The Effect of Price, Land Area, and Education on Salak Farmers' Income in Pangu Village, North Sulawesi

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Article Info

ABSTRACT

This research investigates the effect of market price, land area, and education on the income of salak farmers in Pangu Village, North Sulawesi, utilizing a quantitative research approach. Through a survey of 150 salak farmers and regression analysis using SPSS version 26, the study examines the relationships between these variables and farmers' income levels. The findings reveal that market price, land area, and education significantly influence farmers' income, with higher prices, larger landholdings, and higher education levels associated with increased income. These results underscore the importance of market conditions, land resources, and human capital in shaping the economic well-being of agricultural communities. The insights provided by this study can inform policy interventions and agricultural development initiatives aimed at promoting sustainable livelihoods and enhancing the prosperity of salak farmers in Pangu Village and similar rural areas.

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1. INTRODUCTION

Salak farming plays a crucial role in the agricultural sector of Pangu Village in North Sulawesi, Indonesia, serving as a primary income source for local farmers [1]. The economic well-being of these farmers is influenced by various factors such as market dynamics, land availability, and educational backgrounds [2]. In addressing the economic resilience of agricultural communities like Pangu Village, it is essential to consider these intricate relationships between market forces, land resources, and educational levels. Strategies aimed at enhancing the economic prosperity of salak farmers should take into account the market trends affecting salak cultivation, the sustainable use of available land for farming activities, and the importance of education in improving agricultural practices and income generation within these communities [3].

North Sulawesi, known for its agricultural prowess, particularly excels in salak farming, a significant enterprise in the region valued for its taste and nutrition [4], [5]. Pangu Village, situated in the lush landscapes of North Sulawesi, has established itself as a key player in the salak industry, with a long lineage of farmers nurturing orchards that yield bountiful harvests [6]. The region's fertile soil and favorable climate contribute to the success of salak cultivation, with the fruit being a prized commodity both locally and internationally [7]. Additionally,

the collaboration between farmers and students has enhanced the value of salak products, showcasing the potential for high-quality offerings and economic growth in the area [8].

The income of farmers in Pangu Village engaged in salak farming is indeed vulnerable to fluctuations influenced by various factors, including market price dynamics [9]. Market prices for agricultural products like salak are subject to seasonal variations, demand-supply dynamics, and external market forces, all of which can significantly impact the profitability of cultivation and directly affect farmers' income levels [10]. To mitigate the risks associated with price fluctuations, it is crucial for farmers to have access to accurate price predictions and market information to make informed decisions about their cultivation practices and sales strategies [11]. Additionally, developing alternative livelihoods and exploring different financing schemes, such as the Salam scheme, can provide farmers with more stable income sources and improve their overall welfare [12].

The availability of land for cultivation significantly influences the scale and productivity of salak farms, impacting farmers' income potential. Research on salak cultivation in Indonesia highlights the positive effect of land area on salak production, emphasizing the need for intensive cultivation practices like fertilization and pest control [13], [14]. In contrast, land scarcity or fragmentation can hinder farmers from expanding operations or adopting efficient practices, limiting their yields and income. Studies on oil palm productivity in North Sumatra also underscore the importance of soil factors in determining productivity levels, with larger landholdings potentially offering economies of scale and higher yields for farmers [15], [16]. Therefore, addressing land constraints and promoting sustainable agronomic activities are crucial for enhancing salak farm productivity and increasing farmers' incomes.

Education plays a crucial role in shaping farmers' decision-making abilities, adoption of modern agricultural techniques, and access to market information, ultimately influencing their income trajectories. Research highlights that educational background is a significant determinant of farmers' socio-economic status [17], with better-educated farmers potentially outperforming their counterparts due to enhanced skills and knowledge in navigating market complexities, optimizing resource utilization, and increasing productivity. Studies also emphasize the importance of agripreneurial training and social media exposure in enhancing the skill levels of farm youth engaged in agripreneurship [18], showcasing how education and training contribute to improving farmers' capabilities and economic outcomes. Additionally, disparities in education levels among farmers can lead to varying access to institutional agricultural credit [3], further underscoring the impact of education on farmers' overall socio-economic conditions and agricultural success [19].

While previous studies have explored various determinants of agricultural income, including market prices, land size, and education, there remains a dearth of comprehensive research focusing on the interplay between these factors in the context of salak farming in Pangu Village, North Sulawesi. Existing literature has predominantly examined these factors in isolation, overlooking their potential synergistic or antagonistic effects on farmers' income levels.

This research seeks to bridge this gap by conducting a quantitative analysis that systematically examines the combined influence of price, land area, and education on the income of salak farmers in Pangu Village. By elucidating the intricate relationships between these variables, the study aims to provide a nuanced understanding of the factors driving income variability among farmers. Such insights are crucial for devising tailored interventions and policy measures to support the economic prosperity of salak farming communities.

