The Impact of Promoting the Green Development of Agriculture on Breaking Through Green Trade Barriers

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Abstract. In the new era, international trade invariably occupies a crucial position in the development landscape. The majority of countries, in an attempt to shield their domestic industries, routinely erect tariff and non-tariff trade barriers. Among them, the green trade barrier represents a significant type of non-tariff trade restriction. In recent years, with the escalating severity of green trade barriers, China's agricultural product exports have been confronted with novel challenges. This paper centers on the impact of the green development of agriculture on surmounting green trade barriers and conducts a comprehensive literature review and a profound theoretical analysis of the influence mechanism between the two. Based on the theoretical analysis outcomes, it is manifest that the green development of agriculture not only has a direct positive effect on strengthening the breakthrough of green trade barriers but also can indirectly penetrate them by influencing the implementation of ISO certification. Moreover, with the continuous green development of agriculture in the future, the influence of green trade barriers will be further diminished. Most notably, this research can provide a powerful policy support foundation for the fields of agricultural trade policy formulation and environmental policy-making. It assists decision-makers in devising more judicious and effective strategies, enhancing the international competitiveness of agricultural products, and fostering the harmonious coexistence of economic development and environmental protection in the agricultural sector.

Keywords: Degree of green trade barrier, Agriculture green development, ISO14001.

1. Introduction

1.1. Research Background

As the pace of globalization quickens steadily, international trade assumes a pivotal and indispensable role in the economic growth of nations around the world. Agriculture, as a foundational and essential industry, with its import and export of agricultural products, serves as a vital and crucial link that connects the supply and demand across different countries. In recent years, there has been a remarkable and continuous upsurge in environmental protection awareness, and consumers have become increasingly demanding and exacting when it comes to food safety and quality. Consequently, environmental protection has gradually evolved into one of the key and significant conditions for controlling and regulating international trade. Green trade barriers have thereby emerged on the scene and have become a strategy adopted by some developed countries to limit the trade of developing countries under the guise of environmental protection [1]. The majority of developed countries have meticulously formulated and implemented strict environmental laws, regulations, and standards, aiming to comprehensively regulate the entire lifecycle of agricultural products, from the production stage to the sales phase. For example, major agricultural product importing economies, including the European Union, the United States, and Japan, have rolled out a series of elaborate and extremely stringent detection indicators and certification requirements in relation to issues such as pesticide residues, excessive levels of heavy metals, genetically modified components, and carbon emissions. These green trade barriers have posed an unprecedented and formidable challenge to the agricultural product exports of numerous countries. A substantial quantity of goods has been rejected at the border due to their failure to meet the established standards, leading to a frequent occurrence of trade frictions.

As a large agricultural country, China's agricultural product exports play an irreplaceable role in boosting rural economic growth, increasing farmers' incomes, and ensuring employment. In recent

years, the Central Committee of the Communist Party of China has attached great importance to the development of green agriculture. The No. 1 Central Document in 2022 emphasized the need to promote the green development of agriculture and rural areas. The National Plan for the Green Development of Agriculture during the 14th Five-Year Plan period clearly put forward the goals and work arrangements for the green development of agriculture during the 14th Five-Year Plan period.

However, at the current stage, with the obvious acceleration of social and economic development, the expansion of the population, and the increasing constraints of resources and the environment, the potential risks to the quality and safety of agricultural products are still evident, making it difficult to meet the increasingly stringent green access conditions in the international market [2]. At the same time, Chinese consumers' demand for green, organic, and safe agricultural products is also growing day by day, forcing the agricultural industry to accelerate its transformation and upgrading. Under these dual pressures, promoting the green development of agriculture has become the only way for China's agriculture to achieve sustainable development and enhance its international competitiveness.

1.2. Research Significance

In terms of theory, this study contributes to enriching the interdisciplinary research field of agricultural development theory and international trade theory. By constructing a systematic theoretical framework, it is possible to further analyze the synergistic effects of the green allocation of agricultural production factors, the application of green technological innovation, and the promotion of ecological agricultural models in the process of breaking through green trade barriers. This can provide new theoretical perspectives and analytical paradigms for subsequent related academic explorations.

