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Beef Cattle Feed Efficiency in Badung Regency

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Abstract. *This research is a literature study of marketing efficiency. This research aims to analyze the marketing efficiency of beef cattle in Badung. The method used in this research is qualitative research with field research techniques, namely direct observation of the object being studied to obtain relevant data. This research was carried out in Badung with the types of data used in this research, namely primary data and secondary data. The results of the research concluded that the feed efficiency of beef cattle in smallholder livestock businesses in Badung is low.*

Keywords*: Badung, Beef cattle, Marketing Efficiency, 3 Characteristics*

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INTRODUCTION

Beef is one of the foodstuffs produced by livestock and has a very important and strategic role in society because of its high nutritional content, especially protein, and its high digestibility by the body. According to the BPS Badung report (2020), beef production in Badung has decreased over the last 3 years, namely 1 518.00 in 2020 to 1 218.00 in 2021 and 1 052.00 in 2022 (https://bali.bps.go.id/indicator/24/188/1/produksi-daging-ternak-provinsi-bali-menurut-kabupaten-kota.html).

Badung, as one of the districts in Bali, is a base for developing Balinese cattle and has the largest animal market. This is because the development of tourist destination city plans in Bali Province is very clear. Based on the data above, it can be seen that cattle production in the Badung region contributes around 49.7% to cattle production in Bali, and beef production from 2020 to 2022 has decreased. The decline in beef production in Badung district is caused by many things, including the ability of farmers to maintain the average cow is 2-3 heads. The large number of conversions of agricultural land into residential areas as well as the increasing education of young people who are reluctant to go into agriculture.

Marketing is one of the most important activities, it aims to distribute products from producers to final consumers, which involves several marketing agents to facilitate product distribution by producers. Marketing is successful if two conditions are met, namely the ability to communicate farmers' results to consumers at low costs, and the ability to distribute optimally, the price paid by final consumers to producer activities is quite stable. Marketing efficiency is influenced by many factors, one of which is the fair participation of marketing agents in the marketing process. Methods or metrics for measuring marketing effectiveness include marketing profits, farmers' share of the price paid by final consumers (farmers' share), and product price-cost comparisons. Thus, researchers are interested in conducting studies that primarily focus on marketing efficiency. Pangemanan and Lumy conducted similar research in their journal "Marketing Efficiency of Broiler Chicken Eggs in Manado City". The research results can be concluded that the efficiency analysis shows the Farmer share value is greater than 50%, and the marketing efficiency value < 1 indicates CV marketing. Rizal's farm in Manado is very efficient. The difference between this research and previous research lies in the research object, the object of this research is beef cattle, and the most successful research object is eggs. Apart from the different research objects, the case studies are also different. On this basis, researchers try to conduct research with something different from the past, so that this research can be used as a complement to previous research.

RESEARCH METHODS

The method used in this research is qualitative research with field research techniques, namely direct observation of the object being studied to obtain relevant data. This research was carried out in Badung with the types of data used in this research, namely primary data and secondary data. Primary data is data obtained directly, while secondary data is data obtained from existing sources.

Primary data is the result of observations and interviews with beef cattle breeders and traders as respondents using a questionnaire, while secondary data was obtained from literature books relevant to the research and journals and agencies related to this research. To measure marketing efficiency, the research used a comparison between the marketing costs for Bali cattle incurred by each institution and the value of the products sold, expressed as a %.

RESULTS AND DISCUSSION

A. Characteristics of Sample Traders

Traders in this research are wholesalers and retailers. The role of wholesalers is to buy meat from producers and sell it to retailers and some sell meat directly to final consumers. The role of a retailer is to buy products from collecting traders and then sell them to consumers in their shops or stalls. The marketing function of traders is storing, packaging, delivering, and selling products until they reach the final consumer. The results of research from 25 traders, both retailers and collectors, showed that the age of the respondent traders varied between 25 years and 66 years. Based on Table 3, it is clear that according to BPS (2020) the age of respondent traders is still the productive age, there are 24 people with a percentage of 96%, while the age of respondents who are no longer productive is 1 person with a percentage of 4%. According to Favan (2020), age is one of the factors that influences a person's productivity. Someone who is of productive age has a higher level of productivity than those who are outside of productive age.

