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Research on the Green Production Behavior of Large-Scale Agricultural Business Entities

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Abstract
Green production behavior is conducive to reducing agricultural pollution and saving resources from the source, and is an important path to achieve sustainable agricultural development and the transformation of agricultural green production mode. This study takes large-scale agricultural business entities as the research object, explores the driving factors of green production behavior, constructs an evaluation index system of green production behavior, and analyzes the adoption of green production behavior based on field research. The research conclusion shows that: (1) the occurrence of green production behavior of large-scale agricultural management entities is the result of the combined effect of intrinsic motivation and external stimulus, and the importance of different factors to different green production behaviors is different; (2) The overall adoption of green production behavior was poor, and the score ranking of the four types of behaviors was: green reduction input behavior> green technology adoption behavior> waste recycling behavior > cultivated land protection behavior. Therefore, in the pre-production and post-production cultivated land protection and waste treatment, we should pay attention to the exploration of behavioral methods, and pay attention to the improvement of behavioral efficiency when reducing input in production and adopting green technologies.

Key words: Agricultural business entities; Green production behavior; Driving factors

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1. INTRODUCTION
Green is the background color of agriculture, and a sound ecological environment is the most beneficial thing for the people's livelihood, the greatest advantage and valuable wealth of rural areas. It is of great significance to accelerate the sustainable development of agriculture. The agricultural development policy has changed from the past double goals of "increasing production and income" to the three goals of "stabilizing grain, increasing income and sustainability" (Du et al., 2016). In the past few decades, China's agricultural economy has developed rapidly. By 2021, China will achieve a brilliant 18 consecutive harvest of grain output, but the problems accumulated by the extensive economic growth mode at the cost of resource consumption and environmental damage have been revealed. Excessive use of chemical fertilizers, pesticides, agricultural film and straw burning, livestock and poultry manure discharge pollution has become the main cause of agricultural ecosystem damage (Zhu, 2013), and cause rural and farmland extensive non-point source pollution and soil fertility serious problems such as decline, agriculture has become an important source of water pollutant emissions. In the future, the data of agricultural non-point source pollution emissions may be greater, and the impact of agricultural non-point source pollution on environmental quality will be more significant (Jin, 2018). According to the statistical yearbook, in 2020, China's agricultural chemical fertilizer application amount is up to 52.507 million tons, chemical fertilizer application strength of 313.5 kg / ha, far beyond the internationally recognized 225 kg / ha fertilization

upper limit, the utilization rate is only 40.2%; pesticide use is 260,000 tons, the utilization rate is only 40.6%. It is particularly important and urgent to realize the recycling of agricultural resources and the green development of agricultural production. In 2014, the Ministry of Agriculture issued the Implementation Opinions on the Tough Battle and Control of Agricultural Non-point Source Pollution, proposing the goal of "one control, two reduction and three basic sources". In 2015, an action plan of zero growth in the use of chemical fertilizers and pesticides was proposed to better guide agricultural operators not to overuse agricultural chemicals. In 2021, agriculture NongCunBu joint six ministries issued the "difference" national agricultural green development plan "from" strengthen the protection of agricultural resources utilization, improve the level of environmental protection, strengthen agricultural ecological protection repair, increase the supply of green products " put forward the clear development requirements, agricultural green development from the past advocacy into clear goals of specific action. Green development of agriculture has become a new goal of agricultural policy.

Agricultural green production emphasizes the integration of environmental governance into the production process, and pays attention to resource conservation and ecological environment protection at the beginning of production, which provides an important solution for the effective control of agricultural non-point source pollution and the realization of sustainable agricultural development. Green production behavior is conducive to reducing agricultural pollution, protecting land resources and saving resources, and combines environmental pollution control and resource recycling benefits. It is the fundamental requirement and an important path of deepening agricultural supply-side structural reform. In addition, agricultural business entities with a certain scale, specialization and organization increasingly show the vitality and potential of development, and have become the main body of China's modern agricultural development. It is of great significance to explore the status quo of their green production behavior to promote the comprehensive green transformation of China's agriculture. However, in reality, the decision-making of green production is a very complex process. Secondly, there are many factors restricting the implementation of green production behavior of agricultural operators, and it is difficult to improve the green production behavior of agricultural operators. So, what is the occurrence logic of green production behavior of large-scale agricultural management entities? What factors will affect the green production behavior of large-scale agricultural operators? What is the current situation of its green production behavior? The theoretical community has not obtained more consistent results for the above problems.

