

The Jinsui Model for Improving Agricultural Economic Performance in Long'an County, Guangxi Province

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Abstract

The research objectives are 1) to identify the key factors affecting agricultural economic performance in Long'an County, Guangxi Province, and 2) to propose guidelines based on the Jinsui model for improving agricultural economic performance in Long'an County, Guangxi Province. The study employed a quantitative approach. A structured questionnaire was employed to collect data from a sample of 352 farmers, selected through the simple random sampling technique. The data were analyzed using descriptive statistics such as frequency, percentage, mean, and standard deviation, as well as inferential statistics such as correlation analysis and multiple regression. The research findings revealed that agricultural economic performance in Long'an County is shaped by multiple factors acting together rather than any single dominant driver. Financial services had the strongest impact on production efficiency, while technical support was most influential for farmer income. Other factors—policy support, market access, farmer cooperation, and management capability—also contributed positively, though all effect sizes were small. Together, these factors explained over 40% of the variance in production efficiency and nearly 39% in farmer income, confirming the importance of an integrated approach. Based on these findings, six key guidelines are recommended: improve policy support, strengthen technical assistance, expand financial services, enhance market access, develop management capacity, and promote farmer cooperation. Together, these measures can advance sustainable and inclusive agricultural development in Long'an County.

Keywords: Jinsui model; agricultural economic performance; agricultural production efficiency; farmer income

1. Introduction

Agriculture is the pillar of China's economic and social progress, especially in rural China where it remains the main source of livelihood and economic activity (Islam, 2024). The Chinese government has, in recent years, launched a series of policies and reforms aimed at modernizing agriculture, revitalizing the countryside, and increasing farmers' income (Zhu, 2023). Amongst such initiatives, the creation of novel models in agricultural management is amongst the highest strategies to promote productivity, efficiency, and sustainability within the sector. An example is the Long'an County of Guangxi Province's Jinsui Model. With its solid agricultural basis, favorable natural environment, and middle-standing in the rural area revitalization in the province, Long'an County was selected as a model zone for innovation (Dong et al., 2023). The Jinsui Model, or rural agricultural reform model of the day, was therefore officially designated this status after the county's prioritizing of blending time-honored farming practices and modern agricultural technologies.

The Jinsui Model focuses firms, bases of production, cooperatives, and farmers around an organized framework of standardized production models, uniform managerial standards, and whole-process supporting services, including technical and financial services (Agricultural Bank of China, 2016). It is said to have been used to enhance production efficiency, enhance competitiveness in the market, and enhance farmer incomes. National programs—like Rural Land Transfer Service Center establishments, land transfer regulations, and credit mechanisms—created an environment conducive to its use. Study indicated the ways in which they have heightened farmers' engagement in industrial agriculture and provided avenues for collective economic development (Yang et al., 2024).

However, despite the fact that previous research has captured dimensions of how the Jinsui Model operates and some of its impacts, relatively little is known about the very specific variables that contribute most to the agricultural economic performance of Long'an County. Most of the literature has described policy implementation or talked about agricultural modernization in general terms instead of analyzing how policy support, management capacity, technical support, farmer cooperation, and financial services affect each other to impact production efficiency and farmer income in a systemic way (Qin et al., 2022; Xu et al., 2022; Yang et al., 2024). To compound matters, there are no definitive evidence-based guidelines for local policymakers and practitioners to follow and replicate or modify the model with success in comparable contexts.

This study aims to bridge these research gaps by specifying the most significant causes of the agricultural economic performance using the Jinsui Model and offering actionable recommendations to further increase the agricultural growth of Long'an County. By formulating and estimating a theoretical model that incorporates the model's main features into measurable economic performance, this study contributes to more general knowledge on how all-rounded agricultural management models support rural revitalization, enhance farmers' happiness, and guarantee the agricultural transformation.

2. Objectives

- 1) To identify the key factors affecting agricultural Economic performance in Long'an County, Guangxi Province.
- 2) To propose guidelines based on the Jinsui model for improving agricultural economic performance in Long'an County, Guangxi Province.

3. Literature Review

3.1 Jinsui Model

Jinsui Model is an agricultural management model of Long'an County, Guangxi. It combines companies, production bases, cooperatives, and farmers to carry out large-scale, efficient agriculture. Supported by government policies and advanced agricultural technology, it improves the quality of products, maximizes channels, and boosts market competitiveness. Researchers attribute its success in transforming farming modernization, improving rural economies, and raising farmers' incomes while realizing ecological protection and economic benefits (Wang et al., 2021; Lu et al., 2024).

Policy support encompasses regulations, subsidies, and incentives to the agriculture sector. In the case of the Jinsui Model, policy support allows standardized manufacturing, processing, and marketing. Effectively designed policies increase the efficiency of the market, farmers' revenue, and the health of the ecosystem (Yang & Solangi, 2024). Management ability requires strategic planning, efficient operation, and risk management. In the Jinsui Model, excellent management provides coordination within the value chain and market responsiveness. Excellent management gives rise to competitiveness and sustainable development (Sun et al., 2023).

Farmer cooperation in participating in projects is farmer cooperation. Cooperatives help in raising production, market supply, and farmers' income. The Jinsui Model builds such trust on the basis of technology, finance, and market access. Farm market involves the production,

sale, and distribution of farm products. The Jinsui Model adopts industrialized and branded production for marketing expansion everywhere and beyond China and is market-demand responsive (Zhang, 2024).

Technical support provides better technologies and capacity building in the training of farmers to an advanced level of efficiency and quality. Precision equipment and smart agriculture can be adopted by farmers with the help of the Jinsui Model, enhancing the process of modernization (Li et al., 2023). Financial services through lending and insurance enable farmers to invest in technology, secure access to capital, and be insured against uncertainty. Finance promotes cooperation and increases productivity and incomes by the Jinsui Model (Xie et al., 2024).

According to the literature, policy support, corporate management capacity, degree of farmer cooperation, agricultural market, technical support, and financial services are the driving factors of the Jinsui Model. These are the independent variables in this study's conceptual model because they are the major drivers that influence agricultural development according to the Jinsui Model.

