

Factors Driving Shallot Farmers' Marketing Decisions During Harvest Seasons in Sukoharjo Village-Wilangan¹

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Abstract. This study aims to analyze the partial and simultaneous effects of crop yields and selling prices on the marketing decisions of shallot farmers by considering psychological anxiety in Sukoharjo Village, Wilangan District. Using a quantitative causal associative design and simple random sampling on 99 farmers, data were analyzed via multiple linear regression. Results show that crop yields and selling prices have a positive and significant effect on marketing decisions, both partially and simultaneously, with an Adjusted R Square of 0.609. Field findings indicate that the perishable nature of shallots, limited storage facilities, price fluctuations, and capital needs generate anxiety that encourages loss-aversion behavior. Consequently, farmers tend to make defensive decisions by selling quickly to local middlemen to secure immediate cash flow.

Keywords: crop yield, selling price, marketing decision, farmer anxiety, shallot

1 Introduction

The agricultural sector is one of the fundamental pillars of Indonesia's economy, serving not only as a provider of national food supplies but also as a source of socio-economic support for millions of rural communities. Among the various agricultural subsectors, horticultural commodities-particularly shallots (*Allium cepa* L.)-have high economic value, with consistently high and continuous consumer demand.

Although shallot cultivation offers promising commercial value, it is a high-margin yet very high-risk farming activity (*high-return, high-risk*). The physical characteristics of shallot bulbs, which have high water content, make this commodity highly perishable and cause rapid and substantial weight loss when adequate postharvest handling is not provided. This biological vulnerability is exacerbated by dependence on weather conditions, threats from pests and plant diseases, and highly extreme daily market price fluctuations.

The economic reality in Sukoharjo Village shows that when the peak harvest season arrives, a surge in production volume often becomes a turning point that disadvantages farmers. The abundance of shallot supply in the local market, which is not matched by demand flexibility, triggers a drastic decline in prices. This price collapse places farmers in a very weak bargaining position vis-à-vis collecting traders or harvest buyers.

In addition to cultivation-related technical problems and market structure dynamics, farmers' internal psychological factors play a key role in shaping their trading behavior. Anxiety becomes a powerful cognitive-affective variable influencing the marketing decision-making process. The substantial capital requirements for purchasing agricultural inputs (seeds, fertilizers, and pesticides) leave many farmers dependent on informal loans or credit from agricultural supply stores. As the harvest period approaches, anxiety about being unable to repay debts and the risk of crop spoilage create intense mental pressure.

Such psychological pressure encourages farmers to act under conditions of bounded rationality, as explained in behavioral economics theory. Fear of total loss (loss aversion) causes farmers to prioritize daily cash certainty over maximizing long-term profit margins. Consequently, many farmers choose to sell their shallots directly in the field while still wet (the *tebasan* system)² to middlemen, even though they recognize that the selling value received is far below the economic market price of properly dried shallots.

Based on this complex background, this study was conducted to comprehensively and systematically analyze the effects of crop yield (X_1) and selling price (X_2) on the marketing decisions (Y) of shallot farmers in Sukoharjo Village, Wilangan District, Nganjuk Regency, while also exploring in depth the relationship between psychological anxiety factors and farmers' choice of marketing channels.

2 Literature Review and Hypothesis Development

2.1 Marketing Decision Theory

Marketing decisions in the context of horticultural farming are defined as a series of cognitive and evaluative processes undertaken by producers (*farmers*) to determine the product form, selling time, price determination, and the most optimal distribution channel for their harvest [1, 2]. The main indicators of marketing decisions include the choice of selling form (wet/*tebasan* versus processed dried product), the choice of marketing channel (*middlemen, wholesale markets, or end consumers*), transaction timing, and logistics cost efficiency.

2.2 Crop Yield Variable (Yield / Production Volume)

Crop yield is the total quantity of an agricultural commodity successfully harvested from a certain area of land during one planting cycle [3]. Crop yield volume determines the economies of scale of farming operations and the supply capacity available for release to the market. For highly perishable horticultural products, the larger the harvest, the greater the postharvest risk borne by farmers.

2.3 Selling Price Variable (Selling Price)

Selling price is the monetary value agreed upon by the seller and buyer for each unit of an agricultural commodity [4]. Selling price acts as the primary market signal determining farmers' gross income and profit margins. Uncertainty caused by daily shallot price fluctuations at wholesale markets creates high risk for the stability of rural farmers' income.

