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Livestock Groups in Dolokgede Village: Socioeconomic Profile and Local Resource Utilization

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Abstract. *Small-scale beef cattle farming systems play an important role in rural livelihoods in developing countries. However, comprehensive analysis that integrates the socioeconomic characteristics of farmers with resource utilization patterns is still limited. This study aims to evaluate the socio-economic characteristics of farmers and resource utilization patterns in the beef cattle business in Dolokgede Village, Tambakrejo District, Bojonegoro Regency. Based on the results of the evaluation, it can determine and identify the potential for the development of livestock businesses and in this region. Quantitative descriptive research was carried out using a direct survey method on farmers through questionnaires and environmental analysis. The sample was determined by the Slovin formula with an error rate of 10%, resulting in 29 respondents who were selected by simple random sampling. Data were collected through structured interviews and analyzed using descriptive statistics. Farmers are dominated by the productive age of 31-60 years (72.41%) with the majority of elementary education (75.86%). The selection of 2-5 cattle dominates (65.52%) with the Peranakan Ongole type. The use of feed is integrated with the agricultural system through rice straw (96.55%) and corn waste (93.10%). Feed costs account for more than 60% of the total cost of production, but the R/C ratio shows a value above 1, indicating the economic viability of the business. The beef cattle business in Dolokgede Village has the potential for development through stronger plant-livestock integration, improved feed technology, and institutional support for market access and financing.*

Keywords: *Beef cattle, Crop-livestock integration, Smallholder farmers, Socio-economic characteristics*

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INTRODUCTION

Bojonegoro Regency, as one of the regencies in East Java, has a strategic location for the development of the livestock sector, with an area of 2,073.06 km2 and a population of 1,366,227 (Bojonegoro Regency Statistics Agency 2025). The livestock sector makes a significant contribution to the national economy, particularly in terms of animal protein supply, job creation, and increased community income. Research by Amejo et al. (2018) shows that the smallholder livestock system plays a strategic role in food security and the people's economy. The contribution of the livestock sector to the Gross Domestic Product (GDP) of the livestock sub-sector reached 1.77% in 2022, with the potential for further growth through the optimization of local resources. The socioeconomic characteristics of farmers are important factors that influence the success of livestock businesses. Ahmad et al. (2023) confirmed that farmer demographics, education levels, farming experience, and capital ownership are positively correlated with livestock productivity. The village of Dolokgede in Tambakrejo District, Bojonegoro Regency, has livestock groups with potential for further development. However, comprehensive information on the socioeconomic conditions of farmers, land and livestock ownership, feed characteristics, livestock population structure, and estimated maintenance costs in this area is still limited. These data are essential as a basis for planning sustainable livestock development.

Livestock groups in rural areas generally face various obstacles, ranging from limited access to technology, capital, and markets to suboptimal business management. The diverse socioeconomic conditions of livestock farmers, ranging from education levels, farming experience, asset ownership, to access to resources, also affect the productivity and sustainability of livestock businesses. The utilization of local resources, especially livestock feed, is a crucial aspect of smallholder livestock farming systems. A study by Hilmiati et al. (2024) identified that optimizing local feed can increase production cost efficiency by up to 35%. The availability and quality of feed greatly determine livestock performance and business economic efficiency. The research by Alves et al (2017) emphasizes the importance of identifying the potential of local feed and its utilization patterns for the sustainability of livestock businesses. Based on these issues, research examining the socioeconomic profile and resource utilization and factors that limit the use of livestock farmers in Dolokgede Village is highly relevant. This study will reveal the dynamics of livestock farming, ranging from the demographic

characteristics of farmers, asset ownership patterns, feed resource optimization, to the financial analysis of livestock businesses. Although there is a national goal to improve small-scale beef cattle farming systems in Indonesia. The integration of the socio-economic characteristics of village farmers with the concept of savings is the main obstacle in development. This study aims to evaluate livestock development groups based on agricultural and livestock resource potential through stronger crop-livestock integration and improved feed technology in livestock groups in Dolokgede Village, Tambakrejo District, Bojonegoro Regency.

LITERATURE REVIEW

The socioeconomic characteristics of farmers are the main determinants of the success of smallholder farming. Demographic factors, education level, farming experience, and capital ownership have a significant effect on the productivity and profitability of the business. Ntume et al. (2017) identified that the education level of farmers is closely related to the adoption of technology to achieve increased productivity. Farming experience is not only related to the length of time spent farming, but also includes the accumulation of local knowledge obtained from generation to generation and the ability to adapt to market conditions. Santoso and Amejo et al. (2018) emphasize that social capital in the form of kinship networks and local institutions plays an important role in access to information, technology, and markets.

