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REVIEW ARTICLE

Study on agricultural green productivity

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ABSTRACT

Agricultural productivity, as an important indicator to measure the performance of agricultural economic growth, has always been a hotspot in academic research. Scholars at home and abroad have used different methods to measure agricultural productivity from different aspects, trying to accurately describe the way and path of modern agricultural economic growth. However, for a long time, the measurement of agricultural productivity is only based on the traditional factors such as capital, labor and land, and seldom takes into account the resources and environmental factors closely related to the sustainable development of agriculture. Based on this, this paper mainly explores the problem of agricultural green total factor productivity. Firstly, it combs the literature related to green agriculture, systematically summarizes the connotation and related theories of green total factor productivity, and analyzes the agricultural development status and development prospects from the perspectives of geographical environment, economic environment, technological capital and system. It provides a theoretical basis for evaluating the growth performance of agricultural economy more accurately, promoting the coordinated development of resource conservation, environmental protection and economic growth in the agricultural related departments.

Keywords*: agriculture; economic development; green productivity; resource environment*

1. Introduction

The economic foundation of a country is determined by agriculture, which plays a decisive role in the development level of the whole national economy. In recent years, environmental pollution, food security, health and other issues brought about by the rapid economic growth have attracted much attention. Agricultural development needs to change the extensive growth mode and take the ecological civilization way of sustainable development. Nowadays, with the global advocacy of protecting ecology and healthy consumption, developing green agriculture is a realistic choice to promote the construction of ecological civilization and alleviate agricultural pollution. In the past, the impact of resources and environment was not taken into account when calculating the agricultural productivity, so it did not conform to the concept of sustainable development. The analysis framework of green total factor productivity considering the resource and environmental constraints in the agricultural production process can measure the real performance of green agricultural economic

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growth, achieve a win-win situation between environmental protection and agricultural development, and take a road of ecological civilization development.

Resource conservation and environmental friendliness are the basic characteristics and inherent attributes of agricultural green development. Research of home and abroad shows that vigorously promoting the green development of agriculture is an effective path and inevitable choice to solve the resource constraints of agricultural development and promote the sustainable development of agriculture. Theoretically, the traditional agricultural productivity analysis framework can effectively measure the relationship between agricultural resources input and agricultural economic growth, but it lacks of consideration for environmental issues. In recent years, agricultural environmental problems have been paid more and more attention. Researchers in this field have brought environmental factors into the framework of agricultural productivity analysis, analyzed the economic growth performance of agriculture and comprehensively considered environmental problems, and discussed the internal relationship among capital sources, environment and agricultural development through efficiency measurement and decomposition. It is an important direction to incorporate environmental factors into the analysis framework of agricultural productivity in recent years, which is usually called "Agricultural Green Productivity".

2. Review of related research on agricultural green productivity

Nowadays, more and more attention has been paid to sustainable development and environmental issues, and the concept of green total factor productivity has also been put forward by more scholars. Scholars believe that the resources and environment are not only the endogenous variables of economic development, but also the rigid bundle of economic development. Therefore, when total factor productivity evaluates economic performance, it should not only consider traditional capital and labor factors, but also resources and environmental factors, which have a great impact on economic development. Mohtadi and Ramanathan classified pollutant emissions as unpaid inputs, and introduced capital, energy and labor factors into the production function, and estimated green total factor productivity and environmental total factor productivity on the basis of statistical total factor productivity (Mahtadi, 2003). Scholars found that the side product of expected output is characterized by pollution emission, which should be classified as unexpected output, not as input. In 2003, Chung et al. put forward a method of ML productivity index and directional distance function to measure pulp mills in Sweden, and its pollution emissions were classified as unexpected. This was the first time that pollution emissions were applied to economic growth, and reasonable total factor productivity was obtained (Samuel et al., 2003). In 2004, Larry D.considered environmental factors, etc., and classified their undesirable output into the measurement framework of TFP, which was called Green TFP (Dwyer et al., 2005). This research is also the most important action in recent years. Therefore, on the definition of green total factor productivity, this paper holds that based on traditional research on total factor productivity, considering resources and environmental factors, the consumption of resources is expressed as input factor, and the unexpected output including pollutant emission is expressed as output factor, which is then integrated into the accounting framework system of productivity, and the total factor productivity obtained is green total factor productivity.