Accordingly, this research takes the large-scale, organized and professional agricultural business entities as the research object, constructs the evaluation index system of green production behavior, and analyzes the occurrence logic of its green production behavior from the perspective of internal motivation and external stimulus. Combined with the field research data, the evaluation index system of green production behavior is constructed, the current situation and existing problems of green production behavior of agricultural business entities are analyzed, and the solutions are proposed accordingly, in order to provide a practical basis for the regulation of agricultural production behavior and the effective solution of agricultural non-point source pollution problem.

2. LITERATURE REVIEW

Agricultural green production behavior has become the field of concern of many scholars, from the existing research, the traditional micro operators as the research object of the green behavior research has been relatively rich, agricultural production has shown a certain ecological consciousness (Cai, Du, etc., 2016), at the same time, a large number of studies show that the environmental governance into the agricultural production process, in the beginning of agricultural production subject is an effective way to improve the agricultural ecological environment. The review will sort out the domestic and foreign studies from the connotation of green production behavior and the influencing factors of green production behavior.

Accurately grasping the connotation of green production behavior is an important prerequisite for carrying out the relevant research on green production behavior. Due to the connotation of green production behavior, the current academic community has not yet given the definition of scientific, standard, the vast majority of scholars are considered from the connotation of environmental advantages of green production behavior, many scholars define enterprise green production behavior as one of the behavior of energy conservation and emission reduction, and from different perspectives of green production behavior. The production behavior of agricultural operators has attracted much attention in recent years, For example, low-carbon production behavior is the full use of technology, policies and management measures, While achieving sustained growth in agricultural output, A new mode of agricultural production to reduce the input of agricultural materials as much as possible and reduce agricultural emissions (Chen, et al., 2013; Tian, et al., 2015). Green production behavior refers to the use of mild environmental green inputs, Adopt advanced field management methods and farming techniques, And implement waste treatment and recycling, To achieve production methods to prevent ecological

and environmental pollution and ensure the quality and safety of agricultural products (He, et al., 2021; Zhao, et al., 2022) Pro-environmental production behavior is the production process adjustment made by producers to cope with farmland non-point source pollution and ecosystem imbalance (Yang, et al., 2022). Ecological production behavior refers to the production behavior conducive to reducing agricultural pollution, protecting land resources and saving resources (Cai, 2016; Liu, et al., 2019) And other on more and more research. From the perspective of conceptual connotation, there are certain overlapping connotations between them, but their categories are also heavy. This paper does not make a distinction between this in detail, and it is uniformly regarded as a green production behavior.

As for the decomposition of the connotation of the green production behavior, some scholars believe that the green agricultural production, as a sustainable production mode to reduce the agricultural environmental pollution and save resources, is difficult to be completely modular, and no technology can have a clear defense boundary to completely decompose this behavior (Shi, et al., 2020). Accordingly, the mainstream research means adopted by academia is to conduct in-depth research on a specific behavior, such as: chemical fertilizer and pesticide application behavior (Tian and Zhang, 2015; Cai, 2016), green production technology adoption behavior (Jia, 2021), waste disposal behavior (Guo and Zhao, 2014), and on this basis to carry out related research on agricultural green production behavior. But, with the deepening of green production behavior related research, liu (2019), geng channel (2022) and many other scholars to expand the connotation of green production behavior, combined with prenatal, production, postpartum process, fertilizer pesticide reduction, agricultural film use, using soil formula technology, straw returning, packaging waste recycling into the framework of research, various new production behavior, broaden the connotation of the green production behavior, but also increase the difficulty of research.

