

INDONESIA AUSTRALIA
RED MEAT & CATTLE
PARTNERSHIP



CATTLE BUSINESS SCALE-UP BRAHMAN CROSS

PT. BUANA KARYA BHAKTI

IACCB
Indonesia-Australia Commercial Cattle Breeding Program



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CHAPTER 1. INTRODUCTION/ BACKGROUND

PT Buana Karya Bhakti (BKB) collaborated with the Indonesia Australia Commercial Cattle Breeding (IACCB) Program in implementing a Brahman Cross (BX) Breeding Pilot Project. The breeding model – integration of cattle in oil-palm plantations (SISKA) was initiated with 300 imported productive BX heifers and 30 bulls¹ which started arriving early in October 2016.

The initial 3-year pre-commercial Pilot phase gathered and analysed herd productivity and financial data and provided recommendations for improvements. Data from years 2017 to 2019 were used to provide financial projections of the breeding business and to determine the potential commercial sustainability of the business.

BKB's Board of Directors and management has shown strong financial commitment with an investment of IDR 8.1 billion up to the end of 2019 and an additional allocation of IDR 12.5 billion (A\$ 1.2 M) planned for 2020.

The Board of Directors has seen the business potential of the SISKA-model and is planning an integrated cattle business in South Kalimantan increasing the number of breeders to approximately 2,000 head to achieve an economy of scale and expand the enterprise to include fattening, slaughtering and prime-cut meat to supply the local retail market.

Building on the experience managing a SISKA business model, BKB is setting-up a SISKA training center to cater for the increased demand of people interested in

¹ A total of 30 bulls was provided 11 at the end of 2016 and the remaining 19 were purchased early in 2017.



expanding cattle breeding in oil palm plantations. They have the organizational infrastructure, the human resources, a sufficient network amongst oil palm plantations and other industry players as well as the physical infrastructure to house participants in the training offered and are well on the way to develop a sound curriculum.

Challenges for expansion include the limited availability of cheap high energy feed sources, and the high rainfall throughout the year which is challenging for the health of new-born calves. The limited availability of middle management with expertise in SISKA management and experienced stockmen is also a constraint to development.

A potential barrier for expansion is the uncertainty of the marketing opportunities in South Kalimantan. Initial efforts to market slaughter animals locally and the networking connections with other oil-palm estates provides opportunities including to benefit from lucrative prices targeting the Qurban market. Other companies initiating cattle enterprises in the province might also add to the marketing uncertainties whereas the establishment of the new capital in the adjacent province might provide opportunities for marketing live animals or meat.

This business scale-up document has been developed to better inform BKB's owners. It provides several alternative business model projections, including the opportunities and challenges for each. The projections were calculated using the IACCB-developed CALFIN tool to project cashflow and economic indicators. Assumptions were developed from actual performance results achieved for key performance indicators (KPIs) at BKB over the past three years.



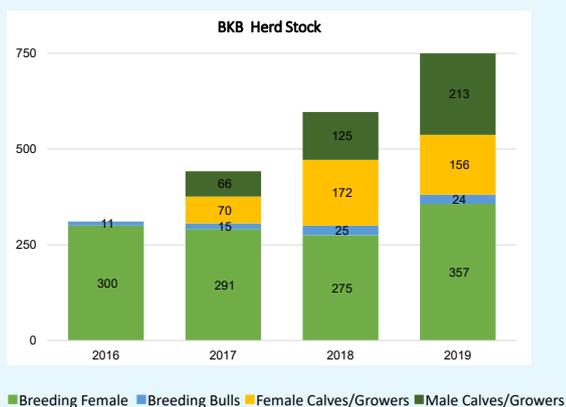
CHAPTER 2. HERD STATUS

Between the arrival of cattle in October 2016, and December 2019 BKB has increased its herd by 240% - from 311 to 750 head, with a mixture of cows and bulls and progeny amounting to approximately 700 Animal Equivalents (AE)².

two estates (BKB and FFD) and totaling 17,000 ha of which 5,200ha has already been identified as being suitable for SISKA. Given the age of the palms between 10-15 years, such an area is approximately enough to house around 1,400AE if no additional feed is provided. The number can be increased to around 1,550AE. when 1 kg of Palm Kernel Cake (PKC) per head per day is provided. Annex 7 provides the carrying capacity calculation.

Given BKB has a strategy to grow the herd to about 2,000 head (an estimated 1,700AE) BKB is planning to support the grazing with additional PKC supply from their own factory and manage palm frond pruning to provide more fodder to accommodate these increased numbers. The development of additional open, improved pastures and forage banks would further increase this carrying capacity. A plan to graze the feeders on the nearby estate is also in the making.

Graph 1. BKB Cattle Stock Expansion 2016-2019



BKB possesses a plantation consisting of

² AE Calculation: Breeding bulls ~ 1.5 AE, Wet cows ~1.5 AE, Dry cows ~ 1 AE, Grower > 12 months ~ 0.85 AE, Weaner 4 – 12 months ~ 0.75 AE.