3.2 Agricultural Economic Performance

The farm economic performance mirrors the ability of agribusiness and farms to generate revenues, be competitive, and foster rural sustainable growth. Here, the farming cooperatives are important in that they lower the transaction cost, enhance farmers' negotiating power, and provide them with access to markets, pooled resources, and new technology. These benefits are acquired collectively by the farmers in an effort to obtain economies of scale benefits and enhance their profitability, particularly during unfavorable market conditions (Candemir et al., 2021). In addition, taking up new agricultural technologies and modern management practices considerably enhances the production efficiency through reducing the input costs, production quantity, and quality of the output. Yet, with increased complexity in agriculture systems, such improvement in efficiency is not only technology-dependent but also on an integrated system with consideration for the environment, economics, and society (Khudoynazarovich, 2021; Baryshnikova et al., 2022).

Farmer income from agricultural sales, government subsidies, and collaboration with businesses such as the Jinsui Model directly gain from such increased efficiency and increased marketability. The Jinsui Model, for example, has revealed how technical support to farmers and safe market channels can increase the value of farm products and revenue concentration.

Aside from administration and technology, rural upgrading of infrastructure financing and effective land transfer policies are also crucial in propagating the growth of higher incomes.

Literature indicates that improved infrastructure enables more effective agribusiness operations, whereas well-planned land management regulations can ensure more equal income distribution and income growth among regions (Harsono, 2024). Collectively, these considerations emphasize that long-term improvement in agriculture economic performance will depend on a combination of cooperative arrangements, technological development, supportive policies, and investment in infrastructure to ensure the farmers will benefit economically while guaranteeing long-term agricultural sustainability.

Based on the literature reviewed, agricultural economic performance is assumed to be the dependent variable in this study, as expressed in two important dimensions: agricultural production efficiency and farmers' income. The above indicators represent the consequences of agricultural modernization and are the foundation for the measurement of the effects of facilitators of the Jinsui Model.

3.3 The impact of Jinsui Model on Agricultural Economic Performance

The Jinsui Model has been effective in improving agricultural economic performance in Long'an County because it combines policy support, standardized management, and farmer participation. Chen et al. (2013) stated that in addition to conducting policies on rural land transfers. Long'an County also established its own approaches, including the Pilot Work Plan for the Transfer of Rural Land Contracted Management Rights. In order to stimulate participation, the county intensified government supervision and set up Rural Land Transfer Service Centers, beginning in Dingdang Town in 2010. The centers were gradually extended to all towns by 2011, with seminars and training programs that instructed farmers on policy and eliminated their misconceptions, and this stimulated them to be interested in land transfer. Li et al. (2024) discovered that Jinsui adopted an Industrialized management system by technology, standardization of production and rigorous supervision.

Jinsui set up specialized departments in production, finance, quality examination, and marketing, invested in 12 big planting bases, and built a "farm manager responsibility system" with unified specifications from cultivation to packaging. This professional style not only enhanced efficiency but also ensured the integrity of the product in the market. Li et al. (2024) emphasized that industrial models are successful because they extensively involve farmers in production processes.

Under the leadership of Jinsui and with the help of advanced technology, farmers' skills, sense of responsibility, and enthusiasm improved significantly, resulting in higher labor income as well as increased enthusiasm for agricultural activities. Wang et al. (2023) went on to explain that agricultural program combined marketing and supply services by standardizing input supply, post-harvest treatment, and promotion of brand names at lower input costs and added-value benefit to grain production. Apart from this, the cooperative assisted the farmers with production technology collaboration, machinery use coordination, and better management guidance. Besides, collaboration with banks encouraged inclusive lending in a “credit guarantee, cooperative control” manner with flexible credit to members and overcoming financing obstacles. Together, these programs demonstrate how the Jinsui Model brings together institutional innovation, empowerment of farmers, and service integration to push rural economic growth and improve the living conditions of agricultural people.

The literature is such that the Jinsui Model improves agricultural economic performance through the combination of policy support, standardized management, participation by farmers, technological innovation, and financial inclusion. In this study, these are the independent variables that are anticipated to help improve the dependent variable, agricultural economic performance.

3.4 Conceptual framework

Conceptual framework as show in Figure 1.

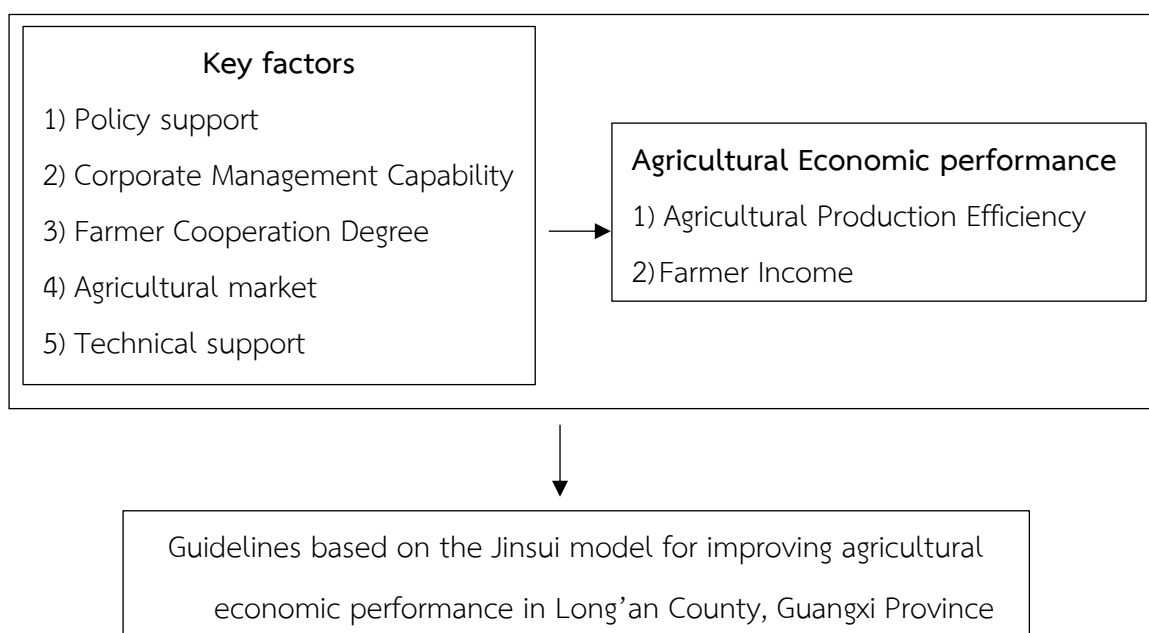


Figure 1 Conceptual framework

Figure 1 displays the conceptual framework of this research. The framework depicts the interrelatedness of the major determinants of the Jinsui Model and their impact on agricultural economic performance. In particular, it demonstrates how the major determinants—policy support, corporate management capacity, farmers' cooperation level, technical support, and financial services—jointly determine the efficiency of agricultural production and farmers' income (Li et al., 2023; Sun et al., 2023; Xie et al., 2024; Yang & Solangi, 2024; Zhang, 2024). These two results, in turn, specify overall enhancement in agricultural economic performance (Wang et al., 2021; Lu et al., 2024).

