

The Contribution Of Agricultural Extension Workers To Honey Citrus Farming Income In Improving Regional Superior Products

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Abstract

The purpose of this study is to analyze the extent of the role of agricultural extension officers in increasing the income of Siamese orange farmers. The research was conducted in Dau Subdistrict, Malang Regency, involving 35 respondents of chayote farmers who are members of farmer groups. The study used a descriptive quantitative approach and data collection was conducted through questionnaires, interviews, and observations. The three main roles of extension agents analyzed were as facilitators, motivators, and dynamists. The results showed that the contribution of agricultural extension workers was high, with a contribution score as a facilitator of 61.02%, as a motivator of 62.85%, and as a dynamizer of 64.68%, all of which fell into the category of "contributing." Extension agents are proven to play a role in technical training, providing motivation, and encouraging farmers to be more active and innovative in developing their businesses. In terms of economics, siamese orange farming generates a net income of Rp54,759,259 per hectare with an R/C ratio of 1.652, which means that the business is financially viable even though profits are relatively modest.

Key Words: Dynamizer, Facilitator, Motivator, Agricultural Extension, Citrus Farmers, Income, Farming

INTRODUCTION

Siamese orange (*Citrus sinensis*) in Indonesia is one of the horticultural products that has great potential for domestic and international markets. Siamese oranges are one of the horticultural products with substantial economic value and export potential (Indrasti &

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Markus Rawung, 2021). Boba from previous research obtained the best formulation, namely the ratio of tapioca flour: tilapia meal: seaweed porridge = 37.5: 12.5: 50 (Aisyah Siti, et.al. 2024) These oranges are increasingly in demand in local and foreign markets due to their distinctive sweet flavor and crisp flesh. The yield and quality of siamese oranges need to be improved through effective and efficient farm management to increase farmers' income. The 2023 Census of Agriculture (ST2023) recorded a decrease in Agricultural Households (RTUP) in the Sragen Regency (Wardani delvira Citra, et.al. 2025). socio-economic, personal and marketing mix on consumer perceptions (Ottu Mellany Anggelina, et.al. 2024)

Agricultural extension officers play an important role in ensuring the best farm management. Agricultural extension workers play an important role in assisting farmers by providing knowledge, instruction, and direction, especially in the areas of crop technology, business management, marketing, and sustainable resource utilization. Data analysis was carried out using the Structural Equation Model (SEM) model with the Partial Least Square (PLS) approach. (Permata Ni Putu Ayu Sinta, et.al. 2024) The goal of agricultural extension services is to help farmers become more knowledgeable about better production techniques, how to utilize the right inputs, and how to adopt environmentally friendly farming systems. Despite their importance, agricultural extension officers still face a number of challenges in optimizing their capacity to increase tangerine farmers' income. The results of the SITOREM analysis show that based on the order of priority improvement, the indicators of the variables that need to be improved (Farid Ahmad, et.al. 2024) Various issues, including limited adoption of new technologies by farmers, disagreements between stakeholders and financial limitations, make it difficult to improve the efficiency of tangerine cultivation. multiple linear regression analysis shows that good financial performance and large company size encourage companies to be more transparent in reporting CSR activities (Adriani ade, et.al. 2024)

To encourage productivity and innovation and improve the welfare of farmers, fishermen and forestry sector actors, Indonesia is constantly adjusting its agricultural, fisheries and forestry extension systems. In addition to technology transfer, the focus of extension now includes aspects of sustainable and environmentally friendly natural resource management. The study revealed that Command Agriculture significantly improved access to critical agricultural inputs such as seeds, fertilizers, and technical support, which led to enhanced crop yields and increased income levels for many A2 women farmers. (Noube Collen, et.al. 2024) Extension activities are carried out to improve the ability of important actors and business actors in various fields through cross-sector cooperation between the government, educational institutions, and community organizations.

Innovation and technology-based learning systems are also continuously strengthened to accelerate the adoption of modern agricultural practices. To ensure its success, extension is overseen by technical agencies tasked with developing policies and implementing field development projects. The aim of this plan is to improve the competitiveness of these crucial sectors and promote the expansion of the national economy.

