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by Edy Prasetyo

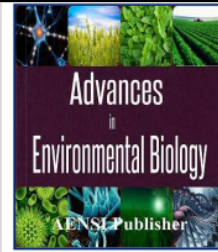
Submission date: 21-Jan-2021 09:00AM (UTC+0700)

Submission ID: 1491144787

File name: Edy_Prast-Empirical_Analysis.pdf (115.92K)

Word count: 3277

Character count: 16920



Empirical Analysis of Return Cost Ratio of Smallholder Bali Cattle Rearing in Tropical Region, Barru, South Sulawesi, Indonesia

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ARTICLE INFO

Article history:

Received 28 September 2015

Accepted 15 November 2015

Available online 24 November 2015

Keywords:

Feasibility Analysis, Smallholder, R/C ratio, Bali Cattle

ABSTRACT

The aim of this study was to determine the income and feasibility of Bali cattle rearing on smallholder in the tropics. The research was conducted in May and October 2015 at Barru regency, South Sulawesi. Data were collected with questionnaires for 5 groups of farmers sampled as respondents in this study. The results of the economic feasibility analysis of Return Cost Ratio suggested two criteria, the first R/C ratio of more than > 1 is a group Livestock *Sipurennue* (1.75), *Leppangeng* (1.07) and *Botto Tawang* (1.07) and the second R/C ratio of less than < 1 were the groups of *Makkawaru* (0.99) and *Lembang* (0.92). Scale cattle holdings and diversification by product of feces and urine waste contributed substantially to the income increase of farmers.

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To Cite This Article: Ikrar Mohammad Saleh, C. Imam Sutrisno, Sunarso, Indah Susilowati and Edy Prasetyo., Empirical Analysis of Return Cost Ratio of Smallholder Bali Cattle Rearing in Tropical Region, Barru, South Sulawesi, Indonesia. *Adv. Environ. Biol.*, 9(24), 461-465, 2015

INTRODUCTION

Bali cattle (*Bos sondaicus*) is a beef cattle native to Indonesia, the result of domestication Bull (*Bos-bibos bull*) [4]. Indonesia as a tropical country located below the equator has the potential of natural resources and abundant support for the development of Bali cattle breeding. Bali cattle, traditionally, received only general maintenance, and cultivated extensively. There are indications that they were not prioritized for development compared to other hybrid cattle.

Bali cattle has strategic significance and important role, as well as a promising market opportunity because it is a genuine cow that was proved able to adapt local conditions which should be paid attention for, because it is a national meat-producing livestock. Bali cattle population reaches 23% of the beef cattle population in Indonesia amounted to 16,043,337 heads. Therefore, the development of Bali cattle than for commercial purposes as well as germplasm need to be supported with relevant government policies. Bali cattle had an important role and market opportunities which are encouraging because they are animal protein livestock consumption which is the largest contributor to the national needs.

To fulfill the needs of Indonesia the government imported live cattle, meat and offal. Lack of choice for beef imports illustrated the importance of developing local farms, especially Bali cattle to meet the needs for domestic meat. Cattle to be fattened by feedlot were still dependent on imports to date. Import feeder cattle reached high percentage.

Based on the number of beef cattle population per province; South Sulawesi was ranked the third (7%), on the development of the number of beef cattle ranked by province, which can be seen in Table 1

South Sulawesi province has significant potential in the development of Bali cattle breeding ever known in the 1970s as an enclave of livestock (Talib, 2001) or the cattle barn with Bali cattle export capabilities to Hong Kong, Taiwan and Malaysia. In the late 1980s South Sulawesi became a source of Bali cattle to other provinces in the context of procurement and deployment of Bali cattle nationwide, especially to East Kalimantan, South Kalimantan, and Lampung. In the study site, the maintenance of Bali cattle done extensively, massively and integrated with rice crop.

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Table 1: Total Population of Cattle Based Ranked Province in 2010-2012.

