Financial Feasibility Analysis of Beef Cattle Breeding Business in Baluran National Park Buffer Zone

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Abstract— *This study aims to determine the financial feasibility and benefits of the beef cattle business with a semi-extensive pattern in the buffer zone of the Baluran Situbondo National Park. The study was conducted from March 2021 to April 15, 2021, in Sidomulyo hamlet and Labuhan Merak hamlet, Sumberwaru Village, Banyuputih District, Situbondo Regency, East Java. The research location determined purposively with the criteria is the area with the largest extensive beef cattle business population in East Java. The sampling technique was carried out by the multistage random sampling method on 60 breeder respondents, with the criteria: 1) Cattle types maintained by Ongole crossbred (PO) and 2) Racked their livestock business with an extensive semi-extensive pattern or shepherd into the Baluran National Park area. Financial analysis used in business feasibility calculations includes Break-Even Point (BEP), Benefit-Cost Ratio (BCR), Payback Period (PP), Net Present Value (NPV), and Internal Rate of Return (IRR). The livestock business in the Baluran National Park buffer zone is known to generate an average revenue of IDR. 16,889,851 per year. Based on financial analysis, livestock businesses run by the community in the two hamlets are feasible to be carried out with a production value of 9.6 units with IDR110,404,186,-; BCR 1,16; PP 4 years seven months; NPV 121,687,283,67; and IRR 36%.*

Keywords— *Baluran National Park, Financial Analysis, Ongole Crossbred.*

I. INTRODUCTION

The parameters of a nation that is said to be prosperous are often based on economic conditions and fulfillment of sufficient community food needs. Based on international standards, Indonesia still needs to be a prosperous nation. However, animal husbandry is one of Indonesia's agribusiness sectors, which has the potential to progress and develop rapidly, supported by the high biodiversity of local livestock and cattle. So Indonesia has many opportunities to achieve independence in producing and managing the available and potential resources.

Fulfilling food needs from livestock has an essential role in realizing a nation's food security. It is known that beef cattle significantly contribute to the need for community animal protein sources (Parlindungan *et al*., 2017). BPS (2021) states that the availability of domestic beef and buffalo production is 425,980 tons. At the same time, the need for meat in the same year reached 696,960 tons. To meet the need for animal protein from meat, as much as 270,980 tons were obtained by importing. That means the demand for domestic meat can only be met by 61.1% of domestic production.

East Java Province is the largest animal livestock producer in Indonesia to date. Based on the data report of the Central Statistics Agency, it is known that the number of beef cattle in

2021 in East Java Province was 4,823,970 units. Situbondo Regency is one of the granaries of cattle in East Java, with a population of beef cattle 179,352 tails (BPS, 2022). This is an opportunity to meet the need for meat production and beef cattle business development opportunities in Situbondo Regency. One of the problems faced by cattle farmers in Situbondo Regency is the low quality of cattle and the maintenance of cattle with traditional systems. Livestock business with traditional maintenance makes farmers less than optimal in managing the quality of livestock and regulating their livestock breeding so that raising is done only as a side business.

Farmers need to know the business's feasibility to determine whether the business is worth running (Anis *et al*., 2015). Therefore it is necessary to do a business feasibility analysis to determine whether the beef cattle business is feasible or not. This study aimed to determine the characteristics of farmers and the feasibility of a beef cattle farm business in Sumberwaru Village, Banyuputih District, Situbondo Regency, because there are no results of studies before that explain whether the management model is financially feasible.

II. RESEARCH METHODS

2.1 Time and Place of Research

Research and data collection was conducted on March 11, 2021, until April 15, 21. The location of study was conducted in two hamlets in the Baluran National Park buffer zone, namely Sidomulyo Hamlet and Labuhan Merak Hamlet, Sumberwaru Village, Banyuputih District, Situbondo Regency, East Java. The selection of the research location was carried out purposive. Namely, livestock business carried out semi-extensively in the Baluran National Park conservation area with a total of ± 5,500 units of cattle (Balai Taman Nasional Baluran, 2018).

The material used in the study is a beef cattle business unit conducted by farmers in two hamlets. Survey methods for farmers conducted the study. The sampling technique is carried out by the multistage random sampling method, combining cluster sampling and stratified random sampling (Sugiyono, 2012). This is done because the number of cattle farmers in the two hamlets is quite large, so the number of respondents selected is 60. The chosen breeder criteria are the farmers who apply the semi-extensive pattern with ownership of ≥15 livestock units.

Data collection was carried out through interviews with farmers with a questionnaire guide. Data was collected in the

form of primary data and secondary data. Primary data was obtained from direct surveys in the field and the results of interviews using questionnaire assistance regarding technical and financial aspects. At the same time, secondary data were obtained from government agencies and the management of Baluran National Park.

