Buletin Peternakan 47 (1): 45-54, February 2023

ISSTAP
Indonesian Society for Sustainable Tropical Animal Production

Bulletin of Animal Science

ISSN-0126-4400/E-ISSN-2407-876X Accredited: 36a/E/KPT/2016
http://buletinpeternakan.fapet.ugm.ac.id/

Doi: 10.21059/buletinpeternak.v47i1.78643

Evaluating Current Increased Price and Fattening Cost of BX Cattle with ESCAS Cost on Slaughtered Cattle Price and their Welfare

Puradireja Rino Hadiwijaya[1*], Daud Rivianda Andre[2], and Ramdani Diky[3]

[1]Postgraduate Program, Faculty of Animal Husbandry, Universitas Padjadjaran, Sumedang, 45363, Indonesia
[2]Department of Socio-Economic of Livestock Development, Faculty of Animal Husbandry, Universitas Padjadjaran, Sumedang, 45363, Indonesia
[3]Department of Animal Production, Faculty of Animal Husbandry, Universitas Padjadjaran, Sumedang, 45363, Indonesia

Article history
Submitted: 25 October 2022
Accepted: 3 January 2023

* Corresponding author:
Telp. +62 853-5063-5708
E-mail: rino14001@mail.unpad.ac.id

ABSTRACT

The Australian Brahman Cross (BX) cattle industry is very modern. They have created a comprehensive system guided by the principles of animal welfare. The importation of BX cattle by companies in Indonesia will be bound by the Exporter Supply Chain Assurance System (ESCAS) regulations. This study aimed to evaluate the current increased price and fattening cost of feeder Brahman Cross (BX) cattle along with ESCAS additional cost on the price of slaughtered cattle and their welfare. Based on the results, the animal welfare assessment in the feedlot for 120 days were considered good, with the average value in the first month 86.40%, then in the second month 88.50%, in the third month 92.14%, and the fourth month 94.29%. Based on the calculations result of the Activity Based Costing (ABC) method in each supply chain, it is known that procurement costs, including the purchase of feeders, contributed to 94,0% of the total costs, while other costs were handling costs 2.70%, cost of ESCAS 1.56%, selling cost 1.52%, and the lowest, maintenance cost 0.24%. Therefore, to fatten Australian BX cattle, special strategies are needed, such as: optimizing stock in the feedlot; efficiency cost in feed ingredients without reducing quality; applying animal welfare rules to minimize handling costs and selecting vendors who want the lower price in providing ESCAS support facilities and establishing regular maintenance of the ESCAS supporting tools.

Keywords: ABC Method, Animal Welfare, BX Feeder Cattle Price, Cost, ESCAS

Introduction

The food crisis is a problem that has not been resolved by various countries, including Indonesia. Several regulations were made to solve the global food crisis, but until now Indonesia has not been able to meet domestic food needs, especially beef needs. In 2022, the availability of beef and buffalo meat in Indonesia had a deficit of 258,69 thousand tons. This deficit is caused by the lower production of beef and buffalo meat, which is 436,70 thousand tons compared to the need for beef and buffalo meat itself of 695,39 thousand tons (BPS, 2022). Therefore, to meet the demand for fresh meat in the country, Indonesia is still importing beef and feeder cattle.

As a developing country that has not been able to produce food self-sufficiency, Indonesia must establish cooperative relations with other countries, especially in the Southeast Asian region, which are members of the Association of Southeast Asian Nations (ASEAN). This relation is expected to resolve the problems in countries that have agreed to cooperate. Indonesia's international relations are entering a new phase: free trade between nations. Indonesia and countries in ASEAN, Australia, and New Zealand have agreed to enter into a cooperation agreement, AANZFTA, the ASEAN-Australia-New Zealand Free Trade Area (Puspitawati *et al.*, 2019). This association was signed in Hua Hin, Thailand, on February 27, 2009 (Nguyen *et al.*, 2020). The cooperation includes main products such as live beef, frozen beef, lamb, feed grains, rolled steel coils, citrus products, carrots, and potatoes.

Indonesia and Australia have long established cooperative relations in livestock, especially cattle and beef. Based on the geographical location of Australia, which is an area adjacent to Indonesia. In addition, Australia is the 17th investor country in the world in 2017, with a GDP value of USD 2,28 trillion (Darman *et al.*, 2022). Based on these considerations, Indonesia finally decided to make a partnership. Therefore, Indonesia agreed to conduct economic cooperation with Australia as stated in the Indonesia-Australia Comprehensive Economic Partnership Agreement (IACEPA) on February 20, 2020, in Jakarta

(Darman *et al.*, 2022). This collaboration is a strategic partnership to gain easy access and expand the trade market with lower import duties aimed at accelerating economic recovery after the Covid-19 pandemic.

Indonesia, with 250 million people, is the world's fourth-most populous country (Agus and Widi, 2018). The high population makes Indonesia the largest consumer in Asia, which has been confirmed as a target market by other already self-sufficient countries. Shifting consumer diets and increasing household incomes continue to support the demand for high-protein foods, including beef. Beef is Indonesia's third most consumed protein after chicken and fish (MLA, 2018).

Beef supply in Indonesia is produced from traditional cattle fattening by domestic farmers, Brahman Cross (BX) feeder cattle from Australia, and frozen beef imported from Brazil, India, America, New Zealand, and Australia. Based on its geographical location, beef consumption in Indonesia will be dominated by residents of Java Island 70% as the primary consumers (Market Snapshot) (MLA, 2018).

