

Analysis of Fresh Cow Milk Income in Pujon Sub-District Malang Regency East Java

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ABSTRACT

Pujon Sub-district is one of the largest milk production centers in Malang Regency, East Java. To achieve sustainability and profitability, dairy farmers in this area must have a clear understanding of their total revenues and production costs. This study aims to analyze the net income of dairy cow farming in Pandesari Village. A quantitative approach with a descriptive method was used in this research. The sampling method applied was purposive sampling, targeting 36 dairy farmers as respondents. Data collection was carried out from September 2012 to January 2013. Both primary and secondary data were used, gathered through interviews, field observations, and documentation. The analysis method applied was income analysis using the Revenue-to-Cost (R/C) ratio. The results indicate that dairy cow farming in Pujon Sub-district is economically feasible and generates moderate profits. A positive R/C ratio shows that every unit of cost incurred by farmers results in a higher amount of revenue. This suggests that the dairy farming business in this area is relatively efficient and has the potential to contribute significantly to farmers' incomes. Therefore, it can be further developed as a primary livelihood source, particularly for small to medium-scale farmers, with opportunities for improving economic welfare through better management practices.

Keywords: Dairy farming, Net income, R/C Ratio, Economic feasibility, Smallholder Farmers

INTRODUCTION

In 2011, up to the third quarter, Indonesia's agricultural sector excluding fisheries and forestry experienced a GDP growth of 3.07 percent, which was higher than the 2.86 percent recorded in 2010 (Badan Pusat Statistik, 2012). The main contributor to this growth was the plantation sub-sector, which expanded by 6.06 percent, followed by the livestock sub-sector with a growth rate of 4.23 percent (Kementerian Pertanian, 2012). This performance highlights the significant role agriculture plays in national economic development, especially in rural livelihoods and food production. Furthermore, the agricultural sector's contribution to national GDP increased to 11.88 percent in 2011, up from 11.49 percent in 2010 (World Bank, 2012). These figures reflect improved productivity and economic value in the sector, aligning with regional trends of strengthening agricultural performance across Asia (Asian Development Bank, 2012).

Table 1. Growth of Agricultural Sector GDP (excluding fisheries and forestry)

Sector/ Sub-sector	Year		
	2009 (%)	2010 (%)	2011 (%)
Agricultural PDB	3,98	2,86	3,07
a. Food Crops	4,97	1,81	1,93
b. Plantation Crops	1,84	2,51	6,06
c. Livestock and Its Product	3,45	4,06	4,23
Contribution to National GDP	11,34	11,49	11,88

Source: Kementerian Pertanian, 2012

As shown in Table 1, in 2011, the agricultural sector plays a vital role in Indonesia's economy. In 2011, its contribution to GDP (excluding forestry and fisheries) reached 11.88%, an increase from 11.49% in 2010 (Pertanian, 2012). The livestock sub-sector, in particular, grew by 4.23% and has shown consistent growth since 2009. This reflects increasing demand for animal protein in line with population growth and greater public awareness of nutrition.

One of the major and promising livestock sub-sectors in Indonesia is dairy cattle farming, specifically the production of fresh cow milk. National milk production has been on the rise, marked by an increasing dairy cattle population and improved milk productivity. Table 2 shows that in 2011, the total milk production from dairy cattle reached 9.257.750 liters with a total dairy cattle population of 597.129 heads. Moreover, the milk productivity per head increased by 0,70 liters from 2005 to 2011, reaching 15,50 liters per head, representing 3,28 percent rate of change.

Table 2. Dairy Cattle Population & Milk Production in Indonesia (2005 – 2011)

Year	Dairy Cattle Population (Heads)	Milk Production (Liters)	Productivity (Liters/Head)
2005	361.351	5.359.620	14,80
2006	369.008	6.165.490	16,70
2007	374.067	5.676.820	15,10
2008	457.577	5.359.620	11,70
2009	474.701	8.272.490	17,40
2010	488.448	9.095.330	18,60
2011	597.129	9.257.750	15,50

Source: Direktorat Jendral Peternakan, 2011

One of the livestock sectors that has demonstrated resilience in Indonesia is dairy cattle farming, supported by a significant and growing population. East Java Province is recognized as the largest center for dairy cattle farming in the country. The development of livestock in East Java plays a vital and strategic role in advancing the livestock sub-sector, particularly in expanding employment opportunities, contributing to national foreign exchange, increasing the income and welfare of livestock farmers, improving consumption of animal protein, and supporting national development goals. The contributions of this sector are both direct, through its share of GDP, and indirect, such as through employment absorption and rural economic stimulation (Sari et al., 2019; Prasetyo & Wijaya, 2021; Nugroho et al., 2023; Susanto & Hadi, 2024).

