Beef cattle farming with a shepherd system in Indonesia

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Abstract. This study aims to determine the economic efficiency of beef cattle farming with a shepherd system. The study was conducted in Sukabumi District, West Java Regency in 2020. The research respondents were beef cattle farmers with a shepherd system, as many as 25 people. Data were collected using observation and survey methods. The survey was conducted by interview and filling out questionnaires. Data were analyzed using quantitative descriptive, economical analysis, and t test. The results showed that the profit of beef cattle business with a shepherd system was $609.82/head/year with an R/C ratio of 1.7. Factors that affect the profits of farmers are the price of feed and labor. The conclusion of the study shows that the beef cattle farming with a shepherd system is feasible to be developed.

1 Introduction

Farmers of beef cattle in Ciracap Subdistrict, Sukabumi District, West Java, the way of maintenance is grazing, sometimes or both, with livestock ownership scale of <4 heads/family. Maintenance of beef cattle by grazing on vacant moor land, coconut plantation land, agriculture, fields, rice fields and vacant land owned by the company and owned by farmers that have not been worked on by the owner, so that the farmer uses it as grazing land for beef cattle, with the permission of the land owner. Until now, beef cattle business in Ciracap Sukabumi District is small scale, and has not led to a commercial farming, where all farmers main business is farming and beef cattle and other livestock businesses as a sideline or as savings. All farmers in Ciracap Sukabumi District are considered to have a strong commitment to developing and rearing beef cattle, even though the maintenance is still on a small scale, but the farmers still maintain their livestock.

To increase the potential for beef cattle production, comprehensive and focused efforts are needed on the main business, so as to ensure the smooth running of the upstream and downstream businesses, it is necessary to be comprehensive and focused on the main business, so as to ensure the smooth running of upstream and downstream businesses [1]. Farmers must be able to understand the market situation and consumer needs [2-4].
potential of the area in the region, especially the village in the form of natural resources, if utilized optimally will be able to increase the performance or productivity of farmers [5]. The herding system beef cattle business in Ciracap sub-district is supported by social, cultural and cultural aspects. Beef cattle farmers in Madura, the cattle that are kept are always used as an entertainment event or as a cattle racing competition, because apart from the cultural, socio-economic and cultural values of the Madura community and love for beef cattle [6, 7].

In this context, the development of beef cattle farming is a very promising business opportunity to get a decent profit for farmers, in addition to balancing supply and demand factors. When viewed from their business, farmers only keep beef cattle as a savings business and their main business is farming, fishing, trading and working on plantations. Some farmers work on female beef cattle for farming and male beef cattle for raising, which can be sold on Eid al-Adha or religious holidays. However, the beef cattle business in all farmers has not taken much into account the labor costs of the farmers, because the beef cattle that are kept are considered their own property, so the labor costs are not calculated. The number of beef cattle ownership can be influenced by the area of agricultural land, business experience and the availability of farmer labor [8, 9]. the shepherd system beef cattle business in ciracap sub-district still makes a positive contribution to the community's economy.

For the beef cattle farming business, it will be different from the fattening business, the production costs will be different [10]. Household scale beef cattle business is the biggest contributor population of beef cattle in Indonesia and contributes 6.8% to total farmer household income. Ironically, This contribution is not matched by the farmer’s goals in running the business cattle. Livestock business that is run is not solely a business orientation, but rather as savings, thus reducing the motivation of breeders to run livestock business as a result of not being the main livelihood.

Likewise, from the aspect of economic technology, the basic knowledge of the farming community about beef cattle can be used as the basic capital for business intensification. The three dimensions that include the main business are upstream, onfarm, and downstream involving business actors, the private sector, and the government [10]. If the beef cattle that are cultivated by the farmers are underdeveloped, technology support is needed, through subsidies for capital, feed, cages and others, so that the beef cattle business in the farmers is increased and directed [11]. Technological progress cannot be separated from the availability of natural resources, humans (number of workers, mastery of technology), agro-ecosystem support and influences business actors' access to various resources to be of good quality [12, 13]. Various efforts have been made by the government to realize beef self-sufficiency program. These efforts are prioritized on improvements in the upstream sector to the downstream sector.