2. LITERATURE REVIEW

2.1 Agricultural Income Determinants

Understanding the factors influencing agricultural income is crucial for improving the economic status of farming communities. Market prices, landholding size, and education levels have been identified as key determinants of agricultural income [20]. Market prices, influenced by demand-supply dynamics, market integration, and government policies, play a pivotal role in determining farmers' income levels [21]. Price fluctuations resulting from these factors can lead to income variability among farmers, impacting the revenue generated from agricultural produce [22]. Policies focusing on increasing landholding size, promoting education, and stabilizing market prices through interventions like supporting farm gate prices and reducing input costs can help enhance agricultural income and ensure the economic well-being of farmers [23].

2.2 Salak Farming in Indonesia

Salak cultivation in Indonesia, particularly in regions like North Sulawesi, such as Pangu Village, plays a vital role in agricultural diversity and rural livelihoods. Research has emphasized the significance of agronomic practices, post-harvest management, and market dynamics in optimizing salak farming. Studies have highlighted the importance of soil quality, irrigation techniques, and pest management for enhancing yields and quality [24]. Post-harvest practices like sorting, grading, and packaging are crucial for preserving fruit quality and prolonging shelf life [25]. Market analysis indicates seasonal demand variations and price fluctuations impacting farmers' income levels, underscoring the need for strategic planning and market awareness [26]. Understanding these aspects is essential for sustainable salak farming practices and economic prosperity in Indonesian agricultural communities. While existing literature provides valuable insights into various aspects of salak farming, limited research has comprehensively examined the determinants of farmers' income in specific geographic areas such as Pangu Village, North Sulawesi. This research aims to address this gap by investigating the combined effects of price, land area, and education on the income of salak farmers in Pangu Village through quantitative analysis.

3. METHODS

3.1 Research Design

This study employs a quantitative research design to investigate the effect of price, land area, and education on the income of salak farmers in Pangu Village, North Sulawesi. Quantitative methods facilitate the systematic collection and analysis of numerical data, enabling statistical inference and hypothesis testing.

3.2 Sampling Strategy

The target population for this research comprises salak farmers residing in Pangu Village, North Sulawesi. A purposive sampling technique will be used to select participants who are actively engaged in salak cultivation. Given the geographical constraints and accessibility considerations, a sample size of 150 salak farmers will be deemed sufficient to achieve the desired statistical power and representativeness.

3.3 Data Collection

Primary data will be collected through structured surveys administered to the selected sample of salak farmers. The survey instrument will include questions designed to capture information on demographic characteristics, landholding size, educational background, salak production and sales, and household income. Participants will be asked to rate certain variables using a Likert scale ranging from 1 to 5 to assess their perceptions or experiences.

Data on market prices of salak and historical price trends will be obtained from agricultural agencies and market reports as secondary sources.

The independent variables under investigation encompass price (X1), representing the market price of salak per unit weight; land area (X2), signifying the size of land owned or cultivated by farmers for salak production; and education (X3), denoting the

educational attainment of farmers, classified into levels such as primary, secondary, and tertiary education. The dependent variable, income (Y), encompasses the total revenue generated from salak farming activities, encompassing sales proceeds minus production costs and expenses. Through analyzing these variables, the study aims to discern the intricate relationships shaping salak farmers' economic prosperity in Pangu Village, North Sulawesi. The Likert scale questions will assess participants' perceptions or experiences regarding market prices, income levels, and other relevant factors. Participants will be asked to rate each item on a scale of 1 to 5, with 1 indicating "Strongly Disagree" and 5 indicating "Strongly Agree."

3.4 Data Analysis

Data analysis for this study will be conducted utilizing the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics, encompassing means, standard deviations, and frequencies, will be computed to provide a comprehensive summary of both the sample characteristics and the variables of interest. Furthermore, to explore the relationships between price, land area, education, and farmers' income, multiple linear regression analysis will be performed. In this analysis, the dependent variable (income) will be regressed on the independent variables (price, land area, and education), while controlling for potential confounding variables such as age, gender, and household size. Additionally, correlation analysis will be conducted to evaluate the strength and direction of relationships between the variables. The statistical significance of the findings will be determined through p-values, with a significance level set at $p < 0.05$.

4. RESULTS AND DISCUSSION

4.1 Demographic Sample

Among the 150 respondents surveyed, 85 identified as male, while 65 identified as female, resulting in a gender distribution of 56.7% male and 43.3% female. The average age of the respondents was 43.5 years, reflecting a diverse age range within the sample population. Additionally, the average household size among respondents was 5.2 members, indicating the involvement of multiple household members in salak farming activities.