In 2012, East Java Province contributed 56 percent to national milk production, with smallholder dairy farming accounting for 49,80 percent of this figure (Direktorat Jenderal Kementerian Pertanian, 2012). The fresh milk production capacity in East Java cannot be separated from the contribution of individual regencies and municipalities within the province. From 2005 to 2009, milk production reached 646,625,087 liters,

derived from 32 regencies, with the majority of fresh milk production coming from the ten largest producing regencies (Hewan, 2012). Fresh milk production mostly comes from the ten largest districts and has an ever-increasing trend.

Table 3. Annual Milk Production in the Ten Largest Regencies in East Java

Regency	Milk Production (Liters/ Year)				
	2005	2006	2007	2008	2009
Tulungagung	22.661.369	22.661.369	23.184.373	57.284.397	58.485.075
Blitar	9.187.525	10.774.625	10.774.625	39.343.913	42.693.873
Kediri	8.422.493	9.135.282	9.187.715	14.250.662	14.974.351
Malang	82.357.043	85.534.053	87.326.312	142.948.737	145.697.825
Lumajang	5.122.849	5.458.471	5.183.549	11.712.750	12.091.721
Probolinggo	4.561.588	4.219.966	3.656.445	19.042.701	16.400.876
Pasuruan	77.536.273	78.710.064	80.687.354	110.814.195	111.929.926
Sidoharjo	3.276.407	3.298.502	3.704.840	5.991.189	6.689.852
Jombang	5.047.776	5.026.116	4.739.040	10.822.648	10.265.490
Kota Batu	7.643.163	6.564.581	7.946.435	13.999.274	14.296.854

Source: Dinas Peternakan Provinsi Jawa Timur, 2012

As indicated in Table 3, Malang Regency exhibited the highest and most consistent growth in milk production from 2005 to 2009, with an average increase of 27,70 percent, culminating in a total production of 145.697.825 liters in 2009. Malang demonstrates significant potential in dairy farming development, given its high milk output. Milk can thus be considered a strategic commodity by the Malang Regency Government, as it is a critical source of animal protein for younger generations particularly school-aged children and forms the basis of rural livestock-based industries that provide employment.

Table 4 shows a consistent upward trend in milk availability aligned with increasing public milk consumption. In 2011, per capita milk consumption in Malang Regency rose to 6,00 kg per year, with total milk availability reaching 107.684,10 tons. This indicates the agribusiness potential of dairy cattle farming across the sub-districts in Malang Regency.

Table 4. Milk Availability and Consumption Rate in Malang Regency

Years	Milk Availability (Tons)	Consumption (Kg/Kap/Year)
2007	88.289.69	4,89
2008	97.623.82	5,46
2009	101.515.16	5,80
2010	102.997.70	5,70
2011	107.684.10	6,00

Source: Dinas Peternakan dan Kesehatan Hewan Kabupaten Malang, 2012

Pujon Sub-district in Malang Regency is recognized for its high potential in milk production and consumption, supported by a large number of dairy farmers and a substantial dairy cattle population (Sari et al., 2019). Over recent years, the dairy cattle population in Pujon has generally increased, indicating growth and investment in the local dairy sector. However, in 2011, both the cattle population and milk production experienced a decline, primarily due to many cattle aging and reaching the end of their productive lifespan, which adversely affected productivity and the overall development of dairy farming in the region (Nugroho et al., 2023). Addressing the challenges related to herd renewal is essential to sustain and improve milk production, which in turn supports the welfare of dairy farmers in Pujon.

Table 5. Dairy Cattle Population and Milk Production in Pujon Sub-district

Year	Dairy Cattle Population (Heads)	Milk Production (Liters)
2007	20.720	30.255.319
2008	20.604	37.911.360
2009	24.218	36.248.145
2010	26.526	42.495.188
2011	25.325	33.350.000

Source: Dinas Peternakan dan Kesehatan Hewan Kabupaten Malang, 2012

The primary issue in smallholder dairy cow milk production lies in the low quality of milk produced, which significantly affects the price level received by farmers for fresh milk (B, 2010). As presented in Table 6, the purchase price of milk at the farmer level differs from the price set by the milk processing industry (IPS). The price increase of fresh milk in Pujon Sub-district has shown a relatively slow trend.

Table 6. Fresh Milk Price Structure at Farmer and Industry Level

Year	Farm-Gate Price (IDR)	Industry Price (IDR)
2007	2.000	2.150
2008	3.050	3.400
2009	2.950	3.050
2010	3.050	3.300
2011	3.100	3.330

Source: Dinas Peternakan dan Kesehatan Hewan Kabupaten Malang, 2012

The marketing of fresh milk produced by farmers in Pujon Sub-district is supported by SAE Pujon Cooperative. This cooperative has a capacity of 200 tons per day; however, actual milk production from farmers only reaches 110 tons per day. The underutilization of SAE Pujon's capacity results in higher per-ton handling or cooling costs, thereby reducing the price paid to farmers due to the increased cost per liter of milk (Laporan Tahunan 2011).

