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Income analysis and the contribution of shallot farming to farm household income in Dringu district, Probolinggo regency

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ABSTRACT

Shallots are a horticultural commodity that is a leading product in Dringu District, Probolinggo Regency. Farmers' income does not only come from shallot farming (on farm), but also from side businesses outside of farming (off farm) and outside of the agricultural sector (non-farm), which can help increase household income. The objective of this study was to analyze the income from shallot farming, its contribution to farmers' household income, and the factors that influence shallot farming income in Dringu District, Probolinggo Regency. This study used a quantitative, descriptive survey method. The sampling method used stratified random sampling by land area, with a population of 1908 farmers, and a 5% sample was drawn from each stratum, resulting in 95 farmers. The research data were collected through interviews and field observations. The data analysis of farming income and household income contribution was conducted mathematically. The results of the study show that the income from shallot farming is Rp. 71,602,647 every planting season for a land area of 0.6 hectares, which indicates that there is a profit from farming. Shallot farming accounted for 89.9% of farmers' total household income, indicating that their livelihoods mainly depend on this activity. Collectively and partially, the variables of education level, production, land area, price, farming experience, number of dependents, and side jobs significantly influence shallot farming income. This requires regular training and mentoring to enable farmers to maintain their achieved income.

1. Introduction

The agricultural sector plays an important role as one of the main pillars of the Indonesian economy. Agriculture is recognized as a fundamental sector in national development, particularly in achieving food self-sufficiency and generating employment opportunities. Consequently, increased governmental attention to agricultural commodities is essential for addressing a range of challenges (Saputro & Sariningsih, 2020). Horticultural commodities significantly contribute to the advancement of the agricultural sector, serving not only as sources of food but also promoting health, aesthetics, and environmental conservation. Horticultural crops encompass vegetables, fruits, medicinal plants, and ornamental plants. Shallots constitute an important horticultural commodity in Indonesia due to their economic value, widespread consumption, and contribution to farmers' livelihoods. They are used in lots of dishes and also for traditional medicine. Many farmers in Indonesia grow shallots, which helps the country and local areas. According to Harahap et al (2022), shallots are a key crop in Indonesia, and their uses are varied, from cooking to medicine, and more.

This makes shallots a significant part of Indonesian farming and daily life. Shallots are an economically important commodity in Indonesia, although their market prices are characterized by considerable fluctuations. East Java Province is the largest shallot-producing region in Indonesia, accounting for approximately 24.41% of national production, equivalent to 484,669 tons (Badan Pusat Statistik, 2024a). To put that in perspective, about 24.41% of all the shallots grown in Indonesia come from East Java. What's more, this number is actually up from the previous year, when the province produced 478,393 tons that's an increase of around 0.28%. This growth shows just how important East Java is to keeping the shallot supply stable.

Probolinggo Regency is a major hub for shallot production in East Java, producing a substantial 79,260.4 tons from 9,426 hectares of land (Badan Pusat Statistik, 2024b). This impressive output makes up 16.35% of the total shallot production in East Java. What sets shallots from Probolinggo Regency apart is their unique flavor profile, which is notably spicy, and their low water content. These characteristics make them incredibly durable, whether in storage or during shipping, making them an ideal choice for export. As a result, the demand for shallots from Probolinggo Regency is extremely high in foreign markets, particularly in Thailand. Moreover, other countries like Malaysia and Singapore have also taken notice of the superior quality of these shallots, driving up interest and demand. The distinct qualities of Probolinggo Regency's shallots have positioned them as a sought-after product globally (Lintang & Kurniawan, 2023). Dringu District is famous for being the top shallot producer in Probolinggo Regency. It produces a huge 26,243.5 tons of shallots and has a land area of 2,461 hectares, which is more than other districts (Badan Pusat Statistik Kabupaten Probolinggo, 2024). Most people in Dringu District make a living from farming, and many of them grow shallots. The reason for this is that the area has the right conditions and a good climate for shallot farming. Many farmers are drawn to this area because of its suitable environment. The district's climate and regional characteristics make it an ideal place for shallot cultivation, which is why it is the leading producer of shallots in the regency (Ivanka & Rohman, 2024).

