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Feasibility Study on Beef Cattle Development in Teluk Bintuni Regency, West Papua

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ABSTRACT

The purpose of this study was to obtain information on the readiness of the development of beef cattle using ranch system in Bintuni District, West Papua through the approach of four local foundations in terms of technical, social and economic. Research respondents were 62 families from four local foundations in Bintuni. Determination of technical feasibility of land used based on carrying capacity for each land. The technical feasibility of raising cattle was observed based on the knowledge of the community. Socio-economic feasibility was investigated based on food security and poverty level of society. Business feasibility was determined according to economic indicators namely B/C ratio, NPV, and IRR. The results showed that the aspect of land provided by the four foundations was feasible with the average carrying capacity based on fresh weight, dry matter and TDN basis were 1.8, 2.0 and 4.5 AU/Ha/year, respectively. About 70,91% of the farmers are free from poverty, and 46.54% are in food security status, which means that cattle raising will not be disturbed by the basic requirement of life but it needs an initial investment to support cattle raising. Based on the technical feasibility of cattle raising as much as 64,39% having no knowledge of breeding, therefore training and livestock education should be done. The business feasibility result shows that cattle raising on a breeding scale of 60 heads were feasible with positive NPV value of IDR 2.536.610,211, IRR of 23.09% and B/C of 1.22. Based on the overall indicators, it was concluded that the development of beef cattle in Bintuni regency was feasible to be done with requisite that improvement on land aspects and community knowledge about raising cattle.

Keywords: Beef cattle, Bintuni, Feasibility, West Papua

Introduction

West Papua is an Indonesian province that has been deliberately planned as beef cattle development area using ranch system. Some targeted areas in the region are Kebar, Fakfak, Sorong, and Bintuni. West Papua has an approximately 9,000 ha of land available for ranch development. Furthermore, the plan is also supported by the availability of agricultural land and agricultural waste.

Tangguh LNG, a Liquid Natural Gas company that operates in Bintuni Bay has an intention to collaborate with the Indonesian government on community development project for people around their operating area (Directly Affected Village) and outside their operating areas such as Bintuni and Fakfak. One of the main programs to promote the economic growth of local people there is involving local people on beef cattle development using ranch model. Hopefully, this program will increase local people participation in supplying beef to meet both company and public meat demand, including the public demand in Manokwari, Sorong, and Fak-fak.

The fact that beef cattle is not an indigenous animal in Papua is becoming one of the challenges on beef cattle development there as local people are not acquainted with beef cattle farming yet (Woran and Sumpe, 2007). Some strategies for introducing and accustoming local people to beef cattle farming practices are thought to be necessary. Assigning religion- and social-based organization as adviser of farmer group on beef cattle development project is believed to be the best way to do so. Mauludin *et al.* (2012) stated that one of the main advantages of beef cattle development via farmer group are reducing farmer's daily time allocation and enabling work ethich transfer process.

Along beef cattle production cycle is one of the other challenges on beef cattle development that involves the community. The fact that farmer

requires at least 3 years on rearing a cow until it will produce a calf is becoming a distinctive challenge for a farmer who still lives under poverty line. An insistence on providing basic needs is a common reason for farmers to sell their cow earlier before it becomes profitable (Widayati *et al.*, 2011). A socio-economic background review of community that includes their food security status and the poverty level is required on a feasibility study to asses the readiness of the community to do a beef cattle farming practices without having any worry that they will sell their cattle earlier before old enough to be slaughtered or sold.

An evaluation of carrying capacity, botany composition, and chemical composition of forages are required on planning a ranch development. High forage production is positively associated with the number of livestock animal that can be grazed (Reksohadiprodjo, 1994).

According to above means, research of technical aspects that include land availability, socio-economic condition by assessing food security status and poverty level of targeted community, and the feasibility study of beef cattle development using ranch system is thought to be necessary to evaluate the visibility of beef cattle development project in Teluk Bintuni Regency.

