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Financial Feasibility Analysis of Beef Cattle Business Peranakan Ongole (PO) Breed in Jaken Subdistrict, Pati

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Abstract

Beef cattle business is part of livestock development that supports the meat self-sufficiency program in the future, therefore it needs to develop and increase productivity that is efficient and provides benefits to farmers. This study aims to analyze the financial feasibility of Peranakan Ongole (PO) beef cattle in Jaken District, Pati Regency. This study used a survey method with qualitative and quantitative approaches. The sampling method was purposive with the provision that respondents were taken from members of the Farmer Group in Jaken Subdistrict who raised Peranakan Ongole (PO) beef cattle with a fattening period of 6 months so that there were 106 respondents. The data analysis method that will be used to calculate the business feasibility analysis is the calculation of business feasibility. The results showed that the feasibility of fattening beef cattle Peranakan Ongole (PO) based on BCR, NPV and IRR criteria as a whole is feasible. Based on calculations using the payback period method obtained on average within 1.48 maintenance periods, the benefits obtained by beef cattle farmers in Jaken District can already return the investment capital of the beef cattle business.

Keywords: Business; Cattle; Farmer Group; Feasibility

1. Introduction

The livestock sector plays a strategic role in rural economic development, particularly in improving the income and welfare of livestock farmers. In Indonesia, livestock development is directed at increasing productivity, meeting national food and nutrition needs, and creating business and employment opportunities in the agribusiness and agro-industry sectors. One of the livestock subsectors that significantly contributes to this goal is beef cattle farming, which supports the national self-sufficiency program through enhanced efficiency and productivity.

Central Java Province is one of the main suppliers of beef in Indonesia, with a total production of 65,150,774 kg in 2022. Pati Regency, as one of the contributing regions, accounted for 2,291,351 kg in the same year (BPS, 2022). Beef cattle farming in Pati Regency is spread across 21 districts, with the highest cattle ownership found in Jaken District, where 12,588 cattle are owned by 6,452 farmers. Among them, 645 farmers manage Ongole Grade (PO) beef cattle farming, with a total population of 12,500 heads (Dispertan Pati Regency, 2023).

Various breeds of beef cattle are raised in Pati Regency, including Limousin, Simmental, and Ongole Grade (PO) cattle. PO cattle, as a superior local breed, have high disease resistance, can adapt well to low-quality feed, and are more tolerant of tropical environmental conditions compared to imported breeds (Ichsan, 2020). Additionally, PO cattle have

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strong heat resistance, are resilient to mosquito and tick bites, and efficiently utilize coarse fiber feed (Suranny et al., 2019). These advantages make PO cattle a strategic commodity in the development of sustainable livestock farming.

Despite these advantages, the development of PO beef cattle farming still faces several challenges, particularly in terms of financial management and business sustainability. Many smallholder farmers continue to operate using traditional farming practices, with limited access to financial literacy and market information. The lack of systematic financial planning, including cost-benefit analysis and investment evaluation, often leads to suboptimal profitability. Moreover, external factors such as fluctuating feed prices, limited access to quality feed, and market price instability further complicate the sustainability of the business. Addressing these issues requires a comprehensive approach that includes technical assistance, financial education, and supportive policies to enhance the resilience of PO beef cattle farming in the region.

Although PO beef cattle farming in Jaken District has significant potential, its financial and economic feasibility has not been extensively analyzed. Most farmers still use a simple approach in calculating profits, relying solely on the difference between purchase and selling prices without considering all production cost components. Consequently, decision-making in livestock farming becomes less optimal, which may impact the long-term sustainability of the business. Given these challenges, this study aims to analyze the financial feasibility of PO beef cattle farming in Jaken District, Pati Regency. The findings are expected to provide insights for farmers to optimize their business management and offer policy recommendations for stakeholders to support the development of a more efficient and sustainable livestock sector

2. Material and methods

Business feasibility analysis consists of two methods, namely undiscounting or discounting financial analysis. According to Ayuningsari and Mahayanthi (2014), the undiscounting method uses Payback Period of Credit (PPC) and Break Even Point (BEP) criteria, while the discounting method uses Benefit Cost Ratio (BCR), Net Present Value (NPV), and Internal Rate of Return (IRR) criteria. Undiscounting financial analysis only analyzes the present value of money, while discounting financial analysis analyzes money in the present and future (Anindya et al., 2023).