In terms of practical application, the research findings can provide a certain basis for decision-making in formulating scientific and reasonable agricultural industrial policies and trade promotion policies. The government can specifically increase its support for the key aspects of the green development of agriculture, guiding the agricultural industry to move towards the direction of being green, efficient, and internationalized. At the same time, in international economic and trade negotiations, relying on a solid industrial foundation, the government can strive for more favorable trade conditions and safeguard the interests of the domestic agricultural industry.

2. Literature Review

2.1. Concept Definition

There is no unified standard definition of green trade barriers internationally, and there is still some controversy about it in the academic community. Chinese scholars define it according to their relevant research. By summarizing and comparing some representative definitions put forward by Chinese researchers, this paper defines green trade barriers as follows: Green trade barriers refer to the measures taken by some developed countries to restrict the import of foreign goods. They use the pretexts of safeguarding human life and health, protecting the ecological environment, and ensuring the rational utilization of natural resources, etc., in order to protect the development of their own national economies [1].

The Organization for Economic Co-operation and Development (OECD) defines green development as promoting economic growth while ensuring that natural capital can continuously provide resources and environmental services. Developing green agriculture means respecting the laws of biological production, the laws of the ecological environment, the physiological laws of the human body, and the law of value [3].

The green development of agriculture is a specific manifestation of the new development concept in the fields of agriculture and rural areas. It emphasizes the greening of the agricultural production environment, the industrial chain, and agricultural products. The core essence is to comprehensively coordinate the economic, social, environmental, and ecological benefits of agricultural development,

so as to achieve the goals of resource conservation, environmental friendliness, ecological conservation, and economic growth.

The behavior of green agricultural development adheres to the unity of economic benefits and ecological benefits. While paying attention to the protection of agricultural resources and the environment, it promotes green ecological agricultural technologies, produces green agricultural products, and practices green agricultural production methods and other behaviors [4].

The ISO14001 standard is an environmental management system certification standard formulated by the International Organization for Standardization (ISO). It is the core part of the ISO14000 series of standards and aims to describe the requirements of the certifiable Environmental Management System (EMS). Enterprises undergo quality certification to align with international quality standards and meet users' requirements for a sense of quality security.

The international conference (Earth Summit) held in Rio de Janeiro, Brazil in 1992 discussed global environmental issues and adopted the action plan "Agenda 21". It was precisely against this backdrop that ISO14001 was developed. In 1996, the International Organization for Standardization introduced ISO14001, which established international standards for environmental management, namely the ISO14000 series.

The basic principle of ISO14001 is that "all types of organizations achieve their own environmental policies and environmental objectives by managing their activities, products, and services, and demonstrate this through their activities, products, and services related to the environment".

2.2. Theoretical Research

The current green trade barriers in international trade possess the following characteristics: legality, concealment, discrimination and unfairness, extensiveness and relevance, as well as timeliness and development [5]. The provisions in some environment-related documents ostensibly aim to protect the ecology, as well as human beings and nature under the principles of scientific justifiability, equal national treatment, and non-discrimination, and to implement corresponding environmental protection norms and policies. However, in reality, many countries take the opportunity to implement excessive trade protection policies.

Meanwhile, the history and progress of technological development in some developing countries lag behind those of developed countries. Therefore, it is also unreasonable to impose uniform standards and rules on all countries. In recent years, green trade barriers have shown a trend of continuous heightening and widening.

The formation of green trade barriers is attributed to rather complex reasons. With the acceleration of social and economic development, the natural environment has been deteriorating day by day, and global environmental issues have drawn increasing attention from people. Nowadays, the living standards of people around the world have improved. Especially in developed countries, people have paid growing attention to the impact of products on their own health, and the concept of green has taken deeper root in people's hearts. At the same time, the frequent occurrence of severe pollution and ecological disasters has also brought people concerns, prompting the introduction of more regulations related to greenness and health.

In terms of international trade, traditional trade barriers have gradually been subject to more restrictions and weakening [6]. The means of traditional trade barriers are relatively obvious, so they are easily restricted and condemned by international organizations and relevant treaties, and are more vulnerable to direct countermeasures from opponents. As a type of non-tariff trade barrier, green trade barriers are characterized by their concealment. Therefore, trade protectionism in many developed countries increasingly resorts to this type of trade barrier to effectively safeguard the competitiveness of their own countries in the increasingly fierce international trade market.

The green development of agriculture requires continuous innovation in technologies and management models. When enterprises participate in the development of green agriculture, they will increase their investment in research and development and enhance their own innovation capabilities.

