Analysis of Operational Challenges and Optimization Pathways of Policy-Based Agricultural Insurance System in Chongqing

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Abstract This article investigates the development process and current status of policy-based agricultural insurance in Chongqing. Based on recent data-including premium income, compensation amounts, the number of insured households, and insurance penetration, the article analyzes the primary challenges faced in the system's operation and proposes recommendations from two dimensions: institutional optimization and practical interventions. These recommendations include establishing a differentiated participation incentive mechanism, optimizing the composition of insurance products, enhancing risk diversification and reinsurance systems, creating an agricultural disaster risk reserve fund, developing a dynamic fiscal subsidy distribution mechanism based on risk and performance, improving information-sharing platforms, strengthening the rural grassroots power grid infrastructure, and accelerating the adoption of modern technologies in underwriting and claims settlement processes. The findings suggest that the coordinated advancement of institutional optimization and technological empowerment can substantially enhance the inclusiveness, sustainability, and operational efficiency of policy-based agricultural insurance in Chongqing, thereby providing substantial support for agricultural modernization and the Rural Revitalization Strategy.

Key words Chongqing, Policy-based agricultural insurance, Challenge, Optimization pathway

0 Introduction

Agriculture forms a fundamental sector of the national economy and plays a critical role in safeguarding national food security and maintaining social stability. Nevertheless, agricultural production is heavily dependent on natural conditions and is susceptible to natural disasters, including floods and droughts. This sector is characterized by unstable returns and a broad, unpredictable distribution of risks. Against the backdrop of growing climate change and the increasing frequency of extreme weather events, agricultural production faces heightened uncertainties, which in turn causes significant fluctuations in farmers' incomes. These challenges not only impede the sustainable development of agriculture but also threaten farmers' livelihoods, rural social stability, and national food security strategies. Ensuring the uninterrupted functioning of agricultural production is therefore crucial for effectively addressing these risks and challenges, as well as for promoting sustained economic growth and social stability. Agricultural insurance, as a critical element of contemporary agricultural risk management systems, assists farmers in mitigating losses resulting from natural disasters through risk pooling and economic compensation. It is considered a vital policy instrument for stabilizing agricultural production and fostering rural economic development.

As the only municipality in western China directly under the central government, Chongqing features diverse and complex terrain, dominated by mountains and hills. Its agricultural sector is multifaceted, encompassing the cultivation of grain crops, economic crops, livestock breeding, and specialty agriculture. However, the region faces significant challenges due to the combined constraints of its geographical environment and climatic conditions, which contribute to a high frequency of natural disasters, such as floods, droughts, and landslides. These events pose substantial risks to agricultural output. To mitigate risks in agricultural production, Chongqing has progressively developed a policy-based agricultural insurance system, propelled by both central and local government initiatives. This system has yielded notable outcomes in areas including system design, the expansion of insurance products, and the provision of financial subsidies. However, compared to the eastern coastal regions, Chongqing still lags in the coverage, participation rate, compensation efficiency, and the degree of innovation in agricultural insurance products. Furthermore, the system's operation faces challenges including limited farmer engagement in insurance programs, a narrow range of insurance products, underdeveloped risk assessment and pricing mechanisms, and cumbersome claims procedures.

In recent years, China has issued several policy documents aimed at promoting the high-quality development of agricultural insurance, such as *The Central Committee of the Communist Party of China* and *the State Council's Opinions on Implementing the Rural Vitalization Strategy*, and *the Guiding Opinions on Accelerating the High-Quality Development of Agricultural Insurance*. These documents have provided clear guidance for the establishment of local agricultural insurance systems. In response, Chongqing has successively progressively rolled out tailored agricultural insurance plans, expanded insurance coverage, and explored innovative models, including insurance for specialty agricultural products and index-based insurance. Nevertheless, challenges persist in the system's implementation and operation, such as inconsistent policy outcomes, uneven allocation of fiscal subsidy funds, and inadequate service capacity among insurance institutions. These issues