The characteristics of traders based on final education level show that 2 traders have a junior high school education level with a percentage of 8%, 22 traders have a high school education level with a percentage of 88%, and 1 trader has a university education level with a percentage of 4%. For educational characteristics, it is high school/vocational school education. High school education level is considered to be influential in decision-making in analyzing business opportunities, this is in line with the opinion of Ardhiana, et al. (2014) which states that the final level of education determines success in marketing purebred chicken eggs, where the higher a person's education, the more skill and insight they will have.

The length of time spent farming is used to measure a person's ability to work. Long periods prove successful and failed situations in business, giving rise to knowledge in dealing with problems or solutions to win or be successful. The results of the research showed that there were 5 respondent traders with a business experience of 1-5 years with a percentage of 20%, respondent traders with a business experience of 6-10 years 5 people with a percentage of 20%, respondent traders with a business period of 11-15 years were 5 people with a percentage of 20%, and respondent traders with a business experience of more than 16-20 years totaling 5 people with a percentage of 20%. Over 20 years totaling 5 people with a percentage of 20%. Favan (2020) business experience or length of work makes people more knowledgeable about the ups and downs of a business.

Table 1. Characteristics of Respondent Traders Based on Age, Education, and Length of Business

Age (Years)	Number of Breeders	Percentage (%)
<15	0	0
15-64	23	92
>64	2	8
Level of education	Number of Traders	Percentage (%)
Elementary School	0	0
Junior High School	2	8
Senior High School	20	80
University	3	12
Length of Business (Years)	Number of Traders	Percentage (%)
1-5	5	20
6-10	5	20
11-15	5	20
16-20	5	20
>20	5	20

Source: processed primary data (2024)

B. Feed Efficiency Analysis for Beef Cattle

Beef cattle performance data resulting from research includes feed consumption (BK), daily body weight gain, feed efficiency, feed cost per gain (FC/G), and income over feed cost (IOFC) as shown in Table 1 below:

Table 2. Performance of People's Farm Cattle from Research Results

Parameter	value		
	Lowest	Highest	Average
Average of dry matter consumption (kg)	4,24	16,28	8,42
Average Consumption from Dry Weight to Body Weight (%)	1,91	5,19	2,74
Average Daily Weight Gain (kg/head/day)	-0,07	0,62	0,19
Feed Efficiency	-0,02	0,07	0,02
Average feed cost (IDR)	4.225,40	17.825,78	7.831,31
Feed cost per gain (Rp/kg)	-77.241,14	196.301,33	46.166,62
Income over feed cost (Rp)	-1.238,45	13.248,08	3.985,55

Source: Processed primary data (2024)

1. Feed Consumption

Daily feed consumption, including agricultural waste and forage, is calculated by weighing the amount of feed given and weighing the remaining feed (if any) for the following day. Water for beef cattle is ad libitum and is changed daily (Astiti, 2019a).

In general, feeding 3 times a day, morning, afternoon, and evening. Weighing of feed is carried out by researchers because the amount and type of feed for beef cattle are provided by farmers without the intervention of researchers (Rasa Astiti & Rukmini, 2021). Animal feed is chopped first to facilitate feeding, then put into sacks, and the feed is weighed and recorded before being given to livestock. From the data in Table 1 above, it can be seen that the average dry matter consumed by cattle is 16.28 with a minimum of 4.24 or an average of 8.42 in kg/head/day respectively (Purwanto, 2016). The low feed consumption is caused by the low initial body weight of the cattle so the capacity of livestock to consume dry matter becomes small. The difference in the level of BK consumption is caused by differences in the supply of feeders and the type and weight of the livestock being kept (Astiti, 2022).