In order to further standardize and improve the green production behavior of agricultural business entities, many scholars are committed to identifying the key factors affecting the willingness and adoption of green production behavior of operators, analyze the factors affecting green production behavior from multiple perspectives, and deeply analyze its internal influence mechanism. Some scholars believe that obtaining economic benefits, based on the cost-benefit perspective, is an important reason to maintain the continuous behavior. Some scholars analyze the factors affecting green production behavior from external policy environment, such as capital and technical compensation, informal system and environmental regulation (Zhang, et al. 2022), agricultural technology supply and promotion, agricultural policy incentive and restraint and internal capital endowment (Zhang, et al., 2017, 2019; He, Zhang, et al., 2014). And scholars based on individual behavior psychology theory, analyze the internal factors of green production behavior choice, from behavior attitude, subjective norms, behavior control and perceived income (Wang, 2021), knowledge ability (ho, 2019), cognitive characteristics, etc., to explore its influence on green production behavior, build the "capital-endowment-cognitive","cognitive-willingness-behavior","cognitive-situational-behavior" and other influence path, enrich the related theoretical research.

Combing related literature found, involving micro operators green production behavior related research is rich, academic focus on farmers as the research object, to the deep research of green production behavior, the research content involves green production behavior status, influencing factors, formation mechanism, performance evaluation and other aspects, has achieved fruitful results, provides a good reference for this study. However, the existing studies have the following shortcomings: first, most of these studies are rare based on traditional small farmers, large-scale agricultural operators, such as family farms and cooperatives. Second, the definition of green production behavior is free and vague, making it difficult to popularize and popularize the conclusions; third, most of the existing studies analyze the influence factors of one or all green production behaviors based on a single theory, but do not consider whether it is reasonable and comprehensive. This study with scale, organization, specialized agricultural business subject as the research object, combined with prenatal, production, postpartum process, the connotation of green production behavior, to the decomposition of the evaluation index system of green production behavior, and based on the cost benefit theory, behavioral psychology theory, sustainable development theory multidimensional analysis of the green production behavior logic. Combined with the field research data, the current situation and existing problems of agricultural operators are analyzed, and solutions are put forward accordingly.

3. DRIVING FACTORS OF GREEN PRODUCTION BEHAVIOR OF LARGE-SCALE AGRICULTURAL OPERATORS

As a rational economic person, the business goal of large-scale agricultural operators is to pursue profit maximization. Some scholars' studies show that the reasonable adoption of green production behavior is conducive to increasing income, reducing costs and increasing output. Based on the internal motivation and external conditions to consider the driving factors of the green production behavior of large-scale agricultural operators, if the operators do not obtain the corresponding economic benefits, then their behavior will not be sustainable.

There are two ways to improve profits, to reduc the total cost or increase the total revenue, and the tw ways to increase the revenue are to increase the output o increase the product unit price, but the product unit pric is often controlled by the market, so the green productio motivation of large-scale business entities is mainly t increase production, reduce cost and increase income At the same time, the external environment, such as th policy environment and the market environment, will als affect its green production behavior needs. After bein stimulated by the behavioral needs, The motivation fo green production behavior also arises, Both economi and environmental motivation, Considering the curren and short-term earnings situation, Or the long-term gains Producers have certain goals, And sufficient motivatio will motivate them to adopt green production behavio The choice of which specific green production behavio (this study mainly involves input reduction behavio protective farmland behavior, green production technolog adoption behavior and waste recycling behavior) is base on its comprehensive consideration of cost-income an its own factor endowment, In addition, to adopt the risk analysis of a certain behavior, This is also whether the production behavior can be implemented eventually, Whether the implementation. Otherwise, there will be a "strong will and weak behavior" of green production behavior. After the comprehensive analysis of the cost and benefit and risk situation, the producers carry out some or more of their selected green production behaviors, and the implementation of the behaviors has its breadth and depth. This study focuses on considering the status of green production behavior from the breadth of the adoption of green production behavior. Green production behavior after the implementation of the results of the producer next business cycle planning, when the results are relatively ideal or temporarily no obvious benefits but acceptable, the green production behavior is strengthened and maintained, but when the results are not ideal or far lower than expected earnings, the green production behavior is suppressed, and appear in the next business cycle, such as new needs, decision to reconsider and give up, etc.

Thus forming a from demand-decision-result, and from result-new demand-new decision of agricultural production cycle, when the process gradually stabilized, its green production behavior is a long-term stable state, it is worth noting that the formation of green production behavior is a dynamic process, from a period to observe its behavior may not be optimal, but based on long-term tracking monitoring is difficult, currently widely used cross section data to analyze its behavior state, also has a certain practical significance and value.

