

Theoretical and Practical Thinking on Green Agricultural Development

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Abstract: Promoting the green development of agriculture and rural areas is the essence of realizing Chinese-style modernization. In the new era, China's agricultural green development still faces problems such as insufficient policy appeal, limited space for coupling and coordinated development, limited application of technical scenarios, low universality of intelligence, weak awareness of farmers' subjectivity, and obstacles to digital governance. In this regard, this paper proposes to solve the dilemma at three levels: strengthening the top-level design, expanding the space for coordinated development, deepening digital transformation, improving the universality of technology scenario application, reshaping farmers' technical needs, and laying the main foundation, so as to comprehensively promote China's rural revitalization with green development.

1. Introduction

The report to the 20th National Congress of the Communist Party of China pointed out: "To build a modern socialist country in an all-round way, the most arduous and arduous task is still in the rural areas." Although China attaches great importance to the high-quality development of agriculture, the current challenges are still severe and cannot be ignored. These problems are mainly reflected in the lag of production efficiency, the imbalance of industrial structure, the lack of agricultural science and technology innovation ability, and the serious agricultural pollution, which greatly limit the leap of agriculture to higher quality development, and also restrict the steady growth of farmers' income and the overall advancement of agricultural and rural modernization. At a time when the world is advocating green development, this is not only the key to achieving sustainable development, but also represents the inevitable trend of the times. As the cornerstone of the national economy, the green transformation of agricultural economy plays a non-negligible role in the construction of the national ecological civilization system and the lasting prosperity of the economy. Therefore, promoting the green development of agriculture not only has a significant driving force for the green transformation of social economy, but also is an important issue that needs to be solved urgently.

2. Logical Argument for the Green Development of Agriculture

2.1. Green Agriculture is the Need for High-quality Development

In the construction and evolution of the national economic system, agriculture occupies an important position. In order to achieve a qualitative leap forward in China's economy, agricultural development should undoubtedly be given priority. On China's pursuit of efficient, harmonious and sustainable development, the concept of green and low-carbon development that integrates ecological, social and economic benefits has emerged, which points out the direction for rural economic development in the face of ecological challenges [1]. In this macro context, green and low-carbon development has not only become an inevitable choice for China's agricultural development, but also the core engine to promote agriculture to a high-quality stage. The green and low-carbon development of agriculture is mainly reflected in the following aspects: one is to promote the vigorous development of green and low-carbon agricultural industry, the second is to

strengthen the research and development and popularization of advanced green and low-carbon production technologies, the third is to cultivate green agricultural products rich in ecological value, the fourth is to widely adopt green processing technology, and the fifth is to actively promote environmentally friendly packaging materials. These measures aim to optimize the allocation and utilization of rural natural resources through green and low-carbon production methods, so as to have a positive protective effect on the ecological environment and promote the sustainable development of agriculture.

2.2. New Quality Productivity is Green Productivity

The green development of agriculture, as the core orientation of modern agricultural development, aims to achieve the harmony and integration of agricultural production and ecological environment. Green agriculture pursues the harmony and unity of economic and ecological benefits. Under the framework of green agricultural development, through the introduction of green production technologies and models, it not only enhances the market competitiveness and added value of agricultural products, increases farmers' income, but also realizes the dual improvement of economic and ecological benefits by reducing environmental governance costs and protecting the ecological environment.

3. The Practical Dilemma of Green Agricultural Development

Under the background of the new era, China's agricultural green development is still facing problems such as insufficient policy appeal, limited space for coupling and coordinated development, limited application of technical scenarios, low universality of intelligence, weak awareness of farmers' subjectivity, and obstacles to digital governance, which have greatly hindered the process of high-quality development of China's agriculture.

3.1. The Policy Appeal is Insufficient, and the Space for Green Agricultural Development is Limited

Although China has made continuous efforts in the green development of agriculture, a complete institutional framework and long-term mechanism that are compatible with the green development of agriculture have not been built at the macro level, which has weakened the enthusiasm and motivation of all parties to participate in agricultural energy conservation and emission reduction to a certain extent. At present, the rural digital governance system is characterized by "transient and non-persistent" in terms of collaborative operation, which reflects the lack of previous experience and a vague understanding of the future development direction.