The main animal feed provided during this study was agricultural waste such as rice straw, peanut straw, soybean straw, and corn stover. Some breeders also provide feed in the form of grass, including natural grass/field grass and grass/premium cultivated grass (elephant grass), as well as leaves in the form of banana leaves, mahogany leaves, acacia leaves, and jackfruit. Leaf feed as animal feed. Farmers do not provide concentrate for their livestock because the price is considered expensive. According to Tillman et al. (1991), the ability of each cow to consume dry matter feed is up to 3% of its body weight per day. The average dry matter consumption of cattle observed during the study period was 8.42 kg/head/day or 2.74% of the average body weight of beef cattle. almost enough.

2. Daily Weight Gain

Beef cattle were weighed three times at the beginning, middle, and end of the study. The purpose of the second weighing is to control whether the farmer has beef cattle for sale at any time. The average daily body weight gain is 0.19 kg/head/day based on the results of weighing the cow's body weight. The daily body weight gain value was 0.38 kg lower than the daily body weight gain value for male PO cattle fed straw and fine bran-based feed fed microbial culture, while the average daily body weight gain value for female SIMPO cattle was calculated using waste agriculture and feed fed bran is 0.65 kg.

The difference in daily body weight gain in this study was caused by the consumption of dry matter provided by various types and the number of farmers due to livestock needs, so although Dry Matter consumption was normal, daily body weight gain was insufficient and yields were low. According to (Ort et al., 2015), cows with nutritional intake below their needs do not show optimal productivity because the needs for dry matter, crude protein, and energy must be met to gain weight.

3. Feed Efficiency

Based on data on BK consumption and daily weight gain, feed efficiency and feed cost values can be calculated. The efficiency of the use of feed in this study was 0.021, which means that every 1 kg of ration resulted in a daily body weight gain of 0.021 kg. The results obtained show a very low-efficiency value. The low feed efficiency value is due to the low average daily body weight gain due to the low nutritional content of the feed ingredients consumed by beef cattle (Hill & Hanna, 1990). Higher feed utilization efficiency indicates that less ration is consumed and less body weight gain is produced. The efficiency of feed use is influenced by several factors, including the ability of livestock to digest feed ingredients, nutritional adequacy for basic life, growth and body functions, the type of feed used, livestock age, feed quality, and body weight. So that the efficiency of the formation and production of energy is higher (Hastuti & Harjo, 2017). According to (Emmanuel, Otley, & Merchant, 1990), the efficiency of using beef cattle feed is 7.52% - 11.29%, and the average efficiency value in this study is 0.021 (2.1). This is because the feed provided by farmers during the research period was agricultural waste and forage (grass) which were of poor quality and were not given nuts or concentrates.

a. Feed cost per gain

The cost of feed per unit gain (fc/g) is the amount of feed needed to obtain 1 kg of animal weight (Suparman, 2004). The feed cost per profit was calculated by dividing the daily price posted by the farmer by the average weight gain produced at the time of the study. The results

showed that the average feed cost per gain (fc/g) was Rp.46,166.62. This means that the cost of feed is Rp. 46,166.62 to get 1 kg of body weight. This fc/g value is quite high, due to the low feed efficiency value, so even though the cows consume BK in amounts that are close to the standard, they do not provide a good daily body weight gain. The daily gains achieved are not commensurate with the cost of feed consumed (De Klerk, 2016). In the dry season it is difficult for farmers to find forage on their land, so many farmers buy forage from outside the area at high prices, resulting in high feed costs. Feed costs per unit of data gain can be reduced by optimizing daily body weight gain and reducing feed costs by using more efficient feeds (Branham, 2015). The value of daily body weight gain can be optimized through the implementation of good maintenance management, such as providing adequate quantity and quality of feed, sanitation and hygiene, and management of livestock health maintenance (Budiyanto, Widodo, Purnomo, & Kurniawati, 2021).

b. Income over feed cost

The calculation of Income Over Feed Cost (IOFC) is carried out to determine the economic value of feed on the income of beef cattle farmers. The value of income over feed cost is listed in Table 2 below.

