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Research on the Sustainable Risk Management of Farmers' Microloans in Rural Commercial Banks

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Abstract: *With the in-depth implementation of the rural revitalization strategy, farmers' microloans have played an important role in supporting rural economic development and improving farmers' production and living conditions. However, rural commercial banks face multiple challenges in carrying out microloan businesses, including credit risk, policy risk, and environmental risk. Insufficient risk management not only undermines the sustainable operation of banks but also restricts the long-term development of farmers. Based on a review of relevant domestic and international research and in combination with the business practices of rural commercial banks, this paper systematically analyzes the risk characteristics and causes of farmers' microloans. It points out the shortcomings of the current risk management mechanism, such as delayed risk identification, inadequate risk diversification, and the lack of sustainable development concepts. On this basis, the paper proposes the construction of a sustainable risk management framework, focusing on optimizing risk identification and evaluation, improving risk-sharing and mitigation mechanisms, embedding the concept of green finance, and strengthening the rural credit system, supported by case studies and empirical analysis. The findings show that sustainable risk management can not only enhance the stable operation of rural commercial banks but also promote the healthy development of farmers' microloans, thereby achieving the dual goals of inclusive finance and rural revitalization.*

Keywords: *Rural Commercial Bank; Farmers' Microloans; Risk Management; Sustainable Development; Rural Revitalization*

1. Introduction

In recent years, with the deepening implementation of China's rural revitalization strategy, the role of financial support for agriculture, rural areas, and farmers ("Sannong") has become increasingly prominent. As an important part of the rural financial system, rural commercial banks play a key role in meeting farmers' financing needs, promoting agricultural modernization, and driving rural economic growth. Among their financial products, farmers' microloans have become an important channel for obtaining production and living funds due to their moderate amount, simplified procedures, and strong inclusiveness. However, compared with traditional credit business, farmers' microloans are often characterized by insufficient collateral, unstable farmer income, and severe information asymmetry, which leads to relatively high levels of risk and directly affects both asset quality and sustainable bank operations.Currently, rural commercial banks have accumulated some experience in risk management for farmers' microloans, such as improving pre-loan investigations, introducing guarantee funds and insurance mechanisms, and strengthening post-loan supervision. Nonetheless, the overall framework still shows weaknesses, including lagging mechanisms, limited means of risk diversification, and insufficient integration of green finance and sustainability concepts. These deficiencies reduce the effectiveness of risk prevention and, to a certain extent, constrain the further development of microloan business. Meanwhile, international experience in inclusive finance and sustainable finance indicates that integrating risk management with sustainable development is an effective way to enhance the resilience of rural finance and support the long-term development of farmers.Against this backdrop, this paper takes farmers' microloans in rural commercial banks as the research object, systematically analyzes their risk characteristics and causes, evaluates the shortcomings of the current risk management mechanisms, and proposes strategies and countermeasures for constructing a sustainable risk management framework. The aim is to provide theoretical support and practical reference for rural commercial banks to explore differentiated and sustainable risk management models, while contributing ideas to achieving the goals of inclusive finance and rural revitalization.

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2. Farmers' Microloans and Rural Commercial Banks

2.1. Definition and Characteristics of Farmers' Microloans

Farmers' microloans refer to loans with relatively low amounts, short terms, and simple procedures issued by rural commercial banks and other agricultural-related financial institutions to farmers in rural areas, mainly to meet their production and living capital needs. Compared with traditional large-scale loans, their core features lie in "small amount, broad purpose, and dispersed risk." This type of loan can alleviate the financing difficulties of farmers to some extent and enhance both the inclusiveness and accessibility of rural finance.In terms of loan amount, farmers' microloans are generally controlled between several thousand and several hundred thousand yuan, featuring "low amount and wide coverage," which better matches farmers' daily agricultural production, input procurement, livestock breeding, and living improvement needs. Regarding term, most loans are short-term within one year, with some flexibly designed in line with crop growth cycles, characterized by relatively flexible terms and diverse repayment methods. On the credit basis, since farmers generally have limited assets and insufficient collateral, loans often rely on credit evaluation, personal reputation, and mutual aid mechanisms at the village level, which further intensifies uncertainty in credit risk[1].In addition, farmers' microloans embody a certain degree of policy orientation and inclusiveness. As an important financial instrument to support "Sannong," this business not only carries the profit-making objective of commercial banks but also assumes the policy responsibility of serving the rural economy, increasing farmers' income, and improving livelihoods. Therefore, its sustainable development requires a balance between commercial viability and social benefits. Overall, farmers' microloans play an irreplaceable role in promoting rural economic development and advancing financial inclusion, but at the same time face greater management challenges due to scattered funds, information asymmetry, and concentrated risks[2].

