

Exploring the Inner Mechanism and Logic of Green Finance to Reshape the Agricultural Value Chain

Yichen Yao^{1, a}, Qingyi Xue^{2, b}, Yaolei Yang^{3, c}

¹Zhengzhou University International College, Finance, Henan, Zhengzhou, 450000, China

²Zhengzhou University International College, Accounting, Henan, Zhengzhou, 450000, China

³Zhengzhou University International College, Economics, Henan, Zhengzhou, 450000, China

^ayyc001014@stu.zzu.edu.cn, ^bxqy0613@stu.zzu.edu.cn, ^c202084040425@stu.zzu.edu.cn

Abstract

At present, the financial products developed for agricultural value chain are not supported by the main line of green finance, and there are still a series of problems that cannot be ignored in helping the development of each main body of agricultural value chain. The article innovatively decomposes the process of reshaping agricultural value chain by green finance at three levels, and explores the inner mechanism of reshaping agricultural value chain by green finance from three aspects: value discovery, integration and reshaping, and derivative innovation. In this way, the problems of lack of credit mechanism, high transaction cost, and contradiction between supply and demand of rural value chain finance in the development process of traditional agricultural value chain can be solved. Relevant suggestions are provided for China to promote the construction of green agricultural value chain and realize green and sustainable development of agriculture.

Keywords

Green finance; Agricultural value chain; Three-level decomposition; Green and sustainable development.

1. A Preliminary Exploration of Green Finance

1.1. Green Finance Concept and Development Status

1.1.1. The Concept of Green Finance

The concept of green finance first appeared in the Equator Principles (EPs) formulated by some private banks in 2003. Since then, foreign scholars have also used the Equator Principles to study the green finance business of commercial banks. [1] Green finance generally refers to a series of economic activities to achieve efficient use and conservation of resources, combat climate change, and support environmental improvement, i.e., financial services for risk management, project operation, project investment and financing in the fields of green buildings, green transportation, clean energy, energy conservation and environmental protection. [2] Among them, the financial services include green credit, green bonds, green funds, green insurance, carbon finance and other financial instruments and related institutional arrangements.

1.1.2. Current Situation of Green Finance Development

In recent years, with the introduction of relevant policies and strong support from the government, China has made significant breakthroughs in the practice of green finance. China has been at the forefront of the international community in terms of top-level design, policy

system and early and pilot implementation of green finance, and has formed a unique development model. [3] As shown in Table 1.

Table 1. China's policies on supporting green financial development

Issued time	Name of the file	Related Contents
August 2016	Guiding Opinions on Building a Green Financial System	The important role of the securities market was clarified, requiring the unification of criteria for defining green bonds, the gradual establishment and improvement of a mandatory environmental information disclosure system for listed companies and debt-issuing enterprises, and the establishment of a more complete financial system.
June 2017	Development Plan for the Construction of Standardization System in the Financial Sector (2016-2020)	Take the green financial standardization project as one of the key projects of financial industry standardization in the "13th Five-Year Plan" period.
November 2018	Green Investment Guidelines (Trial)	The fund manager should provide financial services to support environmental improvement, climate change and resource conservation and efficient use of resources, as well as the basic principle that priority should be given to relevant green industries and enterprises in the investment process.
November 2019	Decision on Several Major Issues of Adhering to and Improving the Socialist System with Chinese Characteristics and Promoting the Modernization of the State Governance System and Governance Capacity	Improve the legal system and policy orientation of green production and consumption, develop green finance, promote market-oriented green technological innovation, and more consciously promote green recycling and low-carbon development.
July 2020	Notice on the Organization of Green Industry Demonstration Base Construction	Increase support for green credit and green bonds, and support green industry demonstration bases to carry out green financial innovation.
February 2021	Guiding Opinions on Accelerating the Establishment of a Sound Economic System for Green, Low-Carbon and Circular Development	Strengthen the support of laws and regulations, improve the price mechanism of green charges, increase financial and taxation support, vigorously develop green finance, improve green standards, green certification system and statistical monitoring system, and cultivate green trading market mechanism.
June 2021	Green Finance Evaluation Program for Banking Financial Institutions	The quantitative indicators of green finance evaluation include four items, such as the proportion of total green finance business, the proportion of share of total green finance business, the year-on-year growth rate of total green finance business, and the proportion of total green finance business risk.

