

# **RESEARCH ARTICLE**

#### PRODUCTION PATTERN AND FEASIBILITY ANALYSIS OF "KALIMANTAN" BUFFALO'S **BREEDING FARMS IN THE RIVER AGROECOSYSTEM OF EAST KALIMANTAN PROVINCE.**

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#### Abstract

Manuscript History Received: 08 January 2019 Final Accepted: 10 February 2019 Published: March 2019

Key words:-Buffalo, Farmer, Production Pattern. Feasibility Analysis, East Kalimantan.

The aim of this research is to identify production pattern and feasibility analysis of "Kalimantan" buffalo's breeding farm in the upstream Mahakam river agroecosystem. This research done in December, 2016 until May, 2017. Tanjung Terakan farmer group in Muara Wis village, Muara Wis sub district, Kutai Kertanegara district, as respondents based on highest buffalo's population of upstream Mahakam river agroecosystem in this area and established. This is survey research with giestionaire used to collected data from 13 respondents which are members of Tanjung Terakan farmer group. Descripyive analysis used as data analysis of production pattern, and feasibility analysis indicators, such as Net present value (NPV), Internal rate of return (IRR) dan Net benefit cost ratio (Net B/C ratio) used as feasibility analysis of "Kalimantan" buffalo's breeding farm in the upstream Mahakam river agroecosystem. The result show that buffalo production patern in agroecosystem upstream Mahakam river determined by season. When dry season, used extensive buffalo production patern, but when rainy season used semi-intensive an intensive buffalo production patern. Indicators of feasibility analysis showed that NPV Rp.2.365.271.000,- with discount factor 12%, IRR value 17,58%, and net benefit cost ratio 1,51. Based on those indicators, concluded that buffalo production business feasible to be done.

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#### **Introduction:-**

Indonesia's beef production is still under supply condition. Government data record in 2019 beef production estimated are 429.000 tons, meanwhile beef demand are 686.000 tons. This condition make the government drive beef import regulation. One of this regulation implementation is buffalo meat imported since 2017. Government through "Bulog" (national logistic agency) done this regulation, in order to give alternatives for people who have not been able to reach beef prices.

The national buffalo meat production in 2017 are 32.260 tons or 6,07% of national beef production, which 42 ton or 0,13% of the buffalo meat supplied from East Kalimantan. This condition showed that buffalo meat production in East Kalimantan have not been developed. This condition is contrary with the buffalo potential in East Kalimantan which have the local breed called "Kalimantan" buffalo (Bubalus bubalis borneonensis). This buffalo is classified

Corresponding Author:-Ludy k. Kristianto. Address:-Student At Ph.D Program Faculty Of Animal Science, Brawijaya University. as river buffalo which one of their agroecosystem at upstream of the Mahakam river in Muara Wis and Muara Muntai sub district. This buffalo designated as national local breed by government through ministry of agricultural decree number 2843/Kpts/LB.430/8/2012. This buffalo breeding farm is one of the additional generate income for East Kalimantan's farmer or fisherman. This condition is supported with East Kalimantan potential as trade route of livestock commodity since many centuries ago. The "Kalimantan" buffalo often trade to South Kalimantan and Tana Toraja in Sulawesi island. This condition causes selling price of buffalo higher than cattle in East Kalimantan. This potential is challenge for farmers and stakeholders in East Kalimantan.

The chalenges comes from buffalo's breeding farm obstacles that are (1) traditionally production pattern and many cases of inbreeding; (2) reduction area because of land clearing for charcoal mining and palm plantation; (3) lower level of human resources causes low level of inovation adoption and low acces to capital. Theese obstacles effect on buffalo's farmers disability to develop their business and dependency on supply from other region. Based on that condition, research need to be done to identify production pattern and feasibility analysis of "Kalimantan" buffalo in river agroecosystem of East Kalimantan.

# **Research Methods:-**

#### **Research Location and Time:-**

Research done in Muara Wis sub district which purpossive sampling method based on highest population of buffalo in East Kalimantan province. From this location determined intentionally Tanjung Terakan farmer group in Muara Wis village, Muara Wis sub district, Kutai Kertanegara district, as respondents based on highest buffalo's population of upstream Mahakam river agroecosystem in this area and established. This research done in December, 2016 until May, 2017.