Policy support supplies the institutional setting and resources required to facilitate land transfers, new technology, and inclusive finance (Yang & Solangi, 2024). Corporate management capability offers coordination of operations, standardization, and market-focused strategies (Sun et al., 2023). Farmer cooperation degree is the level of farmers' active engagement, which is needed for new technology adoption and realization of scale economies (Zhang, 2024).

Technical support provides farmers with improved technique and technology to boost productivity (Li et al., 2023), and financial services provide the capital to invest in inputs and smoothed risk (Xie et al., 2024). Together, these interlinked components form a system that improves production efficiency and boosts farmer income, leading to sustainable agriculture development.

4. Research Methodology

4.1 Population and sample size

The research used the quantitative method through a survey questionnaire as the major instrument of data collection. The questionnaire was administered on a sample of Jin Sui Group staff who were chosen to represent the larger number of employees. The sampling frame was the customers (farmers) under the Jinsui Model.

Simple random sampling was employed, whereby each farmer in the target population had an equal chance of being selected, ensuring that the sample was representative of the population and that the results were valid (Ahmed, 2024). The number of farmers in the Guangxi Jinsui Model consisted of 941 farmers. Following the Yamane formula (Yamane, 1967), it was calculated that 281 farmers were the sample size needed. To provide some margin for study strength and, at the same time, reduce the likelihood of the non-response bias risk,

more questionnaires than calculated through the formula were given out when collecting the data. Thus, accurate responses from 352 farmers were collected and utilized in analysis.

4.2 Research instruments

The instrument used for data collection in this study was a standardized questionnaire to assess the adoption of the Jinsui Model for improving the economic performance of agriculture in Long'an County, Guangxi Province. The research questionnaire was designed from an extensive review of literature, conceptual frameworks, and empirical research on agricultural development, rural economies, and farmer support systems. It is centered on six key dimensions of the Jinsui Model—corporate management capacity, support policy, farmers' cooperation level, agricultural market, finance services, and technical support—and two result dimensions: agricultural production efficiency and farmers' income.

The questionnaire had three sections. Section 1 gathered demographic information such as gender, age, education, farm type, income level, and years of association with the Jinsui Model. Section 2 contained items that measured perceptions of the six elements of the Jinsui Model (4 items for each element), and Section 3 measured the outcomes (agricultural production efficiency and farmers' income) with 4 items each. All items in Sections 2 and 3 were rated on a five-point continuum (1 = Very Low to 5 = Very High).

Content validity was confirmed by having the preliminary questionnaire reviewed by three experts in research methodology, rural development, and agricultural economics. The Index of Item-Objective Congruence (IOC) was used to assess the suitability and clarity of each item in relation to the research objectives. All items were rated by the experts on a scale of -1 (not congruent), 0 (uncertain), or +1 (congruent). The Index of Item-Objective Congruence (IOC) was calculated, and the scores from all items ranged between 0.67 and 1.00, exceeding the minimum accepted threshold of 0.50 (Almanasreh et al., 2019).

Pilot testing was done on 30 farmers of a nearby district outside the main study sample. Clarity, understandability of items, and internal consistency were to be ascertained. Cronbach's alpha values for all constructs ranged from 0.89 to 0.93, exceeding the recommended threshold of 0.70, thereby indicating satisfactory internal consistency (Matouk et al., 1997; Tavakol & Dennick, 2011).

This finished questionnaire was subsequently applied to the main study sample. The data produced is expected to yield reliable and valid information regarding the influence of the Jinsui Model on the economic performance of agriculture and farmer's livelihood in Long'an County.

4.3 Data collection

Data were collected using both online and offline methods. Online questionnaires were distributed via email and WeChat, while offline data collection was conducted through field surveys administered directly by members of the research team.

The 352 respondents who participated in the Jinsui Model in Longan County, Guangxi: in the age distribution, the group aged 40 - 49 accounts for the highest proportion of 34.66%; In terms of gender, women account for 52.84%, slightly more than men; In the Education structure, High school degree accounts for 28.98%, ranking first; Mixed farmers are the main types of farmers, accounting for 59.66%; Income (Per month) is concentrated in the range of 4000 - 10000, accounting for nearly 99%; In terms of cooperation duration, the proportion of participants in Less than 1 year and 4 - 6 years is 30.68% and 30.40%, respectively, indicating that this group is relatively active.

4.4 Data analysis

Data analysis methods as show in Table 1.

Table 1 Data analysis methods

Analysis Type	Purpose
Descriptive Statistics	Summarize respondent profiles
Reliability Test (Cronbach's Alpha)	Test internal consistency of items
Pearson Correlation	Explore variable relationships
Multiple Regression	Identify significant predictors of performance

Inferential and descriptive statistical techniques were employed to analyze data gathered from the questionnaire. Descriptive statistics such as frequency, percentage, mean, and standard deviation shall be utilized to obtain the demographic features of the respondents in a bid to give information about the sample characteristics. In order to compare the level of agreement reached by the respondents on each item, the mean scores will be interpreted on the basis of a five-point rating scale (1 = Very Low to 5 = Very High). The interpretation of the mean score will be done using the criteria given by Boone & Boone (2012)

4.21 – 5.00	=	Very High
3.41 – 4.20	=	High
2.61 – 3.40	=	Moderate
1.81 – 2.60	=	Low
1.00 – 1.80	=	Very Low

In order to confirm the quality of measurement scales, a Cronbach's Alpha reliability test will be conducted to assess the internal consistency of items for each construct. 0.70 or above Cronbach's Alpha will be considered acceptable (Tavakol & Dennick, 2011). Pearson correlation analysis will be applied with the aim to examine interrelationships between the main variables in order to determine the direction and extent of relationships among independent variables and agricultural economic performance.