Province	Number of Cattle				% To Total National	Ranks
	2010	2011	2012	Average		
East Java	3,745,453	4,727,298	5,019,445	4,497,399	30	1
Central Java	1,554,458	1,937,551	2,152,522	1,881,510	13	2
South Sulawesi	848,916	983,985	1,082,173	971,691	7	3
West Nusa Tenggara	695,951	685,810	827,657	736,473	5	4
East Nusa Tenggara	600,923	778,633	809,776	729,777	5	5
Lampung	496,006	778,633	809,776	679,100	5	6
Bali	683,800	637,473	687,538	669,604	5	7
National	13,581,571	14,824,373	16,034,337	14,813,427	100	

Source: Ministry of Agriculture, 2013

Research Objective:

The aim of this study is to determine the economic feasibility of Cost and Return ratio for Bali cattle business for 5 farmers groups, namely: group with government assistance through OCM (Optimization Cattle Movement) program such as the Farmers group *Leppangeng*, groups with the aid of CSR (Corporate Social Responsibility) of Bank Indonesia Makassar namely Farmers group *Sipurennue*, a group with a traditional model for the results sharing (*Teseng*), i.e. the Farmers group *Makkawaru*, farmer group with active female role i.e. Farmers group of *Botto Tawang* and farmer group for traditional share of non-group (*lempang*).

MATERIALS AND METHODS

This study was conducted in tropical conditions in the equatorial regions Barru regency, South Sulawesi Province, Indonesia. The samples were withdrawn with Multi Stage Sampling Methods [1, 5]. Respondents are members of farmer group *Sipurennue*, *Leppangeng*, *Botto Tawang*, *Makkawaru* and *Lembang* as many as 141 respondents. Primary data collection employed instruments with questionnaires that have been previously tested, covering socio-economic characteristics, production inputs, revenues, expenses, the price and production output. Respondents in this study are the same respondents from previous studies (*Cluster Analysis of Bali Cattle Business In Barru Regency, South Sulawesi, Indonesia: Advances in Environmental Biology, 9 (23) October 2015, Pages: 299-304*), but this research use different parameters from previous studies.

Data were processed with descriptive statistics such as frequency distribution and average value of Bali Cattle rearing economy. Descriptive statistics was used to obtain an overview of socio-economic characteristics, costs, revenues, earnings and economic feasibility.

The collected data is then calculated to obtain the value of revenues, expenses, income using the following formula [9, 6, 1, 5]:

Income (IDR) = Revenue - (Fixed cost + Variable Cost)

Total Cost (IDR) = Fixed cost + Variable Cost

The level of economic feasibility is determined with Return Cost Ratio Analysis [9, 3] on the advancement of Bali cattle business at the study location with the following formula:

$$RC = \frac{\text{Revenue}}{\text{Cost}} \times 100$$

1 The results of R/C were then interpreted as follow:

R / C > 1 = Cattle rearing was feasible

R / C < 1 = Cattle rearing was not feasible

R / C = 0 = Cattle rearing was at break-event point

RESULTS AND DISCUSSION

Characteristics of Respondents:

Table 2 shows the social characteristics of respondents. Age range of the respondents were 17 to 60 years. Age composition of the farmers who are in the productive age is an asset to increase cattle production through increased productivity and utilization of technology. Breeders who are in the productive age are more likely to adopt new technology innovation. The level of education of farmers varies widely ranging from elementary school to undergraduate education. All breeders have obtained formal education as shown in table 2.

Table 2 illustrates that the experience of rearing Bali cattle has a cultural heritage passed on to next generations. Span of Bali cattle breeding experience in the range of 1-60 years of breeding experience is sufficient to manage the knowledge and skills appropriate to raise cattle experience [8] which states that **1** rearing experience will provide knowledge and skills in managing the cattle business. The longer the rear the easier for farmers to make decisions related to the technical implementation of the cattle business. On the other hand, long

experience of rearing can also make breeders too cautious in making decisions and continue to make changes to the way of working. Smallholder scale Livestock vary widely and range between 1-12 cattle per breeder. Business management advancement for Bali cattle in the smallholder based in Barru is in the state of transition from extensive to semi-intensive.

Table 2: Socio-Economic Characteristics of Respondents.