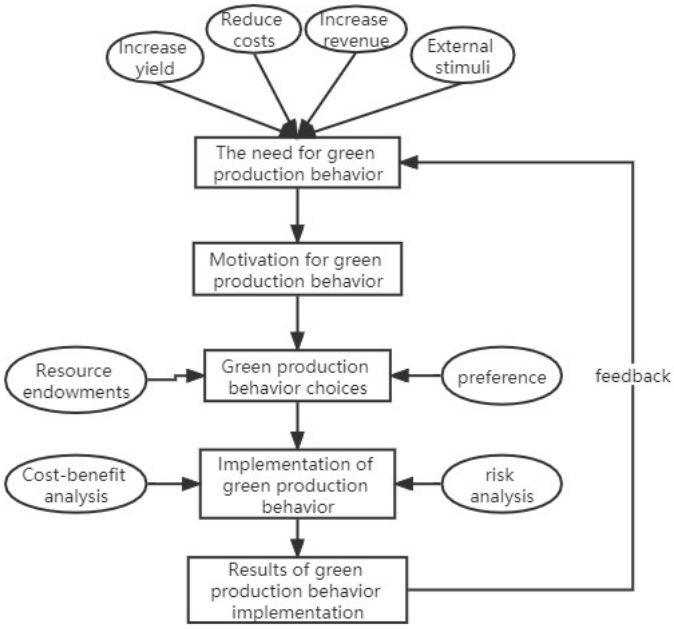

Figure 1
Logic of green production behavior of large-scale agricultural operators

The green production behavior from the four dimensions of green quantity reduction input behavior, green technology adoption behavior, cultivated land protection behavior and waste recovery and treatment behavior are analyzed respectively from the theoretical level. Explore the preference and key factors of various types of green production behaviors.

Reduction efficiency is vigorously advocated friendly environmental behavior, the overuse of fertilizers and pesticides is an important cause of agricultural non-point source pollution, but in real life, it is difficult to grasp the accurate dosage, in the face of risk reduction risk can be directly observed production decline and observation difficult environmental pollution, based on the consideration of their own interests, and no external policy environment regulation, environmental responsibility is often ignored by most producers. In order to effectively deal with environmental pollution, the state attaches great importance to agricultural environmental governance, and has introduced a series of policies and measures, including administrative regulation, economic incentive and technical support measures, including the three different constraints and mandatory behaviors, the main goal of operators is to survive rather than profit, some economic benefits are suppressed, and seek to improve benefits through internal management. So environmental regulation, government subsidies, technical support is an important factor affecting green reduction investment, environmental regulation to some extent will inhibit some

economic income motivation, government subsidies and technical support policy is not always effective, economic incentive and technical support measures because is incentive, the agricultural operators economic profit motivation, operators often put it into the cost benefit, green production decisions. It needs to match different application scenarios to play its utility value.

Reduce the input and the relationship between the efficiency is more complex, the change is mainly reflected in the purchase of green inputs will increase purchase costs, green fertilizer, green medicine investment will increase labor costs, but organic fertilizer has various benefits, improve soil quality, increase organic matter, improve production, improve the quality of agricultural products, the utility only a single benefit is difficult to measure comprehensively. So for production decision makers of decision-making ability, the experience is higher, different individual characteristics of producers for different aspects of income will have different perception, and this perception also formed his decision basis, ultimately affect its production behavior decision, followed by the main body endogenous force, the stronger the main body of endogenous force, the more can consciously fulfill social responsibility, and the responsibility into their own competitive advantage, thus achieve economic benefits. Therefore, in addition to the cost and income factors, environmental regulation, government subsidies, technical support, decision-making ability and endogenous transformation ability are also the key factors affecting the adoption of green reduction investment behavior.