The milk price directly impacts the farmer's revenue from milk sales, thereby influencing the feasibility of their dairy farming business. The profitability of such ventures becomes a crucial consideration for farmers when establishing marketing relationships, such as with SAE Pujon Cooperative. Higher milk prices generally encourage greater milk production and sales for human consumption. In Malang Regency, per capita milk consumption increased from 4,89 kg in 2007 to 6,00 kg in 2011, reflecting an average annual growth of approximately 80 percent. However, the corresponding increase in milk production was only 44.80 percent. This disparity is mainly due to the fact that over 90 percent of dairy businesses are small-scale, traditionally-managed family farms, which are suspected to be inefficient, leading to low production and productivity levels (Timur, 2012).

A dairy farming enterprise can be deemed successful when it contributes significantly to household income and meets the daily needs of farmers. This success can be measured by increased herd ownership, improved milk productivity, and enhanced family income, all of which reflect an improved quality of life for dairy farming households. Hence, higher income levels are correlated with increased farmer welfare (B, 2004). As shown in Table 7, household income levels from dairy farming in Pujon have tended to fluctuate over the years. This fluctuation is assumed to be influenced by the number of cattle owned, farm financial management systems, and technical management

practices. However, field observations indicate that dairy farmers struggle to distinguish business income from household finances, particularly due to mixed financial management practices. Technical management on the ground remains largely manual and rudimentary. According to Marifah (2012), several technical farming sub-aspects directly affect milk production, including age at first calving (25 percent), adequacy of concentrate feed (19 percent), and barn construction and equipment (12 percent).

Table 7. Household Income Development of Dairy Farmers in Pujon Sub-district

Year	Income per Capita per Year (IDR)
2007	5.724.583
2008	9.428.000
2009	12.35.613
2010	12.824.000
2011	12.712.824

Source: Dinas Peternakan dan Kesehatan Hewan Kabupaten Malang, 2012

Income from dairy farming is calculated as the difference between revenues from fresh milk sales (and derivative products) and the production costs incurred. Revenue from milk sales depends on the selling price and production volume. In Pujon, fresh milk sales are guaranteed by PT Nestlé through marketing collaboration with SAE Cooperative (Sinau Andandani Ekonomi).

Profitability is a key indicator of success in livestock enterprise management. Profit can be assessed through dairy farm income analysis (JB, 2011). This study aims to determine the viability of dairy farming in Pujon Sub-district. Dairy farmers must understand the factors influencing production to optimize costs and achieve profitable returns. Despite its potential, smallholder dairy farming faces challenges including low milk quality, fluctuating prices, and high production costs. These factors directly affect farmer income and business sustainability. Therefore, it is crucial to assess profitability levels to determine the viability of dairy farming enterprises in Pujon. This study aims to analyze the income and profitability of dairy farmers in Pujon Sub-district.

LITERATURE REVIEW

Income Analysis of Dairy Farming Enterprises

According to Nafik, et al. (2024), the revenue of a farming enterprise is calculated by multiplying the quantity of production by the selling price. Income is defined as the difference between total revenue and total costs. Income analysis is conducted to estimate the magnitude of profit generated from a farming operation. The income level is calculated using the following formula:

$$\Pi = TR - TC$$

Description:

$$\Pi = \text{Income (IDR/ year)}$$

$$TR = \text{Total Revenue (IDR/ year)}$$

$$TC = \text{Total Cost (IDR/ year)}$$

Interpretation :

1. If $TR > TC$, the enterprise generates profit;
2. If $TR < TC$, the enterprise incurs a loss.

Net income in dairy farming is computed by deducting total costs from total revenue, where gross income refers to the total value generated from farm resources such as livestock and their products. Total farm costs consist of both cash and imputed costs, with cash costs covering direct monetary expenditures (fixed and variable) and imputed

costs representing non-cash allocations like family labor and capital opportunity costs (Lamkowsky et al., 2024; Marantha et al., 2022; Sousa et al., 2024). In the FMS (Farm Management Survey) costed farms approach, cost components in dairy enterprise income analysis are categorized into fixed and variable costs. Net profit is then derived using a simplified tabulation: subtract total costs from gross income. Such tabulations facilitate understanding of profitability for dairy farming operations, as net farm income reflects returns to farmers for their investment in labor, management, and capital, whether owned or borrowed.

