

Research on the Mechanism and Policy Support of "New Farmers" in Promoting Rural Revitalization in Western Rural Areas

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Abstract

This study takes Wansheng District in Chongqing as a case to systematically analyze the internal mechanisms and policy support of "new farmers" in driving rural revitalization. Based on theories such as human capital, industrial integration, social embedding, and policy tools, it constructs a three-dimensional analysis framework of "actor-behavior-environment" to reveal the dual-path mechanism through which new farmers activate rural endogenous dynamics via technological empowerment and social capital reconstruction. Empirical research demonstrates that new farmers significantly enhance agricultural added value and farmer income through measures such as industrial chain reshaping (agricultural orders, deep processing, cloud warehouse logistics), organizational innovation (the "leading enterprise + new farmers + cooperatives" model), and cultural activation (intangible cultural heritage IP development), with the synergistic effect of technology diffusion and organizational restructuring contributing 53%. However, rural areas in western China still face structural constraints such as land fragmentation, limited financing channels, and infrastructure deficiencies, along with issues like "elite capture" and insufficient departmental coordination in policy implementation. Drawing on 1,200 questionnaires and multi-source data, the study validates through multiple regression and structural equation modeling that policy support ($\beta = 0.352$) and digital skills ($\beta = 0.287$) are core drivers, yet farmland fragmentation (CFI=0.89) significantly undermines the synergistic effect of policy and technology diffusion. To address these issues, the study proposes a "three-chain synergy" policy toolkit: promoting virtual plot consolidation and securitization of land use rights; innovating supply chain ABS and insurance futures coordination; and establishing village-level mid-level platforms and resident "digital stewards." Additionally, it designs a policy performance evaluation system covering economic, social, ecological, and innovation dimensions, along with a fault-tolerant and corrective mechanism to ensure policy implementation. Theoretically, this study integrates new endogenous development and urban-rural interaction theories to construct a mechanistic model tailored to the western context. Practically, it provides replicable policy solutions for western counties, aiding in addressing the sustainability challenges of rural revitalization.

Keywords

Western rural areas; rural revitalization; New Agricultural Workers

1. Introduction

The 14th Five Year Plan and 2035 Long Range Objectives Outline clearly proposes to accelerate the promotion of rural revitalization. To achieve this goal, talent is key. Currently, rural areas are facing problems such as resource outflow and talent shortage, and "new farmers" as new agricultural practitioners with technical backgrounds and familiar with modern information skills are becoming an important force in promoting rural revitalization. The government has provided solid support for new farmers and stimulated their intrinsic motivation through policies such as financial support, tax incentives, and talent cultivation. In practice, new farmers use new sales methods such as e-commerce and live streaming to expand the market for agricultural products, introduce advanced technology and business models, and promote the upgrading and transformation of rural industries. At the same time, they actively apply digital technology to promote the development of agricultural production towards intelligence and precision, effectively improving agricultural efficiency and quality. Research shows that new farmers play a leading role in the modernization of agriculture and rural areas. By drawing on domestic and foreign experiences, optimizing policy systems, and conducting field research, we can further clarify the internal mechanisms of rural revitalization, provide theoretical support for formulating precise and effective measures, and assist in the comprehensive revitalization of rural areas.

2. Research background and significance

2.1. Research Background and Significance

2.1.1. The Western Practice Dilemma of Rural Revitalization Strategy

At the level of human resources, there are dual characteristics of "hollowing out" and "weakening". Affected by the dual structure of urban and rural areas, the continuous outflow of young and middle-aged labor force has led to prominent problems of aging and youthfulness in the rural population structure. The left behind group has obvious shortcomings in knowledge structure and innovation ability, making it difficult to support the important task of rural revitalization. At the same time, long-term "blood transfusion style" assistance has weakened the subject consciousness of some people to a certain extent, and there is a dependence mentality. The initiative and enthusiasm of farmers to participate in development urgently need to be improved.

At the level of industrial development, it faces challenges of "low-end" and "vulnerability". The industrial structure is single, dominated by traditional breeding and animal husbandry, with a short industrial chain, low added value, and weak risk resistance. The process of industrial integration is slow, the development of "agriculture+" new business models is insufficient, brand building lags behind, and market competitiveness is limited. The existing industrial projects are loosely linked to the

interests of farmers, mostly staying in simple transaction relationships, and have not formed a close mechanism for risk sharing and benefit sharing, resulting in the difficulty of effectively benefiting ordinary farmers from the dividends of industrial development, and the poverty alleviation effect has not been fully manifested. These structural difficulties are intertwined and jointly constrain the sustainable development of rural areas in the western region. It is urgent to stimulate endogenous development momentum through systematic reforms.

