduct in-depth analysis of factors influencing the development of characteristic agriculture in Henan Province, and put forth the policy recommendations to guide the development of characteristic agriculture in Henan Province.

1 The study area and survey sample

1.1 Overview of the development of characteristic agriculture in Henan Province Henan Province, located in central and eastern China, the middle and lower reaches of the Yellow River, the junction of open coastal areas and western regions, is the intermediate zone of the Chinese economy advancing from east to west. The national strategic plan for promoting the rise of central region more highlights the unique geographical advantage of Henan Province.

In 2010, total grain output in Henan Province reached 54.37 billion kg. Henan Province is now one of six major provinces where the grain is transferred out. Henan Province occupies one sixteenth of China's arable land, and produces more than one tenth of food in China, thus it is a big province of agriculture and a big province of animal husbandry. Through years of development, a large number of characteristic agriculture industries emerge in the province, such as Xinyang tea, Nan-

yang cattle, Zhumadian white sesame, Xinzheng jujube, Lingbao apple, Yanling flower, Qixian garlic, and Yuanyang rice, forming southern Henan duck breeding base, eastern and central Henan pig breeding base, northern Henan chicken breeding base, southwestern Henan cattle breeding base, asparagus and vegetable planting base, with processing meat products, canned food, and frozen vegetables as the goal.

At the same time, a number of more competitive leading processing enterprises of agricultural products have been spawned, such as the leading enterprises of meat products represented by Shuanghui, Huitong, Bangjie and Sitong; the leading enterprises of duck and chicken meat represented by Huaying, Dayong and Yongda; modern export processing enterprises of bee products represented by Jixiang Co., Ltd.; the production enterprises of frozen convenience food represented by Sanquan, Sinian and Kedi; the export processing industry enterprises of spices represented by Lianhua Group. This has played a great role in promoting the market competitiveness of agricultural products in Henan Province.

1.2 Basic information of survey Taking the farmers in the key agricultural counties of Henan Province as the survey and analysis object, we adopt the form of the home interview. The samples involve 350 farmers in 110 counties, districts, 26 cities, Henan Province, with 303 valid questionnaires.

1.2.1 Household characteristics. The characteristics of 303 farmers surveyed can be seen in Table 1.

Table 1 The survey sample characteristics

Item	Property	Number of households	Proportion %
The terrain where the farmers' hometown is situated	Plain	249	82
	Hilly areas	21	7
	Mountainous areas	33	11
Farmers' educational level	Lower education than primary school	15	5
	Primary school	54	18
	Junior high school	148	49
	Senior high school	68	22
	Junior college or higher education	18	6
Sources of household income	Mainly from food crops	136	44
	Mainly from cash crops	29	10
	Mainly from animal husbandry, fishery, and forestry	26	9
	Mainly from working outside the home	79	26
	Mainly from rental income of land	6	2
Markets for agricultural products	Mainly within the city	102	34
	Mainly within the province	62	20
	Mainly across the country	29	10
	Mainly in the foreign countries	3	1
	Self-sufficiency	107	35
The main sales channels for agricultural products	Sales on one's own	221	73
	Sales by relatives, friends, and acquaintances	65	21
	Sales in the market	116	38
	Unified acquisition and sales channels	82	27
	Acquisition by the village collective	42	14
	Unified acquisition and sales by the government	39	14
	Private acquisition and sales	41	18
	Mainly for house construction	22	7
Farmers' land use	Mainly for growing vegetables and fruit trees	25	8
	Contract with others	34	11
	For raising livestock	20	7
	Mainly for growing cash crops	194	64

Table 1 shows that the educational level of major farmers is medium on the whole. The farmers with educational level higher than junior high school account for 76%; the farmers with agricultural income as the main source of income account for 63%; the farmers with non-agricultural income as the main

source of income account for 37%. The marketization proportion of agricultural products is small, and the agricultural products produced by 35% of farmers can only suffice themselves.