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have not only curbed the overall efficacy of agricultural insurance but also eroded farmers' confidence in the policy-based agricultural insurance system. In this context, a systematic investigation of the challenges encountered in the development of agricultural insurance in Chongqing, along with the formulation of practical and feasible countermeasures and recommendations, holds significant practical importance and theoretical value. Firstly, from a practical perspective, the effective implementation of agricultural insurance can substantially mitigate agricultural production risks, stabilize farmers' incomes, foster rural economic development, and directly contribute to the advancement of agricultural modernization and the rural revitalization strategy in Chongqing. Secondly, from a policy perspective, examining the operational bottlenecks and improvement directions in agricultural insurance in Chongqing facilitates the optimization of the local fiscal subsidy mechanism, the enhancement of the insurance product system, the improvement of service quality provided by insurance institutions, and offers a scientific foundation for decision-making authorities. Thirdly, from an academic perspective, Chongqing, as a representative region characterized by hilly and mountainous agriculture in western China, holds significant reference value and provides insights for other similar regions regarding its developmental experiences and challenges in agricultural insurance.

This paper focuses on the current development status of agricultural insurance in Chongqing. By examining the policy background and institutional evolution, it analyzes the policy background and institutional evolution to identify the primary challenges in implementation. Drawing on successful domestic and international experiences, the study proposes targeted countermeasures and recommendations. The aim is to provide both theoretical support and practical guidance for enhancing agricultural insurance in Chongqing and the broader western region, thereby better leveraging its positive role in risk coverage, income stabilization, and sustainable agricultural development.

1 Current development status of policy-based agricultural insurance in Chongqing

1.1 Continuously expanded scale of insurance coverage The official commencement of policy-based agricultural insurance payouts in Hechuan District, Chongqing, on November 7, 2007, marking the beginning of its rapid growth for agricultural insurance in Chongqing. By the end of 2023, the city's agricultural insurance premium income had reached 1.486 billion yuan, with risk coverage amounting to 37.029 billion yuan for 1.632 7 million households (or instances). Additionally, compensation payments totaling 1.455 billion yuan were disbursed to 264 800 households (or instances). The insurance scheme now achieves comprehensive coverage across all agricultural districts and counties in Chongqing. This insurance program comprises 13 types of central government-subsidized categories—including rice, corn, wheat, potatoes, fattening pigs, and commercial forests. Additionally, the city and its districts and counties have independently developed over 100 distinctive and advantageous insurance products, encompassing citrus fruits, pickled mustard tubers, ecological fishery, and other categories. Fig. 1 illustrates the premium income and compensation levels associated with policy-based agricultural insurance in Chongqing.

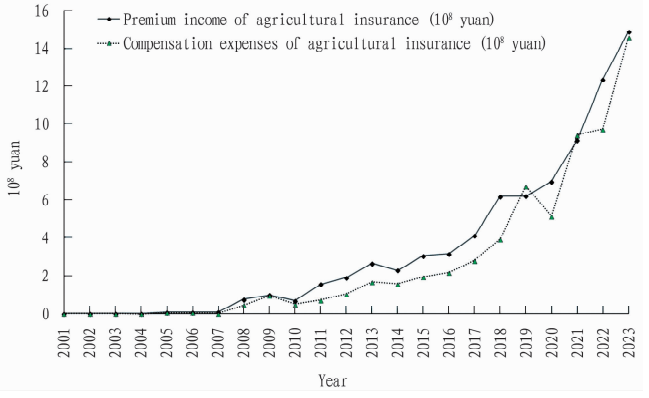

Fig. 1 Premium income and compensation expenses of agricultural insurance in Chongqing from 2001 to 2023

Since Chongqing officially implemented policy-based agricultural insurance program in 2007, the sector has entered a phase of accelerated development. The period from 2001 to 2006 was characterized by limited scale, with both premium income and claim payouts remaining at a low level. The program's coverage and protective role were consequently constrained. A turning point arrived in 2007, when the central government initiated a pilot premium subsidy scheme, marking a pivotal shift in the institutional landscape. This policy impetus triggered rapid growth. By 2008, premium income surged more than sixfold year-on-year to 73.54 million yuan, while claim payouts rose significantly to 44.54 million yuan. Since 2009, premium income had steadily increased, rising consistently from 96 million yuan to 230 million yuan by 2014. During the same period, compensation expenses also grew, increasing from 92.7 million yuan in 2009 to 155 million yuan. This growth in premium scale reflects the gradual normalization of agricultural insurance operations. Since 2015, driven by the expansion of insurance categories, enhancements in protection levels, and increased local matching subsidies, both premium income and compensation expenses have experienced rapid growth. By 2023, these figures reached 1.486 billion and 1.456 billion yuan, respectively, with the loss ratio consistently exceeding 95%. This performance has played a crucial role in stabilizing agricultural production and farmers' incomes during years affected by disasters. However, it has also imposed greater demands on the sustainable management of insurance funds and their capacity for risk diversification.