1. The scale of green financial market is expanding, and green credit continues to develop healthily. By the end of March 2020, the balance of domestic and foreign currency green loans in China was 13.03 trillion yuan, an increase of 24.6% year-on-year, higher than the growth rate of various loans by 12.3 percentage points, of which the loans invested in projects with direct and indirect carbon emission reduction benefits were 6.47 trillion yuan and 2.29 trillion yuan respectively, accounting for 67.3% of green loans in total. From 5.20 trillion yuan at the end of 2013 to 13.03 trillion yuan at the end of March 2020, the scale of green credit has maintained steady growth. (Data source: Chinese government website www.gov.cn/xinwen/2021-05/03/content_5604505.html) Second, credit quality is good overall, with the non-performing

rate at a low level. For example, at the end of June 2017, the balance of non-performing loans for energy-saving and environmental protection projects and services of major domestic banks was 24.17 billion yuan, with a non-performing rate of 0.37%, which is 1.32% lower than the non-performing rate of all other loans. (Data source: China Banking and Insurance Regulatory Commission <http://www.cbirc.gov.cn/cn/view/pages/ItemDetail.html?docId=171047>)

2. In June 2017, the State Council set up pilot zones for green financial reform and innovation in six provinces and nine regions to explore the "bottom-up" path of local green financial development and promote green financial development. The pilot zones have been set up by the State Council in June 2017 in six provinces and nine places to explore the "bottom-up" path of local green financial development and promote the vigorous development of green finance. Based on the existing policies, the pilot zones have innovatively introduced brand-new policy documents in the fields of standards, regulation and incentives to further regulate the institutional mechanism of green financial reform, promote the accelerated development of green finance and stimulate the development vitality and momentum of green financial market players.

3. China's green financial system has been improved, multilateral cooperation has been deepened, and it has actively participated in global economic and financial governance. 2018 has promoted the formation of the concept of common development of green finance globally under the framework of the Group of Twenty (G20) and widely carried out international cooperation in the field of green finance. 2021 In April, the People's Bank of China and others released the Catalogue of Green Bond Support Projects (2021 Edition) to make green projects The definition standard is more scientific and accurate, and the bond issuance management mode is more optimized, and for the first time, it unifies the definition standard of green projects by the relevant management departments of green bonds; it provides a stable framework and flexible space for the development of green bonds in China, and further promotes the international cooperation in the field of green finance.

4. Green financial pilot products into the countryside, green finance to help rural economic development. Compared with the traditional agricultural production method, which is simple and crude, with low utilization rate of resources and low commodity rate of agricultural products, green finance has sufficient capital and can easily produce scale benefits, and relies on the concept of sustainable development, using green financial tools to alleviate the problem of insufficient agricultural capital input. For example, the Agricultural Bank of China has used green leasing as a financial tool and adopted the financing model of "direct leasing of equipment + project loan" to create a farm-bank leasing platform to help local development; PICC and China United Insurance Company have issued "green bonds" to provide financial support for The government of Gansu Province adopts the structure of "mother fund + sub-fund" to issue "green fund" to support the construction of recycling agriculture, Gobi agriculture, high-efficiency water-saving agriculture and other green ecological industry projects. Ltd. is the first green bond issued by a local investment and financing platform in Guizhou Province, with agricultural planting projects as the main bond issuance project; Zhejiang Taelong Bank is issuing green loans to villages or cooperatives in the ecological fishing industry, etc. Therefore, the development of green finance is conducive to the green development of the countryside and the urgent need to promote rural revitalization.

However, there are some problems in China's green finance at this stage. First, the policies and systems related to rural green finance still need to be improved, and China has not yet established a perfect environmental protection information mechanism or introduced relevant laws and regulations. Second, financial institutions still face the risk of collateral guarantee when they participate, and more and more new rural business entities are asset-light operations and lack collateral in the legal sense. [4] Third, there is no unified definition of green agriculture standards, and the development concept still needs to be strengthened.

1.2. Review of the Current Situation and Problems of Agricultural Value Chain Development from the Perspective of Green Finance

The strategy of revitalizing the countryside is a major strategic decision in the report of the 19th Party Congress, which is a strategic arrangement made by the Party Central Committee with an eye on the goal-oriented approach of "two hundred years" and the problem-oriented approach of short legs and short boards in agriculture and rural areas. The strategy of rural revitalization is to adhere to the priority development of agriculture and rural areas, further adjust and rationalize the relationship between industry, agriculture and urban-rural areas, give priority to the allocation of factors, guarantee resources and public services, accelerate the economic development of agriculture and rural areas, speed up the shortcomings in public services, infrastructure and information circulation in rural areas, and significantly narrow the gap between urban and rural areas. And industrial revitalization is the focus of rural revitalization. The focus of rural revitalization is to take agricultural supply-side reform as the main line, accelerate the construction of modern agricultural industrial system, production system and operation system, promote the shift of agricultural production increase orientation to quality improvement orientation, improve agricultural innovation, competitiveness and total factor productivity, and realize the integrated development of rural one, two and three industries. [5]

1.2.1. Current Situation of Agricultural Value Chain Development

Agricultural value chain refers to the negotiation, game and finalization of the linkage among the stakeholders such as producers, processors (enterprises) and sellers (enterprises) of agricultural products according to the principle of maximizing their own interests, and incorporates the supply system, production system, processing, marketing and service system and final consumers of agricultural products into the value chain system together, and responds to the rapidly changing agricultural market by integrating various intermediate demands in the whole agricultural industry chain.

