Research and Exploration of Inclusive Finance on the Transformation of Agricultural Development

Zihan Zhao[1*]

[1]School of Economics and Management, Shandong Agricultural University, Tai'an, Shandong, China

Abstract. This article systematically reviews the correlation mechanism and research progress between inclusive finance and agricultural development transformation. Research shows that inclusive finance supports agricultural transformation through three mechanisms: technology penetration, resource allocation optimization, and regional balanced development. The literature points out that inclusive finance can effectively alleviate the financing constraints of farmers, but it requires supporting policies such as government subsidies and the popularization of digital technology to avoid the digital divide and debt risks. There are two shortcomings in current research: firstly, excessive focus on economic benefits while neglecting ecological impacts; Secondly, there is a lack of long-term dynamic analysis. Future research should focus more on the actual needs of farmers, strengthen financial inclusiveness, and avoid one-sided pursuit of coverage. The marginal contribution of this paper resides in elucidating the function of inclusive finance within agricultural transformation and underscoring the necessity for financial instruments to be deeply integrated with real-world development demands.

1 Introduction

The traditional form of agriculture has problems such as low production efficiency, outdated technology, and poor connection between upstream and downstream markets. Rural households face limited access to modern financial services like loans and insurance, which poses significant challenges to agricultural development transformation. The emergence of inclusive finance provides new ideas for solving these problems. Inclusive finance focuses on providing affordable financial services to groups excluded by traditional finance, characterized by accessible services, controllable costs, and product adaptation. It is a new type of financial facility for modern agricultural development. From a worldwide standpoint, a multitude of nations have channelled inclusive financial resources into the agricultural sector via legal regulations, fiscal subsidy mechanisms, and other approaches. This has further guaranteed the sustainable advancement of inclusive finance within the agricultural domain.

* Corresponding author: z2065560987@outlook.com

In recent years, the academic field has seen a plethora of research studies exploring the correlation between inclusive finance and agricultural development. Some scholars attach great importance to the technological aspect, such as how mobile finance innovation affects rural areas. Numerous studies have likewise shown that inclusive finance can create regional edge, thereby driving the coordinated development of agricultural economies in neighbouring regions [1]. Some studies also suggested that inclusive finance can help achieve the Sustainable Development Goals. Some scholars also pointed out that inclusive finance promotes rural development by optimizing agricultural production factors.

By examining recent academic publications, this study consolidates the crucial role and implications of inclusive finance in agricultural development transformation, while also dissecting the research lacunae in inclusive finance research amid the agrarian transition context. This study arrives at the conclusion that inclusive finance does effectively mitigate the funding shortfall for farmers, yet this necessitates support from multiple dimensions, including government subsidies and the dissemination of digital technology. The marginal contribution of this article is twofold: firstly, to summarize the correlation mechanism between inclusive finance and agricultural development transformation, while emphasizing the importance of combining financial mechanisms with practice; The second is to propose that future research should focus more on the actual needs of farmers, rather than solely pursuing financial coverage.

2 The practical context underlying the implementation of inclusive finance in the evolution of agricultural development

The transformation of agricultural development is subject to multiple challenges such as global population growth, ecological resource constraints, and deteriorating environmental conditions. From a supply-side perspective, traditional agriculture relies on chemical nutrient inputs and extensive management models, resulting in approximately 29% of global land degradation being caused by human activities [2]. Small-scale agriculture has low production efficiency and cannot achieve efficient and convenient farming methods, which restricts food security. Previous studies showed that the grain yield of small farmers in developing countries is usually between 20% and 50% of their potential yield, but various factors such as land scarcity, outdated equipment, and poor management hinder the increase in yield. The core of modern agricultural transformation is to enhance competitiveness through technology (such as precision agriculture, biotechnology), large-scale operations, and industrial chain integration. However, transformation requires financial support, but the rural financial supply is insufficient: farmers lack collateral, credit records are incomplete, financial institutions have low willingness to lend, forming a bottleneck of "financing difficulties", leading to poor financial inclusiveness in rural areas [3].

Against this backdrop, as inclusive finance continues to evolve and mature, its application in the transformation of agricultural development is becoming increasingly widespread. By leveraging innovative economic models and service approaches, inclusive finance effectively reduces the barriers to accessing financial services and overcomes geographical limitations. Once farmers gain access to such financial services, they can utilize diverse strategies to enhance agricultural productivity, thereby contributing to the resolution of food security challenges.

