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Analysis Of Profit And Risk Of Tomato Farming In Kontukowuna District, Muna Regency

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Abstract

Tomato farming faces production risk and price fluctuations that can affect farmers' profit levels. This study aims to analyze the level of profit, feasibility, production risk, profit risk, and the relationship between profit and risk in tomato farming in Kontukowuna District, Muna Regency. The study was conducted from January to July 2026 and involved the entire population of 40 tomato farmers through a total sampling technique. Data were collected through interviews and documentation, then analyzed using profit analysis, the Revenue Cost Ratio (R/C Ratio), the coefficient of variation, and descriptive analysis. The results show that the average profit of tomato farming reached Rp15,786,448/ha/planting season with an R/C Ratio of 1.602, indicating that the farming is feasible. Production risk was moderate with a coefficient of variation of 0.636, whereas profit risk was low with a coefficient of variation of 0.497. These findings indicate that although farmers face production uncertainty due to pest and disease attacks and weather conditions, farming profit can be relatively maintained through cost management and cultivation practices. Therefore, controlling production risk and using inputs efficiently are important for sustaining the profitability of tomato farming.

Keyword: profit risk, production risk, profit level, tomato farming

INTRODUCTION

Horticulture is one of the agricultural subsectors that plays an important role in meeting food needs and improving the community's economy. One horticultural commodity with fairly high economic value is the tomato (*Solanum lycopersicum L.*). In addition to its economic value, tomatoes contain various nutrients beneficial to health, such as vitamins, minerals, carbohydrates, protein, and fat (Apriadi et al., 2017). Tomatoes also have fairly good

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development prospects because demand for them as a food ingredient continues to rise, so increasing production and quality is an important aspect of developing horticultural farming (Hanindita, 2008). Tomato cultivation has the potential to provide income for farmers if managed effectively (Nurak and Rato, 2022).

Despite its economic prospects, tomato farming faces various problems that can affect farmers' yields and profit. Pest and disease attacks, such as fusarium wilt, brown spot, blossom end rot, and leaf blight, can reduce both the quality and quantity of production. In addition, high production input costs, particularly for pesticides and mulch, as well as selling-price fluctuations caused by seasonal changes, further increase the risk of loss (Nalefo et al., 2025). Weather and climate change can also trigger attacks by plant-disturbing organisms and disrupt productivity (Linda et al., 2023). These conditions show that tomato farming is not free from uncertainty that may affect the profit farmers achieve (Qintharah, 2019).

Profit is one of the important indicators for assessing the success and sustainability of farming. Profit is obtained from the difference between total revenue and all production costs incurred during the business activity (Oktaviati et al., 2019). A positive profit value indicates that revenue is able to cover production costs, so the business has the potential to be sustained (Sutrisno, 2023). However, the level of profit needs to be analyzed together with the risks faced by farmers. Profit analysis provides an overview of the economic returns obtained, while risk analysis is used to determine the level of production and profit uncertainty. Therefore, both aspects are important to examine in order to provide a more comprehensive picture of the economic condition of tomato farming.

Southeast Sulawesi is one of the regions developing horticultural commodities, including tomatoes. According to data from Statistics Indonesia (BPS) for 2025, the highest tomato production in Southeast Sulawesi was in Baubau City at 7,897 quintals, followed by South Konawe Regency at 7,468 quintals and Muna Regency at 5,693 quintals. In terms of harvested area, Muna Regency ranked third with 131 hectares. These conditions show that Muna Regency makes a fairly large contribution to tomato production in Southeast Sulawesi. This potential is also supported by the role of the agricultural sector in the community's economy, with 30.54% of Muna Regency's population working in agriculture, forestry, and fisheries according to BPS Muna Regency data for 2023.

Tomato production in Muna Regency is spread across several districts with different production levels. According to BPS data for 2025, Kabangka District was the area with the highest production at 1,760 quintals and a harvested area of 45 hectares. Kontukowuna District ranked second with production of 875 quintals and a harvested area of 17 hectares, while

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Napabalano District followed with production of 480 quintals. Tomato production in Kontukowuna District in 2024 reached 875 quintals, or approximately 87,500 kg (BPS, 2025). This achievement shows that Kontukowuna District has potential for developing tomato farming. However, this production potential needs to be supported by good farm management so that farmers are able to earn profit and control the risks they face.