To examine the strongest predictors of performance, multiple regression analysis is employed with six factors of the Jinsui Model as independent variables and two aspects of agricultural economic performance as dependent variables. Lastly, analysis of the mean score will be carried out in order to determine the strengths and weaknesses along each dimension of the Jinsui Model. The findings will be utilized to provide a foundation for developing viable recommendations for Long'an County, Guangxi Province's agricultural economic performance improvement.

5. Research Finding

5.1 Descriptive analysis

Descriptive analysis as show in Table 2.

Table 2 Descriptive Statistics of Different Dimensions of Jinsui Model

Variable/Items	Mean	S.D.	Interpreted
Policy Support			
The Jinsui service makes good use of government farming support.	4.00	1.02	High
Government support improves the work of the Jinsui service.	4.04	1.05	High
Current government policies are suitable for farming and help through the Jinsui service.	4.02	0.96	High
Government support is provided through the Jinsui service at the right time.	4.01	1.00	High
Corporate Management Capability			
There is good cooperation between me and the Jinsui team.	3.90	1.10	High
I am willing to actively join Jinsui's farming activities or projects.	3.96	1.07	High
Working together with the Jinsui team helps me produce more efficiently.	3.93	1.07	High
It is easy to talk and share information with the Jinsui team.	3.91	1.03	High
Farmer Cooperation Degree			
There is good cooperation between me and the Jinsui team.	3.93	1.03	High
I am willing to actively join Jinsui's farming activities or projects.	3.94	1.03	High

Variable/Items	Mean	S.D.	Interpreted
Working together with the Jinsui team helps me produce more efficiently.	3.93	1.02	High
It is easy to talk and share information with the Jinsui team.	3.89	0.97	High
Agricultural Market			
The Jinsui team is strong in the agricultural market.	3.83	1.04	High
The Jinsui team quickly adjusts when the market changes.	3.80	1.06	High
Jinsui's farming plans match current market demands.	3.81	1.03	High
Jinsui has been successful in selling to more markets.	3.76	1.06	High
Technical Support			
I am satisfied with the technical help from the Jinsui team.	3.90	1.03	High
Jinsui's technical support helps solve problems in farming.	3.93	1.03	High
Jinsui's training improves farmers' skills in production.	3.88	1.04	High
I get enough technical support when I need it.	3.90	1.02	High
Financial Services			
Jinsui's financial services support farming needs.	3.79	1.02	High
I am satisfied with the financial services Jinsui offers.	3.78	0.98	High
It is easy to apply for and use Jinsui's financial services.	3.74	1.02	High
Jinsui's financial services help increase farmers' income.	3.78	1.00	High
Agricultural Production Efficiency			
I can produce a high output using limited farming resources (e.g., land, labor, materials).	3.86	1.02	High
My use of agricultural inputs is efficient and not wasteful.	3.81	1.01	High
I apply farming techniques or technologies that improve productivity.	3.80	0.95	High
My farming results show consistent and stable yields each season.	3.86	1.03	High
Farmer Income			
My income has increased since I started working with the Jinsui team.	3.81	0.99	High
I am satisfied with the amount of income I earn through Jinsui's support.	3.81	0.98	High
My income through Jinsui is better than what I could get from other sources.	3.78	0.97	High
Jinsui's way of working helps farmers like me earn more money.	3.81	1.01	High

Table 2 makes descriptive statistics on Jinsui pattern in Longan County, Guangxi from the perspectives of Policy Support and Corporate Management Capability. Among them, the average score of the Policy Support dimension is 4.00 - 4.04, which is at the high level, indicating that farmers highly recognize the efficient use and timely response of the Golden Spike model to the government's agricultural support policies; The average values of Corporate Management Capability, Farmer Cooperation Degree and Technical Support are distributed in 3.89 - 3.96, which also belong to the high level range, reflecting the good state of cooperation, participation in projects and technical support between farmers and Jinsui team.

The average dimensions of Agricultural Market, Financial Services, agricultural production efficiency and Farmer Income are 3.74 - 3.86, which is close to the high level, which means that Jinsui model has achieved remarkable results in market adaptation, financial service supply, production efficiency improvement and farmers' income increase, but there is still room for further optimization. The values of descriptive statistics show that the means of all the dimensions are high, and the standard deviation values range from 0.95 to 1.10. Although some of the S.D. values are a little higher than 1.00, this range of dispersion can still be tolerated for five-point Likert scale measured data (Yaska & Nuhu, 2024). A standard deviation of roughly 1.00 will generally indicate moderate variability in the subjects' response, which is statistically acceptable and will not compromise stability of interpretation. Dispersion in the data, thus, can be described as moderate, and the results are still reliable and valid.

5.2 Reliability analysis

In the reliability evaluation standard, it is generally believed that Cronbach's α coefficient is lower than 0.60, which indicates poor internal consistency and low data reliability; Between 0.60 and 0.70, the reliability is acceptable but there is room for improvement; 0.70 - 0.80 is a good reliability; 0.80 - 0.90 reliability is very good; Above 0.90, the reliability is extremely excellent.

Table 3 Reliability Test

Dimension	Cronbach's α coefficient	Standardized Cronbach's α coefficient	Number of terms	Sample number
Policy Support	0.909	0.909	4	352
Corporate Management Capability	0.931	0.931	4	352
Farmer Cooperation Degree	0.904	0.904	4	352
Agricultural Market	0.896	0.896	4	352
Technical Support	0.918	0.918	4	352
Financial Services	0.904	0.904	4	352
Agricultural Production Efficiency	0.899	0.899	4	352
Farmer Income	0.903	0.903	4	352
Total	0.958	0.958	32	352

5.3 Correlation analysis

Table 4 presents the results of correlation analysis among dimensions such as Policy Support and Corporate Management Capability in Jinsui model of Longan County, Guangxi. The Pearson correlation coefficients among all variables. All relationships are positive and statistically significant at the 0.001 level ($p < 0.001$). Policy Support (PS), Technical Support (TS), and Agricultural Market (AM) have strong correlations with Agricultural Production Efficiency (APE) and Farmer Income (FI), indicating their key roles in improving performance.