In 1957, Solow put forward Solow Residual Method, which used C-D function to calculate the difference between economic growth and

factor input growth, and regarded the result as technological progress (Solow, 1957). However, there are some defects in the use of this set of methods, for example, the economic reality does not conform to the assumption of perfect competition, and the gap between producer technology and cutting-edge efficiency is not fully considered in the model. He personally thinks that technical efficiency is completely effective in production. In the study of stochastic frontier production function (SFA), Abler has made a great breakthrough. This method has also been used by scholars to make up for the defects of Solow Residual Method in measuring total factor productivity (David, 1993). However, SFA method also has limitations, it must have a specific form, and it is only suitable for single-output and multi-input production mode. If the unexpected output is considered at the same time when measuring, a new accounting method needs to be considered. In 1978, on the premise of using Farrell's concept of efficiency for reference, Charnes, Rhodes and others built a brand-new model, arguing that the measured variables should not only be limited to input and output, but should rely on linear programming to define the production boundary problem, which is often called DEA model (David et al., 1993). In recent years, the application of DEA method has become increasingly mature, and great progress has been made in the fields of domestic and international economic situation, financial investment, resource allocation, efficiency of technological progress and benefit evaluation. As the most important part of the national economy, there are many scholars who study and evaluate agricultural efficiency. Firstly, the DEA method assumes that the input and output capacities of each production unit are the same, and then analyzes the input and output status of the decision-making unit (DMU) according to the possible set of production inputs. When determining what the production frontier is, the closer it is to the production unit, the higher the technical efficiency level. When the input is excessive or the output is insufficient, there will be non-zero slack of input or output, and the corresponding radial and angular DEA measures will have inaccurate results. In 2009, the SBM directional distance function developed by Fare and Grosskopf (2010) was based on the non-radial and non-angular relaxation vector. Swedish scientist Malmquist put forward the concept of scaling factor in 1953. In 1982, scholar Caves et al studied it again and applied it to productivity, and then put forward the concept related to Malmquist productivity index. Its main feature is that it does not need input and generated price information, and it is more convenient to process panel data, so it is also widely used in the estimation of total factor productivity changes (Caves et al., 1982).

Economists have added environmental factors into the measurement framework of total factor productivity, and then made many analyses on the influencing factors of green economic benefits under the background of environmental changes. Li G et al. (2010) explored the constraints of environmental regulation on agricultural development by means of non-radial method, and emphasizing that only by changing extensive planting and production modes can we truly realize green agriculture. Two scholars, Su Z and Chen S in China (2012), studied the impact of endogenous economic growth theory on human resources in the investigation of agricultural total factor productivity in Guangdong Province. The results show that agricultural technology research and development of human capital can actively promote the change of agricultural total factor productivity, technological progress and technological efficiency, but the stock of rural labor human capital plays a blocking role in these three aspects. To eliminate or reduce this defect, Guangdong Province needs to start with institutional innovation, agricultural technology renewal, talent structure improvement and educational activities. Han H (2013) used Tobit

regression model to study the influencing factors of rural environmental technology. The results show that the proportion of agriculture, the level of rural education development and the government's agricultural support have played a great role in improving the technical efficiency of agricultural environment, while industrialization and farmers' income level have a counter-effect on it.

According to the existing literature, scholars have done more research on the evaluation methods and influencing factors of green total factor productivity. In addition to the input of traditional production factors, water pollution, air pollution and other factors are also considered. Many countries pay more attention to the innovation of total factor productivity theory and method, which is rigorous in theory. They thoroughly studied the premise of measurement method and the scope of application of the model. They mainly use SFA, DEA, productivity index and other methods to discuss the development of green total factor productivity and its impact on agricultural development under the premise of considering factors such as time and space.