1.2.2 Types of characteristic agriculture. Types of characteristic agriculture in the sample area are shown in Table 2.

Table 2 Types of characteristic agriculture in the sample area

Item	Property	Number of households	Proportion %
Types of characteristic agriculture	Characteristic farming	242	80
	Characteristic breeding industry	20	7
	Characteristic forestry	28	9
	Characteristic processing industry	7	2
	Tourism and leisure industry	6	2
	Having two kinds of characteristic agriculture at the same time	38	12.5
Types of region	Natural resources development and utilization-based	184	65
	Enterprise-oriented	36	13
	Market-oriented	47	17
	Technology-led	14	5
	Leading enterprise-driven	32	12
The dominant pattern	Professional large households-driven	49	18
	Cooperative and association support-based	46	17
	Government-led and farmer-participatory	149	53

1.2.3 The development of characteristic agriculture in the sample area. 16% of farmers believe that the construction of characteristic agriculture enterprises or bases affects their life significantly, and their living conditions are improved prominently; 12% of farmers believe that the development of characteristic agriculture enterprises in their hometown has a great impact on their life, making their living conditions deteriorate; 48% of farmers believe that there is an effect, but not obvious; 24% of farmers believe that the development of characteristic agriculture enterprises or bases has no impact on their life quality.

The survey results of human resources recruitment and integrated management in the characteristic enterprises or bases show that 24% of farmers believe that there are flaws in the management mode of the township enterprises, such as nepotism, family management, and poor sanitary conditions of factory; 30% of farmers believe that there are a small number of new management components, but the majority of enterprises still adopt family management mode, with low level of management; 35% of characteristic agriculture enterprises have new management pattern, good appearance of factory, high level of management and corporate culture, and better prospects for development; only 2% of farmers believe that the development trend of characteristic agriculture in their hometown is good, using advanced management methods and having good corporate culture.

As for the reliance of characteristic agriculture on science and technology, 43% of farmers believe that the main projects have neither the scientific and technological personnel, nor the technology support units; 25% of farmers believe that in the agricultural enterprises, there are only a small amount of technical personnel, lacking the technology support units; 23% of farmers believe that the number of scientific and technical personnel can basically meet the demand, the main projects rely on the science and technology units to some extent; only 9% of

farmers believe that the number of scientific and technical personnel and the technology support units are ideal, of which only 3 farmers hold that the characteristic agriculture has scientific and technological advantages.

The survey results of farmers' sales of characteristic agricultural products show that 39% of farmers say that there are no relatively reliable sales areas; 30% of farmers say that there are only a handful of reliable sales areas in the province, but there are no reliable sales areas outside the province. 16% of farmers say that the characteristic agricultural products in their hometown have relatively reliable sales areas inside and outside the province; 10% of farmers say that the characteristic agricultural products have large sales areas outside the province, and 5% of characteristic agricultural products have been exported to other countries. Thus, it can be found that the sales situation of characteristic agricultural products in the province is not so rosy.

As for the brand, 52% of farmers say that their hometown's characteristic agricultural product does not have its own brand; 22% farmers say that their hometown's characteristic agricultural product has had brand, but the actual effect of the brand has not yet been shown; 17% of farmers say that their hometown's characteristic agricultural product has had brand, with high value and strong competitiveness; 6% of farmers say that the brand has high value and strong competitiveness, becoming the basic image of enterprises; only 3% of farmers believe that the brand has high value and strong competitiveness, having brought huge economic interests to the enterprises and regions.

24% of farmers believe that the main project of characteristic agricultural products in their hometown faces great natural and market risks, lacking measures to fight against natural disasters, preventing disease outbreak and protect prices of agricultural products. 20% of farmers say that the natural risk, market risk and price volatility of products are not big, with few

or invalid countermeasures. 27% of farmers believe that they can basically fight against minor natural disasters, and epidemic diseases, but they have no measures to protect the prices of agricultural products. 92 farmers say that they have had the conventional measures to fight against natural disasters and epidemic diseases, and measures to protect the prices of agricultural products, but the measures only cover a small area, accounting for 27%. Only 6 farmers say that they have all-around measures to fight against natural disasters and epidemic diseases, covering a large area, and the measures for protecting agricultural products are effective, accounting for 2%.

1.2.4 Advantages and disadvantages. The survey results of the development of characteristic agriculture in the sample farmers' hometown show that the most principal advantages of characteristic agriculture are concentrated in rich natural resources, convenient transportation and the habit of planting and breeding, accounting for 35%, 20%, 24%, respectively. The advantage needed most is agricultural science and technology factor, accounting for 44%, followed by government support and natural resources, accounting for 16% and 13%, respectively. The survey results show that the greatest constraint is the backward agricultural technology equipment and low level of processing, accounting for 39%, followed by unsound economic cooperative organizations and low farmers' education level, accounting for 19% and 14%, respectively.

