

A Review of China's Green Transformation of Agriculture in the Context of "Double Carbon"

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Abstract: China is in a critical period of economic transformation, and the green transformation of agriculture is inevitable. Building a new type of agriculture oriented to green and low-carbon is the key to green transformation, which requires improving the laws related to the agriculture of "double carbon", vigorously developing science and technology, and changing the agricultural development model.

Keywords: Low carbon agriculture, Carbon neutral, Carbon peaking.

1. Introduction

On September 22, 2020, in response to the threat posed by global climate change, China proposed a "double carbon" target, i.e. to achieve a "carbon peak" by 2030 and "carbon neutral" by 2060. "The "carbon peak" refers to the point in history when annual carbon dioxide emissions in a certain region reach their highest value and then enter a gradual decline, which is the point in history when carbon emissions change from increasing to decreasing, while "carbon neutral" refers to the state where carbon dioxide emissions are offset by carbon dioxide absorbed through afforestation. emissions are offset by the carbon dioxide absorbed by afforestation. Under this vision, agriculture, as the largest source of carbon emissions after the energy sector, has become an important demand for high-quality development of agriculture, and it should not only play the role of "carbon sink" in agriculture and use resources such as farmland and woodland to sequester carbon, but also reduce the amount of carbon emissions from agriculture as a "carbon source". "Therefore, the transformation of agriculture to green and low-carbon can not be delayed. At present, most countries in the world are working hard to achieve the goal of "double carbon", and new progress has been made at home and abroad in terms of agricultural development methods, technologies and laws, etc. However, due to the limitations of farmers' literacy and technical factors, the task of carbon reduction and sequestration in Chinese agriculture is still a long way off.

2. Current Status of Domestic and International Research

2.1. Overview of the development of green transformation of Chinese agriculture

Agriculture in eastern China reached the carbon peak earlier because of the developed economy, while agriculture in the west and northeast reached the carbon peak later. There are relevant studies on low-carbon agriculture model exploration and law-making technology in China, but the overall development is not as good as developed countries abroad due to factors such as farmers' quality and technology level, as well as the fragmentation of farmers and breeders, etc. The following is a list of China's studies on 'double carbon' The following is the research and overview of China's 'double carbon' goal and green transformation of agriculture.

2.1.1. Policies and Laws

According to Liu Mingming, because the "double carbon" target has been proposed for a relatively short period of time, no specific laws have been issued on agricultural carbon neutrality, but China has issued several laws and documents on carbon emission reduction, such as the Renewable Energy Law of the People's Republic of China in 2005, the Law of the People's Republic of China on the Promotion of Circular Economy in 2009, and the Law of the People's Republic of China on the Revitalization of the Countryside in 2021. The Law of the People's Republic of China on the Promotion of Rural Revitalization in 2021, etc. These laws mainly focus on preventing pollution generation, strengthening infrastructure and promoting waste utilization. Although they give China's low-carbon agriculture a law to follow and open up the precedent of China's low-carbon agriculture-related laws, they do not form a perfect legal system, lack regulations in some key areas, and lack effective supervision and feedback mechanisms and incentives. In the future, China's "double carbon" legislation on agriculture In the future, China's legislation on agricultural "double carbon" should focus on the above aspects.

2.1.2. New development model of agriculture

Zheng Yuyu pointed out that during the period of historical opportunity to achieve the goal of "double carbon", a new agricultural development model of resource-saving, green low-carbon and ecological recycling should be built. According to existing studies, China's agricultural development as a whole shows a pattern of high emissions and high output, and the indiscriminate use of chemical fertilizers, energy consumption pollution and pollution from planting and farming are still not completely solved, among which the problems of scattered farmers causing pollution that is difficult to handle and straw burning are still the key targets. According to the existing domestic studies, the analysis using generalized moment estimation (GMM) and other methods shows that the transformation of the new development model of agriculture needs to explore multiple paths to reduce carbon emissions, such as the promotion and utilization of clean energy, recycling of agricultural waste, carbon sequestration technologies such as agricultural farming, and the improvement of agricultural productivity, which is based on the ancient Chinese principle of "the unity of heaven and man". "According to the new economic development theory, China should strengthen the investment

in human capital, cultivate professional talents, and improve productivity. In order to develop green low-carbon agriculture, it is also necessary to recognize the special characteristics of agriculture in the "double carbon" target, and the use of agricultural production materials such as arable land, forest land and grassland to sequester carbon is also an effective carbon reduction development model. It is conducive to the construction of green low-carbon agriculture.

