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Towards Collaborative Governance for Agricultural Security and Development: Policy Instrument Evolution and Governance Logic of China's Agricultural Insurance under a Public Value Orientation

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Abstract

This study, grounded in public value theory, proposes a conceptual framework integrating value appeals, instrument design, and governance logic to examine the evolution of agricultural insurance policy in China. The findings reveal a phased progression: from cost-based to income-based, then index-based, followed by green agricultural insurance, culminating in a unified 'agricultural insurance +' concept. This trajectory reflects ongoing governmental innovation to address expanding public values, shifting focus from safeguarding basic agricultural output to stabilizing farmers' incomes, promoting green transformation, and supporting rural revitalization. As public values expand from producer relief to other areas, China's role in agricultural policy has transitioned from 'relief provider' to 'stabilizer,' 'navigator' and 'collaborative partner' and the governance has shifted from survival-oriented to developmentally and precision-driven. Three critical structural challenges are identified: (i) trade-offs between equity and efficiency, (ii) data infrastructure, and (iii) fiscal sustainability. To address these issues, future agricultural insurance policies are to be anchored based on the principles of public value by clearly defining value objectives in terms of income security and ecological transformation, building a multi-tiered policy menu and improving data management capabilities. Such reforms would help bring about a paradigm shift from risk compensation towards empowerment for sustainable development.

Keywords

Agricultural Security and Development; Agricultural Insurance; Public Value Theory; Food Security; Farmers' Income Growth.

1. Introduction

As one of the pillars of the state administration, food security enjoys unassailable strategic importance [1]. However, in the light of a series of complex tasks associated with modern conditions, a new concept of food security has recently emerged, which is not just a constant associated with certain levels of agricultural outputs, but now is a complex system of public values. Besides ensuring a stable source of sustenance provision, modern formulations of this notion now comprise a series of tasks such as ensuring enhanced farm income and supporting sustainability. This represents a radical change in the state policies on agricultural administration, no longer based on the basic sustenance, but rather a complex interweaving mechanism between agricultural development and sustainability.

This shift mirrors China's broader strategic planning for agricultural policy. Initial mandates emphasized "ensuring the groundwork for food security in all aspects," evolving toward a dual focus on "improving agricultural efficiency and raising farmers' incomes." State directives now equally prioritize these public values, advocating a balanced approach that harmonizes food

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security with income growth through coordinated policy instruments. Thus, a dual goal of "food security and farmers' income growth" has come to be a distinct strategy for China's agricultural administration with agricultural sustainability inbuilt as a double pillar.

Nevertheless, in the process of pursuing such two-fold tasks, deep-rooted challenges in governance emerge. This is because farm productions are always vulnerable to natural risks and market risks. Here, a compounded risk effect triggered by current climatic changes and escalated market Volatility threaten farm productions directly as well as stable farm income growth [2][3]. This compounding of risk effect is a profound form of market failure that requires state intervention in governance. As such, this profound form of market failure led to a radical change of China's agricultural insurance mechanism elaborated below. Over the past few years, China has made significant progress in its state intervention policies. This varies from an improved coverage of total income insurance for major grains to a multi-tiered agricultural insurance scheme. This is an indication of deep-rooted state commitment to such public values.

Although a great deal of progress has been made concerning the coverage and premium levels, agricultural insurance in China is still inadequate in effectively supporting a unified effort towards realizing food security and the increase of farmers' income. On one side, the imperfections that exist between the product design and the risk profile of agriculture hinder the precision in agricultural insurance when it comes to protecting food security. On the other side, its function related to income stability has less development and therefore is not able to make a practical contribution to the increase of farmers' income. This empirical shortcoming illustrates a severe gap in current literature concerning agricultural insurance: most literature focuses on economic aspects of agricultural insurance, but little attention has been devoted to a basic public administration issue: What changes in governmental logic concerning governance appear with developments in agricultural insurance?