#### **Research Method:-**

This research done with survey method used questionaire to interviewed 13 respondents of all member of Tanjung Terakan farmer group. This research method designed as :

- 1. Observational research, based on data collected
- 2. Analitical research, based on data analyzed

The research data were primary and secondary data. Primary data collected from respondents about buffalo production pattern and feasibility analysis done. There were :

- 1. Buffalo production pattern in : procedures, reproductive, housing and feeding
- 2. Buffalo feasibility analysis, such as : investment cost, production cost, population development and income value

Secondary data were datas area, such as buffalo population, supply and demand of buffalo meat, buffalo slaughtering data, agricultural data, land use, organizational support and economic facilities. Secondary data collected from Government Development Planning Office, Statistical Bureau, Government Agricultural Service Office and Local Government Service Office.

#### **Data Collection Method:-**

Primary data collected by depth interviewed to respondents with questioners used and datas observed. Secondary data collected from government report and paper documents, previous research result and report, and also references study. Datas grouped according to needs and analyzed according to plan.

# Data Analysis:-

Descriptive analysis and feasibility analysis used as data analysis of this research. Descriptive analysis used to describe production pattern. Feasibility analysis used with indicators : Net present value (NPV), Internal rate of return (IRR) dan Net benefit cost ratio (Net B/C ratio).

# **Research Result And Discussion:-**

# Production Pattern Of "Kalimantan" Buffalo's Breeding Farm in The Upstream Mahakam River Agroecosystem:-

The result show that buffalo production patern in agroecosystem upstream Mahakam river determined by season, dry season and rainy season with flood. The season causes differences in buffalo system's handling. When it's dry season, all trapondents used extensive buffalo production patern, but when rainy season used semi-intensive an

intensive buffalo production patern. In extensive buffalo production patern, they are freely released in swamp or the edge of the forrest, which 2 - 3 kilometers far away from "kalang". When it's rainy season, they returned into kalang. The exception of this pattern, for female and younger buffalo (before 6 months old) which are always in intensive pattern with forages and fenced. For intensive and extensive pattern, forages always given to them at evening, when they have returned into kalang.

Forages used as feed are local forages, which called "kumpai". *Kumpai* have highly palatability for the buffalo. Farmers always grazed *kumpai* which many of them spread in swamp and far away from their home. They are often accross the river and use boat to get them. They brought *kumpai* to *kalang* used boat. Then *kumpai* stored on front of the *kalang*. At the evening *kumpai* given to buffaloes as feed. When *kalang* is empty, farmer always clean up use waterpump which suck water from below (kristanto, 2007).



Figure 1:-Kalang in Dry Season and Floaded Season

#### Farmers have facilities, such as :

**Kalang**, is cage which is build above the river or swamp, with height set depend on water level when it's rainy season. Kalang made from wood, called "ulin", because of it's strength and durability. Tanjung Terakan farmer group have  $624 \text{ m}^2$  of kalang with 414 buffaloes capacity. This kalang owned and handed down to the next generation. Kalang have door and stair which used for the entry and exit of buffaloes into the river.

**Cage**, used for younger (before 6 months old) and female buffaloes. Cage built and owned in private for each member of farmer group. Cages placed in the corner or backside of the kalang. Theese cages strongly fenced in order to male buffaloes could not get into cage from kalang. Cages have roof with 40  $m^2$  wide of area.

**Guard house**, built for night guard of kalang area with  $32 \text{ m}^2$  wide of area. This house occupied alternately for all members of farmer group. This house also use for group meeting.

**Motorboat** (Jukung Alkon), is farmer river mode of transportation used for grazed kumpai crossover the river and fishing. Jukung alkon also used to herded buffaloes get in and get out from kalang into the river or swamp.

# Financial Analysis of "Kalimantan" Buffalo's Breeding Farm in The Upstream Mahakam River Agroecosystem:-

This financial analysis describe financial condition of buffalo breeding farm system in the upstream Mahakam river agroecosystem, with group system occupied alternately for all members of farmer group.

#### **Financial Analysis Indicators**

Financial analysis indicators used based on condition of buffalo breeding farm system in respondent location. For that, used financial assumptions and indicators based on condition of buffalo breeding farm system in respondent location.