Unlike the traditional agricultural value chain, the circulation and trade of agricultural products in the modern agricultural value chain form a net-like structure, and the production chain evolves from the former independent small farmers to the "production team" composed of leading farmers, large agricultural households and rural collective economic cooperatives, and agricultural products processing and production enterprises, etc. The procurement and sales of agricultural products The procurement and sales of agricultural products are gradually standardized, and professional buyers sell agricultural products directly or after processing to domestic and international markets. At present, the following two main models exist:

1. A sustainable development model that integrates recycling agriculture, creative agriculture and agricultural experience with farmers' cooperatives as the main carrier. This model is guided by the government, led by farmers' cooperatives, and oriented by market demand to achieve precise supply of downstream consumption in the agricultural industry chain. For example, the Wuxi Tian Yuan Dongfang project, with the support of the government, is invested by Tian Yuan Dongfang Investment Company, whose main business is the three segments of garden industry, tourism resort and real estate. This model, as a new business mode for sustainable development of agriculture and rural areas, conforms to the reform of agricultural supply side under the new pattern of urban-rural integration, meets the requirements of industrial transformation and upgrading, and meets various new needs of urban and rural residents for high-end living, tourism and consumption under the promotion of green finance to achieve sustainable development of local villages.

2. With the advantage of local leading agricultural enterprises, relying on their industry advantages and status, after meeting the relevant green requirements, they can obtain green project loans from banks and sign order agreements with upstream subjects or a model of

strategic cooperation agreements with downstream enterprises. For example, Jiangsu Yike Food Group Co., Ltd. signs order agreements with upstream farming subjects and puts forward relevant green requirements to them, and introduces online business banks to provide financing services for upstream farming subjects. Yike Group provides farmers with "five unified" services, such as chicken chicks, feed, medicine, feeding management technology and recycling products, and cooperates with scientific research institutes to provide guidance and training to farmers. Farmers get relevant services and training from Yiku Group on credit, and Yiku provides production equipment, production materials, poultry seedlings, veterinary drugs and feed. Based on this, at the breeding end, Jiangsu Yike Food Group Co., Ltd. realizes company guidance, drives local farmers to re-employment and promotes the development of the local economy.

1.2.2. An Overview of the Issues of Agricultural Value Chain Development from the Perspective of Green Finance

At the present stage, there are some problems in the development of agricultural value chain under the perspective of green finance.

1. Lack of relevant financial policies in rural areas and imperfect rural financial system. From the current point of view, various regions have actively responded to the national call and introduced policies related to rural revitalization, however, the policies are fragmented and poorly synergized among them, and the synergistic effect between policies cannot be brought into play. Secondly, China has introduced corresponding policies to guide financial institutions and others to provide financing services for rural areas, but there is no policy yet to guide the establishment of credit system for agricultural financing subjects. The system is mainly composed of subjects such as farmers, family farms and small and micro enterprises, with little available credit evaluation information, and the lack of information can create obstacles for financial institutions to provide financing services to them. Moreover, the risk assessment and compensation mechanism is lacking, and the supporting incentive support policies such as risk sharing, interest rate compensation and agricultural insurance to support the development of rural finance are slow to be introduced or yet to be improved.

2. The supply of green financial products and services is relatively single and lacks innovative products. In recent years, a large number of financial products exist on the market to support the revitalization of rural industries, but most of them are only an extension of the scope of collateral guarantee, and most credit products of state-owned commercial banks are still designed only for large enterprises, and the variety and supply are still relatively small, which cannot meet the needs of the majority of farmers. [6] First, we should actively explore and promote the development of the three-tier market of green economy, vigorously carry out the promotion of green financial products, and promote the development of green securities and private equity investment. Secondly, the collateral category of green credit project financing should be increased, and new two rights mortgage loans in rural areas should be explored, i.e., land contract management rights and sewage rights. Promote the development of green financial credit, insurance and bonds, establish multi-level and multi-category green financial mortgage, guarantee and quality assurance system, and diversify the supply of funds. [7] Efforts should be made to optimize financial services, innovate financial products, reduce financial risks, and promote the diversified development of green financial products and services.

3. Financial institutions still face information barriers when participating in the value chain of rural revitalization. On the one hand, due to the problem of information asymmetry in rural credit market, it is then difficult to eliminate adverse selection and moral hazard. [8] Various tools in financial institutions, especially credit services, require extremely high accuracy, value and timeliness of information, and it can be said that credit industry is a typical information industry. Due to the rural related green credit statistical system, the green credit supervision

system was introduced late compared to other financial systems, the construction of related platforms is not perfect, and there is less information to evaluate the credit of rural business entities. Therefore, financial institutions need to pay higher costs in order to obtain credit information, design information contracts, and fulfill credit responsibilities. It is not even possible to judge the real situation of borrowers, which leads to the difficulty for credit institutions to distinguish the merits of borrowers under the long-term adverse selection and thus reject the borrowers' requests. On the other hand, the certification mechanism of green agricultural products is not sound. The green project certification system is not perfect, and various local governments and agriculture-related enterprises have not made uniform requirements on the concept, characteristics and standards of agro-ecological products, resulting in different standards and lack of recognition of green agricultural products. And due to the different qualifications of the third-party green project certification agencies, the quality of personnel level varies. This leads to the conclusion of contracts with information asymmetry caused by third parties. [9]