2.1. Benefit Cost Ratio (BCR)

BCR is the amount of net revenue per investment level of the costs used. BCR is used to see how much net benefit a project can receive for every one dollar spent. BCR is a comparison such that the numerator consists of the total present value of net benefits in years where net benefits are positive, while the denominator consists of the total present value of net costs in years where Bt-Ct is negative, namely gross costs are greater than gross benefits. BCR analysis is a comparison between discounted gross revenue and discounted total costs.

$$BCR = \frac{discounted penerimaan kotor}{discounted biaya total} atau BCR = \frac{\sum_{i=1}^{n} Bt(1+r)^{-n}}{\sum_{i=1}^{n} Ct(1+r)^{-n}}$$

Where:

- Bt = Revenue in year t (Rp)
- Ct = Costs incurred in year t (Rp)
- I = Discount Rate (%)
- T = Economic life (year)
- In the BCR method there are 3 important criteria, namely:
    - Net BCR> 1 the business is profitable
    - Net BCR = 1 business done break even
    - Net BCR < 1 business done loss

2.2. Net Present Value (NPV)

NPV analysis is the difference between total revenue (benefit) and total cost (cost) and investment.

NPV = total present benefit value - (total present cost value + investment)

$$NPV = \sum_{i=1}^{n} Bi - (Ci + I)$$

Where:

- **NPV** = Net Present Value
- **B** = Benefit or revenue obtained in year *j*
- **C** = Cost or expense incurred in year *j*
- **r** = Discount rate or interest rate used to calculate the present value of cash flows
- **j** = The *j*-th year in the investment analysis
- **n** = The total period of the project or investment

2.3. Analisis Internal Rate of Return (IRR)

IRR analysis is a level of discount rate, at which discount rate the Benefit Cost Ratio = 1 and or Net Present Value = 0.

$$IRR = p\% + \frac{X}{X+Y} x(q\% - p\%)$$

Where:

- X (positive) = NPV at discount rate p%
- Y (negative) = NPV at discounted rate q%
- q% is greater than p% (q% > p%)

Beef cattle business is said to be feasible if the results of the business analysis show the value of BCR> 1, positive NPV and IRR greater than the prevailing bank interest rate.

3. Results and discussion

3.1. Characteristic of The Research Area

3.1.1. Potential of Cattle Farming in Jaken Subdistrict

Jaken sub-district has the highest number of farmers and number of beef cattle in Pati district so beef cattle business has high potential to be developed further in Jaken sub-district. This can be seen in Table 1 below.

Table 1 Data on Cattle Farmers and Number of Cattle in Pati District for the Second Quarter of 2023

Number	Sub-District	Number of Farmers (people)	Jumlah Sapi (ekor)
1	Sukolilo	2.530	6.222
2	Kayen	492	2.578
3	Tambakromo	1.218	3.659
4	Winong	3.741	4.795
5	Pucakwangi	5.529	12.830
6	Jaken	6.452	12.588
7	Batangan	1.880	4.369
8	Juwana	1.391	2.346
9	Jakenan	2.709	6.112
10	Pati	1.750	3.660
11	Gabus	2.480	4.082

12	Margorejo	1.355	2.316
13	Gembong	1.169	4.174
14	Tlogowungu	1.760	4.849
15	Wedarijaksa	905	2.761
16	Trangkil	1.381	5.234
17	Margoyoso	1.010	5.740
18	Gunungwungkal	1.096	3.003
19	Cluwak	667	1.177
20	Tayu	853	3.827
21	Dukuhseti	1.945	6.699
TOTAL		42.313	103.021