As such, this study argues that the transformation of China's agricultural insurance system from cost protection insurance to income protection insurance and then to green insurance represents a strategy of governance tool redesign for rising demands of public value. As policy objectives have broadened from farm output protection to farm incomes maintenance and green agricultural development promotion, this series of changes in the evolution of a particular policy tool suggests a nexus between changes in public values and changes in government philosophy, role and approach in agricultural risk management. Specifically aiming to verify this argument, this article develops a conceptual model combining the public value demands and policy tool designs and approaches. By tracing changes in agricultural insurance in China today, this research seeks to draw on the experiences of agricultural risk management enhancement in China's governance.

2. The Evolution of Policy Instruments and Governance Logic of China's Agricultural Insurance under a Public Value Orientation

Moore (1995) holds that the main goal of public administration is the maximization of public value for society. Public values, which are the expectations of citizens from their government, are by definition pluralistic and dynamic [4]. In the agricultural sector, these values historically centered on providing sufficient agricultural production and food security. However, with the development of socioeconomic development, the scope of public values has broadened to encompass farmer income enhancement, environmental sustainability, and policy efficiency. Consequently, the evolution of agricultural public values has moved from a basic "sufficient food" imperative to a complex set of goals that include prosperous farmers, ecological integrity and effective governance. Policy instruments are concrete expressions of government resources and principles and represent how governments interpret and implement policies.

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The development of new policy instruments is an indication that existing tools are no longer adequate to meet new public value demands, and that innovative public interventions are needed in economic and social areas [5].

Building on this, the paper argues that socioeconomic development is driving shifts in agricultural public values which in turn are stimulating innovation and redesign of agricultural insurance policy instruments. These innovations in turn change the logic of governance of the government.

2.1. Cost Insurance

2.1.1. Value Demand

During this time, the base of China's agricultural production was weak and the fiscal capacity was low. The main public value objective was to create a safety net for securing essential inputs of commodities for major crops. This clear and focused goal was to keep grain output at a level that would assure basic national food security.

2.1.2. Policy Instrument Design

To achieve a stable grain supply, the Chinese government implemented cost insurance as one of the policy tools. This insurance covers inputs for cultivation of crops and rearing of livestock and compensates the losses due to natural disasters, accidents or adverse events that cause reduction in output. Although the level of compensation per farm is relatively low, the scheme has wide population coverage. Compensation is calculated according to the stage of growth of the crops or livestock at the time of the loss. By reducing financial barriers and heavily subsidizing premiums, this tool helped farmers to be compensated in a timely manner and thus contributed to a stable grain supply.

2.1.3. Governance Logic

At this stage the state is a risk moderator of last resort, with production protection being the main focus of governance. This way is effective and efficient for creating a basic risk protection system with agility. However, it has limitations in itself. First, there is a limited cost insurance coverage, which allows farmers only to maintain simple reproduction without scaling operations and improving quality. Second, this emphasis on output protection strengthens a governance mindset that ignores the risks of markets and limits the role of the government in promoting efficiency-driven agricultural development.

2.2. Income Insurance

2.2.1. Value Demand

With the achievement of a moderately prosperous society and stable grain output, public value priorities have shifted from solely protecting agricultural production to safeguarding agricultural incomes. The focus has expanded beyond “affordable food” to emphasize “prosperous farmers,” prioritizing the protection of farmers’ living standards.

2.2.2. Policy Instrument Design

Income insurance has become a key tool reflecting this evolving public value. Unlike cost insurance, it calculates premiums based on a farmer’s expected income, incorporating both natural and market risks. Compensation is triggered when farm income falls below a guaranteed threshold, offering broader protection. A notable example is the ‘Income Insurance + Futures’ model by China Sunshine Agricultural Mutual Insurance Company in Heilongjiang Province. This model uses the arithmetic average of commodity futures prices as a benchmark, activating compensation when prices fall below the guaranteed level, thereby mitigating the impact of price volatility on farmers’ incomes.

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2.2.3. Governance Logic

The government's role has shifted from a passive relief provider to an active stabilizer, guided by a developmental governance logic. This approach emphasizes systematic protection of farming incomes, enhancing the policy's empowerment function. However, effective implementation of income insurance requires strengthened government capacities in data management, market risk assessment, and technical expertise. Moreover, the adoption of complex actuarial models may increase premiums, highlighting the need to ensure fiscal sustainability of subsidy programs.