3 The mechanism of inclusive finance in the transformation of agricultural development

3.1 Technology penetration and digital transformation

Emerging from the integration of big data and informatization, inclusive finance demonstrates remarkable advantages in facilitating technological diffusion. Certain academics argue that digital inclusive finance can efficiently drive innovation in agricultural technology and advancement in environmental technology [4]. Take Paytm as an instance: as a prominent digital payment and financial services platform in India, it has spearheaded the promotion and implementation of inclusive finance within the agricultural sector. By connecting enterprises, agricultural cooperatives, and small farmers in the farm supply chain, Paytm created a digital supply chain finance solution. And it achieved immutability and traceability of agricultural product transaction information through blockchain technology, ensuring the authenticity and transparency of transactions. Drawing on these data, major financial entities exhibit heightened confidence in offering supply chain financing services to farmers and small-to-medium agricultural enterprises. This enables them to resolve financial obstacles throughout the procurement, production, and sales continuum. Promoted the digital transformation of the agricultural industry. Moreover, inclusive finance is rooted in deep digitization, which streamlines the sharing and dissemination of information. This mechanism particularly enables advanced technology to diffuse from developed urban centers to rural areas, thereby fostering technological accumulation [5].

Drawing on the strong interconnection between agricultural development and the ecological environment, certain academics argue that inclusive finance exerts a substantial influence, particularly in facilitating the diffusion of low-carbon and green technologies [6]. For example, Banco Sabadell in Spain established a green finance initiative to provide green loans and financing for small and medium-sized farmers, supporting them in sustainable agricultural practices such as organic agriculture, water resource management, and renewable energy utilization. This initiative not only helps farmers improve production efficiency but also reduces environmental pollution hazards.

3.2 Resource allocation optimization

The effective allocation of resource elements plays a crucial role in agricultural development. Inclusive finance can establish a collaborative allocation mechanism of "land capital human resources" to promote the restructuring and optimization of various factors. The financial innovation brought by inclusive finance can effectively promote land transfer among different crops, optimize the spatial distribution of crops, and maintain the balance of agricultural product supply and demand. This is achieved by leveraging a flexible mechanism that adapts to market needs, ensuring rational allocation of resources across different cultivation areas. In Bavaria, Germany, local farmers obtain loans through land mortgage credit cooperatives and actively engage in land transfer, concentrating small, scattered plots of land. Some regions use the transferred land for developing characteristic agriculture, such as planting wine grapes. Data shows that in the past decade, the area of land transfer through this method in the region reached about 25% of the total arable land area, and the planting area of wine grapes increased by about 15%. The implementation of inclusive finance not only optimizes the spatial layout of crops but also drives the development of the local wine industry and increases the added value of agriculture.

However, it should be noted that relevant research scholars warned that the application of inclusive finance needs to be combined with strict environmental policies, and excessive financialization will only exacerbate the deterioration of ecological resources [7].

The optimization of natural resource allocation promoted the development of large-scale agriculture, and small farmers are at a disadvantage in the trend of intensification and urgently need to find new channels to obtain income. Under the inclusive finance model, land

transaction costs can be reduced, supply-demand mismatch can be broken, and agricultural land transfer can be promoted to a certain extent, leading to the development of agriculture towards intensification and scale [8]. Renting farmland by farmers indirectly affects non-agricultural employment and broadens their employment channels. Some scholars believe that inclusive finance provides marginalized residents with entrepreneurial opportunities that are difficult to obtain through traditional financial services, achieves diversified household income, and improves the resilience of rural economic development [9]. Taking Tanzania's small and micro credit institutions as an example, with their increasing number, as of June 2022, there are 4 primary small and micro credit banks and 576 secondary small and micro credit institutions. Individuals who obtain small and micro loans can start and expand businesses, thereby creating employment opportunities for themselves and their communities. According to a study by the Tanzania Association of Small and Micro Credit Institutions, since 2020, small and micro credit institutions have created many job opportunities for Tanzanians.

Some experts have said that digital finance has greatly helped rural businesses stay alive [10]. How? By making it easier for people to get business loans! Because of this, inclusive finance has made sure that more talented people are doing useful work in the countryside.

