

Original Article

Study of the Financial Feasibility of a Dairy Farming Business after the FMD Outbreak in Kampung Susu Lawu, Plaosan District, Magetan Regency

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Abstract

Objective: An outbreak of Foot-and-Mouth Disease (FMD) in Indonesia targeted ruminants, notably impacting dairy cows and precipitating a significant downturn in milk production during the year 2022. This research aimed to determine the financial feasibility and break-even point of post-FMD dairy farming within the Kampung Susu Lawu livestock group in Plaosan District, Magetan Regency.

Methods: Employing a quantitative descriptive method, this study utilized survey techniques involving 50 dairy farmers affiliated with the Livestock Group of Kampung Susu Lawu. The data analysis encompassed investment analysis, including the Benefit Cost Ratio (BCR), Net Present Value (NPV), Internal Rate of Return (IRR), Pay Back Period of Credit (PPC), and Break-Even Point (BEP).

Results: The findings revealed a BCR value of 1.49, NPV amounting to IDR 38,888,178.00, IRR at 26.36%, PPC of 3.46 years, BEP pegged at IDR 33,043,062.00/year, and BEP based on the unit set at 7,396 liters of milk/year. Financial analysis indicated a positive NPV, a BCR exceeding 1, an IRR surpassing prevailing bank interest rates, and a PPC duration of 3.46 years, collectively affirming the financial feasibility of the dairy farming business.

Conclusions: This investigation shows that the post-FMD smallholder dairy business is economically feasible. Farmers stand to accrue benefits by surpassing the production threshold of 7,396 liters of milk/year or by maintaining a herd of productive dairy cows numbering more than three.

Keywords: Dairy business; Financial Analysis; Break Even Point

INTRODUCTION

Livestock development, integral to the broader spectrum of agricultural progress, assumes a crucial role in Indonesia's economic activities as an agrarian nation. Among the primary objectives of livestock development is the provision of essential nutritional requirements for the populace, derived from animal protein sources such as meat, eggs, and milk. The dairy cattle sector emerges as a particularly promising domain, boasting

substantial potential for sustained expansion. Milk, a product of dairy cows, holds dual significance serving as a protein source for direct consumption by farmers and concurrently constituting a revenue stream through sales. The dairy farming industry's viability persists in light of the continual necessity for dairy products aligned with societal advancements and enhanced welfare. The present landscape indicates a propitious environment for ongoing development within the dairy farming sector. This is propelled by an escalating demand for

livestock products and processed derivatives, spurred by factors including population growth, increased income levels, a burgeoning requirement for animal protein, and heightened public awareness regarding nutritionally rich food. Meanwhile, the prevailing dairy farming in Indonesia is characterized by a preponderance of small-scale enterprises, typified by modest livestock ownerships, typically ranging between 3 to 6 cows per individual farmer. [1].

The national demand for milk consistently experiences an upward trajectory, driven by population growth. However, this heightened demand has not been met with commensurate increases in optimal milk production, resulting in a substantial reliance on imports. According to the [2] Indonesia's annual milk consumption stands at 4.4 million tons, while domestic milk production only attains 0.9 million tons. This discrepancy underscores a stark reality where a mere 20% of the national milk demand is fulfilled by Indonesian breeders, leaving a significant 80% to be sourced from imports.

Magetan Regency, situated in East Java Province, stands out as a region with a noteworthy concentration of dairy cattle. The trajectory of milk production in Magetan Regency has demonstrated an upward trend, with recorded figures indicating an increase from 1,455,727.41 liters in 2021 to 1,492,120.60 liters in 2022 [3](BPS Magetan, 2023). Plaosan District, within Magetan Regency, significantly contributes to this milk production surge. The district recorded a production volume of 925,265.54 liters in 2021, witnessing a subsequent increase to 999,720.80 liters in 2023 [3] (BPS Magetan, 2023).