Materials and Methods

Location and respondent

This study was conducted in Bintuni and Manimeri District of Bintuni Bay Regency, West Papua by using survey method with question list-baed in-depth interview and direct observation as well. Respondents are 62 patriarchs consisting of 25 patriarchs from Yayasan Muhammadiyah (Islamic-based organization), 5 patriarchs from Yayasan Pendidikan Kristen (YPK, a Christian-based Education Organization), 6 patriarchs from Yayasan Pendidikan dan Persekolahan Katolik (YPPK, Catholic-based Education Organization), 16 patriarchs from Koperasi 7 Bersaudara (a cooperative), and 3 patriarchs form transmigrant community.

Sampling was conducted purposively toward key stakeholder such as the head of the agricultural agency; head of local government office; head of the industrial and cooperative agency; BP Tangguh representative; board member and member of Yayasan Muhammadiyah, Yayasan Pendidikan Kristen, Yayasan Pendidikan dan Persekolahan Katholik, and Koperasi 7 Bersaudara. Other key respondents involved are public figures; local people from Sebyar, Sumuri, and Irarut ethnic groups who have targeted recipients of the project; local entrepreneurs in meat industry such as trader, butcher, meat seller, local restaurant owner, transportation agent, slaughterhouse, and meat warehouse and storage facility.

Techniques on land availability and feasibility evaluation

The feasibility of land was assessed based on multiple aspects: forages conformity, forages productivity and quality, carrying capacity, water content, and targeted land for ranch area that evaluated as below.

Forages identification

All sampled forages were identified by using the guideline determination, then separated based on their species. Species identification inside the quadrant used identification book.

Forages production and quality

Forages production were evaluated based on fresh weight, dry weight, and total digestible nutrient (TDN) of available forages. The production of fresh forages was measured based on the conversion of the average of fresh production/m^2 into fresh production/ha by using proper use factor 45%. The production of dry matters was measured by multiplying the fresh production with the percentage of dry matter content of the forage. TDN was calculated based on this following formula:

Production of forage TDN = fresh production (kg/ha) x % TDN

The forage quality was evaluated by using proximate analysis and crude fiber content. As much as 300 g of each forages samples were taken for analysis in the laboratory. Measured forages nutrient content include dry matter, crude protein, crude fat, crude fiber, and nitrogen-free extract, and ashes.

Carrying capacity

Carrying capacity was evaluated based on Voisin formula (1959) cit. Reksohadiprodjo (1994) that had been modified as follow:

$$CC = A \times B$$

whereas, forages production/ha

$CC = \text{Carrying Capacity}$

$$Y = \frac{\text{forages consumed/one animal unit/month}}{\text{forages production/ha}}$$

$$Y = (Y - 1)S = R$$

whereas,

$Y = \text{required paddock/one animal unit/year}$

$S = \text{grazing period (30 days)}$

$R = \text{resting period (70 days)}$

One animal unit is equal with a cattle with 255 kg of body weight that consumes dry matter as much as 5 kg/day with TDN requirement for maintenance and production for a year is 0.6618 tonnes TDN/ha/year.

Beef cattle production feasibility

Beef cattle production feasibility was assessed by evaluating farmers knowledge related with cattle housing, breeding, production process, animal reproduction, feed, and livestock disease management via questionnaire (Waris *et al.*, 2015). The results were then sorted into 3 main categories which are: score 0-30 (farmers

without any knowledge on beef cattle farming practices); score 31-60 (farmers with limited knowledge on beef cattle farming practices); and score 61-100 (farmers with sufficient knowledge).

Socio-economic feasibility

The socio-economic feasibility was determined based on the food security and poverty status of targeted program recipient and by assessing economic indicator of feasibility.

Food security status

There are numerous methods on assessing food security status, while the indicator that directly related with welfare is food expenses. Evaluating food expenses of a household toward total expenses will allow seeing unprosperous household that has a great amount of food expenses, leaving small amounts for education, health, recreation, expenses for luxury stuff, and investment. Food security status than can be known according to the formula that had been proposed by Supardi (2002), and Ilham and Sinaga (2007) as below:

$$\omega = \frac{\text{Household expenses}}{\text{Total Expenses}} \times 100\%$$

in which, ω = food expenses

A household with food expenses as much as <60% is household with secured food security, while a household with food expenses as much as ≥60% is a household with unsecured food security.