1.2 Continuously elevated insurance penetration The penetration of policy-based agricultural insurance—measured as the ratio of its premium income to the gross domestic product (GDP)—serves as a proxy for its integration with the regional economic foundation. A higher penetration indicates more extensive insurance coverage and a enhanced risk transfer mechanism, thereby contributing to stabilization of agricultural production, the security

of farmers' incomes, and the advancement of rural economic development. Based on official data released by Chongqing City, Fig. 2 is presented accordingly.

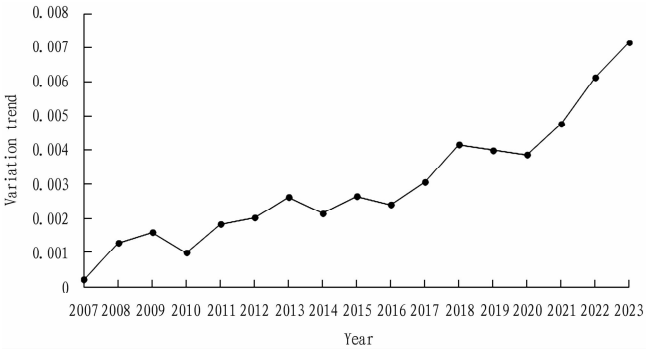

Fig. 2 Variation trends of insurance penetration of policy-based agricultural insurance in Chongqing

From 2007 to 2023, the penetration of policy-based agricultural insurance in Chongqing exhibited a marked upward trajectory, rising from 0.021% in 2007 to 0.714% in 2023, representing an increase of more than 33-fold. This growth indicates a sustained improvement in the integration of agricultural insurance within the regional economy and its capacity to provide risk protection. The penetration rate increased more than fivefold in 2008, coinciding with the full rollout of central government premium subsidies and marking the program's transition into a phase of institutionalized development. A temporary dip occurred in 2010, attributable to fluctuations in total agricultural output value and a slowdown in premium growth. However, from 2011 onward, the penetration exhibited a consistent upward trend, driven by the diversification of insurance types, increased local matching subsidies in Chongqing, and the expansion of participation scale. Since 2017, the growth rate of insurance penetration had notably accelerated, driven by the dual factors of agricultural modernization and the increasing frequency of disaster risks. This trend had resulted in consecutive record highs from 2021 to 2023. This development not only demonstrates the sustained effectiveness of policy support but also signifies that agricultural insurance has become a crucial institutional mechanism for stabilizing agricultural production and securing farmers' incomes in Chongqing.

1.3 Continuously expanded scope of insurance coverage In 2024, the Chongqing Municipal Bureau of Finance, in collaboration with the Municipal Commission of Agriculture and Rural Affairs and the Chongqing Regulatory Bureau of the National Financial Supervision and Administration Commission, issued the *Notice on Further Improving the Comprehensive Cost (Supplementary) Insurance for Staple and Other Crops and Implementing Corn Planting Income Insurance*. This initiative seeks to optimize the premium subsidy structure as well as the underwriting and claims settlement mechanisms, thereby enhancing the guarantee capacity and operational efficiency of policy-based agricultural insurance to support food security and rural revitalization strategies. This Notice introduces differentiated policies concerning insurance types and regional distribution. In major grain-producing counties, it mandates full cost insurance for rice, wheat, and corn, alongside supplementary full cost insurance for potatoes; additionally, corn planting income insurance will be piloted. In non-major grain-producing counties, comprehensive supplementary cost insurance is offered for rice, corn, and potatoes. Regarding insurance standards, the unit insurance amount, rate, and premium for each insurance type are explicitly defined, and it is stipulated that the same crop cannot be insured multiple times. The premium-sharing policy prioritizes major grain-producing counties, counties benefiting from rural revitalization assistance, and designated groups, with the participation threshold lowered by reducing the required proportion. During the underwriting verification process, the insured area must be confirmed based on the land management right certificate or lease contract. In cases of incomplete documentation, the competent authority is required to issue a certificate and register the relevant information.