In Plaosan District, the dairy cattle business is characterized as a grassroots endeavor, employing a simple and traditional maintenance pattern. Consequently, the determination of financial feasibility remains elusive. The assessment of a livestock business's success hinges on two crucial factors: operational margin and profitability. Operational margin gauges the financial surplus derived from returns relative to direct operating costs, excluding investment costs. On the other hand, profitability, a measure of long-term financial success, comprehensively considers all income and production costs, encompassing investment

costs. This comprehensive evaluation ultimately determines the sustainability of the livestock business [4].

The success or failure of a business is commonly appraised through the assessment of profits or losses. The optimization of business potential entails a comprehensive examination of investments, production costs, and sales receipts, a process facilitated by business financial analysis. The primary objective of financial analysis is to ascertain the feasibility of a business, making it an integral component of strategic business planning [5]. In 2022, Indonesia witnessed an outbreak of Foot-and-Mouth Disease (FMD), specifically affecting ruminants, with dairy cows bearing a significant brunt, resulting in a marked reduction in milk production. This deleterious impact extended to the dairy cows situated in Kampung Susu Lawu, located in Plaosan District, Magetan Regency. The FMD outbreak precipitated a decline in both the population and milk production of dairy cows within this region. Consequently, a research initiative has been initiated to investigate the feasibility of the smallholder dairy cattle business in Susu Lawu Village, Plaosan District, post the FMD outbreak. The research is to conduct a thorough financial analysis with the aim of determining and evaluating the feasibility of small-scale dairy farming in Susu Lawu Village, Plaosan District, Magetan Regency. The research outcome of this financial analysis is to provide insights into the feasibility and sustainability of the local dairy farming business in the aftermath of the FMD outbreak.

MATERIALS AND METHODS

Data source

This research took place from June 2 to July 7, 2023, within the confines of Plaosan District, Magetan Regency. The study incorporated a combination of primary and secondary data. Primary data were acquired through interviews and direct observations involving dairy farmers, utilizing a pre-arranged set of questionnaires and inquiries. Meanwhile, secondary data were extracted from relevant literature provided by governmental and pertinent agencies associated with the ongoing research. The origins of secondary data encompassed entities such as the

Magetan Regency Livestock and Fisheries Service, the Plaosan District Agriculture Extension Center, and the Magetan Regency Central Statistics Agency.

Sampling Method

The primary methodology employed in this study is a quantitative descriptive approach utilizing survey techniques. The quantitative descriptive method involves the collection of data from samples that reflect the actual circumstances, followed by the compilation, processing, and analysis of the data using statistical methods. This method serves to provide a comprehensive overview of the prevailing situation and addresses inquiries pertaining to the status of the research subjects [6]. The selection of the research location was purposefully undertaken, considering that Plaosan District boasts a multitude of dairy cattle businesses, encompassing both small and large-scale enterprises. This choice was further justified by the district's possession of adequate infrastructure, natural resources, and a sufficient pool of human resources that are conducive to developmental endeavors. The sampling approach adopted was purposive, involving the deliberate selection of breeders in various villages within Plaosan District. The criteria for selection included a minimum of 2 lactating dairy cows, a minimum of 1 year of farming experience, and the sale of milk to collectors, specifically PT DAS Ponorogo and PT Toing Tulungagung. A total of 60 respondents from a population of 134 dairy farmers in Plaosan District, Magetan Regency were sampled for inclusion in this research.

Descriptive Analysis

Descriptive analysis was a methodology employed for data analysis, characterized by the description and portrayal of collected data without the explicit intent of deriving general conclusions or generalizations [9].