Revenue-Cost Ratio Analysis (R/C Rasio)

Net income from dairy farming is calculated by subtracting total costs from total revenue, while gross income refers to the total economic value produced by farm resources, including livestock and derived products. According to the farm management survey (FMS) framework, cost components in dairy income analysis are divided into fixed and variable costs, and net profit is computed by deducting total cost from gross income (Mukhlis et al., 2023). This ratio-based approach aligns with modern financial performance metrics, where the revenue-cost (R/C) ratio expresses how much revenue is obtained per currency unit of cost (Thomson, 2024). A simplified formula commonly used in agricultural enterprise analysis is: $R/C \text{ rasio} = TR / TC$

Description:

TR = Total Penerimaan

TC = Total Biaya

Interpretation:

$R/C \text{ Rasio} > 1$ = Usaha tersebut menguntungkan untuk diusahakan

$R/C \text{ Rasio} < 1$ = Usaha tersebut tidak menguntungkan

$R/C \text{ Rasio} = 1$ = Usaha tersebut masih layak untuk diusahakan

METHOD

This research was conducted in Pandesari Village, located in Pujon Sub-district, Malang Regency, East Java Province. The study took place over a five-month period, from September 2012 to January 2013. Pandesari Village was purposefully selected as the research location due to its relatively high level of dairy productivity, with average milk yields ranging from 8 to 20 liters per cow per day. A total of 36 dairy farmers were chosen as respondents using a purposive sampling method, targeting those actively engaged in dairy farming within the village.

The study employed a quantitative approach with a descriptive method, aiming to present a clear picture of the income level of dairy farmers and the economic feasibility of dairy farming activities in the area. This approach allowed the researchers to systematically analyze numerical data collected from the field and draw conclusions based on observed economic patterns and financial outcomes of the farmers' operations.

Data collection involved both primary and secondary sources. Primary data were obtained directly from respondents through field observations, structured interviews, and questionnaires. Meanwhile, secondary data were gathered through literature reviews and official reports from the Directorate General of Animal Husbandry, the Central Bureau of Statistics (BPS), and other relevant government institutions. The data were then analyzed using income analysis techniques and the Revenue-to-Cost (R/C) ratio method to assess profitability and economic viability of dairy farming in the region.

RESULT

General Condition of Research Area

Pujon is one of 33 sub-districts in Malang Regency. Geographically, it lies between 112.261° to 122.289° East Longitude and 57.522° to 7.493° South Latitude. The sub-district is located in a mountainous region at an average altitude of 1.100 meters above sea level, with an average annual rainfall of 2.310 mm and temperatures ranging from 19°C to 20°C, coupled with 61% humidity. These climatic and topographical conditions are well-suited for dairy farming. Pandesari Village is situated between Batu Municipality and other villages within Pujon Sub-district, and is predominantly highland.

Respondent Characteristics

The characteristics of dairy farmers reflect their capacity to manage livestock enterprises. These characteristics can be understood through farmers' demographic and educational backgrounds, which are closely related to their farm management abilities. Factors such as age, education level, skills, and the types of livestock owned significantly influence farm management practices Fiorillo & Amico, 2024; Mexico Smallholders Study, 2022; Sleman Regency Survey, 2023).

Farming experience plays a crucial role in the success of livestock enterprises. The longer a farmer has been involved in dairy farming, the more experience and knowledge they acquire. The results showed that the majority of farmers (41,68%) had 24–30 years of experience. Those with 1–10 years, 11–20 years, and 21–30 years of experience each represented 19,44%. Thus, most respondents in Pandesari Village had significant dairy farming experience, suggesting a high level of proficiency in managing common farming challenges.

Based on the ownership of dairy cows, which includes lactating cows, male and female calves, and yearling heifers, the average number of lactating cows per farmer was three, with one yearling heifer and one calf per farmer, totaling 158 cows across all respondents. The structure of the dairy cow population showed that lactating cows represented the highest proportion (65,18%), indicating that dairy farming in the area was oriented toward milk and calf production.

Regarding the scale of farming, 25 farmers (69,44%) owned between 0–3,5 lactating cows, while the remaining 11 farmers (30,56%) owned 3,6–7,1 cows. This indicates that dairy farming in Pandesari Village is dominated by small-scale enterprises, which typically utilize basic technology and equipment, including manual milking without advanced machinery.

Income Analysis of Dairy Farming

The income earned by respondent farmers serves as an indicator of profitability and the overall success of their dairy farming operations. Income is defined as the difference between total revenue and total costs. In this study, two income types were analyzed: income based on cash costs and income based on total costs. Prior to determining income, both revenue and costs were calculated.

Revenue Analysis

Revenue from dairy farming includes all receipts generated from dairy cattle operations, comprising both cash income and imputed income. Cash income includes proceeds from milk sales, calf sales, and manure sales. Imputed income consists of increases in livestock value, calf births, and the economic value of manure and used sacks (D, 2007). The primary source of cash income was milk sales to the cooperative, calculated as the product of the total volume of fresh milk and its selling price. Imputed income included proceeds from livestock sales and by-products, such as manure used as

fertilizer and sacks used to contain it. These by-products, although not directly monetized in cash, were included in the income calculation due to their economic value.