2 Challenges in the operation of policy-based agricultural insurance system in Chongqing

In recent years, policy-based agricultural insurance in Chongqing has achieved significant progress regarding coverage scale, protection levels, and the structure of insurance product types. This progress has established a distinct development trend characterized by "wider coverage, richer product variety, and higher standards". However, an analysis of official statistics, policy documents, and public reports from recent years reveals several prominent operational challenges that impede sustainable development and institutional advancement.

2.1 Insufficient insurance penetration and uneven coverage quality Although the number of insured households and the scale of premiums have increased substantially in recent years, and the capacity for insurance protection has been continuously enhanced, deficiencies remain in terms of insurance penetration, long-term coverage rates, and the precision of protection. For example, in the first eight months of 2022, policy-based agricultural insurance in the city covered 1.741 million households, providing approximately 43.51 billion yuan in risk coverage . By the first half of 2023, there were 1.632 7 million households, with the total for the entire year projected to reach approximately 1.9 million households, and a coverage amount of about 40.9 billion yuan. In 2023, the penetration of agricultural insurance at the municipal level was 0.71%. Although this represents an increase of more than threefold since 2007, it remains below the national average of 1.25%. Furthermore, a pronounced disparity in coverage exists between major grain-producing areas and non-production regions. In particular, enrollment rates remain notably low among farmers in mountainous areas and key counties targeted for rural revitalization support. This misalignment between "expanding coverage volumes and inadequate protection levels" suggests that there remains significant potential for enhancing the inclusiveness and balance of policy-based agricultural insurance.

2.2 Considerable pressure faced by financial subsidies and underwriting institutions on compensation funds The substantial scale of compensation and pronounced annual fluctuations have exerted sustainability pressures on fiscal subsidies and under-

writing entities. Analysis of premium and compensation data for policy-based agricultural insurance in Chongqing from 2001 to 2023 indicates that both metrics have remained elevated over the past three years. Specifically, in 2021, the premium amounted to 915.06 million yuan, with a compensation of 939.84 million yuan; in 2022, the premium reached 1 234.45 million yuan, accompanied by a compensation of 970.11 million yuan; and in 2023, the premium was 1 486.64 million yuan, with a compensation of 1 455.96 million yuan (Table 1). In certain years, the loss ratio approaches or surpasses 100%, indicating that during periods of concentrated natural disasters, fiscal subsidies and underwriting institutions encounter substantial pressure regarding compensation funds.

Table 1 Loss ratio of policy-based agricultural insurance in Chongqing over the past three years

Year	Premium income 10^8 yuan	Compensation expenses 10^8 yuan	Loss ratio//%
2021	9.150 6	9.398 4	102.7
2022	12.344 5	9.701 1	78.6
2023	14.866 4	14.559 6	97.9

Although municipal authorities have implemented measures such as revising the *Administrative Measures for Premium Subsidies of Agricultural Insurance* and introducing reinsurance mechanisms to diversify risk, challenges related to fiscal sustainability and the marketization capacity of insurance persist. In the event of frequent disasters and concentrated compensation claims, the current subsidy and reinsurance frameworks may prove inadequate to cover compensation demand in full, thereby eroding insurers' incentives and undermining farmers' confidence in the insurance programs.

2.3 Insufficient precision in fiscal subsidy allocation and inadequate performance evaluation mechanisms Chongqing has established a relatively comprehensive fiscal subsidy system and has implemented differentiated subsidy policies in recent years. For example, the proportion of self-paid insurance premiums for farmers in major grain-producing counties is set at 10%. This rate is further reduced by 5% in counties benefiting from rural revitalization assistance and by an additional 5% for households that have been lifted out of poverty or are under monitoring. This tired design helps concentrate resources on key regions and vulnerable groups. However, from the perspective of practical implementation, the allocation of subsidies has not been systematically aligned with the agricultural risk exposure, historical claim levels, or industrial structures of individual districts and counties. In certain disaster-prone regions, the total financial subsidies received are relatively low due to limited arable land or smaller insured areas. Conversely, low-risk regions, characterized by larger insured areas, have obtained greater financial subsidy allocations. This misallocation has reduced the efficiency of public fund utilization. According to the research conducted by Huang Yingjun *et al.*, the effectiveness of policy-based agricultural insurance subsidies in Chongqing is significantly lower than the national average, with notable disparities in development across districts and counties. Furthermore, the allocation of subsidies primarily depends on the annual budget and area statistics, lacking a dynamic adjustment mechanism informed by risk models, fluctuations in loss ratios, and underwriting performance. As a result, fiscal resources cannot be flexibly redirected to regions facing growing risks. Meantime, performance evaluations primarily emphasize indicators such as the compliance of fund utilization and the premium subsidy payment rate. However, there is a lack of quantitative assessment regarding factors such as claims settlement speed, farmers' satisfaction, and the coverage rate of risk protection. This limitation results in a relatively narrow and monotonous evaluation of the effectiveness of subsidy fund utilization.