Assuming that part of the opportunity benefit from fulfilling environmental liability suppression is S, The green subsidy is U, The benefits from technical support are the V, undeniable, For most small-scale agricultural operators, The primary goal of production is to achieve revenue, There is no more ability to balance environmental responsibility, this moment, Only mandatory environmental regulations can affect its behavior, Sacrifice part of the economic benefit s, Some business entities will incorporate their environmental responsibility into their production plans, this moment, When the U+V>S, Business entities have high green production willingness, Green production behavior has been strengthened; When U+V<S, The green production willingness of business entities is reduced, Green production behavior is suppressed. However, the size and direction of S /V are related to the decision-making ability and self-generated transformation ability of the business subject. The stronger the decision-making ability, the stronger the endogenous transformation ability, the better the suppressed income, and even the enhanced inhibition, transforming the environmental responsibility burden into an economic benefit; the stronger the endogenous transformation ability, the better the technical support, and the higher the benefit.

$$\Delta Y = U + V - S$$

$$V = \alpha + \beta_1 X_1 + \beta_2 X_2 + \mu$$

$$S = \alpha + \xi_1 X_1 + \xi_2 X_2 + \mu$$

Among them, ΔY is the increase in income, and X_1、X_2 represent the decision-making ability and endogenous transformation ability of large-scale agricultural management entities. β_1、β_2、ξ_1、ξ_2 represents the coefficient to be estimated; α stands for constant term; μ is the random error term.

Green production technologies include fertilizer saving technology, drug saving technology, water-saving irrigation technology, film saving technology, waste disposal technology, etc. Science and technology is the primary productive force, which can not only improve crop yield, liberate some labor force, but also effectively save resources, protect and control the environment. Is a key factor of many research attention, but the promotion and popularization of technology often need decades of time, the cost is higher, so its effect needs to achieve certain threshold requirements to play, is not suitable for most producers, but the scale agricultural business subject because of its considerable scale and professional degree, have better capital endowment conditions and capital strength, technology use proportion relative to the traditional small farmers. At this time, different green production behaviors will be adopted based on the differences in factor endowment capacity, production objectives and risk preference. Based on the profit of a certain operating cycle; when the adoption of green production technology is strengthened, its willingness and behavior is weakened.

$$\sum_{i=1}^{n}(Y_{\text{Fertilizer saving technology}} + Y_{\text{Drug-saving technology}} + Y_{\text{Water-saving technology}}) \geq Y_0$$

Cultivated land is a particularly important resource for large-scale agricultural management entities, which cannot be replaced by any factor endowment. Land is an essential condition for production, so it is very precious for producers. The protection of the land largely ensures the yield and quality of the crops, but without the limited technology, they have sufficient reasons to protect the land from environmental persecution, and have sufficient

motivation to adopt green production behavior. However, the change of land quality is difficult to detect. Because the change cycle is generally long and the observation technology is difficult, it is often ignored by producers, and the monitoring difficulty is large. The lack of technology will weaken the positive impact of farmland protection behavior on agricultural environmental governance, and reduce the producers' willingness and behavior of farmland protection.

$$Y_{\mathrm{i}} = \sum_{\mathrm{i}=1}^{n} (P_i \bullet Q_i - C_i)$$

$$P_i = \lambda M_i + \varepsilon$$

$$Y_{\mathrm{i}}' = \sum_{\mathrm{i}=1}^{n} (P_i' \bullet Q_i' - C_i')$$

$$P_i' = \lambda' M_{\mathrm{i}}' + \varepsilon'$$

In the above formula, Y_{i} represents the profit of the i period, i represents the business cycle, and Q_i、C_i、P_i、M_i represents the yield, total cost, product unit price, and product quality when the cultivated land quality is good (using certain monitoring technology means and protecting the cultivated land behavior) respectively (under the market protection mechanism, it can be expressed in the form of price, that is, $P_i = \lambda M_i + \varepsilon$, representing the linear relationship between product quality and price. Q_i'、C_i'、P_i'、M_i' represents the yield, total cost, unit price of the product, and product quality when the cultivated land quality is poor (no monitoring and protection of cultivated land is carried out). When $Y_i > Y_i'$, the willingness of business entities to protect cultivated land will be strengthened, and when $Y_i < Y_i'$, the willingness to protect cultivated land will be suppressed.

The reason why protected cultivated land is an important sustainable production behavior is that the rational use of land and other environment will eventually have benign feedback, which is conducive to its production and realize circular agricultural development. In addition to the increase of production, it also includes the reduction of input and efficiency of the next period, reduce the production difficulty and save labor costs. But its benefit also has a long cycle, difficult to estimate the characteristics, difficult to grasp. Therefore, in addition to the cost and income factors, the technical level restriction is also a key factor affecting the producers' adoption of protective farmland behavior.

