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The Influence of Accounting Understanding, Operational Costs, Technological Advancement, and The Role of Farmers' Groups on Farming Income: Reviewed from Agricultural Accounting (Case Study in Panggung Jaya Village)

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Abstract
This study aims to examine the influence of accounting understanding, operational costs, technological advancements, and the role of farmer groups on the success of farming businesses in Panggung Jaya Village. A quantitative approach was used with statistical analysis through T-tests and P-values. The results indicate that accounting understanding and operational cost management have a significant influence. Farmers who master accounting and can manage costs efficiently tend to have more productive and sustainable farming businesses. Conversely, technological advancements and the role of farmer groups do not have a significant impact, possibly due to the low utilization of agricultural technology and suboptimal group participation. These findings emphasize the importance of increasing farmer capacity in accounting and cost management, while strengthening the role of farmer groups and expanding access to and adopting agricultural technology. The results of this study are expected to serve as a reference for policymakers and stakeholders in designing more effective farming business development strategies.

Introduction

Indonesia, as an agricultural country, has vast agricultural lands and is rich in natural resources, making the agricultural sector vital to the economy. The government's role in agricultural policy is crucial to improving the quality and quantity of products and achieving food self-sufficiency. (YASMITA and Faculty 2023) . Indonesia, which consists of many islands and has abundant natural resources, places the agricultural sector as one of the main pillars of its economy. Approximately 60% of the population depends on this sector for its livelihood, which plays a vital role in meeting domestic food needs and supporting economic growth. Agricultural development is carried out sustainably to increase production, income, and the welfare of farmers. This sector also provides raw materials for industry, increases exports, and creates jobs. With the application of modern technology and training for farmers, it is hoped that the agricultural sector can grow more productively. Government support through strategic policies and infrastructure development is crucial to strengthening this sector. With these steps, it is hoped that the Indonesian agricultural sector can contribute to food security and the welfare of society as a whole. (Garatu 2010) .

The agricultural sector plays a crucial role in supporting Indonesia's national economy. As the primary food provider, it ensures food availability and employs approximately 60% of the workforce, contributing to reduced unemployment and improved welfare (Mawarni, Baruwadi, and Bempah 2017) . Furthermore, this sector is also a viable investment area, so increasing productivity should be a priority through the adoption of agricultural technology, optimal water, soil, and post-harvest management (Prapnuwanti and Sudiana 2019) .

From the above explanation, the author is motivated to delve into research on " **The Influence of Accounting Understanding, Operational Costs, Technological Advances, and the Role of Farmer Groups on Farming Business Income"** , considering the importance of the agricultural sector as a supporter of the village economy and

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efforts to improve farmer welfare through more efficient and targeted farming business management.

Accounting knowledge plays a crucial role in supporting effective financial management in agricultural businesses. Adequate accounting knowledge enables farmers to systematically record transactions, differentiate between personal and business finances, accurately calculate production costs, and objectively communicate profits. Accurate financial record-keeping also helps farmers make informed decisions regarding pricing, cost control, and resource allocation, ultimately contributing to higher income levels. Previous studies have shown that farmers who implement basic accounting practices tend to manage their farming activities more efficiently and sustainably. Simple accounting records increase transparency and accountability in farm management, enabling farmers to identify inefficiencies and improve financial performance. Therefore, a higher level of accounting knowledge is expected to positively impact farm income.

H_1: Accounting Knowledge Has a Significant Impact on Farm Income.

Operational costs are one of the most important components in determining agricultural profitability. These costs include expenses related to seeds, fertilizers, fertilizers, labor, irrigation, and other production inputs. Efficient operational cost management allows farmers to minimize waste, optimize input use, and increase profit margins without having to increase production volume.

Several empirical studies have shown that cost efficiency is a key factor influencing agricultural income, particularly in small-scale and traditional farming. Farmers who can effectively control and manage operational costs are more likely to achieve better financial results. Therefore, effective operational cost management is expected to have a significant impact on agricultural business income.

H_2: Operational Costs Has a Significant Impact on Agricultural Business Income.

Increased rice production must be accompanied by cost efficiency to improve farmer welfare. Lower production costs will directly impact farmer income, ultimately supporting their welfare, all other things being equal. However, Statistics Indonesia (BPS) data (2020) shows that the food crop farmer exchange rate index (NTPP) from December 2015 to December 2019 did not show a significant increase. While not the sole indicator, this reflects stagnant farmer purchasing power. Approximately two-thirds of Indonesia's population lives in rural areas and relies on the agricultural sector for their livelihood. If their welfare does not improve, farmers will likely lose interest in farming and shift to other sectors deemed more profitable (Musilah, Putri, and Utami 2021). Technological advances in agriculture are widely recognized as driving productivity and efficiency. The use of modern agricultural technologies—such as high-yielding seed varieties, mechanization, digital farming tools, and precision farming—can improve production efficiency, reduce labor dependence, and increase crop yields. In theory, the adoption of appropriate technology should lead to increased farm incomes.