3.3 Regional balanced development

Utilizing cutting-edge technologies like big data and smart algorithms, digital inclusive finance has significantly improved how easily people can access financial services and made them more convenient. This improvement is especially clear in less-developed rural areas, where traditional financial services don’t cover enough ground. Inclusive finance helps distribute financial resources more fairly between cities and the countryside, allowing rural businesses and farmers to get financial services similar to what city residents have [11]. Some researchers have also mentioned that digital inclusive finance allows financial services to break through geographical barriers and has effects that spread to surrounding areas. Thus, the development of inclusive finance can help reduce relative poverty in rural areas and in the provinces next to them [12]. For example, in the relatively impoverished southwestern region of China, a joint conference was established by the Finance Bureau of Chengdu City, Sichuan Province, and other departments. Through the establishment of the "Agricultural Loan Connect" platform, numerous financial institutions were established, and many financial products were released. At the same time, it radiated to the concentrated and contiguous poverty-stricken areas of southwestern ethnic groups, promoting local economic development, increasing residents' income, and reducing the size of the impoverished population.

On the whole, inclusive finance has surmounted geographical constraints and hurdles in financial services, restructured the distribution pattern of rural-urban resources, narrowed the income disparity among residents, and fostered the integration of regional benefits.

4 The process and shortcomings of research on inclusive finance and agricultural development transformation

4.1 Progress of related research

As a new financial model that emerged in recent years, the interaction between inclusive finance and agricultural modernization transformation is a hot topic in current economic and financial research. Past studies mainly focus on the advantages and disadvantages of inclusive finance during the transformation of agricultural development. Certain academics

have investigated the facilitative effect of inclusive finance on agricultural development transformation. For example, since 2010, Brazil has provided hundreds of millions of dollars in low-interest loans annually to farmers implementing sustainable agriculture, promoting the popularization of low-carbon agricultural technologies such as no-till direct seeding and crop rotation. The upgrade to the ABC+ plan in 2021 consolidated the sustainability, resilience, and competitiveness of Brazilian agriculture and promoted the transformation of Brazilian agriculture towards low-carbon and environmentally friendly directions.

Scholars also explored the differences in the effectiveness of policies and implementation methods in different regions. Various studies generally point to a common view that inclusive finance has a driving effect on the upgrading of agricultural industrial structure, but the effect varies depending on factors such as regional economic development status, specific implementation measures, resources, and technology [13]. For example, the agricultural tax reduction policy in the United States achieved significant results in promoting green agriculture and ecological economic development; Germany's organic agriculture subsidy policy led to the rapid development of organic agriculture in Germany.

4.2 Shortcomings of related research

Firstly, existing studies on inclusive finance and agricultural development predominantly concentrate on economic benefits, whereas research into the ecological environment remains underdeveloped. Agricultural development is inherently intertwined with ecology, as agriculture exerts a substantial influence on the environment [14]. However, current research on inclusive finance in domains like soil degradation and biodiversity remains scarce.

Secondly, the majority of studies rely on cross-sectional data, thereby lacking in-depth exploration of the long-term dynamic relationship between inclusive finance and agricultural development transformation. Additionally, panel data research remains inadequate, failing to sufficiently analyze the temporal evolution of this relationship.

5 Conclusion

This article comprehensively studies and analyzes how inclusive finance promotes agricultural development transformation through three mechanisms: technological penetration, factor optimization, and spatial balance. However, need to be alert to abnormal risks. Firstly, the digital divide may exacerbate information inequality among farmers, especially elderly farmers or remote areas who cannot access digital financial services such as satellite remote sensing credit assessment and intelligent risk control due to insufficient technological capabilities, resulting in unequal information access and resource allocation; The second issue is the abuse of financial instruments. The low threshold of inclusive finance can easily trigger new types of financial disputes, and some farmers may borrow excessively due to a lack of risk awareness or fall into debt crises due to fluctuations in agricultural operations.

Based on this, the current policy of inclusive finance for agricultural development transformation should focus more on infrastructure construction, targeted promotion, and implementation of targeted subsidies. Academic studies in this field should also prioritize granular analysis of the diverse financial requirements across distinct agricultural stakeholders—including smallholder farmers, cooperatives, and agricultural enterprises—and undertake in-depth inquiry into the long-term effects of inclusive finance on agricultural development transformation. Further exploration is also needed in specific areas, such as analyzing the causes of obstacles faced by small farmers in using mobile banking, investigating the financial needs of agricultural cooperatives and enterprises, and providing more accurate theoretical support for policy iteration.

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