Poverty status

A study by Widayati *et al.* (2011) revealed that households whose any difficulty on providing their basic needs such as food and clothes will be barely able to take a role on beef cattle development and rearing beef cattle due to the long cycle of beef cattle production, up to 3 years. Thus, poverty status is required to be analyzed to perceive the readiness of targeted community on rearing beef cattle in a relatively long period. The poverty criteria used are based on Sayogyo (1977) criteria. Poverty reduction target base on poverty criteria in the region where the study was conducted is shown in Table 1.

Business feasibility

The financial feasibility of ranch development was evaluated by using net present value (NPV), internal rate of return (IRR) and benefit cost ratio (BCR) (Gittinger, 1986).

Net present value (NPV). Net Present Value was used to calculate the difference between the value of the present investment and the present value of cash inflow, subtracted with future operating cash flow using a certain discount rate. If the NPV value of a project is positive, it can be concluded that the investment is feasible. Meanwhile, the negative NPV shows that the investment is not feasible.

NPV can be calculated by following this formula:

$$NPV = \sum {P_t}/{(1+i)^t} - I_0$$

In which,

P_t = net cash flow
i = discount rate
n = investment period
I_0 = initial outlay

The internal rate of return (IRR). The internal rate of return is an interest rate that shows present value of benefit and cost are equal to zero.

IRR method is a trial method, whereas NPV is equal to zero. The interest rate is calculated by using trial and error method, finding 2 interest rate in which can produce PV of cash inflow above and below the investment value. The IRR of an investment can be calculated by using this formula below:

$$IRR = i^- + \left[\frac{NPV^+}{NPV^+ - NPV^-}\right](i^- - i^+)$$

In which,

IRR = internal rate of return
NPV+ = positive NPV
NPV- = negative NPV
i+ = interest rete of positive NPV
i- = interest rate of negative NPV

An investment is feasible if the IRR value greater than interest rate (IRR > i).

Benefit-cost ratio (BC). Benefit-cost ratio is the comparison between benefit present value and cost, indicating the feasibility of an investment. BC analysis can be used to evaluate the benefit value of an investment. Theoretically, BC can be calculated as below:

$$B/C = \frac{\sum B_t/(1+i)^t}{\sum C_t/(1+i)^t}$$

In which :

B/C = Benefit cost ratio
i = interest rate
t = investment period

An profitable investment will have B/C greater than 1.

Data analysis

Data were analyzed descriptively by using some scales that latter can be used to analyze the feasibility from some aspects. The technical

Table 1. Criteria of poverty according to Sayogyo (1977)

Poor area	Rice (kg/capita/year)	Calori (kcal/capita/year)
Poor city	320	3.156,16
Poor vilage	240	2.367,12

feasibility and socio-economic aspect for feasibility justification can be seen in Table 1.

Result and Discussion

Land feasibility

Carrying capacity is the capacity of a ranch on producing forages for livestock animals grazed in per ha of ranch/rangeland. In another word, it is the ability of a ranch to accommodate livestock animal (Reksohadiprodjo, 1994). The carrying capacity of a ranch/rangeland is depended on various factors, such as land and soil condition, soil fertilization, climate, forages species, and the type of a livestock animal. Determination of grazing pressure base on animal production is the best method to know optimum stocking rate of a ranch/rangeland.

According to chemical analysis of forages samples in surveyed area, the average of fresh forage production, dry matter production, and TDN production are 4.4; 1.0; and 3.0 ton/ha. The average of carrying capacity based on fresh weight, dry weight, and TDN in the surveyed area are 1.8; 2.0; and 4.5 animal unit/ha/year (Table 2).

Those values are from a calculation in which the used bodyweight value of cattle is 250 kg/head as a standard in the tropical area. Carrying capacity based on the dry matter is relatively greater, compared to carrying capacity based on fresh production, 2.0 vs. 18. It might be possible because of the high water content of forages in the research site, as much as 77.98%. Santosa (1995) stated that carrying capacity estimation based on the dry matter of forages is more suitable as the nutrient requirement of cattle is calculated based on dry matter.