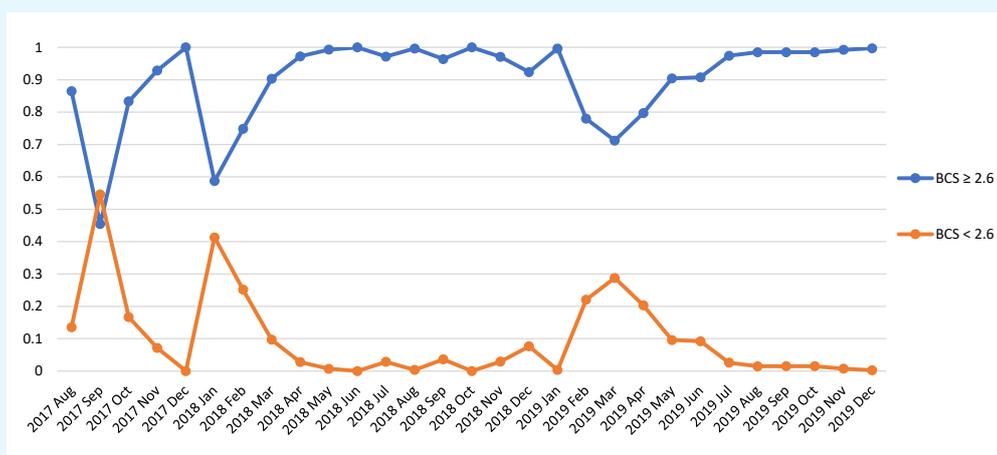
CHAPTER 3. HERD KEY PERFORMANCE INDICATORS

Body Score Condition:

After the initial first 6 months, BKB succeeded in maintaining BCS condition of the productive herd as can be seen in the following graph. Below a BCS of 2.6, cows

commonly struggle to function effectively through their reproductive cycle. Better availability of PKC should result in fewer cows losing BCS below 2.6 into the future.

Grafik 2. Rerata BCS pada Sapi Betina Produktif



Key Performance indicators:

Key performance indicators i.e. conception rate, calving rate, calf mortality rate,

weaning rate and grower mortality rate for the herd for the specific 12-month period are shown in Table 1.

Table 1. Key Performance Indicators

Parameter	Year 1	Year 2	Year 3	Av. Yr2 & Yr3	Benchmark ³
Conception Rate	74.7%	72.2%	63.5%	67.9%	>80%
Calving Rate	9.3%	64.7%	74.0%	69.4%	>70%
Calf Mortality Rate ⁴	10.7%	5.2%	5.9%	5.6% ⁵	5-10%
Weaning Rate	2.0%	55.1%	54.5%	54.8%	>65%
Grower Mortality Rate	NA	0.6%	12.6%	6.4% ⁶	<2%

Table 1 shows a stabilizing of percentages over Year 2 and Year 3, which were used in projections. Year 1 figures were impacted by the start-up phase, as BKB entered a new business with newly arrived cattle adapting to their new environment, forage availability in the plantation being limited, inexperienced stockmen and late delivery of bulls (4-5 mts late).

Most of the KPIs are trending towards the benchmark for SISKKA. An important exception is the weaning rate, which is below target. Early in the project calf mortality was high due to reproduction

issues (e.g. abortion, prolapse, premature calving and dystocia), bad mothering ability (common among first calf Australian BX heifers), injuries, and the inexperience of stockmen dealing with cattle during calving - especially as the peak of calving occurred during the peak rainy season in Year 1. Last year's grower mortality was high due to insufficient oversight of newly weaned calves by new, inexperienced stockmen. By providing improved oversight to reduce calf and grower mortalities, the benchmark weaning rate is quite achievable.

Calving Interval (CI):

The calving interval for the 27 months up to December 2019⁷ averaged 17 months. Whilst CI is still above the benchmark of 15 months the interval is improving⁸.

$$\text{Estimate of CI} = \frac{\text{Project period (month)} \times \text{number of initial cows stock at the intended period}}{\text{Total calves born up to the intended project period}}$$

$$\text{BKB's Calving Interval} = \frac{27 \text{ months} \times 287}{453} = 17 \text{ months}$$

3. The benchmarks provided are based on the best results that have actually been achieved by an IACCB partner company using the SISKKA breeding model in at least one calendar year. Individual companies can set their own KPIs each year as they work towards achieving the industry benchmark. Industry benchmarks may also be raised every few years as overall industry performance improves.
4. Calf mortality rate is % of calves born that died before weaning.
5. 22 mortalities out of 396 calves
6. 12 mortalities out of 312 weaned
7. Year 1 figures have been excluded as they were impacted by the start-up phase, as BKB entered a new business with newly arrived cattle adapting to their new environment, forage availability in the plantation being limited, inexperienced stockmen and late delivery of bulls (4-5 mts late). After that period figures stabilized.
8. If we include January 2020, when 44 calves were born, in the CI calculation, the CI becomes 16 months.



CHAPTER 4. ECONOMIC VIABILITY TO DATE

In order to analyse the economic viability of the enterprise we considered daily costs including feed, and operational costs, cost-of-gain and production costs for weaners and feeders.

Total daily cost (feed cost plus operational cost) per head varied between IDR 7,856 and IDR 10,630 and averaging IDR 10,241 over the three years averaging. Average feed cost over the last 3 years was below IDR 5,000/hd/day, mainly because of the low cost of grazing in the plantation and the limited amounts of self-produced relatively cheap Palm Kernel Cake provided as the primary supplement. In comparison, commercial breedlots commonly spend IDR15,000 to IDR20,000 per day per cow on rations.

Average Daily Costs/hd – Cows.