Source: Livestock Data Dispertan second quarter of 2023

Table 2 Number of Farmers and Number of PO Cattle in Jaken Subdistrict

No	Sub-District	Number of PO Cattle Farmers	Number of cattle (head)
1	Sukolilo	240	622
2	Kayen	49	258
3	Tambakromo	122	366
4	Winong	373	480
5	Pucakwangi	553	1.183
6	Jaken	645	2.500
7	Batangan	188	437
8	Juwana	129	235
9	Jakenan	268	611
10	Pati	175	366
11	Gabus	248	408
12	Margorejo	136	232
13	Gembong	120	417
14	Tlogowungu	168	485
15	Wedarijaksa	70	276
16	Trangkil	135	523
17	Margoyoso	91	574
18	Gunungwungkal	108	300
19	Cluwak	59	118
20	Tayu	96	383
21	Dukuhseti	197	670
TOTAL		**4.169**	11.443

Source: Update data for the second quarter of 2023 Pati District Agriculture Office

Based on Table 2, the ownership and number of Peranakan Ongole (PO) cattle in Pati District tops the list with 645 people and 2,500 PO cattle. Data from the Jaken Extension Center shows that only Peranakan Ongole cattle are local cattle raised by farmers in Jaken Sub-district, while the remaining 10,088 head consist of Simental. Limosin, Brahmin and other crosses.

3.1.2. Data on the number of Ongole breed cattle in Jaken sub-district

Table 3 Number of Farmers and Number of PO in Jaken sub-district

No	Year	number of famer's	Number of Cattle
1	2021	660	3.330
2	2022	650	3.250
3	2023	645	2.500

Source: Livestock Data Program of Agricultural Extension Center (BPP) Jaken 2023.

Table 3 presents number of farmer's and number of population of cattle (PO) in Jaken from 2021 to 2023. The data indicate a slight decline in the number of farmers over the years, from 660 in 2021 to 645 in 2023. This downward trend may suggest various factors such as aging farmer populations, shifts in occupational preferences, or economic constraints affecting farmer retention in the livestock sector. Similarly, the number of cattle experienced a significant decrease, from 3,330 heads in 2021 to 2,500 heads in 2023. The reduction in cattle population could be attributed to several factors, including market dynamics, feed availability, disease outbreaks, or shifts in farming practices. The sharper decline in cattle numbers compared to the number of farmers suggests that productivity or herd management strategies may have changed during the period (Lange *et al*., 1998).

3.2. Financial Feasibility Analysis

The results of the financial feasibility analysis of Peranakan Ongole (PO) beef cattle in Jaken Subdistrict based on BCR, NPV, IRR criteria. while the average business feasibility based on these three criteria is listed in Table 4.

Table 4 Average Financial Feasibility of Fattening Peranakan Ongole (PO) Cattle

Feasibility Criteria	Average Result
BCR	1,409
NPV	50.625.856
IRR	17,77

Source : Field Data, 2024.

3.2.1. Business Feasibility Based on BCR Criteria

Based on the results of the average business feasibility analysis with the BCR criteria, it produces a number of 1.409. According to Yulianto (2022), BCR> 1 indicates that the benefits obtained are greater than the cost plus investment so that business activities can be run. BCR < 1 indicates that the benefits generated cannot pay the costs so that business activities cannot be carried out. Meanwhile, if BCR = 1 indicates that the benefits are only able to cover the cost plus investment.

From the results obtained, it can also be seen that the BCR value is quite varied at various levels of business scale so that there is no specific trend pattern. In this case, it does not mean that the greater the number of beef cattle ownership, the greater the BCR value. The difference in BCR value is technically caused by differences in the use of investment costs and production costs as well as the income of each farmer at various business scales, while non-technically this difference is caused by the farmer's own skills in utilizing these production factors, among others, inseparable from educational background factors and business experience.

3.2.2. Business Feasibility Based on NPV Criteria

Net Present Value (NPV) is the ratio between the present value of benefits and the present value of costs of an investment. NPV needs to be used for long-term business activities because it considers changes in currency values. Based on the results of the average business feasibility analysis with the NPV criteria, there were no respondents who

had NPV <0 so that business activities were feasible. According to Shopia et al (2023) NPV> 0 means that the business is feasible, NPV < 0 means that the business is not feasible, while NPV = 0 means that the business will break even.

NPV is the entire net cash flow multiplied by the discount factor in the year and interest rate at a predetermined rate. NPV analysis is very important, especially for long-term businesses that need to consider the value of money by time. In this study, the interest rate is set at 13 percent. The NPV to be seen is during the investment return period. Based on the NPV criteria, a business is said to be feasible if the NPV value is greater than zero (>0) or the NPV is positive.