4. The digital technology in rural areas is backward and the training of relevant personnel of the main body of green finance needs is not in place. The low penetration rate of basic digital technologies such as the Internet in rural areas is not conducive to farmers' access to timely and effective information, but also to the construction of a rural credit system, which hinders the process of rural revitalization. Second, the requirements of technology and information are also reflected in the cooperation and sharing of information between financial institutions and other sectors, and the application of existing information technology in green finance is only a stage of progress. In fact, the information requirements of financial institutions in the promotion of green finance also require information identification, selection and utilization based on information cooperation and sharing with various departments such as environmental protection, industry and commerce, agriculture and trade, which is a key link in the process of green finance risk prevention. And local officials and grassroots personnel do not have a comprehensive and profound understanding of green finance and the value chain, and their knowledge of the concept still needs to be strengthened, while the training of green finance personnel should be strengthened to provide policy explanation and services to rural grassroots financial demand subjects.

2. Discussion on the Inner Mechanism and Path of Green Finance Reshaping Agricultural Value Chain--Based on the Idea of Three-level Decomposition

None of the financial products currently developed for the agricultural value chain are supported by the main line of green finance [10], and there are many deficiencies in terms of hierarchy, coordination, and stability. There are still a series of realistic bottlenecks that cannot be ignored in the reshaping of agricultural value chain by green finance. The traditional resource endowment and economic conditions of China's rural areas will, to a certain extent, create potential barriers to any entity that enters the rural areas to seek development. The rising transaction costs, declining market efficiency, and declining potential returns caused by the barriers will further strengthen the exclusion of later rural market entrants. For agriculture and related industries, which are naturally weak in nature, this will undoubtedly add to the problem. How to break the barriers to rural entry, minimize transaction costs, and improve the efficiency of rural markets is the key to green entry to reshape the agricultural value chain and the right thing to do.

As we discussed earlier, the degree of reshaping of both depends on the degree of industrialization of agriculture and the influence of credit mechanism. Based on the traditional rural governance and development in China over the past decades, the aggregation and credit

enhancement of rural value actors will help solve the problems of scattered and poor coordination of traditional agricultural value chains in the process of green development, and thus promote the reshaping of both. It should give full play to the key role of rural collectives in the value chain, and rely on resource valorization to reintegrate relevant resources instead of the traditional one-size-fits-all, sell-it-all, rough, discrete, traditional agricultural development ideas that are contrary to sustainable development thinking in the past.

2.1. Value Discovery - Initial Structure of Green Resource Valorization

Property rights of rural resources in China mostly exist in collective form. However, along with the increasing development of social economy, the discrete degree of rural areas is increasing, and the interaction between individuals and the outside world is increasing, which indirectly leads to the gradual dispersion of the original rural institutional structure. At the same time, the decentralized ownership of resources by farmers will make it difficult for market participants to enter the market due to high transaction costs and opaque information. Even if they can barely enter, they will cause a lot of inconvenience to the participants due to the problems of the former, and even produce a crowding-out effect.

Therefore, in the context of high-quality development of the three rural areas, first of all, it is necessary to conduct a village-based, all-round exploration of the green resources within the whole village, with a view to obtaining accurate and clear cognition. Secondly, in the process of valorization, the basis of pricing should not be based on the expected returns of villagers in the area, but on the developed market participants under the premise of marketization. On this basis, the region can also make fluctuating adjustments to the relevant prices according to the real situation.

The above has completed the first step of green resource valorization, i.e. value discovery. However, we still need to face the problem of unclear ownership, input and distribution of farmers brought about by decentralized operation. Therefore, on the basis of value discovery, any green resources that can generate potential income and meet the relevant criteria should be collectivized, equitized according to relevant policies and given a certain amount of equity to relevant subjects according to the actual value after valorization. The rules of the external market are gradually introduced, and intra-village transactions and the behavior of market players are gradually standardized. Due to the natural internal aggregation of villages, i.e., vernacular nature [11], there are fewer obstacles to the implementation of relevant rules and institutions, and thus the costs and risks faced are relatively small.

Accordingly, by introducing internalized pricing with market standards and the subsequent idea of collectivization of resources, two key steps of pricing resources and turning resources into assets have been achieved. However, we still need to avoid the problem of uneven distribution of benefits after collectivization. Accordingly, on the basis of the above two steps, the flexibility of shares is used to transform shares into multi-level and different kinds of equity. In this way, we can face the problems such as uneven and insufficient distribution of benefits, thus changing the past rough practice of one-size-fits-all in the distribution of benefits. At the same time, the settings of villagers' assembly and shareholders' assembly are improved to optimize the grassroots design from the institutional level.