Table 2. Feed and Operational Costs of Productive Cows

Parameter	Year 1 ⁹	Year 2	Year 3	Avg. Yr2 & Yr3
Feed cost	IDR 2,868	IDR 4,971	IDR 4,672	IDR 4,821
Operational cost ¹⁰	IDR 4,989	IDR 5,659	IDR 5,180	IDR 5,420
Total costs	IDR 7,856	IDR 10,630	IDR 9,852	IDR 10,241

Table 3. Feed and Operational Costs of Growers

Parameter	Year 2	Year 3	Avg. Yr2 & Yr3
Feed cost	IDR 2,930	IDR 5,558	IDR 4,244
Operational cost	IDR 5,659	IDR 5,180	IDR 5,420
Total cost	IDR 8,588	IDR 10,739	IDR 9,664

9. Perhitungan rerata biaya untuk Tahun 1 adalah dari Oktober 2016 - Desember 2017, Tahun ke-2 dari Januari-Desember 2018, dan Tahun ke-3 dari Januari-Desember 2019.

10. Rerata biaya operasional termasuk biaya tenaga kerja, utilitas, pemeliharaan dan biaya overhead lainnya, dan rumus biaya operasional rata-rata adalah total biaya operasional dibagi jumlah total induk sapi dan sapi grower.

Average Daily Costs/hd - Growers ¹¹

In the first year there were no growers as calves were still young at year end. The average daily feed costs in the second and third years were IDR 2,930 and IDR 5,558, respectively.

11 Growers in BKB consist of weaners (4-12 mths) and feeders (12-24 mths).



The feed cost in the third year increased because weaners were fed in the pen during rainy season before being returned to grazing under palms with the herd. Feed composition in the pen included soy-bean meal (SBM) which is relatively expensive but has high protein content to support the young calves being weaned. Average daily cost of the total ration was still less than IDR 10,000/head.

Cost of Gain (COG) and Feeder Liveweight Production Cost

BKB growers (between 4-24 mths) had an average ADG of 0.45/kg/hd/d¹² with a total production cost (feed plus operational) of IDR 9,664/hd/d.

In the below 'Calculator: calf, weaner and feeder production cost' we consider the parameters of calving and weaning rate, daily costs and targeted liveweight of a feeder to calculate the projected production cost of 320kg¹³ feeders. Figures are based on actual BKB data.

¹² Using the average ADG of weaners (0.42kg) to feeders (0.47kg) and the average grower costs of Yr2 and Yr3.

¹³ 320kg is the average liveweight of imported Australian BX feeders delivered to the feedlots.

Table 4. Calculator: Local calf, weaner and feeder production costs

Cow-Calf-Weaner	Feed costs (hd/day) – Cows	IDR 4,822
	Operational costs (hd/day)	IDR 5,420
	Sub-total (hd/day)	IDR 10,241
	Calving Rate	69.4%
	Daily Costs	IDR 14,767
	Costs/calf born (A)	IDR 5,390,000
	Calf mortalities	5.5%
	Cost of calf mortalities (B)	IDR 316,723
	Weaner Cost /hd (A+B)	IDR 5,706,723
Weaner-Grower	Calf age at weaning (months)	4 mths
	Calf weight at weaning (kgs/hd)	100 kg
	Grower weight gain (kgs/hd/day)	0.45 kg
	Target weight at sale	320 kg
	Months required (Weaning to sale)	16 mths
	Feed costs (/hd/day) - Growers	IDR 4,244
	Operational (/hd/day) - Cows + Growers	IDR 5,420
	Sub-total costs to weaning (/hd/day)	IDR 9,664
	Grower mortalities	6.6%
	Cost of Grower mortalities /hd (C)	IDR 333,843
	Grower Costs /hd (D)	IDR 5,058,220
	Total costs/hd/feeder (A+B+D)	IDR 10,764,943
	BKB Production Cost /kg	IDR 33,600

BKB Feeder production costs were IDR 33,600 /kg liveweight for calves raised to 320kg feeders stage at the age of 20 months. These figures are confirmed by real figures in BKB as Year 1 progeny have now reached feeder and slaughter stage.

The above feeder liveweight production cost provides a good means of comparison both with the local market price and the cost of imported feeders which averaged between IDR 40,000 and IDR 45,000 in 2019).

The calculator also shows:

- the indicative production cost of a weaned calf at BKB is approximately IDR 5.7 million
- the production cost of a 320 kg liveweight feeder is approximately IDR 10.7 million
- a liveweight of 320kg can be reached 16 months after weaning (with the assumption weaning at 4 months results in calves of 100kg)

Addressing the weaning rate KPI, which is currently well below the benchmark, will further reduce the cost of producing a 320kg feeder. BKB has the capability to meet the weaning rate benchmark in year 4.



CHAPTER 5. SCALE-UP OPTIONS

Given the commitment of the BKB Board of Directors to expand the business, IACCB has prepared three scale-up options for consideration by ranch management with the target to raise the herd to approximately 2,000 head. These include:

1. Organic Growth – retain heifers as they become available and slowly grow the herd to target number in 10 years
2. Organic growth plus buying additional 100 pregnant cows in year 4 and more rapidly increasing the herd to target number in 8.5 years
3. Organic growth plus buying additional 300 pregnant cows in year 4 and rapidly grow the herd to target number in 6 years.