2 Analysis of factors influencing the development effect of characteristic agriculture

2.1 Influencing factors and expected influence direction

On the basis of the existing research literature and actual survey of the development of characteristic agriculture in Henan Province, the factors affecting the development effect of characteristic agriculture include the terrain, types of characteristic agriculture, the impact of the development of characteristic agriculture on farmers' life, reliance on agricultural science and technology, sales of characteristic agricultural products, and risk management of characteristic agricultural products.

2.1.1 Terrain. The endowment of regional characteristic resources is the basis for the development of characteristic agriculture, and the premise for the formation of good quality and special needs. Plain, mountainous areas, and hilly areas all have different resource endowments. The agriculture in different types of areas needs to adopt the appropriate agricultural development pattern according to the topographical features. The endowment of various resource factors and the quality of various environmental factors result in the resource differences between regions, which is the root cause of characteristics and potential agricultural comparative advantage. The development and use modes established based on a variety of resources and environmental conditions, determine the development direction and development pattern of agriculture in a sense.

2.1.2 Types of characteristic agriculture. The types of characteristic agriculture in Henan Province are divided into characteristic farming, characteristic breeding industry, characteristic

forestry, characteristic processing industry, leisure and tourism industry. Characteristic farming mainly includes grain, cotton, oil, hemp, silk, tea, sugar, vegetables, fruit, tobacco, drugs, cereals, etc. Characteristic breeding industry includes poultry, livestock, fish, and special animals. Characteristic forestry includes afforestation, forest protection, forest cultivation, deforestation and forest restoration, collection and processing of timber and other forest products, etc. When establishing the model, characteristic forestry, processing industry, leisure and sightseeing industry are listed into other types.

2.1.3 Improvement in farmers' life. Farmers, as the direct participant in agricultural production, play a crucial role in the agricultural development. The educational level of farmers, agricultural production income, and subsidies all affect the changes in the living standards of farmers and satisfaction with characteristic agriculture in farmers' hometown. At the same time, they are highly correlated with the production enthusiasm, thereby constraining the development of characteristic agriculture.

2.1.4 Reliance on agricultural science and technology. Science and technology has become the most active and decisive factor in productivity, and the development of characteristic resources needs the support of technology. Currently, agricultural technology is not advanced, agricultural technology popularization system is imperfect, and the conversion efficiency of technology is not high, which are the obstacles to China's agricultural modernization. Characteristic agriculture is a industry form with high technological content, thus it is necessary to focus on the technological input, take the route of technological innovation, and actively introduce and cultivate new varieties, new technologies, new processes, to improve product quality and create brand effect.

2.1.5 Sales of characteristic agricultural products. Marketing of agricultural products is directly related to agricultural economic benefits. Good sales include having certain production and marketing relationship (most of the products are marketable, basically keeping short in stock); having certain sales force (having sales staff and sales network, with strong ability to sell both inside and outside the province); having certain market areas (having reliable sales areas both inside and outside the province).

2.1.6 Risk management of characteristic agricultural products. Due to the special nature of agricultural production, it is necessary to take some measures to cope with natural and market risks. Good risk management of agricultural products can effectively fight against natural disasters, epidemic diseases. In addition, local governments should adopt effective measures for protecting the prices of agricultural products, and implement the early warning system for characteristic agriculture.

Among 6 factors, the development of characteristic agriculture for improvement in farmers' life, reliance on agricultural science and technology, product sales and risk management may have a positive impact on the expectation of the variables to be explained. Value assignment of each variable and the ex-

pected direction can be shown in Table 3.

Table 3 Value assignment of each variable and the expected direction

Variable	Value assignment of variable	Percentage %	The expected direction
Whether the variables to be explained are satisfied with the development of characteristic agriculture(Y)	0 = Not satisfactory	57	
	1 = Satisfactory	43	
Terrain	1 = Plain areas	82	Uncertain
	2 = Non-plain areas	18	
Types of characteristic agriculture	1 = Characteristic farming	80	Uncertain
	2 = Characteristic breeding industry	7	
	3 = Others	13	
Impact on farmers' life in the past five years	1 = Great influence ,improvement;	16	Forward
	2 = Great influence ,deterioration;	12	Reverse
	3 = Not obvious;	72	
Characteristic agriculture's reliance on science and technology	1 = Yes	68	Forward
	2 = No	32	Reverse
Sales of characteristic agricultural products	1 = Good	39	Forward
	2 = Average	30	Reverse
	3 = Poor	31	
Risk management of characteristic agricultural products	1 = Good	29	Forward
	2 = Average	27	
	3 = Poor	44	Reverse