Notably, Technical Support has the highest correlations with both APE ($r = 0.502$) and FI ($r = 0.519$). Farmer Cooperation Degree (FCD) and Financial Services (FS) also show moderate positive correlations with outcomes. Overall, the results confirm that improvements in policy, management, cooperation, market access, technology, and finance are all closely linked to better agricultural efficiency and higher farmer income.

The findings of the correlation analysis (Table 4) indicate that all the correlation coefficients of the independent variables are statistically significant and positive. Yet, they vary from 0.43 to 0.57, which falls short of the standard threshold of 0.80 that indicates possible multicollinearity (Hair et al., 2019). That is, the independent variables are fairly strongly intercorrelated but not highly correlated. Hence, there is no multicollinearity issue here and independent variables may be added with confidence in future regressions.

Table 4 Results of correlation analysis

	PS	CMC	FCD	AM	TS	FS	APE	FI
Policy Support (PS)	1							
Corporate Management Capability (CMC)	0.495 (0.000***)	1						
Farmer Cooperation Degree (FCD)	0.504 (0.000***)	0.513 (0.000***)	1					
Agricultural Market (AM)	0.514 (0.000***)	0.433 (0.000***)	0.474 (0.000***)	1				
Technical Support (TS)	0.569 (0.000***)	0.508 (0.000***)	0.509 (0.000***)	0.524 (0.000***)	1			
Financial Services (FS)	0.469 (0.000***)	0.463 (0.000***)	0.536 (0.000***)	0.472 (0.000***)	0.505 (0.000***)	1		
Agricultural Production Efficiency (APE)	0.501 (0.000***)	0.465 (0.000***)	0.488 (0.000***)	0.487 (0.000***)	0.502 (0.000***)	0.522 (0.000***)	1	
Farmer Income (FI)	0.499 (0.000***)	0.448 (0.000***)	0.476 (0.000***)	0.479 (0.000***)	0.519 (0.000***)	0.459 (0.000***)	0.477 (0.000***)	1

Note: *** $p < 0.001$, ** $p < 0.01$, and * $p < 0.05$

5.4 Regression analysis

1) Regression analysis of agricultural production efficiency

In the overall test of the model in Table 5, the value of R-square is 0.422, indicating that the independent variables in the model can explain the 42.2% variability of agricultural production efficiency; The Adjusted R-square is 0.412, which is close to R-square considering the influence of the number of independent variables, indicating that the fitting effect of the model is acceptable.

Table 5 Overall test of agricultural production efficiency model

R-square	Adjusted R-square	D-W	F	P
0.422	0.412	2.122	42.043	0.000***

Note: *** $p < 0.001$, ** $p < 0.01$, and * $p < 0.05$

The value of D-W is 2.122, which is close to 2, indicating that there is no obvious autocorrelation in the residual sequence. The f value is 42.043, and the p value is 0.000 (significant at 1% significance level), which shows that the whole regression model is significant, that is, the independent variables have a significant impact on agricultural production efficiency as a whole.

Table 6 Regression coefficient of agricultural production efficiency

	Non-standardized coefficient		Standardization coefficient	t	p	Collinear statistics	
	B	standard error	Beta			Tol	VIF
Constant	0.658	0.204		3.224	0.001**		
Policy Support	0.142	0.054	0.144	2.624	0.009**	0.554	1.806
Corporate Management	0.102	0.047	0.113	2.148	0.032*	0.610	1.640
Capability Farmer Cooperation Degree	0.111	0.054	0.113	2.064	0.040*	0.563	1.777
Agricultural Market	0.142	0.050	0.148	2.817	0.005**	0.607	1.647
Technical Support	0.115	0.053	0.122	2.164	0.031*	0.530	1.885
Financial Services	0.208	0.052	0.210	3.969	0.000***	0.596	1.677
Dependent variable: Agricultural Production Efficiency							

Note: *** $p < 0.001$, ** $p < 0.01$, and * $p < 0.05$

Table 6 shows the regression coefficients of their respective variables. From the perspective of non-standardized coefficient, the coefficient b of Financial Services is the largest, which is 0.208, indicating that the agricultural production efficiency increases by 0.208 units on average for every additional unit of financial services, while other conditions remain unchanged; Judging from the Beta value of standardization coefficient, the coefficients of Agricultural Market and Policy Support are relatively high, which are 0.148 and 0.144 respectively, indicating that their influence on agricultural production efficiency is more prominent among the variables. From the significant point of view, the t-test P values of Policy Support, Corporate

Management Capability, Farmer Cooperation Degree, Agricultural Market, Technical Support and Financial Services are all less than 0.05, which means that these independent variables have a significant impact on agricultural production efficiency. In the aspect of collinearity statistics, the Tolerance (tolerance) of each variable is greater than 0.10, and the VIF (variance expansion factor) is less than 10, indicating that there is no serious multicollinearity problem between independent variables.

2) Regression analysis of farmer income

In the overall test of the model in Table 7, the R-square value is 0.398, indicating that the independent variables in the model can explain 39.80% of the variability in Farmer Income. The Adjusted R-square is 0.387, which is close to the R-square value, suggesting that after accounting for the number of independent variables, the model still has a relatively stable fitting effect.

Table 7 Overall test of farmer income model

R-square	Adjusted R-square	D-W	F	P
0.398	0.387	2.059	37.990	0.000***

Note: *** $p < 0.001$, ** $p < 0.01$, and * $p < 0.05$

The D-W value is 2.059, close to the ideal value of 2, which means that there is no significant autocorrelation in the residual sequence, and the error terms of the model are independent of each other. The F value is 37.990, and the P value is 0.000 (significant at the 1% significance level), demonstrating that the entire regression model is significant. In other words, the independent variables as a whole have a significant impact on Farmer Income.