Assumptions

Based on the productivity and the financial data trends and the optimistically achievable parameters¹⁴, assumptions for the 3-options are as follows:

¹⁴ BKB is optimistic that the projected parameters can be achieved

Table 5. Assumptions on Key Parameters

Key Parameter	Assumptions	Comments
Allocated land for grazing	5,200 ha in FFD	Additional land available in the neighboring oil palm plantation (BKB) useful for grazing (planned to be used for grass fed fattening)
Target herd size	Approx. 2,000 hd	BKB has a 2,000-herd size in mind with breeding and growing occurring in FFD and fattening in BKB estate in the longer term
Simulation period	The simulation starts from 2020 and is projected to 2026 (or year 10 since project start)	In the three simulations growth of the herd was limited to approximately 2,000 hd
Calving rate	70%	Previous 2-year average 69.4%
Calf mortality	5%	Previous 2-year average 5.6%
Grower mortality rate	3%	Previous 2-year average 6.4%
ADG Weaners/Growers	4-12 mths 0.42 kg	Angka ADG yang dicapai
12-24 mths 0.47 kg	ADG figures as achieved	Biaya pakan yang dicapai dalam penggembalaan
Feed cost Cows/hd/d – Grazing	IDR 6,000 with yearly increase 3%	Feed cost in grazing as achieved
Feed cost Growers/hd/d - Grazing	IDR 5,000 with yearly increase 3%	Feed cost in grazing as achieved
Feed cost Cows and Growers/hd/d - Pen	IDR 7,000 with yearly increase 3%	Feed cost in pen approx. IDR 7,000
Retained Heifers	95% - up to the year that the targeted 2,000 head are reached. After that, retainment numbers are adjusted to stabilize the herd number	The 5% retaining of female progeny is not maintained. Retainment numbers are adjusted especially focusing on selection high productive heifer.
Feeders' sales	Sold at 24 months with weight approximately 387 kg	Avg. ADG 0.47kg/hd/d
CIF Purchase Price Pregnant Cows	IDR 22.950.000	Avg. cost of pregnant heifers acquired in 2019 by BKB. (This price seems relatively high and with the experience gained there might be some negotiation room to decrease slightly. Or alternatively collaborate with a feedlot. ¹⁵)
CIF Purchase Breeding Bulls	IDR 50.000.000	Estimated price for selected bull

Option 1. Organic Growth

In the organic growth option, herd numbers increase organically without purchasing additional breeding stock.

The total herd closing stock number reaches 1,977 head by 2026, increase 2.6x from the closing stock in 2019 (750 head) (see Annex 1. Herd Growth Projection – Option 1)

With this option, if BKB starts selling the culled breeding females and feeders, positive cash flow can be achieved in 2020.

However, in some of the following years - because the sales revenues are still less than the expenditures - the cash flow becomes negative in 2021, 2022, 2023, 2024 and 2025 (see Annex 2: Cash flow projection – Option 1).

Over the 10-year period to 2026, expectedly BKB could gain an NPV of IDR 1,282,008,137 with a projected IRR of 11.22%.

15. See Herd Expansion opportunities pg 10



Option 2. Buying an additional 100 pregnant cows in 2020

The simulation is based BKB purchasing an additional 100 pregnant cows in 2020 as well as add some supporting infrastructure such as a feed shelter, portable yard, mixer, portable cattle crush, an additional electric fencing set and office equipment for a total of IDR 670 million. To fulfill the ratio between breeding females and bulls, BKB will also need to purchase 9 bulls per year from 2021 onwards.

The additional purchase of 100 pregnant cows directly increases the stock numbers and subsequently the number of calves born and the cattle sales from 2021 onwards. In the 9th year of operations (2025), it is projected that the total herd will have grown to 2,118 head which is the targeted number for the enterprise. From year 10 onwards, cows will be culled at a rate of 20% while also selling 25% of the heifers and BKB will maintain its herd number at 2,122 hd. (see Annex 3: Herd Growth Projection – Option 2).

Cash flow positive will be achieved in 2023 although in 2024 it will become negative again due to the purchase of breeding bulls (see Annex 4. Cashflow projection – Option 2).

The projected NPV at the end of year 10 (2026) is IDR 2,130,823,377 if terminal value is applied. IRR is projected at being 11.75%.

Option 3. Buying an additional 300 pregnant cows in 2020

With this option, BKB purchases and additional 300 head of pregnant cows in the 2020 along with 5 breeding bulls. BKB also invests IDR 670 million in supporting infrastructure, providing: a feed shed, portable yards, a feed mixer, a portable cattle crush, an additional electric fencing set and office equipment. From 2021 onwards, BKB will purchase 10 additional bulls annually to balance the bull / heifer ratio.

Herd numbers increase rapidly with this strategy, reaching 2,116 head by the end of 2023. To stabilize the total herd number at around 2,100-2,200 head, BKB will cull 20% of its cows and retain 80% of its heifers from 2024 onwards. At the end of the 10th year of operations and with this strategy it is projected that the total herd numbers become 2,155 head (see Annex 5: Herd Growth Projection – Option 3).

Positive cash flow is achieved by 2022 and stays positive until the end of the projection in 2026 (see Annex 6. Cash flow projection – Option 3).

Within this simulation, the NPV (using terminal value) at the end of Year 10 (2026) is projected at IDR 3,166,495,774 and IRR is projected at IRR 12.22%.

Herd Closing Stock

As mentioned, the targeted BKB herd size is approximately 2,000 head and different options result in different herd numbers which can be adjusted by culling an

increased number of cows selecting the least productive ones and replacing with selected heifers.