No	Characteristic	Number (Person)	Percentage(%)
1	Age (Years)		
	17 – 22	1	0.71
	23 – 28	5	3.55
	29 – 34	28	19.86
	35 – 40	32	22.70
	41 – 45	22	15.60
	46 – 50	24	17.02
	51 – 55	12	8.51
2	Education		
	Elementary School	67	47.52
	Junior High School	34	24.11
	Senior High School	28	19.86
	Undegraduate	12	8.51
3	Farm Scale in 1 year		
	1 – 4 head	71	50.35
	5 – 8 head	64	45.39
4	Farmer Experience		
	1 – 15 year	71	50.35
	16 – 30 year	46	32.62
	31 – 45 year	17	12.06
	46 – 60 year	7	4.96

Source: Primary Data processed in 2015.

Feasibility Analysis of Return Cost Ratio:

Soekartawi [9] and Baruwa[1] stated that, the feasibility of a business can be measured by using the Revenue Cost Ratio (R / C Ratio). If R/C ratio indicates the number >1 then the business can be said to benefit but if the show number <1 then the business can be said to suffer from loose. The feasibility analysis is an evaluation of the overall effort as a viable basis for the agreement to be reviewed whether or not a business with the size of current revenues and current expenditures or costs.

Revenue:

Table 3 indicated that advancement of business income component in smallholder Bali cattle based were varied. Smallest acceptance value is the value of the reception at farmer group *lempang* of IDR 27,333,333, while the highest revenue value was the value of the revenue at farmer group *Sipurennue*, IDR 73,346,896. The value of revenue was influenced by various types of receipts by farmers. Animal by-product waste processing into products such as biogas, compost, biourine were able to increase the income value. Biogas results of diversification of feces and urine were economically viable for the community, the same thing was reported by Klavon [2] and Wresta [11] regarding the economic viability of biogas and digester of feces and urine of livestock. In addition, the group *Sipurennue* obtain funds from Corporate Social Responsibility form stable colonies which also contributed significantly to the low fixed cost that resulted increased revenues for members of the group. Saleh [7] in his study explained that, the group benefited significantly either directly or indirectly from the South Sulawesi provincial government assistance through the OCM (Optimizing Cattle Movement) program and Corporate Social Responsibility (CSR) funds.

Variable costs:

Table 3 described the number of values used in variable costs for each farmer group who were respondents in this study. The highest-value variable cost was used by the farmer group *Leppangeng* IDR 45,121,657, while the smallest variable cost was used by the farmer group *lempang* IDR 28,841,667. The amount of variable cost is influenced by the scale of rearing and the number of Bali cattle ownership and indications of the use of production inputs, e.g. forage in this case.

Fixed cost:

The value of fixed costs in Table 3 showed the value of the highest fixed costs was used by farmer group *Leppangeng* IDR 621.685, while the smallest value was by the farmer group *lempang* IDR 84.528. The size

depends on the value of the fixed costs and a wide variety of equipment and ranches owned. Maintenance of semi-intensive system with individual stable into the increased value of the fixed costs, compared to Sipurennue groups with stable that keep costs for colony stable.

Table 3: Component Of Economic Value Of Bali Cattle Rearing On Smallholder, Barru Regency, South Sulawesi.

No.	Item	Farmers Group				
		<i>Sipurennue</i> 5.59 heads	<i>Leppangeng</i> 6.14 heads	<i>Makkawaru</i> 3.93 heads	<i>Botto Tawang</i> 4.1 heads	<i>Lempang</i> 3.42 heads
2	Revenues (IDR)					
i	Cattle Ready For Slaughter	44.689.655	49.142.857	31.466.666	36.900.000	27.333.333
ii	Biourine	20.110.344	-	-	-	-
iii	Biogas	2.513.793	-	1.770.000	-	-
iv	Compost	6.033.103	-	-	-	-
A	Total Revenue	73.346.896	49.142.857	33.236.666	36.900.000	28.926.195
3	Variable Costs (IDR)					
v	Forage Feed	1.233.379	1.345.285	861.400	890.600	748.250
vi	Concentrate And Salt	354.227	379.628	243.080	253.380	211.150
vii	Drugs	113.958	125.314	80.240	83.640	69.700
viii	Labor Costs	5.818.965	6.107.142	7.500.000	7.275.000	7.312.500
ix	Retribution	279.310	307.142	196.666	205.000	170.833
X	Heifer/Cow	33.517.241	36.857.142	23.600.000	24.600.000	20.500.000
B	Total Variable Costs	41.298.082	45.121.657	32.481.386	33.307.620	28.841.667
4	Fixed Costs (IDR)					
xi	Land Rental Value Of The stable	5.237	2.209	1.031	-	-
xii	Depreciation Stable	333.333	386.428	195.333	-	-
xiii	Drinking Places	11.194	12.310	7.882	8.216	6.847
xiv	Ropes	69.782	76.736	49.135	51.217	42.681
xv	Sickle	35.000	34.008	35.000	34.008	35.000
xvi	Shovel	37.500	37.500	27.500	-	-
xvii	Hoe	37.500	37.500	37.500	37.500	-
xviii	Boots	35.000	34.992	25.666	20.995	-
C	Total Fixed Costs	564.548	621.685	379.048	151.936	84.528
D	Total Cost = B + C	41.862.630	45.743.342	32.860.435	33.459.556	27.333.333
E	Revenue = D - A	31.484.265	3.399.514	-377.261	3.440.443	-1.592.861
F	Return Cost Ratio (RCR) = A / D	1.75	1.07	0.99	1.07	0.92

