



Breakeven Point Analysis of Beef Cattle Business: A Case Study in Boliyohuto Subdistrict, Gorontalo

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ABSTRACT

Beef cattle farming is important in providing food, especially animal protein, and supporting the community economy. This study illustrates how this livestock business can quickly breakeven point (BEP), cover costs, and start making a profit. The uniqueness of this study lies in the specific analysis of costs, revenues, and income, as well as the calculation of BEP, which can be used as a guideline for more efficient business management. This study aims to analyze the BEP of the beef cattle business in the Boliyohuto District. The sample used was 89 beef cattle farmers using a quantitative approach. Data was collected through observation, interview, and documentation, followed by quantitative descriptive analysis. The results showed that the average total cost incurred was IDR 11,418,410, and revenue was IDR. 19,814,935, income was IDR. 8,396,525. In addition, the breakeven point (BEP) in quantity is 0.576, and the rupiah value is IDR. 5,709,205. The beef cattle business in the Boliyohuto Subdistrict provides economic benefits because the production and unit price is greater than the breakeven point value, so the business is up-and-coming. This research is very relevant in the context of community economic empowerment because the beef cattle sector has the potential to be a stable source of income, support food security, and create jobs. In addition, the results of this study can be the basis for developing policies and programs that support the sustainability of livestock businesses in rural areas, as well as optimizing the profitability of livestock businesses in the long term.

Keywords: Break Even Point; Beef Cattle; Cost; Revenue; Income

INTRODUCTION

The agricultural sector is the main focus of national development, especially in the food sub-sector (Batubara & Pane, 2023). The food sector is a top priority in Indonesia's development due to the continuous growth of the population and the increasing demand for food and energy. One of the critical subsectors in the food sector is animal husbandry. Production from animal husbandry is significant in meeting the food needs of the community, as well as being a primary source of income for many business actors in this field (Karimuna et al., 2020).

The livestock subsector plays a vital role in developing the agricultural sector, focusing on strengthening food security, meeting animal protein needs, and improving the community's economy. Regional development also has a crucial role. In the future, the development of beef cattle cultivation has great potential because it can produce meat that is a source of protein with a higher content (Saputra & Widodo, 2016). Currently, the demand for beef is primarily met by smallholder farms, which are the mainstay. Therefore, increasing the population and optimizing beef cattle production is important (Haumahu et al., 2020).

Indonesia is the center of beef cattle farming development and has great potential to support food needs, especially animal protein (Abdussalam, 2023). Gorontalo Regency, located in Gorontalo Province, has

considerable potential for advancing beef cattle production and contributes to the economy by supporting food security, creating employment opportunities, and increasing farmers' income. Data on the beef cattle population in Gorontalo Regency in 2019-2023 can be seen in Table 1.

Table 1. Beef Cattle Population in Gorontalo Regency 2019-2023

No	Year	Population (head)	Percentage (%)
1	2019	89.110	18.15
2	2020	96.681	19.70
3	2021	99.108	20.19
4	2022	101.685	20.72
5	2023	104.291	21.25
Amount		490.875	100.00

Source: Gorontalo Regency Central Bureau of Statistics 2020-2024.

Table 1 shows information about the beef cattle population in Gorontalo Regency from 2019-2023, which has increased yearly. This proves that beef cattle farming in Gorontalo Regency has the potential to be developed. One of the sub-districts in Gorontalo District, Boliyohuto Sub-district, has significant development potential for beef cattle farming. This phenomenon can be seen from the area's characteristics related to feed availability, natural resources, and market behavior. However, the beef cattle business also has challenges managing its business, including cost efficiency. Beef cattle farmers need to manage their business efficiently, given the fluctuations in beef cattle prices and feed costs that are often unstable, so as to maximize income and minimize the risk of loss in terms of financing.