2.2. Functional Positioning and Current Development of Rural Commercial Banks

Rural commercial banks, as a core component of China's rural financial system, were restructured from the former rural credit cooperatives, combining the dual attributes of serving "Sannong" and operating commercially. Their functional positioning includes not only meeting the financing needs of farmers, rural collective economic organizations, and small and micro enterprises, but also promoting the development of inclusive finance and supporting the implementation of the rural revitalization strategy. From a business perspective, rural commercial banks are not only the primary providers of farmers' microloans but also important channels for rural payment settlement, deposit absorption, and agricultural industry chain financial services.In terms of functional roles, rural commercial banks first undertake the responsibility of extending financial services to grassroots rural areas[3]. Compared with large commercial banks, their network of branches is closer to rural communities, enabling them to provide flexible financial products in environments where farmers' financial needs are scattered and credit information is incomplete. Second, rural commercial banks combine policy guidance with market-oriented operations: while maintaining profitability, they must also bear a degree of social responsibility to ensure the accessibility and sustainability of rural finance. Furthermore, rural commercial banks play an active role in promoting rural credit system construction and exploring innovative rural financial models, such as joint loans involving "company + farmer" or "cooperative + farmer."From the perspective of current development, rural commercial banks have gradually expanded in overall scale, and their asset quality and profitability have improved in recent years, becoming important providers of capital in local financial systems. Nevertheless, they still face several challenges: first, their risk management capabilities remain relatively underdeveloped, with high loan concentration and a weak collateral system; second, digital financial transformation is insufficient, and the application of big data and artificial intelligence in risk control is still at an early stage; third, the sustainability of inclusive financial services needs further improvement, as balancing commercial benefits and policy objectives remains a critical issue. Overall, rural commercial banks play the role of "main force" in the development of farmers' microloans, but achieving long-term stable growth requires continuously optimizing their risk management and sustainability capabilities on the basis of their functional positioning[4].

2.3. The Connotation of Sustainable Farmers' Loans

The sustainability of farmers' loans refers to achieving a balance among economic, social, and environmental benefits in the process of supporting farmers' financing needs and promoting rural

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economic development. Loan business must not only meet the requirements of stable bank operations but also satisfy farmers' long-term capital needs while aligning with rural revitalization strategies and green development goals[5]. Unlike traditional loans, which emphasize short-term profitability, the sustainability of farmers' loans focuses more on controllable risks, continuous financial resource provision, and long-term support for rural economic growth.From the perspective of financial institutions, sustainability means that rural commercial banks, when engaging in farmers' loan business, must maintain asset quality and profitability, avoid systemic fragility caused by high risk concentration, and, through mechanisms such as risk-sharing, policy support, and financial technology applications, enhance the broad coverage and inclusiveness of loan services to ensure their continuity.From the farmers' perspective, sustainability is reflected not only in the accessibility of loans but also in the fact that the funds obtained can improve production, increase income, and enhance repayment capacity. This process should gradually form a virtuous cycle of "credit accumulation → financial support → production development → timely repayment." If loans merely address short-term capital shortages without improving farmers' long-term development capacity, true sustainability cannot be achieved.From the societal and policy perspective, the sustainability of farmers' loans should also be combined with the concepts of green finance and inclusive finance. By promoting agricultural insurance, guarantee funds, credit village construction, and financing for green agricultural projects, risks and returns can be reasonably shared, thereby ensuring the healthy development of the rural financial ecosystem. Only when financial institutions, farmers, and society maintain a dynamic balance can the sustainability of farmers' loans be realized, ultimately fostering the coordinated development of rural commercial banks and the rural economy[6].