The improvement of such innovation capabilities also helps enterprises to better implement the management system required by ISO certification [7]. At the same time, during the process of green agricultural development, the government usually introduces a series of policy measures to support and guide the development of enterprises. These policy measures may include providing rewards, subsidies or preferential support to enterprises that have obtained ISO certification [8].

The green development of agriculture has received substantial support from national policies, which can boost the development of rural areas and agriculture and contribute to the construction of an environmentally friendly society. At the same time, the green development of agriculture is conducive to promoting economic growth, especially high-quality economic growth. For instance, recent studies have shown that the digital economy has a significant positive impact on the green total factor productivity of agriculture [9].

By improving the quality and safety of agricultural products, green agricultural products can meet consumers' demand for healthy food, thereby gaining a competitive edge in both domestic and international markets. As a result, it is possible to enhance the competitiveness of agricultural products, break through green trade barriers, and advance the construction of export-oriented agriculture [10].

ISO14001 provides enterprises with a systematic environmental management approach, assisting them in identifying and managing environmental factors, thus enhancing their environmental management level. It is applied across various industries. By implementing ISO14001, enterprises can establish an environmental management system, clarify environmental policies and objectives, formulate environmental management plans, and carry out environmental monitoring and measurement. At the same time, it can also reduce environmental risks, avoid legal liabilities and economic losses caused by environmental issues, and continuously improve environmental performance [11].

3. Impact Mechanism Analysis

Many scholars have conducted research on the ways to break through green trade barriers. Nie Zhengyan et al. demonstrated through case studies that measures such as promoting green agricultural production, improving the level of agricultural product exports, actively applying for green certifications, and establishing a scientific early - warning response system can be adopted to address and break through unreasonable trade barriers [12]. Meanwhile, strategies such as implementing a brand strategy, strengthening product innovation and increasing added value, implementing an environmental standard system, developing environmental - standard products, developing green markets, developing green products, and conducting green marketing can be employed to circumvent green trade barriers [13]. Existing research has shown that implementing ISO certification can be regarded as one of the important measures to cope with green trade barriers [14]. Moreover, measures for developing green agriculture, including promoting green ecological agricultural technologies and producing green agricultural products, are among the methods mentioned above to avoid unreasonable green trade barriers. Based on this, this article proposes the influence mechanism of agricultural green development on breaking through green trade barriers, as shown in Fig. 1.

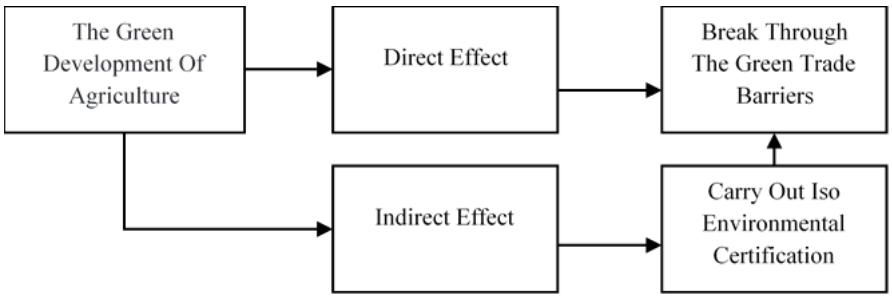

Figure 1. Influence Mechanism Diagram of the Green Development of Agriculture on Breaking through Green Trade Barriers

4. Case Analysis

4.1. The Case of Jinxiang, Shandong Province

As a renowned "Hometown of Garlic", Jinxiang in Shandong Province has set a highly referential example in promoting the green development of agriculture to break through green trade barriers. Relying on its profound foundation of garlic cultivation, after years of arduous development, Jinxiang County has established an industrialized development model for agricultural products that integrates "large-scale cultivation, branded operation, and a layout covering the entire industrial chain". It has achieved remarkable results in breaking through green trade barriers and expanding export markets.

In the link of green planting, based on the actual situation of industrial development and market demand, Jinxiang County has issued the "Guiding Opinions on Promoting the Construction of the Standard System for Jinxiang Garlic". This opinion has established a framework for the standard system of Jinxiang garlic covering six major aspects and three levels, and has clarified the core tasks such as the construction of the standard system, the development of standards in key areas, and the implementation and promotion of standards. It has also proposed multi-dimensional guarantee measures in terms of working mechanisms, work guarantees, technical support, etc. in a supporting manner.