According to Hasibuan *et.al.* (2024), the majority of Indonesia's population lives in rural areas, where agriculture plays a large role in the country's economy. In Dau District of Malang Regency, an area that is largely dependent on agriculture for its livelihood, produces tangerines as one of its main products. The relatively high price and stable market demand indicate its potential economic value. However, in reality, many farmers still struggle to develop their farms, ranging from a lack of understanding of modern farming practices to constraints in marketing their products and managing the harvest efficiently. In this situation, agricultural extension officers are crucial as they serve as a bridge to increase farmers' capacity by offering agricultural data and technical assistance. However, there are still few studies conducted on the real influence of agricultural extension workers on tangerine farmers' income. Therefore, the objective of this study was to find out how agricultural extension agents help honey tangerine farmers increase their income and provide tactical recommendations for developing more effective extension programs.

METHODS OF RESEARCH

This study used a census approach, and the sample consisted of all 35 members of the population. The questionnaire serves as the main tool for data collection. This method ensures that every member of the population is directly represented during the research. When the same thing is measured again, a reliable instrument will give consistent results. By looking at the Cronbach's Alpha value, testing can be done using the SPSS 26 program on Windows 10 to assess the level of reliability. An instrument is considered reliable if its Cronbach's Alpha value is higher than 0.60, according to Rejivas *et.al.* (2023).

Table 1. Composition of Likert Scale Measures

No	Symbol	Description	Score
1	STS	Strongly Disagree	1
2	TS	Disagree	2
3	N	Neutral	3
4	S	Agree	4
5	SS	Strongly Agree	5

Table 2. Intervals of Agricultural Extension's contribution to Siamese citrus farming enterprise income

No	Interval	Criteria
1	0% - 19,99%	Very Not Contributing
2	20% - 39,99%	Not Contributing
3	40% - 59,99%	Moderately Contributed
4	60% - 79,99%	Contributing
5	80% - 100%	Very Contributing

Source (Arsyad *et al.*, 2023)

The variables used in this study include: X_1 = Extension Officer as Facilitator. Agricultural extension officers play a crucial role as facilitators by providing facilities to improve their farming business and providing solutions and smoothness in the process of counseling, teaching, and learning. X_2 = Extension Worker as Motivator. Extension officers must be able to build positive relationships with farmers to support them in their role as motivators.; X_3 = Extension Agent as a Dynamic Agent

1. Farming Costs

There are two types of costs associated with farming: fixed costs and variable costs. Fixed costs, such as the price of farm equipment, are costs that do not change much even if the volume of production changes. On the other hand, costs such as labor, fertilizer, and pesticides are examples of variable costs that depend on the amount of production.

In Saadudin et.al. (2017), Suratiyah (2015) stated that the following formula should be used to add up fixed costs (FC) and variable costs to determine total costs Formula: $TC=FC+VC$

Description:TC = Total Cost (Fixed Cost); FC = Fixed Cost (Total fixed cost); VC = Variable Cost

2. Analysis of Farm Income and Profit

The amount of product sold multiplied by the selling price per unit is known as revenue. Here is one way to express it: $TR=Py.Y$ Description: TR = Total Revenue; Py = Product Price; Y = Product Quantit Suratiyah (2015) states that income is calculated by the following formula, namely the difference between revenue (TR) and total costs (TC): $I=TR-TC$ Description: π = profit of citrus farming; TFC = Fixed Cost; TVC= Variable Cost;TR = Gross Profit; P= Price of chayote; Q= Siamese orange production ; Suratiyah (2015) defines R/C as the ratio between total costs and profits.

$$\frac{R = \text{Total Revenue (TR)}}{C \text{ Total Cost (TC)}}$$

Where:

Revenue = The amount of revenue earned; Cost = The amount of costs incurred There are three criteria in the calculation, namely: If $R / C > 1$ means that the farm is profitable; If $R / C = 1$ means that the farm breaks even; If $R / C < 1$ means the farm is losing money.