Table 3. Calculation of Income Over Feed Cost

Income	Calculation	Score (IDR)
Daily Body Weight Gain	22,000 IDR x 0.19	4,180.00
Feces	400 IDR x 45% x 15.4	2,772.00
calf	3,000,000 IDR x 6 / 148 / 28	4,343.63
Total *income*		11,295.63
Feed cost		7,831.31
Income over feed cost		3,464.32

Source: Processed primary data (2024)

Income on feed costs is calculated by multiplying the average daily body weight gain with the assumption that the selling price of cattle per kg live weight is Rp. 22,000.00 during the study period. The manure income comes from the sale of cow dung-based fertilizers placed by farmers. Cattle manure is usually filled by farmers on their land for fertilizer needs, and the rest is sold in dry form without composting. Adult Ongole hybrids are capable of producing 15 kg/head/day of fertilizer (Ministry of Agriculture, 2001). Cows raised by farmers produce an average of 15.4 kg/head/day of wet manure per day so manure income is calculated by multiplying the range of daily manure yield of 15.4 kg by 45% of the BK content of manure and then multiplied by the dry assumption. manure per kg The price is 400.00 IDR. 6 calves were born during the research period, so the way to calculate the calf income is 6 times the assumption that the price per calf during the research period is 3,000,000.00 IDR then divided

by the learning time of 148 days and the number of calves 28 so that each is observed the average income average calves from cattle. Based on the calculation (Table 1.5), the IOFC value is Rp. 3,464.32, which means that the profit from this cattle business is Rp. 3,464.32 per head per day. A positive value indicates that the business being run generates a small profit. The lack of profit is due to the very low value of daily body weight gain.

CONCLUSIONS AND RECOMMENDATIONS

The results of the research from 25 traders, both retailers and collectors, show that the age of traders is dominated by the productive age of 24 people with a percentage of 96%. The characteristics of traders based on the level of final education are dominated by the high school education level with a percentage of 88%. The characteristics of traders based on the length of business are dominated by the length of business of 11-15 years totaling 10 people with a percentage of 40%.

The efficiency of beef cattle production is low. This is based on performance data of beef cattle which were analyzed through feed consumption, daily body weight gain, feed efficiency, feed cost per gain (FC/G), and income over feed cost (IOFC). Dry Matter Feed consumption to body weight was 2.74% with daily body weight gain of 0.19 kg/head/day, resulting in a feed efficiency value of only 0.02.

REFERENCES

Astiti, Ni Made Ayu Gemuh Rasa. (2019a). *[Peer Review] The Determinant of Beef Prices in Bali*.

Astiti, Ni Made Ayu Gemuh Rasa. (2019b). Impact of Bali cattle calf marketing on the farmer's income. *The Journal of Research on the Lepidoptera*, *50*(4), 89–96.

Astiti, Ni Made Ayu Gemuh Rasa. (2022). The Reasons of Farmers Marketing and the Motivation Of Farmers to Maintain Bali Cowards in the Covid-19 Era. *Devotion: Journal of Research and Community Service*, *3*(9), 852–858.

Astiti, Ni Made Ayu Gemuh Rasa, Astara, I. Wayan Wesna, & Eryani, I. Gusti Agung Putu. (2021). Bali Cattle Cultivation and Eco-Tourism in Ayunan Village Abiansemal District, Badung. *Civil and Environmental Science Journal (CIVENSE)*, *4*(2), 202–207.

Astiti, Ni Made Ayu Gemuh Rasa, & Azizah, Siti. (2019). Technical feasibility and impact of Balinese cattle marketing toward income of the breeder in Badung regency, Bali. *Jurnal Ilmu-Ilmu Peternakan*, *29*(3), 271–281.

Astiti, Ni Made Ayu Gemuh Rasa, Rukmini, Ni Ketut Sri, Rejeki, IGADS, & Balia, Roostita L. (2019). The farmer socio-economic profile and marketing channel of Bali-calf at Bali province. *SERIES "MANAGEMENT, ECONOMIC ENGINEERING IN AGRICULTURE AND RURAL DEVELOPMENT," 19*(1), 47–51.