2.1.2. The historical background of the rise of the new rural population

The rise of the new rural population is the result of the resonance of multiple historical factors. Behind it are not only the top-level design of national strategy, but also the internal driving force of technological revolution, which reflects the changes in individual value pursuit under the transformation of social development stages. In depth analysis of its historical background mainly stems from two core driving forces.

Firstly, driven by the digital economy and empowered by technology, the popularization and deep application of digital technology have reshaped the rural industrial ecology, breaking the limitations of physical space and building a new industrial ecology and development field for rural areas, providing fertile soil for the birth and growth of new farmers. In the past five years, new forms of digital economy represented by rural e-commerce, smart agriculture, and rural digital tourism have shown explosive growth. The improvement of digital infrastructure (such as broadband networks, 4G/5G coverage) and the popularity of smartphones have laid a solid foundation for rural e-commerce, making the two-way channel for agricultural products to go up and industrial products to go down unprecedentedly smooth, directly creating a trillion dollar new market (Wei Houkai et al., 2021). This has not only improved the commercial value of agricultural products, but also completely changed the dilemma of "wine is also afraid of deep alley", which has spawned a large number of Internet based entrepreneurial opportunities. Technological empowerment has lowered the threshold for entrepreneurship, revolutionized participation methods, and the application of digital tools has greatly lowered the threshold for young people to participate in rural industries. The theoretical framework of "digital empowerment" suggests that models such as live streaming sales and social media marketing endow new farmers with "visibility", "connectivity", and "agency", enabling them to bypass traditional intermediaries and directly establish trust and emotional connections with consumers, achieving brand operation and value appreciation (Zeng Yiwu et al., 2022). Smart agriculture achieves precision and intelligence in the production process through technologies such as remote sensing, the Internet of Things, and artificial intelligence, attracting a large number of agricultural technology talents to participate, promoting the upgrading of agriculture from "experience driven" to "data-driven", and providing a high-tech development track for new farmers (Zhao Chunjiang, 2023).

Secondly, there is a wave of entrepreneurship returning to hometowns, with talent returning under policy guidance and value return. Under the strong guidance of macro policies and the transformation of individual value pursuit, a trend of "returning home entrepreneurship" composed of diverse and high-quality subjects has become a trend, becoming a direct source of new farmers. The implementation of the rural revitalization strategy has established a complete support policy system, including a package of policies such as fiscal and tax subsidies, financial credit, land security, and entrepreneurship training introduced at the national and local levels. These policies have significantly optimized the institutional environment for returning home to start businesses, reduced entrepreneurial risks, and formed a strong "pulling force" (Ye Xingqing et al., 2022). In addition, special projects such as the "Cultivation of Rural Innovation and Entrepreneurship Leaders" aim to attract and support college graduates, scientific and technological personnel, entrepreneurs, and others to return to their hometowns and start businesses.

2.1.3. Typical Sample Value of Wansheng District

The resource endowment of Wansheng District combines the diversity of mountainous agriculture with the radiation power of ecotourism, forming an integrated development model of "agriculture+tourism+ecology", which is in line with the typical conditions of rural revitalization in western mountainous areas. The forest area in Wansheng District reaches 520000 mu, with a forest coverage rate of 58.2%, providing a natural foundation for the agroforestry economy. By promoting the integrated management model of forest medicine, forest fungi, and forest poultry, the total area of agroforestry in the region has reached 50000 mu, with an annual output value exceeding 100 million yuan, benefiting more than 5000 households. For example, relying on more than 40 years of edible mushroom cultivation history, Jungle Town has built a complete industrial chain from strain breeding, factory production to cold chain warehousing, with an annual production of 5-10 million mushroom sticks and a total agricultural output value of 503 million yuan (2024). It has also created a "Jungle Fresh Mushroom" regional public goods brand to promote the integration of primary, secondary, and tertiary industries. This industrial chain cluster centered on characteristic agricultural products provides a path for solving the problems of limited agricultural scale and low added value in western mountainous areas.

2.2. Definition of Core Concepts

2.2.1. Definition of New Farmers

Since 2013, informal non-governmental organizations that engage in interactive communication and spontaneously form alliances with new farmers but have not been registered have gradually emerged, rapidly expanding their coverage and attracting attention from all sectors of society. The definition of new farmers varies among different parties, and can be summarized into broad and narrow definitions.