Optimizing the use of local feed resources is key to the sustainability of smallholder farming systems, given that feed costs account for 60-70% of total production costs. Balehegn et al. (2020) show that the use of locally sourced feed can reduce feed costs and maximize the utilization of agricultural waste. The seasonal availability of local feed requires appropriate preservation and processing strategies to ensure continuity of supply throughout the year. Fermentation and ammoniation technologies for agricultural waste have been proven to improve the nutritional quality and digestibility of local feed. Recommendations for waste utilization include fermenting rice straw using lactic acid bacteria to improve feed digestibility.

Livestock population structure reflects the reproduction and management strategies implemented by farmers, where composition based on age and sex affects cash flow and business profitability. Livestock demographic analysis is important for planning replacement, culling, and sustainable breeding programs. Feldt et al (2016) showed that

livestock populations with a productive female ratio have a higher return on investment in the long term. Estimated maintenance costs, including feed, health, labor, and other overheads, form the basis for calculating the economic feasibility of a livestock business. The variability of these costs is greatly influenced by fluctuations in input prices, livestock health conditions, and management efficiency.

RESEARCH METHODS

This study uses a quantitative descriptive approach with a survey method consisting of structured questionnaires and field observations. This design was chosen to describe the socio-economic conditions of farmers, resource utilization patterns, and economic aspects of the beef cattle business in a systematic and objective manner. The research location was Dolokgede Village, Tambakrejo District, Bojonegoro Regency, East Java (7°15'S, 111°53'E), considering that this village has an active and representative livestock group that combines agriculture and smallholder livestock farming. The research was conducted from July to August 2025, covering demographics and different seasonal conditions to obtain varied data related to feed availability and business costs. The research population included all members of the beef cattle farming group in Dolokgede Village. The sample was determined using the Slovin formula with a 10% margin of error, resulting in 29 respondents. Respondents were selected using simple random sampling from the list of farming group members as respondents so that the results would be more objective. Data obtained from structured interviews were analyzed using descriptive statistics. The analysis process includes the calculation of frequency distribution, percentage, average, and standard deviation to describe the socio-economic characteristics of farmers, feed utilization patterns, and production costs.

Prossedure

Primary data was obtained through structured interviews using questionnaires conducted in stages with each respondent. The instruments were developed based on relevant socio-economic indicators for farmers and ranchers, such as human resources, land, and capital, which determine household livelihood strategies. Structured interviews were chosen so that respondents' answers could be standardized, facilitating quantitative analysis. Secondary data were obtained from village reports, livestock group documents, publications from the Bojonegoro Regency Central Statistics Agency, and relevant academic literature. Field observations were conducted to verify respondent data while

also recording the actual conditions of barns, forage land, and agricultural waste utilization, and to analyze field conditions that were not conveyed in the interviews.

RESULTS AND DISCUSSION

Demographics of Livestock Farmers

The demographic characteristics of beef cattle farmers in Dolokgede Village reflect the profile of smallholder farming in Indonesia. The majority of farmers are of productive age, indicating their potential as a labor force and their relatively good physical ability to handle farming and agricultural work. However, the low participation of young farmers indicates a challenge in regeneration that needs special attention in the future development of the livestock sector, as shown in the following graph:

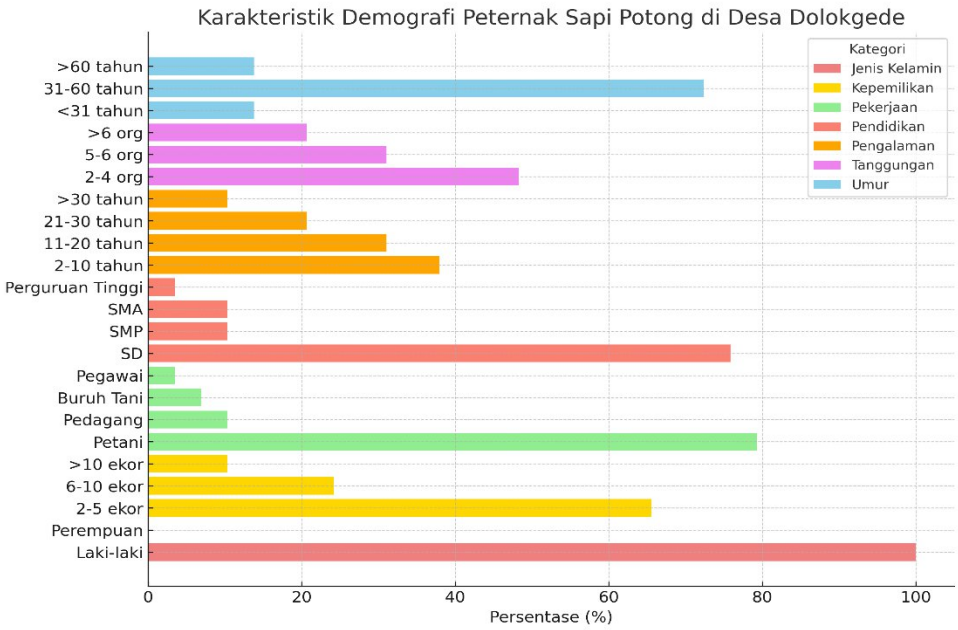

Figure 1. Demographic Chart of Farmers

The age distribution of farmers is dominated by the productive age category between 31 and 60 years old, accounting for 72.41%, followed by the over-60 age group and young farmers under 31 years old, each accounting for 13.79%. Kenny et al (2016) stated that the dominance of the productive age group indicates the potential for labor and adequate physical ability to handle farming activities that require high stamina. All research respondents were 100% male, indicating that regional culture greatly influences the gender of farmers. The majority of women are responsible for lighter work in the family. The absolute dominance of men in this study shows that strategic decision-making in livestock businesses in the study location is still heavily dominated by the traditional

role of men as heads of households, while women play a greater role in supporting activities or household management.

The educational level of farmers is generally low to medium, with the majority being elementary school graduates (75.86%), followed by junior high school and high school graduates (10.34% each), and only 3.45% having a college degree. This condition is very similar to the research by Pham-duc et al (2019) in Botswana, which found that 78% of cattle farmers had a basic to medium level of education. The low level of formal education has implications for the limited ability of farmers to understand new technologies, access modern livestock management literature, or optimize extension programs. Based on the relatively low educational history, it greatly affects the ability to work, so the majority are farmers. The main employment structure shows that the majority of respondents work as farmers (79.31%), followed by traders (10.34%), farm workers (6.90%), and employees (3.45%). This pattern is in line with research by Sahara et al. (2025), which shows that 83.3% of cattle farmers have agriculture as their main occupation. This result is also supported by the research of Mohammed et al. (2024) stating that the rural agricultural sector is considered more profitable than the livestock sector with limited capital and understanding. This predominance of work reflects a strategy of earning side income in the traditional agrarian system where livestock functions as a complementary business, rather than a single source of income. Limited capital and understanding will minimize opportunities to try and utilize local potential, so that many livestock are still largely sidelined.

Farming experience varies with distribution: 2-10 years 37.93%, 11-20 years 31.03%, 21-30 years 20.69%, and more than 30 years 10.34%. Most farmers (68.96%) have more than 10 years of experience, indicating substantial accumulation of practical knowledge. This finding supports the research by Ahmad et al. (2023), which states that ≥ 5 years of experience has a positive effect on beef cattle productivity. With relatively low experience, it will be more difficult to integrate into agriculture and livestock that should have very profitable linkages. Many farmers feel that a large farm requires considerable maintenance costs and manpower. This perception if it is associated with income, then a large scale will get greater profits as well. Profits will arise based on the purchase price of cheap feed materials in large quantities, hiring people to use feed during the harvest season and other factors. The dominance of this small business makes

livestock commodities less profitable than agriculture. These factors correlate on family size significantly because they affect the allocation of resources for livestock business costs and the availability of family labor. The difference in land area owned by each family is the main supporter in increasing the number of livestock. Livestock ownership per household shows the following pattern: 2-5 heads 65.52%, 6-10 heads 24.14%, and more than 10 heads 10.34%. The dominance of 2-5 head ownership reflects the limitations of capital, land, and market access that are common characteristics of smallholder livestock farming in Indonesia, but also indicates potential for development through targeted intensification programs and technical assistance.