Table 6. Herd closing stock numbers for the three options

Options	Organic Growth	Add 100	Add 300
Adjusted Parameters	Retained heifers 95%	<u>Yr-10th</u>	<u>Sejak thn ke-8 dan seterusnya</u> Sapi betina diafkirkan 20% Sapi betina dipertahankan 80%
Cull cows 20%	904	969	900
Retained heifers 75%	From Yr-8th onwards	52	49
Cull cows 20%	284	350	324
Retained heifers 80%	284	350	324
Breeding Females	904	969	900
Breeding Bulls	49	52	49
Grower Heifers 12- mths	284	350	324
Grower Bulls 12- mths	284	350	324
Grower Heifers 12+ mths	238	164	218
Grower Bulls 12+ mths	238	237	340
Total Closing Stock	1,997	2,122	2,155



Herd expansion opportunities

Feedlots importing cattle from Australia face two different issues that would provide opportunities for BKB to efficiently acquire more breeding stock i.e. (1) Feedlots consistently identify a small number of female feeder cattle that are

accidentally pregnant and they provide a nuisance for the feedlot as they require space within the limited area of the feedlots; and (2) Government policy - 1/20 (for every 20 feeders imported, feedlots must import one breeder) enforces feedlots to import breeders which they are not equipped for.

Opportunity 1: Pregnant feeder cattle

Pregnant feeder cattle are identified in small numbers – a couple of cattle over a few weeks or months – this makes the feedlots will soon end up with a number of pregnant heifers that need to be sold. This would provide an opportunity for BKB who could acquire these through an ongoing contract with the feedlot. Shipped on inter island car/truck ferries the cost is not cheap but BKB would get fat and pregnant animals which is a significant bonus for a breeding enterprise. The pregnancy on arrival will usually be 4-6 months so not long to wait for the return on investment.

This opportunity allows expansion at a modest pace that doesn't stretch BKB's resources. These purchases also make it easier to cull empty cows from the existing herd - 6 - 12months empty or more. When stock numbers are below target there is a tendency to retain these empty non-performers, so it is a much easier decision to sell them when you know there are fresh pregnant heifers available to replace them.

Opportunity 2. Importing pregnant heifers as part of the 1/20 or independently

If BKB is in need for a quick scale-up through acquiring breeders, then the next fastest solution is to ask the feedlot (Java or Sumatra) to import 100 - 200 pregnant heifers - in multiples of truck loads - along with the feedlot's routine feeder imports. This is a relatively simple way to get some new heifers without the huge exercise of a full breeder shipment. New breeder bulls can also be imported this way.



CHAPTER 6. SUMMARY

A major recommendation was the need for integration of plantation and cattle breeding management operations.

6.1. Improve Cattle Performance

In order to achieve better commercial outputs BKB still has an opportunity to improve some of the current KPIs by tightening the management of the enterprise.

Nr	Issue	Current KPI achievement	BKB target
1	Calving Interval	16 ¹⁶	15 Months
2	BCS (Body Condition Score)	Avg above 2.60	3+
3	Calving Rate	69.4%	75%
4	Weaner Weight - 4 months		100 Kg
5	ADG (Average Daily Gain)	Growers - 0.42 Kg/hd/d Feeders – 0.47 Kg/hd/d	Growers - 0.45 Kg/hd/d Feeders – 0.50 Kg/hd/d
6	Calf mortality	5.6%	<5%
7	Grower mortality	6.4%	<3%

¹⁶ If January 2020 figures are included.

6.2. Scaling-up Projections up to 2026

	Organic Growth	Add 100 hd	Add 300 hd
Key strategy	Retain heifers as they become available Buy 8 hd bulls annually (yr-2021 onwards)	Buying an additional 100 pregnant cows (yr-2020) Buy 9 hd bulls annually (yr-2021 onwards)	Buying an additional 300 pregnant cows (yr-2020) Buy 5 hd bulls (yr-2020) and 10 hd bulls annually (yr-2021 onwards)
Additional capital	<ul style="list-style-type: none"> IDR 2.45B (CAPEX) IDR 23B (Op. Costs) 	<ul style="list-style-type: none"> IDR 5.6B (CAPEX) IDR 26.2B (Op. Costs) 	<ul style="list-style-type: none"> IDR 10.8B (CAPEX) IDR 30.5B (Op. Costs)
Herd Size	<ul style="list-style-type: none"> 904 cows 1,997 head in total 	<ul style="list-style-type: none"> 969 cows 2,122 head in total 	<ul style="list-style-type: none"> 900 cows 2,155 head in total
Cashflow positive	2020, 2026	2023, 2026	From 2022 onwards
IRR	11.22%	11.75%	12.22%
NPV	IDR 1.28B	IDR 2.13B	IDR 3.16B

The alternative projections show that faster scaling-up, which needs a bigger investment, leads to better returns over the 10-year period. By adding 300 head of pregnant heifers in 2020 and stabilizing

the herd numbers at 2,100-2,200 head from 2023 onwards, the projected NPV in year 10 (2026) and using terminal value calculation is IDR 3.16 billion whereas an IRR of 12.22% can be achieved.