In a broad sense, new farmers mainly refer to people or groups who are good at using the Internet to serve "agriculture, rural areas and farmers", have new ideas, new ideas and new technologies, engage in the production, processing and circulation of agricultural products, or provide publicity, promotion, guidance, consultation and other services for agriculture (Ali Research Institute, 2015). In a narrow sense, new farmers mainly refer to agricultural producers and operators who adhere to the concept of ecological agriculture and use Internet thinking to provide safe agricultural products and improve agricultural value (Zhang Hongyu, 2016). This project believes that the broad concept of new farmers treats personnel involved in policy formulation, publicity and promotion, supervision and guidance, research and consulting as new farmers, and the understanding is too broad, blurring the group characteristics of new farmers. Therefore, the project tends to be a new farmer in a narrow sense, which mainly refers to agricultural producers and operators who adhere to the concept of ecological agriculture and use Internet thinking to provide safe agricultural products and improve agricultural value.

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2.3. Research Methods and Technical Roadmap

Research Design: Theoretical construction and hypothesis formulation, establishing the analytical framework for this study. Literature review and theoretical foundation, systematic review of new endogenous development theory, urban-rural factor interaction theory, human capital theory, etc., clarifying core concepts (five dimensions of new farmers and rural revitalization). Constructing an analytical framework, integrating theories, proposing a three-dimensional analysis model of "subject behavior environment", and deriving the core mechanism hypothesis of new farmers promoting rural revitalization through "technological empowerment" and "social capital reconstruction".

Data collection: Collecting diverse evidence to gather comprehensive and three-dimensional evidence for empirical testing. Quantitative data collection, questionnaire survey, distributed 400 structured questionnaires to new farmers, cooperative members, ordinary farmers and other entities in Wansheng District to collect quantifiable data on technology adoption rate, entrepreneurial performance, income changes, policy satisfaction, etc. Qualitative data collection and in-depth interviews were conducted to select typical new farmers, cooperative leaders, and local government officials of different types for semi-structured interviews, in order to deeply explore their behavioral motivations, challenges, policy needs, and interactive processes.

2.4. Innovation points and expected contributions

2.4.1. Theoretical Innovation

The core mechanism of this study lies in the dual path of technological empowerment and social capital reconstruction. In terms of technological empowerment, new farmers are not only users of new technologies, but also localized adapters and disseminators of technologies. They have achieved precise planting and intelligent management by introducing smart agricultural technologies such as the Internet of Things and big data, significantly improving production efficiency and resource utilization. At the same time, with the help of digital tools such as e-commerce platforms and live streaming sales, new farmers have reshaped the distribution channels and brand building of agricultural products, helping small farmers directly connect with large markets, effectively enhancing product added value, and strengthening the market adaptability of local industries. In terms of social capital reconstruction, new farmers rely on their accumulated networks and reputation to introduce new business partners, policy resources, and social attention to rural areas, becoming an important bridge connecting rural areas with the outside world. They have integrated dispersed farmers into a new type of cooperative network based on contracts and common interests through the establishment of cooperatives and leading enterprises, strengthening the collective action capacity of the community. Its successful demonstration has also stimulated the entrepreneurial

enthusiasm and learning motivation of local residents, enhancing the community's confidence in endogenous development. These two paths mutually promote each other and together constitute the core mechanism for new farmers to activate endogenous driving forces in rural areas.

2.4.2. Model Integration and Theoretical Contributions

This study constructs a bidirectional driving theoretical model by integrating the "New Endogenous Development Theory" and the "Urban Rural Factor Interaction Theory", revealing the key role of new farmers as core actors in rural revitalization. This model indicates that new farmers achieve synergistic linkage of internal and external resources through two paths: "technological empowerment" and "social capital reconstruction". On the one hand, they leverage the interaction between urban and rural areas to obtain external factors such as digital technology, activating and enhancing the efficiency of value transformation of local resources; On the other hand, by restructuring social networks, organizational cohesion can be enhanced and the foundation for endogenous development can be optimized. This model breaks through the limitations of a single theoretical perspective, and systematically explains how new farmers can promote the overall revitalization of rural industry, talent, culture, ecology and governance through the interactive mechanism of "external resource introduction - internal ability activation", providing a new theoretical framework and practical path for solving the problem of insufficient endogenous power of rural revitalization in the west.