3. Risk Characteristics and Causes of Farmers' Microloans

3.1. Risk Classification

Farmers' microloans, due to their business model and target borrowers, present unique risk characteristics. These risks are similar to those of conventional commercial loans but are also highly dependent on the rural economic environment and the individual traits of farmers. Overall, the risks associated with farmers' microloans can be classified into the following categories.First is credit risk. This is the most fundamental and common risk in farmers' loans, primarily manifested when farmers default as a result of income fluctuations, business failure, or weak credit awareness. Since most farmers lack effective collateral, loans often rely on personal credit or mutual guarantees, which exposes lenders to higher levels of risk[7].Second is market risk. Agricultural production is heavily influenced by market conditions, and fluctuations in agricultural product prices directly affect farmers' income and, in turn, their repayment ability. For example, imbalances in supply and demand, price declines, or disruptions in transportation can all hinder farmers' ability to repay loans.Third is natural disaster risk. Agricultural production is highly vulnerable to climate conditions. Floods, droughts, and pest infestations can all lead to reduced yields or total crop failure, which often trigger defaults. Such risks are sudden and uncontrollable, making them a key feature distinguishing farmers' loans from ordinary commercial loans.Fourth is operational risk. Weaknesses in internal management within rural commercial banks, such as insufficient pre-loan investigation, inadequate post-loan supervision, or incomplete information systems, may also contribute to the accumulation and exposure of risks.Finally is policy and institutional risk. Farmers' loan businesses are closely tied to "Sannong" policies and the rural revitalization strategy. Changes in the policy environment, such as adjustments in loan interest subsidies, risk-sharing mechanisms, or regulatory requirements, can affect the sustainability of banks' loan operations.In summary, the risks of farmers' microloans are diverse and interwoven, encompassing traditional financial risks such as credit, market, and operational risks, while also being affected by natural disasters and policy-related shocks. This compound risk structure requires rural commercial banks to adopt integrated and dynamic risk management strategies to effectively control and mitigate potential risks[8].

3.2. Causes of Risk

The risks associated with farmers' microloans are not caused by a single factor but rather result from the interplay of farmers' individual characteristics, the management capacity of rural commercial banks, and external environmental conditions. The main causes can be summarized as follows.First, unstable farmer income and limited repayment capacity. Agricultural production is subject to strong seasonality and cyclicality, resulting in significant income volatility. On one hand, agricultural product

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prices fluctuate due to supply-demand dynamics and trade policies; on the other, rising production costs or blocked sales channels may weaken profitability. Moreover, some farmers lack financial literacy and risk awareness, leading to inefficient fund utilization and poor debt-servicing ability, thereby increasing the likelihood of default[9].Second, insufficient collateral and underdeveloped credit systems. In rural areas, farmers have limited assets for collateral, and the procedures for pledging land or housing are often cumbersome, with low liquidity. As a result, loans typically rely on credit-based or joint guarantee models. However, rural credit systems remain underdeveloped, with incomplete credit histories and limited information sharing, making it difficult for banks to comprehensively assess risks before granting loans.Third, natural disasters and environmental factors. Agricultural production is highly dependent on natural conditions. Disasters such as droughts, floods, or pest infestations can directly reduce yields or cause total crop failures, often trapping farmers in a vicious cycle of "cash flow disruption → loan default → refinancing difficulties." These risks are unpredictable and often regionally concentrated, creating high correlations in loan risk exposures for rural commercial banks.Fourth, deficiencies in internal management of rural commercial banks. In practice, some banks conduct shallow pre-loan investigations, lax loan reviews, and inadequate post-loan monitoring, leading to misallocation of funds or their diversion into high-risk activities. At the same time, due to limited adoption of financial technologies at the grassroots level, their capacity for risk monitoring and data analysis remains weak, restricting dynamic risk identification and control.Finally, uncertainties in policy and institutional environments. Farmers' loans often depend on fiscal subsidies, tax incentives, and government-backed guarantees. Adjustments in these policies may weaken risk-sharing mechanisms or reduce capital supply. Additionally, imperfections in rural land systems and financial regulatory frameworks may hinder effective risk resolution.In sum, the causes of risk in farmers' microloans are complex and intertwined, stemming from both farmers' limited economic capacity and creditworthiness, as well as the managerial shortcomings of rural commercial banks and fluctuations in the external environment. Effective risk management, therefore, must be multidimensional: enhancing farmers' credit building and production capacity, strengthening internal risk controls within banks, and leveraging policy support and financial innovation to form a coordinated effort[10].