ANNEX 1

HERD GROWTH PROJECTION – OPTION 1

	2019	2020	2021	2022	2023	2024	2025	2026
Opening Stock								
Breeding Females		357 hd	376 hd	439 hd	521 hd	579 hd	683 hd	808 hd
Breeding Bulls		24 hd	18 hd	24 hd	30 hd	35 hd	40 hd	44 hd
Grower Heifers		156 hd	211 hd	240 hd	272 hd	326 hd	375 hd	436 hd
Grower Bulls		213 hd	217 hd	240 hd	272 hd	326 hd	375 hd	436 hd
Total Opening Stock		750 hd	822 hd	938 hd	1085 hd	1252 hd	1455 hd	1702 hd
Purchases								
Breeding Females		0 hd	0 hd	0 hd	0 hd	0 hd	0 hd	0 hd
Breeding Bulls		0 hd	8 hd	8 hd	8 hd	8 hd	8 hd	9 hd
Total Purchases		0 hd	8 hd	8 hd	9 hd	8 hd	8 hd	9 hd
Births								
		250 hd	264 hd	316 hd	376 hd	416 hd	506 hd	598 hd
Cattle Sales								
Grower Heifers		2 hd	5 hd	6 hd	6 hd	7 hd	9 hd	10 hd
Grower Bulls		112 hd	98 hd	115 hd	122 hd	147 hd	177 hd	196 hd
Cull Breeding Females		35 hd	19 hd	22 hd	52 hd	29 hd	34 hd	80 hd
Cull Breeding Bulls		5 hd	1 hd	1 hd	2 hd	2 hd	2 hd	2 hd
Total Cattle Sales		154 hd	123 hd	144 hd	182 hd	185 hd	222 hd	288 hd
Closing Stock								
Breeding Females	357 hd	376 hd	439 hd	521 hd	579 hd	683 hd	808 hd	904 hd
Breeding Bulls	24 hd	18 hd	24 hd	30 hd	35 hd	40 hd	44 hd	49 hd
Grower Heifers	156 hd	211 hd	240 hd	272 hd	326 hd	375 hd	436 hd	522 hd
Grower Bulls	213 hd	217 hd	240 hd	272 hd	326 hd	375 hd	436 hd	522 hd
Total Closing Stock	750 hd	822 hd	943 hd	1095 hd	1266 hd	1473 hd	1724 hd	1997 hd

ANNEX 2

CASH FLOW PROJECTION – OPTION 1

IN THOUSAND RUPIAH (000)

	2019	2020	2021	2022	2023	2024	2025	2026
Cash In								
Cattle Sales	IDR 168,642	IDR 2,721,659	IDR 2,188,842	IDR 2,617,677	IDR 3,409,062	IDR 3,516,340	IDR 4,301,779	IDR 5,732,214
Terminal Value	IDR 0	IDR 0	IDR 0	IDR 0	IDR 0	IDR 0	IDR 0	IDR 34,611,077
Sub Total Cash In	IDR 168,642	IDR 2,721,659	IDR 2,188,842	IDR 2,617,677	IDR 3,409,062	IDR 3,516,340	IDR 4,301,779	IDR 40,343,290
Cash Out								
Investment Costs	IDR 11,084,530	IDR 0	IDR 400,000	IDR 450,000				
Operational Costs	IDR 4,489,329	IDR 2,267,885	IDR 2,489,272	IDR 2,775,007	IDR 3,131,312	IDR 3,574,925	IDR 4,086,360	IDR 4,704,178
Taxes	IDR 0	IDR 113,444	IDR 0	IDR 0	IDR 69,437	IDR 0	IDR 53,855	IDR 257,009
Sub Total Cash Out	IDR 15,573,858	IDR 2,381,329	IDR 2,889,272	IDR 3,175,007	IDR 3,600,750	IDR 3,974,925	IDR 4,540,215	IDR 5,411,187
Cashflow for IRR Calculation	IDR -15,405,217	IDR 340,331	IDR -700,429	IDR -557,329	IDR -191,688	IDR -458,585	IDR -238,436	IDR 34,932,103
Cumulative Cashflow	IDR -15,405,217	IDR -15,064,886	IDR -15,765,316	IDR -16,322,645	IDR -16,514,333	IDR -16,972,918	IDR -17,211,354	IDR 17,720,749
Discount Factor	1.00	0.91	0.83	0.75	0.68	0.62	0.56	0.51
Present Value	IDR -15,405,217	IDR 309,391	IDR -578,867	IDR -418,730	IDR -130,925	IDR -284,745	IDR -134,591	IDR 17,925,692
Cumulative Present Value	IDR -15,405,217	IDR -15,095,825	IDR -15,674,693	IDR -16,093,423	IDR -16,224,348	IDR -16,509,093	IDR -16,643,684	IDR 1,282,008

ANNEX 3 HERD GROWTH PROJECTION – OPTION 2

	2019	2020	2021	2022	2023	2024	2025	2026
Opening Stock								
Breeding Females	357 hd	476 hd	533 hd	641 hd	717 hd	841 hd	995 hd	995 hd
Breeding Bulls	24 hd	18 hd	25 hd	32 hd	37 hd	42 hd	47 hd	47 hd
Grower Heifers	156 hd	244 hd	306 hd	338 hd	397 hd	462 hd	538 hd	538 hd
Grower Bulls	213 hd	250 hd	306 hd	338 hd	397 hd	462 hd	538 hd	538 hd
Total Opening Stock	750 hd	988 hd	1,170 hd	1,349 hd	1,548 hd	1,807 hd	2,118 hd	2,118 hd
Purchases								
Breeding Females	100 hd	0 hd	0 hd	0 hd	0 hd	0 hd	0 hd	0 hd
Breeding Bulls	0 hd	9 hd	9 hd	9 hd	9 hd	9 hd	9 hd	9 hd
Total Purchases	100 hd	9 hd	9 hd	9 hd	9 hd	9 hd	9 hd	9 hd
Births	320 hd	334 hd	384 hd	462 hd	516 hd	622 hd	736 hd	736 hd
Cattle Sales								
Grower Heifers	2 hd	5 hd	7 hd	8 hd	9 hd	11 hd	188 hd	188 hd
Grower Bulls	112 hd	98 hd	147 hd	156 hd	178 hd	217 hd	298 hd	298 hd
Cull Breeding Females	35 hd	24 hd	26 hd	64 hd	36 hd	42 hd	197 hd	197 hd
Cull Breeding Bulls	5 hd	1 hd	1 hd	2 hd				
Total Cattle Sales	154 hd	128 hd	181 hd	230 hd	225 hd	272 hd	685 hd	685 hd
Closing Stock								
Breeding Females	357 hd	476 hd	533 hd	641 hd	717 hd	841 hd	995 hd	969 hd
Breeding Bulls	24 hd	18 hd	25 hd	32 hd	37 hd	42 hd	47 hd	52 hd
Grower Heifers	156 hd	244 hd	306 hd	338 hd	397 hd	462 hd	538 hd	514 hd
Grower Bulls	213 hd	250 hd	306 hd	338 hd	397 hd	462 hd	538 hd	587 hd
Total Closing Stock	750 hd	988 hd	1,170 hd	1,349 hd	1,548 hd	1,807 hd	2,118 hd	2,122 hd