RESULTS AND DISCUSSION

The purpose of the validity test is to determine how well the measuring instrument can capture all ideas about the symptoms or events that need to be assessed. A questionnaire is considered valid if the statements it contains can reveal whatever the questionnaire is measuring. The validity test was conducted to determine the validity of the questionnaire. A statement is considered true if the calculated r value (correlation of total correlated items) is higher than the r table value (at 10% significance level). This is determined by comparing the two values. The following table displays the results of the validity test:

Table 3. Validity Test Results

Variable	Question Indicator	r-count	r-table	Description
Contribution of agricultural extension workers as facilitators (X1)	X1.1	0,921	0,334	Valid
	X1.2	0,929	0,334	Valid
	X1.3	0,939	0,334	Valid
	X1.4	0,925	0,334	Valid
Contribution of agricultural extension workers as motivators (X2)	X2.1	0,870	0,334	Valid
	X2.2	0,816	0,334	Valid
	X2.3	0,860	0,334	Valid
	X2.4	0,817	0,334	Valid
Contribution of agricultural extension workers as dynamizers (X3)	X3.1	0,928	0,334	Valid
	X3.2	0,930	0,334	Valid
	X3.3	0,955	0,334	Valid
	X3.4	0,908	0,334	Valid

Source: Primary data processed, 2025 (spss 26)

Table 3 shows that each indicator used to measure the variables in this study has a correlation coefficient (r) value for each statement item in the research instrument used to

measure the role of agricultural extension workers as motivators, facilitators, and dynamists significantly higher than the r table value (0.334) (r table value for $n = 35$). This indicates that each statement item is valid and the research instrument is suitable for use in collecting accurate and reliable research data. Therefore, all indicators of the research variables are valid because the research instruments used meet the established validity requirements.

3. Reliability Testing Results of Agricultural Extension Contributions as Facilitators, Motivators and Dynamizers.

One method to evaluate a questionnaire that serves as an indication of variables is the reliability test. If the respondent's answer to the questionnaire remains constant or stable over time, the questionnaire is considered reliable. SPSS version 26 for Windows 10 can also be used for the reliability test if the Cronbach's Alpha score is higher than 0.60.

Table 4. Reliability Test Results

Variable	Cronbach's Alpha	Description
Contribution of agricultural extension workers as Facilitator X_1	0,946	Reliable
Contribution of agricultural extension workers as Motivator X_2	0,862	Reliable
Contribution of agricultural extension workers Agriculture as Dynamizer X_3	0,948	Reliable

Source: Primary data processed, 2025

The results of the reliability test of this study. These results show that all the tools used to measure the contribution of agricultural extension workers as motivators, facilitators and dynamic agents have a very high level of consistency. All three variables have Cronbach's Alpha values that are much higher than the generally accepted minimum reliability requirement of ≥ 0.70 . The Cronbach's Alpha values for the facilitator and dynamic agent, two of the three variables, were actually above 0.90, indicating exceptional reliability. Therefore, it can be assumed that this study tool will provide accurate and consistent data when assessing the role of agricultural extension agents. These findings support the idea that the tool is suitable and trustworthy for further research.

4. Contribution of Agricultural Extension Agents as Facilitators, Motivators and Dynamizers for Siamese Orange Farming

For honey tangerine farming to thrive and succeed, agricultural extension agents play an important role as facilitators. As "agents of change", agricultural extension officers help farmers gain information, skills, and access to resources and technologies needed for tangerine production. They are responsible for organizing training, providing technical advice, and helping farmers overcome challenges that arise during and after the harvest process (Dea Taufik *et.al.*, 2024). In addition, extension workers help farmers learn new technologies in various areas, including post-harvest management, pest and disease control, fertilization methods, and seed selection. Thus, the facilitator function of extension improves farmers' ability to manage their farms independently and sustainably while increasing the productivity and quality of tangerine crops (Wa Ode Putri Nabilah *et.al.*, 2024).

Table.5 Contribution of Agricultural Extension Officers as Facilitators .

No	Statement	STS 1	TS 2	N 3	S 4	SS 5	Total
1	Extension workers facilitate training or technical guidance on the cultivation of citrus crops	2	3	3	14	13	138
2	Extension agents contribute to assisting farmers in selling the harvest of citrus crops	3	3	5	12	12	132
3	Extension agents contribute to assisting farmers in accessing markets for agricultural products	3	3	6	15	8	127
4	Extension workers provide practical solutions to farming constraints faced by farmers	-	4	1	10	10	137
Total							534
Contribution of agricultural extension workers as facilitators		534: 875× 100%					61,02%

Percentage contribution of agricultural extension workers:

With a total score of 534 out of 875, agricultural extension workers in Dau sub-district facilitate the income of honey tangerine farmers with a score of 61.02%, which is

classified as "contributing". This indicates that agricultural extension officers have a significant and impactful role in increasing the income of honey citrus farmers in the region.