Table 8 presents the regression coefficients of each independent variable. Looking at the non-standardized coefficients (B), the coefficient of Technical Support is 0.172 and that of Policy Support is 0.151, which are relatively high among all variables. This indicates that, when other conditions remain unchanged, for every one-unit increase in Technical Support, Farmer Income increases by an average of 0.172 units, and for every one-unit increase in Policy Support, Farmer Income increases by an average of 0.151 units. In terms of the standardized coefficients (Beta), Technical Support (0.183) and Policy Support (0.155) also stand out, further highlighting that these two factors play important roles in influencing Farmer Income compared with other variables. Regarding the significance test (t-test), the P-values of Policy Support ($t = 2.755$, $p = 0.006$), Corporate Management Capability ($t = 1.865$, $p = 0.043$), Farmer Cooperation Degree ($t = 2.214$, $p = 0.028$), Agricultural Market ($t = 2.786$, $p = 0.006$), Technical Support ($t = 3.183$, $p = 0.002$), and Financial Services ($t = 2.056$, $p = 0.040$) are all less than 0.05.

Table 8 Regression coefficient of farmer income

	Non-standardized coefficient		Standardization coefficient	t	p	Collinear statistics	
	B	standard error	Beta			Tol	VIF
Constant	0.750	0.207		3.625	0.000***		
Policy Support	0.151	0.055	0.155	2.755	0.006**	0.554	1.806
Corporate Management	0.089	0.048	0.100	1.865	0.043*	0.610	1.640
Capability Farmer Cooperation	0.120	0.054	0.123	2.214	0.028*	0.563	1.777
Degree							
Agricultural Market	0.142	0.051	0.149	2.786	0.006**	0.607	1.647
Technical Support	0.172	0.054	0.183	3.183	0.002**	0.530	1.885
Financial Services	0.109	0.053	0.111	2.056	0.040*	0.596	1.677
Dependent variable: Farmer Income							

Note: *** $p < 0.001$, ** $p < 0.01$, and * $p < 0.05$

This means that these independent variables have a significant impact on Farmer Income, that is, changes in these factors can actually cause changes in Farmer Income. In terms of collinearity statistics, the Tolerance of each variable is greater than 0.10, and the Variance Inflation Factor (VIF) is less than 10. This shows that there is no serious multicollinearity problem among the independent variables, the independence of each variable in the model is good, and the regression results are reliable and valid.

The two models of polynomial regression also vary in terms of their dependent variables. Table 6 describes the effect of Jinsui Model variables on Agricultural Production Efficiency, whereas Table 8 describes their effect on Farmer Income. The same independent variables have been included in both the models, but used differently, i.e., the first model represents the effect on production outcomes, whereas the second represents the effect on income outcomes.

5.5 Guidelines based on the Jinsui model for improving agricultural economic performance in Long'an County, Guangxi Province.

According to the regression analysis, hypothesis test findings, and Jinsui model average score analysis of Long'an County in Guangxi Province, the following suggestions are made with the aim of enhancing agricultural economic performance—particularly agricultural production efficiency and farmers' income (see Table 9).

Table 9 Guidelines for Improving Agricultural Economic Performance in Long'an County
Based on the Jinsui Model

Key Dimension	Guideline / Action	Justification (Finding-Based)	Implementation Suggestions
Policy Support	Strengthen and tailor government agricultural support programs	Highest mean score (4.017); significant at $p < 0.01$ for both efficiency and income	- Update and promote subsidies - Improve policy outreach - Target smallholders
Technical Support	Expand agricultural extension services and promote smart farming	Highest standardized beta (0.183) for farmer income; significant impact at $p < 0.01$	- Offer training and digital tools - Deploy expert advisory teams - Use AI-based alerts
Financial Services	Enhance access to agricultural credit and insurance	Largest non-standardized coefficient ($B = 0.208$); significant for both outcomes ($p < 0.05$)	- Partner with rural banks - Develop credit scoring for farmers - Promote agri-insurance
Agricultural Market Access	Develop stable, diverse sales channels (offline and online)	Significant positive effect ($p < 0.01$); mean score 3.798 shows room for growth	- Expand rural e-commerce - Support contract farming - Build local market hubs
Corporate Management Capability	Train and professionalize local agricultural managers and cooperatives	Significant ($p < 0.05$); highest variance (0.944) shows inconsistent management	- Provide leadership training - Set KPIs and audits - Incentivize accountability
Farmer Cooperation Degree	Support the development of cooperatives and joint farming activities	Significant impact on both outcomes ($p < 0.05$); mean = 3.923 reflects readiness	- Formalize farmer groups - Offer group-based incentives - Involve farmers in planning
Cross-Cutting Strategy	Monitor performance and engage farmers in feedback loops	Needed for sustainable improvement and adaptive management	- Create a performance dashboard - Use annual surveys - Pilot-test new approaches

To improve agricultural economic efficiency of Long'an County, there are some key measures proposed in accordance with the research conclusion. First, policy support needs to be more accessible, timely, and effective with better subsidies and good information in a bid to remind farmers of and enable them to use available programs, especially new farmers, women, and smallholders. Second, there should be enhancement in technical support, which has a major impact on farmers' rewards; this involves offering one-on-one training, specialist advice in the farm environment, and web-based platforms to enable farmers to make value-based decisions.

Third, rural financial services should be enhanced through collaborations with rural banks, microfinance institutions, and fintech firms to provide customized credit and insurance products that insulate farmers from hazard and spur investment into new practices. Fourth, enhancing market linkages by constructing direct supply channels, facilitating e-commerce platforms such as WeChat Mini Programs, contract farming, and local product branding will enhance access to markets and remunerative prices for farmers. Fifth, enhancing management capacity in cooperatives and farm enterprises through targeted training, performance measurement, and evidence-based decision-making will enhance organizational performance and delivery.

Lastly, encouraging farmer collaboration and cooperation through facilitating the establishment of cooperatives, providing tax credits for collective labor, and engaging farmers in participatory planning will strengthen trust, collective ownership, and resilience. These all constitute an integrated strategy towards making Long'an County's agriculture more efficient, inclusive, and sustainable in line with the Jinsui Model.

6. Conclusion and Discussion

6.1 Conclusion

1) Key factors affecting agricultural Economic performance in Long'an county, Guangxi province.