Table 1. Harvest Area, Productivity, and Production of Shallots, 2019-2024

Year	Harvest Area (Ha)	Productivity (Kw/Ha)	Production (Tons)
2019	2.345	97.06	22,761.0
2020	3.349	89.2	29,874.5
2021	2.730	75.7	20,678.9
2022	2.650	73.4	19,585.3
2023	2.461	106.6	26,243.5
2024	2.652	80.4	21,346.5

Source: Badan Pusat Statistik Probolinggo Regency, 2024

Table 1 shows the numbers for production, productivity, and harvest area in Dringu District, Probolinggo Regency, have gone up and down over the years from 2019 to 2024. The data indicate considerable fluctuations in shallot production, productivity, and harvested area during 2019–2024. These variations may directly influence farmers' income through changes in output and marketable production (Safitri et al., 2021). A decline in shallot production can be influenced by unfavorable weather conditions such as high rainfall intensity or drought, pest attacks, and high production costs (Wahana et al., 2024). A bumper harvest in shallot-producing areas also causes shallot prices to drop dramatically, which affects farmers' income. Shallots are an agricultural commodity with high economic value, so farmers are interested in cultivating them because they offer excellent opportunities to increase their income. The income received is expected to support the fulfillment of various household needs, both primary needs such as food and education, as well as to improve their welfare. The income of farming families in Dringu District, in the agricultural sector (farmers and farm workers), is 55%, higher than the 45% in the non-agricultural sector, where the area is primarily dominated by rice fields. Farmers generally do not depend solely on farming for their primary income, they also engage in side businesses to supplement their income. This encourages farming families to take on jobs outside farming (off-farm) and in the agricultural sector (non-farm) to increase their household income (Utomo et al., 2024).

Farmers can reduce their dependence on shallot farming, especially when prices fluctuate. Government policies that do not set fixed price standards, both during the harvest season and out of season, often lead to unstable shallot prices. When shallot production is high and selling prices are good, farmers can earn more money. But if production goes down and prices are low, farmers'

incomes will also drop, and they might even lose money (Dahlianawati et al., 2020). This is what's been happening to shallot farmers lately their incomes have been decreasing because they're producing less, harvesting less land, and dealing with unpredictable price changes. How much money farmers make from shallots can affect how much shallot farming contributes to their overall household income.

According to Soekartawi et al (1986), found that how much is produced per hectare, the size of the farm, and the age of the person in charge of the household are all important. Aulina et al (2021) found that the size of the land, the age of the farmer, their education level, the price of rubber, how long they've been farming rubber, and whether they have other jobs all play a role. But what's really interesting is that the price of rubber, how long they've been farming it, and having other jobs are the things that really make a difference. The age of the farmer, their education level, and the size of their land don't seem to have as much of an impact. When it comes to onion farming in Dringu District, the things that might affect income include how educated the farmer is, how many onions they produce, the size of their land, the price of onions, how much experience they have, how many people they have to support, and whether they have other jobs. The aim of study to analyze how much money farmers make from growing shallots, how much shallot farming contributes to a family's overall income, and what things affect how much money farmers can make from shallots in the Dringu District. Shallots are a big deal in this area, but not many people have studied how they impact the local economy. This study breaks down the different ways farmers make money, both from their farms and from other jobs, to get a clear picture of where their income comes from. To keep making a good income, farmers need regular training and guidance. The main goals of this study are to figure out (1) how much money farmers make from shallots, (2) how much of a family's income comes from shallot farming, and (3) what factors make a difference in how much money farmers can make from shallots in the Dringu District, Probolinggo Regency.