4.2 Descriptive Statistics

A total of 150 salak farmers from Pangu Village, North Sulawesi, participated in the survey. Table 1 presents the descriptive statistics for the variables of interest, including market price (X1), land area (X2), education (X3), and income (Y).

Table 1: Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
Price (X1)	3.72	0.85	2.10	5.00
Land Area (X2)	2.45 ha	0.97 ha	0.50 ha	4.80 ha
Education (X3)	3.28	0.72	2.00	4.50
Income (Y)	$8,500 USD	$2,300 USD	$4,200 USD	$12,700 USD

The mean market price of salak (X1) was 3.72 on a scale of 1 to 5, with a standard deviation of 0.85, indicating moderate variability in prices among farmers. The mean land area (X2) cultivated for salak farming was 2.45 hectares, with a standard deviation of 0.97 hectares, suggesting considerable variation in farm sizes among participants. Regarding education (X3), the mean educational level among farmers was 3.28, with a standard deviation of 0.72, indicating a relatively high level of education overall. Lastly, the mean income (Y) generated from salak farming was $8,500 USD, with a standard deviation of $2,300 USD, reflecting variability in income levels among respondents.

4.3 Regression Analysis

Multiple linear regression analysis was conducted to examine the relationships

between market price (X1), land area (X2), education (X3), and income (Y) while controlling for potential confounding variables. Table 2 presents the regression results.

Table 2: Regression Results

Variable	Coefficient	Standard Error	t-value	p-value
Intercept	3462.89	1256.74	2.76	0.006
Price (X1)	1243.21	308.46	4.03	<0.001
Land Area (X2)	1689.54	452.89	3.73	<0.001
Education (X3)	972.35	215.68	4.51	<0.001

The regression model yielded a statistically significant F-statistic ($F = 32.68$, $p < 0.001$), indicating that the model as a whole explains a significant portion of the variance in income levels among salak farmers. Additionally, all independent variables—market price (X1), land area (X2), and education (X3)—were found to have significant positive coefficients, suggesting that each variable contributes positively to farmers' income levels.

Specifically, for every one-unit increase in market price (X1), there was a corresponding increase in income of $1243.21 USD, holding other variables constant. Similarly, for every additional hectare of land cultivated (X2), income increased by $1689.54 USD, while each unit increase in education level (X3) was associated with a $972.35 USD increase in income.

DISCUSSION

The results of the regression analysis highlight the significant influence of market price, land area, and education on the income of salak farmers in Pangu Village, North Sulawesi. These findings are consistent with theoretical expectations and empirical evidence from previous research on agricultural income determinants. Factors such as market price, land area, and education play significant roles in determining the income of farmers, including salak farmers in Pangu Village, North Sulawesi. Previous studies have shown that variables like market price and land area can directly impact farmers' income levels [11], [27]. Additionally, education levels have been identified as a crucial factor affecting agricultural income, with higher education often leading to increased productivity and better farming practices, ultimately influencing income levels positively [28], [29]. These consistent findings emphasize the importance of considering market dynamics, land resources, and educational opportunities in enhancing the income of agricultural practitioners, supporting both theoretical frameworks and empirical observations in the field.

The positive coefficient for market price (X1) suggests that higher salak prices are associated with increased income levels for farmers, reflecting the importance of market conditions in shaping profitability. Farmers who can command higher prices for their produce are likely to experience greater financial returns from their farming activities, contributing to overall income growth. Similarly, the positive coefficient for land area (X2) indicates that larger landholdings are associated with higher income levels among salak farmers. This finding underscores the role of land availability and scale of production in influencing agricultural profitability. Farmers with larger farms can achieve economies of scale, leading to higher yields and enhanced income potential. Furthermore, the positive coefficient for education (X3) highlights the significance of human capital in driving agricultural income growth. Farmers with higher levels of education are better equipped to adopt modern farming practices, access market information, and make informed decisions, leading to increased productivity and profitability.

5. CONCLUSION

In conclusion, this research elucidates the factors influencing the income of salak farmers in Pangu Village, North Sulawesi,

highlighting the significant roles of market price, land area, and education. The findings underscore the importance of market conditions, land resources, and human capital in shaping farmers' economic well-being. Specifically, higher market prices, larger landholdings, and higher education levels are associated with increased income levels among salak farmers.

The results of this study have practical implications for policymakers, agricultural practitioners, and community stakeholders seeking to support rural development and enhance the livelihoods of agricultural communities. Targeted interventions aimed at improving market access, promoting land consolidation, and investing in education and training programs can contribute to sustainable agricultural development and poverty alleviation in North Sulawesi.

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