Net Benefit Ratio (Net B/C Ratio)

The Net Benefit Cost Ratio (Net B/C Ratio) was defined as the ratio of positive net present value to negative net present value [10]. This metric served to illustrate the magnitude of additional benefits in relation to each incremental cost of one unit. If a net B/C

value is > 1 [9]. The formula utilized for computing the Net Benefit Cost Ratio was:

$$\frac{B}{C} = \frac{\sum_{t=1}^n \frac{B_t - C_t}{(1+i)^t}}{\sum_{t=1}^n \frac{C_t - B_t}{(1+i)^t}}$$

Notes :

B_t : Gross profit in year t

C_t : Gross cost in year t

i : Interest rate (discount rate)

t : Economic age

The criteria that are often used in assessing a business are determined by:

Net B/C > 1 : business is feasible (profitable)

Net B/C = 1: business no profit no loss (break event)

Net B/C < 1 : business is not feasible (loss)

Net Present Value (NPV)

NPV represented the net disparity between the present value of benefits and the present value of costs. Its purpose was to compare the present value of net cash inflows or net income with the present value of the cost associated with an investment [10]. NPV was calculated using the following formula:

$$NPV = \sum_{t=1}^n \frac{B_t - C_t}{(1+i)^t}$$

Notes:

B_t : Total gross revenue from business in year t

C_t : The total gross expenses of the business in year t

n : year amount

i : interest rate (discount rate)

The criteria that are often used in assessing a business are determined by:

NPV > 0 : The business is feasible

NPV = 0: The business returns capital equal to the cost which are issued

NPV < 0 : The business is rejected because it is not profitable

Internal Rate of Return (IRR)

The Internal Rate of Return (IRR) was utilized to ascertain the interest rate at which the NPV value of the project equaled zero [11]. As indicated by [12], IRR is defined as the discount rate that yields a rate of return

equivalent to zero. IRR serves as an indicator of a project's capability to generate a return on capital or the extent of profit it can achieve. The calculation of IRR involved the application of the following formula:

$$IRR = i_2 + \left(\frac{NPV_1}{NPV_1 - NPV_2} \right) (i_2 - i_1)$$

Notes:

NPV1 : NPV at the highest discount rate

NPV2 : NPV at the lowest discount rate

i1 : Discount rate NPV 1

i2 : Discount rate NPV 2

The criteria that are often used in assessing a business are determined by:

IRR > Cost of capital then the project is considered feasible.

IRR < Cost of capital then the project is considered not feasible.

Payback Period of Credit (PPC)

The Payback Period of Credit (PPC) was a metric employed to determine the period required to recoup investment expenses through cash flow. It represented the duration or number of years necessary to recover the issued investment value. A quicker return on investment costs was indicative of a favorable project, reflecting efficient capital turnover [10]. Investors or entrepreneurs frequently relied on the PPC or payback period as a determinant in their decision-making process regarding the investment of capital in a project [12].

$$\text{Payback Period} = \frac{I}{Ab} \times 1 \text{ tahun}$$

Notes:

I : The amount of business investment costs required

Ab : Cash flow generated by the business each year

The criterion commonly employed for evaluating a business was whether the payback period was shorter than the maximum stipulated payback period, rendering the business acceptable. Conversely, the project would be rejected if the payback period exceeded the predetermined maximum payback period.

Break Even Point (BEP)

The Break Even Point (BEP), frequently denoted as the break-even point, represented the juncture at which the company encountered a situation of neither profit nor loss [13]. The calculation of BEP was performed using the following formula:

$$BEP \text{ unit} = \frac{FC}{P - V}$$

$$BEP \text{ IDR} = \frac{FC}{1 - \frac{V}{P}}$$

Notes :

FC : Fixed costs

Q: Selling price per unit

V : Variable cost per unit

RESULTS

Characteristics of Respondents

The characteristics of respondents in the dairy business in Plaosan District, Magetan Regency can be seen in table 1.

According to the study findings, it was revealed that 48 individuals, constituting 80% of the farmers, fell within the productive age category, while 12 individuals, accounting for 20% of the farmers, were categorized as non-productive age. The productive age range spans between 15 and 65 years, encompassing individuals actively engaged in the workforce [14]. Given that the majority of breeders in Plaosan District were within the productive age range, there existed an opportunity to enhance their knowledge and skills by introducing new innovations in the livestock sector. Furthermore, the educational attainment of breeders in Plaosan District was observed to be relatively low. The study results indicated that 53.33% or 32 breeders had only completed elementary school, and 7 breeders, equivalent to 11.67%, either did not attend school or did not graduate from elementary school. According to [15], the formal education of farmers plays a crucial role in influencing their capacity to adopt innovation and technology. Higher levels of education are anticipated to enhance the adoption of technology, thereby contributing to the improvement of their agricultural enterprise.