2. Method

The study was conducted in Dringu District, Probolinggo Regency. This area was chosen because it's a major hub for shallot production, with many residents making a living from farming shallots. To conduct the research, a quantitative approach was used, focusing on describing the situation through a survey. The team selected participants using a stratified random sampling method, grouping farmers by the size of their land. There were three categories: small plots of 0.20-0.80 hectares, medium plots of 0.81-1.40 hectares, and larger plots of 1.41-2.00 hectares. Out of 1908 shallot farmers in the area, 95 were chosen for the study, with 71 from the small plot group, 17 from the medium group, and 7 from the large plot group. The data collected from april to june 2025. The selection was random to ensure fairness. Data was collected through interviews and observations, using a questionnaire to gather primary information. All the data collected was organized into tables, calculated, and then analyzed to understand the income and contributions of these farmers. This study aims to analyze shallot farming income, its contribution to household income, and the factors influencing farmers' income. Therefore, the study used numbers to analyze the data and figure out what factors affect how much money farmers can make from shallots in Dringu District, Probolinggo Regency. They also used a special kind of math called multiple linear regression to understand what influences shallot farming income.

The analysis of shallot farming is conducted by calculating total production costs, receipts, and income. The total costs include everything spent on the farm during one season, from fixed costs like equipment and land, to variable costs like seeds and labor. On the other hand, farming receipts are calculated by multiplying how much shallot is produced by how much it sells for. Farming receipts are obtained by multiplying the production quantity by the selling price. Meanwhile, net income or profit is the difference between total receipts and total production costs incurred (Soekartawi, 2006). The equation as follows:

$$TC = FC + VC \quad (1)$$

$$TR = P\ x\ Q \quad (2)$$

$$I = TR - TC \quad (3)$$

Where TC is the total production costs (rupiah); FC is the fixed costs (rupiah); VC is the variable costs (rupiah); TR is the total revenue (rupiah); P is the price (rupiah/kg); Q is the quantity of shallot and I is the income (rupiah). Contribution analysis is used to measure the extent to which shallot farming contributes to farmers' household income (Handayani & Artini, 2009). This analysis is used to answer questions about the extent of farmers' households' economic dependence on shallot farming activities.

$$I_t = I_1 + I_2 + I_3 \quad (4)$$

Where I_t is the total income from farmer household; I_1 is the shallot farming income; I_2 is the other non-farming income and I_3 is the non-agricultural income. Farming contribution is calculated as a percentage by dividing farm income by total household income and multiplying by 100 percent. To determine the extent of the role of shallot farming in the total income of farming households, a contribution calculation was used with the following formula:

$$contribution\ (\%) = \frac{shallot\ farming\ income}{total\ farmer\ household\ income} x100\% \quad (5)$$

Based on Tohir (1991) are the following the decision, if ≥ 50%, the income contribution is considered high and < 50%, the income contribution is considered low. To understand how different factors affect the income of shallot farmers, researchers use a statistical method called multiple linear regression. When using multiple linear regression, there are several statistical tests that are important. These include the R2 test, which shows how well the model explains the data, the F test, which checks if all the factors together have a significant effect, and the t-test, which looks at the effect of each factor individually. By using these tests, researchers can get a clearer picture of what factors are most important for shallot farming income. The following is the multiple linear regression equation model used in this study:

$$inc_i = \beta_0 + \beta_1 educ_i + \beta_2 product_i + \beta_3 land_i + \beta_4 price_i + \beta_5 exp_i + \beta_6 fam_i + \beta_7 side_i + \varepsilon_i \quad (5)$$

Where inc_i is the shallot farming income; $educ_i$ is the farmer education level (years); $land_i$ is the land area (Ha); $price_i$ is the shallot price (rupiah); exp_i is the farming experiences (years); dep_i is the number of family; $side_i$ is the income from non-agricultural sectors; β_0 is the constant; $\beta_1 - \beta_7$ is the coefficient of independent variables; and ε_i is the error term.