Previously conducted beef cattle farming research only relates to farmer characteristics, farmer knowledge and attitudes, innovation adoption process, utilization of agricultural and livestock waste, asset addition, beef cattle feasibility, beef cattle farming problems, farmer perceptions of BUMDES, beef cattle business development and sustainability of beef cattle breeding based on ecological dimensions (Hasanah & Basriwijaya, 2023; Simamora & Matoneng, 2024; Kusmawan et al., 2024; Abdullah et al., 2024; Maskur et al., 2023; Rohani et al., 2023; Asimin et al., 2024; Rasyid et al., 2023; Abas & Baruwadi, 2023; Bawinto et al., 2016). This research has a novelty in the focus of Break Even Point analysis in beef cattle farming, which has not been widely discussed in previous studies. Although many studies examine the feasibility of beef cattle farming in general, specific studies on BEP for beef cattle farming, as conducted in this study, are still rare. This study offers a new approach by digging deeper into the breakeven point in the context of rupiah value and quantity, providing a more comprehensive insight for farmers, especially those involved in small and medium-scale businesses that are more commonly found in rural areas. As such, this study makes an important contribution to optimizing the sustainability and profitability of beef cattle enterprises in the area.

Maruta (2018) explained that the breakeven point is one of the most critical analytical instruments in the management of the beef cattle business. It analyzes the relationship between sales volume and business profitability. The purpose of this is so that a business avoids losses and starts to make a profit when the profit is at zero point. BEP analysis provides an overview of the company's or business's financial position in a breakeven point state. It is also quite helpful for farm management in strategizing and making decisions related to the beef cattle business. By knowing the breakeven point, managers can plan the right strategy to achieve profit and optimize the use of resources.

This study aims to analyze BEP in beef cattle farming. This research focuses on assessing beef cattle enterprises' ability to break even to optimize the profit level. The results of this study are expected to provide practical recommendations for stakeholders, including local government and related institutions, in designing policies that support business sustainability and increase the profitability of the beef cattle farming sector.

RESEARCH METHODS

a. Location and time of research

This research was conducted in Boliyohuto Subdistrict, Gorontalo District, which is known as an area with potential beef cattle business with a population of 7,230 heads or 7.11% of 19 subdistricts in Gorontalo District as of 2022 (Gorontalo District Livestock and Animal Health Service Office, 2023). The beef cattle business in this area has become a source of income for the community, especially for small and medium farmers. This creates a high relevance to conducting research related to business feasibility in the area.

b. Type of Research

This research used a quantitative approach with a descriptive case study method. The quantitative approach is applied because this research analyzes numerical data such as costs, revenue, income, and breakeven points in beef cattle farming.

c. Population and sample

This study had a population of 1,818 people consisting of all beef cattle farmers in Boliyohuto Subdistrict, Gorontalo Regency. The research sample was taken from farmers who raised selected beef cattle from 13 villages in Boliyohuto Subdistrict by purposive sampling, which was determined based on specific village selection criteria such as having livestock in cages, then grouped according to the number of livestock populations, namely villages with the largest, medium and small populations. The villages selected for sampling were Sidodadi Village, which had the largest population; South Sidomulyo Village, which had a medium population; and Sidomulyo Village, which had the least livestock population. In this study, respondent sample size was calculated using the Slovin formula (Santoso, 2023).

$$n = \frac{N}{1 + N \times e^2} (1)$$

Description:

n = sample size

N = total population

e = error rate

Based on the Slovin formula above, the number of samples used with an error rate of 10% is as follows:

$$n = \frac{N}{1 + N \times (e)^2}$$

$$n = \frac{825}{1 + 825 \times (0,1)^2}$$

$$n = \frac{825}{1 + 825 \times 0,01}$$

$$n = \frac{825}{9,25}$$

$$n = 89,19 = 89$$

The number of samples obtained was 89 respondents.