3.3. Risk Manifestations and Case Analysis

In practice, risks in farmers' microloans not only exist as potential threats but also manifest in concrete forms, directly affecting the asset quality of rural commercial banks and the financial stability of farmers. The main manifestations can be summarized as follows.First is the high default rate. Given farmers' income volatility, frequent natural disasters, and uncertain market conditions, overdue payments and defaults occur frequently. In some regions, collective defaults have even occurred when agricultural product prices fell sharply or liquidity constraints intensified, seriously threatening banks' asset security.Second is the misuse of loan funds. Some farmers, after obtaining loans, do not allocate them fully to agricultural production or livelihood improvements but instead divert funds into high-risk investments, consumption, or repayment of other debts. Such deviations in fund utilization exacerbate repayment pressures and amplify risk accumulation.Third is the high concentration of risks. Farmers' loan businesses are often concentrated in specific industries or regions. Consequently, when a certain agricultural product suffers a price drop or when a region experiences a natural disaster, risks can cluster and erupt simultaneously, imposing significant shocks on rural commercial banks.Finally, information asymmetry leads to delayed risk exposure. Due to the underdevelopment of rural credit reporting systems, banks lack complete information on farmers during the pre-loan, loan, and post-loan stages. This makes it difficult to promptly detect operational difficulties or cash flow disruptions, thereby delaying timely risk interventions.In actual cases, one rural commercial bank expanded its livestock loan business by relying excessively on farmers' verbal commitments without sufficient investigation into breeding scale, market conditions, or epidemic prevention measures. When a regional avian influenza outbreak occurred, a large number of farmers defaulted, causing the bank's non-performing loan ratio to rise above 10%, severely damaging asset quality. In another case, a farmer who applied for agricultural production loans diverted the funds into real estate speculation. When the market declined, the farmer not only failed to repay the loan but also triggered defaults within a chain of mutual guarantees, further amplifying the transmission of risk.In summary, the real-world manifestations of farmers' microloan risks include high default rates, fund misallocation, risk clustering, and severe information asymmetry. The cases demonstrate that risks often arise not from a single factor but from the combined effects of natural conditions, market changes, farmers' creditworthiness, and bank management. This reality highlights the need for rural commercial banks to place greater emphasis on foresight and systemic approaches in risk management to effectively enhance the sustainable development of farmers' microloans.

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4. Current Situation and Problems of Risk Management in Farmers' Microloans

With the continuous improvement of the rural financial system and the advancement of inclusive finance policies, rural commercial banks have accumulated practical experience in risk management for farmers' microloans. At present, most banks have established relatively complete credit management systems, including pre-loan investigation, loan review, and post-loan supervision. In the pre-loan stage, reliance is placed on farmers' credit evaluation, village committee recommendations, and household economic assessments to mitigate risks from information asymmetry. During the loan stage, joint guarantees, "credit villages," and policy guarantee funds are employed to partially offset the shortage of collateral. In the post-loan stage, banks increasingly emphasize follow-up visits and monitoring of fund utilization, using big data risk-control platforms and rural credit information systems to dynamically supervise loan use and repayment behaviors. In some regions, linkages with agricultural insurance have also been explored, with "loan + insurance" models providing an additional layer of risk sharing. Overall, the risk management model for farmers' microloans is moving toward diversification and digitalization, gradually integrating the dual functions of serving "Sannong" and controlling risk.Nevertheless, the current model still faces significant problems. First, risk identification and early warning mechanisms remain inadequate. Particularly in terms of external risks such as natural disasters and market fluctuations, rural commercial banks lack effective forecasting and preventive tools, often resorting to post-event remedies, which delay timely responses. Second, risk diversification and mitigation mechanisms remain underdeveloped. Although guarantee funds and insurance products exist, their coverage is limited, and in some areas farmers show low acceptance of insurance, reducing the effectiveness of risk transfer. Third, information asymmetry remains a persistent issue. Rural credit information system development is uneven, with incomplete credit records for farmers in certain regions. As a result, banks continue to rely heavily on subjective judgment when making lending decisions, hindering comprehensive and scientific risk assessments. Fourth, sustainability concepts have yet to be fully incorporated into risk management. In pursuit of loan expansion and profitability, banks sometimes neglect the long-term developmental impact of loans on farmers, resulting in short-term financing cycles that fail to foster sustained income growth or credit accumulation. Finally, the application of financial technologies in risk management remains limited. Some rural commercial banks, constrained by technical capacity and investment costs, have not fully adopted big data, artificial intelligence, or other tools to enhance monitoring and decision-making, relying instead on traditional manual reviews and offline supervision.In general, while rural commercial banks have built a basic framework for risk management in farmers' microloans, shortcomings persist in forward-looking risk identification, effective risk-sharing mechanisms, credit information systems, and the integration of sustainability concepts. These limitations increase the probability of risk exposure and constrain the healthy development of farmers' microloans. To ensure sustainable loan operations, the existing risk management system must be systematically optimized, shifting toward models that are more intelligent, systematic, and sustainability-oriented.