Among them, four group standards such as "Jinxiang Garlic" have meticulously regulated the quality requirements, test methods, inspection rules, logos and signs, packaging, transportation and storage of Jinxiang garlic, laying a solid foundation for improving product quality, helping enterprises effectively avoid technical trade barriers, and promoting the standardized and regulated development of the industry. The "Technical Regulations for Garlic Planting in Jinxiang" focuses on the whole process of garlic planting, including the production area environment, agricultural inputs, cultivation management, comprehensive prevention and control of diseases, pests and weeds, harvesting and file management. It aims to solve the stubborn problems such as the extensive production mode under the traditional planting model, significantly improving the yield and quality of garlic, and laying a solid foundation for breaking through green trade barriers.

At present, Jinxiang County has about 700,000 mu of garlic planted throughout the year, and the total output can reach more than 800,000 tons.

In order to ensure the quality of garlic from the source, Jinxiang County has been actively promoting the standardization and organic cultivation of garlic planting. Take the Organic Garlic Base of Huaguang Group in Jinxiang County as an example. This base is located in Xili Village, Dongli Village, Lihanglou Village and Guomiao Village of Jishu Town. It belongs to the well irrigation area, with abundant underground water resources, excellent water quality, fertile soil, high organic matter content, superior isolation conditions, a good ecological environment, and no pollution from "three wastes" (waste gas, waste water and industrial residue).

Huaguang Group has made full use of the advantage of the developed breeding industry in the surrounding villages. It has scientifically applied farmyard manures such as livestock and poultry manure to garlic planting, reducing the use of chemical fertilizers and practicing the concept of green planting. At the same time, the group has made substantial investments in infrastructure construction. It has successively invested 250,000 yuan in equipping advanced monitoring equipment to standardize the traceability system of the base; invested 600,000 yuan in building isolation fences, hardening production roads and renovating isolation ditches; invested 50,000 yuan in creating green belts; invested 160,000 yuan in purchasing physical pest control equipment such as sticky insect boards, sweet and sour basins and insecticidal lamps; invested 60,000 yuan in building a nursery; and invested 300,000 yuan in drilling new machine wells to improve irrigation facilities.

In addition, the group has established a special leading group for base construction and a technical guidance group, and hired agricultural technology experts. Through holding on-site training sessions and distributing technical brochures on planting, it has improved the organic agricultural technology level of farmers to ensure that the whole process of garlic planting complies with green and organic standards. Thanks to the strict green production control, Jinxiang garlic far exceeds the strict

international standards in key indicators such as pesticide residues and heavy metal content, successfully crossing one green trade threshold after another.

In terms of industrial upgrading and innovation, Jinxiang County has actively established in-depth strategic cooperation relationships with more than 40 universities and research institutions, including the Chinese Academy of Sciences and the Chinese Academy of Agricultural Sciences. It has established 24 high-level scientific and technological research and development platforms, covering the Chinese Garlic Functional Food Research Center, the Shandong Garlic Engineering Technology Research Center, etc.

These platforms have obtained more than 100 independent intellectual property rights in key areas such as garlic germplasm innovation, variety improvement, and technology upgrading, which has effectively promoted the transformation of the garlic industry from the traditional "farmhouse garlic" to the modern "scientific and technological garlic". For example, Wang Chenggang, a staff member of Jinchunyu Seed Industry, introduced that the enterprise has established an international garlic germplasm resource bank, collecting 468 garlic varieties from around the world, expanding the garlic gene pool and providing solid support for cultivating excellent new varieties.

The local area has also explored the application of space breeding technology to crack the "code" of fine seeds, injecting high-quality seed sources for increasing garlic production and breaking through the yield bottleneck. Empowered by science and technology, Jinxiang garlic has not only increased in yield but also achieved a qualitative leap in quality. Relying on its excellent quality, it has won a good reputation in the international market and further expanded its export territory.

In the aspects of sales and trade, Jinxiang County has established several information technology service platforms and industrial parks, including the International Garlic Capital Center, Jinxiang County Cross-border E-commerce Digital Trade Industrial Park, the "Garlic Connects the World" Garlic Information Service Platform, and the "China · Jinxiang Garlic Index". These platforms provide all-round information support for garlic trade.