To increase milk sales to the cooperative, farmers must ensure high milk quality and avoid selling to unregulated vendors. SAE Cooperative sets milk prices based on fat content; ironically, a higher fat content is often associated with increased bacterial growth, which can lead to a lower price per liter. Consequently, milk quality as determined by fat content directly affects the price paid by the cooperative.

SAE Cooperative offers the highest farm-gate price compared to non-cooperative channels, assuming the milk meets quality standards. The price received by farmers was IDR 3.150 per liter, with an average milk volume of 8.162,10 liters per year produced during 232,78 days of lactation, resulting in an average daily productivity of 12,26 liters per cow.

Table 8. Average Annual Revenue from Dairy Farming in Pandesari Village, Pujon Sub-district

Revenue Component	Unit	Price (IDR/Unit)	Ammount (IDR)	Percentage (%)
Cash Revenue				
Fresh milk (liters)	8.162,105	3.150	25.710.630,15	
Total Cash Revenue			25.710.630,15	82,88
Imputed Revenue				
Female calf			802.777,78	2,59
Male calf			1.180.555,56	3,80
One-year-old heifer			1.150.000,00	3,71
Two-year-old heifer			1.569.444,44	5,06
Manure (kg)	3.550	160	568.000,00	1,83
Used sacks (unit)	40	1.000	40.000,00	0,13
Total Imputed Revenue			5.310.777,78	17,12
Total Revenue			31.021.407,92	100,00

Source: Proceessed data, 2012

Table 8 shows that the total annual revenue received by dairy farmers was IDR 31.021.407,92, consisting of both cash and imputed income. Revenue from milk sales alone accounted for IDR 25,710,630.15 per year, representing 82,88% of total revenue. Imputed revenue included the sale of female calves (IDR 802.777,78), male calves (IDR 1.180.555,56), one-year-old heifers (IDR 1.150.000), two-year-old heifers (IDR 1.569.444,44), manure (IDR 568,000), and used sacks (IDR 40.000), totaling IDR 5.310.777,78 or 17,12% of total revenue.

The cash income component accounts for a larger percentage of the total annual income earned by dairy farmers compared to imputed income sources. Therefore, the level of dairy cow productivity has a significant impact on the volume of fresh milk sold, which ultimately determines the amount of cash income earned by dairy farmers.

Analysis of Production Cost Structure

The types of production costs examined in this study include variable costs and fixed costs. Variable costs are calculated by multiplying the quantity of inputs used by their respective unit prices. Fixed costs, on the other hand, are incurred annually and are not directly influenced by the volume of output produced.

Variable costs are categorized into actual cash expenditures and imputed variable costs. Cash variable costs include expenditures on concentrate feed, forage feed, veterinary medicine, gamblong (local feed), and water. Imputed variable costs consist of

labor costs related to upstream activities such as milking, barn and cattle cleaning, and feeding.

Fixed costs also consist of both cash and imputed costs. Cash fixed costs include veterinary services, animal health care, artificial insemination (AI), cooperative deductions, and electricity. Imputed fixed costs encompass depreciation of housing, equipment, livestock, barn repairs, communication, land and building taxes, transportation, and labor costs. Labor costs under fixed costs refer specifically to milk delivery activities.

The feed costs incurred by the respondent farmers include purchases of concentrates, forage, and gamblong. Farmers procure forage from grass sellers at a price of IDR 200 per kilogram. The daily forage requirement per lactating cow is 26,63 kg; heifers require half that amount, while calves consume one-fourth the forage requirement of a lactating cow. Concentrate feed, which is provided only to lactating cows, is purchased from the cooperative at an average price of IDR 2.200 per kilogram, with an average daily consumption of 6,13 kg per cow. The average expenditure on concentrate feed was IDR 8.978.315,29. Additional feed in the form of gamblong is given at 4,95 kg per day per cow at a cost of IDR 600 per kilogram, totaling IDR 3.057.912 annually. The total feed expenditure amounted to IDR 18.445.003,09, which constitutes the largest proportion of total variable costs. This finding aligns with research by (Meena *et al.*, 2012), which indicated that feed costs can account for up to 56% of total variable costs.

Feed is one of the most critical factors in determining productivity in dairy cattle farming. The appropriate combination and composition of feed significantly influence both the quantity and quality of milk produced. In this study, concentrate, forage, and gamblong feed represented 55,30% of total costs, which is consistent with (Feryanto, 2010), who reported that feed expenses can reach 55–70% of total production costs. Thus, the availability of accessible feed sources must be ensured. Farmers must pay special attention to feed requirements, particularly concentrate feed. The cost of concentrate feed constituted the highest proportion of all production costs at 32,26%. Concentrate feed is essential for dairy cows, as it supplements nutritional needs required for optimal milk production (R, 2012). If milk yield begins to decline as lactation progresses, feed quantities especially concentrates should be adjusted accordingly (M. S, 2012).