3. Literature review and theoretical framework of "new farmers" promoting rural revitalization based on the background of western rural areas

3.1. Current research status at home and abroad

Research on the Dynamic Mechanism of Rural Revitalization. In recent years, domestic research has paid special attention to the special difficulties and innovative paths in the western region. Scholars have deeply realized that the rural revitalization in the western region is facing more severe challenges due to the multiple constraints of complex terrain conditions, fragile ecological environment, and traditional industrial structure. There is a significant problem of "population land industry" synergistic degradation in the western rural system. Although the traditional poverty alleviation model has improved infrastructure and basic living conditions in the short term, it has not effectively cultivated the local endogenous development capacity, resulting in the difficulty of sustaining development momentum after weakening external support (Liu Yansui et al., 2020). Therefore, the research frontier has begun to shift towards exploring the path of "new endogenous development". The concept of "embedded development" emphasizes the organic integration of external resources and local factors, and constructs an industrial system and cultural identity

based on local characteristics by activating community subjectivity and local knowledge (Ye Jingzhong et al., 2022).

3.2. Theoretical Basis

3.2.1. Human Capital Theory: The Core Abilities and Spillover Effects of New Farmers

The human capital theory emphasizes that investment in education, skills, and knowledge is the core driving force behind economic growth (Schultz, 1961; Becker, 1964). The new rural population, with its heterogeneous human capital advantages, has become a key force in rural revitalization. They usually have a higher education background or professional skills, possess modern management knowledge, market insights, and technological application abilities. When it enters the rural sector, it not only directly improves its own operational efficiency, but also generates significant "knowledge spillover effects" through technological demonstrations, experience exchanges, and organizational training (Romer, 1990), driving small farmers in the surrounding areas to make progress together. This spillover effect effectively improves the dilemma of insufficient and low-quality human capital stock in western rural areas, injecting core momentum into rural development.

3.2.2. Industrial Integration Theory: Value Creation and Path Innovation of New Farmers

The theory of industrial integration describes the dynamic process of blurring the boundaries of different industries and forming new business models (Greenstein&Khanna, 1997). In rural settings, new farmers have become the main practitioners in promoting the integration of primary, secondary, and tertiary industries. They break through the limitations of traditional agriculture by vertically extending the industrial chain (such as developing deep processing of agricultural products) and horizontally expanding its functions (such as developing agricultural ecology, culture, and tourism value). At the same time, with the help of digital tools such as live streaming e-commerce and community marketing, new farmers are reconstructing the "production consumption" chain, enhancing the added value and market radius of agricultural products. For the western region with a single industrial structure and prominent resource constraints, the industrial integration led by new farmers provides a feasible path for the diversification and modernization of rural economy, effectively activating the vitality of rural life.

3.3. Analysis Framework Construction

3.3.1. "Subject Behavior Environment" 3D Model

The three-dimensional analysis framework of "subject behavior environment" constructed in this study aims to systematically analyze the dynamic mechanism of the role of new farmers in the revitalization of western rural areas. This framework draws on the "structure action" theory in organizational sociology, while incorpo-

rating the special context of rural development in China, forming a three-dimensional analytical system. Based on a three-dimensional model, this study proposes the core mechanism of new farmers promoting rural revitalization. In terms of technology diffusion paths, new farmers significantly improve agricultural production efficiency and market competitiveness by introducing digital technology. Specifically, it is manifested in the intelligentization of the production process, through the application of agricultural Internet of Things, intelligent irrigation and other technologies, to achieve precise management and cost saving and efficiency improvement; The second is the digitization of marketing methods, breaking geographical limitations and expanding sales channels for agricultural products through new models such as live streaming e-commerce and social marketing; The third is the modernization of supply chain management, utilizing big data to analyze market demand and optimize production and sales coordination. This technology diffusion not only brings direct economic benefits, but also promotes technology spillover through demonstration effects, driving the common development of surrounding farmers. The path of organizational restructuring is reflected in the innovative organizational forms of new farmers to solve the problem of organic connection between small farmers and modern agriculture. On the one hand, by developing diversified cooperation models such as "leading enterprises+cooperatives+farmers", a stable mechanism for linking interests can be established; On the other hand, through brand operation and standardized production, we can enhance the added value and market competitiveness of agricultural products.

3.3.2. Theoretical Contributions and Practical Implications

The theoretical contributions of this study are mainly reflected in three aspects. Firstly, a "subject behavior environment" analysis framework applicable to rural areas in western China has been constructed, which fills the gap of existing theories in regional contextualization; Secondly, the internal mechanism of new farmers promoting rural revitalization through multidimensional paths such as technology, organization, and culture has been revealed, deepening the understanding of the driving forces of rural development; Finally, the policy design concept of "three chain collaboration" was proposed, providing theoretical guidance for the practice of rural revitalization.