5. Construction of a Sustainable Risk Management Framework

In farmers' microloan operations, risks are diverse and interwoven. Relying solely on traditional credit management processes is no longer sufficient to address the complexity of today's financial environment. To achieve the long-term sustainable development of farmers' microloans, rural commercial banks must establish a systematic, forward-looking, and sustainability-oriented risk management framework. Figure 1 illustrates the structure of this framework, which consists of five interconnected components: risk identification and assessment, risk sharing and mitigation, green finance and sustainable development, information sharing and credit system building, and digital and intelligent risk control. These components are mutually reinforcing and together form a dynamic risk management cycle.

To begin with, risk identification and assessment is the starting point of the framework. By introducing big data analytics, remote sensing monitoring, and agricultural product market information platforms, banks can detect potential risk factors at an earlier stage, construct credit profiles for farmers, and thus achieve more precise credit evaluations. This dynamic approach to risk identification helps overcome the limitations of traditional experience-based judgment and enhances the foresight of risk warnings.Second, risk sharing and mitigation serves as the framework's central pillar. Rural commercial banks can establish policy-based guarantee funds, promote agricultural insurance, and develop cooperative mutual-aid mechanisms to transfer part of the risk to broader social and policy-level actors. Moreover, constructing combined models of "loan + insurance + guarantee" helps diversify losses when risks materialize and strengthens the overall resilience of the system.Third,

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embedding the concept of green finance and sustainable development into risk management is crucial for long-term stability. By prioritizing financing for green agricultural projects, ecological farming, and low-carbon industries, banks can simultaneously reduce environmental risks and support the green transformation of rural economies. This approach not only aligns with national sustainable development strategies but also provides favorable conditions for the long-term development of farmers.In addition, information sharing and credit system development are vital for improving the efficiency of risk management. Strengthening collaboration with local governments, rural credit cooperatives, and credit reporting platforms to build a more comprehensive credit database for farmers enhances transparency and information sharing. This not only helps reduce information asymmetry and improves the scientific basis for lending decisions but also enables farmers to accumulate creditworthiness and improve their access to finance.Finally, digitalization and intelligent risk control represent the inevitable trend in raising the level of risk management. Rural commercial banks should increase investment in financial technology, applying artificial intelligence models, blockchain technology, and smart contracts to achieve end-to-end risk monitoring. Real-time monitoring of loan usage and dynamic evaluation of farmers' operational conditions can significantly shorten the time between risk exposure and response, thereby improving the flexibility and precision of risk management.In summary, this sustainable risk management framework emphasizes both the systematic nature of risk identification and mitigation and the integration of green finance, credit system development, and digital risk control. It transforms risk management from a single defensive approach to a comprehensive and forward-looking governance model. For rural commercial banks, constructing such a framework not only ensures financial security but also fosters a virtuous cycle between farmers' microloans and rural economic growth, achieving the organic integration of commercial objectives and social value.

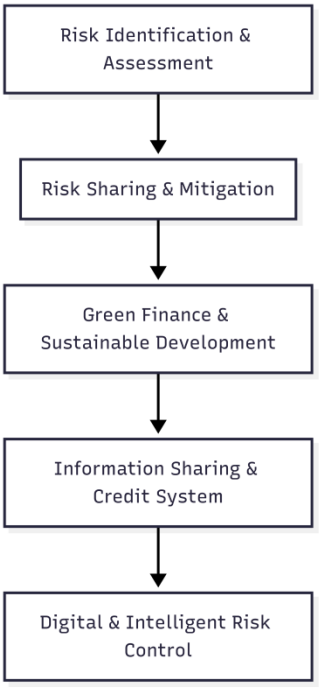

Figure 1 Sustainable Risk Management Framework for Farmers' Microloans

6. Conclusion

This paper takes farmers' microloans in rural commercial banks as the research object, systematically analyzes their risk characteristics and causes, evaluates the current risk management models and shortcomings, and on this basis proposes a sustainable risk management framework. The study finds that farmers' microloan risks are diverse and complex, influenced by internal factors such as unstable farmer income and insufficient collateral, as well as external factors including natural disasters, market volatility, and policy changes. Current management models still exhibit deficiencies in risk identification, risk diversification, and credit information infrastructure, making it difficult to meet the requirements of sustainable loan operations.To address these issues, this paper proposes an integrated framework covering risk identification and assessment, risk sharing and mitigation, green

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finance and sustainable development, information sharing and credit system building, and digital and intelligent risk control. The framework can enhance the risk management capacity of rural commercial banks, promote the long-term healthy development of farmers' loans, and create a virtuous interaction between financial stability and rural revitalization. Future research may further validate the feasibility of this framework through empirical data and case studies, while also exploring the deeper application of financial technology in risk management.

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