3. Analysis on Influencing Factors of Agricultural Green Total Factor Productivity

3.1. Regional geographical environment factors

According to the theory of spatial econometrics, within a certain area, the economic geography phenomenon or attribute value of a certain spatial unit is related to the same economic geography phenomenon or attributes value of the adjacent spatial units. If this relationship is not considered, assuming that the economic behavior is performed at a "point" that does not contain spatial dimensions, the accuracy of the model may be reduced, and the measurement results will become more unscientific. Policies formulated on this basis may produce deviations (Wang X, 2011). In the process of economic analysis, many data related to geographical space do not consider spatial dependence, and there may be errors in the results obtained by statistical and quantitative analysis on this basis. Any region will be affected by other regions, and each region will have economic social interactions with other regions. The tie between agricultural productions units are getting closer. From the perspective of regional agricultural green productivity level, the agricultural green productivity of agricultural production units will be affected by other surrounding areas. Therefore, when discussing which factors are related to agricultural green productivity, it is necessary to consider the mutual influence between different regions, especially adjacent regions, so as to reveal the influence of geographical factors on this productivity. The spatial measurement model is used to measure the agricultural green productivity under the influence of geographical factors.

3.2. Regional economic and environmental factors

The income level of rural residents

It can be seen from practical experience and economic theory that determine the income level of rural residents are the efficiency of agricultural production technology, the promotion of advanced technology, the use of agricultural resources and the methods of agricultural production. Interdependence is inseparable. If residents' income level is low, then interests will drive them to pursue agricultural output and income, thereby neglecting environmental protection. In the process of increasing the consumption of natural resources and inputting production factors, the local agricultural environment and resources will be destroyed and unreasonably used. The income level of residents

has increased, but changes in consumption structure and the changes in concepts will enable them to adhere to the concept of long-term, stable and healthy development, and provide guidance for the allocation of natural resources. Nowadays, people pay more attention to technology and management, the negative impact of human activities on the environment is reduced, and agricultural output is continuously increasing.

Adjustment of agricultural industrial structure

Considering that the productivity of different sectors and the extent of their changes are different, when more input factors are separated from low-productivity sectors, the total productivity will increase continuously. However, from another perspective, due to the changes in pollutant emission intensity and the differences in resource consumption between different industries, the adjustment of agricultural industrial structure has a significant impact on resource consumption and agricultural non-point source pollution emission. If the proportion of industries with a high degree of dependence on resources or serious pollution increases, the first rate of resource consumption will obviously increase, and the environmental pollution will increase; on the contrary, the rate of resource consumption will decrease and the environmental pollution will slow down. Therefore, the effect of the adjustment of agricultural industrial structure on agricultural green productivity remains to be proved.

Income gap between urban and rural areas

After conducting an in-depth study of economic growth and the income gap between urban and rural areas, scholars at home and abroad generally believe that: the development of China is driven by material capital, and the increase in income gap is conducive to the accumulation of material capital, so maintaining a reasonable income gap is helpful for economic development. When the economic development is at a climax, economic growth is mainly driven by human resources. However, the increase of human capital investment for low-income groups will be constrained by the income disparity, which will slow down economic development. When the income gap becomes more obvious, the low-income groups will be more likely to overuse natural resoures and increase the environmental damage in the process of using natural resources, but groups with higher incomes among the population will transfer their property to areas with low environmental risks. Local environmental governance does not have a high willingness to pay. After the gap gradually widens, no matter what kind of people they are willing to pay for resources and environment, their willingness to pay for resource and the environment is getting lower and lower, so it causes more pollution and consumption to the environment and resources.

Degree of regional industrial development

On the one hand, as the level of industrialization continues to increase, the flow of products and human resources will become more frequent, which will drive the dissemination of technology and information and inject impetus into the improvement of agricultural productivity. In addition, with the development of industry will prompt more rural laborers to move to cities and reduce the number of rural laborers. In this case, farmers may increase the use of chemical fertilizers to make up for the shortage of labor, and further aggravate the problem of environmental pollution.