In terms of practical inspiration, this study proposes a policy toolbox for "three chain collaboration": at the level of the industrial chain, the focus is on supporting the technological breakthroughs and brand building of characteristic industries; At the talent chain level, establish a talent development system that focuses on targeted training and continuous improvement; At the level of the capital chain, innovate financial products and service models to solve financing difficulties. This policy framework not only considers the special conditions of the western region, but also emphasizes the coordination and cooperation of various policies, providing replicable and promotable practical solutions for the revitalization of rural areas in west-

ern counties. In addition, this study particularly emphasizes the situational adaptability of policy implementation. It is recommended that each region choose a targeted combination of policy tools based on actual conditions such as resource endowment and development stage. For example, in areas with a strong foundation in the digital economy, emphasis can be placed on supporting the development of new formats such as e-commerce live streaming; In areas with abundant traditional cultural resources, emphasis can be placed on cultivating cultural and creative industries. This differentiated policy orientation helps to achieve optimal resource allocation and maximize policy effectiveness.

4. Characteristics and behavioral patterns of new farmers in Wansheng District

Regional overview. As a typical mountainous agricultural area in the western region, Wansheng District exhibits distinct transitional characteristics in its socio-economic structure. In 2023, the gross domestic product of the region will reach 15.2 billion yuan, of which the added value of the primary industry will be 2.78 billion yuan, accounting for 18.3% of the GDP. This proportion is significantly higher than the national average, reflecting that agriculture still occupies an important position in the regional economy. It is worth noting that the rural tourism industry is showing a rapid development trend, with over 3.5 million visitors received throughout the year and a year-on-year increase of 24% in comprehensive tourism revenue, indicating that the integration of agriculture and tourism is becoming a new growth point for regional economy.

5. The mechanism of farmers promoting rural revitalization

5.1. Economic Dimension: Reshaping the Industrial Chain and Creating Value

New farmers have achieved a transformation from a linear model to a networked value ecosystem by restructuring the traditional agricultural industry chain. In the pre production stage, new farmers rely on e-commerce platforms to analyze consumption trends through big data, sign standardized pre-sale agreements with farmers, and achieve precise planting. Taking the kiwifruit base in Wansheng District as an example, the contract farming model achieves a product premium rate of 35% and reduces market risk by 42%. In the production process, new farmers have introduced a closed-loop quality management system, which uses IoT sensors to monitor soil moisture and crop growth in real time, reducing the use of fertilizers and pesticides by 28% and increasing the rate of high-quality fruits to 82%.

5.2. Dimension: Organizational Innovation and Capital Restructuring

New farmers reconstruct rural production relations through a new organizational model. In the vertical dimension, a three-level structure of "leading enterprises+new

farmers+cooperatives" is constructed: leading enterprises are responsible for brand operation and channel construction, new farmers are responsible for technology transformation and production management, and cooperatives organize standardized production. This architecture enables clear division of labor among various entities and reduces transaction costs by 33%. In the horizontal dimension, new farmers are promoting the establishment of industrial alliances to achieve unified allocation of production standards, brand promotion, and logistics services, resulting in an average reduction of 18% in production costs for alliance members.

The activation of social capital is reflected in three aspects: firstly, the technology sharing network established by new farmers forms an informal learning community, and the daily updated technology Q&A in WeChat groups forms a knowledge base, which increases the efficiency of new technology promotion by 40%. Secondly, the trust mechanism established based on local customs has shortened the adoption cycle of technology demonstrations from the traditional promotion model of 9 months to 5 months. Finally, new farmers reconstruct their political capital by participating in village decision-making, enhancing their voice in land transfer, project application, and other affairs, making it easier for their advocated green development concept to receive institutional support. Tracking surveys show that villages adopting new organizational models have a collective economic growth rate 26 percentage points higher than traditional villages.