2.2 Financial Analysis

The financial analysis used to calculate the feasibility of the livestock business in this study includes break-even point (BEP), benefit-cost ratio (BCR), payback period (PP), net present value (NPV), and internal rate of return (IRR).

A. Break-Event Point (BEP)

BEP in units:

$$BEP = \frac{FC}{P - VC}$$

BEP (IDR) :

$$BEP = \frac{FC}{1 - \frac{VC}{P}}$$

Where:
FC   = Fixed Cost
P   = Price per Unit
VC   = Variabel Cost per Unit

B. Benefit-Cost Ratio (BCR)

$$Net\ BCR = \frac{\sum Present\ value\ Benefit\ yang\ psitif}{\sum Present\ value\ net\ benefit\ yang\ negatif}$$

Parameters:
Net BCR >1: The business is profitable and feasible to operate.
Net BCR <1: The business is not profitable and not feasible to operate.

C. Payback Period (PP)

$$Payback\ Period = n + \frac{a - b}{c - b} \times 1\ year$$

Where:
n = the last year when the amount of cash flow was not sufficient to cover the initial investment
a = amount of initial investment
b = cumulative amount of cash flows in year n
c = cumulative amount of cash flows in year n+1

D. Net Present Value (NPV)

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

Where:
n = Investment period
i = Discount rate (%)
Bt   = t-year income
Ct   = Cost of year t
t = Year

Parameters:
NPV> 0 (positive NPV): The business is feasible because the benefits received are greater than the costs incurred.
NPV<0 (negative NPV): then the business is not feasible to carry out because the costs incurred are greater than the benefits received

E. Internal Rate of Return (IRR)

$$IRR = i_1 \frac{NPV_1}{NPV_1 - NPV_2} \times (i_1 - i_2)$$

Where:
NPV_1 = Positive Net Present Value
NPV_2 = Negative Net Present Value
i_1 = Discount rate resulting in NPV+
i_2 = discount rate resulting in NPV-
Parameters:
IRR < bank loan interest rate = business is not feasible because the profit is lower than the bank loan interest.
IRR > bank loan interest rate = business is feasible because the profit is greater than the bank loan interest.

III. RESULTS AND DISCUSSION

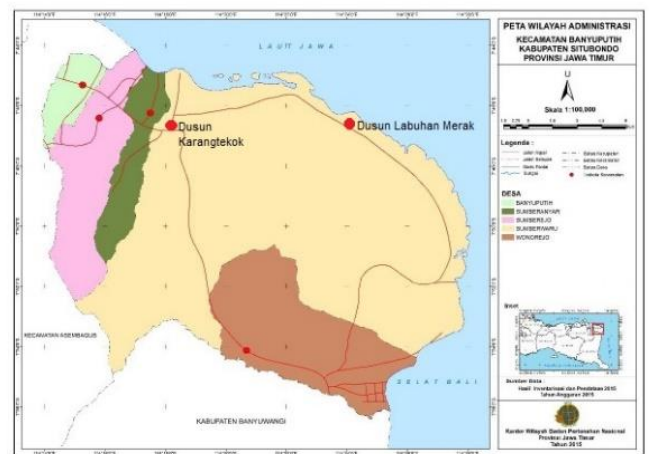### 3.1 Characteristics of Research Sites

Figure 1. Location of Karangtekok Hamlet and Labuhan Merak Hamlet
Source: Situbondo Regency Profile (2018)

Sidomulyo Hamlet and Labuhan Merak Hamlet are hamlets in Sumberwaru Village, Banyuputih District, Situbondo Regency. Both are areas directly adjacent to the Baluran National Park conservation area and act as buffer zone for the national park. Based on data from the beef cattle population census at the time of the study, 4,718 cattle were reared with a grazing pattern in the Baluran National Park conservation area.

The population of Sumberwaru Village in 2021 is 8,131 people. Most people work as farmers and farm laborers and raise livestock. The community has long done beef cattle raising as a side business because the availability of land and abundant forage in the savanna of Baluran National Park supports it.