Several previous studies have examined the profit and risk of tomato farming in various regions. Akbarrizki (2017) showed that tomato farming in Teluk Lingga Subdistrict, East Kutai Regency, obtained an R/C Ratio of 2.4, indicating that the business was profitable and feasible to develop. Heriani et al. (2013) obtained an R/C Ratio of 3.03 with a profit coefficient of variation of 0.86, indicating that tomato farming was profitable but still faced a fairly high profit risk. Meanwhile, the study by Siregar et al. (2024) in Merdeka District, Karo Regency, showed an R/C Ratio of 2.45 and an income coefficient of variation of 0.75. The risks faced by farmers in that study were related to pest and disease attacks, weather conditions, and selling-price fluctuations.

Based on previous studies, tomato farming has the potential to generate profit but also faces different risks depending on regional characteristics, production conditions, cost structure, and selling prices. Nevertheless, results from other regions do not fully describe the condition of tomato farming in Kontukowuna District. The absence of empirical studies that specifically integrate analysis of profit, business feasibility, production risk, and profit risk in this area constitutes a research gap that needs to be addressed. This study offers an empirical examination of the economic aspects and risks of tomato farming in an integrated manner at the farmer level. Therefore, this study aims to analyze the level of profit, feasibility, production risk, profit risk, and the relationship between profit and risk in tomato farming in Kontukowuna District, Muna Regency.

METHOD

This study was conducted in Kontukowuna District, Muna Regency, from January to July 2026. The research location was determined deliberately (*purposive sampling*) on the grounds that Kontukowuna District is one of the areas developing tomato farming and has production potential. The research population consisted of 40 tomato farmers based on data from the Agricultural Extension Center of Kontukowuna District and the results of a field survey. The entire population was used as the sample through a *total sampling* technique, so the number of respondents in this study was 40.

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The data used consisted of primary and secondary data. Primary data were obtained through direct interviews with farmers using a questionnaire, while secondary data were obtained from Statistics Indonesia (BPS) of Muna Regency, the Agricultural Extension Center of Kontukowuna District, and relevant literature. Data were collected through interviews and documentation.

Data analysis was carried out quantitatively and descriptively. Farming profit was calculated as the difference between total revenue (*Total Revenue*) and total cost (*Total Cost*), using the following formula (Sukirno, 2005):

$$\pi = TR - TC$$

Total revenue was calculated by multiplying the selling price by the quantity produced, TR = P x Q, while total cost is the sum of fixed and variable costs, TC = FC + VC. The profit level was grouped into low, medium, and high categories based on the mean and standard deviation (Azwar, 2012). Furthermore, farming feasibility was analyzed using the ratio of revenue to cost (*Revenue Cost Ratio/R/C Ratio*), with the criteria (R/C>1) indicating that the business is profitable and feasible, (R/C=1) indicating break-even, and (R/C<1) indicating that the business is not feasible (Soekartawi, 2002).

Farming risk analysis was carried out using the coefficient of variation (*Coefficient of Variation/CV*) and the lower limit (*Lower Limit/L*) based on the approach of Pappas and Hirschey (1995). Profit risk was calculated using the following formula:

$$KV_{\pi} = \frac{S_{\pi}}{\bar{\pi}}$$

$$L_{\pi} = \bar{\pi} - 2S_{\pi}$$

Meanwhile, production risk was calculated using the following formula:

$$KV_{Q} = \frac{S_{Q}}{\bar{Q}}$$

$$L_{Q} = \bar{Q} - 2S_{Q}$$

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The relationship between profit and risk was analyzed descriptively by interpreting the results of the profit, production risk, and profit risk calculations. This analysis was used to describe the profit obtained by farmers as well as the level of production and profit uncertainty faced in tomato farming in Kontukowuna District.

RESULTS AND DISCUSSION

Production Costs of Tomato Farming

Production costs are all expenditures used by farmers during the tomato cultivation process, comprising fixed and variable costs. The results show that the average production cost of tomato farming in Kontukowuna District was Rp26,216,587/ha/planting season. Details of the production costs are presented in Table 1.