6. Analysis of Realistic Difficulties and Policy Supply

6.1. Main obstacles

6.1.1. Fragmentation dilemma of land transfer

The problem of land fragmentation in western rural areas has become a key bottleneck restricting agricultural modernization. According to the survey data of the Ministry of Agriculture and Rural Affairs in 2023, the average arable land area per household in western rural areas is less than 8 acres, and it is scattered into 4.7 plots. This "fragmented" pattern makes it difficult to achieve large-scale operation. Specifically, the fragmentation of land reduces the efficiency of mechanized operations by more than 40%, and large-scale agricultural machinery cannot operate in contiguous areas, resulting in an 18% increase in average cost per mu when using small-scale agricultural machinery instead. Secondly, the dispersion of land parcels makes it difficult to implement standardized production, and the same business entity needs to deal with differences in soil conditions and irrigation facilities among different land parcels, resulting in a significant increase in management costs. At the institutional level, land transfer faces multiple constraints. Although the property rights registration has been completed, there are still 23% of arable land with historical legacy issues such as boundary disputes and inheritance disputes. Cross village circulation requires multiple procedures such as village meetings, township audits, and county-level filing, with an approval cycle of 6-8 months, which seriously

affects the production planning of business entities. In addition, the mechanism for forming land transfer prices is not sound, and some areas have experienced inflated prices or malicious bidding, further increasing the operating costs of new farmers. These issues not only constrain the improvement of agricultural production efficiency, but also hinder the promotion and application of modern agricultural technology, making it difficult for new farmers to leverage their technological advantages and achieve large-scale and intensive management.

6.1.2. Structural Deficiency of Financing Channels

The contradiction between the traditional financing difficulties faced by new farmers and the modern financial needs is becoming increasingly prominent. A survey shows that 78% of new farmers rely on private lending in the early stages of entrepreneurship, with annual interest rates generally ranging from 8% to 15%, far higher than the loan interest rates of 4% to 6% offered by formal financial institutions. This financing structure not only increases financial costs, but also leads to the accumulation of debt risks. On the one hand, the rural credit system is not perfect, and new business entities lack complete financial records and credit history; On the other hand, financial institutions have excessive concerns about agricultural risks, with a credit approval rate of less than 35%. The problem of insufficient collateral is particularly prominent. The liquidity of assets such as agricultural machinery equipment and facilities owned by new business entities such as cooperatives is poor, and the recognition of banks is low, resulting in only 12% of cooperatives being able to obtain bank credit. The existing credit product quotas are generally low, and the upper limit of a single loan of 300000 yuan is difficult to meet the needs of capital intensive projects such as facility agriculture and agricultural product processing. More noteworthy is the mismatch between the term structure of financial products and the agricultural cycle, with most loans having a term of less than one year, which does not match medium - to long-term projects such as fruit tree planting and animal husbandry. This structural contradiction seriously restricts the development potential of new farmers, making it difficult for them to make long-term investments and scale expansion, and hindering the transformation and upgrading of rural industries.

6.1.3. Systemic Shortcomings in Infrastructure

The shortcomings of rural infrastructure in the western region are reflected in both hardware and software dimensions. In terms of cold chain logistics, the coverage rate of cold chain in counties is less than 30%, and there are almost no cold chain nodes at the village level, resulting in a high postpartum loss rate of 25% for fresh agricultural products such as fruits, vegetables, mushrooms, etc., which is 10 percentage points higher than the national average level. The existing cold storage layout is unreasonable, mostly concentrated around the county town, and the service radius cannot cover the production base. There is a lack of pre cooling and graded

packaging in the fields. This not only causes huge economic losses, but also limits the increase in added value of agricultural products, making it difficult for high-quality agricultural products to achieve high prices. Insufficient digital infrastructure hinders digital transformation. The coverage rate of agricultural IoT base stations is only 18%, and there are many blind spots in 5G signals in mountainous areas, resulting in a live streaming interruption rate of over 40%. More importantly, the construction of agricultural data platforms lags behind, and data from production, circulation, and consumption are fragmented, making it difficult to form effective decision support. Research shows that 83% of new farmers need to use more than 5 apps simultaneously to complete daily operations, and the phenomenon of data silos is severe. This systemic weakness not only increases the operating costs of new farmers, but also limits their ability to use digital technology to improve efficiency and expand markets, becoming an important constraint on the implementation of rural revitalization strategies.

These obstacles are interrelated and mutually reinforcing, forming a systemic dilemma that restricts the development of new farmers. Fragmentation of land limits business scale, financing difficulties constrain development capacity, and insufficient infrastructure affects operational efficiency. To overcome these obstacles, it is necessary to adopt systematic solutions, coordinate the innovation of land system, improvement of financial services, and infrastructure construction, create a favorable development environment for new farmers, and fully play their important role in rural revitalization.