ANNEX 4

CASH FLOW PROJECTION – OPTION 2

IN THOUSAND RUPIAH (000)

	2019	2020	2021	2022	2023	2024	2025	2026
Cash In								
Cattle Sales	IDR 168,642	IDR 2,721,659	IDR 2,281,092	IDR 3,289,952	IDR 4,302,276	IDR 4,272,791	IDR 5,268,529	IDR 12,256,695
Terminal Value	IDR 0	IDR 36,606,469						
Sub Total Cash In	IDR 168,642	IDR 2,721,659	IDR 2,281,092	IDR 3,289,952	IDR 4,302,276	IDR 4,272,791	IDR 5,268,529	IDR 48,883,164
Cash Out								
Investment Costs	IDR 14,084,530	IDR 2,965,000	IDR 450,000	IDR 450,000				
Operational Costs	IDR 4,489,329	IDR 2,379,310	IDR 2,833,800	IDR 3,193,336	IDR 3,605,697	IDR 4,145,608	IDR 4,777,116	IDR 5,288,392
Taxes	IDR 0	IDR 52,087	IDR 0	IDR 0	IDR 140,645	IDR 0	IDR 122,853	IDR 1,742,076
Sub Total Cash Out	IDR 15,573,858	IDR 5,396,398	IDR 3,283,800	IDR 3,643,336	IDR 4,196,342	IDR 4,595,608	IDR 5,349,969	IDR 7,480,468
Cashflow for IRR Calculation								
Cashflow for IRR Calculation	IDR -15,405,217	IDR -2,674,738	IDR -1,002,707	IDR -353,383	IDR 105,934	IDR -322,817	IDR -81,441	IDR 41,382,697
Cumulative Cashflow	IDR -15,405,217	IDR -18,079,955	IDR -19,082,662	IDR -19,436,046	IDR -19,330,111	IDR -19,652,928	IDR -19,734,369	IDR 21,648,328
Discount Factor	1.00	0.91	0.83	0.75	0.68	0.62	0.56	0.51
Present Value	IDR -15,405,217	IDR -2,431,580	IDR -828,684	IDR -265,502	IDR 72,355	IDR -200,444	IDR -45,971	IDR 21,235,867
Cumulative Present Value	IDR -15,405,217	IDR -17,836,797	IDR -18,665,481	IDR -18,930,983	IDR -18,858,628	IDR -19,059,072	IDR -19,105,043	IDR 2,130,823

ANNEX 5

HERD GROWTH PROJECTION – OPTION 3

	2019	2020	2021	2022	2023	2024	2025	2026
Opening Stock								
Breeding Females	357 hd	676 hd	722 hd	878 hd	989 hd	975 hd	922 hd	922 hd
Breeding Bulls	24 hd	23 hd	31 hd	37 hd	43 hd	49 hd	49 hd	49 hd
Grower Heifers	156 hd	310 hd	436 hd	467 hd	542 hd	528 hd	557 hd	557 hd
Grower Bulls	213 hd	316 hd	436 hd	467 hd	542 hd	635 hd	678 hd	678 hd
Total Opening Stock	750 hd	1,325 hd	1,625 hd	1,849 hd	2,116 hd	2,187 hd	2,206 hd	2,206 hd
Purchases								
Breeding Females	300 hd	0 hd	0 hd	0 hd	0 hd	0 hd	0 hd	0 hd
Breeding Bulls	5 hd	10 hd	10 hd	10 hd	10 hd	10 hd	10 hd	10 hd
Total Purchases	305 hd	10 hd	10 hd	10 hd	10 hd	10 hd	10 hd	10 hd
Births	460 hd	474 hd	520 hd	632 hd	712 hd	722 hd	722 hd	682 hd
Cattle Sales								
Grower Heifers	2 hd	5 hd	10 hd	11 hd	155 hd	159 hd	164 hd	164 hd
Grower Bulls	112 hd	98 hd	211 hd	220 hd	242 hd	297 hd	335 hd	335 hd
Cull Breeding Females	35 hd	33 hd	36 hd	87 hd	196 hd	193 hd	183 hd	183 hd
Cull Breeding Bulls	5 hd	1 hd	2 hd	2 hd	2 hd	7 hd	7 hd	7 hd
Total Cattle Sales	154 hd	137 hd	259 hd	320 hd	595 hd	656 hd	689 hd	689 hd
Closing Stock								
Breeding Females	357 hd	676 hd	722 hd	878 hd	989 hd	975 hd	922 hd	900 hd
Breeding Bulls	24 hd	23 hd	31 hd	37 hd	43 hd	49 hd	49 hd	49 hd
Grower Heifers	156 hd	310 hd	436 hd	467 hd	542 hd	528 hd	557 hd	542 hd
Grower Bulls	213 hd	316 hd	436 hd	467 hd	542 hd	635 hd	678 hd	664 hd
Total Closing Stock	750 hd	1,325 hd	1,625 hd	1,849 hd	2,116 hd	2,187 hd	2,206 hd	2,155 hd