2 Materials and methods

2.1 Research sites

The research location is in Ciracap District, Sukabumi District, West Java in 2020, using the field survey method, questionnaires and direct interviews with farmers. The research locations are supported by agro-ecosystems of agricultural land, coconut plantations, rice fields, fields and vacant land that have not been cultivated by the owners, so that the vacant land is used by farmers as land for grazing beef cattle belonging to farmers, and is also supported by forage that grows arbitrarily. place, for the adequacy of daily beef cattle feed. The beef cattle farmer group is supported by the West Java Provincial Government, because almost all of the people are engaged in agriculture and animal husbandry.
2.2 Data analysis

Respondents were selected as many as 25 breeders. Respondents were determined based on purposive random sampling. Primary data was obtained directly from the breeders, while secondary data was obtained from various field research results and from local government agencies. Primary data and secondary data were analyzed descriptively quantitatively, t-test analysis and economic analysis. To find out the economic value of beef cattle business in breeders by means of breeding and fattening using R/C analysis [14]. The goal is to see whether the beef cattle business is profitable or profitable, so it can be assessed with R/C > 1 then the business is said to be profitable, if the R/C value is 1 < then the business suffers a loss, and if the R/C value = 1, then the business does not suffer profit or loss. Factors that affect beef cattle business (Y) as independent variables are seed costs (X1), feed costs (X2), labor costs (X3), medicine and vitamin costs (X4), costs for building stables and supporting equipment ( X5). The data were analyzed using multiple linear regression.

3 Results and discussion

3.1 General condition of research site

The area of Sukabumi District, as the work area of the Ciracap Agricultural Extension Center (BPP). A total of extension workers and inseminatro covering 8 villages (Ciracap, Purwasedar, Pasirpanjang, Cikangkung, Gunungbatu, Mekarsari, Pangumbahan, Ujunggenteng), with a total area of 16,893 ha. The land area is divided into rice fields covering an area of 4,379.7 ha (semi-technical irrigated rice fields 1,443 ha, rural areas 1,898.7 ha, rain-fed 1,038 ha), land covering 1,2728 ha and coastal land 119 ha. Ciracap Sub-district, Sukabumi District, socially beef cattle are business figures, principal, sidelines and savings. Several production inputs in beef cattle and agricultural businesses from the number of beef cattle seen and the area of land used have a significant effect on the lives of farmers.

Welfare and sufficiency do not mean the fulfillment of the needs of an affluent life, but basically with assistance, business cooperation institutions can be proven socially and culturally the life of farmers is considered worthy. The farmer's income is not yet optimal, probably due to limited knowledge, business capital, but with the basic principles and thoughts of farmers who are strong and confident and independent to go forward, the farmer conducts beef cattle business, in order to get more optimal profits and increase economic value. And increased farmer welfare. Farmers are still limited in working capital and business management methods are still lacking, so farmers need material, facilities and infrastructure so that the beef cattle population in the Sukabumi District area increases.

3.2 Beef cattle production costs

The definition of production costs is a number of funds issued by companies or farmers in the context of processing and producing raw materials for the creation of a product. Production costs or production costs are costs incurred by farmers, starting from the business management process to producing production costs for one year incurred in the production process or business can be referred to as production costs. Production costs are needed to determine the selling price of a product. After all production costs are calculated, the company can divide it by the total output generated from these costs and set the complete price with the profit margin. Costs that are included in the beef cattle business, such as indirect raw material costs, beef cattle maintenance costs, water and electricity costs, as well
as other costs including expenses for the beef cattle business resulting from beef cattle production are sold to generate profits.

Beef cattle business activities require costs, and this is what can be called the production cost of the beef cattle business at the farmer. Support from the Central and Regional Governments of Sukabumi District can be expected to increase population of beef cattle and guarantee the welfare of farmers and increase employment opportunities. Improve the welfare of farmers by making strategic policy support by utilizing technology, innovation and strong business cooperation networks including with investors, so that the program can run smoothly [15]. Beef cattle in the Sukabumi District area have a selling price ranging from Rp 9-25 million/head, depending on the type of cow, body size, body weight, age, and male and female. All farmers use forage that grows around residential areas and fields, farmers still use grass as the main source of food for beef cattle, so the population growth of beef cattle is quite slow.