2.4 Potential for enhancement in grassroots service system and technical support capabilities Chongqing has made notable progress in developing the service system for policy-based agricultural insurance. At present, a three-tier service network comprising "county and district branches, rural service stations, and village insurance assistants" has been essentially established across the city. In certain districts and counties, advanced technologies such as unmanned aerial vehicles (UVAs), remote sensing monitoring, and video investigation have been implemented, reducing processing times for underwriting and claims settlement. Overall, however, significant disparities exist among different districts and counties regarding the density of service network stations, personnel allocation, and the technology adoption rate. These issues are especially pronounced in mountainous towns with limited transportation infrastructure, where challenges such as extensive service areas and insufficient staffing persist. In terms of the rural service network development, while most county-level insurance companies have established marketing service departments in key towns and township-level service coverage is generally achieved in core agricultural zones, the network remains underdeveloped at the village level. Furthermore, the rural agricultural insurance marketing service departments have not yet fully realized their potential in underwriting, claims settlement, or expanding insurance outreach. Additionally, the quantity and quality of cooperative insurance and claims personnel within the agricultural insurance planting and breeding system remain insufficient to fully satisfy the demands of high-quality development. This challenge is particularly acute in townships with relatively low business volumes, where recruiting qualified staff is difficult. even when personnel are assigned, their overall educational background and professional skills require further improvement. Although rural service networks have been established in certain regions, their operational capacity remains weak, and their practical role in promoting agricultural insurance is limited. With regard to technological application, the level of informatization is relatively high in core urban areas and adjacent counties and districts. By contrast, some remote locations still rely heavily on manual on-site investigations persists, which are susceptible to terrain and weather conditions, leading to claims settlement cycles. Moreover, the investigation systems and data platforms of various insurance companies have not been fully integrated, resulting in insufficient cross-regional and cross-institutional data sharing. This limitation constrains the effectiveness of risk monitoring, disaster warning, and precise premium pricing. Regarding the composition of insurance products, agricultural insur-

ance in Chongqing predominantly targets staple crops such as rice, while the coverage rate for specialized agricultural insurance remains relatively low. For example, in 2023, the share of premium income derived from insurance on characteristic agricultural products in the city was below 15%. In contrast, certain districts and counties within other more developed provinces reported that the proportion of premium income from insurance on characteristic industries exceeded 50%. This structural imbalance has, to some extent, constrained the ability of agricultural insurance to effectively support the local agricultural economy.

3 Optimization pathways and countermeasures for policy-based agricultural insurance in Chongqing

3.1 Enhancing insurance penetration and protection balance

Given the issues of inadequate insurance penetration and regional disparities in protection levels within policy-based agricultural insurance in Chongqing, efforts to expand insurance coverage should simultaneously focus on enhancing the precision of protection and increasing long-term participation rates. On the one hand, a differentiated participation incentive mechanism should be incorporated into fiscal support policies. This is particularly important for regions such as mountainous areas and key counties targeted for rural revitalization, where participation rates are significantly lower than the urban average. Measures such as increasing the premium subsidy ratio and providing sigh-up incentives should be implemented to encourage stable participation among farmers. Additionally, the introduction of temporary subsidy policies during seasons with elevated disaster risks could help sustain the scale of participation in policy-based agricultural insurance. On the other hand, the structure of insurance products should be optimized to enhance coverage for specialized agricultural sectors, advantageous industries, and high value-added crops, such as citrus, tea, and Chinese medicinal materials, thereby narrowing the protection disparity between major grain-producing areas and other regions. Concurrently, efforts must be intensified to improve policy dissemination and risk education. Utilizing channels such as village-level insurance assistants, agricultural technology promoters, and rural cooperatives can effectively increase farmers' understanding of the role of agricultural insurance in mitigating production risks and stabilizing income. Linking insurance participation records with the rural credit system, associating consistent coverage with preferential loan rates, fiscal incentives, and industrial support, could also help increase long-term engagement by addressing both economic and credit constraints.