Land and Livestock Ownership

This pattern of land-livestock ownership reflects farmers' adaptation strategies in optimizing available resources. In mixed crop-livestock systems, there is competition and synergy in land use between food crop production and forage production. Farmers with limited land allocate priority to food crops, while the rest is used for forage in limited quantities. This land ownership pattern is illustrated in the following graph 2:

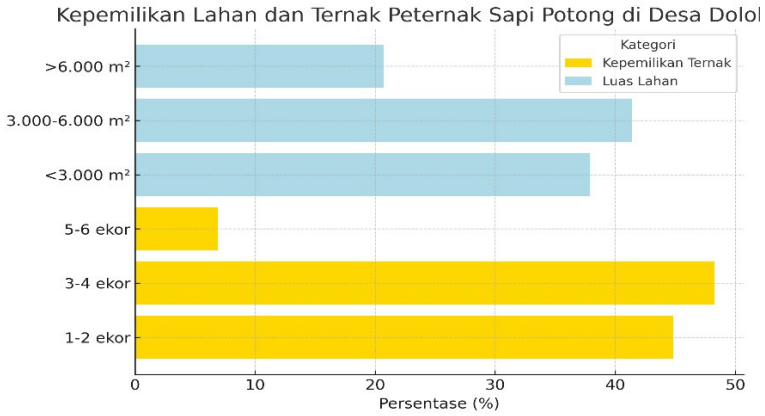

Figure 2. Graph of land and livestock ownership

Land ownership data shows significant variation, ranging from small plots of 1,200 m² to large plots of 10,000 m², with an average of 4,810 m² per farmer. Land ownership distribution is divided into: small plots <3,000 m² (37.93%), medium plots 3,000-6,000 m² (41.38%), and large plots >6,000 m² (20.69%). Livestock ownership per household shows the following pattern: 1-2 heads 44.83%, 3-4 heads 48.28%, and 5-6 heads 6.90%. There is a positive correlation between land area and number of livestock owned. Farmers with land area >6,000 m² tend to raise 3-6 cows, while farmers with small land area <3,000 m² mostly raise 1-2 cows. These findings are consistent with the research by

Tatipikalawan et al. (2022) in Maluku, which shows that land area is a major limiting factor in the development of household livestock farming in developing countries.

Cattle require a minimum of 0.3-0.5 hectares of land to meet their forage needs in an extensive system. The implication of this ownership pattern is the need for intensification technology interventions to increase land carrying capacity. Research by Youkhana et al. (2018) shows that the application of cut-and-carry system technology and the planting of superior forage crops can increase carrying capacity. Forage seed assistance programs, such as elephant grass, lamtoro, and indigofera, can help farmers with limited land to increase livestock populations without expanding land area. This research data also indicates the potential for developing silvopasture and agroforestry systems to optimize land productivity. Research by Jose and Dolinger (2019) shows that silvopasture systems can increase carrying capacity by up to 130% compared to conventional systems. This system provides additional benefits in increasing income through the utilization of land with various types of plants. The implementation of this system is very relevant for farmers in Dolokgede Village, who have an average of 0.48 hectares of land per household.

Feed Potential Characteristics

The characteristics of feed potential for beef cattle in Dolokgede Village show diversification of feed sources that reflect the pattern of local resource utilization in smallholder livestock farming systems. The combination of various types of waste provides better nutritional variety compared to the use of only one type of waste. The potential for forage shows a high degree of uniformity, with all farmers (100%) utilizing elephant grass (Setaria) and wild grass as forage sources, as shown in the following graph 3.