5. Contribution of Extension Motivators to Tangerine Farming

In tangerine cultivation, agricultural extension officers play an important role as motivators, increasing the enthusiasm and capacity of farmers to overcome various agricultural constraints. To keep farmers inspired to innovate and improve their yields, agricultural extension officers provide more than just technical knowledge; they also provide emotional support and encouragement. They act as motivators, providing farmers with encouragement and practical ideas to help them overcome challenges, including low-quality seeds, insect infestations, and unpredictable weather. This position has been successful as the encouragement from extension agents motivates farmers to continue learning, adapt to new technologies, and increase tangerine farming production (Wa Ode Putri Nabilah *et.al.*, 2024).

In addition, the encouragement provided by extension agents influences farmers' actions in using appropriate crop technology and integrated pest control, which ultimately increases yields and farmers' income. Other factors that contribute to the increased motivation of tangerine farmers include farming experience, formal and informal education, and assistance from extension workers (Abiyanto Prabowo *et.al.*, 2021).

Table.6: Contribution of Agricultural Extension Officers as a Motivator

No	Statement	STS	TS	N	S	SS	Total	
		1	2	3	4	5		
1	Extension workers often carry out reforestation to farmers' land	4	4	1	14	12	131	
2	Extension workers encourage farmers to continue to advance the farmer group	1	6	-	14	14	139	
3	Extension workers make an important contribution to encouraging farmers to increase productivity of siamese citrus crops	3	3	1	13	15	139	
4	Extension agents contribute to guiding farmers to better	-	6	3	10	16	141	

	understand the use of new technologies						
	Total						550
Contribution of agricultural extension workers as motivator 534: 875× 100%				550: 875× 100%			62,85%

Several conclusions can be drawn from Table 6, which details the role of agricultural extension officers as income motivators for the conjoined orange farming industry in Dau sub-district, Malang district.

1. Once or twice a month, agricultural extension officers actively conduct field inspections. The majority of respondents who scored (contributed) to this statement gave a total score of 131, which makes this clear.
2. With a maximum score of 139, indicating that farmers highly value the support and inspiration from extension officers, extension officers also contribute to the sustainable development of local farmer organizations.
3. The impact of extension workers on tangerine crop production also reached a score of 139, indicating their significance in increasing farm yields.
4. Extension workers help farmers better understand how to use new technologies; their effectiveness in transmitting technology to farmers is demonstrated by their highest score of 141.

Once calculated, the overall contribution score of agricultural extension workers as motivators is 550 out of a possible 875, or 62.85%, and is classified as contributing. This indicates that honey citrus farmers in Dau sub-district, Malang district, rely heavily on agricultural extension officers as motivators to increase their income. This finding is consistent with other studies that show how important agricultural extension officers are in educating, inspiring and advising farmers to increase production and farm income of honey siam oranges. Extension agents encourage farmers to adopt new technologies and build sustainable farmer organizations in addition to acting as information providers (Romualdus Abdias Dappa *et.al.*, 2023).

6. Contribution of Extension Dynamizers to Honey Citrus Farming

As dynamic agents, agricultural extension officers play an important role in bringing about change and advancing the honey citrus farming industry to become more sophisticated and efficient. Agricultural extension officers are dynamic agents of change who, by introducing various concepts and methods, inspire farmers to adopt new technologies and refine existing farming methods.

Key Contributions of Extension Dynamizers:

1. The force behind change. Tangerine producers are encouraged by agricultural extension agents to switch from conventional cultivation techniques to more effective and contemporary cultivation techniques. They act as agents of change, encouraging farmers to experiment with new technologies and improved farming methods (Artati Latif *et.al.*, 2022).
2. A Bridge to Innovation. Extension agents act as intermediaries between farmers and sources of innovation, including markets, governments, and research organizations. To increase production and income, they help farmers gain access to innovative technologies, crop management methods, and marketing tactics (Artati Latif *et.al.*, 2022).
3. Group Development for Farmers. By forming and strengthening farmer associations, extension agents encourage cooperation among farmers. They make groups more active and efficient in managing honey chayote cultivation by facilitating communication, collaboration, and decision-making (Marc Asher Tumbé *et.al.*, 2024).
4. Provider of up-to-date information and solutions. Extension agents provide farmers with up-to-date information on farm management and answers to their technical and non-technical problems. This function still needs to be improved, as some farmers believe that the improvements offered are still limited to basic technical issues and the updates are not ideal (Artati Latif *et.al.*, 2022).