The test of agricultural productivity efficiency and farmers' incomes through regression in Long'an County uncovers the factors of the Jinsui model's performance of agricultural economy. Six factors—corporate management ability, farmer cooperation, technical services, government support, market situation of agriculture, and financial services—were investigated for their influences. The regression analysis reveals that six independent variables—policy support, corporate management capability, farmer cooperation degree, agricultural market, technical support, and financial services—have statistically significant impacts on agricultural production efficiency in Long'an County.

Table 10 Summary of key factors affecting agricultural Economic performance in Long'an county, Guangxi province

Factor	Agricultural Economic performance		Effect Size
	Production Efficiency (β)	Farmer Income (β)	
Financial Services	0.210	0.111	Small
Technical Support	0.122	0.183	Small
Policy Support	0.144	0.155	Small
Agricultural Market	0.148	0.149	Small
Farmer Cooperation Degree	0.113	0.123	Small
Corporate Management Capability	0.113	0.100	Small

Note: Effect sizes between 0.10–0.29 are considered small, 0.30–0.49 are medium, and ≥ 0.50 are large (Nieminen, 2022, p. 436)

The overall model demonstrates good explanatory power, with an R^2 of 0.422 and an adjusted R^2 of 0.412. The Durbin-Watson statistic (2.122) indicates no autocorrelation. All variables were found to be significant at the 5% level or lower, with no multicollinearity ($VIF < 2$). Among the predictors, financial services exhibit the highest standardized beta coefficient ($\beta = 0.210$), followed by agricultural market ($\beta = 0.148$) and policy support ($\beta = 0.144$). Other variables such as technical support, farmer cooperation, and corporate management capability also show positive effects, with β values between 0.113 and 0.122. According to the effect size criterion, all predictors demonstrate small effect sizes ($0.10 \leq \beta < 0.30$). This indicates that while no single factor dominates, each contributes meaningfully to improving agricultural production efficiency. In the regression model for farmer income, the six independent variables again show statistically significant relationships.

The model's R^2 is 0.398 and the adjusted R^2 is 0.387, indicating a stable fit. The Durbin-Watson value (2.059) confirms that residuals are independent. Technical support is the most influential factor, with the highest standardized beta ($\beta = 0.183$), followed by policy support ($\beta = 0.155$) and agricultural market ($\beta = 0.149$). Other predictors, including farmer cooperation, financial services, and corporate management, also have significant effects, with β values ranging from 0.100 to 0.123. As with agricultural production efficiency, the beta coefficients for all variables fall within the small effect size range (0.10–0.29), indicating that farmer income is influenced by a combination of several modest but consistent factors.

Although none of the predictors exhibit medium or large effect sizes, the models as a whole explain a substantial proportion of the variance in agricultural production efficiency

(41.20%) and farmer income (38.70%). This suggests that agricultural economic performance in Long'an County is shaped not by a single dominant factor, but through the cumulative and coordinated impact of multiple small but statistically significant drivers.

2) Guidelines based on the Jinsui model for improving agricultural economic performance in Long'an County, Guangxi Province.

According to regression analysis, hypothesis test results, and Jinsui model test in Long'an County, six general recommendations are made for improving agricultural economic performance, especially production efficiency and farmers' income. First of all, policy support mechanisms need to be strengthened by enhancing the accessibility, timeliness, and inclusiveness of governmental agricultural subsidies and support policies. As the strongest mean score of all and with both variables having statistically significant effects, policy support continues to be a cornerstone in empowering rural farmers. Subsidy programs need to be regularly revised to include changing circumstances of farming, with specific targeting of small-scale farmers, gender targeting of women farmers, and targeting of new entrants.

Technical support systems need to be consolidated, as this dimension showed the strongest impact on farm income. Third, improving access to financial services—credit, savings, and agriculture insurance—is vital. Financial services had the strongest effect on production efficiency and were also significant for income improvement. Huge development of agricultural extension services, on-farm training, and application of digital technologies like AI-based warnings and mobile advisory teams will increase productivity and resilience by a very large margin. Partnership with rural banks and fintech companies and implementation of tailored credit scoring systems and risk aversion tools will make investment in improved farming easier.

Fourth, inter-market linkages need to be strengthened. As much as market access is already highly beneficially affecting, its relatively low mean rating means that there is still room for improvement. Rural electronic market promotion, contract farming promotion, and local market centers can generate price stability and extend to the market. Fifth, agricultural businesses and cooperatives must improve their corporate management capacity. Though this factor showed slightly lower impact, it reflected the highest variance, suggesting unstable managerial quality. Investing in leadership training, establishing key performance indicators (KPIs), and strengthening accountability mechanisms will improve organizational efficiency and service delivery.

Lastly, the establishment of cooperation between farmers and collective action is also important. Farmer cooperation affected both outcomes and scored well in respondent

willingness to engage in group-based activities. Promoting the formalization of cooperatives, incentivizing collective action, and involving farmers in participatory planning will enhance coordination, bargaining power, and long-term sustainability. Across all areas, it is recommended that the county establish routine performance monitoring systems and feedback loops with farmers to enable adaptive management and policy responsiveness.

In brief, the evidence informs a multi-dimensional approach to the agricultural development of Long'an County with parallel policy, technological, financial, market access, managerial, and collective organizational initiatives. Collectively, the above recommendations constitute a complete Jinsui model blueprint for inclusive and sustainable agricultural economic growth in the county.

6.2 Discussion

The findings shown that six of the determinants—corporate management capability, farmer cooperation level, market for agriculture, technical support, policy support, and financial services—are significant in the economic performance of agriculture in Long'an County. Financial services and technical support were especially significant, supporting previous research that the availability of credit and new technology are essential to improve productivity and income (Li et al., 2023; Xie et al., 2024). Besides, competitiveness and market responsiveness were improved through policy support and judicious management, backed by the existing literature highlighting the significance of institutional support to strengthen rural economy resilience (Sun et al., 2023; Yang & Solangi, 2024).