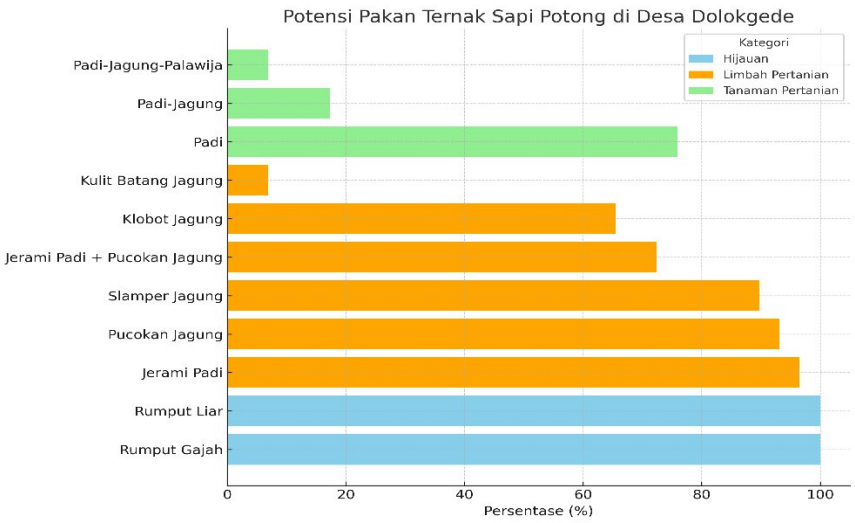

Figure 3. Graph of feed potential and utilization of agricultural waste

The types of agricultural crops cultivated by farmers are dominated by rice at 75.86%, followed by a combination of rice and corn at 17.24%, and rice, corn, and secondary crops at 6.90%. In Papua province, the agricultural sector is dominated by rice and corn cultivation, which integrates agricultural waste with ruminant livestock farming (Suawa, et al. 2022). The use of agricultural waste as animal feed shows a diverse pattern, with rice straw dominating at 96.55%, followed by a combination of rice straw and corn cobs at 72.41%, and corn husks at 65.52%. The utilization of corn cobs reached 93.10%, corn husks 89.66%, and corn stalks 6.90%. The high utilization of rice straw is in line with the research by Yusriani et al. (2015) that the majority of cattle farmers in Aceh province utilize rice straw agricultural waste as basal feed to reduce livestock feed costs. The diversification of agricultural waste reflects the farmers' adaptation strategy in optimizing available resources. The utilization of agricultural waste is a key characteristic of mixed crop-livestock systems as an integration of crop and livestock production. This condition differs from subtropical countries, which predominantly use forage, natural grass, and legumes. The absolute dependence on elephant grass and wild grass indicates limited access to high-quality forage seeds and forage diversification programs.

Dependence on elephant grass and wild grass as the sole source of forage creates the potential risk of nutritional deficiencies, especially protein. This condition requires protein supplementation from other sources, which in the context of this study is fulfilled through the diversification of agricultural waste that contains higher protein. The feed utilization pattern shows high efficiency in the utilization of agricultural waste, with rice

straw utilization reaching 96.55%. The utilization of corn cobs at 93.10% also shows farmers' understanding of the nutritional value of corn waste as a source of energy and fiber. The implication of this feed utilization pattern is the need for waste processing technology intervention to improve nutritional quality. The use of forage as basal feed indicates the need for a program to introduce forage legumes such as lamtoro, indigofera, and kaliandra to increase the protein content of basal feed.

Cattle Ownership Population Structure

The structure of cattle ownership is also influenced by the purpose of raising cattle. Most respondents raise cattle as family savings that can be sold at any time for urgent needs, such as school or health expenses. A small number of respondents have made cattle farming a source of regular income through the sale of slaughter-ready cattle. This is in line with the findings of Tatipikalawan et al. (2022) that the majority of slaughter cattle at the household level are used more as liquid assets than commercial commodities. The results of the data are presented in the following graph:

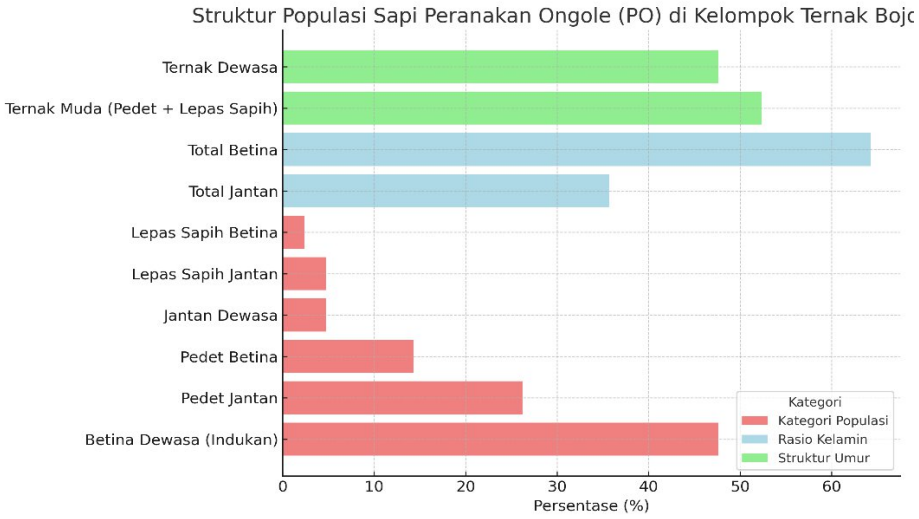

Figure 4. Graph showing percentage of cattle ownership

The structure of the cattle population raised by farmers in Dolokgede Village shows that livestock ownership is dominated by small-scale farmers, with an average of 1–3 head per household. A small number of respondents raise 4–6 head, and only a handful have more than 7 head. This pattern reflects the characteristics of smallholder farms, which generally function as a side business rather than a main source of livelihood. Research in Malaka Regency also shows a similar pattern, with an average of 2–5 beef cattle owned per household (Samberg et al., 2016). The majority of cattle raised are

Peranakan Ongole (PO) cattle, which are known for their high adaptability to tropical environments and limited feed. A small number of farmers have started raising artificially inseminated cattle, such as Simmental and Limousin, although the number is limited because they require higher maintenance costs.

The composition of the cattle population based on age category shows that the majority are breeding cows, while calves and heifers are fewer in number. This condition indicates that the orientation of breeding is more towards breeding. Research by Schaler et al. (2019) confirms that the population structure dominated by breeding cows is closely related to local market demand, which prioritizes breeding cows. Livestock ownership distribution in Dolokgede is still concentrated in households with relatively large land resources. Households with small plots of land tend to only raise 1-2 cows, while households with larger plots of land are able to raise more cows. This condition shows that the size of forage land is positively correlated with the number of livestock owned by rural communities. The results of this study confirm that the cattle population in Dolokgede Village is still subsistence-oriented with a small-scale business orientation. Efforts to increase the contribution to household income need to be made through a development strategy based on breeding and fattening. These efforts can be carried out by improving reproductive management, increasing access to artificial insemination, and utilizing agricultural waste as alternative feed.

Livestock Maintenance Costs (Feed Cost Estimates)

Feed cost analysis based on data from 29 farmer respondents shows a dominant dependence on natural feed and agricultural waste with highly variable cost estimates. The high costs incurred by farmers in cultivation, with nearly 80% going towards livestock feed, create significant economic challenges for rural farmers. Feed costs account for 80% of total production costs, with the largest cost components being the purchase of additional forage, commercial concentrates, and feed transportation costs. The feed cost structure shows a heterogeneous pattern, ranging from the dominant use of free natural forage to the purchase of commercial feed costing up to IDR 1,000,000 per maintenance period. Cattle farmers spend between IDR 150,000 and IDR 500,000 per head per month on feed, while poultry farmers need to invest between IDR 20,000 and IDR 100,000 per period. These variations in costs are influenced by the availability of

local feed, access to agricultural waste, and the feed management strategies implemented by farmers.

The proportion of feed costs is a very significant part of the total business costs as it can reach 70% (Makkar, 2018). Feed costs vary according to livestock category. Calves require lower feed costs because their daily consumption is still limited. Costs increase for heifers and fattening cattle, which require additional concentrates to support weight gain. This condition is evident in Dolokgede Village, where farmers who use concentrates have higher costs than those who use forage and agricultural waste. Most farmers in Dolokgede still rely on local feed sources, utilizing rice straw and corn stalks. This relatively reduces feed costs because the materials are available from their own agricultural production. The integration of farming and livestock businesses can reduce feed costs by up to 40% compared to non-integrated management patterns (Amejo et al., 2018). Limited access to capital means that most farmers are reluctant to buy commercial concentrates even though they can accelerate cattle growth. The low purchasing power of farmers for commercial feed is a major obstacle to increasing beef cattle productivity at the smallholder level. A similar pattern is also seen in Dolokgede, where the use of concentrates is only done by farmers with greater capital.

CONCLUSION

This study shows that beef cattle farming in Dolokgede Village is still small-scale, with an average of 1–3 cows per household. The majority of farmers are of productive age, have low levels of education, and rely on agriculture as their main occupation. Land use is integrated with livestock farming, but in practice there is still a lot of potential waste that has not been managed as an alternative feed source. The number of livestock owned, which is still used as savings, is an obstacle and a limitation of capital in maximizing the livestock sector. Overall, the beef cattle business in Dolokgede has the potential to support household livelihoods, but its development requires the optimization of local resource utilization, increased farmer capacity, and capital and market access support. Further research is recommended to examine the importance of utilizing local resources, such as agricultural waste, which can reduce feed costs and increase the efficiency of livestock businesses.

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