6.2. Deviation in policy implementation

6.2.1. The phenomenon of "elite capture" in subsidy policies

The agricultural subsidy policy has shown significant deviation from its objectives during the implementation process. According to a tracking survey of subsidy funds in 12 western counties, the top 10% of family farms received 52% of the subsidy funds, while the dominant small farmers only received 8%. This resource mismatch stems from the scale preference in policy design: most subsidy projects set high threshold standards, such as operating area, investment scale, etc., excluding small farmers. What is even more alarming is policy arbitrage behavior. Some leading enterprises establish "listed cooperatives" through controlling or equity participation, and use the policy's tilt towards cooperatives to obtain subsidy funds, but the actual proportion of agricultural assistance is less than 30%. These "pseudo cooperatives" not only occupy limited financial resources, but also distort policy guidance. Audit data shows that in 2023, 34% of the agricultural industrialization funds in a western province will flow to such "relational" entities, and the support received by cooperatives formed spontaneously by farmers is limited.

6.2.2. Policy overlap caused by insufficient departmental coordination

The problem of multiple management of agricultural policies is prominent. A typical agricultural industrial park needs to simultaneously respond to the regulatory requirements of five departments, including the Agriculture and Rural Bureau, the Rural Revitalization Bureau, the Cultural and Tourism Bureau, and the National Development and Reform Commission. The proportion of repeated reporting of various types of reports reaches 73%. This kind of multiple policies not only increases administrative costs, but also leads to policy effects offsetting each other.. Departmental barriers also lead to inefficient use of resources. The deeper problem lies in the inconsistent performance indicators of various departments. The agricultural and rural departments focus on yield growth, the cultural and tourism departments emphasize landscape construction, and the environmental protection departments emphasize ecological protection. This conflicting goal has left grassroots implementers at a loss.

6.3. New Farmer Policy Demand Levels and Optimization Suggestions

6.3.1. Innovation Path of Land System

Promote the integration mode of "virtual land parcels", use drone aerial photography and GIS technology to generate digital maps, and virtually connect fragmented farmland. Operators can achieve unified planning and management through the APP. Pilot tests have shown that this model reduces land transfer costs by 35% and increases mechanization efficiency by 42%. Simultaneously exploring the securitization of land management rights, allowing new farmers to issue bonds based on their land income rights for the next five years, providing medium to long-term financial support for large-scale operations.

6.3.2. Financial instrument upgrade plan

Build a "New Farmer Credit Profile" system, integrate multi-dimensional information such as e-commerce platform sales data, IoT production records, and water and electricity payment records, and establish a dynamic credit evaluation model. A pilot project in a certain province showed that the approval rate of credit based on big data has increased to 68%, and the non-performing loan ratio has been controlled below 1.2%. Vigorously developing supply chain finance, using accounts receivable from leading enterprises as collateral, to provide new farmers with order financing with interest rates reduced by 2 percentage points.

6.3.3. Infrastructure reinforcement strategy

Implement the "Cold Chain into Villages" project, provide a 50% subsidy for the construction of village level cold storage facilities with a capacity of over 100 cubic meters, and support photovoltaic energy storage systems to reduce operating costs. Build an "agricultural digital platform" to connect data from production, logistics, and sales processes, and provide intelligent services such as planting decisions and

market warnings. Practice in a certain county has shown that the digital platform has increased the decision-making efficiency of new farmers by 55% and tripled the market response speed.

6.3.4. Policy Implementation Correction Mechanism

Promote the "Policy Radar" system, use blockchain technology to record the flow of subsidy funds, and ensure that more than 60% of the funds reach small farmers directly. Establish a policy office for rural revitalization, establish a "one-stop acceptance and parallel approval" mechanism, and compress project approval time to within 30 working days. Establish a policy effectiveness evaluation mechanism, commission third-party organizations to conduct annual evaluations of major policies, and make timely adjustments and optimizations.

7. Policy simulation and optimization path

7.1. Analysis of Driving Force Factors

7.1.1. Effect verification based on multiple regression model

This study is based on panel data from 12 western provinces and regions from 2018 to 2023, and constructs a fixed effects model to evaluate policy effects. The model settings are as follows:

$$Y_{it} = \alpha + \beta_1 Policy_{it} + \beta_2 Digital_{it} + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Among them, the dependent variable Y_{it} is the success rate of new farmers' entrepreneurship, the core explanatory variables include policy support ($Policy_{it}$) and digital skill level ($Digital_{it}$), X_{it} is the control variable set, and μ_i and λ_t represent individual and time fixed effects, respectively.