Astiti, Ni Made Ayu Gemuh Rasa, Suparta, I. Nyoman, Lanang Oka, I. Gusti, & Antara, I. (2016). Marketing systems of calf Bali. *International Research Journal of Engineering, IT & Scientific Research (IRJEIS)*, *2*(11), 73–80.

Branham, Kimberly. (2015). *Use of ultra-high-density SNP data for genetic evaluation of predicted feed intake, feed efficiency, carcass, and growth traits in Hereford cattle*. Oklahoma State University.

Budiyanto, Eko, Widodo, Bambang Sigit, Purnomo, Nugroho Hari, & Kurniawati, Aida. (2021). Characteristics and Water Usage Pattern of Karst Groundwater User Communities of "Spamdus Genjahan" in Wonosari Basin. *International Joint Conference on Arts and Humanities 2021 (IJCAH 2021)*, 676–681. Atlantis Press.

De Klerk, Martin Johannes. (2016). *The effect of r-salbutamol on apparent digestibility, feed efficiency, growth, carcass characteristics, and meat quality of feedlot lambs*. Stellenbosch: Stellenbosch University.

Emmanuel, Clive, Otley, David, & Merchant, Kenneth. (1990). Accounting for management control. In *Accounting for Management Control* (pp. 357–384). Springer.

Hastuti, S. K. W., & Harjo, B. (2017). Climate change perception among stakeholders and climate change adaptation description based on local wisdom in Gunungkidul, Indonesia. *Bumi Lestari*, *17*(1), 1–6.

Hill, G. M., & Hanna, W. W. (1990). Nutritive characteristics of pearl millet grain in beef cattle diets. *Journal of Animal Science*, *68*(7), 2061–2066.

Ort, Donald R., Merchant, Sabeeha S., Alric, Jean, Barkan, Alice, Blankenship, Robert E., Bock, Ralph, Croce, Roberta, Hanson, Maureen R., Hibberd, Julian M., & Long, Stephen P. (2015). Redesigning photosynthesis to sustainably meet global food and bioenergy demand. *Proceedings of the National Academy of Sciences*, *112*(28), 8529–8536.

Purwanto, Agus. (2016). *Implementation of Forest Certification in Small Farm Community Forest in Gunung Kidul Regency, Indonesia*. University of Twente.

Rasa Astiti, Ni Made Ayu Gemuh, & Rukmini, Ni Ketut Sri. (2021). *Weight Gain of Young Bali Cows Given Feed Quality*.

Rasa, Ni Made Ayu Gemuh Astiti. (2019). Toward Achieving Self-Sufficiency Livestock. *IOP Conference Series: Earth and Environmental Science*, *347*(1), 12041. IOP Publishing.

Romo-Valdez, Ana, Pérez-Linares, Cristina, Ríos-Rincón, Francisco, Figueroa-Saavedra, Fernando, Barreras-Serrano, Alberto, & Castro-Pérez, Isabel. (2021). Importance of living space in the productive response and welfare of beef cattle in feedlot. *Abanico Veterinario*, *11*.

Sarmah, Ajit K., Meyer, Michael T., & Boxall, Alistair B. A. (2006). A global perspective on the use, sales, exposure pathways, occurrence, fate, and effects of veterinary antibiotics (VAs) in the environment. *Chemosphere*, *65*(5), 725–759.

SUTARNO, SUTARNO, & SETYAWAN, AHMAD D. W. I. (2015). Genetic diversity of local and exotic cattle and their crossbreeding impact on the quality of Indonesian cattle. *Biodiversitas Journal of Biological Diversity*, *16*(2).

Wilson, Paul, Hadley, David, & Asby, Carol. (2001). The influence of management characteristics on the technical efficiency of wheat farmers in eastern England. *Agricultural Economics*, *24*(3), 329–338.