In practice, there are certain difficulties in implementing the above steps in the vast central and western regions. Firstly, there are widespread problems such as loose organization and hollowing out in the central and western regions; secondly, there are widespread phenomena such as scarcity of green resources or destruction of green resources; finally, there are corresponding deficiencies in the stage of local industrial development and agricultural business system, as well as problems such as aid mismatch. In order to achieve economic development in the rural areas of central and western China, it is especially important to build a village-based collective economic organization that meets the realities of the situation. At the

same time, there is still a need for government financial support and financial assistance to the countryside to support the development of rural areas that currently lack the ability to generate their own income. The specific approach is to change the investment into shares, i.e., to change the past crude capital investment method into the investment method of shareholders' equity for local rural collective economic development. The government is gradually transformed from an external participant in the past to an internal participant and a guide. Thus, many problems such as unreasonable and uncoordinated use of funds can be avoided. By introducing the green concept into it, the value discovery of local rural green resources is guided in an orderly manner, and the market is financed, thus achieving sustainable development.

2.2. Improving the Chain - Integration and Reshaping of Green Finance and Agricultural Value Chain

After the first step of valorization of rural green resources is completed, value discovery and centralization are realized. Through the collective economic organizations, farmers and other rural subjects realize credit enhancement, improve the transparency of information, enhance negotiation and bargaining power, and then negotiate and cooperate with market entrants and external investors, thus promoting asset repricing and the emergence of related industrial chains and the formation of value chains. In this regard, rural collective economic organizations establish multiple economic entities in the form of cooperatives through various forms of equity and debt, and link with external parties to form various industrial combinations and investment methods. In this way, different subjects form a close chain-like relationship, and from this, the value combination - agricultural value chain - is derived.

Cooperatives, governments, investment and financing institutions, enterprises and so on constitute the agricultural value chain, and the multiple participating subjects jointly build a dynamic system of agricultural value-added, which integrally reflects the product transactions and capital liquidation among different subjects. In the midst of this, lending and investment and financing among different subjects constantly strengthen the demand for finance. At present, although rural financial chains led by production cooperatives, leading enterprises and buyer guarantees have emerged in China,[12] there are still more deficiencies in green guidance, market information and efficient collaboration. The unreasonable development has led to serious environmental pollution in the rural ecological environment, and there is a general lack of necessary infrastructure for sustainable development in rural areas; along with the gradual transfer of the "two high and one leftover" industries to rural areas, the environmental pollution situation in some areas has become more severe. Therefore, it is necessary to use the green financial system to reshape the original agricultural value chain, to change the development concept and to form a green and sustainable development cycle by guiding the behavior of participating subjects in an orderly manner. The fit between green finance and agricultural value chain mainly revolves around providing credit enhancement and financial support for subjects engaged in green industries, providing lowering of access threshold and related green financial support for participating subjects in related green matters, and optimizing rural financial environment.

Agricultural and rural financial markets remain geographically constrained, and growth in agricultural and rural areas is still influenced by the availability of location-specific credit; thus, these markets remain somewhat separate types of financial markets. [13] At the same time, financial markets possess attributes that are asymmetrical, especially agricultural financial markets are subject to local monopolies [14], resulting in many problems such as high transaction costs. Thus, on top of collectivization, external docking should not be the first to dock with external private investment entities, but with government finance, with the aim of expanding collective assets and achieving credit enhancement in the value of green assets. If external private capital is allowed to enter in the first stage, it will not contribute to the

development of local green values to a certain extent under the premise of profit maximization; at the same time, it means handing over the chain and the related market to external private capital, which is detrimental to the development of rural collective economy to a certain extent. Thus, the local government, based on the relevant green development ideas and regulations, forms the supervision and guidance for the development of rural economic entities through the form of investment in shares. At the same time, local governments can require local agricultural commercial banks and agricultural banks to grant higher credits to business entities engaged in green production based on rural green finance policy guidelines, rural green credit catalog guidelines, agricultural environmental protection standards, and environmental friendly rating standards for rural green projects, and provide diversified green financial products to meet the needs of different agricultural production entities.

In China's actual situation, the rural collective economy should first be connected with the government. First of all, given the natural weakness of agriculture, more additional inputs are needed; on the road to green and sustainable development, the needs will be even larger. This means that the investment activity of general external investment agents will be somewhat reduced. The collective agricultural economy can only guarantee its production and investment by being connected to government finance. Second, at the level of value enhancement, the credit brought by relying on the collective economy is often low or even missing. The injection of government funds will not only increase the value of credit, but will also, to a certain extent, guide the tendency of market investment, which in turn will have an amplifying effect on the credit of rural collective economy. Finally, the government can also provide financial and capital support for agricultural economic entities engaged in green production by participating in the construction of green development funds.

On this basis, rural green resources, through further credit enhancement and value-added, will enable rural collective economic organizations to participate more actively in the cooperation with related enterprises and social organizations, and attract them to participate in the framework of cooperation in the agricultural value chain. Under the relevant green standards, agricultural collective economic entities can independently choose relevant cooperative entities that are in line with the direction of green development and conducive to their own expansion. To a certain extent, the subjects participating in the relevant green agricultural development can get the relevant policy preferences and financing preferences, so as to attract more interested market subjects to participate in it and thus form a virtuous circle. On the one hand, it reduces the participation cost and information opacity of the traditional value chain and improves the efficiency of market participation; on the other hand, the participation power of the agricultural collective economy is enhanced after credit enhancement and value discovery, which further promotes relatively equal and fair transactions. In addition, the green value chain formed on this basis is, to a certain extent, both efficient and transparent, which helps promote the construction of a unified rural green information platform and the improvement of related information systems and credit systems.