Technical Assumption	Total
Total member group of Tanjung Terakan	13 men with 131 buffaloes female
Long time livestock business	20 years

 Table 1:-Technical and Economical Coeffisient Assumption

Kalang's period (flood season)	120 days/year
Calving interval	18 bulan
Mortality risk of young buffaloes	11%
Mortality risk of adult buffaloes	2%
Male and female ratio of young buffaloes	3:5
Rejected ages	15 – 16 year
Gasoline costs for motorboat	Rp.9.000,-/liters
Labor costs	Rp.100.000,-/HOK
Drug costs	Rp.50.000,-/head/year
Selling price	
a. Male 3 years ages	Rp.17.500.000,-/head
b. Female 3 years ages	Rp.15.000.000,-/head
c. Rejected male	Rp.24.000.000,-/head
d. Rejected female	Rp.20.000.000,-/head
e. Younger male	Rp.9.000.000,-/head
f. Younger female	Rp.9.000.000,-/head
Discount factor	12%

Source : primary data analysis, 2017

#### Investment Cost dan Operational Cost

Investment Cost

Investment costs of buffalo breeding farm consist of kalang construction costs, procurement costs of buffaloes (male and female), motorboat purchase costs, fencing area costs and other operational costs.

Total investment costs for 131 mating female buffaloes with 10 buffaloes ownership for each farmer is Rp.4.006.028.000,-. Total investment divided into individual investment cost and group investment cost. Individual investment cost consist of jukung alkon and private cage costs, which owned by each group member. Each group member had one 80m<sup>2</sup> private kalang. Group investment cost consist of kalang construction costs, procurement costs of buffaloes, fencing costs of pastured area when dry season, and guard house costs. The biggest group investment cost is procurement costs for 152 buffaloes, consist of 131 mating female buffaloes in mating ages, and 21 young male buffaloes, which were costs Rp.2.332.500.000,-. The second one was kalang construction costs for Rp.1.248.000.000,- or 31,15% of total investment cost. Other group investment costs were construction and procurement costs for Rp.425.528.000,- or 10,62% of total investment cost. All investment costs shows in table 2

Table 2:-Investment Cost of Buffalo Breeding Farm

No	Items	Unit	Unit Costs (Rp 000 -)	Total	Costs (Bp 000 -)
Scale	of 131 head of mating females		(14.000,-)		(11.000,-)
I.	Livestiock procurement				
a.	Young females (3 years)	head	15.000	131	1.965.000
b.	Mating males (3 years)	head	17.500	21	367.500
	Total of procurement cost				2.332.500
II.	Kalang contruction				
a.	Local government grand (4x100m)	m <sup>2</sup>	750	400	300.000
b.	Local government grand (8x8 m)	m <sup>2</sup>	750	64	48.000
с.	Cage group (8x20 m)	m <sup>2</sup>	750	160	120.000
d.	Private cage (4x20 total 13 units)	m <sup>2</sup>	750	1.040	780.000
	Total of procurement costs				1.248.000
III.	Infrastructure procurement				

	Zero year				
a.	Motorboat purchase costs	units	7.000	13	91.000
b.	Guard house costs (4x8 m)	$m^2$	2.000	32	64.000
с.	Fencing costs	М	57	3.000	171.000
d.	Generator set costs	units	2.500	1	2.500
e.	Sickle costs	units	39	26	1.014
f.	Waterpump costs	units	750	1	750
	Total of Infrastructure procurement costs				330.264
	Total of investment costs in zero year				3.910.764
	Fifteenth years				
a.	Motorboat purchase costs	unit	7.000	13	91.000
b.	Generator set costs	unit	2.500	1	2.500
с.	Sickle costs	unit	39	26	1.014
d.	Waterpump costs	unit	750	1	750
	Total of Infrastructure procurement costs				95.264
	Total Investment Costs				4.006.028

**Source :** primary data analysis, 2017

#### **Operational Cost**

Operational cost of buffalo breeding farm spent when buffalo in *kalang*. Operational cost consist of labor costs, herding costs, cage cleaning costs, gasoline costs, health costs and *kalang's* maintenance costs. Details of operational costs shows in table 3.