Table 1. Average Production Costs of Tomato Farming in Kontukowuna District

Cost component	Average (Rp/ha/planting season)
Fixed cost	4,158,202
Variable cost	22,058,384
Total cost	26,216,587

Based on Table 1, variable costs dominate farming expenditure, at about 84% of total cost, while fixed costs account for 16%. Fixed costs consist of land rent of Rp2,000,000 and equipment depreciation of Rp2,158,202/ha/planting season. The largest variable cost is family labor at Rp11,568,772 (52%), followed by plastic mulch at Rp2,543,125 (11%), fertilizer at Rp2,046,091 (9%), and seed at Rp2,003,368 (9%).

The large amount of family labor cost shows that cultivation still relies on the involvement of family members. Although it does not always entail cash expenditure, family labor is still counted as an economic cost because it involves sacrifice of effort and time. This dominance of variable costs is consistent with Hairunnisa et al. (2024), who showed that variable costs are the main expenditure component in annual-crop farming. Thus, the efficient use of labor and production inputs is an important aspect of controlling costs and sustaining farmers' profit.

Revenue and Profit of Tomato Farming

Tomato farming revenue is influenced by the quantity produced and the selling price received by farmers. The results show that average tomato production reached 7,264

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kg/ha/planting season, with an average selling price of Rp6,150/kg. Average revenue and profit of the farming are presented in Table 2.

Table 2. Average Revenue and Profit of Tomato Farming

Description	Average
Land area (ha)	0.25
Production (kg/ha/planting season)	7,264
Selling price (Rp/kg)	6,150
Revenue (Rp/ha/planting season)	42,003,034
Total cost (Rp/ha/planting season)	26,216,587
Profit (Rp/ha/planting season)	15,786,448

Based on Table 2, the average profit of tomato farming reached Rp15,786,448/ha/planting season. The highest profit was Rp45,512,593/ha/planting season, while the lowest was Rp8,212,444/ha/planting season. This difference in profit indicates variation in farmers' ability to generate production and manage farming costs.

The selling price of tomatoes received by farmers ranged from Rp5,000 to Rp7,000/kg. Price declines generally occurred during the peak harvest due to increased market supply. This is consistent with Leovita et al. (2024), who explained that increased supply during the peak harvest can depress prices and farmers' revenue. Conversely, higher selling prices have the potential to increase income, as explained by Pelealu et al. (2023) and Mengko et al. (2025).

Production variation is also related to plant condition and the intensity of land management. Some farmers were able to reach productivity of up to 20 tons/ha through intensive land management and the use of family labor. This is consistent with Sita et al. (2017), who explained that intensive management of small landholdings can increase productivity per unit area. Conversely, pest and disease attacks can reduce harvest yields, as stated by Nurita (2025).

Based on the grouping of profit levels, most farmers were in the medium category. The distribution of profit levels is presented in Table 3.

Table 3. Profit Level of Tomato Farming in Kontukowuna District

Profit level	Number of farmers	Percentage (%)
Low	0	0
Medium	35	88

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High	5	12
Total	40	100

Table 3 shows that 35 farmers (88%) earned profit in the medium category, while five farmers (12%) were in the high category. No farmers earned profit in the low category. This result indicates that tomato farming still provides profit for all respondents, although the level of profit obtained differs. This finding is consistent with studies by Kusumawati et al. (2022) and Ginting et al. (2022), which showed that tomato farming has economic potential, with R/C Ratios of 7.7 and 3.43, respectively.

Feasibility of Tomato Farming

Farming feasibility was analyzed using the Revenue Cost Ratio (R/C Ratio), which is the comparison between total revenue and total production cost. The results of the tomato farming feasibility analysis are presented in Table 4.

Table 4. Feasibility Analysis of Tomato Farming in Kontukowuna District

Description	Value (Rp)
Total revenue	1,680,121,377
Total cost	1,048,663,475
R/C Ratio	1.602

Based on Table 4, the R/C Ratio was 1.602. This means that every Rp1.00 of cost generates revenue of Rp1.602. An R/C Ratio greater than one indicates that tomato farming in Kontukowuna District is feasible and able to provide profit.