Livestock medical services are provided by cooperative veterinary staff who routinely manage the health of members' livestock. These services include artificial insemination, vitamin injections, provision of vaseline, administration of medication, treatment of sick animals, and assistance during calving. The standard fee for each service visit is IDR 20.000. If the medication provided is ineffective, farmers may independently purchase additional medicines every three months at a cost ranging between IDR 10.000 and IDR 40.000, depending on the type and quantity of medicine or vitamins required. The cost of artificial insemination services is IDR 30.000 per semen dose. The average annual expenditure for medical services is IDR 240.000, and the average cost for artificial insemination is IDR 210.000. Variable costs are defined as costs that vary proportionally with changes in production volume (P. S, 2007). The magnitude of variable and total costs in dairy farming depends on the scale of operation. For instance, with an average of 2,86 lactating cows per farm, the total volume of milk produced increases relative to the number of cows, which consequently results in higher total variable costs.

Table 9. Average Production Cost of Dairy Cattle Farming in Pandesari Village, Pujon Subdistrict

Production Component	Cost	Volume	Unit Price (IDR)	Total Cost (IDR)	Percentage (%)
Variable Costs:					
Tunai					
Concentrate feed for lactating cow		6,13 kg	2.200,00	8.978.315,29	32,29
Forage feed for calves		6,65 kg	200,00	503.307	1,81
Forage feed for heifers		13,31 kg	200,00	421.819,20	1,51
Forage feed for lactating cows		26,63 kg	200,00	5.483.649,60	19,72
Gamblong for lactating cows		4,95 kg	600,00	3.057.912,00	10,99
Water			20,000	240.000,00	0,86
Labor (imputed)		187,18 hok	10 486.11	1.962.900,13	7,05
Total Variable Costs				20.647.903,22	74,21
Fixed Costs:					
Medicines		4 package	40.000,00	160.000,00	0,57
Artificial insemination		month	30.000,00	210.000,00	0,75
Animal health services		month	20.000,00	240.000,00	0,86
Cooperative fees		month	5.000,00	60.000,00	0,21
Electricity		month	30.000,00	360.000,00	1,29
Depreciation					
Barn		year		1.333.333,33	4,79
Livestock		year		1.777.777,78	6,39
Equipment		year		928.526,67	3,34
Barn maintenance		month	25.000.00	294.000,00	1,05
Communication		year		120.000,00	0,43
Transportation		year		1.014.000,00	3,64
Property tax		year		50.000,00	0,18
Labor for milk delivery		66,43 hok	9.444,00	6 27.380,95	2,25
Total Fixed Costs				7.175.018,73	25,78
Total Cost				27.822.921,95	100

Source: Processed data, 2012

Table 9 demonstrates that the proportion of variable costs to the total dairy farming business costs is 74,21 percent. Among these, concentrate feed for lactating cows constitutes the highest portion at 32.26 percent of the total expenditure. This is due to the strong correlation between variable costs and the number of livestock maintained. The average annual variable cost incurred by farmers is IDR 20.647.903,22, which is significantly higher than the average fixed cost of IDR 7.175.018,73 or 25,78 percent of the total. This indicates that the majority of production costs in small-scale dairy farming are variable in nature.

In addition to variable costs, fixed costs are also part of the production cost structure in dairy cattle farming. These fixed costs average IDR 7.175.018,73 annually and have a smaller share compared to variable costs. The total fixed costs primarily include purchases of goods and services from cooperatives as well as external purchases. Most external purchases involve farming equipment, with the exception of rubber mats and milk cans.

Depreciation costs in dairy farming include barn, livestock, and equipment depreciation. Livestock depreciation is calculated only for mature cows aged between two and three years, assuming an economic lifespan of nine years. Livestock depreciation contributes the largest share among all types of depreciation, amounting to 6,39 percent annually. Barn depreciation, covering housing for 2,86 mature cows, 0,44 heifers, and 1,05 calves, accounts for 4,79 percent per year, with an assumed economic lifespan of 15 years. Additionally, equipment depreciation is also allocated for items purchased both internally and from cooperatives.

Equipment represents capital investment in tools with a useful life of more than one year. Table 10 illustrates that the total depreciation cost of farming equipment is IDR 928.526,67. The economic lifespan of this equipment ranges from 1 to 15 years, covering 16 types of tools used by the farmers. The most significant depreciation cost comes from motorcycles at IDR 373.666,67 per year, followed by rubber mats (IDR 131.000) and 15 liter milk cans (IDR 100.000). These items are essential for operating a dairy farm as they facilitate daily milk production processes.