Source: Primary Data, 2015

Return Cost Ratio:

Table 3 indicated that, the feasibility of (R/C) rearing of Bali cattle done by farmers group in the research area on the scale of livestock have different R/C ratio. Farmers group of *Sipurennue* had the highest R/C ratio of 1.75. Next row were farmers group of *Leppangeng* 1.07, *Botto Tawang* 1.07, *Makkawaru* 0.99 and the lowest qualification was *Lempang* with the R/C ratio was 0.92.

R/C ratio showed the feasibility of rearing and business of Bali cattle done by five farmer groups. Based on the analysis and interpretation of data, it is known that there are two groups with R/C ratio below 1 point, the group *Makkawaru* and *lempang*. In terms of financial viability, the two groups are not considered financially profitable. With the scale of livestock ownership, each *Makkawaru* and *lempang* groups had livestock holdings scale below 4 heads which affected the value of R/C ratio. Besides the magnitude of use costs, both fixed costs and variable costs will affect earnings.

Each *Sipurennue*, *Botto Tawang* and *Leppangeng*, had a value of R/C ratio above 1 figure. This indicated that the advancement of Bali cattle operations were financially feasible. Bali cattle ownership scale above 4 heads, and the utilization of waste by-product as the return of additional efforts of rearing Bali cattle. The low value of feasibility is affected by the costs that can not be minimized, indicated with avoiding waste production costs associated to advancement of the length of time of Bali cattle rearing. Long period of advancement as long as 12 months, resulted an increased cost (TC). Compared to Prasetyo [5] which explained that the average length of the maintenance period of fattening beef cattle in Central Java province was 7.82 months with an average ownership of livestock (non Bali cattle) of 3.08 heads.

Conclusion

Economic feasibility with analysis of Return Cost Ratio indicated two categories, the first R/C ratio of larger than > 1 was group of *Sipurennue* (1.75), *Leppangeng* (1.07) and *Botto Tawang* (1.07), while the two groups of other livestock farmer were *Makkawaru* group (0.99) and *lempang* (0.92) were smaller than > 1.

Suggestion:

The government should not be entangled with the policy of beef imports to meet domestic demand. Business of Bali cattle breeders cultivated by the society to date has potential revenue that should be improved both for farmers and Bali cattle business productivity. Various efforts worth applied fundamentally in the business of breeder community were 1). Bali cattle ownership scale of 4 or more heads, 2). Perform improvement that had become semi-intensive, extensive subsequent to intensive, 3). Shortening time extension for Bali cattle to be 6-7 months from 12 months, 4). Developing a by-product in the form of compost, biourine,

and biogas to provide added value to the Bali cattle business, which has an impact on improving the incomes and welfare of farmers.

ACKNOWLEDGEMENT

1. Thanks to the farmer groups who were respondents in this study (Farmers groups of *Sipurennue, Leppangeng, Botto Tawang, Makkawaru, and lempang*).
2. Thanks to Dr. Muh. Najib, M.Ed., M.Lib. who had shared his ideas in scientific and English contribution.
3. Thanks to Mr. Indrawirawan and Mr. Irvan, who had assisted in data processing.

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