d. Types and sources of data

This study uses quantitative data such as income, revenue, and costs of beef cattle farming and qualitative data through interviews with beef cattle farmers. The data sources of this study are (1) primary data, namely data collected directly from beef cattle farmers in Boliyohuto Subdistrict through questionnaires or structured interviews to explore information about the costs, revenues, and income of their businesses, and (2) secondary data taken from beef cattle farming documents and information obtained from the Gorontalo Regency Statistics Agency.

e. Data collection methods

Data collection was conducted through three main approaches: (1) Observation of beef cattle farming activities in the Boliyohuto sub-district; 2) Direct interviews with beef cattle farmers and the use of questionnaires or interview guides to obtain information on their business income; and 3) Documentation, which includes collecting information from the Gorontalo District Statistics Office and financial reports.

f. Data analysis

This study used quantitative descriptive analysis to measure costs, revenues, income, and the breakeven point in beef cattle farming (Razak et al., 2024; Serandoma et al., 2024; Adnan et al., 2022):

1. Total cost

$$TC = VC + FC (2)$$

Description :

Total cost (TC) is the sum of variable and fixed costs.

Variable cost (VC) is calculated in units of Rupiah

Fixed cost (FC) is calculated in units of Rupiah

2. Total Revenue

$$Total\ revenue\ (TR) = P.Q (3)$$

Description :

P (price) is the unit selling price (IDR/tail)

Q (quantity) is the number of items sold (tail)

TR (total revenue) is the total revenue in units of Rupiah

3. Income

$$Pd = TR - TC \quad (4)$$

4. Break-even point

$$BEP \text{ production}_{(Q)} = \frac{\text{Total Production Cost}}{\text{Unit price}} \quad (5)$$

Beef cattle farming is profitable if the output quantity (Q) exceeds the BEP (Q).

$$BEP \text{ price}_{(IDR)} = \frac{\text{Total Production Cost}}{\text{Total production}} \quad (6)$$

Beef cattle farming is profitable if the unit selling price (P) exceeds the BEP price (IDR).

RESULTS AND DISCUSSION

Research Design

A. Average Production Cost of Beef Cattle Farming in Boliyohuto Subdistrict

The main problem in beef cattle farming is related to production costs, which include labor costs, seeds, feed, medicines, and cage depreciation. Farmers bear annual production costs of up to IDR 11,418,410. An analysis of each cost component was conducted to determine the expenditure structure of farmers in the Boliyohuto Subdistrict, as shown in Table 2.

Table 2. Average Production Cost of Beef Cattle Business in Boliyohuto Subdistrict

No	Description	Amount (IDR)
1	Seed	7,247.191
2	Feed	2,443.554
3	Medicine	36.798
4	Labor	1,611.742
5	Cage depreciation	79.125
Total cost		11,418.410

Source: Processed primary data

Table 2 shows that the most dominant element of beef cattle production costs is the purchase of cattle seeds, with an average of IDR7,247,191 per head or 63.47% of total production costs. The type of cattle used as seedlings in the study location is Balinese cattle. These breeds are purchased directly from nearby markets and then sold when they reach a certain body weight or when they need money for family needs, and others are used as broodmares and studs, which will produce offspring to be developed again. Farmers in the Boliyohuto subdistrict choose beef cattle purchased from local markets because of their ability to adapt to the local environment and produce quality offspring. High expenditure on seedlings reflects the importance of initial investment in determining the success of a livestock enterprise. Moh Saleh et al. (2017) showed that the cost of purchasing seedlings dominated the production cost of beef cattle farming. The selection of superior seedlings has proven important for improving the productivity and quality of livestock products. A decision support system in selecting superior seeds can help farmers choose quality seeds that can increase sales results in the future (Khairina et al., 2021).

The second largest production cost in Bali cattle farming in the study area is feed, mainly consisting of forage such as elephant grass deliberately planted by farmers, wild grass around rice fields, and agricultural waste such as rice straw, rice bran, and tofu dregs. The feeding system is still traditional, where feed is given without considering the needs that should be met, which is about 10% of the cow's body weight. The average feed cost incurred by farmers reaches IDR 2,443,554 per year, which contributes about 21.40% of the total annual production cost. According to research by Sukanata et al. (2014), the cost of forage and concentrate feed is the second largest component after the cost of livestock seeds in the production cost structure. Although unplanned feeding can reduce efficiency, the availability of local feed ingredients can be utilized to reduce costs.