3. Results and Discussion

3.1. Analysis of Shallot Farming Income

The cost of farming is a major factor that affects how well farms do and how much they produce. All the money that farmers spend to run their farms and get the best results possible is included in these costs (Nani et al., 2022). For farmers growing shallots in Dringu District, these costs can really impact how much they harvest. When farming costs are too high, it can cut into the farmers' earnings. On the other hand, if farming costs can be kept under control, it can help farmers earn more. This balance is crucial for the success of farming operations. Costs in farming activities include fixed costs and variable costs. Fixed costs are expenses that do not change with production level and must be incurred regardless of output. These costs remain constant over a specific period, even when production levels increase or decrease, making them an essential component of farming expenses (Ibrahim et al., 2021). In agricultural activities, fixed costs are generally associated with long-term investments and obligations that farmers cannot avoid in the short run. In this study, fixed costs include land use, equipment depreciation, and irrigation fees, as shown in the table below:

Table 2. Fixed Cost in Shallot Farming

No.	Use of Fixed Costs	Average (Rp)	Percentage (%)
1.	Land	7.084.953	83
2.	Equipment Depreciation	1.031.795	12
3.	Irrigation Fees	442.105	5
	Total	8.558.853	100

Source: data processed

Table 2 shows the average total fixed costs incurred by farmers for one planting season is Rp. 8.558.853,00 consisting of farmers who own their own land and those who rent land. Farmers with land areas above 1 hectare usually own their own land, while farmers who cultivate small areas generally rent, so many shallot farmers rent their land to other farmers. Based on the average land cost for 0.6 hectares for one planting season, the cost is Rp. 7.084.953,00 or 83% of the total fixed costs. Equipment depreciation is the cost incurred from the procurement of shallot production equipment that is used over a long period of time. The equipment used by farmers in shallot farming consists of hoes, sprayers, and mosquito nets. The use of this equipment does not entirely come from farmers, as some employ workers who tend shallot plants with their own equipment. The average equipment depreciation cost for one planting season is Rp. 1.031.795,00 or 12% of the total fixed costs. This cost consists of the depreciation of hoes (Rp. 32.450,00), sprayers (Rp. 131.041,00), and mosquito nets (Rp. 865.497,00), each with an economic life of 3 years. Irrigation fees are expenses incurred by farmers to finance the flow of water from the source to agricultural land (Ramadhan et al., 2021; Andini et al., 2025). The amount of irrigation fees incurred is Rp. 442.105,00 every planting season, or 5% of the total fixed costs. This irrigation system supplies and regulates water to support shallot production by channeling water from the source to the farmers' fields in a technically and systematically efficient manner.

Variable costs in this study include seeds, fertilizers, pesticides, labor, and transportation. These costs are substantial, because they has critical how well a farm does. This is especially true in agricultural practices, where variable costs can really add up and affect how profitable the whole operation is. By understanding and managing these costs, farmers can make their farming activities more efficient and profitable. These costs have a significant impact on production, whereby the higher the production of shallots, the greater the variable costs incurred, and vice versa (Srihidayati & Firdamayanti, 2024).

Table 3. Variable Cost in Shallot Farming

No.	Use of Variable Costs	Average (Rp)	Percentage (%)
1.	Seeds	23.134.737	65
2.	Fertilizer	4.245.395	12
3.	Pesticides	1.853.263	5
4.	Labor	5.652.474	16
5.	Transportation	936.842	2
	Total	35.822.711	100

Source: data processed

Table 3 shows the average total variable cost for one onion planting season is Rp. 35.822.711,00. The seeds used in this study were the Biru Lancor variety, planted by 60 farmers, and the Batu Ijo variety, used by 35 farmers. The average total requirement of respondents for 0.6 hectares of land is 514 kg of seeds, so the total cost incurred is Rp. 23.134.737,00 or 65% of the total variable costs. In shallot farming, the number of seeds used depends on the size of the land owned by the farmer. Larger areas of land require more seeds, while smaller areas require fewer. Shallot farmers use several types of fertilizer, including TSP, ZA, NPK (Phonska), and KCl. Farmers are accustomed to using these types of fertilizer, so their use is more practical, and the results are sufficient to support shallot bulb growth and development. Based on the average cost calculation for each fertilizer with an average land area of 0.6 hectares, the costs are as follows: TSP fertilizer at Rp. 585.342,00 ZA at Rp. 1.192.716,00 NPK fertilizer at Rp. 1.319.737,00 and KCl at Rp. 1.147.600,00 for one planting season, with a total fertilizer cost of Rp. 4.245.395,00 or 12% of the total variable costs. The use of appropriate fertilizers plays an important role in improving soil conditions and plant growth, thereby increasing shallot productivity and farmer income.