Carrying capacity based on fresh production in this study shows a greater number compared to carrying capacity of rangeland in Kebar, West Papua which is 0.49-1.70 AU/ha/year (Yoku *et al.*, 2014). Furthermore, compared to rangeland in Flores Regency, Nusa Tenggara Timur that has 0.38 of carrying capacity (Kleden *et al.*, 2015). Reksohadiprodjo (1994) stated that rangeland can be classified as productive rangeland if the carrying capacity is at least 2.5 AU/ha/year. The surveyed area in this study can be transformed into a ranch/range land for beef cattle by introduction new type of forages and legumes, and the application of "cut and carry" feeding method.

The average of TDN production of forages in Bintuni and Manimeri District is 68.8%. It is higher than typical TDN production of forages in tropic that ranges from 41.5 to 59.9% (Reksohadiprodjo, 1984). According to that analysis, forages available in the surveyed area is able to supply nutrient requirement for livestock animal.

The above carrying capacity estimation based on either dry matter or TDN is ranging from 2 to 6 AU/ha/year. This condition shows that the forages available in the area can be used as a ranch for ruminant livestock. However, an improvement on its management is thought to be necessary to obtain optimal livestock productivity.

Knowledge readiness of community on animal farming practices

Technical knowledge on animal farming practices that include breeding and feeding process play an important role on the business sustainability of beef cattle production (Suroto and Nurhasan, 2014; Waris *et al.*, 2015; Malotes, 2016). The study shows that the good on farm management practices has not been completely adopted by a farmer or targeted community in Bintuni.

Technical experience and knowledge on animal farming practices of respondents in Bintuni and Manimeri District can be seen in Table 3.

Data on Table 3 show that most respondents in the study do not have beef cattle farming knowledge: YPK (100%), Koperasi 7 Bersaudaara (93.75%). Meanwhile, groups whose limited knowledge on beef cattle farming are YPKK (66.67%) and Yayasan

Table 2. Fresh production, dry matter, and TDN of forages in research site

Description		Yayasan Muhammadiyah	YPK (SP-5)	YPPK (Manimeri)	Koperasi 7 Saudara (Km 9)
Fresh production	kg/m^2	0,87	0,66	1,290	0,77
	ton/ha	3,93	2,97	5,81	3,44
Carrying capacity based on fresh production	AU/ha/year	2,00	1,00	2,00	1,00
Dry matter (DM) production	(%)	24,49	22,26	20,10	22,26
	ton/ha	0,96	0,66	1,17	0,77
Carrying capacity based on dry matter production	AU/ha/ year	2,00	1,00	2,00	2,00
TDN prodcution	(%)	69,65	72,21	64,97	68,67
	ton/ha	2,74	2,14	3,77	2,36
Carrying capacity based on TDN production	AU/ha/ year	4,00	3,00	6,00	4,00

Note: 1 Animal Unit (AU) is cattle with 250 kg of body weight as cattle standard in the tropical area.

Table 3. Technical experience and knowledge on animal farming

Foundation	Technical knowledge of cattle raising		
	Does not know about beef cattle farming (%)	Has limited knowledge of beef cattle farming (%)	Has sufficient knowledge on beef cattle farming (%)
Koperasi 7 Bersaudara	93,75	6,25	0,00
Yayasan Muhammadiyah	61,54	11,54	26,92
Transmigrant (Control)	0,00	100,00	0,00
YPPK	66,67	33,33	0,00
YPK	100,00	0,00	0,00
Rata-rata (average)	64,39	30,22	5,38

Muhammadiyah (61.54%). Respondents whose sufficient knowledge are transmigrant community (100%) and Yayasan Muhammadiyah (26.92%).

One of technical challenges related to beef cattle farming found in the targeted community is the inadequate knowledge of breeding. All respondents from YPK (100%) do not have skill and knowledge on determining the species of beef cattle, breeding process, selection, breeding age, calving interval, and determining behavioral signs of estrous. Moreover, the rearing management knowledge is considered as another challenge. Most the respondents do not have housing for their beef cattle. All beef cattle will be grazed all the time or moved to one yard/farm to another communally. Beef cattle farming is only a side job, and it acts as a saving. Beef cattle have not been used for soil processing in agriculture. Most of beef cattle feces is also not used optimally, only a few of farmers that used it as fertilizer. Recording on a breeding date, vaccination, and other practices have not practically applied yet.