Farmers spent relatively little on medicines, averaging IDR 36,798 per year or 0.32% of total production costs. Medicines are used to prevent and treat livestock diseases, as well as maintain the health of cattle to remain productive. Drug administration is generally done one to two times a year. Despite its low cost, Deworming livestock is vital in maintaining health, preventing mortality, and ensuring optimal production performance.

Research by Moh Saleh et al. (2017) showed that beef cattle medication costs accounted for about 0.28% of the overall variable costs with an average of six cattle. In contrast, in smaller enterprises, with an average of three cows, medication costs were recorded at 0.24%. Although the amount is relatively small, investment in these medications is crucial to maintain animal health and prevent more significant losses in the future.

Average labor costs for beef cattle farming reached IDR 1,611,742 per year, or 14.12% of total production costs. Farmers' family members are mainly employed as laborers, feeding and caring for livestock for 3 hours daily. The use of family labor allows for cost savings, as they generally do not use the formal daily wage system. However, when calculated on an economic value basis, labor costs reflect the significant time and energy required for daily operations. According to La Ode et al. (2021), this indicates the high allocation of time spent by family labor in beef cattle production. On average, this business absorbs 0.94 HOK (person days worked), contributing to about 8.17% of the total family labor time used for agricultural activities. In addition, according to I Gusti Agung (2018), beef cattle farmers who run livestock as a side business spend about 2.95 hours daily managing their livestock business.

Average cage depreciation costs amounted to IDR 79,125 per year or 0.69% of total production costs. Enclosures are made of quality materials and are primarily permanent in the study site, such as teak wood, coconut wood, zinc, and roof tiles. Investing in permanent pens provides long-term benefits such as optimal livestock protection and reduced risk of damage. The depreciation cost indicates an efficient allocation of resources to the supporting infrastructure of the livestock enterprise. The relatively small depreciation cost of cages compared to other components suggests that the initial investment in cages provides economic benefits in the long term. Sturdy and standardized cages can increase livestock productivity, and the quality of cages plays a crucial role in supporting beef cattle productivity. Implementing an optimal pen management system, including layout, shape, and model of the pen, roof design, placement of feed bins, and frame structure, will contribute significantly to the sustainability and success of the beef cattle farming business.

B. Average Revenue from Beef Cattle Business in Boliyohuto Subdistrict

Farmers in the Boliyohuto Subdistrict generate average income from the sale of bulls and females throughout the year. Income from the livestock industry is shown in Table 3.

Table 3. Average Revenue from Beef Cattle Business in Boliyohuto Subdistrict

No	Description	Amount (IDR)
1	Sale of bulls	11.383.117
2	Female cattle sales	8.431.818
Total Revenue		19.814.935

Source: Processed primary data

Table 3 shows that the sale of bulls and females represents the average revenue from beef cattle farming. The average annual revenue was IDR19,814,935 per head, consisting of IDR11,383,117 from bull sales and IDR8,431,818 from female sales. The gap in selling price between bulls and females reflects the market's preference for bulls due to their higher weight or increased meat value. Damayanti et al. (2021) stated that male beef cattle are more economical to slaughter because the percentage of carcass weight in male cattle is higher than the carcass weight of female cattle. Livestock sales are usually carried out by farmers based on urgent needs, such as financing education, health, or other family needs. The beef cattle business is a liquid asset that can be readily cashed out when needed. Arrival et al. (2022) stated that it is relatively easy to find 2-, 3- and 4-year-old beef cattle in abattoirs because farmers tend to sell their cattle in this age range to meet urgent needs, such as children's education fees or hospital treatment.