This result is consistent with Sembiring et al. (2024), who obtained an R/C Ratio of 1.50 in Merek District, Karo Regency. However, it is lower than the results of Akbarrizki (2017) at 2.4 and Heriani et al. (2013) at 3.03. Differences in feasibility values may be related to variation in production costs, productivity, and tomato selling prices across regions. Therefore, improving cost efficiency and productivity remains necessary to increase farmers' profit.

Production Risk and Profit Risk of Tomato Farming

Farming risk was analyzed using the coefficient of variation (CV) and the lower limit (L) to determine the level of production and profit uncertainty. The results of the risk analysis are presented in Table 5.

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Table 5. Analysis of Production Risk and Profit Risk of Tomato Farming

Description	Production risk	Profit risk
Average	7,264 kg	Rp15,786,448
Variance	21,361,473	61,584,823,036,296
Standard deviation	4,621.847 kg	Rp7,847,600
Coefficient of variation	0.636 (63.6%)	0.497 (49.7%)
Lower limit (L)	-1,979.274 kg	Rp91,248
Risk category	Medium	Low

Based on Table 5, production risk has a coefficient of variation of 0.636, or 63.6%, and therefore falls into the moderate category. This value indicates considerable variation in production among farmers. Based on interviews, the sources of production risk mainly come from pest and disease attacks and weather uncertainty. Pests that frequently attack tomato plants include armyworms and aphids, while diseases commonly reported by farmers include fusarium wilt and leaf blight.

High rainfall can increase humidity and the risk of fruit rot, while water shortages during the dry season can hinder plant growth. This finding is consistent with Sinaga et al. (2025), who explained that weather changes and pest and disease attacks can cause crop damage and increase uncertainty in production yields. Siregar et al. (2024) also identified pests, diseases, and weather and climate conditions as factors affecting tomato production.

To deal with these risks, farmers carry out control measures through pesticide spraying, weeding, monitoring plant condition, uprooting infected plants, and maintaining field cleanliness. Even so, production risk remains moderate. This result differs from the study by Siregar et al. (2024), which obtained a production coefficient of variation of 0.01, indicating very low production risk. This difference shows that environmental conditions, the intensity of plant-disturbing organism attacks, and cultivation management can result in different levels of production risk across regions.

Meanwhile, profit risk has a coefficient of variation of 0.497, or 49.7%, and therefore falls into the low category. This result indicates that variation in profit is relatively controlled compared with the average profit obtained by farmers. Based on interviews, profit risk is mainly related to selling-price fluctuations, price declines during the peak harvest, and increases in fertilizer and pesticide prices. To reduce the impact, farmers monitor market prices before harvest, continue to sell their produce when prices fall to avoid greater losses, and reduce the use of chemical pesticides by combining them with cheaper organic pesticides.

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The difference in category between production risk and profit risk shows that variation in harvest yields is not always followed by variation in profit at the same level. Farmers' profit is determined not only by the quantity produced but also by the selling price and the costs incurred. Thus, although production risk is in the moderate category, profit risk is still low. Descriptively, this condition illustrates the interrelationship between production, costs, selling price, and profit in tomato farming.

CONCLUSION

The results show that tomato farming in Kontukowuna District, Muna Regency, earned an average profit of Rp15,786,448/ha/planting season. The majority of farmers (88%) were in the medium profit category. An R/C Ratio of 1.602 indicates that tomato farming is feasible. Production risk was moderate with a coefficient of variation of 0.636, whereas profit risk was low with a coefficient of variation of 0.497. These conditions indicate that although farmers face production uncertainty due to pests, diseases, and weather changes, farming profit can be relatively maintained through cost management and cultivation practices.

Farmers need to improve pest and disease control and the efficiency of production input use to reduce risk and sustain profit. Extension support from the Agricultural Extension Center (BPP) and the government is also needed, particularly in cultivation management and the control of plant-disturbing organisms. Future research is recommended to examine in greater depth the factors affecting the profit and risk of tomato farming.

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