However, the effectiveness of technology adoption depends on farmers' access to, knowledge of, and ability to optimally utilize the technology. Limited infrastructure, high investment costs, and inadequate training can hinder the impact of technological advances on income, especially in rural areas. Nevertheless, based on theoretical expectations and previous studies, technological advances are expected to impact farm incomes.

H_3: Technological Advancement Has a Significant Effect on Farming Business Income.

Farmer groups serve as important institutions that facilitate collaboration, knowledge sharing, access to government

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programs, and collective bargaining power. Through farmer groups, members can receive training, technical assistance, market information, and input subsidies, which can increase productivity and income levels. Strong farmer group institutions can also improve farmers' access to credit and markets.

From an institutional perspective, collective action through farmer groups is expected to strengthen farmers' economic positions and improve business performance. Although the effectiveness of farmer groups depends on the quality of their organization and member participation, theoretically, active farmer groups should contribute positively to agricultural business income.

H_4: The Role of Farmer Groups Has a Significant Effect on Farming Business Income.

Methodology

This study used a quantitative research approach with a survey method to analyze the relationship between accounting understanding, operational costs, technological progress, and the role of farmer groups on agricultural business income. The quantitative method was chosen to obtain objective and measurable results through statistical analysis. This research was conducted in Panggung Jaya Village, North Rawajitu District, Mesuji Regency, from May to June 2024, as much of the population in this area are rice farmers.

The population consisted of 100 rice farmers who were members of four farmer groups: Margo Makmur 1 (24 farmers), Margo Makmur 2 (25 farmers), Tunas Muda 1 (26 farmers), and Sumber Karya (25 farmers). Due to the relatively small population size, this study used a purposive sampling technique, where all members of the population were selected as respondents to ensure comprehensive data representation. Data were collected using a structured questionnaire measured using a Likert scale, designed to capture respondents' perceptions regarding accounting understanding, operational cost management, technology utilization, and farmer group participation. Prior to data analysis, the questionnaire was tested for validity and reliability.

Data analysis was performed using Partial Least Squares–Structural Equation Modeling (PLS-SEM), which includes external model evaluation (validity and reliability testing) and internal model evaluation (R-square and hypothesis testing). This method was chosen because of its ability to analyze complex relationships between latent variables with a relatively small sample size.

Result And Discussion

Results

Outer Model

1. Validity Test

a. Convergent Validity

Convergent validity is assessed by examining the loading factor values and *Average Variance Extracted* (AVE). An indicator is considered valid if its loading value is greater than 0.70. However, in the context of PLS-SEM, loading values ranging from 0.50 to 0.70 are still considered acceptable, as long as the construct's AVE exceeds the 0.50 threshold.

The analysis results indicate that all indicators in the model have loading values above 0.70, indicating that each indicator has a strong relationship with the construct it represents. Furthermore, the AVE value for each construct is also above the minimum limit of 0.50, namely: Accounting Understanding (0.599), Operational Costs (0.576), Technological Progress (0.611), Role of Farmer Groups (0.621), and Farming Business (0.583). These findings indicate that all constructs in the model have met the requirements for convergent validity.

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b. Discriminant Validity

Discriminant validity was evaluated using the *cross-loading technique* , which involves comparing the loading value of an indicator with the corresponding construct against its loading with other constructs. The findings showed that each indicator showed the highest loading value on the construct it was intended to measure, compared to other constructs. For example, the accounting understanding indicator showed the highest loading on Accounting Understanding (0.819) when compared to Operational Costs (0.583) or Agricultural Business (0.688). This indicates that each construct has strong discriminatory power, confirming that discriminant validity has been achieved.

2. Reliability Test

Construct reliability was tested using Composite Reliability and Cronbach's Alpha. A construct is considered reliable if its Composite Reliability value is more than 0.60 and its Cronbach's Alpha is more than 0.70. The test results indicate that all constructs in this study meet reliability criteria. *Composite reliability values* for each variable ranged from 0.867 to 0.898, while *Cronbach's Alpha values* ranged from 0.832 to 0.891. Thus, all constructs demonstrated good internal consistency and can be used in subsequent analysis stages.

Inner Model

1. Determination Coefficient Value *(R-Square)*

The coefficient of determination (R^2) measures how much variation in endogenous variables can be explained by exogenous variables. In this study, the *Adjusted R-Square value* for the Farming Business variable was 0.627, indicating that 62.7% of the variation in Farming Business Income can be explained by the variables Accounting Understanding, Operational Costs, Technological Progress, and the Role of Farmer Groups. The remaining 37.3% is explained by other variables not included in this study. These results indicate that the model has quite strong predictive capabilities.