Table 1. Characteristics of dairy cattle business respondents in Plaosan District, Magetan Regency

Farmer's age (year)	Number of Farmers (People)	Percentage (%)
<15	0	0,00
15-64	48	80,00
>64	12	20,00
Farmer's Education		
Not pass elementary	7	11,67
Elementary school	32	53,33
J High school	4	6,67
S High School	16	26,67
Bachelor degree	1	1,67
Farming experiences (year)		
< 5	3	5,00
5-10	19	31,67
11-15	21	35,00
> 15	17	28,33
Main Job		
Farmer	26	43,33
Breeder	30	50,00
Driver	1	1,67
Entrepreneur	2	3,33
Construction laborers	1	1,67
Total	60	100

Source: Processed primary data, 2023

The majority of respondents had accumulated 11-15 years of experience in livestock farming, constituting 21 individuals or 35.00%. Among the respondents in Plaosan District, 30 individuals or 50.00% were primarily engaged in breeding, while the second most prevalent occupation was farming, encompassing 26 individuals or 43.33%. The respondents acquired their skills in livestock raising and farming through familial knowledge passed down through generations. As suggested by [16], a farmer's experience in livestock raising can significantly impact the success of their business, as an extended duration of experience contributes to a more profound understanding of the intricacies involved in livestock management. Moreover, the availability of land and forage for livestock within the region further buttressed the livestock and agricultural enterprises. Given the integrated and mutually sustainable nature of these two businesses, the local conditions facilitated their operation and development.

Economic Aspects of Dairy Cattle Business in Plaosan District

The financial and economic evaluation of agricultural projects, such as dairy husbandries, was identified as one of the paramount activities within the agricultural sector [17]. In financial analysis, cash flow denoted the monetary movement within the company over a specific period. It delineated the inflow of funds resulting from the sale of cow's milk and the outflow of funds encompassing various costs, including investment expenses, equipment purchases, feed costs, drug expenses, fuel expenditures, and labor costs. Cash flow exhibited a non-proportional relationship between annual expenditures and total annual receipts. The analysis of business feasibility provided diverse information pertaining to the level of profits, the duration for the return on capital, and the permissible interest rate on credit that this particular business activity could endure [18].

Investment

The investment costs incurred in the dairy cattle business in Plaosan District, Magetan Regency can be seen in Table 2. The investment costs associated with the dairy cattle business in Plaosan District, Magetan Regency, comprised expenditures on cages, equipment, and the procurement of cows. Investments in equipment and parent cages were envisaged for long-term utilization, serving as integral components of production facilities and infrastructure. Investment, in this context, represents a strategic allocation of available funds or resources aimed at garnering substantial profits in the future [19].

The most significant proportion of the investment costs pertained to the acquisition

of four cows, amounting to IDR 68,052,632.00 or 85.61%. The breed chosen by the breeders for their dairy cattle was the Holstein Friesian Cross (PFH). Cages functioned as essential shelters for livestock, playing a crucial role in supporting livestock productivity. The average barn area in Plaosan District measured 59.03 m², constructed with materials such as tiles, wooden and brick walls, and cement floors, incurring an average cost of IDR 10,347,368.00 for cattle pen construction. Conversely, the smallest proportion of investment costs, at IDR 1,093,649.00 or 1.38%, was attributed to equipment. This category included tools such as milk cans, screws, hoes, hoses, and sickles.