Items	Satuan	Tahun							
		1	2	3	4	5	6	7	8 s/d 20
Population :									
Mating females	head	131	131	131	131	131	131	131	131
Mating males	head	21	21	21	21	21	21	21	21
Younger females	head	0	70	70	0	70	70	0	70
Younger males	head	0	54	54	0	54	54	0	54
Females (3 tahun)		0	0	0	69	69	0	69	69
Males (3 tahun)		0	0	0	53	53	0	53	53
Young females	head	0	0	69	69	0	69	69	0
Young males	head	0	0	53	53	0	53	53	0
Total population	head	152	276	398	396	398	398	396	398
Variable Costs :									
Days of work	dow	780	780	780	780	780	780	780	780
activities									
Grazing in the	dow	463	463	463	463	463	463	463	463
morning									
Clean up private	dow	48	48	48	48	48	48	48	48
cage									
Total of labor	dow	1.291	1.291	1.291	1.291	1.291	1.291	1.291	1.291
Labor costs	Rp.000,-	129.149	129.149	129.149	129.149	129.149	129.149	129.149	129.149
Total of gasoline	Liter	3.120	3.120	3.120	3.120	3.120	3.120	3.120	3.120
Gasoline costs	Rp.000,-	28.080	28.080	28.080	28.080	28.080	28.080	28.080	28.080
Drug costs	Rp.000,-	3.800	3.800	3.800	3.800	3.800	3.800	3.800	3.800
Kalang	Rp.000,-	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
maintenance costs									
Total variable	Rp.000,-	166.029	169.136	172.145	172.082	172.137	172.137	172.082	172.137
costs									

**Table 3:-**Operational Projection Cost of Buffalo Breeding Farm

Fixed Costs :									
Depreciation costs	Rp.000,-	21.312	21.312	21.312	21.312	21.312	21.312	21.312	21.312
Total production	Rp.000,-	187.341	190.448	193.457	193.395	193.450	193.450	193.395	193.450
costs									

#### **Production and Income**

Production and income of buffalo breeding farm depend on ages, sex and total of buffaloes sold out. IncomeprojectionofbuffalobreedingfarmdescribeinTable4.

Table	e 4:-Produc	ction projection	and inco	me averag	e of buffalo b	reeding farm

No	Year	Туре	Total	Selling	Value	Total	Income
				Price	(Rp.000,-	(Rp.000,-	Famer/year
				(Rp.000,-)	/year)	/tahun)	(Rp.000,-)
1	4	Young Females	69	15.000	1.828.324	1.960.099	150.777
		Young Males	53	17.500	931.776		
2	5	Young Females	69	15.000	1.828.324	1.960.099	150.777
		Young Males	53	17.500	931.776		
3	7	Young Females	69	15.000	1.828.324	1.960.099	150.777
		Young Males	53	17.500	931.776		
4	8	Young Females	69	15.000	1.828.324	1.960.099	150.777
		Young Males	53	17.500	931.776		
5	10	Young Females	69	15.000	1.828.324	1.960.099	150.777
		Young Males	53	17.500	931.776		
6	11	Young Females	69	15.000	1.828.324	1.960.099	150.777
		Young Males	53	17.500	931.776		
7	13	Rejected Females	66	20.000	1.320.000	2.361.599	181.661
		Rejected Males	11	24.000	264.000		
		Young Females	3	15.000	38.324		
		Young Males	42	17.500	739.276		
8	14	Rejected Females	67	20.000	1.340.000	2.360.099	181.546
		Rejected Males	10	24.000	240.000		
		Young Females	2	15.000	23.324		
		Young Males	43	17.500	756.776		
9	16	Young Females	69	15.000	1.828.324	1.960.099	150.777
		Young Males	53	17.500	931.776		
10	17	Young Females	69	15.000	1.828.324	1.960.099	150.777
		Young Males	53	17.500	931.776		
11	19	Young Females	69	15.000	1.828.324	1.960.099	150.777
		Young Males	53	17.500	931.776		
12	20	Mating Females	131	20.000	2.620.000	6.200.099	476.931
		Mating Males	21	24.000	504.000		
		Young Females	69	15.000	1.828.324		
		Young Males	53	17.500	931.776		
		Younger Females	70	9.000	630.000		
		Younger Males	54	9.000	486.000		
		Total (Rp.000,-)					28.562.693
	Тс	otal (Rp.000,-/respond	ent)				2.197.130
	Tota	l (Rp.000,-/responden	t/year)				109.857
	Total	(Rp.000,-/respondent/	/month)				9.155

Source : primary data analysis, 2017

Average of buffalo sold were 122 heads/year, consist of young female were 69 heads and young male were 53 heads. Based on buffaloes selling price on that time, average income were Rp.150.777.000,-/farmer/year. For 20

years, based on that value, average income would be Rp. 2.197.130.000,-/farmer or Rp.109.857.000,-/farmer/year or Rp.9.155.000,-/farmer/month.