Level of contribution and Challenges:

According to research, agricultural extension officers often make limited contributions as dynamic agents. This is due to infrequent communication, poor farm teamwork, lack of formal socialization, and lack of innovation. For agricultural extension officers to be more successful in encouraging tangerine farmers to engage in more advanced and sustainable farming practices, they must increase the involvement of dynamic agents (Artati Latif *et.al.*, 2022).

Table 7. Contribution of Agricultural Extension Officers as a Dynamizer to the income of tangerine farming

No	Statement	STS	TS	N	S	SS	Total	
		1	2	3	4	5		
1	Agricultural extension workers help farmers learn new things about farming	1	2	6	13	13	140	

2	Agricultural extension workers teach farmers about the latest farming practices to increase their yields and income	-	4	6	11	14	140
3	Extension workers help farmers find the best way to manage their land	1	4	4	12	14	139
4	extension workers provide information on how to increase farmers' yields and income	-	4	3	10	18	147
	Total						566
Contribution of agricultural extension workers as 100% Dynamizer $566: 875 \times 100\%$							64,68%

Based on Table 7, agricultural extension workers are the main factor in increasing the income of honey citrus farming in Dau District. This is evidenced by the relatively high overall score, which is 566 out of a total of 875, or about 64.68%.

7. Statment Details and Score

Extension workers help farmers gain new agricultural knowledge. With an overall score of 140, respondents' assessment is the most favorable (contributing). This indicates that extension workers actively help farmers learn new information that is important for agricultural applications.

The latest farming applications are provided by extension workers to increase income and crop yields. With an overall score of 140, this statement shows that extension officers not only exchange knowledge but also provide farmers with the latest methods that they can immediately use to increase yields and profits.

Extension agents help farmers determine the most effective land management approach. Extension agents have an important role in offering effective land management solutions and practices, which enable farmers to optimize their land utilization, based on a score of 139.

Data on techniques to increase farmers' income and yields are shared by extension workers. This statement, which received the highest score of 147, indicates that extension

agents are highly involved in the exchange of strategic information that directly affects increasing yields and profits for honey citrus farmers.

With a percentage of 64.68%, it can be said that Dau sub-district agricultural extension officers are effective in promoting income growth in honey citrus farming. This function includes providing up-to-date information, training on the latest agricultural applications, and tutorials on land management and yield improvement.

8. Price of Siamese oranges in Dau District, Malang Regency

The price of honey siam oranges varies from the first harvest: Honey Siamese oranges with high fruit quality are profitable and have a stable value, ranging from IDR 13,000 to IDR 15,000/kg. Second harvest: Prices range from Rp. 5,000 to Rp. 15,000/kg and can drop if there is an oversupply. Third harvest: Due to the main harvest and deteriorating fruit quality from insects, prices often drop to Rp. 6,000-Rp. 8,000/kg. Fourth harvest: If output decreases and quality is maintained, prices stabilize or rise to Rp. 13,000-Rp. 15,000/kg. In general, seasonality, fruit quality and local market conditions all affect the price of tangerines. The size of honey tangerines and the state of the local market affect the price, according to Mr. Hartono, leader of the farmers' organization. Tangerines are often sold in traditional markets and marketed to middle to lower class consumers. Based on the assessment results, the average price of respondent farmers' honey tangerines from the first to the fourth harvest is around IDR 11,250 per kilogram. This is influenced by the high and low yields of farmers.