Table 2. The average investment cost of a dairy business in Plaosan District, Magetan Regency with an average ownership of 4 birds

Investment	Cost (IDR)	Percentage (%)
Cage	10.347.368,00	13,02
Equipment	1.093.649,00	1,38
Purchase of cows	68.052.632,00	85,61
Total	79.493.649.00	100

Source: Processed primary data, 2023

Production cost

The production costs of a dairy cattle business in Plaosan District, Magetan Regency can be seen in Table 3 and Table 4.

Based on the data from Table 3, the fixed costs incurred for the dairy cattle business in Plaosan District are the cost of depreciation of the cage, depreciation of equipment and depreciation of the cows. The biggest proportion of fixed costs for a year is the main depreciation expense of IDR. 2,407,519.00/year, the second largest proportion value is the depreciation of the cage with the amount of IDR. 1,034,737.00/year and the smallest are the equipment depreciation of IDR. 218,730.00/year. The depreciation value of fixed costs is calculated using the straight-line method. The estimated useful life of the cage is 10 years, the equipment is 5 years and the cows is rejected at the age of 9 years. This is in accordance with the opinion of [18] that rejected cows are 8 years old and produce little milk.

The biggest proportion of variable costs is feed with the amount of IDR. 28,977,789.00/year. The feed given is in the form of forages such as

kolonjono grass, elephant grass and pakchong grass. The average forage grass is 18 kg/head/day. Another feed is dairy cow concentrate. Giving concentrate is 7 kg/head/day. Forage price IDR 300.00/kg, concentrate is IDR 200,000.00/sack or IDR 4000.00/kg.

The second largest proportion of variable costs is labor costs with a total of IDR 10,800,000.00/year for 2 workers. Labor is the second largest production cost after feed costs, which is 20-30% of production costs due to excessive use of labor, it could also be due to the use of overtime rates which are of course more expensive than direct labor costs [19]. Labor costs in Plaosan District do not reach 20% of production costs because the labor used is family labour. Family workers tend not to consider labor wages as part of production costs or consider labor wages to be part of the profit earned.

Diseases that often attack livestock are bloating, mastitis and diarrhea. Each time the treatment by the vet costs between IDR 40,000.00 – IDR 150,000.00 for one treatment.

The average cost spent on health is IDR 711,930.00/year. The cost of purchasing tools in the dairy cattle business is an average of IDR 218,730.00/year. The cost of purchasing the tools used in the dairy business are milk cans, shovels, hoses, hoes and sickles. The cost of repairing the cage is IDR 413,895.00/year. Cage repairs are usually carried out to replace broken tiles, walls and floors and damaged fences.

The cost of water and electricity is IDR 297,965.00/year. Electricity costs for dairy cows spend an average of 20% of their daily electricity needs. Electricity is used for lighting the stables and drinking water. The water used for breeders is well water which is taken using a water pump. The smallest proportion of variable costs is the cost of artificial insemination (AI) of IDR 228,491.00/year. The IB fee is quite large, because the average S/C ratio is 2 with a fee per IB ranging from IDR 35,000.00 – IDR 50,000.00.

Table 3. The average production cost of a dairy cattle business in Plaosan District, Magetan Regency with an average ownership of 4 cows

Fixed cost	Amount (IDR/year)
Cage depreciation	1.034.737,00
Equipment depreciation	218.730,00
Cows depreciation	2.407.519,00
Total	3.660.986,00

Source: Processed primary data, 2023

Table 4. The average production cost of a dairy cow business in Plaosan District, Magetan Regency with an average ownership of 4 cows

Variable cost	Amount (IDR/year)
Feed	28.977.789,00
Labor	10.800.000,00
Health	711.930,00
Cage repair	413.895,00
Equipment purchase	218.730,00
Water and electricity	297.965,00
Artificial insemination	228.491,00
Total	41.648.800,00

Source: Processed primary data, 2023

Revenue

Revenue from the dairy cattle business in Plaosan District, Magetan Regency can be seen in Table 5.