Cash Flow

Cash flow for buffalo breeding farm consist of cash inflow and cash outflow. Cash inflow from buffaloes total sold out started from fourth years with average of calving interval is 18 months.

Years	Profit	Investme nt	Production	Total	Net Profit	Cash Flow
	( <b>Rp.000,-</b> )	( <b>Rp.000,-</b> )	Cost	Cost	( <b>Rp.000,-</b> )	( <b>Rp.000,-</b> )
			( <b>Rp.000,-</b> )	( <b>Rp.000,-</b> )	+ (-)	+ (-)
	1	2	3	4 = (2 + 3)	5 = (1 - 4)	
0	0					
		3,910,764		3,910,764	(3,910,764)	(3,910,764)
1	-		187,341	187,341	(187,341)	(4,098,105)
2	-		190,448	190,448	(190,448)	(4,288,552)
3	-		193,457	193,457	(193,457)	(4,482,009)
4	1,960,099		193,395	193,395	1,766,705	(2,715,304)
5	1,960,099		193,450	193,450	1,766,650	(948,654)
6	-		193,450	193,450	(193,450)	(1,142,104)
7	1,960,099		193,395	193,395	1,766,705	624,601
8	1,960,099		193,450	193,450	1,766,650	2,391,251
9	-		193,450	193,450	(193,450)	2,197,802
10	1,960,099		193,395	193395	1,766,705	3,964,506
11	1,960,099		193,450	193,450	1,766,650	5,731,156
12	-		193,450	193,450	(193,450)	5,537,707
13	2,361,599		193,395	193,395	2,168,205	7,705,912
14	2,360,099		193,450	193,450	2,166,650	9,872,561
15	-	95,264	193,450	288,714	(288,714)	9,583,848
16	1,960,099		193,395	193,395	1,766,705	11,350,553
17	1,960,099		193,450	193,450	1,766,650	13,117,203
18	-		193,450	193,450	(193,450)	12,923,753
19	1,960,099		193,395	193,395	1,766,705	14,690,458
20	6,200,099		193,450	193,450	6,006,650	20,697,108
Total	28,562,693	4.006.028	3,859,557	3,954,821	24,607,872	20,697,108
Average (Rp.000,-	2,197,130	308,156	296,889	304,217	1,892,913	1,592,085
/responden)						
NPV (Rp000,-)	2.365.271					
IRR	17,58%					
Net BCR	1,51					

**Tabel 5:-**Cash flow of buffalo breeding farm

Source : primary data analysis, 2017

Table 5 show that theese buffalo breeding farm is projected to give net profit Rp.20.697.108.000,- at 131 head of mating females scale of business within 20 years, with averages are Rp.1.592.085.000,-/respondent at 10 head of mating females scale of business within 20 years. Assumed that buffaloes sold at 3 years ages with male and female ratio is 63 : 100. Cash flow in zero year to sixth years still negatives, because of high investment costs and profit from buffaloes sold begun in fourth years. Total of sold buffaloes will increase eleven times within 20 years.

Feasibility analysys indicators show that NPV Rp.2.365.271.000,- at discount factor 12% and IRR 17,58% also net benefit cost ratio 1,51. Based on those indicators and assumptions, show that theese buffaloes breeding farm business is feasible.

# **Conclusions And Suggestions:-**

#### **Conclusions:-**

- 1. Buffalo production patern in agroecosystem upstream Mahakam river determined by season. When dry season, used extensive buffalo production patern, but when rainy season used semi-intensive an intensive buffalo production patern.
- 2. Indicators of feasibility analysis showed that NPV Rp.2.365.271.000,- with discount factor 12%, IRR value 17,58%, and net benefit cost ratio 1,51. Based on those indicators, concluded that buffalo production business feasible to be done.

#### Suggestion:-

Recommendation from this research is need to develop the farmer's ability by trained them in order to develop their ability in buffalo reproductive and productive management in order to develop "Kalimantan" buffalo performances.

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