Furthermore, despite lower production volumes compared to the rainy season, farmers and local business owners noted that the price of honey siam oranges tends to be higher during the dry season due to the better quality of the fruit. Based on statistics, honey siamese citrus production in Malang Regency has been steadily increasing, especially in Dau District, one of the main tangerine production centers in the region (Hasim Ashar *et.al.*, 2014). Experts in horticulture and agricultural economics state that harvest season, fruit quality, market accessibility and production variables all affect tangerine prices. For example, local supply and demand dynamics, along with farmers' ability to maintain product quality to be competitive in the market, have a significant impact on the price of horticultural commodities such as tangerines, according to agricultural marketing theory. Another tactic to boost the market and increase the value of tangerine commodities is to develop tangerine picking tourism as a regional flagship product. This can increase the selling price and income of farmers (Mustarini Dessy Vitiara *et.al.*, 2022). This study shows the relationship between tangerine prices and production yields. Tangerine prices show stable local market conditions, but they can be increased by diversifying marketing strategies and improving quality, including agritourism, which is currently developing in the area.

9. Analysis of Revenue Costs and Income of Siamese Tangerine Farming.

1 Fixed Cost

Regardless of variations in production results, fixed costs are expenses that never fluctuate. Regardless of production volume, whether large or small, fixed costs are expenses that never change. Taxes and depreciation of equipment including hoes, sickles, sprayers, shovels, rakes, scissors, mowers, and compressors are examples of fixed costs. Respondent farmers spent an average of IDR 36,566,790 on fixed costs.

The cost of using farm equipment, expressed in rupiah per hectare each growing season for large red chili, is known as depreciation. The straight-line approach, one of the easiest and most popular fixed asset depreciation techniques, was used to determine the depreciation amount of the farm equipment. The difference between the purchase price of the asset and its salvage value is divided by the useful life of the asset each year to determine the depreciation. According to Suratiah (2006) in Nurmala *et.al.* (2017), the formula is as follows:

$$\text{Depreciation cost} = \frac{\text{Cost of acquisition} - \text{Residual value}}{\text{Useful Life}}$$

Table 8. Average depreciation costs of tools for citrus farmers

No.	Fixed Cost (FC)	Total cost per hectare (Rp)
1	Hoe	76.874
2	Scythe	76.957
3	Splayer	735.343
4	Skop	59.223
5	Arco (wheelbarrow)	216.884
6	Scissors	89.799
7	Lawn mower	1.406.767
8	Compress machine	3.021.832
9	Tax	30.883.111
	Total	36.566.790

Table 8's assessment of the average cost of tool depreciation for citrus farmers in Dau sub-district, Malang district, yields the following findings: The data shows that the depreciation cost of agricultural equipment used by citrus farmers varies. Compressor machines have the largest depreciation cost at IDR 3,021,832 per hectare, while lawn mowers have the lowest depreciation cost at IDR 1,406,767 per hectare. At Rp 59,223 to Rp

735,343 per hectare, other tools including shovels, arcos (wheelbarrows), scissors, hoes, sickles and spades have relatively lower depreciation costs. At IDR 30,883,111 per hectare, land and building tax is the highest fixed cost component and is much larger than the depreciation cost of tools. Total fixed costs, including taxes and tool depreciation costs, reached IDR 36,566,790 per acre. This shows that land tax, which is very dominant in the citrus farming industry in Sumbersekar Village, has a significant impact on fixed costs. However, although significant, the cost of equipment depreciation only has a smaller portion. For chayote cultivation to be effective and profitable, these fixed costs must be controlled. To assess the effectiveness of resource management and tool use in citrus farming in the region, tool depreciation cost is a fixed cost component that should be considered in the analysis of citrus production costs (Devi Indah Masfufah Agustin *et.al.*, 2021).

Table 9. Results of Recapitulation of Average Fixed Costs and Taxes Expended

No.	Description	Total Cost Per Hectare (Rp)
1	Tool Depreciation Costs	36.566.790
2	Tax	30.883.111
	Total	67.449.901

Based on Table 9, honey citrus farmers incur an average fixed cost of Rp 67,449,901 per hectare. The two main components of these fixed costs are taxes amounting to Rp 30,883,111 per hectare and equipment depreciation costs amounting to Rp 36,566,790 per hectare. Based on the results of the data analysis, it appears that most of the fixed costs incurred are related to equipment depreciation; however, the tax burden also contributes significantly, almost equaling the cost of equipment depreciation. This suggests that the land tax burden is an important aspect that farmers must take into account in managing a tangerine farm, in addition to the cost of equipment repair and maintenance. An important component of the cost of production study and tangerine farm planning in the region is the total fixed costs, which amount to more than IDR 67 million per hectare. The viability and profitability of honey tangerine farming will be greatly influenced by effective fixed cost management.