Based on Table 5, the income from the dairy cattle business in Plaosan District, Magetan Regency, with an average ownership of 4 productive cows is IDR 76,962,491.00/year. The main income is the sale of milk, which amounts to IDR 46,943,368.00/4 fish/year or 61.00%. According to [20] stated that the main income comes from selling milk because dairy cows are the main product of milk. The average milk production in Plaosan District that is sold is 7 liters/day.

By-products include the sale of feces, calves and the sale of rejected cows, but the proceeds from the sale of cows are received at the end of the cash flow calculation or the 5th year. The proceeds from the sale of calves is IDR 18,689,123.00/4 head/year or 24.28%. The calves that are born will be sold at an average age of 5 months and are assumed to sell all male and female calves. Revenue from the sale of feces is IDR 1,090,000.00/year. Stool sales are calculated using a non-cash value for feces used alone.

Table 5. The average income of a dairy cow business in Plaosan District, Magetan district scale with an average ownership of 4 cows

Description	Total (IDR)	Percentage (%)
Main revenue		
Sales of milk	46.943.368,00	61,00
Side revenue		
Sales of feces	1.090.000,00	1,42
Sales of calves	18.689.123,00	24,28
Sales of cows	10.240.000,00	13,31
Total	76.962.491,00	100

Source: Processed primary data, 2023

Dairy Cow Business Financial Analysis

Criteria that can be used to calculate business feasibility in investment are NPV, IRR, BCR and PPC. The size of the investment criteria in the dairy cattle business in Plaosan District, Magetan Regency can be seen in Table 6.

Table 6. Results of the financial analysis of a dairy cow business in Plaosan District, Magetan Regency with an average ownership of 4 cows

Description	Results
Nett present value (NPV)	IDR 38.888.178,00
Internal rate of return (IRR)	26,36%
Benefit cost ratio (BCR)	1,49
Payback period of credit (PPC)	3,46 years

Source: Processed primary data, 2023

The results of the financial analysis of the dairy cattle business in Plaosan District are based on research data obtained by an NPV of IDR 38,888,178.00 with a discount rate of 12%. NPV value of IDR 38,888,178.00 it can be concluded that the business is feasible to run because the NPV value obtained during the life of the business is greater than zero (NPV > 0) [21]. IRR research data shows 26.36% so it is feasible to run. This is in accordance with the opinion of [22] which states that the IRR value indicates the ability of a project to generate a return on capital or the level of profit that can be achieved, if the IRR is more than the cost of capital discount factor then the project is feasible to work on. The BCR at the research site was 1.49, which means that the dairy cattle business in Plaosan District is feasible to run because the income earned by farmers is greater than the total production costs incurred. In accordance with the opinion [2] which states that the business is feasible if the BCR value is more than 1. Based on the data obtained, the PPC value of the dairy cattle business in Plaosan District is 3.46 years, which means that a period of less than 4 years can return investment so that the dairy cattle business in Plaosan District is feasible because it returns investment quickly.

Break Event Point (BEP) of Dairy Cattle Business

The value of the break event point (BEP) for dairy cattle in Plaosan District, Magetan Regency can be seen in Table 7. The results of the calculation of the BEP of the people's dairy business in Plaosan District, Magetan Regency

based on the sales value of milk is IDR 33,043,062.00/year. The results of selling milk with the sales value, the farmer does not experience losses or profits. Breeders will benefit if the sales are more than IDR 33,043,062.00. The BEP value based on the unit is 7,396 liters/year. Breeders will benefit if they are able to produce more than 7,396 liters of milk per year or raise more than 3 productive female cows with an average milk production of 7 liters/day.