The level of opening to the outside world

According to the perspective of international trade theory, increasing the trade theory,

increasing the degree of openness of the domestic market, or avoiding unreasonable trade policies as much as possible, will help to improve the rationality of resource in different sectors and allow more capital to flow in productive projects. The advancement of science and technology injects momentum, which is very beneficial to agricultural production. Some scholars have pointed out that the degree of market openness is a key factor in determining the terms of trade of agricultural sector. Further opening up will lead to an increase in the scale and intensity of agricultural production, which will lead to the massive use of chemical fertilizers and pesticides, as well as a substantial increase in water and land used for agricultural production, which will lead to a decrease in the quality of agricultural environment. Under the free trade environment, agricultural production that pollutes the environment will be continuously transferred to countries with relatively backward development level, causing their environment to be more severely polluted. However, some scholars believe that this impact is positive for resources and environment. The main theory is as follows: the increase in market openness is conducive to the optimization of resource allocation and technological exchanges, thereby improving environmental quality. With the continuous opening up to the outside world, there are also market pressures in the country. For example, after the environmental protection standards are raised, the investment in the environment will increase, and the environmental control policies will become stricter, which will undoubtedly greatly improved the environmental quality.

Regional industrial agglomeration

In a certain region, there are a large number of industrial capital elements in the same industry, which is called industrial agglomeration. The relationship between industrial agglomeration and economic growth is discussed. After considering the location and space factors, it is found that industrial agglomeration is directly related to each other. The role is to form economies of scale, control transaction costs in a lower range, and promote the improvement of the rationality of industrial structure, which has a positive effect on economic development. As early as 1980s, Winsberg, an American scholar, studied the agricultural industrial agglomeration in China, and thought that it was to increase the agricultural economy through the establishment of agricultural professional belt and industrial economies of scale (Chen X et al., 2011). In 2011, scholars Lv Chao and Zhou Yingheng took China's vegetable industry as an example to analyze the relationship between agricultural economic growth and vegetable industry agglomeration, and concluded that the adjustment of agricultural structure has a positive role in promoting industrial agglomeration, and provides a more powerful driving force for the economic development of vegetable industry. However, everything has both advantages and disadvantages, and so does industrial agglomeration, which will lead to an increase in the consumption of agricultural production resources and make environmental pollution more serious. Usually, in the process of agricultural industry development, industrial agglomeration will be limited by resource endowments, and the effective utilization rate of resources will increase with the development of the industry, followed by pollutant emissions. From a technical point of view, industrial agglomeration can promote the effective utilization of resources and slow down environmental pollution, because industrial agglomeration can promote the innovation and application of more environmentally friendly production technologies.

3.3. Rural human capital factors

In theory, agricultural productivity and human capital change in the same direction. The

improvement of human capital will promote the utilization rate of farmers' physical capital, thus promoting the innovation of knowledge and technology. At the same time, farmers' management level of production factors will be improved, and they can obtain and understand market information, making it more efficient, so as to promote the rise of agricultural productivity. In addition, people pay more attention to environmental pollution in the case of abundant human capital, so they will use environmental protection technology more actively in agricultural production to protect resources and environment in this way. Therefore, the role of human capital in the change of agricultural green productivity should be positive.

3.4. Factors of regional technological capital

Irrigation facilities play a key role in agricultural development. Increasing investment in such equipment will promote the improvement of agricultural productivity. In addition, the use of more advanced irrigation equipment helps to reduce the waste of water during irrigation, thus saving water resources consumed by agricultural production. Therefore, from the perspective of agricultural green productivity, this factor has a positive impact on it.

3.5. Institutional environmental factors

Rural system

Institutional innovation plays a great role in promoting agricultural growth. Most of the existing agricultural economic development policies are influenced by the changes of agricultural finance and price policies. The fiscal policy of supporting agriculture plays a very important role in agricultural growth. Agricultural technology extension and agricultural water conservancy infrastructure all need financial support policies for investment. For agricultural economic growth, financial support also plays a very important role. The financial support policies for agriculture will lead to the price change of agricultural products, and also have an impact on agricultural production activities, such as resource utilization mode, input structure and quantity of chemical elements, which will have different impacts on resources and environment. Therefore, the expected influence direction caused by this variable in agricultural green productivity needs to be verified and confirmed.

In terms of agricultural price policy, it is an existing agricultural price policy to control the price of means of production and agricultural products. For a long time, the minimum purchase price policy has been implemented, and a grain risk fund has been established to maintain the enthusiasm of producers to grow grain.