First, from the national level, although the formulation of policies tends to be comprehensively considered, some provisions of the strategies in terms of energy conservation and emission reduction and green agricultural development have shown low adaptability and feasibility in local practice. Due to the distinctive regional characteristics, it is difficult to fully correspond to the actual situation of local agriculture, so that local governments face many challenges that deviate from expectations when implementing them [2]. The inadequacy of the monitoring mechanism leads to frequent adjustments in the process of policy implementation, which in turn weakens the effective implementation of the policy. In some regions, governments even have the phenomenon of selective implementation, which undoubtedly poses a big obstacle to the dual requirements of "carbon peak and carbon neutrality" in the agricultural sector.

Second, although the government plays a central guiding role in promoting the green development of agriculture, especially in the promotion of digital technology and the participation of farmers, the instrumental application of digital technology in practice often emphasizes too much on the form and ignores its intrinsic value. Although digital technology has improved the efficiency of government work, it has also increased the learning and work burden of grassroots cadres. Due to problems such as inconsistent data standards, non-transparent data use, and insufficient supervision, some management departments are unable to disclose basic agriculture-related data, which limits the improvement of governance system and policy implementation efficiency [3]. At the same time,

rural digital governance relies too much on policy support and financial subsidies, which not only increases the pressure on grassroots services, but also distorts the direction of governance, making it difficult for new productive forces to bear the economic costs of agricultural development.

3.2. The Application of Agricultural Green Development Technology Scenarios is Limited

First, in the whole chain of agricultural production, green and low-carbon transformation is particularly critical to the green development of agriculture. Although digital technology has the potential to fully empower agricultural production, its practical application scenarios are still limited due to factors such as technology access barriers. On the one hand, the use of digital technology in agricultural production is mainly limited to consulting services and e-commerce platforms, while the popularity of embedded technologies such as intelligent monitoring and precision fertilization systems is still low. On the other hand, even in non-embedded digital technologies, their in-depth applications are relatively limited, for example, digital financial services are mostly focused on transfer transactions, and the understanding and application of diversified financial products are insufficient. These limitations often stem from the high cost and complexity of digital technologies and differences in knowledge and skills among farmers, especially among small-scale farmers with limited resources, resulting in inefficient or idle use of technology.

Second, given that green and low-carbon agriculture has significant public good characteristics, it often faces the challenge of low profits. At present, the development of low-carbon agriculture in China is still in the early stage, and the trading mechanism of low-carbon agricultural products at the national, provincial and municipal levels has not yet been perfected, which makes it difficult for operators to obtain sufficient returns in market competition. What is more noteworthy is that compared with traditional agricultural production models, low-carbon agriculture requires higher cost inputs, which undoubtedly further compresses profit margins and makes the production of low-carbon agricultural products lack sufficient internal driving force in terms of economic benefits.

3.3. The Endogenous Driving Force for the Development of Low-carbon Agriculture is Insufficient

In the context of the new era, food safety has received unprecedented attention. At the public level, the growing desire for healthy and safe lifestyles is driving the continued demand for high-quality agricultural products. However, from the perspective of agricultural producers, the endogenous motivation of farmers to promote green and low-carbon production is somewhat insufficient, which has become a common and urgent challenge.

First, farmers pay more attention to economic benefits than ecological benefits. As the core driving force for the green transformation of agricultural production, green and low-carbon technological innovation has effectively reduced the carbon intensity and emission intensity of the energy structure through the continuous progress of green production technology, thereby curbing the growth of carbon emissions. However, at present, farmers' awareness of green and low-carbon technologies is still shallow and their participation is low, which stems from their lack of green and low-carbon awareness, which restricts the pace of independent innovation. In addition, compared with traditional production methods, green and low-carbon production is more resource-intensive, and it is susceptible to uncontrollable factors such as geography and climate, which makes farmers hesitate to adopt new technologies.

Second, farmers are challenged to master the technology for green agricultural development. Farmers often find it difficult to learn green technologies such as farmland conservation, water-saving irrigation, fertilizer and pesticide reduction and efficiency, and agricultural waste recycling. At the same time, in the process of practice, farmers rely too much on experience and ignore the application of new technologies, resulting in uneven quality of agricultural products and difficulty in meeting the standards of green development.

Third, farmers' awareness of green agricultural production is weak. Smallholder farmers' willingness to go green is positively correlated with their expected returns, and high profits will motivate them to be more motivated. However, the current concept of green agriculture production

is not widely used among smallholder farmers, and the economic benefits are still unclear, which inhibits their willingness to participate to a certain extent.