Table 7. Break event point (BEP) value of dairy cattle business in the District Plaosan, Magetan Regency with an average ownership of 4 cows

Description	Total
Fixed cost	IDR 3.660.986,00
Variable cost	IDR 41.648.800,00
Variable cost/liter milk	IDR 3.973,00
Revenue	IDR 46.943.368,00
Price/liter milk	IDR 4.468,00
BEP IDR	IDR 33.043.062,00
BEP unit	7.396 liter

Source: Processed primary data, 2023

DISCUSSION

When the FMD outbreak occurs in 2022, the spread of foot and mouth disease (FMD) triggers a decline in milk production of up to 30-40%. The FMD outbreak caused the dairy cow population to shrink because many dairy cows died due to FMD. This year, after the FMD outbreak subsided, farmers began trying to recovery their businesses. The results of research in the KSL group showed that dairy cow who had been attacked by FMD found it difficult to produce back to normal as before, around 8-10 liters/day. The efforts made by breeders are to provide intensive care by providing high nutritional feed and many even sell the unproductive broodstock and replace it with new ones. Therefore, this research aims to find out how to analyze the financial feasibility of breeders who join KSL after recovering from the FMD outbreak.

The results of the research show that the demographic characteristics of the 60 dairy farmer respondents who are members of KSL (Table 1) are that most of them are still of productive age [12], but many still have low

education. Most of the farmers have experience in the dairy farming business for more than 10 years with their main jobs as horticultural farmers and dairy cattle breeders. These demographic characteristic conditions are quite supportive in the development of dairy cattle businesses that are members of KSL in Sarangan District, Plaosan District, Magetan Regency [14].

Analysis of the financial feasibility of a livestock business can start from calculating investment costs, production costs, both fixed costs and variable costs, as well as calculating business revenues. After that, the calculation of business profits obtained from the revenue is reduced by the total operational costs of business production [10]. To determine financial feasibility, it is necessary to carry out financial analysis in the form of NPV, BCR, IRR, PPC and BEP [6]. The results of the research show that the investment costs for KSL dairy farmers with an average ownership of 4 cows are IDR 79,493,649 in the form of cages, equipment and the purchase of dairy cows, where the largest investment is the purchase of dairy cows amounting to 85.61% (Table 2). In this research, land investment costs are not included in the calculation, because the land is owned by the breeders.

The production operational costs of the KSL dairy farming business are the sum of fixed costs and variable costs. Fixed costs include stall depreciation, equipment depreciation and depreciation of dairy cows, while variable costs include feed costs, labor, livestock health costs, stall repairs, equipment purchases, electricity and artificial insemination costs. The average production cost for a dairy business is 4 cows per year, with fixed costs of IDR. 3,660,986/year (Table 3) and variable costs of IDR 41,648,800/year (Table 4), so the total operational costs are IDR 45,309,786. The largest proportion of fixed costs in livestock businesses is depreciation of dairy cows, while the largest proportion of variable costs is the cost of animal feed.

The income generated in the dairy farming business is obtained from the sale of milk, sale of calves, sale of rejected heifers and sale of manure. The total income from the above sales for keeping 4 dairy cows is IDR. 76,962,491/year (Table 5), so that the total income minus the total

costs results in a profit of IDR. 31,652,705/year. The results of the feasibility study analysis of the dairy farming business projected for the next 5 years (Table 6) obtained an NPV value of IDR 38,888,178, IRR 26.36%, BCR 1.49 and PPC 3.46 years. This shows that the dairy farming business that is part of the KSL group in Sarangan village, Plaosan District, Magetan Regency is declared feasible to operate because all feasibility analysis values meet the predetermined feasibility criteria [15].

CONCLUSION

Based on the research findings and the subsequent discussion regarding the investment in the dairy cattle business in Plaosan District, Magetan Regency, utilizing an investment age of 5 years and a discount factor of 12%, it can be conclusively determined that the dairy cattle business in Plaosan District is deemed feasible for cultivation. The NPV, IRR, BCR, PPC, and BEP values were IDR 38,888,178.00; 26.36%; 1.49; 3.46 years; BEP unit 7,396 liters of milk, and BEP sales of IDR 33,043,062.00. These outcomes signify that farmers would experience positive outcomes if milk production from dairy cattle exceeded 7,396 liters/year or if they maintained more than 3 productive cows with an average milk production of 7 liters/day.

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