Finally, the ultimate goal of the integration and reshaping of green finance and agricultural value chain is to optimize the rural financial environment and ultimately promote the construction of a rural green development system. Its essence lies in promoting the formation of a fair and interactive market participation system between rural economic entities and external participating entities, which can smoothly promote the optimization of the rural financial environment and realize the steady appreciation of relevant green assets, which in turn can continuously promote the rural collective economic entities to further optimize the rural environment, promote technological progress and realize high-quality development. It further strengthens the linkage with market players and forms a beneficial development cycle. At the same time, it promotes the construction of a green information platform and a green

evaluation system based on the green agricultural value chain to provide a system guarantee for the further development of the agricultural value chain.

2.3. Deep Exploration - Innovation of Related Green Financial Products

In-depth exploration is based on the second step, to innovate relevant green financial technologies and related products in response to the new needs for investment and financing of each participating entity in the agricultural value chain in its production and operation activities.

Relying on the Internet and blockchain technology, we promote digital financial platforms and related products and services to meet the financial needs of different rural entities. By building intelligent terminals such as "cloud" intelligent system and green approval construction platform, we can realize the efficient processing of centralized information, real-time monitoring and intelligent approval, and facilitate all participating entities in the green value chain system. In addition, the use of big data and intelligent cloud system, the construction of rural credit system, the establishment of rural green resources sharing platform and rural green products trading platform and other supporting facilities, to provide a technical hotbed for the innovation of green finance. The key point of deep exploration is interconnection, and the innovation of relevant green financial technologies should ultimately promote the convenient circulation of capital, technology and products among all subjects in the value chain under the premise of green sustainability; and ultimately promote the formation of a dense value network in each value chain. Thus, the market efficiency will be enhanced and the value of rural green assets will be increased to the maximum extent.

In addition, the role of green finance in reshaping the agricultural value chain should be brought into play as much as possible to maximize the value-added of green finance to the participating subjects of rural economy. On the basis of continuously revitalizing rural green resources, efforts should be made to promote the capitalization of green resources. In this regard, the traditional village collective-based economic entities can be extended to a larger area to promote the gradual transformation of the green value chain from chain to surface. In addition, innovation of relevant green financial products, based on the traditional green bonds, green funds, green credit innovation, consider the gradual introduction of green stocks, green futures, green options and other financial instruments. At the same time, on the basis of continuously enriching the original green financial products, promote the formation of a multi-stage and multi-level systematic and reasonable product system of green financial products. In this regard, we should pay particular attention to the following two principles: "focus on the value form that can be split, transformed and continuously traded after the assetization of green resources continuously; pay more attention to the fit and coordination of the rural economic development subjects at different stages and the green financial products related to their corresponding stages, focusing on the mismatch between the two in the corresponding process and other outstanding issues. "

3. Exploration and Practice - Domestic Perspectives under the Characteristic Path

With the improvement of China's economic level, the importance of ecological sustainable development continues to rise, and green development has become an inevitable choice for the future development of China. On this basis, the top-level design and institutional system of green finance in China have been enthusiastically discussed, and good practical results have been achieved in some regions. In terms of the practical achievements of green finance and agricultural value chain, Sichuan Province and Heilongjiang Province are the most representative.

3.1. Sichuan Province - An Interactive System with Diversified Participation

According to the relevant requirements of green development, the Sichuan Provincial Party Committee and the provincial government have issued relevant policy guidelines one after another, which have strongly promoted the development of green financial products such as green credit, green bonds and green funds, etc. In January 2018, the General Office of the provincial government issued the "Green Financial Development Plan of Sichuan Province", proposing to build a green financial "one core, one belt and many points" spatial pattern, and gradually establish a diversified and broad-coverage green financial innovation system and green financial market system, marking the completion of the construction of the framework of institutional arrangements for green finance in Sichuan Province. [15]

Under the leadership of the Sichuan Provincial Party Committee and the provincial government, financial institutions in the region have also paid more and more attention to the services related to green financial services in the countryside and carried out positive and beneficial exploration and practice. Take Guishang Village Bank in Guangyuan City, Sichuan Province as an example, the village bank issues loans to farmers who have entered into purchase contracts with the purchasing enterprises and are guaranteed by the purchasing enterprises. Through the loan, the village bank effectively guides the green production behavior of the purchasing enterprises and farmers. At the same time, traditional farmers can obtain loans and other funds more conveniently based on the credit value-added formed by the purchasing enterprises to meet their production needs; at the same time, they can broaden their sales channels and expand their revenue, further promoting the value-added of green resources and the green development of local agriculture.