Another technical challenge of the project is the limited knowledge of farmer regarding the feeding management. Most of the respondents have already understood the number of forages and feeding frequency that they should have done. However, they still have limited knowledge on the using of high-quality forage and the necessity of providing ad libitum drinking water for their beef cattle. Furthermore, the targeted community also still have limited knowledge of animal disease management.

Food security and poverty status

Understanding economic background of targeted community is considered important in evaluating the feasibility of beef cattle development. One of underlying reason for the failure of beef cattle development in small-scale farmers is the pressure on providing basic needs. As it has been known before, the production cycle of beef cattle takes a relatively long period of time. Farmer requires at least 3 years to produce a beef cattle that can be slaughtered. Therefore, it is considered tough for farmers who are still facing difficulty in providing basic needs to keep their beef cattle until reaching the slaughtering-age (Widayati *et al.*, 2011). A study on household income and farmer welfare by assessing household income toward poverty line and food security is considered to be required. The calculation of household income, poverty level, and food security status are shown in Table 4.

Household income was calculated by adding all net income that available to spend. Income comes from various type jobs either main or side job. The average of annual household income in this study is Rp32.588.591 with the lowest and highest income as much as Rp10.380.000 and Rp66.250.000.

The sustainability of a job/occupation is considered as an important factor in improving household income. An extractive job that commonly practiced by Papua people has less sustainability and reliability compared to other occupation including farming.

The study shows that 70.91% of surveyed households are above the poverty line, while the rest of 29.09% of surveyed households are below the poverty line. It confirms that most of the targeted households have been capable on providing their basic needs. Bandini (2003) stated that the best time to sell a steer when it has reached 2 years of age and 8 years for a cow to allow it is reproducing in the meantime. Selling

Table 4. Calculation of income, poverty level and food security status of communities in Bintuni

Organization of respondents	Annual income (Rp)			Number of households under the poverty line	Number of households that have no food security status
	Lowest	Highest	Average	%	%
Koperasi 7 Bersaudara	13.500.000	75.650.000	46.425.000	35,71	78,57
Yayasan Muhamadiyah	13.200.000	90.000.000	23.277.959	23,08	65,38
Transmigran (kontrol)	4.200.000	21.000.000	10.800.000	33,33	33,33
Yayasan Katolik (YPPK)	6.000.000	84.600.000	43.200.000	33,33	50,00
Yayasan Kristen (YPK)	15.000.000	60.000.000	39.240.000	20,00	40,00
Average	10.380.000	66.250.000	32.588.591	29,09	53,456

the livestock animal in the right time will give a benefit on the sustainability and economic profit. Williamson and Payne (1993) stated that the growth curve of beef cattle will keep growing along the age of the beef cattle until it stops at the certain time. At the initial phase of growth, beef cattle will need more nutrient for tissue development, followed by muscle and carcass growth. Selling beef cattle before it reaches its slaughtering-age only will lead to economic inefficiency.

In the other hand, the study of food security status shows that 53.46% of targeted household are not secured yet regarding their food security status. It means that only 46.54% of targeted household that has food security issue. Most of the respondents are only able to provide their basic needs, compromising welfare. Fewer segment expenses indicate that the household has an allocation of their expenses to improve their welfare and be able to provide basic needs such as food. The study by Joanne and Photakoun (2008) and Biradar *et al.* (2013) stated that beef cattle farming on improving the welfare of farmer. Beef cattle farming practices are hoped to be a motivation for improving welfare and well being of the targeted community.

Economic review by assessing household income and poverty level shows that most targeted community is poverty free. It means that targeted households are ready to be involved in the project in beef cattle development without any worry that they will sell their beef cattle earlier, before the recommended time.