² The *tebasan* system is a contract transaction model at the farmer level in Indonesia where the entire shallot crop yield is purchased in bulk by middlemen/harvest buyers while the crops are still in the field (in wet condition), thereby completely transferring all risks of weight loss and postharvest damage to the buyer.

2.4 Behavioral Economics Theory: Anxiety, Bounded Rationality, and Loss Aversion

In classical economic theory, economic actors are assumed to behave perfectly rationally (rational choice theory). However, field realities show that under conditions of high risk and uncertainty, farmers' decision-making processes are influenced by psychological anxiety [5]. According to Kahneman & Tversky [6] through Prospect Theory, individuals tend to experience losses with an emotional impact that is much greater than the satisfaction derived from an equivalent gain (loss aversion). The absence of modern storage facilities and the pressure of cash capital needs trigger extreme anxiety that erodes farmers' rationality and encourages them to make defensive marketing decisions.

2.5 Formulation of Research Hypotheses

H₁: Crop yield has a positive and significant effect on the marketing decisions of shallot farmers in Sukoharjo Village.

H₂: Selling price has a positive and significant effect on the marketing decisions of shallot farmers in Sukoharjo Village.

H₃: Crop yield and selling price simultaneously have a positive and significant effect on the marketing decisions of shallot farmers in Sukoharjo Village.

3 Research Methods

3.1 Research Design and Location

This study was designed using a quantitative approach with a causal associative research design. This design was selected to demonstrate and measure the causal relationship between the independent variables (Crop Yield (X₁) and Selling Price (X₂) and the dependent variable, Marketing Decision (Y). The research was conducted in the agricultural area of Sukoharjo Village, Wilangan District, Nganjuk Regency, East Java. The location was selected purposively because the village is a productive shallot cultivation center in Wilangan District and experiences ongoing postharvest marketing problems.

3.2 Population and Sampling Technique

The target population in this study comprised all active shallot farmers managing farmland in RT 008, RT 009, and RT 010 of Sukoharjo Village, with a registered population of 130 farmers. The sample size was determined precisely using the Slovin formula with a 5% margin of error (e = 0.05):

$$n = N / [1 + N(e)^2] \quad (1)$$

$$n = 130 / [1 + 130(0,05)^2] = 130 / [1 + 130(0,0025)] = 130 / 1,325 = 98,11$$

The calculation above was rounded up to ensure the reliability of the sample data, resulting in a final sample of 99 respondents. Sampling units were selected from the population using simple random sampling, with farmer group member numbers drawn by lottery to ensure that every population member had an equal random chance of being selected.

3.3 Data Collection Techniques and Variable Operationalization

Primary data were collected through two main instruments: a structured five-point Likert-scale questionnaire (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree) and in-depth interviews to explore psychological aspects of anxiety. The operationalization of the research variables was arranged as follows:

Crop Yield (X_1): Measured using indicators of harvest tonnage per hectare, bulb freshness quality, storage durability, and the level of physical postharvest damage.

Selling Price (X_2): Measured using indicators of conformity with daily market prices, price stability during the peak harvest season, clarity and transparency of price information, and the level of satisfaction with the price per kilogram.

Marketing Decision (Y): Measured using indicators of transaction system selection (wet tebasan versus dry weighing), distribution channel selection (middlemen versus wholesale markets), certainty of cash payment, and marketing time efficiency.

3.4 Data Analysis Techniques and Statistical Testing

All raw questionnaire data were first tested for instrument quality through a Validity Test (Pearson Product Moment with the criterion $r(\text{calculated}) > r(\text{table})$) and a Reliability Test (Cronbach's Alpha with a threshold value > 0.60). After the instruments passed these tests, the data were processed through a series of Classical Assumption Tests to ensure that the regression model met the Best Linear Unbiased Estimator (BLUE) criteria:

- Normality Test: A non-parametric Kolmogorov-Smirnov statistical test was used, with residuals considered normally distributed when the significance value (Asymp. Sig.) > 0.05 .
- Multicollinearity Test: Conducted by examining the Tolerance value (> 0.10) and Variance Inflation Factor / VIF (< 10.0) to ensure that there was no strong linear correlation among the independent variables.
- Heteroscedasticity Test: Conducted using the Glejser test by regressing the absolute residual values against the independent variables. Heteroscedasticity is considered absent when the significance values of all independent variables are > 0.05 .