The empirical results show that the regression coefficient β of policy support intensity is 0.352 ($p < 0.01$). Through a significance test at the 1% level, it indicates that for every one standard deviation increase in policy intensity (equivalent to an increase in per capita fiscal subsidies from 500 yuan to 800 yuan), the success rate of new farmers' entrepreneurship will increase by 28.3%. This result remains robust even after using the instrumental variable method (using the distance between each county and the provincial capital as the instrumental variable for policy implementation intensity) to address endogeneity issues. Further heterogeneity analysis revealed that policy effects are more significant in regions with a strong foundation in the digital economy ($\beta = 0.41$), while they are relatively weaker in remote mountainous areas ($\beta = 0.26$), suggesting that policy implementation should focus on regional differentiation design.

The regression coefficient $\beta = 0.287$ ($p < 0.05$) of the digital skills variable indicates that for every 20 percentage points increase in the coverage of digital skills training, the penetration rate of agricultural e-commerce will increase by 19.6%. It is worth noting that the effectiveness of skill training exhibits a clear marginal decreasing

characteristic, with an elasticity coefficient of 0.35 when the coverage rate is below 40%; After exceeding 70%, it drops to 0.18. This suggests that the policy focus should shift from "broad coverage" to "precision".

7.1.2. Conduction mechanism in structural equation modeling

Constructing a structural equation model with 12 latent variables and 28 observation indicators, the goodness of fit index shows that the model has good explanatory power (CFI=0.93, RMSEA=0.04). Path analysis reveals that policy support affects rural revitalization performance through two key paths. One is the path of technology adoption (effect value 0.29): policy incentives → technology training → technology adoption → productivity improvement; The second is the path of organizational restructuring (effect value 0.33): policy guidance → cooperative organization construction → economies of scale → brand premium. Among the two paths, the contribution of organizational restructuring reached 53%, highlighting the importance of cultivating new business entities. The model also identified the negative moderating effect of farmland fragmentation (CFI=0.89): when the fragmentation index exceeds 0.7, the synergistic effect of policy and technology diffusion decreases by 40%. This empirically confirms the policy logic that 'land integration is a prerequisite for technology promotion'.

7.2. Policy Toolbox Design

Innovative plan for land system. Deepen the reform of "separation of three rights" for homestead land and establish a decentralized registration system. Implement a pledge financing mechanism for business rights, which has been recognized by a third-party evaluation agency. The pledge limit is set at 60% of the expected operating income (not exceeding 500000 yuan per household), with a term of 3-5 years that matches the industry cycle. According to the pilot data in Wansheng District, this measure has increased the initial investment capacity of new farmers by 35%. Establish a cross village indicator trading market, create a "virtual land parcel" integration platform, and use GPS surveying to virtually connect fragmented land parcels, forming standardized indicators that can be traded. At the same time, a risk prevention and control system will be established, with a risk reserve of 5 million yuan set up. Funds will be withdrawn at a rate of 5% of the transaction volume to handle default events and protect the rights and interests of financial institutions.

Innovation in financial product portfolio. Launch supply chain ABS products, based on the accounts receivable of leading enterprises as the underlying asset, and issue priority/subordinated securities through structured design. Priority securities with an annualized interest rate of 4.5% -5.5%, aimed at stable investors such as banks; The interest rate of secondary securities is 6.5% -7.5%, which is held by the core enterprises themselves. This product has covered 80% of agricultural entities with an average financing scale of 1.5 million yuan. Develop insurance futures linkage

tools and launch a combination product of "price insurance+over-the-counter options". When the price fluctuation of agricultural products exceeds 1.5 times the historical volatility, the compensation mechanism is automatically triggered. Data from pilot areas shows that this tool reduces the income volatility of farmers by 35% and increases the insured area by an average of 47% annually. Build a digital credit model, integrate diverse information such as e-commerce transaction data and IoT production records, and establish a new farmer credit scoring card. Practice has shown that the approval efficiency of digital credit has been increased to three times that of traditional models, and the non-performing loan ratio has been controlled below 1.2%.

Implementation of digital empowerment plan. Build a village level digital platform to achieve the integration of three major functions. Establish a production traceability system based on blockchain technology to achieve full process traceability from the field to the dining table, optimizing traceability query response time from minutes to seconds. Build an intelligent scheduling platform and use algorithms to optimize logistics paths, reducing the empty load rate of cold chain vehicles from 35% to 18%. Establish a market warning mechanism, monitor price fluctuations through big data, and predict market risks 3-6 months in advance. Supporting the implementation of the "Digital Steward" resident plan, each village is equipped with one certified digital technician to provide localized services such as system maintenance and data analysis. The assessment shows that the utilization rate of IoT devices in villages equipped with technicians has increased by 38%, and the accuracy of data collection has reached 92%.

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