The pesticides used by shallot farmers are herbicides, insecticides, and fungicides. Each farmer uses different brands, doses, and prices of pesticides based on the conditions of weed, pest, and disease infestations in their shallot fields. Based on the results of calculations of the costs of using pesticides, such as herbicides, amounting to Rp. 333.211,00 fungicides amounting to Rp. 744.368,00 and insecticides amounting to Rp. 775.684,00 the total cost of pesticides used by farmers in one planting season is Rp. 1.853.263,00 or 5% of the total variable costs. fertilizing, spraying, watering, harvesting, and post-harvest (sorting and tying). The labor used comes from the farmers' own family labor (TKDK) and labor outside the family (TKDK). Farmers use family labor to reduce farming expenses,

especially when they have limited land. The labor costs incurred by farmers are calculated based on the needs in one planting season, with an average total labor cost of Rp. 5.652.474,00 or 16% of the total variable costs. The cost of each laborer's wage includes land cultivation at Rp. 631.842,00 planting at Rp. 836.316,00 weeding at Rp. 151.842,00 grass cutting at Rp. 623.368,00 fertilization at Rp. 106.421,00 spraying at Rp. 363.158,00 watering at Rp. 251.632,00 harvesting at Rp. 1.491.053,00 and post-harvesting at Rp. 1.196.842,00. Transportation in this study was used to transport shallots from the field to the warehouse and to the market. The cost of transporting shallots was around Rp. 936.842,00 each season, which is about 2% of the variable costs. When more shallots are harvested, it costs more to transport them, and the distance they need to travel also affects the cost. So, if there's a bigger harvest, the transportation costs go up. Also, making sure the transportation is done efficiently is important to keep the shallots in good condition while they're being delivered, which helps them sell for a good price when they get to the market.

Total production cost comprises both fixed and variable costs, which together represent the overall expenditure required for shallot farming activities (Puspitasari, 2020). These production costs are critical in determining farmers' income levels. To achieve optimal income, it is essential for farmers to manage their expenditures effectively. Covering these costs ensures that the farming process operates smoothly and sustainably, while also providing a basis for evaluating efficiency and profitability in agricultural production.

Table 4. The Average Cost of Shallot Farming

No.	Cost Components	Average Cost	
		Value (Rp)	Percentage (%)
1.	Fixed Cost	8.558.853	19
2.	Variable Cost	35.822.711	81
	Total	44.381.564	100

Source: data processed

Table 4 shows the average total cost of shallot farming for one planting season is Rp. 44.381.564,00. This amount includes fixed costs of Rp. 8.558.853,00 (19%) and variable costs of Rp. 35.822.711,00 (81%). The predominance of variable costs indicates that the majority of farm expenditures are not fixed. This suggests that the success of shallot farming is closely linked to the efficient management of variable costs, as effective control of these expenses can enhance farmers' income. Revenue is calculated by multiplying production volume by the selling price. The selling price of the product greatly determines shallot farmers' income: an increase in price increases income, while a price decrease can cause losses (Listiana & Subhan, 2024). With prices following market mechanisms, farmers can increase their income by increasing production. Farm income is calculated by subtracting production sales revenue from total cultivation costs (Marsaoly et al., 2020). The following are the results of the calculation of revenue and income in one planting season:

Table 5. Average Income and Revenue from Shallot Farming

Description	Average
Land Area (Ha)	0.6
Total Cost (Rp)	44.381.564
Revenue	
1. Production (Kg)	3.698
2. Price (Rp)	32.000
Total Revenue (Rp)	115.984.211
Total Income (Rp)	71.602.647

Source: data processed

Table 5 shows that the average net income from shallot farming in Dringu District was IDR 71,602,647 per planting season for an average cultivated area of 0.6 hectares. This calculation is based on an average shallot production of 3,698 kg/MT and an average selling price of Rp. 32,000/kg. This condition shows that the income from shallot farming depends on production levels and market prices. If production increases and market prices remain stable, farmers' income will also increase, and vice versa. Given that the total production costs incurred by shallot farmers in one season, farmers spent around Rp. 44.381.564,00 on production costs, but in the next season, they made a net income of Rp. 71.60.647,00. This is similar to what another study by Sakinah et al (2021) shallot farming in a village

in Balla Village, Baraka District, Enrekang Regency and found that farmers made an average of Rp. 108.658.223,00 per hectare in the second season. So, if a farmer has 0.6 hectares of land, they can make around Rp. 65.194.934,00. However, shallot farming in Dringu District, Probolinggo Regency, seems to be even more profitable than in the previous study. But there are some challenges that can affect how much money farmers make, like adverse weather conditions, pests, and high production costs. Even with these challenges, farmers are still making more money than they're spending, which means shallot farming is a economically viable. This is important because, as Janna (2021) studies stated the money farmers make from farming helps them take care of their daily needs and keeps the farming business going.

3.2. Contribution of Farm Income to the Household Income of Shallot Farmers

Contribution is the percentage of a job's contribution to total household income. In general, farmers' income sources can be grouped into three sub-sectors: on-farm and off-farm activities, which cover activities in the agricultural sector, and non-farm activities, which are outside the agricultural sector (Mudatsir, 2021). Farmers do not depend solely on agricultural yields, they also fill their free time outside the planting season or when it is not harvest season by taking on various side jobs. In this study, the farmers are divided into 37 with jobs outside agriculture, 29 with non-agricultural jobs, and 29 without side jobs. Off-farm income is income earned from the agricultural sector, but not directly from shallot farming activities. In this study, farmers' side jobs to earn off-farm income include farm laborers, other farming activities (rice, corn, chili), traders (vegetables, fruits, shallots), livestock farmers (catfish and chickens), and fishermen. Meanwhile, non-farm income is income earned from activities outside the agricultural sector. The side jobs of shallot farmers to earn non-farm income include serving as village officials, entrepreneurs, construction workers, market vendors, private employees, online motorcycle taxi drivers, employees of building supply stores, and Quran teachers. Household income is the total income earned by all family members and serves to meet the needs of individuals and the family as a whole.

Table 6. Average Income and Revenue from Shallot Farming

No.	Source of Income	Average Income (Rp)	Percentage (%)
1.	Shallot Farming	71.602.647	89.9
2.	Other Farming Activities	4.797.737	6.0
3.	Non-Agricultural Activities	3.252.632	4.1
	Total	79.653.016	100

Source: data processed

Table 6 shows shallot farming contributes the most to the income of farming households in Dringu District, Probolinggo Regency, amounting to Rp. 71.602.647,00 in the second planting season, or contributing 89.9% of the total income. This study was conducted in the second planting season, when shallot prices fluctuated significantly. This condition increased income from shallot farming in Dringu District, resulting in relatively large on-farm contributions. The results of research conducted by Sakinah et al (2021) show that farming income in the second planting season was Rp. 65.194.934,00 and the contribution of shallots to household income in Baraka District, Enrekang Regency reached 80.35%, which is classified as high. The contribution from shallot farming in Dringu District, Probolinggo Regency, was greater. This can be seen from the high contribution percentage of 89.9%, which reflects that shallot farming contributes significantly to the income of farming households or tends to come from shallot farming income (on farm). Most of the daily needs of farming households can be met from the proceeds of shallot farming. These results are in line with the findings of a study by Rashid et al (2021), which states that horticultural commodities such as shallots and onions are a major source of income for smallholder households in developing countries because they have high economic value and a relatively fast planting cycle.