Next, multiple linear regression analysis was conducted to formulate the causal relationship model among the variables using the following mathematical formulation:

$$Y = a + b_1X_1 + b_2X_2 + e \quad (2)$$

Where Y is the Marketing Decision, a is the constant value, b_1 and b_2 are the regression coefficients of Crop Yield (X_1) and Selling Price (X_2), respectively, and e is the error term.

Hypothesis testing was conducted using the t-test (partial) to examine the significance of the individual effects of each independent variable on the dependent variable by comparing the $t(\text{calculated})$ value with the $t(\text{table})$ value at a significance level of $\alpha = 0.05$ ($df = n - k - 1 = 99 - 2 - 1 = 96$; $t(\text{table}) = 1.985$). The F-test (simultaneous) was conducted to examine the joint effect of all independent variables ($F(\text{table}) = 3.09$). Finally, the coefficient of determination (R^2) was calculated to measure the extent to which the variability of the dependent variable could be explained by the regression model.

4 Results and Discussion

4.1 Validity and Reliability Testing of the Research Instrument

Before the regression testing was conducted, the Likert-scale research instrument was tested for reliability on 30 respondents in an initial pilot test. The validity test results showed that all

question items for variables X_1 , X_2 , and Y had $r(\text{calculated}) > 0.361$ ($r(\text{table})$ for $n = 30$), and were therefore declared valid. The Cronbach's Alpha reliability test produced values of 0.842 for Crop Yield, 0.876 for Selling Price, and 0.859 for Marketing Decision,

4.2 Evaluation of Classical Assumption Tests of the Regression Model

The results of the Kolmogorov-Smirnov normality test produced an Asymp. Sig. (2-tailed) value of 0.200 ($p > 0.05$), confirming that the model's residuals are perfectly normally distributed. The multicollinearity test showed that variables X_1 and X_2 have Tolerance values of 0.782 (> 0.10) and VIF values of 1.279 (< 10.0), proving the absence of multicollinearity issues. Furthermore, the Glejser heteroskedasticity test yielded significance values of 0.145 (X_1) and 0.210 (X_2), both of which are greater than 0.05 (> 0.05), confirming that the regression model is free from heteroskedasticity problems.

4.3 Multiple Linear Regression Analysis

The results of the multiple linear regression estimation using SPSS are presented in detail in Table 1 below:

Table 1. Multiple Linear Regression Analysis Output

Model / Variable	Unstandardized Coefficient (B)	Std. Error	t-value	Sig.
(Constant)	2,145	0,850	2,524	0,013
Crop Yield (X_1)	0,384	0,062	6,208	0,000
Selling Price (X_2)	0,512	0,063	8,101	0,000

Source: Primary data processed using SPSS 25, 2026

Based on the estimation in Table 1, the resulting multiple linear regression equation is formulated as follows:

$$Y = 2,145 + 0,384 X_1 + 0,512 X_2$$

The mathematical interpretation of the regression equation above is as follows: The constant of 2.145 indicates that if the Crop Yield (X_1) and Selling Price (X_2) variables are constant or equal to 0, the farmers' marketing decision score is positively valued at 2.145 scale points. The regression coefficient $b_1 = 0.384$ indicates that every one-unit increase in the Crop Yield variable will increase the Marketing Decision value by 0.384 units. Meanwhile, the regression coefficient $b_2 = 0.512$ indicates that every one-unit increase in the Selling Price variable will increase the Marketing Decision value by 0.512 units.

4.4 Partial (t-test) and Simultaneous (F-test) Hypothesis Testing

Partial Hypothesis Test (t-test).

The Effect of Crop Yield (X_1) on Marketing Decision (Y): The t-value obtained for the Crop Yield variable is 6.208. This value is much greater than the t-table value of 1.985 ($6.208 > 1.985$), with a significance level of $0.000 < 0.05$. These results demonstrate that the First Hypothesis (H_1) is accepted, meaning that Crop Yield has a positive and significant partial effect on the Marketing Decisions of shallot farmers in Sukoharjo Village.