Waste treatment and recycling behavior, With all its own cost and benefit considerations, The contradiction between waste recycling behavior and economic income is mainly reflected in, On the one hand, waste recycling can improve the quality of cultivated land, On the other hand, waste disposal costs more costly, Low income, The high cost is a difficult problem for waste disposal, More influencing factors come from forced environmental control and green awareness, Environmental control is closely related to national macro policies and market environment, Depely on the continuous progress of social systems, And the green behavior consciousness depends on the deepening of the internal cognition of the producers and operators, In relation to government training and receiving education, And the growth process of business entities, At the beginning of the production period, It is difficult for general producers to take into account environmental responsibility, Will choose to sacrifice the environment for a timely income, When stabilizing, The producer's income is saturated, It is difficult to improve from the early and middle stages of production, At this time, there will be more consideration of the entire production link of the cost and benefit analysis, Place the attention point on post-production processing, Handle production waste as much as possible, reclaim, To achieve both environmental and economic benefits. Therefore, in addition to the cost and income factors, the system development level, the education development level and the main body development level are also the important factors affecting the behavior of waste recycling.

To sum up, in addition to the cost, income, production will drive green production behavior, and policy environment (environment regulation, government subsidies, government technical support, etc.), decision-making ability, endowment ability, endogenous transformation, development stage, the main body, technology development level, education development level will also affect the scale of green production behavior, and these factors on the influence of different behavior differences.

4. CURRENT SITUATION OF GREEN PRODUCTION BEHAVIOR OF LARGE-SCALE AGRICULTURAL BUSINESS ENTITIES

4.1 Construction of the Evaluation Index System of Green Production Behavior

Regarding the characterization of green production behavior, different scholars choose different indicators, but they are all much the same. CAI Yingping et al. (2016); Liu Ke et al. (2019); Yang Chenyao et al. (2022); Zhao Xiaoying et al. (2022): whether soil testing formula fertilization; reduced per mu use of pesticide,

fertilizer, agricultural film; water-saving irrigation; straw returning to the field; recycling of used agricultural products packaging, etc. Due to the different subjects, CAI Yingping et al. (2016) used the average fertilizer and pesticide per mu than the surrounding ordinary farmers, and whether they chose mechanized straw returning to the field to represent the production behavior of family farms. On this basis, scholars follow the natural process of agricultural production, and select green production methods or technologies from the links of green production behaviors as follows, such as less tillage / no-tillage, organic fertilizer use, and straw returning to the field (Cheng Pengfei et al., 2021). Wei Xin et al. (2012) believe that farmers' agricultural production behavior includes the change of planting methods, the application of chemical fertilizers, the application of a large number of pesticides, and the use of a large number of agricultural films. Liu Ke (2019) believes that agricultural pro-environmental production behavior is the agricultural operation mode of scientific reduction, recycling and environmental friendliness adopted by agricultural production subjects. Specific to the actual pro-environmental behavior, mainly including agricultural chemical input reduction application, straw returning to the field, water-saving irrigation, etc.

This study draws on Zhang Chaotong (2017), liu (2019), Yang Chenyao (2022), Cai Yingping (2016) and other scholars on the definition of ecological production behavior, and combined with farmers agricultural production before, production, postpartum process, this paper defines it as: scale agricultural business subject to achieve business objectives, take a series of is conducive to productive input to reduce agricultural pollution, saving resources, production behavior. Specifically, it includes four aspects: green input reduction behavior, conservation tillage behavior, green production technology adoption behavior, and waste recycling behavior. Using farmland protection activities, crop rotation and fallow to indicate conservation tillage; using organic fertilizer instead of chemical fertilizer, reducing fertilizer per mu, using commercial organic fertilizer and adopting scientific fertilizer distribution scheme, indicating green reduction input; adopting water-saving irrigation technology, adopting green pest control technology; recycling packaging waste, recycling straw, and recycling waste agricultural film. There are 13 measurement items in total, all of which are set as binary variables. The combined indexes of each dimension can get the comprehensive value of green production behavior and the level value of the new agricultural operators in each dimension.