2.1.3. Science and Technology

China has been developing low-carbon agricultural technology and agricultural resources carbon sequestration technology, but there are still gaps compared with some developed countries, so we need to learn and exchange with international developed countries, mainly developing agricultural carbon sequestration technology, new energy technology and other technologies to reduce agricultural carbon emissions, using advanced technologies such as Internet of Things and artificial intelligence to achieve precise fertilization, matching market demand and production, and promoting green transformation of agriculture.

2.2. Overview of International Agricultural Green Transformation Development

Compared with the domestic situation, the development of low-carbon agriculture in the international arena varies, mainly divided into developed countries and less developed regions, such as Tanzania and other less developed countries basically rely on international assistance and government policies to provide funding and technology. The literature available shows that other countries have carried out corresponding research in the following aspects.

2.2.1. Policies and Laws

Developed countries have contributed a lot to the policies and laws at the level of green agriculture. The United States and Australia have creatively adopted carbon finance policies, controlled carbon emissions, set carbon taxes, and eliminated negative externalities in agricultural production based on the Pigeon Law; Germany's Eco-Agriculture Law has strict regulations on fertilizer use and farming methods, and has the advantages of severe penalties, transparent information, and strict enforcement, which have significance at the legal research level. scale, new energy application in agriculture and forest and geological carbon sink have clear legal regulations and policy support, which are of great significance to agricultural carbon environment reduction and agricultural environment improvement.

2.2.2. Agricultural development model

The developed countries in the West basically adopt the new cycle model of agriculture in the agricultural development model, and the representative country is the Netherlands. The Netherlands and other countries insist on developing the concept of circular agriculture, constantly innovating the circular model, insisting on the model of combining breeding and raising, optimizing the regional layout of various livestock, matching the number of livestock and poultry with the area of pasture cultivation in the region and the self-purification capacity of the land, and strengthening the application and promotion of recycling technology, except for the Netherlands, other developed countries have distinct development models for agricultural waste recycling, and the straw return rate in the United States reaches 90%, and the soil Zhang Bin points out that sustainable agriculture will be more competitive in the future,

even though short-term policies will affect the output of agriculture, long-term sustainable development policies will force agricultural productivity to improve, and it can be said that sustainable agriculture is also a future trend.

2.2.3. Science and Technology

Developed countries such as the U.S. and Canada have developed agriculture and abundant land resources, and there are many innovations and places to learn from in low-carbon agriculture technology. France has vigorously promoted the "Four Thousandths" program and called on the international community to actively participate in soil carbon sequestration. The U.S. has improved feed formulations to reduce methane and other gases from livestock intestinal fermentation, and the U.K. has reused methane from livestock as renewable energy by means of anaerobic water discharge. The Netherlands has made a lot of innovations in soil-less cultivation, precision fertilization, rainwater harvesting and other recycling technologies.

3. Summary

The green transformation of agriculture is of great significance to the realization of China's "double carbon" goal. This study mainly introduces the research results and development status of domestic and international low-carbon agriculture, and shows that the development of low-carbon agriculture and the realization of the "double carbon" goal should start from the following aspects: Second, domestic agriculture needs to change its development model, explore multiple paths to reduce carbon emissions, and build a new agricultural development model that is resource-saving, green, low-carbon, and ecological recycling; third, develop new technologies such as new energy technologies and soil carbon sequestration technologies to improve productivity and reduce carbon emissions, and vigorously research and develop technologies to enhance agricultural carbon sequestration and reduce agricultural carbon emissions. Third, to develop new technologies such as new energy technologies and soil carbon sequestration technologies, to improve productivity and reduce carbon emissions, and to vigorously research and develop technologies to enhance agricultural carbon sequestration and reduce agricultural carbon emissions.

China's "double carbon" goal was proposed late, the relevant laws are not perfect, and due to the quality of farmers and the level of science and technology, the current low-carbon agriculture model and technology application is not very perfect, and there is still a gap compared with developed countries abroad. In the future, we will focus on the above-mentioned aspects, strengthen international exchanges, improve laws and regulations, develop science and technology, and add bricks to the realization of the goal of "double carbon".

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