3.2 Enhancing compensation capacity and risk diversification levels Given the issues of substantial compensation amounts and considerable annual variability in agricultural insurance in Chongqing, it is imperative to strengthen the overall risk resilience by developing a multi-tiered risk dispersion mechanism and establishing a risk reserve system. Firstly, it is essential to enhance the reinsurance framework by expanding collaboration with both the national reinsurance platform and the international reinsurance market. Additionally, the introduction of diverse financial instruments, such as catastrophe bonds and agricultural risk mutual aid funds, is necessary to facilitate risk sharing and prevent a deficit of compensation funds during years characterized by concentrated disasters. Secondly, a municipal agricultural disaster risk reserve fund should be established, with regular contributions from the finance department. This fund would be specifically utilized in years when the loss ratio significantly exceeds the average, thereby mitigating annual expenditure fluctuations for the finance department and alleviating operational pressures on insurance institutions. To optimize the underwriting structure, it is essential to strategically distribute risk concentrations across various regions and crop types to mitigate the risk of simultaneous compensation claims arising from regional natural disasters. Concurrently, in partnership with agricultural insurance contracting companies within the city, new insurance products, including disaster insurance and meteorological index insurance, should be actively introduced. Utilizing a trigger mechanism based on objective indicators, claims processing can be expedited, thereby minimizing the uncertainty and delays associated with manual investigations. For example, in districts and counties with elevated risks of drought and flooding, an automatic compensation model triggered by abnormal rainfall or temperature indicators is recommended to improve the efficiency and transparency of claims settlement.

3.3 Optimizing the distribution and performance evaluation mechanism of fiscal subsidies Regarding the allocation of fiscal subsidies, the subsidy policy should transition from "broad-based support" to "precision targeting". Besides, a dynamic adjustment mechanism should be established, incorporating multiple indicators such as risk levels, historical loss ratios, agricultural industrial structures, and participation rates. In districts and counties that are frequently affected by disasters and have inadequate protection levels, the subsidy ratio may be appropriately raised. Conversely, in low-risk areas with relatively high guarantee levels, the subsidy amount should remain stable to ensure the optimal allocation of fiscal resources. In addition, subsidy distribution should be linked to the performance evaluation of agricultural insurance, with the establishment of a comprehensive and multi-dimensional assessment framework. This system should evaluate not only the compliance in fund utilization but also key indicators such as the timeliness of claims settlement, farmers satisfaction, and the coverage rate of protection. Evaluation standards should be transparent and publicly accessible. For insurance institutions demonstrating outstanding performance, incentive-based financial support or policy preferences may be offered to create a positive incentive mechanism of "superior performance, superior compensation". Furthermore, it is essential to strengthen information sharing among the finance department, the agricultural and rural affairs department, and the insurance regulatory authorities. By leveraging big data platforms, information from various stages, including underwriting, claims settlement, and subsidy allocation should be integrated to reduce resource misallocation cased by information asymmetry and to improve the accuracy and timeliness of policy implementation.

3.4 Strengthening grassroots service systems and technical support capabilities In response to the challenges posed by the underdeveloped rural insurance service infrastructure and inadequate technical support in certain regions of Chongqing, a compre-

hensive approach encompassing network planning, workforce development, system integration, and the application of advanced technologies should be adopted. Firstly, an increased number of village-level service points should be established in key production areas, regions susceptible to disasters, and locations with service gaps. This is particularly important in mountainous areas where populations are dispersed and transportation is challenging. In such regions, insurance service functions should be integrated through channels such as cooperatives and agricultural supply distribution centers to ensure that underwriting, investigation, and claims settlement processes can be conducted locally. Secondly, it is essential to strengthen the development of the cooperative insurance and claims team by enhancing personnel expertise in agricultural production, risk assessment capabilities, and information management. This can be achieved through regular centralized training, the establishment of a professional certification system, and other relevant measures to improve the overall quality of the team. Thirdly, efforts should be directed towards the standardization and integration of the city's agricultural insurance investigation and claims settlement systems. This integration would enable real-time data sharing among various insurance companies and across different districts and counties, thereby facilitating the rapid acquisition of disaster information and the prompt initiation of the claims process. Regarding technological applications, the adoption of modern tools such as UAVs aerial photography, satellite remote sensing, and mobile claims terminals should be actively promoted to reduce dependence on manual investigations affected by terrain and weather conditions, and to enhance the efficiency of disaster assessment and compensation procedures. Finally, in accordance with the local agricultural development strategy, the variety of insurance products should be optimized, and the insurance coverage for distinctive agricultural products and locally advantageous industries should be increased. This approach will allow policy-based agricultural insurance to more effectively align with the local agricultural industrial structure, thereby strengthening its supportive role in the regional economy.