Table 2
Evaluation index system of green production behavior of large-scale agricultural business entities

	Level 1 indicators	Secondary indicators	Variable assignment
Green production behavior	Green reduction of input behavior	Use organic fertilizer instead of chemical fertilizer	Yes =1; No =0
		The amount of fertilization per mu was reduced	Yes =1; No =0
		Use of commercial organic fertilizer	Yes =1; No =0
		The fertilizer blending scheme comes from professional guidance	Yes =1; No =0
	Conservation tillage practices	Carry out activities to protect farmland or improve its quality	Yes =1; No =0
		Implement the "crop rotation" planting system	Yes =1; No =0
		Implement the "fallow" planting system	Yes =1; No =0
	Green production technology adoption behavior	Use of water-saving irrigation techniques	Yes =1; No =0
		Adopt water and fertilizer integrated technology	Yes =1; No =0
		Soil testing and formula technology is adopted	Yes =1; No =0
		Adopt disease and insect pest control technology	Yes =1, No =0
	Waste recycling behavior	Recycling of pesticide and fertilizer packaging waste	Yes =1, No =0
		Recycling straw	Yes =1, No =0
		Recycling and treatment of waste agricultural film	Yes =1, No =0

4.2 Current Situation of Green Production Behavior of Large-Scale Agricultural Business Entities

4.2.1 Data Sources

The data of this research comes from the field research, research in July and August 2022 to carry out concentrated research, research object is with a certain scale, organization, specialization of agricultural business subject, the total cultivated land area is more than 50 mu, the questionnaire involves the basic characteristics of agricultural business main body, business owner cognition, green production behavior ", etc. Using the method of questionnaire survey and the structure of interview, investigators to the field and agricultural business subject principal interview, in order to ensure the effectiveness of the data, the researchers before the research training, improve the way of asking questions, to explain the professional words, to ensure the meaning of the questionnaire each item can let the interviewer clear understanding. Finally, the questionnaire interview and

data collection work were completed. Finally, a total of 126 valid questionnaires were obtained, and the overall questionnaire response rate was 74.1%.

4.2.2 Basic Information of Samples

Sample operators has the following characteristics: standardized production degree is higher, higher professional scale degree of organization, labor quantity and the number of machinery and equipment make it has the basis of high production capacity, planting and breeding the combination of mode of operation is more obvious, this situation and the new agricultural business entities in China is consistent with the actual situation. In the sample, agricultural enterprises accounted for 16.2%, farmers' cooperatives for 21.4%, family farms for 44.4%, and large professional households for 21.4%. It can be found that family farms are the main force of new agricultural business entities. The planting scale is concentrated between 100 and 500 mu, In line with the characteristics of moderate scale development of new agricultural business entities in China, Of them, less than 100 mu accounted for 38.1%, 100-200 mu represents 25.4% of the middle sample, 200 – 500 mu represented 21.4% of the total sample, There are 15.1% over 500 mu of scale above; The main body operating life of 5 years or less is 30.1%, Five years long-up to 10 years long, For 44.4%, Only 25.3% of those over 10 years old, Based on the sample observations, Seventy percent of the operating entities are not transferred to the land in the current period, It is possible that long-term buying and leasing, According to the type of planting and breeding combination, In 56.3% of the samples, planting and breeding were combined, But 76% of the new business entities have not received the relevant product certification.

4.2.3 Evaluation Results and Analysis of Green Production Behavior

Based on the given evaluation index system given, the comprehensive value of green production behavior of 126 sample operators, F1 and the level value of the four dimensions, were scored respectively, and the following results were obtained.

Table 3
Scores of green production behavior of large-scale agricultural business entities

Metric	Symbol	Mean	Standard error	Least value	Crest value
Comprehensive value of green production behavior	F	6.69	2.33	2	13
Green reduction of input behavior	F1	2.29	0.89	1	4
Protecting sex cultivated land behavior	F2	1.01	1.01	0	3
Green technology adoption behavior	F3	2.03	0.90	0	4
Waste recycling behavior	F4	1.37	0.91	0	3

Sample scale agricultural management subject of green production behavior adopted the average of 6.69 (14 points), 52.4% of agricultural operators above the average, generally the adoption of green production behavior, the highest score 13 and the lowest score 2 points, there is a big gap between the green production behavior needs to be improved, especially for the main body of low green production behavior to guide and support, to narrow the behavior gap, improve the overall level of green production.