Meanwhile, the local area offers menu-style financial services tailored to each enterprise. The Jining Inland Port has been opened and operated, and the National Inspection Trade Facilitation Service Center has been established, enabling garlic enterprises to enjoy a convenient one-stop customs clearance process that includes harvesting, packing, customs declaration, and inspection and release locally.

At present, there are more than 900 enterprises in Jinxiang County that have the right to conduct self-operated import and export business. Garlic from Jinxiang is exported to more than 170 countries and regions, and its export volume accounts for more than 70% of the export volume of similar products in China. The foreign exchange earnings from the export of this single agricultural product have ranked first in the country for consecutive years.

In 2023, the online retail sales of garlic in Jinxiang County reached 800 million yuan, a year-on-year increase of more than 60%. The sales model that integrates online and offline channels has enabled the market share of Jinxiang garlic in the international market to continue rising.

After a long period of development, Jinxiang garlic has successively won the honorary titles such as a Well-known Trademark of China, a National Famous, Special, Excellent and New Agricultural Product, and the Geographical Indication Certification of the European Union. It has won the Gold Award of the International Organic Food Expo for nine consecutive years, and its brand value has soared to 21.819 billion yuan.

By promoting the green development of agriculture and making efforts in all links of the whole industrial chain including planting, processing and sales, Jinxiang garlic has successfully broken through the green trade barriers, realized the efficient connection from "cultivation, sowing and harvesting" to "production, processing and marketing", and consolidated its status as the "Five Major Centers" in the world garlic industry. This has injected strong impetus into the development of the county economy and the increase of farmers' income and prosperity, and also provided valuable experience and reference for agricultural products in other regions to break through green trade barriers.

4.2. The Case of Apple Industry in Shaanxi Province

Shaanxi Province is a major apple-producing area in China. In recent years, the local area has been actively promoting the green development of the apple industry. In terms of orchard management, green agricultural technologies such as replacing chemical fertilizers with organic fertilizers and green prevention and control of diseases and pests have been vigorously promoted. For example, in apple-producing areas like Luochuan, physical control methods such as installing solar insecticidal lamps and hanging insect traps are adopted to reduce the use of chemical agents. Meanwhile, fruit growers are also encouraged to plant green manure to improve the soil structure. In terms of industrial chain extension, the green control of the apple processing process has been strengthened to improve the quality of processed products such as apple juice and preserved fruits and reduce pollution emissions in the processing links.

Many apple enterprises in Shaanxi Province have actively responded to the call for green development and carried out the ISO14001 environmental management system certification. Taking the Haisheng Group as an example, during the certification process, the enterprise has identified and evaluated environmental factors in the entire industrial chain from orchard planting to product processing and sales. In the orchard planting link, the irrigation system has been optimized to improve the efficiency of water resource utilization. In the processing link, waste water and waste gas are strictly treated to ensure up-to-standard emissions. Through continuous improvement of the environmental management system, the enterprise has achieved remarkable results in aspects such as resource conservation and pollution reduction.

With the help of the green development of agriculture and the ISO14001 certification, the recognition of Shaanxi apples in the international market has been greatly improved. According to the statistics of Xi'an Customs, in 2022, the export volume of fresh apples from Shaanxi was 37,800 tons, a year-on-year increase of 1.61%; the export value was 41.2694 million US dollars, a year-on-year increase of 3.59%.

In the markets of countries along the Belt and Road Initiative such as Russia and Kazakhstan, Shaanxi apples, relying on their green and environmentally friendly advantages, have successfully broken through local green trade barriers regarding the pesticide residues of fruits and the environmental friendliness of packaging materials, and have become popular fruit products among local consumers. Some importers have reported that the ISO14001 certification has given them more confidence in the quality and environmental protection of Shaanxi apples, which has promoted the in-depth development of trade cooperation [15].

5. Conclusion

Through the review and summary of relevant literature as well as the analysis of two typical cases, this paper has finally drawn the following conclusions. Theoretically speaking, the green development of agriculture has a certain direct positive promoting effect on breaking through green trade barriers. Moreover, the green development of agriculture can also indirectly promote the breaking through of green trade barriers by facilitating the implementation of the ISO14001 certification. In other words, it can effectively break through green trade barriers.

In the future, it will be possible to collect data and conduct empirical analysis, strengthen the combination of empirical research and theoretical exploration, and conduct further research on the long-term effects of the green development of agriculture on breaking through green trade barriers.

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