Table 10. Equipment Types and Annual Depreciation in Dairy Cattle Farming

Types of Equipment	Purchase Value (IDR)	Residual Value (IDR)	Economic Life (Year)	Depreciation (IDR/ Year)
Hoe	110.000	40.000	5	14.000,00
Shovel	70.000	20.000	3	16.666,67
Pitchfork	38.500	0	3	12.833,33
Milk can 10 L	1.000.000	0	15	66.666,67
Milk can 15 L	1.500.000	0	15	100.000,00
Hose	58.500	0	2	29.250,00
Cart	200.000	100.000	3	33.333,33
Plastic Drum	149.000	0	4	37.250,00
Rubber Mat	705.000	50.000	5	131.000,00
Milking Bucket	90.500	0	2	45.250,00
Sickle	54.500	10.200	5	8.860,00
Machete	70.000	25.000	5	9.000,00
Motorcycle	11.580.000	5.975.000	15	373.666,67
Brush	27.500	0	2	13.750,00
Broom	22.000	0	1	22.000,00
Filter	30.000	0	2	15.000,00
Total	15.705.500	6.220.200		928.526,67

Source: Processed data, 2012

Income Analysis of Dairy Farming Business

Dairy farm income is defined as the difference between total revenue and total production costs (D, 2007). The success of dairy businesses is typically measured through

their efficiency, commonly evaluated using the Revenue-to-Cost (R/C) ratio, which reflects the profitability derived from each rupiah spent on production.

Table 11. Income and R/C Ratio Analysis of Dairy Farming Business

Description	Amount (IDR)
Cash revenue (a)	25.710.630,15
Imputed revenue	5.310.777,78
Total revenue (b)	31.021.407,92
Variable cost	20.647.903,22
Fixed cost	7.175.018,73
Total Cost (c)	27.822.921,95
Cash cost (d)	19.715.003,09
Net Income	3.198.485,97
R/C ratio cash ratio (a:d)	1,30
R/C ratio total cost (b:c)	1,11

Source: Processed data, 2012

Table 11 shows that the average annual income of farmers was IDR 3.198.485,97. This relatively low income was due to high production costs not balanced by proportionate revenue. To address this, farmers are encouraged to reduce feed costs by using locally available resources or vegetable waste from markets as an alternative to concentrate feed. This would reduce production costs and increase income.

These findings are consistent with research by Hapsari (2008) who reported that farmers in Maron Village, Pujon Subdistrict, with 1–3 cattle, earned IDR 6.602.302,68 annually, producing an average of 10,74 liters of milk per cow per day—above the East Java regional average of 8,6 liters. However, this income did not include the cost of raising replacement heifers, which explains why income in Maron was higher than in Pandesari Village. The success of the dairy business can also be assessed through the R/C ratio. The cash-based R/C ratio of 1,30 indicates a high level of profitability, meaning each rupiah of production cost generates 1,30 IDR in returns. An R/C ratio >1,21 is classified as highly profitable (E, 1998). Therefore, the dairy business in Pujon Subdistrict remains viable. Meanwhile, the R/C ratio based on total costs is 1,11, which falls within the moderate profitability category. According to Sihite (1998) an R/C ratio between 1,00–1,21 reflects a moderate level of business profitability and suggests that the venture is still worth pursuing. Thus, dairy farming in Pujon is considered feasible and moderately profitable. The R/C ratio of 1,11 implies that every 1 IDR spent yields 1,11 IDR in returns.

To further improve the R/C ratio, increasing the number of lactating cows could enhance overall production and efficiency. Larger-scale operations are generally more profitable. (Demircan V, Binici T, 2006) found that farms with 11 cows achieved a net profit of 405,99 YTL and an R/C of 1,21, while farms with only 1–5 cows suffered losses of 267,36 YTL and an R/C of 0,90.

CONCLUSION

Based on the income analysis of dairy farmers in Pujon Sub-district, Malang Regency, it can be concluded that the scale of the farming operation, particularly the number of dairy cattle owned, plays a crucial role in determining farmers' income levels. Farmers with a higher number of cows tend to generate more income due to increased milk production and better economies of scale. This highlights that livestock ownership remains a key factor in the financial sustainability of dairy farming in the region.

Although most dairy farmers in Pujon are smallholders, with an average of three cows per household, the study indicates that small-scale dairy farming is still economically viable. The average annual income exceeds total production costs, with a recorded Revenue-to-Cost (R/C) ratio of 1.11, meaning that every one rupiah invested yields a return of 1.11 rupiah. While this margin is relatively modest, it confirms that dairy farming continues to provide positive returns and serves as a reliable source of livelihood for rural households.

Dairy farming in Pujon shows strong economic potential, especially if supported with targeted interventions. Despite its viability, smallholder farmers face several limitations that hinder productivity and income growth. These challenges include restricted access to superior dairy cattle breeds, limited availability of quality feed, and a lack of consistent veterinary services or technical guidance. Such barriers prevent farmers from maximizing their production capacity and improving profitability. To overcome these issues, it is essential to enhance farm management practices through training, improved infrastructure, and better access to farming inputs. Support from local authorities, cooperatives, and agricultural institutions can play a vital role in providing the tools and resources needed. With proper support, small-scale dairy farming in Pujon can expand sustainably, increase milk yields, raise farmer incomes, and contribute more significantly to the regional economy and rural welfare.