Money has value over time. The rupiah received now is worth more than the rupiah received in the future. This can be explained that if the money received now is used for investment it will earn interest. Therefore, the amount of money initially and the interest will be greater at a later time than the same money received at the present time without earning interest.

Referring to the assumption that a certain amount of money now has a different value in the future, the analysis of business feasibility based on the NPV criterion is very helpful to find out how much rupiah is received today if it is received in the future. In livestock business in particular, the value of money is very important, especially in terms of investment, where the manager (in this case the farmer) is faced with investment alternatives and must make a decision which one is more profitable.

Based on the results of the study there are no businesses that have NPV less than 0 (NPV <0) or NPV is negative, so that financially beef cattle business in Jaken Subdistrict at various scales of business feasible to be implemented. This according to Rinawati et al., (2023) means that the benefits obtained are greater than the cost of production plus investment, so the business is favorable.

The results of the calculation, it can be seen that the larger the scale of livestock ownership business will affect the higher NPV. While the NPV value varies among the same scale of business due to differences in the use of production costs, investment costs and revenue from cattle sales obtained at various scales of business.

3.2.3. Business Feasibility Based on IRR Criteria

IRR is a certain level of discount rate, where the BCR is less than one (BCR<1) or NPV is equal to zero (NPV=0). This means that at the IRR level, the amount of benefits obtained is only enough to cover all costs and investments during the technical economic life of the business concerned (Chandra *et al.,* 2016). A business is said to be feasible if the IRR is greater than the discount rate or bank loan interest. According to Chandra *et al.,* (2016) a high IRR value or greater than the loan interest rate indicates that the business can be implemented or continued.

The purpose of using financial feasibility analysis with IRR criteria is to find an interest rate that equates the present value of expected cash flows in the future, or cash receipts by issuing an initial investment. Because the calculation of IRR is inseparable from the calculation of NPV, this method is also very important to determine the financial feasibility of beef cattle farming if it is planned for a long time, especially for farmers whose capital comes from loans with certain interest expenses.

The results of the IRR calculation show that the beef cattle business in Jaken Subdistrict has a fairly high average IRR value of 17.17 percent. As with the feasibility analysis based on BCR and NPV, the difference in the IRR value of this beef cattle business on various livestock ownership is technically also more due to differences in the use of investment costs, production costs and the amount of revenue of each farmer, while non-technically the difference in utilization of the use of production factors is closely related to the level of skill of farmers in managing their business.

Based on several opinions about business feasibility criteria based on IRR, from the results obtained it can be said that the financial beef cattle business in Jaken Subdistrict on various scales of livestock ownership is feasible to implement, this can be seen from the IRR value that exceeds the discount rate or bank loan interest rate that has been determined at 13 percent.

4. Conclusion and Recommendation

The feasibility analysis of the Peranakan Ongole (PO) beef cattle fattening business, based on the financial indicators of Benefit-Cost Ratio (BCR), Net Present Value (NPV), and Internal Rate of Return (IRR), indicates that this business is overall feasible and profitable. The analysis results show an average BCR of 1.409, an NPV of IDR 50,625,856, and an IRR of 17.77%. These figures suggest that the investment in PO beef cattle fattening provides positive financial returns

and can be considered a viable agribusiness venture in Jaken District, Pati Regency. Given these findings, it is recommended that further extension services and counseling be provided to local farmers to enhance their understanding of the financial feasibility and potential profitability of the PO beef cattle business. Many farmers may still perceive cattle rearing as merely a supplementary activity to meet household needs or to utilize their spare time. By raising awareness about the promising financial prospects of this business, farmers can be encouraged to transition from subsistence-oriented cattle farming to a more commercially driven enterprise. Furthermore, with proper guidance and training on improved cattle husbandry management, farmers can optimize production efficiency, improve livestock health, and enhance overall productivity. Strengthening business-oriented cattle farming will not only contribute to increasing farmers' income but also elevate their standard of living. In the long term, this shift could lead to the development of a more structured and sustainable beef cattle industry in the region, supporting rural economic growth and ensuring a stable supply of high-quality beef.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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