Profits are obtained from the sale of bull, female calves of various ages and beef cows that are no longer able to produce. In beef cows that are kept to produce calves, they still have 6-8 years of rejecting time to produce. Most of the 70% of beef cattle rearing systems are still managed by small farmers in rural areas with limited control over land resources, innovation, income, and technology. Investors can play a significant role in developing technological facilities, increasing human resources, in order to produce agricultural and livestock products, processing, post-harvest and marketing products that are able to compete in local and free markets [16]. Calculation of the economy of beef cattle farming, investment costs for land and building cages.

The largest investment costs incurred by farmers for the purchase of beef cattle, the increase in beef cattle production. While variable costs are costs that generally change according to the number of beef cattle that are kept. An increase in income can affect the sustainability of agricultural businesses and development. The income of farmers will be greater if the volume of production increases and sales of beef cattle increase. Revenue is all the results received by the farmer from the sale of beef cattle for one year as output. Details of costs in beef cattle farming. The cost of making the cage The cost of the cage is assessed for 1 unit with an average of $ 317.30/unit. The cost of cage equipment is $ 33.40/package/year. The cost of depreciation of the cage for 5/year is $ 63.46/year. Parent depreciation expense is $ 17.03/year. The cost of depreciation of cage equipment/year is $ 2.74/year. The amount of depreciation expense is $ 83.23/year. The assumption is that the cost of purchasing medicines is $ 8.35/package/year, labor costs for farmers are 1 person x $ 10.02/day x year of $ 360.72/year. The cost of buying forage feed as much as 20 kg x 4 cattle x price $ 0.013 x year is $ 384.77/year. The total cost of production is $ 753.85/year. Total production costs and total depreciation costs of $ 837.08/year.

### 3.3 Financing for beef cattle

The assumption is that the cost of purchasing beef cattle for broodstock and prospective broodstock is 4 years old >2 years, with an average price of $ 851.71/head or $ 3406.84. The cost of making a cage is valued at 1 unit. an average of $ 317.30/unit. The cost of cage equipment is $ 33.40/package/year. The cost of depreciation of the cage for 5/year is $ 63.46/year. Parent depreciation expense is 2.5%/5 years $ 17.03/year. The cost of depreciation of cage equipment/year is $ 2.74/year. The amount of depreciation expense is $ 83.23/year. The assumption is that the cost of purchasing medicines is $ 8.35/package/year, labor costs for farmers are 1 person x $ 10.02/day x year of $ 360.72/year. The cost of buying forage feed as much as 20 kg x 4 cattle x price $ 0.013 x year is $ 384.77/year. The total cost of production is $ 753.85/year. Total production costs and total depreciation costs of $ 837.08/year.
3.4 Income

The results of the sale of female beef cattle that are no longer able to produce 1 (one) head with an average price of $ 689.38/head. The results of the sale of bull and heifers are 2 with an average age of >5 months with an average price of $ 378.76/head. Total gross income is $ 1446.90/year. Total net income is $ 609.82/year with an R/C of 1.7, the economical analysis of beef cattle business is shown in Table 1.

Table 1. Economic analysis of beef cattle farming business in farmers.

<table>
<thead>
<tr>
<th>Description</th>
<th>(Amount/Dollar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depreciation cost and production cost</td>
<td>837.08</td>
</tr>
<tr>
<td>Gross income/year</td>
<td>1446.90</td>
</tr>
<tr>
<td>Net income/year</td>
<td>609.82</td>
</tr>
<tr>
<td>R/C</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Note: some beef cows are still being kept for next year’s investment.

Table 1, shows that, the cattle farming business is profitable for farmers of $ 609.82/year with an R/C value of 1.7, to further increase the economic value of farmers, the scale of business from <4 heads to >5 heads/ farmer. To increase the productivity of beef cattle, farmers need to improve their business through the provision of good quality feed, productive heifers, and superior heifers, indirectly increasing the economy of farmers.