2.3. Index-Based Insurance

2.3.1. Value Demand

With basic needs for output and income partially met, more advanced public value concerns, such as efficiency and sustainability, have emerged. These evolving demands have driven innovation in policy instrument design. Index-based agricultural insurance has emerged as a novel tool to address these challenges, aiming to overcome limitations of traditional insurance and reduce the high costs associated with damage assessment.

2.3.2. Policy Instrument Design

Index-based insurance leverages meteorological data and agricultural output indicators rather than direct loss assessments [6]. For example, the "Aquaculture Weather Index Insurance" pilot by China Sunshine Property Insurance in Wuhan links weather variables to losses in fish farming using scientific models that incorporate both favorable and adverse conditions. Compensation is triggered automatically upon reaching predefined thresholds, enhancing payment efficiency. Similarly, the "Map-Based Underwriting" model by Ping An Property & Casualty Insurance in Jingyang and other provinces employs Geographic Information Systems and satellite imagery to enable precise management of agricultural land and products, emphasizing improved efficiency in administrative processes.

2.3.3. Governance Logic

Index-based insurance exemplifies precision-driven governance, where innovative design and technology enhance the accuracy and transparency of agricultural risk management.

2.4. Green Insurance

2.4.1. Value Demand

In response to urgent needs from society for environmental and food safety, agricultural ecological security and sustainable development have become an integral part of fundamental public values.

2.4.2. Policy Instrument Design

Green insurance is a strategic innovation in agricultural policy instruments by combining agricultural insurance with environmentally sustainable technologies. This model provides an incentive for farmers to work in a sustainable way through longer coverage or premium discounts. It plays an important role in promoting sustainable agricultural production and growth. Innovations such as ecological breeding insurance and specialty crop insurance, developed by companies such as China Sunshine Property Insurance Co., Ltd. and China Sunshine Agricultural Mutual Insurance Company, match the agricultural risk protection with ecological development.

2.4.3. Governance Logic

The role of the government has been transformed from a stabilizer to a strategic guide, indicating a move towards guidance-oriented government. By introducing incentive-compatible mechanisms, the state motivates agricultural operators to adopt effective practices

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that are consistent with their interests while promoting broader public objectives, such as environmental protection.

2.5. The "Agricultural Insurance +" Integrated Service System

2.5.1. Value Demand

The Rural Revitalization Strategy has an important role to play in promoting environmental and ecological protection. Reflecting this, public values for agricultural insurance have broadened from protection of the environment to ecological sustainability, although with a continuing strong focus on agricultural public values.

2.5.2. Policy Instrument Design

In the face of increasing demands from the public for higher values such as industrial integration, China has led the way in creating innovative and integrated service systems under the "Agricultural Insurance +" framework. To solve problems such as low technical level, small-scale farming, low product standardization and so on, China United Property Insurance Co., Ltd. came up with the novel "Insurance + Credit + Financing" system. Centered on agricultural insurance, this system helps to improve the operational credit rating of farmers by including risk protection, thereby improving their access to bank loans. This approach addresses financing challenges and facilitates technological development and scaling in the agricultural sector, contributing to sustainable development and farm incomes. Compared to traditional insurance products, which only pay attention to the risk protection, the full-chain credit protection functions of "Agricultural Insurance +" advocate for a comprehensive platform of risk protection and financing services.

2.5.3. Governance Logic

The establishment of Agricultural Insurance Plus integrated service system is the beginning of the cooperative governance system. By bringing together resources from agricultural insurance, technology services, banking and other sectors, it creates an open environment for promoting risk-sharing and mutual benefit. Agricultural insurance services are a key gathering place where different parts meet to promote the industrialization of the rural economy and improve public value creation.

3. Core Challenges in the Evolution of China's Agricultural Insurance Policy Tools under a Public Value Orientation

3.1. The Enduring Tension between Equity and Efficiency

The development of agricultural risk management tools, especially income and index-based insurance, shows that there are practical improvements in efficiency but challenges of marginalization among smallholders. Income insurance, due to its complex structure, is often hampered by the low literacy and access to information of the farmers, who limit their understanding of such mechanisms. Additionally, both index-based and income insurance rely on accurate and continuous data on crop prices and production, which is not available to many small-scale farmers because of their limited data management capacity. As a result, these farmers often find it difficult to get fair benefits and may even suffer losses. Furthermore, while index-based methods help cut operational costs for insurers, the extension of coverage to geographically dispersed smallholders is costly, reducing commercial incentives to cover this vulnerable population.