C. Average Income of Beef Cattle Farming in Boliyohuto Subdistrict

Income is an important metric to evaluate beef cattle farming performance by subtracting farmers' total production costs from the total revenue generated in the Boliyohuto Subdistrict, which can be seen in Table 4.

Table 4. Average Beef Cattle Business Income in Boliyohuto Subdistrict

No	Description	Amount (IDR)
1	Total Revenue	19.814.935
2	Total production cost	11.418.410
Total Income		8.396.525

Source: Processed primary data

Table 4 shows that the average income of farmers is IDR8,396,525 per year, equivalent to the income of one head of cattle per year. This income reflects the success of farmers in managing the beef cattle business economically. However, this income can still be increased through production cost efficiency, especially in the feed component. This is in line with the statement of Sukanata et al. (2014) that the efficient use of forage and concentrate feed can increase farmers' profits. In addition, product diversification, such as utilizing livestock waste in organic fertilizer, can be an additional opportunity to increase farmers' income. This was also conveyed by Rasyid et al. (2018), showing that most beef cattle farmers still do not optimize cow dung for use as an organic fertilizer with high economic value. This is due to their lack of understanding, especially in business financial analysis.

D. Break Even Point of Beef Cattle Business in Boliyohuto Subdistrict

Breakeven point analysis is used to determine the extent to which beef cattle businesses in the Boliyohuto Subdistrict are able to achieve a balance between production costs and revenue. This breakeven point describes the minimum amount of production or the minimum selling price required so that farmers do not experience losses. The results of the BEP analysis for this enterprise are presented in Table 5.

Table 5. Average Results of Breakeven Point Analysis of Beef Cattle Business in Boliyohuto Subdistrict

No	Description	Analysis result
1	Selling price of cattle (IDR)	19.814.935
2	Revenue (IDR)	19.814.935
3	Total production cost (IDR)	11.418.410
4	BEP Production(Q)	0.576
5	BEP Price (IDR)	5.709.205

Source: Processed primary data

Table 5 shows that the breakeven analysis of beef cattle enterprises in the Boliyohuto sub-district shows good performance through a production BEP of 0.576 head per year; farmers only need to sell around 0.576 cattle to cover all production costs. However, the recorded BEP price of IDR 5,709,205 indicates that the current average selling price of IDR 19,814,935 far exceeds the minimum selling price required to break even. This finding indicates that beef cattle farming in the area significantly resists market price fluctuations. However, to maintain business sustainability, farmers need to be aware of potential increases in production costs, especially related to seeds and feed. Rahmatullah et al. (2022) stated that although beef price fluctuations do not significantly impact farmers' income, more influential factors are production cost efficiency and increased livestock productivity.

CONCLUSION

Based on the analysis, beef cattle farming in the Boliyohuto Subdistrict shows significant potential, with an average income far exceeding the considerable costs. The BEP (IDR) value of IDR 5,709,205 and BEP (Q) of 0.576 head per year indicate that this business can cover production costs with a relatively low number of sales. Costs are dominated by purchasing seedlings and feed, reflecting the importance of initial investment and efficient feed management. At the same time, revenue is derived from the sale of bulls, which contribute more due to their higher meat weight. Given that both income and output volume are above the breakeven point, beef cattle farming in the Boliyohuto sub-district can be economically viable to continue and develop. This study has several limitations, including the limited sample that only includes beef cattle farms in the Boliyohuto Subdistrict, so the findings cannot be generalized to other regions. In addition, this study only focused on financial aspects and did not consider other factors such as feed quality, cattle genetics, and market access, which also affect productivity and profitability. The implications of these findings suggest that beef cattle enterprises in the region have good economic potential, but their sustainability depends on the efficiency of feed management and the selection of quality breeds. Stakeholders such as farmers and the government are advised to increase investment in feed management and animal health counseling and focus on improving feed quality and selecting superior seeds. Academics are recommended to conduct further studies on beef cattle farming technology and market risk management and develop research considering external factors such as feed price fluctuations in climate change.

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