Look at the price policy of agricultural means of production formulated and implemented by the Chinese government. Before 2004, the government focused on adopting indirect subsidies measures in this respect, such as reducing the tax burden of agricultural machinery manufacturers, so as to control the price of means of production in a lower range. After 2004, the government shifted its policy focus to food subsidies, which are the most common in the purchase of agricultural machinery. On the one hand, it makes farmers have greater enthusiasm for the production of agricultural products. On the other hand, it injects more powerful power into the development of agricultural economy. However, if the price is too high, it will lead to the imbalance between supply and demand in the market, which will lead to the ineffective use of natural resources and the reduction of the difference rate of agricultural students. Therefore, for agricultural green productivity, this variable is expected to have a negative impact.

Government resources and environment control policy

As the core component of government regulation, resource and environment regulation means that when resource consumption and environmental pollution show uneconomical characteristics, it requires the government to regulate economic activities and achieve the balance between resources, environment and economic development through some policies and measures. From the perspective of agricultural pollution, the control policies implemented by the government can be divided into several types: first, the command control policy (such as prohibiting stocking animals in some areas and limiting fishing orders, etc.); Second, economic incentive policies (such as forcing fertilizer tax and providing subsidies for farmers who use green fertilizers); Third, resource planning policies (such as encouraging the use of low-pollution production technologies, etc.), of course, there are some other policies, such as providing education and training services for farmers. From the point of view of water resources, the government starts with specifying reasonable water price, and establishes an incentive mechanism to improve the idea of saving agriculture, improve the initiative and enthusiasm of water resource managers, and establish an ideal standard of agricultural water use efficiency.

The resource and environment control policy plays a significant role in improving the effective utilization rate of resources and reducing pollutant emissions. Of course, we should also realize that the implementation and implementation of any policy will consume certain social costs, which will lead to the crowding-out effect of the economy. This means that such policies have both positive and negative effects on productivity. In the past, people thought unilaterally that such policies would lead to an increase in production costs, thus offsetting the benefits of production investment and leading to a decline in industrial growth rate. However, technological innovation can use appropriate resource design to reduce costs and promote the improvement of product quality and production efficiency.

4. Suggestions on Improving Agricultural Green Total Factor Productivity

4.1. To promote the coordinated development of regional agricultural green industry

To improve agricultural green total factor productivity from the layout, firstly, deepening the cooperation between farmers and green enterprises, forming long-term orders according to market forecast, increasing farmers' income and enterprise benefits, stimulating local economic development and achieving win-win results. Secondly, on top of the green agricultural base, establish green industrial parks, forming industrial clusters, sharing supporting facilities and rationally allocating resources. Finally, increasing the government's efforts to introduce foreign capital, fully learning from foreign advanced production technology and management experience, building a leading enterprise in green agriculture, further expanding the industrial chain of green products, increasing the technological and cultural content of products, and enhancing their value. The industrial chain of production, processing and deep processing is formed inside the enterprise, and the logistics distribution, storage and sales channels are improved outside the enterprise, so that the green agricultural products can meet the different needs of the public without the restriction of region and time. To strengthen the construction of agricultural green industrialization and create a good industrial environment, it is necessary to standardize the existing green agricultural

products market, establish a special green agricultural products exhibition center, improve the logistics system, play the role of green agricultural products certification, and increase the tracking of agricultural products information to ensure the quality of green agricultural products. Innovating the sales model, using the Internet, new media and other promotion platforms to publicize the advantages of green agricultural products and release purchase information. Strictly controlling the quality of green products and building a green brand. The brand information is not only close to the daily life of consumers, but also can meet consumers' daily health needs, provide high-quality special needs and reflect the quality of agricultural products.

4.2. To improve the agricultural education and training system

Firstly, raise the awareness of developing agriculture through science and technology, and increasing farmers' knowledge reserve of agricultural science and technology. The state introduced policies and measures, provided financial and material guarantees, and guided and encouraged farmers to participate in modern agricultural knowledge training. Secondly, doing a good job in rural education infrastructure projects and vigorously promotes compulsory education. In the education system, we should reform the old system, introduce new ideas, provide perfect education and teaching equipment and conditions, ensure that every school-age child enters school on time, and guarantee and safeguard the right of education of minor children. Finally, actively cultivate and introduce new forces is necessary. Create policy welfare advantages, attract and retain agricultural high-tech talents, and make new contributions to the development of various undertakings in rural areas. It is also necessary to encourage local colleges and universities to actively participate in the training of agricultural professionals, and provide technical personnel guarantee and technical support for the development of agricultural economy in various regions. Colleges and universities in various regions can set up agricultural vocational and technical colleges as training bases for agricultural technical talents, and establish and improve agricultural technical grade evaluation system, which is helpful to understand the technical level of employees. Taking the community as a unit and setting up agricultural technical training groups in rural areas, this school-running mode with the community as the service network can provide education and training for farmers in an all-round, fast and convenient way.