The business feasibility of beef cattle farming using ranch system

The main purposes of rach development for beef cattle in Bintuni Regency is to raise the beef cattle population in the area. Thus, breeding is the main project that considered to be the best way to attain the purpose. The fattening in this project is becoming the additional business in order to cut the period for farmers to sell their beef cattle. The investment value on rearing 60 beef cattle for breeding and 70 beef cattle for fattening are shown in Table 5, as much as Rp8.111.870.250.

Table 5. Investment value and operating cost on beef cattle production using ranch system (60 beef cattle for breeding and 70 beef cattle for fattening

A	Investment for breeding	Volume		Cost per unit (rp)	Total (Rp)
1	Purchasing 2 years old of heifer	60	head	10.000.000	600.000,000
2	Purchasing 2 years old of bull	4	head	10.000.000	40.000.000
3	Selection and Quarantine process for 4 days	2	unit	15.000.000	30.000.000
4	Transportation and mobilization of beef cattle	1	pack	75.000.000	75.000.000
5	Land clearing	20	Ha	40.120.000	802.400.000
6	Cultivation	20	Ha	12.800.000	256.000.000
7	Ranch construction and development	8	Ha	18.475.000	147.800.000
8	The development of cutting grass	8	Ha	15.000.000	120.000.000
9	The construction of fences surrounding the ranch area	20	Ha	80.000.000	1.600.000.000
10	The construction of barbed grass surrounding the grass area	8	Ha	80.000.000	640.000.000
11	The construction of beef cattle yard	2	Ha	39.647.500	79.295.000
12	The construction of beef cattle housing/bardn	4	Unit	55.000.000	220.000.000
13	The construction of cattle neck clamp used for handling	2	Unit	2.000.000	4.000.000
14	The construction of shelter and drinking system	4	Unit	10.461.000	41.844.000
15	The construction of warehouse (3 m x 3 m)	2	Unit	57.340.000	114.680.000
16	The construction of clinic (3 m x 6 m)	1	Unit	64.446.250	64.446.250
17	The construction of office (5 m x 6 m)	1	Unit	90.000.000	90.000.000
18	The construction of employee housing	5	Unit	150.000.000	750.000.000
19	The construction of a deeping facility for beef cattle	2	Unit	50.000.000	100.000.000
20	Purchasing working tools and utilities	1	pack	5.000.000	5.000.000
21	The construction of water tower and water tub	2	pack	12.080.000	24.160.000
22	Alkon pump and hose	2	Unit	7.000.000	14.000.000
23	The construction of wells and sewage system	2	Unit	11.706.000	23.412.000
24	Pick up car	1	Unit	200.000.000	200.000.000
25	Motorcycle	1	Unit	20.000.000	20.000.000
26	Electrical generator	2	Unit	5.000.000	10.000.000

Lanjutan. Table 5.

		volume		cost per unit (Rp)	Total (Rp)
27	Chopper	2	Unit	40.000.000	80.000.000
28	Livestock scale	1	Unit	15.000.000	15.000.000
	Sub Total A				**6.167.037.250**
B	Investment value for fattening				
29	Procurement of seed, planting, fertilizing and lawn maintenance	2	Ha	15.000.000	30,000,000
30	The construction of housing/barn	2	Unit	250.000.000	500.000.000
31	Livestock Scale	1	Unit	15.000.000	15.000.000
	Sub Total B				**545.000.000**
C	Operating cost				
32	Labor cost for 1 additional assistant	12	months	10.000.000	120.000.000
33	Purchasing fertilizer and animal drugs	1	Pack	6.000.000	6.000.000
34	Labor cost	12	months	38.000.000	456.000.000
35	Fuel 20l/day	365	days	15.000.000	109.500.000
	Sub Total C				**691.500.000**
D	Operating cost of fattening				
38	The purchasing of 1.5 years old of male beef cattle	70	Head	8.000.000	560,000,000
39	Trasnportation and mobilization cost of beef cattle	1	Pack	75.000.000	75,000,000
39	Selection and quarantine for 4 days	2	People	15.000.000	30,000,000
40	Feed supplement and animal drugs	2	Pack	5.000.000	10,000,000
41	Cultivation of legume	33,333	Stek	1.000	33,333,000
	Sub Total D				**708.333.000**
	Total of Investment and Operating Cost				**8.111.870.250**