2.2 Model selection To test whether the explanatory variables affect the variables to be explained and the influencing direction and extent, we set whether the farmers are satisfied with the development of characteristic agriculture in their hometown as the Logistic regression model, according to the classification of variables:

$$\ln \frac{P}{1-P} = b_0 + \sum_{i=1}^n b_i x_i$$

where P represents the probability that farmers are satisfied with the development of characteristic agriculture, namely the probability when $Y = 1$; $1 - P$ represents the probability that

farmers are not satisfied with the development of characteristic agriculture, namely the probability when $Y = 0$; i is the number of variables influencing farmers' satisfaction with the development of characteristic agriculture; b_0 is the regression intercept (constant); b_i is the regression coefficients of factor i . In the study, the influencing factors are set as 6 independent variables.

2.3 Results and analysis Based on the data from the questionnaire, the Logistic regression results of factors influencing the development effect of characteristic agriculture are shown in Table 4.

Table 4 Logistic regression results of factors influencing the development effect of characteristic agriculture

Variable	B	S. E	Wals statistic	df	Sig.	Exp (B)
The terrain where the farmers' hometown is situated is plain <i>landform</i> (1)	0.323	0.340	0.904	1	0.342	1.381
Characteristic farming <i>type</i> (1)	-0.843 *	0.418	4.064	1	0.083	0.431
Characteristic breeding industry <i>type</i> (2)	0.197	0.639	0.095	1	0.135	1.217
Reliance on science and technology <i>technology</i> (1)	0.435 * *	0.322	1.819	1	0.03	1.545
Good sales of characteristic agricultural products <i>sell situation</i> (1)	0.451 *	0.343	1.735	1	0.058	1.570
Average sales of characteristic agricultural products <i>sell situation</i> (2)	-0.228 * *	0.318	0.513	1	0.02	0.796
Good risk management of characteristic agricultural products <i>riskmag</i> (1)	0.287	0.363	0.623	1	0.430	1.332
Average risk management of characteristic agricultural products <i>riskmag</i> (2)	0.626 * *	0.295	4.517	1	0.034	1.871
Improving farmers' life <i>influ</i> (1)	1.308 * * *	0.380	11.838	1	0.001	3.698
Deteriorating farmers' life <i>influ</i> (2)	-0.168	0.422	0.158	1	0.691	0.846
Constant	-0.508	0.563	0.816	1	0.366	0.602

Note: *, **, *** denote 10%, 5%, 1% statistical significance level, respectively.

The maximum likelihood estimate in Table 4 is 43.18. Nagelkerke R^2 value is 0.730, and the model has statistical significance.

In terms of the model results, the local respondents, who are very satisfied with the development of characteristic agriculture, are mostly in the plain areas, where the characteristic agriculture is dependent upon science and technology; the characteristic agricultural products have better sales channels and risk management; the characteristic agriculture is able to signif-

icantly improve residents' living standards. The regression coefficient of farmers' hometown in the plain areas is 0.323, but not significant, indicating that the plain areas and non-plain areas have not significant effect on the development of characteristic agriculture. The regression coefficient of characteristic farming is -0.843, significant at the 10% level, which is negatively correlated with farmers' satisfaction with the development of characteristic agriculture in their hometown. Characteristic breeding industry is positively correlated with farmers' satisfac-

tion with the development of characteristic agriculture in their hometown, indicating that as against characteristic farming, characteristic breeding industry is more likely to promote local development of characteristic agriculture and improve farmers' living standards.

The regression coefficient of the development of characteristic agricultural products reliant on science and technology is significant at 5% level, positively correlated with farmers' satisfaction with the development of characteristic agriculture in their hometown. In the economic sense, the regression coefficient of whether it is reliant on science and technology is 0.435, indicating that for each additional one unit of scientific and technological input, farmers will increase 0.435 units of satisfaction. But in terms of the actual situation of scientific and technological input into characteristic agriculture in Henan Province at present, there are still many problems. For example, as to the agricultural products of farmers and bases, the scientific and technological content is not high, and the market competitiveness is weak; most products lack distinctive features, failing to achieve the transition of characteristic products to famous brand products; the effective development level of resource is very low; the industrial system is unsound.

The regression coefficient of risk management of characteristic agricultural products is significant at 5% level, positively correlated with farmers' satisfaction with the development of characteristic agriculture in their hometown.

In the economics sense, the more perfect the risk management mechanism, the more stable the prices of farmers' agricultural products. However, in terms of the model results, the regression coefficient of variable of good risk management of characteristic agricultural products is smaller than that of ordinary risk management of characteristic agricultural products, indicating that the proportion of ordinary risk management of characteristic agricultural products in the regions where the farmers are surveyed is large.