4 Conclusions

Over the past decade, policy-based agricultural insurance in Chongqing has evolved from exploratory pilot phases to an institutionalized and large-scale system. The scale of participation, the level of protection, and the capacity for risk diversification have all markedly improved, contributing positively to the stabilization of agricultural production, the enhancement of farmers' income, and the advancement of rural revitalization. However, research indicates that the current operation of the system continues to face several challenges, including insufficient insurance penetration, uneven quality of coverage, highly variable compensation payouts, inadequate accuracy in the distribution of fiscal subsidies and performance evaluation mechanisms, and an urgent need to enhance the grassroots service system and technical support capacity. These issues are closely linked not only to Chongqing's complex and diverse natural geographical conditions and the characteristics of its agricultural industrial structure but also to the specific aspects of policy design and institutional implementation.

In response to the aforementioned issues, this paper proposes targeted optimization pathways and countermeasure recommendations. These include establishing a differentiated participation incentive mechanism, optimizing the composition of insurance types, enhancing the risk dispersion and reinsurance system, creating an agricultural disaster risk reserve fund, developing a dynamic subsidy distribution mechanism based on risk and performance, improving the information-sharing platform, strengthening the development of grassroots rural network systems and cooperative underwriting-settlement teams, and accelerating the adoption of technologies such as UAVs and remote sensing for claims investigation and settlement. The implementation of these measures will improve enhance the inclusiveness, sustainability and operational efficiency of policy-based agricultural insurance in Chongqing, thereby providing a more solid institutional support for ensuring agricultural production safety, promoting agricultural modernization and advancing the rural revitalization strategy. It is important to emphasize that the development of the agricultural insurance system is a dynamic and continuously optimized and iterative process. Its operational effectiveness is influenced not only by policy design and implementation efficiency but also by broader factors such as the macroeconomic environment, climate change trends, and the transition of agricultural production methods. Future research should build upon existing foundations by integrating methods such as big data analysis, disaster risk modeling, and farmer behavior analysis. This approach will facilitate continuous monitoring and evaluation of the operational performance of policy-based agricultural insurance at various stages, thereby offering more precise decision-making support for institutional refinement and innovation.

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products and services that align with market needs. Utilizing internet platforms for differentiated brand marketing and launching customized products for specific consumer groups can effectively enhance the brand's market competitiveness. (iii) Strengthening the development of brand storytelling and innovating consumer experiences are essential. By narrating compelling brand stories and delivering high-quality consumer experiences, trust and loyalty toward the brand can be strengthened. Pingguo City can integrate science education with Party building and patriotic education, combine industrial culture with red culture, and develop a "green + red" agricultural culture as the core of its brand narrative. Through packaging design, brand communication, and other methods, the appeal and recognition of the brand can be enhanced.

3 Conclusions

At present, Pingguo's abundant resources, significant geographical advantages, robust talent support, and the rapid growth of the "Internet +" industry provide a solid foundation for the development of its county-level agricultural products. However, in the face of intense competition due to product homogeneity and shifting market demands, the branding and development of agricultural products in Pingguo City still have a long way to go. Moving forward, Pingguo should actively align with national strategies such as rural revitalization, seize policy opportunities aimed at integrating primary, secondary, and tertiary industries in rural areas, and capitalize on the development of digital village pilot programs. Efforts should focus on promoting the convergence of agriculture, culture, sports, and tourism, leveraging the strengths of co-construction, co-governance, and sharing to engage all stakeholders in the branding initiative of agricultural products. Only through these measures can Pingguo optimize its traditional industrial structure, facilitate the emergence of leading agricultural product brands, increase farmers' income, and achieve innovation and sustainable development in the national agricultural industry.

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