Tabel 6. Economic feasibility indicators of beef cattle development using ranch system in Bintuny Bay

Indicator)	\					
	Beef cattle production (breeding purpose)			Beef cattle production (breeding and fattening purpose)		
	value	statement	justification	value	statement	justification
B/C	1,22	>1	feasible	1,28	>1	feasible
IRR (%)	23,0384	>tingkat bunga (> interest)	feasible due to the IRR value is above the interest (11%)	23,2986	(>interest)	feasible due to the IRR value is above the interest (11%)
NPV (Rp)	2.536.610.211	Positive	Feasible due to the NPV value is positive	3.193.345.168	Positive	Feasible due to the NPV value is positive

The economic feasibility on breeding of 60 beef cattle is obtained in year 13th with positive NPV, as much as Rp2.536.610.610.211. The 23.09 of IRR indicates that the project can be done above the interest rate (11% per year). B/C calculation for 20 years of the project is more than 1, as much as 1.22. Thus, this beef cattle development project is feasible (Siregar, 2012; Steflyando *et al*., 2014).

The feasibility value of project combining breeding and fattening shows the greater positive value compared to breeding project only, as much as Rp3.193.345.168 in the same year (year 13th). The IRR value of the project combining breeding and fattening is 23.30 which is greater than present interest rate (11). The 1.29 of B/C value shows that a combination of breeding and fattening project is feasible (Gittinger, 1986; Zulfanita *et al*., 2009).

Reksohadiprodjo and Brojonegeroro (1997) stated that the advantage and benefit of a project should not only be reviewed for its short-term benefit. Other benefit that should be considered are a direct and indirect benefit. The direct benefit includes net income obtained from selling the main and side product of the animal husbandry project in Bintuni Regency. Indirect benefit can be seen from numerous indicators such as the improvement of land productivity, the improvement of work opportunity, the improvement of knowledge on animal farming practice, transfer process of work ethic, and interaction between the community with project assistant (Poole *et al*., 2007; Mwaura, 2014; Tolno *et al*., 2015), the knowledge on product processing technology and marketing, knowledge on economic organization and cooperation. Another indicator are the enhancement of environmental quality as an effect of the project (Santoso *et al*., 2014).

The beef cattle development project using mini ranch system have multiplier effects, mainly on providing job availability that will increase the

local people employment and the using of unused land as productive land. This system also improves the net income of farmer through diversification of beef products through fattening (Hoddi *et al.*, 2011). Beside that meat produced from the fattening project will have ASUH standard (stands for A=Aman=Safe, S=Sehat=Healthy, U=Utuh=Whole, and H=Halal), it also can be processed into sausage, dendeng, and meatball to meet the local demand and to supply nutritious food for local households.

To prevent the wasteful spending of the income from the project (only on consumer products), a pattern of utilization is thought to be necessary. Most of the respondents have children that are still in school and elderlies. Thus, the utilization of the income from the project should be directed for their children education or provide basic needs and care for elderly (health insurance for example). This type of pattern of utilization will provide a distinctive meaning for the targeted community as has a meaningful impact on them.

Conclusion

The study shows that land aspect provided by 4 organizations are feasible for beef cattle development using ranch system that can be seen from their carrying capacity based on fresh production, dry matter, and TDN as much as 1.8; 2.0; and 4.5 AU/ha/year. Most of the targeted community, as much as 70.91% are poverty free and 46.44% of them are secured in term of their food security status. It can be conluded that the project is feasible since most of the targeted community are already able to provide their basic needs. According to techniqual aspects, 64.39% of targeted do not have sufficient knowledge regading animal farming practice. Therefore training on skill and knowledge on beef cattle production is required for targeted community. The feasibility study of beef cattle production for the breeding purpose has positive NPV value (Rp2.536.610.211), IRR and B/C as much as 23.09% and 1.22. Generally, the bee cattle development using ranch system in Bintuni Bay is feasible with a requirement on land improvement, and enhancing knowledge of the targeted community.

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