3.2 Characteristics of Farmer Respondents

Respondents in this study were farmers who carried out Ongole crossbred beef cattle, which were reared with a grazing pattern in the Baluran National Park Conservation Area or an extensive pattern. The community livestock business in the two hamlets in Sumberwaru Village is a side job from farming and farm laborers. The characteristics of farmers in this study are presented in Table 1 below:

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TABLE 1. Characteristics of Respondents

No	Characteristic	Number of Respondents (People)	Percentage (%)
1	**Farmers age**		
	0 – 14	0	0
	15 – 63	51	85
	>63	9	15
2	**Level of Education**		
	0-6	33	55
	7-9	14	23,3
	10-12	12	20
	11 - >16	1	1,6
3	**Experience**		
	5	5	8,3
	10	25	41,6
	>15	30	50

Source: Primary data processing (2021)

Characteristics of 60 respondents include age, education level, and experience in raising livestock. The age of the breeder is the productive age. The age distribution in Table 1 is around 15-60 years, with as many as 51 people (85%). According to Chamdi (2003), the productive age limit is between 15-65 years, so the age of the respondents is generally a productive age which has the potential to be empowered in the development of the beef cattle business (Sahala *et al*., 2016). Age is a factor that can affect the ability to think and work (work ethic), and decision making (Chamdi, 2003). The average education level of respondents is 33 (55%) elementary school (Table 1); this shows that the respondent's education level is low. The low level of education impacts the ability to accept innovation and technology adoption to increase productivity and income (Soekartawi *et al*., 2006; Sahala *et al*., 2016). The respondent's experience in raising livestock is more than ten years (41.6%) (Table 1), which shows that the desire for livestock business continues to grow among farming communities. The time the farmer has run a livestock business is directly proportional to his experience and knowledge. The length of time running a livestock business provides experience. It increases knowledge related to livestock business, giving hope and motivation to continue improving business skills to achieve optimal production results (Mastuti and Hidayat, 2008).

3.2 Characteristics of Beef Cattle Business

Beef cattle business activities in two hamlets in the Baluran National Park buffer zone are semi-extensive cattle businesses. They have become a side job for the people of Sumberwaru Village. The breed of cattle that is kept is Ongole crossbred. Maintenance management is carried out by grazing into the savanna in Baluran National Park in the morning and caged at night to meet all feed needs.

3.3 Beef Cattle Business Cash Flow

The financial picture of the business determines the sustainability of the beef cattle business; the business can survive if the profits obtained are greater than the costs incurred, all of which must be decided financially feasible. Calculations can find out the value of receipts, all production costs, and finally, the farmers' income received in one year after selling business production. Details of revenue and production costs for the semi-extensive beef cattle business in the Baluran National Park buffer zone are presented in Table 2.

TABLE 2. Revenue, Production Costs, and Income of Semi-Extensive Beef Cattle Business in Baluran National Park Buffer Zone.

No	Time	(year)				
		1 (IDR)	2 (IDR)	3 (IDR)	4 (IDR)	5 (IDR)
1.	**Admission**	**-**	**-**	**99.000.000**	**99.000.000**	**224.000.000**
a.	Cattle stock sale	-	-	99.000.000	99.000.000	99.000.000
b.	Livestock sale	-	-	-	-	125.000.000
2	**Production Cost**	**85.721.500**	**36.443.000**	**36.443.000**	**36.443.000**	**36.443.000**
a.	Cattle (1 bull dan nine cows)	65.000.000	-	-	-	-
b.	Labor costs	18.000.000	36.000.000	36.000.000	36.000.000	36.000.000
c.	Cage Making Cost	2.500.000	-	-	-	-
d.	Chemical and Medicines Cost	162.000	324.000	324.000	324.000	324.000
e.	Miscellaneous	59.500	119.000	119.000	119.000	119.500
3	**Income**	**-85.721.500**	**-36.443.000**	**62.557.000**	**62.557.000**	**187.557.000**

Source: Primary data processing (2021)

3.3.1 Admission

Revenue is all production results obtained multiplied by the selling price. Revenue during the production of beef cattle business with a semi-extensive pattern of livestock business comes from the sale of feeder cattle aged one year and brood cattle during the five-year investment period. The sale of feeder cattle is obtained in the 3rd to the 5th year, while the sale of livestock is in the 5th year. The selling price of feeder cattle is determined based on the price of feeder cattle and the price of adult cattle in the nearest animal market or cattle broker in Sumberwaru Village, which is IDR 11,000,000 for feeder cattle and IDR 12,500,000- for adult cattle.

3.3.2 Production Cost

Production costs are costs incurred during the production process within five years. The production cost component consists of the initial Cost of buying cattle, the cost of making the cage, the Cost of chemical medicines, and miscellaneous. The Cost of building the cage is a component of fixed costs. The cage building uses materials from wood obtained by farmers from the forest. The cage building was built simply in the house's yard with a dirt floor. Generally, cage buildings do not use shelters used by livestock to protect themselves from rain, so the Cost of making cages is relatively low.

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Figure 2. Ongole Crossbreed Cattle Farmer's Cage in Labuhan Merak
Source: Personal documentation

Variable costs in the beef cattle business for the Baluran National Park buffer zone include labor costs, drug costs, and other costs whose value can change depending on the increase in the number of cattle kept in the 2nd year to the 5th year.