This study identified multiple factors shaping agricultural economic performance in Long'an County, Guangxi Province. Land and water resource management, infrastructure quality, access to technology, and the availability of skilled agricultural labor were all found to influence productivity and income (Tadele, 2021). Although the area has rich agricultural resources, challenges remain, including inefficient land use, seasonal droughts, and outdated infrastructure in remote regions (Wang et al., 2025). Limited technological adoption and a shortage of specialized agricultural talent further constrain progress (Bwambale et al., 2022). Market dynamics also play a critical role; weak brand recognition and fragmented value chains reduce the competitiveness of local products (Mondliwa et al., 2021). Policy support and institutional frameworks significantly impact development, but current measures require improvement to be more responsive and better integrated (Yang & Solangi, 2024). Importantly, while each factor alone showed only a modest effect size, their combined influence explained

over 40.00% of the variation in production efficiency and nearly 39.00% of farmer income, confirming that a systems-based approach is needed.

Drawing on the Jinsui Model, the study proposes guidelines to improve agricultural economic performance. These include optimizing land and water use, investing in modern infrastructure, strengthening technology transfer, and expanding training for farmers (Xiuling et al., 2023). Enhancing market linkages through e-commerce and contract farming, promoting processing industries, and supporting brand building are also essential (Li et al., 2024). Encouraging cooperatives, integrating agriculture with tourism, and strengthening environmental protections can further raise value and sustainability (Liang et al., 2023; Yang & Solangi, 2024). Finally, policy measures should include better financial support, land system reforms, and incentives for innovation and talent development (Gong et al., 2023). By applying these comprehensive strategies inspired by the Jinsui Model, Long'an County can improve productivity, raise incomes, and advance toward sustainable rural revitalization.

7. Application of research results to enhance the organization's competitiveness

Empirical evidence of drivers to agricultural economic performance in Long'an County is actionable proof that can be strategically employed to raise the competitiveness of agricultural enterprises at local and national levels. Empirical studies identify six drivers with interactive powers—policy support, financial services, technical support, agricultural markets, farmer cooperation, and corporate management ability—that work individually to contribute in small, incremental ways toward production efficiency and farmer income. The use of these results offers an approach to constructing organizational resilience, market adaptability, and sustainable economic competitiveness in agriculture.

7.1 Enhancing organizational competitiveness at the local level

A strategic and coordinated approach to elevating organization competitiveness must be adopted. Investment in high-payback areas such as financial services and technical support can be central to the role of underpinning enhanced productivity and stability of income for agriculture firms. This translates into better utilization of resources and improved risk management, finally resulting in improved overall competitiveness.

In addition, while there were fewer beta coefficients in corporate management skill in the study, high variance indicates significant potential for improvement. Focused leadership development programs, deployment of performance management systems, and installation of accountability processes are needed to build robust internal governance and operating

excellence. Market responsiveness is also a key driver of organizational competitiveness. E-strengthening of agro-market access through digital commerce channels and contract farming assists organizations in price stabilization, improving the consumer base, and gaining a foothold in local value chains.

Besides, adoption of cutting-edge technologies like digital advisory systems, mobile-enabled applications, and AI -based tools has the potential to improve technical support systems through augmented knowledge sharing, agricultural risk forecasting, and enabling real-time decision - making. Agility and innovation capacities are both enhanced through these efforts. Lastly, encouraging farmer cooperation and group - based associations like cooperatives optimizes collective efficiency.

The cooperation increases bargaining capacity, minimizes transaction costs, and allows infrastructure sharing, thereby being most beneficial to small farms in the context of sustainable development. Together, these strategies offer a comprehensive framework for optimizing local organizational competitiveness in Long'an County's agriculture.

7.2 Contribution to national competitiveness and agricultural policy

The study also plays an important role in national competitiveness and policymaking for agriculture. It is in line with China's general objectives on rural revitalization and agricultural modernization by providing an empirical basis on promoting public policy, first and foremost in the design of specific subsidy schemes, gender schemes, and digital agriculture programs. The evidence -based policy proposal leaves space for adaptive policy - making, which allows the government agencies to actively follow and adapt to changing challenges in rural areas, mainly climate change and market changes.

Additionally, the suggested improvement of access to farm- oriented financial services—through collaboration with rural banks and fintech institutions—is aligned with national targets in inclusive finance, investment stimulation, and risk management of rural businesses.

Most importantly, this research's Jinsui model is a replicable model that can be utilized to inform other provinces and counties in order to enhance rural agricultural economic performance. The integrated approach facilitates learning from institutions and replication of good practice at the national level, and the result is greater consistency and impact of rural development policy in China.

8. Research Recommendations

8.1 Practical recommendation

Based on the study findings, several practical recommendations can be made to improve agricultural economic performance in Long'an County. Local governments should enhance policy support by regularly updating subsidies and incentive programs to better align with current agricultural needs and ensure equal access for smallholders, new farmers, and women. Investments in infrastructure, particularly in transportation, irrigation, and storage facilities, are essential to reduce production costs and minimize post-harvest losses in remote areas.

Strengthening technical assistance through mobile advisory teams and digital platforms will help farmers adopt advanced technologies and improve productivity. Expanding financial services by partnering with microfinance institutions and rural banks can provide flexible credit and insurance products tailored to agricultural cycles. Promoting market integration through e-commerce, contract farming, and branding initiatives will help farmers reach more consumers and secure better prices. Developing human capital by offering training and incentive programs can attract and retain skilled agricultural professionals and cooperative leaders. Finally, reinforcing environmental management and supporting ecological farming practices will ensure the long-term sustainability of agricultural production.

8.2 Future research suggestion

For future research, several areas deserve further attention. Longitudinal studies tracking the long-term impact of policy interventions and the Jinsui Model practices would provide valuable insights into their sustained effects on productivity and farmer income. Comparative case studies between Long'an County and other regions adopting different agricultural development models could help identify best practices and contextual success factors. Research exploring barriers to technology adoption among different farmer groups would inform more targeted training and support strategies. Examining how women and marginalized groups experience agricultural transformation could help ensure that reforms are inclusive and equitable. Additionally, studies focused on environmental sustainability and climate resilience would provide guidance on scaling up ecological practices. Finally, in-depth analysis of market dynamics, value chain integration, and pricing strategies would offer practical recommendations to improve market competitiveness and enhance farmers' incomes.

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