In addition, China Post and Reserve Bank Ya'an Branch has developed and designed special credit products for "cattle raising" based on the actual local situation; meanwhile, it has strengthened communication with local agricultural credit guarantee companies, given full play to the advantages of cooperation between the two sides, and vigorously expanded the market of agriculture, forestry, animal husbandry and fishery. Bank of Chengdu has formulated the "Bank of Chengdu Green Credit Development Guideline" and dovetailed with the World Bank loan for the systematic transformation of pig breeding, monitoring and traceability in Chengdu, a food safety demonstration project in China, to promote the construction of an integrated green platform. Meanwhile, relying on ecological resources around Chengdu, the Sichuan Branch of the Agricultural Bank of China has developed a series of rural tourism, leisure agriculture and other special areas based on the valorization of green resources, and built multiple green financial supply chains to strongly meet the capital needs of local business entities in production and technology.

3.2. Heilongjiang Province - Precise Matching of Supply Chain System

As one of the earliest innovative provinces in agricultural value chain finance, the origin of Heilongjiang can be traced back to Long Jiang Bank's creation of investment and research and development of agricultural supply chain finance product system. Relying on the actual situation of agricultural development in Heilongjiang, Long Jiang Bank has developed a corresponding agricultural supply chain financial system, "Huinong Chain", by combining finance and agricultural value chain. By organically linking all participating subjects in the value chain, it meets the financing needs of each value chain subject in a dynamic environment.

With the basic framework of "core enterprise + upstream and downstream enterprises + farmers + government + bank + insurance + technology", Long Jiang Bank has developed the "agricultural company + farmers", "reclamation farm + farmers", "harvesting and processing company + farmers", "company + cooperative + farmers", "family farms/big farmers", and "agricultural supply chain". Family farms/big farmers, core enterprises + small and medium-sized suppliers and other risk-controlled product models. Long Jiang Bank has designed a

number of financial products such as planting loan, farming loan, agricultural machinery loan, grain trade loan, golden land, agricultural information and so on, in accordance with the relevant programs of Heilongjiang on promoting green financial development. Through capital guidance and product services, we have given full play to the important role of green finance in the agricultural value chain. Realize the green and sustainable development of all parties involved in the value chain.

4. Learning and Reference - A Foreign Perspective on Reinvention and Development

Green finance as a broad concept, from an international perspective, mainly includes financial investment to support sustainable development projects and environmental protection products, as well as policy investment to encourage sustainable development. After continuous practice, China has achieved leapfrog development in green finance, and has formed "five pillars" to support the green financial system. However, compared with Germany, Japan and other developed countries, the development of green finance in China is still in the primary stage, and learning from the policy planning and operation mode of developed countries has long-term significance for the further development of green finance in China.

4.1. German Green Finance Model

Germany, as a country in the forefront of global green finance development, is actively promoting the development of green finance. The development of green finance in Germany stems from the high importance attached by the public and the government to ecological protection. Since 1972, the German government has introduced a series of relevant environmental protection policies, laying the foundation for the development of green finance and making it one of the countries with the most comprehensive green finance legislation in the world. At the same time, the German government has supported the banking industry and developed corresponding financial products through the capital market to provide low-interest loans for eco-friendly projects undertaken by enterprises.

Summarizing the development path of green finance in Germany and even in the EU, we can conclude the following points: first, clear top-level policy directions, national strategic planning, and enhanced legal and regulatory support; second, policy banks as the mainstay, with extensive auxiliary participation of commercial banks and increased market practice and innovation. [16] Taking the world's first policy environmental bank, KfW, as an example, the bank mainly provides policy loans for environmental protection projects and other related projects to guarantee the financing of project works. In continuous practice, the bank has improved its own risk management system, incorporated environmental factors into it, formed a complete loan approval process, and achieved more objective benefits. In its continuous development, the bank has used its rich practical experience as an advantage to lead a large number of investors to green environmental protection projects. At the same time, led by policy banks, commercial banks have also been widely involved, incorporating green development concepts into their investment and financing mechanisms, establishing unified industry standards and actively carrying out innovations to launch dual businesses for individuals and enterprises, resulting in good market returns.

4.2. Japanese Green Finance and Agricultural Value Chain Operation System of Farmers' Association

Green finance in Japan began in the 1970s. Influenced by local environmental pollution, the Japanese government attached great importance to environmental protection and introduced a series of environmental policies to strengthen the construction of green-related laws and regulations. Japan's financial market has developed in two main ways in the direction of

environmental protection. On the one hand, it increases the investment and financing of funds in the green environmental protection business; on the other hand, it carries out environmental rating financing and socially responsible investment to bring financing facilities to low-carbon enterprises and guide their sustainable development.