The Effect of Selling Price (X_2) on Marketing Decision (Y): The t-value obtained for the Selling Price variable is 8.101, exceeding the t-table value of 1.985 ($8.101 > 1.985$), with a significance

level of $0.000 < 0.05$. This demonstrates that the Second Hypothesis (H_2) is accepted, meaning that Selling Price has a positive and significant partial effect on Marketing Decisions. Selling Price is proven to be the predictor with the most dominant contribution.

Simultaneous Hypothesis Test (F-test). The ANOVA results for the simultaneous test produced an F-value of 77.393. This statistic far exceeds the F-table value of 3.09 ($77.393 > 3.09$) at a significance level of $0.000 < 0.05$. This statistical decision confirms that the Third Hypothesis (H_3) is accepted; Crop Yield (X_1) and Selling Price (X_2) simultaneously have a significant effect on the Marketing Decisions (Y) of shallot farmers.

Coefficient of Determination Test (R^2). Based on the data processing results, the Adjusted R Square (R^2) value was 0.609 or 60.9%. This determination value indicates that 60.9% of the variability in changes in the Marketing Decisions of shallot farmers in Sukoharjo Village can be jointly explained by the Crop Yield and Selling Price variables. The remaining 39.1% is influenced by other external risk factors outside the focus of this research model, such as trader partnership networks, transportation infrastructure, and the availability of farmer group institutional facilities.

4.5 Descriptive-Qualitative Analysis: The Phenomenon of Farmers' Psychological Anxiety

The quantitative statistical findings confirming the strong influence of Crop Yield and Selling Price on Marketing Decisions do not stand in isolation. In-depth interviews with farmer respondents in Sukoharjo Village revealed that behind the regression statistics lies a psychological dynamic in the form of anxiety, which plays a crucial role in shaping their marketing decisions when the harvest season arrives.

The psychological anxiety experienced by farmers in Sukoharjo Village originates from three closely interrelated major risk dimensions:

Anxiety Regarding the Physical Vulnerability of the Commodity (Perishability Risk). Freshly harvested shallots have high water content. Without proper hanging drying (curing) or access to modern drying storage facilities (instore drying), shallot bulbs quickly deteriorate and may lose 20–30% of their weight within a matter of days. Fear of physical deterioration of the product creates constant anxiety among farmers.

Anxiety Regarding Price Declines During the Peak Harvest Season (Price Volatility Risk). The peak harvest season is characterized by abundant supply in local markets, which simultaneously reduces farmers' bargaining power. Price information asymmetry between harvest buyers who control wholesale market information and rural farmers makes farmers feel powerless. Fear that prices will fall further the following day than on the current day encourages farmers to sell their harvest immediately.

Anxiety Regarding Financial Burden & Input Debt (Debt Pressure Risk). Most of the capital for shallot cultivation comes from loans from agricultural input stores or informal financing. Debt repayment deadlines that coincide with the harvest period create severe financial pressure. Fear of being unable to repay debts, together with daily cash needs for household consumption, forces farmers to prioritize rapid cash liquidity.

The interaction of these three dimensions of anxiety forms defensive economic behavior among farmers. From the perspective of Prospect Theory, fear of loss (loss aversion) outweighs the desire to obtain a greater profit deviation in the future. Consequently, the majority of farmers in Sukoharjo Village consciously make marketing decisions by selling shallots while still wet in the field through the tebasan system to local middlemen. Although the tebasan system offers a relatively low margin,

this option provides immediate cash certainty, transfers the risk of product spoilage to the harvest buyer, and relieves farmers of prolonged psychological anxiety.

5 Conclusion

Simultaneously and partially, Crop Yield (X_1) and Selling Price (X_2) have a positive and significant effect on the marketing decisions (Y) of shallot farmers in Sukoharjo Village, with Selling Price being the most dominant factor ($t_{\text{calculated}} = 8.101$) and Crop Yield determining strategic flexibility ($t_{\text{calculated}} = 6.208$), together explaining 60.9% of the variation in marketing decisions. Beyond these quantitative factors, psychological anxiety stemming from product perishability, price fluctuations, and debt obligations drives loss-aversion and bounded-rationality behaviors, ultimately forcing farmers into defensive marketing choices like the wet tebasan system to maintain daily cash liquidity.

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