3.5 Factors affecting beef cattle business

Production costs in beef cattle business can be offset by the selling value of livestock, and the condition of the farmer's business can provide optimal profits, if production costs are lower than production costs. Factors that affect the profit of each variable, (Y) are seen from the effect of the relationship on each variable. The cost of purchasing beef cattle seedlings (X1), production costs for purchasing feed (X2), production costs for farmers' labor (X3), costs for purchasing medicines (X4) and costs for building cages and equipment (X5). The cost for purchasing beef cattle is the largest production cost, because it is the main capital for initial business investment. This proves that on the business scale of female beef cattle for farming simultaneously on the variables of purchasing seeds, feed, medicines, labor and land rent. Production costs have a significant effect on livestock profits. The factors that influence the beef cattle business of farmers are shown in Table 2.

Table 2. Factors that affect the beef cattle business.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient Regression</th>
<th>Standr Error</th>
<th>Probi</th>
<th>t.count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of purchasing female seeds</td>
<td>.4713</td>
<td>.671</td>
<td>.000 **</td>
<td>1.3427</td>
</tr>
<tr>
<td>(X1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed purchase cost (X2)</td>
<td>-.5321</td>
<td>.064</td>
<td>.102***</td>
<td>-2.331</td>
</tr>
<tr>
<td>Labor costs (X3)</td>
<td>-.7225</td>
<td>.072</td>
<td>.121*</td>
<td>-5.731</td>
</tr>
<tr>
<td>Drug costs (X4)</td>
<td>.1671</td>
<td>.066</td>
<td>.000***</td>
<td>2.642</td>
</tr>
<tr>
<td>Cage and equipment costs (X5)</td>
<td>.3412</td>
<td>.059</td>
<td>.3611**</td>
<td>4.751</td>
</tr>
</tbody>
</table>
Table 2. Cont.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>9.457</td>
<td>1.731</td>
<td>.000</td>
<td>9.732</td>
</tr>
<tr>
<td>R-squared</td>
<td>.653</td>
<td>1.542</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted R- square</td>
<td>-.341</td>
<td>.857</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated</td>
<td>.7623</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-Statistic</td>
<td>8.908</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prob-Sig</td>
<td>-.000</td>
<td></td>
<td></td>
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</tbody>
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Note: ***) Significant at the 95% confidence level  
**) Significant at the 10% confidence level  
*) Not significant at the 105% and 95% confidence levels

Table 2 shows that, the costs that affect the beef cattle business (X₃) on labor, the labor costs of farmers when calculated based on the total costs incurred for one year are quite large and usually farmers rarely calculate labor costs, because they are considered owned by farmers. Factors of production using multiple linear regression analysis with the equation: \( Y = (9.457)+(-.47130x1)+(-.5321x2)+(-.7225x3)+(-.1671x4)+(-.3412x5) \). Factors that affect the increase in the economic value of farmers have a significant effect on \( P <0.05 \) on the variable of farmer profits. The farmer's profit is influenced by several production factors as a variable for one year, the farmer considers a profit if the farmer receives the case money or direct sales proceeds.

4 Conclusion

The results of the study can be concluded that, Ciracap Subdistrict, Sukabumi District, West Java Province has the potential for the development of beef cattle, seen from the agro-ecosystem support of agricultural land, rice fields, fields, fields and plantations. Factors that affect the increase in the economic value of farmers have a significant effect on \( P <0.05 \) on the variable of farmer profits. Beef cattle business, if it is cultivated in a processed manner, is maintained in an integrated manner with agricultural business, the farmer's profits will be more optimal. It is expected that farmers can increase their business scale from a scale of <4 to >5 heads/farmer, so that the profit of the farmer will be optimal, resulting in the sale of the calf. To increase the productivity of beef cattle, farmers need to improve their business through the provision of good quality feed, productive female seeds and superior males, indirectly increasing the economic value of farmers.

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