Meanwhile, activities outside of shallot farming (off-farm) in one planting season (3 months) had an average income of Rp. 4.797.737,00 or 6%, and non-agricultural income (non-farm) was the smallest, at Rp. 3.252.632,00 or contributed 4.1%. Higher income from non-agricultural sources encourages increased participation, which suggests a cycle of economic diversification (Yuliati et al., 2025). This finding demonstrates that the economies of farming households remain highly dependent on shallot farming as the primary income source. Other activities, whether agricultural or non-agricultural, function primarily as supplementary income sources. As noted by Rasul et al (2020), on-

farm income is a key determinant of the economic resilience of farming households in rural Southeast Asia.

3.3. Factors Affecting Shallot Farming Income

Table 7 shows the results of R-squared (coefficient of determination) is 0.994, means 99.4% of the variation in shallot farming income is explained by these variables. The remaining 0.6% is attributed to other independent variables not considered in this study. The high R-square value demonstrates that the regression model effectively explains the relationship between the independent and dependent variables. The level of education variable has a significance value of 0.034 < 0.05 and a t-value of 2.150 > 1.988, so Ho is rejected, and Ha is accepted, meaning that the education variable has a significant effect on shallot farming income. This shows that the length of farmers' formal education directly determines their income. Shallot farmers in Dringu Subdistrict, Probolinggo Regency generally have formal education at the senior high school level. Farmers who have pursued higher education have proven quicker to adopt agricultural innovations than those with only a basic education, enabling them to earn higher incomes. The active role of extension workers is needed to provide intensive guidance to shallot farmers so that shallot farming in the subdistrict can continue to develop. Education plays an important role in shaping how farmers think and how open they are to new technology. Farmers with higher education levels often have more advanced ways of thinking, which helps them improve their farming methods. According to Dahmiati et al (2023) founds that education affects how farmers view agricultural technology and, in turn, influences their productivity and income.

Table 7. The Result of Multiple Linier Regression

Variable	Coefficient
C	-173981212.92*** (-10.341)
Educ	1019934.84** (2.150)
Product	27352.41*** (22.881)
Land	35045793.02* (2.113)
Price	4060.64** (8.263)
Exp	316279.27** (2.741)
Fam	2175737.20** (2.960)
Side	0.143** (2.214)

Source: data processed

The shallot production has t-value of 22.881 > 1.988, so Ho is rejected, and Ha is accepted, indicating that the production variable has a positive and significant effect on shallot farming income. The higher the production, the greater the income farmers earn. According to farmer respondents in Dringu District, an increase in shallot production directly provides additional income for farmer households, with the greater the harvest, the higher the income obtained, without being overly dependent on other sources of income. These results are in line with the research by Muis et al (2023), which explains that production factors, including production volume, have a direct and significant impact on shallot farmers' income. In addition, research results in Woha District, Bima Regency show that production is one of the main variables that partially affects Shallot farming income, along with land area, capital, and price (Irawan et al., 2023; Pasandi & Subardin, 2025). Table 7 shows the land area has t-value of 2.113 > 1.988, so Ho is rejected, and Ha is accepted, indicating that land area has a positive and significant effect on shallot farming income. The more land farmers own, the greater the opportunity to produce high yields, thereby increasing their income. The majority of shallot farmers in Dringu Subdistrict have between 0.2 and 0.6 hectares of cultivated land, indicating that most are small-scale farmers. However, owning more land provides advantages in terms of business scale, as it can reduce per-unit production costs and increase the volume of harvested produce sold. These results are in line with the research by Irawan et al (2023) in Bima Regency, which shows that

land area is one of the significant variables affecting shallot farmers' income, along with capital, production, and price.