3.2. Weak Data Foundations

A credible, robust, and transparent national agricultural data system is essential for the sustainable development of income and index-based insurance. Currently, China's data infrastructure is fragmented: crop production data reside with the agricultural department,

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market prices with the Ministry of Commerce, weather data with meteorological agencies, and land data with natural resource authorities. This siloed structure prevents integrated data processing and sharing, resulting in incomplete and inadequate data for income insurance pricing and index design.

Reliable data underpin both the functionality and viability of these innovative risk management tools. For example, regional yield data may rely on remote sensing and sample surveys, but these methods are vulnerable to sampling bias, algorithmic inaccuracies, and observational errors. Additionally, price data may not accurately reflect small farmers' actual sales prices due to poorly located data-gathering stations, causing systematic discrepancies between compensation data and individual losses. Since index-based insurance directly links payouts to data thresholds, any manipulation or inaccuracies, whether in climate measurements or localized price samples, undermine farmers' trust in these tools.

3.3. Fiscal Sustainability Pressure

As agricultural insurance advances toward a multi-layered, comprehensive coverage system, fiscal subsidies exhibit strong path dependence, presenting complex challenges for sustainability amid budget constraints. Effective management coordination, encompassing incentive alignment, behavioral guidance, and performance, is essential. First, traditional cost-based insurance, characterized by broad coverage and operational simplicity, has established a stable foundation deeply embedded in local agricultural support systems. Transitioning fiscal support toward income protection and green insurance requires substituting and integrating these new policies with existing frameworks, complicating fiscal adjustments and creating gaps between management innovation and fiscal support administration. Second, current fiscal subsidy structures, largely tied to output levels and planted areas, may induce behavioral distortions and tensions. For example, universal, proportional premium subsidies can dampen farmers' risk sensitivity, fostering moral hazard by encouraging riskier production and income behaviors. Without aligning subsidies to income insurance payments based on demonstrated risk levels, income smoothing may reduce farmers' responsiveness to financial risks, potentially misaligning with evolving market demands. Third, fiscal subsidy management critically impacts efficiency and innovation within agricultural insurance markets. Subsidies risk reducing fiscal management efficiency, potentially leading to homogenized risk management and intensified competition based solely on scale. Therefore, targeted fiscal management is needed to optimize subsidy disbursement, incorporating farmer classification, risk profiling, and innovation criteria to ensure effective and sustainable subsidy allocation.

4. The Future Pathway for China's Agricultural Insurance Policy Tools under a Public Value Orientation

4.1. Guiding the Strategic Allocation of Fiscal Resources through Consensus-Driven Objectives at the Value Level

In this regard, the focus and coordination of multiple public values need to be realigned in the wider scope of state agricultural policy. First, a subsidy-assessment mechanism should be introduced to reinforce the relationship between subsidy allocation and strategic objectives. This mechanism would require the development of clear and appropriate assessment criteria. These criteria must be able to assess the accuracy and stability of various insurance products in securing agricultural income and promoting environmentally adapted farming methods.

Based on the assessment results, subsidies allocated to different insurance schemes of income risk and ecological protection should be dynamically adjusted. This adjustment has to take place at both central and local government levels. For instance, agricultural income insurance

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and ecological insurance can be given a preferential subsidy coefficient, while the total amount of subsidy for more conventional cost-based agricultural insurance can be gradually reduced.

Secondly, there needs to be a target-oriented and evidence-based subsidy approach. Subsidy design should focus on being precise, especially when distinguishing between types of agricultural operators. Small-scale producers, family farms and large grain producing regions all need specific subsidy structures. Ecological agricultural zones and particularly those dedicated to conservation-oriented production also need differentiated support. This approach is a major change from the traditional uniform subsidy models and moves towards a more precise fiscal subsidy system based on needs.