Tabel 1. *R-Square Adjusted*

	R Square	Adjusted R Square
Usaha Tani	0.647	0.627

Sources : Data Process SmartPLS 4.0 (2025)

2. Hypothesis Testing

Hypothesis testing was applied using the *bootstrapping method* to obtain the *path coefficient* , *T-statistic* , and *P-value* . The results of the hypothesis test are presented in the following table:

Tabel 2. Hypotesys Testing Based On Total Effect

	Sampel (O)	Sampel Average (M)	Sampel Average (M)	T Statistik (|O/STDEV |)	P Values
Accounting Knowledge (X_1) > Farming Business Income (Y)	0.527	0.528	0.095	5.562	0.000
Operational Cost -> Farming Business Income (Y)	0.373	0.362	0.106	3.528	0.000
Technological Advancement -> Farming Business Income (Y)	0.079	0.077	0.098	0.813	0.416
Farmer Groups Role -> Farming Business Income (Y)	-0.114	-0.091	0.133	0.860	0.390

Sources: Data Process (2025)

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The Influence of Accounting Understanding on Farm Business Income

Accounting understanding has a significant influence on farm income. The T-statistic value of 5.562 (> 1.96) and P-value of 0.000 (< 0.05) indicate that accounting understanding significantly improves farmers' financial management performance. Farmers with good accounting skills are better able to record cash flow, plan, and make data-based decisions, which ultimately have a positive impact on increasing income. This finding is in line with Sahrian et al. (nd) who stated that simple accounting practices contribute to farming efficiency.

The Influence of Operational Costs on Farming Business Income

Operational costs also showed a significant impact on farm income, with a T-statistic of 3.528 and a P-value of 0.000. Efficient operational cost management helps farmers avoid waste, optimize the use of inputs such as labor, seeds, and fertilizers, and increase profit margins. This supports the findings of Fathi (2024), who emphasized that operational cost efficiency is a crucial factor in increasing farmer income, particularly in rural areas.

The Impact of Technological Advances on Farming Income

Technological advances have a positive but insignificant impact on farm income. A coefficient value of 0.079, a T-statistic of 0.860 (<1.64), and a P-value of 0.390 (>0.05) indicate that technology implementation has not had a statistically significant impact on farmer income in the study area. This is likely due to limited access to modern agricultural technology, high investment costs , and minimal training and assistance in technology utilization. These results align with research by Rusydi and Rusli (2022), which also found that agricultural technology has not had a significant impact in the context of rural agriculture.

The Impact of Technological Advances on Farming Income

The role of farmer groups did not significantly influence farm income. Based on the analysis, the T-statistic value of 0.813 (<1.64) and P-value of 0.416 (>0.05) indicate that the contribution of farmer groups to income is still low. This is thought to be due to the weak organizational structure of the groups, the lack of productive activities, and the minimal active participation of members. However, theoretically , farmer groups can be a collaborative tool for sharing information, training, and access to government and market assistance. This study's findings contradict those of Sudarso, Luthman, and Hendra (2022) , which stated that farmer groups can increase farmer income through solid collaboration and institutional support.

Conclusion and Recommendations

Based on the above results, research can conclude that understanding accounting and costs operational influential significant to income business farmers in Panggung Jaya Village, showing importance *literacy* finance and efficiency cost in support successful business farmers. However, technology and roles group farmer No show influence significantly, which is likely caused by low utilization technology and less active role group farmer in support agriculture.

Based on the research findings, several recommendations can be put forward. First, there is a need to improve farmers' accounting understanding through ongoing training and mentoring programs focused on simple financial record-keeping and cost management. Second, farmers should be encouraged to implement efficient operational cost management to increase profitability and business visits.

Furthermore, government agencies and relevant stakeholders should expand access to modern agricultural technologies, accompanied by practical training and technical assistance to ensure effective utilization. Finally, strengthening farmer groups through active participation, capacity building, and collaborative economic activities is crucial to increasing their contribution to farmer income. For future research, it is recommended to include additional

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variables such as access to capital, government policy support, market access, and environmental factors to gain a more comprehensive understanding of the determinants of agricultural income.

Limitations

Therefore, it is recommended to improve farmers' accounting understanding through training, optimize efficient operational cost management, expand access to and training in the use of modern agricultural technology, and strengthen the function of farmer groups through active and collaborative activities. For further research, it is recommended to add other variables such as access to capital, government policy support, market conditions, and environmental factors to obtain a more *comprehensive understanding* of the various aspects that impact agricultural income.This study makes several important contributions to the literature and practice of agricultural accounting and farm management.

This study contributes to the development of agricultural accounting theory and farm income by integrating understandings of accounting, operational costs, technological progress, and the role of farmer groups into a single empirical model. The findings strengthen theories emphasizing the importance of financial literacy and cost efficiency as key determinants of farm income. Furthermore, this study extends previous research by showing that technological progress and institutional support through farmer groups do not always have a significant impact on income, particularly in rural farming contexts with limited technology adoption and weak organizational structures.

Empirically, this study provides evidence from rice farmers in Panggung Jaya Village, Mesuji Regency, an area that has received little attention in previous research. By applying the PLS-SEM approach, this study offers strong empirical insights into the relationship between financial capacity, cost management, technology utilization, and institutional factors in small-scale farming. The results of this study enrich empirical findings in the context of developing countries, particularly regarding the inconsistent impact of technology and farmer groups on farm income.

From a practical perspective, this research offers valuable insights for policymakers, agricultural extension officers, and agricultural organizations. The results highlight the urgency of improving farmers' understanding of accounting and operational cost management through targeted training and mentoring programs. Furthermore, the findings suggest that technology dissemination and farmer group empowerment must be accompanied by intensive assistance and capacity building to ensure effective implementation.

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