ANNEX 6

CASH FLOW PROJECTION – OPTION 3

IN THOUSAND RUPIAH (000)

	2019	2020	2021	2022	2023	2024	2025	2026
Cash In								
Cattle Sales	IDR 168,642	IDR 2,721,659	IDR 2,447,142	IDR 4,709,964	IDR 5,980,530	IDR 10,650,105	IDR 12,039,875	IDR 12,903,283
Terminal Value	IDR 0	IDR 36,838,929						
Sub Total Cash In	IDR 168,642	IDR 2,721,659	IDR 2,447,142	IDR 4,709,964	IDR 5,980,530	IDR 10,650,105	IDR 12,039,875	IDR 49,742,211
Cash Out								
Investment Costs	IDR 11,084,530	IDR 7,805,000	IDR 500,000	IDR 500,000				
Operational Costs	IDR 4,489,329	IDR 2,601,820	IDR 3,523,800	IDR 4,012,724	IDR 4,550,249	IDR 5,044,961	IDR 5,317,922	IDR 5,438,297
Taxes	IDR 0	IDR 0	IDR 0	IDR 140,810	IDR 324,070	IDR 1,367,786	IDR 1,680,488	IDR 1,866,246
Sub Total Cash Out	IDR 15,573,858	IDR 10,406,820	IDR 4,023,800	IDR 4,653,534	IDR 5,374,319	IDR 6,912,747	IDR 7,498,411	IDR 7,804,544
Cashflow for IRR Calculation								
Cumulative Cashflow	IDR -15,405,217	IDR -7,685,161	IDR -1,576,658	IDR 56,430	IDR 606,211	IDR 3,737,358	IDR 4,541,465	IDR 41,937,668
Discount Factor	1.00	0.91	0.83	0.75	0.68	0.62	0.56	0.51
Present Value	IDR -15,405,217	IDR -6,986,510	IDR -1,303,023	IDR 42,397	IDR 414,050	IDR 2,320,605	IDR 2,563,539	IDR 21,520,655
Cumulative Present Value	IDR -15,405,217	IDR -22,391,727	IDR -23,694,750	IDR -23,652,353	IDR -23,238,303	IDR -20,917,698	IDR -18,354,159	IDR 3,166,496

ANNEX 7. CARRYING CAPACITY BKB

Parameter	Nilai	Unit	Catatan
A. Kebutuhan pakan ternak per AE (Dry cows)			
Berat sapi dewasa/ekor	400	kg	
Kebutuhan pakan per hari	10	kg BK/ekor/hari	
Kebutuhan pakan per tahun (365 hari)	3650	kg BK/ekor/tahun	(a)
B. Suplemen bungkil sawit			
Suplemen bungkil sawit diberikan	1	kg/ekor/hari	
Bahan Kering Bungkil Sawit (%)	90%		
Sumbangan Bungkil Sawit terhadap kebutuhan BK	0,90	kg BK/ekor/hari	
Kebutuhan pakan yang harus dipenuhi dari hijauan/rumput	9,10	kg BK/ekor/hari	
~ kebutuhan pakan yang harus dipenuhi dari hijauan/rumput per tahun	3321,5	kg BK/ekor/tahun	(b)
C. Produksi hijauan (rumput alam) dibawah sawit			
Produksi hijauan segar rotasi dibawah sawit (sample hanya yang dimakan sapi. Produksi rerata termasuk gawangan mati, parit, path, dll)	0,140	kg /m2	
~ Produksi hijauan per ha (bahan segar)	1.400	kg /ha	
Bahan Kering rumput	20%		BK rumput antara 20-25%
Hijauan tersedia per 1 kali penyenggutan dlm Bahan kering	280	kg BK/ha	
Lama rotasi grazing (1x putaran)	90	hari	
Jumlah rotasi per tahun	4 ¹⁷	kali	
Berapa kali panen di musim hujan	3		
Berapa kali panen di musim kemarau	1		
Hijauan dihasilkan di musim hujan	840,0	kg BK/ha	
Hijauan dihasilkan di musim kemarau estimasi 50% dari musim hujan	140,0	kg BK/ha	
Estimasi total hijauan per ha/tahun	980,0	kg BK/ha/thn	(c)
D. Daya Tampung (Carrying Capacity) Lahan Grazing			
Carrying capacity per AE /ha/th	0,30	AE/ha/tahun	(C) / (b)
~ diperlukan ratio lahan per ternak	3,4	ha/ AE	(d)
E. Luas Lahan grazing dan daya tampung lahan			
Luas lahan sawit untuk grazing	5204	ha	(e)
Daya tampung lahan dengan suplementasi bungkil sawit	1.535	AE	(e) / (d)

17 The total of grazing cycles in dry and wet season needs to equal this number

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