4.2. At the Instrument Level, Constructing a Composite Policy Toolkit with Complementary Functions and Actor-Specific Adaptation.

Firstly, considering the large number of scattered small-scale farm holders, priority should be given to the development of weather index insurance and yield index insurance in specific regions. These insurance products have simple contract structures, low premiums and quick claim settlement. Such characteristics make them practical and accessible risk protection tools for small farm households.

Secondly, for emerging agricultural business entities, such as large-scale farms, cooperatives, and family-managed farms, the crop income insurance and total-cost insurance should be actively promoted. These products can boost their confidence to venture into scale expansion and modernization. They also offer a more stable financial environment for long-term developments in agriculture.

Thirdly, innovation should move towards an overall "Green Insurance+" system that rewards environmentally responsible farm management. For example, premium reductions or additional benefits under carbon sink insurance could be provided to farm holders who use farmland for carbon sequestration. In other cases, lower deductibles or longer coverage periods for specialized insurance products may be offered to those who use biological methods of pest control or low water irrigation techniques.

4.3. At the Capacity Level, Fortifying the Digital and Institutional Foundations for Modern Governance.

Firstly, it is necessary to create enabling cross-departmental legislation or high-level administrative coordination between key players such as Ministry of Agriculture and Rural Affairs, meteorological agencies and financial regulatory bodies. Such coordination would aid in the development of unified data-standardization protocols and open-interface designs. These mechanisms would guarantee accessible real-time price and yield data, and high-resolution remote sensing and meteorological grid data. These data resources are essential for both income-protection and index-based protection schemes. Establishing these systems would also help break down existing data silos as well as reduce credibility gaps.

Secondly, a reinforced tripartite governance model between the state, markets and civil society needs to be put in place. The role of the state should be in the area of regulation and rule-making regarding the provision of data. Data using entities, such as insurance companies, should focus on product innovation and service optimization. Civil society organizations, such as village organizations, should work towards improving customer benefits and facilitating user mobilization. Effective governance will require appropriate investments and a balance of power distribution among these actors.

Thirdly, it is important to stimulate innovation within the insurance sector. This requires specific investments in training, technological upgrading and infrastructure development. Such measures would help to narrow existing innovation gaps and strengthen the overall capacity of the sector.

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5. Conclusion

Based on the public value theory, this research constructs a three-dimensional analytical framework, including value demands, instrument design and governance logic, for systematically exploring the evolution of agricultural insurance policies in China and their related governance transformations. The findings show a sequential process: from cost-based insurance to revenue-based insurance and then to index-based and green insurance, up to the present comprehensive "Agri-insurance +" service system. This trajectory is the government's adaptive response to changes in public values in an increasingly diverse agricultural sector, in which the protection of crop output for survival, followed by income stabilization, policy efficiency, green transformation and ultimately integrated rural revitalization were the main objectives.

Corresponding to these policy upgrades, the role of the state has changed from "last-resort relief provider" to "income stabilizer", "development guide", "pluralistic coordinator", and the logic of governance has changed from "survival-oriented" (emphasizing production security) to "development-oriented" (focusing on income stabilization), then "precision-oriented" (focusing on efficiency and cost reduction), "guidance-oriented" (facilitating transitions), and finally "collaborative" governance involving diverse actors and capacities. Agricultural insurance has therefore evolved from a simple risk compensation mechanism to a key governance mechanism, making the link between policy objectives and farmer behavior, mobilizing market and public resources, and coordinating agricultural security with development, which has consolidated the position of agricultural insurance in China's agricultural governance system.

However, three major structural challenges remain: (1) the equity-efficiency tradeoff that restricts the applicability of advanced insurance tools for small-scale farmers; (2) fragmented data systems and credibility issues that limit the precision of instruments; and (3) fiscal subsidy path dependencies and potential behavioral distortions that limit sustainability. These challenges point to challenges in reforming governance "software" in tandem with innovations in policy "hardware." To address these issues, future agricultural insurance policies are to be anchored based on the principles of public value by clearly defining value objectives in terms of income security and ecological transformation, building a multi-tiered policy menu and improving data management capabilities. Such reforms would help bring about a paradigm shift from risk compensation towards empowerment for sustainable development.

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