From the score situation of the four dimensions of green production behavior, The ranking by average is: green input behavior> green technology adoption behavior> waste recycling behavior> protected farmland behavior; Green input reduction is one of the four behaviors, The reason may be its low difficulty, At the same time, the state pays more attention; Second, the green technology adoption behavior, Its adoption situation is second only to the green investment reduction behavior, The reason may be the government's vigorous promotion of technology, And the overall technical level of large-scale agricultural operators is higher than the traditional small farmers, Therefore, the use situation is good; However, the protective cultivated land behavior and the waste disposal behavior are easy to be ignored in the actual production, The adoption of these two aspects is poor, This may be due to the high relevant technical requirements, Difficult monitoring and high management cost, Reflected from the side, The government has paid insufficient publicity and attention to these two aspects of green behavior, The actual situation meets the expectations.

5. CONCLUSIONS AND SUGGESTIONS

5.1 Study Conclusion

a. Large-scale agricultural business subject green production behavior process is more complex, cost, income, production, policy environment (environmental regulation, government subsidies, government technical support, etc.), decision-making ability, endowment ability, endogenous transformation, main body development stage, system development level, technology development level, education development level is the important factors affecting its behavior adopted, and these factors to the importance of different behavior.

b. Based on the field research, on the whole, the overall level of green production behavior of large-scale agricultural operators is relatively low, and the level gap between different subjects is relatively large. From the level dimension, four aspects of green production behavior score ranking as: green reduction input behavior> green

technology adoption behavior> waste recycling behavior> protective farmland behavior, agricultural business entities pay more attention to the production, technology use of green management, but for the protection of prenatal farmland and postpartum waste treatment degree is not enough.

5.2 Policy Recommendations

5.2.1 Optimization of the Dynamic Mechanism of Green Production Behavior

a. Application of binding policy tools. For a long time more attention to the development of agricultural green, also formulated the heavy pollution industry pollution standards, does not conform to the requirements of the discharge, illegal emissions enterprises implement administrative punishment, and environmental information disclosure, but overall, and agricultural production highly related to less binding policy, suggested that the government from the agricultural micro subject level to develop specific production behavior constraint policy, especially for chemical fertilizers, pesticides and other chemical inputs, Suggestions from propaganda guidance to strict control stage, strengthen the demonstration, strengthen practice, strict control, Let the green reduction of input behavior gradually become the production habit of agricultural operators.

b. Application of incentive policy tools. Green production behavior will increase the input cost of production subject, so policy makers considering its income risk, will be more cautious, suggest that the government to establish green production behavior oriented subsidy mechanism, strengthen financial support, special funds support, and preferential tax policies, encourage a certain scale, organizational degree of agricultural operators actively carry out green production, to maximize green production benefits, enhance the endogenous force, to ensure its long-term sustained income. In the choice of specific incentives to encourage innovation, elect advanced, strengthen support a group of high-quality agricultural leading enterprises, play its leading and demonstration role, and promote the division of cooperation in the agricultural industry chain, give professional things to professional people, traditional small farmers and family farms can perform some simple basic farming, some complex and difficult work, agricultural enterprises, such as agricultural processing, technological innovation and marketing, and farmers cooperatives can strengthen the farmers and communication, shorten transactions, and reduce transaction costs.

5.2.2 Optimization of the Resource Guarantee Mechanism of Green Production Behavior

First, we need to strengthen agricultural infrastructure construction, Insufficient supply of farmland monitoring facilities in China, The difficulty of green production management is an important reason for the unsatisfactory adoption of green production by agricultural production subjects, The boundary division between green production behavior and basic production behavior should be based on the corresponding production monitoring results, But at present, there are still few monitoring projects involving agricultural micro-subjects in China, More authoritative monitoring data include only the annual rural monitoring projects carried out by the Ministry of Agriculture, But its investigation is limited, Insufficient monitoring of green production behavior, It is suggested that the government should include the important indicators of the green production behavior in the four dimensions of the input reduction, the green technology adoption, the cultivated land protection and the waste treatment into the monitoring indicators, To provide a basis for the formulation of green production related policies. In addition, market management should be strengthened, so that the price and sales environment of green products are better guaranteed and form a good guidance.

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