As for China's agricultural insurance, we can see from the development of agricultural insurance in China in the past 20 years that China is one of the countries with the most serious natural disasters in the world, and various disasters are so frequent and endanger a wide range, such as wind, hail, cold, pests and diseases, inflicting a great impact on China's agricultural production. The lack of agricultural risk prevention system is a very serious problem in the development of characteristic agriculture in Henan Province, which is faced with a wide range of risks, such as natural risk, market risk, and technology risk. The agricultural risk prevention system in Henan Province has not yet been established, and the risk circumvention mechanism is not still perfect. Although in some cases, the leading characteristic agriculture enterprises in Henan Province show a good "leader" style, but in the long run, requiring the leading enterprise to replace farmers to bear the natural risks is unrealistic^[11]. Farmers are independent producers and operators, with fragile economic strength, unable to resist the enormous risk arising from changes in market competition and demand. Any farmer will find it difficult to timely, comprehensively and

accurately grasp the market situation, produce a timely response, scientifically predict future changes, and form characteristics, resulting in the convergence of industries and varieties. Good sales of characteristic agricultural products are significant at 10% level, positively correlated with the development effect of characteristic agriculture in Henan Province, with the regression coefficient of 0.451; ordinary sales of characteristic agricultural products are significant at 5% level, but negatively correlated with farmers' satisfaction with the development of characteristic agriculture in their hometown, with the regression coefficient of -0.228. The two variables on sales of characteristic agricultural products indicate that sales channels have a great effect on the development effect of characteristic agriculture, and only there are good sales can the development of characteristic agriculture be ensured. In terms of the construction of market organization, the focus of the market construction is mainly the construction of wholesale market in city or marketing place, but the rural market lags behind, especially the construction of wholesale market in marketing place seriously lags behind the requirements of production development. There are some prominent problems in the trading market of agricultural products, such as only attaching importance to the hardware construction, outdated mode of market transaction, poor quality of market transaction subject, low degree of organization, imperfect management tools and market information system.

There are still many problems and constraints in the marketing channels. (i) The organizational function of channel is not perfect. There is still a gap between the wholesale markets that have been established and modernization requirements of agricultural product marketing channel system, having a serious impact on the speed and quality of the circulation of characteristic agricultural products. (ii) The circulation radius is too small. Most of the characteristic agricultural products are sold near the place of origin, the amount and proportion of products sold to the sales places are limited. (iii) There are many and complex channel links and the circulation chain is too long. Taking the case of vegetable circulation process, from farmers to residents, it will go through 5 to 6 links, such as vegetable growers (producers) – middlemen in the place of origin – market wholesalers – market intermediaries – retailers – consumers. Increase in the circulation links also augments costs.

The model results show that the regression coefficient of variable of prominent improvement in farmers' life is 1.308, significant at 1% level; the Wals statistic is the highest, and the variable of improvement in farmers' life makes the greatest contribution to farmers' satisfaction with the development of characteristic agriculture in their hometown. Therefore, raising farmers' income plays an important role in the development of characteristic agriculture. From the farming, the agricultural planting structure in Henan Province is simple at present, with prominent characteristics; wheat and corn are major crops, and the cultivation scale of grain and vegetables is small, with not high commercialization rate. In addition, farmers' operating scale is small. Under conditions of low level of processing, the

single household is difficult to make the enterprise bigger and stronger. It is necessary to rely on the industrialized operation of agriculture to form the appropriate scale of characteristic agriculture as soon as possible; break through the traditional mode of agricultural development, and cultivate characteristic agriculture; promote added value and benefits of agricultural products, and improve the agricultural economic cooperative organizations; increase farmers' income, and narrow the gap between urban and rural areas.

3 Policy recommendations

Based on the above findings, in order to further strengthen and develop characteristic agriculture in Henan Province, create new advantages of the development of characteristic agriculture in Henan Province and improve the development effect of characteristic agriculture, it is necessary to position the development types of characteristic agriculture, broaden sales channels of characteristic agricultural products, increase agricultural science and technology input, and perfect risk management mechanism. Currently and in the future, we should place emphasis on the following aspects.

3.1 Increasing the government support In terms of the model results, the majority of respondents with great satisfaction with the local development of characteristic agriculture are in the plain areas; the local characteristic agriculture relies on science and technology; characteristic agricultural products have good sales channels and risk management; there are farmers who can significantly improve the residents' living standards.