Agricultural development is suitable for a diversified path of "government + colleges + agricultural base", relying on the scientific and technological achievements of various scientific research institutes to raise the level of scientific and technological agricultural production to a higher level. For agricultural institutions, it is necessary to develop new technologies with less investment and quick results according to the needs of local agricultural production, and strive to make agricultural technologies practical, easy to use and be learned; When popularizing new technologies, technicians should give full consideration to the actual situation of local farmers in Heilongjiang and impart new technologies to the masses in easy-to-understand language. For agricultural technology professionals, it is necessary to prove themself, and continuously absorb and introduce highly educated and high-level agricultural professors, and at the same time, strengthens the verification of new agricultural scientific and technological achievements to ensure that the scientific and technological achievements entering the agricultural production field are mature and effective. Agricultural technology personnel should play a good role as professional consultants, and answer and solve all kinds of

questions and problems in farmers' production process in time.

4.3. To build a regional agricultural technology extension system

In recent years, people's demands and requirements for green food are getting higher and higher. Therefore, it is necessary to vigorously build a technical research and development system for this series of products, and invest manpower, material resources, capital and technology to promote the large-scale and industrialized operation of green food. With its natural advantages, green agriculture has higher standards from the external ecological environment to the internal raw materials and technologies. The application of chemical fertilizers and pesticides should be cautious, but the current agricultural technology system cannot adapt to it. Therefore, it is necessary to rely on high technology (modern biotechnology, physical technology, etc.) to improve the agricultural green total factor productivity.

It is need new breakthroughs in innovative pest control, fertilizer and safe production to be paid more attention to match the research and development of green agricultural science and technology requires. From the perspective of aquaculture, we should pay attention to the research on the prevention, control and treatment of animal and plant diseases and insect pests; In the deep processing of agricultural products, more efforts should be made to match "green standard". On the one hand, the processing technology of green agricultural products should be improved, the industrial chain should be expanded, and the added value of products should be increased. On the other hand, the damage of green production to environment and resources should be effectively reduced. As far as new product research and development is concerned, besides researching and cultivating high-yield and disease-resistant varieties, we should also actively develop new fertilizers and improve planting and control techniques. In this way, on the one hand, the high yield of rice, wheat, beans and other crops can be realized. On the other hand, diseases and insect pests can be effectively resisted, and the residues of fertilizers and pesticides in crops can be reduced. From the perspective of innovative farming techniques, we creatively put forward conservation farming techniques and use modern high technology to improve the utilization rate of unit land and comprehensive productivity, so as to achieve the effect of increasing output and liberating labor; Using crop straw to produce biogas not only reduces the pollution of agricultural waste, but also gives consideration to energy conservation and environmental protection, which changes the production and lifestyle of farmers to a certain extent. For example, developing and popularizing technologies such as water-saving planting, no-tillage and grass covering can not only save water, reduce farmers' labor intensity, but also help to enhance soil fertility. Therefore, the development of conservation tillage technology is conducive to the efficient use of resources, while improving the production and environmental benefits.

4.4. To change the way of agricultural financial subsidies

Firstly, give subsidies to producers of agricultural green production. As an important part of participants in agricultural production, agricultural producers are generally reluctant to spend too much money on environmental protection organic fertilizer, non-residual pesticides, degradable plastic film, etc. Because of the obvious external characteristics of this green production behavior, it is difficult to change the inherent input mode of producers without strong financial subsidies. Therefore, the government needs direct subsidies in place, actively advocates agricultural green production mode, weakens the externality of

green production behavior, changes the factor input mode of producers from the root causes, and reduces the environmental pollution caused by agricultural production. At present, we should advocate agricultural green production behavior, such as sprinkler irrigation facilities, rotation and interpolating. Agricultural producers can widely apply organic fertilizer and farmyard manure, and build biogas digesters in villages, which can not only save resources, but also ensure the green production of agriculture. Government subsidies mainly support the green behavior of the above agricultural producers.