The labor cost for a semi-extensive beef cattle business in the Baluran National Park buffer zone is IDR 18,000,000 per person annually. Labor costs increased to IDR 36,000,000, - in the second year until the end of the business period in the fifth year. This is because the number of livestock handled has increased by 19 units. The labor cost is based on the prevailing wage in Sumberwaru Village, IDR 1,500,000 per month.

The Cost of chemical medicines cost in the semi-extensive cattle business of the Sumberwaru Village community is relatively low at IDR 162,000 per year. This is because farmers get chemical medicines and vaccines from the community from the government through local livestock health officers, who are given free of charge. After all, Sumberwaru Village is one of the main concerns of the Situbondo Livestock Service with its potential population of Ongole crossbreed cattle. Instead, the Cost of chemical medicines is used to buy additional supplements, vitamins, or transportation costs to pick up chemical medicines at the Animal Husbandry Office of Situbondo Regency.

3.3.3 Income

Income is the result of income derived from receipts minus the costs incurred on production costs or costs used during livestock rearing. Based on Table 2, the income from the semi-extensive pattern of the beef cattle business is negative in the first and second years. This is because the livestock business has yet to obtain children from the marriage of 9 parents and one male. Farmers earn income in the 3rd and 4th years, respectively, of IDR. 62,557,000,- from the sale of feeder cattle, and in the 5th year, IDR. 187,557, 000,-. So if the income value is accumulated, the average income from a semi-extensive beef cattle business is IDR 62,534,200 per year. This follows Soekarwi *et al*. (2006) that gross income in farming is the result obtained from the total resources in the production process, while net income is the difference in gross income minus total costs during one production process.

3.4 Financial Analysis

Analysis of the semi-extensive pattern of beef cattle farming in the Baluran National Park buffer zone was carried out with calculation analysis models, including BEP, BCR, PP, NPV, and IRR based on (Rademarker *et al*., 2017; Anis *et al*., 2015; Juhasz, 2011; Gittinger, 1986). The financial analysis uses a discount value of 8% with a business period of 5 years in one business cycle. The assessment of the investment is used to analyze the feasibility of the Ongole crossbreed cattle business by the community in the two hamlets based on financial aspects.

TABLE 3. Financial Analysis of Semi-Extensive Beef Cattle Business in Baluran National Park Buffer Zone.

No	Description	Value
1	Break Event Point (BEP)	9,6 unit or IDR 110.404.186,-
2	Benefit Cost Ratio (BCR)	1,16
3	Payback Period (PP)	4 years 7 months
4	Net Present Value (NPV)*	IDR 121.687.283,67
5	Internal RateReturn (IRR)	36%

Note: *) NPV with a discount factor of 8%
Source: Primary data processing (2021)

The results of the unit BEP calculation are obtained on the sale of 9.6 units of livestock from the total number of livestock produced or the value of BEP in rupiah amounting to IDR 110,404,186, -; in this amount, the farmer experiences a profit and no loss.

In the semi-extensive pattern of the Ongole crossbreed cattle business, the Sumberwaru Village community obtained a BCR of 1.16, which indicates that for every additional IDR 1 spent, it will provide an additional net benefit of IDR 1.16. Thus, this semi-extensive Ongole crossbreed cattle business is feasible to run and provides benefits because the BCR value is >1.

In the calculation of the Payback Period (PP), a value of 4 years seven months is obtained, which means that the return on business investment allocated to the purchase of brooders and bulls, construction of cages, Cost of chemical medicines, and miscellaneous Cost can be returned within four years seven months.

Feasibility analysis of semi-extensive Ongole crossbreed cattle business with ownership scenario of 10 cattle consisting of 9 brooders and one male per five-year period, with a discount factor value of 8% indicating a positive NPV value of IDR 121,687,283.67,-. This value means that the profits obtained are greater than the production costs incurred plus the investment costs. Based on the positive NPV value, the business has generated more benefits than the costs incurred by the farmer.

The IRR value obtained for the livestock business is 36%, which means that the livestock business is feasible to run up to an interest rate of 8%. With an IRR value greater than the interest rate, the business is feasible to run.

IV. CONCLUSION

The semi-extensive beef cattle business in two hamlets (Baluran National Park buffer zone), namely Sidomulyo Hamlet and Labuhan Merak Hamlet, Sumberwaru Village, Bayuputih District, Situbondo Regency, is feasible to run with the calculation results of BEP 9.6 units or IDR. 103,024,175,-

; BCR 1.16; PP 4 years 7 months; NPV 121,687,283.67; and IRR 36%. The characteristics of farmers are dominated in productive age ranging from 15-60 years, as many as 51 people (85%), relatively low level of education with elementary school education or the equivalent as many as 33 (55%), and livestock experience of more than ten years (41.6%).

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