Therefore, the government should increase support in mountainous areas, and hilly areas. In accordance with the principles of adapting to the market, taking actions that suit local circumstances, highlighting the features and giving play to the advantages, all regions should formulate the local development plan of characteristic agriculture; adopt the means of policy guidance, information services and technology demonstration, to strengthen guidance for characteristic agriculture; increase capital input, to create a favorable investment environment.

3.2 Relying on scientific and technological progress to improve the quality of characteristic agricultural products

Good reliance on science and technology is positively correlated with the development effect of characteristic agriculture. Therefore, the development of characteristic agriculture, must rely on scientific and technological progress.

One the one hand, it is necessary to adjust the direction and priority of the agricultural scientific and technological innovation, strengthen the technology research and development related to characteristic agricultural products, concentrate human resources, financial resources and material resources for directed input, and implement interdisciplinary and cross-sector joint research.

On the other hand, it is necessary to speed up the pace of promotion and application of new varieties and new technologies. At the same time, it is necessary to establish the technol-

ogy extension system of characteristic agricultural products; focus on promoting a number of excellent varieties suitable for local regional development and new resource-saving agricultural technologies; actively adopt international standards and refer to the leading level of the same trade at home; pay special attention to the source of production, and vigorously carry out production activities of pollution-free agricultural products, green food and organic food, to enhance the quality of characteristic agricultural products and production level^[12].

3.3 Cultivating and improving the market system Sales channels have a great impact on the development effect of characteristic agriculture. Only there is good sales can the development of characteristic agriculture be ensured. We should cultivate and improve the market system, and strengthen the circulation of characteristic agricultural products.

(i) Further improving the market system. In accordance with the principles of unified planning, rational distribution, and outstanding characteristics, it is necessary to focus on the selection of specialized production area of characteristic agricultural products, transport hub and distribution center of agricultural products; build the specialized wholesale market of agricultural product distribution center; strengthen the construction of supporting market facilities, such as grading, classification, storage, transportation, preservation and packaging of characteristic agricultural products.

(ii) Accelerating the agricultural market information network construction. It is necessary to increase the spread of market information, technology information, and industrial policy; strengthen the prediction and analysis of information, and give full play to its serving and guiding function in the economy of characteristic agriculture.

(iii) Encouraging the leading enterprises to develop new markets. It is necessary to organize processing according to market demand; rely on the processing to promote the production and achieve connection of production and marketing; develop production and marketing cooperation team with farmers as the main body, to promote the organizational degree of farmers in the markets.

(iv) Implementing the brand strategy to promote the market competitiveness of characteristic agriculture. To remain invincible in the fierce market competition, it is necessary to adapt to people's changing consumer preferences; find the meeting point of different levels and different types between resource characteristics and market demand for "characteristics", in order to create brand-name products^[9].

3.4 Perfecting risk management system According to the risk characteristics and manifestations of industrialization operation of characteristic agriculture, we should draw experience and lessons of the risk management of foreign agricultural industrialization. The risk management system of agricultural industrialization operation should be the diversified risk management system integrating the government, the market (society), enterprises and farmers.

(i) Stepping up publicity efforts to improve farmers' awareness of anti-risk. In the market of characteristic agricultural

products, the vast majority of farmers are risk evaders. In order to enhance farmers' awareness of anti-risk, the relevant government departments need to increase publicity efforts, so that farmers can consciously realize the potential risk and harm, and master certain defensive measures of risk.

(ii) Strengthening the construction of agricultural information system, and establishing the characteristic agriculture risk early warning system to reduce market risk. Due to the asymmetry of information transmission, there is a need to reduce market risk and strengthen the construction of agricultural information system. The government should increase input to the market information system construction of characteristic agricultural products; strengthen the infrastructure construction of agricultural information system; collect, sort and process various kinds of information on characteristic agriculture, to analyze and predict the possibility of agricultural risk, so that farmers know the dynamic market information, promoting their ability to resist risks.

(iii) Using a variety of risk management tools. The farmers can choose many risk management strategies, but different strategies have their appropriate scope and objectives. Government and cooperatives should help farmers to select the appropriate risk management tools. For example, the farmers can spread risks through diversified operation, scattered planting, diversification of varieties and other activities. The farmers can also adopt the contract production, the futures market the insurance contracts and other financial instruments. In addition, cooperatives, market information collection, phased sales and retaining cash are also important agricultural risk management tools^[10].

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