Secondly, give subsidies for the construction of agricultural projects. The construction of agricultural engineering requires the government to invest a lot of manpower, material resources and financial resources, so it has strong positive externalities. Considering the long-term interests of environmental protection, the construction of large-scale environmental projects, such as shelter forest construction projects, sand control projects and returning farmland to forests projects, will not only improve the local agricultural production environment, but also improve the overall environment. Water conservancy project and rural clean energy-biogas project are common in agricultural engineering construction. The above projects have obvious promotion function on agricultural green production, but they have certain influence on the agricultural production process and the interests of producers in the process of engineering construction. Therefore, the government should take into account the interests between agricultural engineering construction and agricultural producers when subsidizing agriculture, and make effective compensation with the marginal income of agricultural production as a reference to ensure the smooth progress of agricultural engineering construction.

Thirdly, give subsidies to green production enterprises. Subsidy targets cover environmental fertilizer production enterprises, green agricultural products processing enterprises and sales enterprises. Subsidies mainly include reducing taxes of green enterprises, increasing agricultural financial support and technical support to ensure smooth capital chain of enterprises. In terms of reducing the product cost of green enterprises, we should increase investment in scientific research, produce replaceable environmental protection products, and set up special funds to reduce the production cost of products, so as to facilitate the promotion of organic fertilizers. Vigorously publicize green organic agricultural products, improving market identifiability and guide green demand, and creating a good market for green production of agriculture.

4.5. To improve the green management and supervision system

First, it is necessary to improve the green policies and regulations. Green policies and regulations are of great significance to guide and restrain labor and consumption, and also effectively guarantee the healthy development of green agriculture. From the perspective of legislative, it should bring the development process of green agriculture into the monitoring system, and formulate and improve relevant laws and regulations of green agriculture. We should learn from the successful cases of green agriculture legislation abroad and formulate relevant legal provisions according to the actual situation of Heilongjiang Province. From the perspective of production environment, we should adhere to the principle of equal rights and obligations; constantly repair the Environmental Protection Law and other laws and regulations. From the perspective of building legal system, it should actively promote the construction of local standardized legal system. From the perspective of green food safety production, it is to revise and improve laws and regulations on product quality, hygiene and safety. For governments at

all levels, according to local conditions, it should constantly improve the legal system and build local laws and regulations according to local conditions. To build a sound green management and supervision system, we should pay attention to data collection and dynamic monitoring, so as to continuously improve the productivity level of green agriculture.

Secondly, it is to implement supervision and management. It should establish a strict environmental accountability system, strictly control and control enterprises with high energy consumption and serious pollution, improve laws and regulations, strictly control the whole production process from the examination and approval procedures, formulate a strict system of pollutant discharge permits and fees, and cooperate with environmental protection, water conservancy and other departments to strictly control the wastewater, waste gas and waste residue of enterprises. For some enterprises that have serious pollution hazards but have not taken corresponding measures, the supervision and administration department has the right to take compulsory measures and order them to make rectification within a time limit. Once environmental accidents are caused, the enterprises will be investigated for responsibility, ranging from administrative punishment to legal sanctions. By continuously improving the professional quality of inspectors, strengthening the public inspection of green agricultural products, and actively constructing the "management, prevention and control" system of green agricultural products. At the same time, reasonable allocation of supervision and management costs for green product production.

Finally, it should improve the public's awareness of power, encourage everyone to use the rights of participation, supervision and decision-making fairly and reasonably, continuously improve the public's awareness of environmental protection, and promote the continuous improvement of green agriculture supervision system by means of public participation. The state also has relevant supporting policies for livestock and poultry breeding industry. When making full use of the policy conditions, enterprises should also explore new channels for the utilization of waste resources from the perspective of their own long-term development, for example, taking the farmer + enterprise model, relying on agricultural science and technology to reduce carbon emissions, and taking the road of coordinated development. The construction of green agricultural system needs the government's strong guidance and support, and it needs to speed up the construction of green agricultural mechanism, formulate development norms, clarify responsibilities and rights, and help to realize the green development of agriculture.

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