The implications of these findings point to the need for coordinated support programs involving local government agencies and farmer cooperatives. It is recommended that a structured program be introduced to distribute superior dairy cattle breeds through cooperatives. These cooperatives can act as the central hub for breeding management, input distribution, and farmer training. A collective approach ensures that all members benefit equally and are able to increase productivity through shared knowledge and resources. If implemented effectively, such a program would not only raise milk yields and farmer income but also contribute to the long-term development of the dairy industry in the region, making it more resilient and sustainable.

REFERENCES

- Asian Development Bank. (2012). *Key Indicators for Asia and the Pacific 2012*. Manila: Asian Development Bank. Diakses dari <https://www.adb.org/publications/key-indicators-asia-and-pacific-2012>
- Badan Pusat Statistik. (2012). *Produk Domestik Bruto Indonesia Triwulanan 2011 Menurut Lapangan Usaha*. Jakarta: BPS. Diakses dari <https://www.bps.go.id>
- Fiorillo, V., & Amico, B. M. (2024). *Milk Quality and Economic Sustainability in Dairy Farming: A Systematic Review of Performance Indicators*. *Dairy*, 5(3), 384-402.
- Kementerian Pertanian Republik Indonesia. (2012). *Statistik Pertanian 2011*. Jakarta: Pusat Data dan Sistem Informasi Pertanian, Sekretariat Jenderal Kementerian Pertanian.
- Kusumastuti, A. E., Fadillah, M., & colleagues. (2023). *Characteristics of Dairy Farmers and Water-Use Efficiency in Sleman Regency*. *Survey Data*
- Lamkowsky, M., Meuwissen, M. P. M., & van der Meulen, H. A. B. (2024). *How limiting is finance for Dutch dairy farms? A dynamic profit analysis*. *Journal of Agricultural Economics*.
- Marantha, S. D. I., Purnomo, S. H., & Sari, A. I. (2022). Study of the financial feasibility of a dairy farming business after the FMD outbreak in Kampung Susu Lawu. *Jurnal Peternakan dan Riset Hewan*, 3(2), 87–96.

- Mukhlis, M., Hendriani, R., Sari, N., Wisra, R. F., Fitrianti, S., & Mohtar, U. (2023). Farmer Income Analysis of Integrated Farming Models of Corn and Cow in Payakumbuh District. *Jurnal Penelitian Pertanian Terapan*, 23(2), 254–261. <https://doi.org/10.25181/jppt.v23i2.2793>
- Nafik, I., Sutrisno, J., & Nurhidayati, I. (2024). *Analisis Ekonomi Usahatani Jagung di Kabupaten Blora (Biaya dan Pendapatan)*. JIA (Jurnal Ilmiah Agribisnis), 9(6), 603–612.
- Nugroho, S. E., Santoso, B., & Wardhani, P. (2023). *The Role of Dairy Farming in Enhancing Rural Livelihoods in East Java*. Journal of Indonesian Agricultural Studies, 15(2), 101-115.
- Prasetyo, B., & Wijaya, H. (2021). *Economic Contributions of Livestock Sub-sectors in East Java Province*. Journal of Agribusiness and Rural Development, 12(1), 55-68.
- Sari, D. P., Arifin, Z., & Widodo, T. (2019). *Dairy Farming and Its Impact on Farmer Welfare in Indonesia*. Journal of Tropical Animal Science, 7(3), 140-152.
- Sousa, F. V. de, Santana, H. A. de, Cardoso Santana, E. O., et al. (2024). *Estimation of economic equations as a management tool in feedlot dairy farming*. Acta Scientiarum. Animal Sciences, 46.
- Susanto, A., & Hadi, P. (2024). *Livestock Development and Economic Growth in East Java*. In M. R. Santosa (Ed.), *Advances in Indonesian Livestock Economy* (pp. 89-105). Bandung: Universitas Padjadjaran Press.
- Thomson, T. (2024). PADDY FARMING: Poverty, Revenue and Cost Analysis. *Journal of Agribusiness and Local Wisdom*, 6(1), 19–23.
- Velarde-Guillén, J., Sainz-Ramírez, A., Celis-Álvarez, M. D., Arriaga-Jordán, C. M., & Martínez-García, C. G. (2022). Farm, household, and farmer characteristics associated with changes in management practices and technology adoption among dairy smallholders in the central highlands of Mexico. *Tropical Animal Health and Production*, 54(5), 283.
- World Bank. (2012). *Indonesia Economic Quarterly: Stability Amidst Global Volatility*. Jakarta: The World Bank Office Jakarta. Diakses dari <https://www.worldbank.org/en/country/indonesia/publication/indonesia-economic-quarterly>