In addition, Japanese commercial banks make full use of the policy bank's environmental risk assessment system to monitor corporate operations and improve investment efficiency. Japan has established a mature insurance system in the field of dealing with the risks of natural disasters and climate change; in terms of green finance policy, Japan carries out top-level design at the national level. Second, in the organization and implementation of green financial policies to carry out green credit, and the formulation of the 21st Century Financial Action Principles, the assessment of enterprises' environmental projects, to provide the necessary advice and guidance to enterprises, and to conduct regular inspections of the implementation of enterprises; in the green financial policy support, Japan strongly encourages producers for the development of environmentally friendly technologies, increase the promotion of green and environmentally friendly products, and cultivate consumers. The government has also established a system of environmental subsidies to promote environmental protection for households and businesses, as well as other preferential policies such as tax reductions and recycling equipment. Japan has also given full play to the coordinating role of policy banks to provide long-term stable financial support for projects that are beneficial to the economy and society. At the same time, commercial banks use the risk assessment system of policy banks to monitor loan-granting companies, improve investment efficiency, and avoid investment risks. [17]

In Japan, through the form of agricultural cooperatives, the formerly scattered individual farmer households are organically integrated with the market, making Japanese farmers highly organized. [18] By establishing a comprehensive and efficient service system, the agricultural cooperative links agricultural products from production and packaging to supply and marketing. A value chain is established from top to bottom to serve enterprises, farmers, financial institutions, government, consumers and other related agricultural stakeholders.

The starting point of this farming association value chain is the farmer, and the farming association acts as an intermediary to take deposits from members, provide immediate funds for farmers, and provide loans for buyers, processors, and distributors. At the same time, the farming association has established a corresponding credit guarantee insurance system and credit guarantee system [19] to reduce the loan risk of the farming association, measured by the market prospect and development. It also provides production guidance to farmers and helps them to market their products. In this model, the farmers' association and the purchasing enterprise form the dual core of the system, which enhances the degree of farmers' organization, increases the capital exchange between the enterprise and the financial institution, and effectively promotes the development of the agricultural value chain.

5. Insights and Suggestions to Help Green Finance Reshape the Agricultural Value Chain

5.1. Gradually Promoting the Construction of A Green Financial System Adapted to the Development of Agricultural Value Chain

To promote the integration and reshaping of green finance and agricultural value chain, the most important thing is to build a framework for green financial development. Focusing on the comprehensive management of agricultural and rural environment, ecological resources exploration and sustainable development of agriculture, we will precisely define and explore the new industries and forms generated in the process of green development in agriculture and rural areas, and lay a good foundation for rural green resources to enter the market. By building

an agricultural green resource platform as well as a comprehensive credit platform and a green project platform, we can solve from the source many problems such as high transaction costs and imperfect market channels caused by insufficient information. In addition, it focuses on supporting the important role of green finance in the development of the agricultural value chain in terms of green agricultural science and technology, scale for operation, storage management, logistics and transportation, etc., and promoting the various subjects of the agricultural value chain from point to line and from line to surface. Finally, on the basis of the original green financial products, continuous innovation can be made, and financial products such as futures and options can be gradually introduced with reference to the relevant products in the capital market. On the basis of revitalizing rural green resources, we can change their forms to a certain extent, so that they can be split and extended. Continuously meet the financial needs of all subjects in the agricultural value chain.

5.2. Optimize Policy Orientation and Fill in Green Gaps

To a certain extent, the initial development of agricultural value chain needs to rely on local government financial support and certain policy guidance as support. Therefore, while implementing relevant supporting policies, it is also necessary to actively create a favorable development environment. First of all, the shortage in fiscal and financial aspects should be actively addressed, and relevant green preferential programs and participation systems should be formulated on this basis. At the same time, the subjects engaged in green production, transportation, finance and other aspects should be given certain interest rates, tax rates and other preferences to encourage the subjects to participate in the development of the agricultural green value chain; second, improve the relevant legal system and related regulations, such as: the establishment of a sound green agricultural product catalog, improve the relevant laws and regulations on green sustainable development of agriculture, the construction of a green financial product framework, unification of relevant green project standards etc. Finally, a government-led green development fund should be set up to attract various social groups to participate in the construction of green villages and reduce the risks involved.

5.3. Two-way Force Of Supply and Demand to Promote Green Integration

In the process of reshaping the agricultural value chain with green finance, the most important thing is to make efforts from both the supply and demand sides. Gradually form a stable agricultural value chain relationship and market system with mutual trust, and steadily guarantee the value appreciation and credit enhancement of each subject and thus "form a line into a surface." First of all, under the premise of government guidance and participation of all subjects in the value chain, a unified green label and related directory should be formed as soon as possible. Based on the local characteristics of rural green resources, according to market demand, the development of special agricultural production and management line; secondly, to encourage both supply and demand to form a market pattern of equal exchange and fair trade. On the one hand, external social subjects from all walks of life are encouraged to enter the agricultural development chain and carry out various forms of production and operation, investment and financing and other economic activities. On the other hand, agricultural economic agents should be guided to enter the external environment, i.e., from the countryside to the city and from the inside to the outside; finally, the training of grassroots green finance practitioners should be accelerated to solidify the realistic foundation of rural green finance. More importantly, it is necessary to accelerate the promotion of green finance to the countryside, popularize relevant green finance knowledge to the local area, and make efforts from the demand side to cultivate new green finance demand subjects.

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