2 Variable Costs

Costs known as variable costs are costs that remain, regardless of the high or low volume of production. Fertilizer, pesticide, and labor costs for land clearing, planting, fertilizing, maintenance, and harvesting are examples of variable costs.

Table 10: Average Variable Costs of Siamese Oranges

No.	Variable Cost (VC)	Total cost per hectare
1	Urea fertilizer	1.108.222
2	Za fertilizer	3.094.722
3	Manure	1.472.778
4	NPK fertilizer	4.122.500
5	Pearl fertilizer	3.169.167
6	Phonska fertilizer	1.740.278
7	Organic fertilizer	923.611
8	Paktani fertilizer	1.727.778
9	TSP fertilizer	3.326.111
10	ZK fertilizer	1.194.444
11	Herbicide (gramason)	601.944
12	Herbicide (paragat)	683.333
13	Herbicide (binasol)	161.111
14	Herbicide (dasial)	194.444
15	Insecticide (besasep)	397.222
16	Insecticide (fosmid)	1.214.722
17	Insecticides (chlorpyrifers)	516.667
18	Fungicide (apasel)	1.141.944
19	Functionalide (mankozeb)	1.133.056
20	Functionalide (atracol)	1.208.611
21	Functionalide (pentatron)	272.222
22	Functionalide (antila)	257.778
23	Land management labor	11.102.222
24	Planting labor	619.444
25	Fertilization labor	426.667
26	Maintenance labor	4.502.500
27	Harvest labor	1.507.500
Total		47.319.665

The variable costs include various types of fertilizers, herbicides, insecticides, fungicides, as well as labor involved in land management until harvest, according to the findings in Table 10, which details the average variable costs incurred to grow Siamese oranges per hectare in Dau Sub-district, Malang District.

10. Variable Cost Analysis

1 Fertilizer Cost

One of the most expensive aspects of conjoined orange cultivation is fertilizer. At Rp. 4,122,500 per hectare, NPK fertilizer is the most expensive. TSP fertilizer comes in second at Rp. 3,326,111, while ZA fertilizer comes in third at Rp. 3,094,722. At IDR 923,611, organic fertilizer is relatively cheaper, indicating that it is used as a complementary fertilizer.

2 Herbicide Cost

Gramason and paraguat, two herbicides used to control weeds, cost Rp. 601,944 and Rp. 683,333 respectively. Other herbicides, such as dasial and binasol, are quite affordable, costing less than IDR 200,000 each.

Cost of insecticides and fungicides

At IDR 1,214,722, fosmid insecticide is the most expensive for pest and disease control, while besasep and chlorpyrifuse insecticides are cheaper. In addition, fungicides such as atracol, mancozeb, and apasel are also expensive, ranging between IDR 1,133,056 and IDR 1,208,611 per hectare.

3 Labor Costs

The majority of variable costs relate to labor, especially land management labor, which costs IDR 11,102,222 per hectare. Maintenance labor is also quite expensive, at IDR 4,502,500. With labor expenditures of IDR 619,444, IDR 426,667, and IDR 1,507,500 for planting, fertilizing, and harvesting, respectively, these costs are reduced.

4 Total Variable Costs

Total variable costs for honey citrus cultivation reached Rp 47,319,665 per hectare. This shows that honey citrus management requires large financial costs, especially for labor and fertilization.

5 Production Costs

The total variable cost for honey citrus cultivation is Rp 47,319,665 per hectare. This implies that tangerine management requires significant financial investment, especially for labor and fertilization.

Table 11. Production Cost of Tangerine

No.	Description	Total production cost per hectare (Rp)
1	Variable cost	47.319.665
2	Fixed cost	36.566.790
Total		83.886.455

The production cost of chayote per hectare in Dau Sub-district, Malang Regency, is broken down into variable costs and fixed costs in Table 11.

11. Production Cost Analysis

1 Variable Costs

Siamese citrus cultivation has variable costs of Rp 47,319,665 per hectare. These costs include labor directly involved in the production process, purchase of fertilizers, and pesticides, among other costs that fluctuate according to the intensity of production.