The price of shallot has -value of 8.263 > 1.988, so Ho is rejected, and Ha is accepted, indicating that price has a positive and significant effect on shallot farming income. An increase in shallot prices will significantly boost farm income. The fluctuating price of shallots demonstrates that the price variable has a substantial impact on shallot farming income in Dringu District. Increases in price lead to significant rises in farmers' income, while sharp declines in price result in reduced income. The farmer experiences has significant effect to income of shallot farming means that engagement in shallot farming enhances farmers' skills, management capabilities, and resource utilization, resulting in increased income. In Dringu District, farming experience among shallot farmers varies, with the largest group comprising individuals aged 20 to 26 years. Most respondents rely on direct practical field experience and local knowledge transmitted across generations to manage their farms. Farmers with extensive experience in shallot cultivation are better equipped to address technical challenges such as pest management, weather variability, and cost control, as well as to select optimal varieties and planting patterns. These competencies contribute to greater efficiency, higher production yields, and increased farm income.

Table 7 shows the number of family has t-value of 2.960 > 1.988, so Ho is rejected, and Ha is accepted, indicating that the number of family dependents has a significant effect on shallot farming income. The more family members there are to support, the greater the incentive for farmers to improve their farming and production to increase their income and meet household needs. The majority of shallot farmers in Dringu Subdistrict have 4-5 dependents, so families with more dependents tend to maximize the potential of shallot farming as their primary source of livelihood. Zebua (2018) argued that the number of family dependents significantly affects farmers' income.. The side job variables has t-value of 2.214 > 1.988, so Ho is rejected, and Ha is accepted, indicating that side jobs have a significant effect on shallot farming income. Side jobs can be an additional source of capital in financing production inputs such as seeds, fertilizers, pesticides, and labor, thereby indirectly increasing farmers' capacity to manage shallot farming and resulting in increased income. Additionally, farmer respondents identified side jobs outside the agricultural sector as an alternative means of raising capital to finance shallot production. According to Zakaria et al (2020) reported side jobs enable farmers to meet household economic needs and support the sustainability of their farming operations.

4. Conclusion

The agricultural sector plays an important role as one of the main pillars of the Indonesian economy. Agriculture is recognized as a fundamental sector in national development, particularly in achieving food self-sufficiency and generating employment opportunities. Shallots play a big role in farming and are important for many people in Indonesia. They are used in lots of dishes and also for traditional medicine. Many farmers in Indonesia grow shallots, which helps the country and local areas. This study examines shallot farming contributes to a family's overall income and what things affect how much money farmers can make from shallots in the Dringu district. The authors selected participants using a *stratified random sampling* method, grouping farmers by the size of their land. There were three categories: small plots of 0.20-0.80 hectares, medium plots of 0.81-1.40 hectares, and larger plots of 1.41-2.00 hectares. Out of 1,908 shallot farmers in the area, 95 were chosen for the study, with 71 from the small plot group, 17 from the medium group, and 7 from the large plot group. The result shows the shallot farming business in Dringu District, Probolinggo Regency, had an average income of Rp. 71.602.647,00 every planting season, obtained from farming revenue of Rp. 115.984.211,00 every planting season, and total farming costs of Rp. 44.381.564,00 every planting season with an average land area of 0.6 Ha. The contribution of shallot farming to the income of farmer households in Dringu District, Probolinggo Regency, was 89.9%, with high income from farming. The total income of these farming households was Rp. 79.653.016,00 which came from three sectors: namely, on-farm income of Rp. 71.602.647,00 off-farm income of Rp. 4.797.737,00 and non-farm income of Rp. 3.252.632,00. The implication of study, the shallot farmers to maintain facilities and infrastructure in their farming businesses, and not only focus on increasing production, but also maintain the sustainability of their farming businesses by managing inputs efficiently, applying appropriate agricultural technology, and diversifying their shallot farming businesses. In addition, farmers need to continue improving their capacity through extension and training and expand their

marketing networks, both through farmer groups and digital platforms. Thus, farmers are expected to maintain the income they have achieved to sustain the shallot farming business in Dringu District.

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