4. The Optimal Path of Green Agricultural Development

4.1. Strengthen Top-level Design and Expand the Space for Green Development of Agriculture

In order to effectively promote the transformation and upgrading of agriculture, it is necessary to strengthen the top-level design and institutional system construction of agricultural green development. First, in the field of agriculture, new quality productivity is embodied in the wide application of emerging formats and technologies such as smart agriculture, precision agriculture, and green agriculture. In the process of formulating policies, in view of the agricultural characteristics of different regions, strengthen the research and development of agricultural science and technology, popularize new agricultural technologies and varieties with strong adaptability and remarkable benefits, and improve the adaptability of agricultural production to the natural environment and the ability to resist risks. Second, policy innovation promotes the efficient allocation and optimal utilization of agricultural production materials, leading agriculture into a new stage of comprehensive digital and intelligent upgrading. The government should build a set of value-oriented digital technology application framework to ensure that digital technology promotes the green development of agriculture. This includes formulating a scientific and rational digital agriculture development plan, and clarifying the key areas and goals for the application of digital technology; Establish a digital agriculture technology standard and evaluation system to ensure the quality and effect of technology application; and strengthen the research and development and innovation of digital agricultural technology, and continuously introduce new technologies and models to meet the needs of green agricultural development. Third, the government should build a value realization mechanism for agricultural ecological products and promote the two-way synergistic integration of agriculture to ecological industrialization and industrial ecology.

4.2. Improve the Universality of the Application of Digital Technology Scenarios

The green development of agriculture urgently needs scientific and technological innovation as the core driving force. First, governments at all levels should build a sound scientific and technological innovation framework and platform to accelerate the incubation and application of high and new technologies, so as to deepen the penetration and application of new quality productivity in the green development of agriculture. In the face of the urgent need for green transformation of agriculture, we should plan and deploy cutting-edge technologies in a forward-looking manner, such as intelligent technology and quantum communication, and deepen the in-depth integration and innovative application of the Internet of Things, big data processing and advanced AI technologies in the agricultural field, and strive to achieve leapfrog innovation and breakthroughs in the field of agricultural science and technology. Second, the key to the digital transformation of agriculture lies in a sound infrastructure system. Therefore, the government should increase investment and construction of agricultural information infrastructure, and accelerate the optimization and upgrading of rural broadband networks, Internet of Things systems and big data centres, so as to lay a solid foundation for the application of advanced technologies such as intelligent monitoring and precision fertilization.

4.3. Cultivate Farmers' Concept of Green Agricultural Development

In the new stage of development, the green and high-quality development of agriculture requires the deep integration of science and technology, talent and innovation with traditional agricultural industries. First, in view of the limited awareness of farmers on green and low-carbon technologies, it is urgent to strengthen the education and training system and build a solid agricultural talent incubation base in the new era. Comprehensively improve farmers' awareness and practical application capabilities of green and low-carbon technologies, especially informatization and digital

means. At the same time, agricultural enterprises, cooperatives and other new agricultural business entities are encouraged to play a leading role in the demonstration of agricultural green development, and stimulate their enthusiasm for participation through on-site observation and experience exchange. In addition, a platform for the exchange of green and low-carbon technology innovation can be established to promote experience sharing and cooperation among farmers, and jointly promote the innovation and development of green and low-carbon technologies in agriculture. Second, it is necessary to deepen farmers' awareness of the importance of green technologies and increase their willingness to accept new technologies. The government and agricultural technology extension agencies should increase publicity efforts to show farmers the practical application effects of green technologies and their positive effects on sustainable agricultural development through on-site demonstrations and other forms. At the same time, the use of social media, network platforms and other modern means of information dissemination to broaden publicity channels, enhance the effect of publicity, so that the concept of green technology is deeply rooted in the hearts of the people. Third, establish a risk assessment and early warning mechanism for green agriculture to provide farmers with risk prevention and control information and suggestions in a timely manner, so as to reduce uncertainty and risks in their production processes.

5. Conclusion

The green development of agriculture in China is a complex and long-term systematic project, and the key lies in transforming the traditional agricultural development mode through technological progress and institutional innovation, so as to realize the synergy between economic development and ecological protection. Under the guidance of the "dual carbon" goal, the green development of China's agriculture has become an urgent task. However, at present, the driving force of China's agricultural green development is still insufficient, especially in terms of technical support, which still faces significant challenges and shortcomings. In order to effectively promote the green development of agriculture, it is necessary to further strengthen technological innovation and application to ensure that China's agriculture is steadily moving forward on the road of carbon emission reduction and sustainable development.

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