2 Fixed Costs

Despite variations in production levels, fixed costs, which total IDR 36,566,790 per hectare, never fluctuate. These costs usually consist of land rent, equipment depreciation, and other administrative costs associated with tangerine farm management.

3 Total Cost of Production

Tangerines cost Rp83,886,455 per hectare to produce. This figure is the total fixed and variable costs that farmers must bear in order to grow honey tangerines as efficiently as possible.

Revenue

The scale of production and the price of the product determine the income in the farming system, which is calculated as the product of production and the selling price. The average income earned by respondent farmers is IDR 138,645,714.

Table 12: Cost of receiving Siamese oranges in Dau sub-district, Malang district

No.	Description	Total average cost of production per hectare
1	Total production	182.800
2	Price of chayote	9.500
	Total	138.645.714

The income per hectare from citrus production in Dau sub-district, Malang district, is shown in Table 12. The price of citrus, production volume, and total income of farmers are all included in these statistics.

12. Revenue Analysis of Siamese Orange

1 Total Production

The yield of Siamese orange per hectare is 182,800 kg. The yield obtained by farmers from one hectare of Siamese orange plantation is shown in this figure.

2 Price of Siamese oranges

In the local market, one kilogram of tangerines is priced at IDR 11,250. The amount of income farmers earn from their honey tangerine crop is determined by this price.

3 Total Revenue

The sale of tangerines generated a total income for farmers of IDR 138,645,714. This amount is calculated by multiplying the product price (IDR 11,250/kg) by the production volume (182,800 kg).

Table 13: Average Income and R/C Ratio of Siamese Orange Farming in Dau District, Malang Regency

No.	Description	Unit	Per hectare
1	Revenue (Tr) = $P \times Q$		
	Total average revenue	Rupiah	138.645.714
2	Variable Cost		
	Total average variable cost	IDR	47.319.665
3	Fixed cost (FC)		
	Total average fixed cost	IDR	36.566.790
4	Total Cost (TC)= $VC + FC$		
	Total average production cost	IDR	83.886.455
5	Revenue (PD)= $TR - TC$		
	Total average revenue	IDR	54.759.259
6	R/C Ratio		1,652

The average revenue and expenditure of honey citrus farming per hectare in Dau District, Malang Regency, can be summarized as follows using the information in Table 13:

4 Farm Revenue

With an average selling price of IDR 11.00 per kilogram, Siamese orange cultivation produces an average of 5,223 kilograms per hectare. As a result, each hectare generates an income of IDR 138,645,714.

5 Production Costs

Variable costs and fixed costs are included in production costs.

Total variable costs are IDR 47,319,665 per hectare and include different types of fertilizers, herbicides, insecticides, fungicides, and labor for land maintenance. Total fixed costs are IDR36,566,790 per hectare and include taxes, machinery, and farm equipment. Thus, the total cost of production (variable costs plus fixed costs) is IDR83,886,455 per hectare.

6 Net Income

The difference between total revenue and total production costs, or IDR 54,759,259 per hectare, is the net income of the Siamese orange plantation. Based on this figure, the Siamese orange plantation is still making a small profit.

7 R/C Ratio

The total revenue and total cost of production are compared to get the R/C (Revenue to Cost Ratio) as follows:

$$R/C = \frac{138,645,714}{83,886,455} = 1.652$$

Every Rp. 1,- of production costs generates revenue of Rp1,652, based on an R/C value of 1.652. In other words, the citrus industry has reached the break-even point ($R/C > 1$), which indicates that this business is financially viable and feasible to run and develop.

CONCLUSION

Through their efforts as facilitators, motivators and dynamizers, agricultural extension workers help tangerine farming enterprises make a profit, according to the study's findings and debates. The percentage contribution for each function is indicated by the contribution category: 61.02% for Facilitator, 62.85% for Motivator, and 64.68% for Dynamic. It has been proven that agricultural extension workers help farmers gain knowledge, technical training, motivation for their work, and development of innovations- all of which contribute to increased production and efficiency of tangerine farming.

In the study locations, farmers involved in tangerine farming generated a net income of IDR 54,759,259/ha with an R/C ratio of 1.652, indicating that this farming activity is viable. Agricultural extension officers often make a substantial contribution to increasing farmers' income and improving their ability to manage their farms more sustainably and independently.

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