Lampung Province is an area that has a vital role in supporting the fulfillment of beef cattle needs. The population of beef cattle in Lampung Province is the second highest on the island of Sumatera, which is 860,952 heads in 2021 (BPS, 2022). Lampung is a very strategic area with the potential as a producer because of the abundance of animal feed from agricultural waste. In addition to the island of Java, especially in the Greater Jakarta area, Lampung can also be a meat producer for the Sumatera to Aceh region. BX cattle feedlot is widely developed in the Lampung area. BX cattle from Australia are imported through the Panjang Port International port.

The Australian Brahman Cross cattle industry is very modern, they created a comprehensive system guided by the principles of animal welfare. The importation of BX cattle by companies in Indonesia will be bound by the Exporter Supply Chain Assurance System (ESCAS) regulations, and Australian Exporting companies will be bound by the Australian Standards for the Export of Livestock (ASEL) system. Importers and exporters are required to apply the principles of animal welfare, including the following: (1) freedom from thirst, hunger and malnutrition; (2) freedom from thermal and physical discomfort; (3) freedom from pain, injury, and disease; (4) freedom from fear and distress; (5) freedom to express normal behavior (Webster, 2016).

The application of animal welfare in the feedlot also needs to be a concern, whether it has been done properly or still needs improvement. Applying good animal welfare will affect the quality of livestock production. In addition, animal welfare is very helpful in facilitating maintenance activities in the feedlot. The recognition of animals as sentient beings that can suffer unless appropriately handled has resulted in farm animal welfare regulations (Hansson and Lagerkvist, 2016). It is known that Brahman Cross cattle are very different from local cattle. Brahman Cross cattle generally can be characterized by not a rope tied. Instead, they can move and express themselves freely according to their natural behavior.

On the one hand, the application of animal welfare is a good way for the livestock. But on the other, certainty requires additional costs in addition to the cost of feed, medicine, and other costs. Given the costs involved with improving the welfare of farm animals, there are tradeoffs for businesses to consider (Fernandes *et al.*, 2021). The number of costs incurred will certainly affect the selling price of feeder cattle. Indonesia, as a consumer country that buys feeder cattle from Australia, certainly has a significant impact. When the purchase price of feeder cattle is high, it will automatically affect the selling price of cattle ready for slaughter. With rising costs in the upstream sector, business competition increasingly makes feedlot, as a company that carries out the fattening process of purchasing BX feeder cattle, have to make it efficient. The main goal of efficiency is to reduce costs then the products produced are of good quality at competitive prices.

The feedlot's best effort to resolve the problems is by doing calculations and studies to determine the number of costs sacrificed to produce the product. The company must improve the supply chain that is already running. If the company knows the number of costs incurred in detail, then the company will be able to make more precise planning and decision-making. The method used to analyze the cost in each supply chain uses the Activity Base Costing (ABC) method. The ABC method allows to find a basis for the distribution of the overhead cost that is not related to production volume, and it will enable a part of the indirect costs proportional to their actual use of the resources which originated those costs to be allocated to the final cost objects (Carli *et al.*, 2014; Pavlyuchenko and Kosteva, 2020).

The results of research from Bernawati and Fatmawati (2021) showed the use of the Activity Based Costing method for calculating the cost of production by charging overhead costs based on each product's activity needs, resulting in a more accurate calculation of the cost of production. Furthermore, Stašová (2020) argue that practical experience in agriculture implies that the ABC method is the most cost-effective tool for cost control and encourages it to be used in budgeting, planning, modelling, and decision-making. Giyono *et al.* (2020) noted that the factors that affect the import of live cattle in Indonesia include the exchange rate, beef imports, and buffalo meat imports.

Based on this description, the study aimed to evaluate the current increased price and fattening cost of feeder Brahman Cross (BX) cattle along with ESCAS additional cost on the price of slaughtered cattle and their welfares.

Materials and Methods

Location

The study site was located in Lampung Province, chosen purposively by considering the large number of BX cattle feedlots that develop in the Lampung region.

Data sources

The data were collected during the period of October 2021 – April 2022. Primary data was obtained from a feedlot company in Lampung Province, while secondary data were collected from Bank Indonesia, Indonesia Statistical Bureau, and various related sources. The method used in this research is a case study with a descriptive quantitative approach. The quantitative method refers to the philosophical view of positivism. The philosophy of positivism views phenomena in research as relatively fixed, concrete, observable, measurable, and the phenomenon has causal relationships. The research method uses standardized measurements or uses a data measurement scale. Essentially, the quantitative research methods explain an issue or phenomenon by gathering data in numerical form and analyzing it with mathematical methods (Apuke, 2017). The descriptive method is used to describe the data from the analysis without the intention of making generally accepted conclusions.

Data analysis

The data were analyzed using Activity Based Costing (ABC) and animal welfare assessment. The animal welfare assessment technique used sampling techniques, probability, and non-probability sampling. This research used a non-probability sampling technique. Non-probability sampling technique is a sampling technique that does not provide equal opportunities for each element or member of the population to be selected as a sample (Sugiyono, 2016). The data obtained by analysis using the Likert scale method. The Likert scale has four or more questions or statements combined to form a score or value representing individual characteristics, for example, in terms of knowledge, attitudes, and behavior (Siregar *et al.*, 2022).

In the context of the current research, we modify the ESCAS's guidelines to be more technical. The ESCAS scoring is based on a Likert scale modified with research needs. The assessment consists of three answer choices, and each question has a different value, including: 1) Score = 2, if the animal welfare in the feedlot is according to the procedure; 2) Score = 1, if the animal welfare in the feedlot is still not entirely according to the procedure; 3) Score = 0, if the animal welfare in the feedlot is not according to the procedure.

Category assessment based on Likert scale from the lowest and highest values with interval distance. The lowest value is the number of repetitions multiplied by the weighted of the lowest value. In contrast, the highest value is the number of repetitions multiplied by the weighted of the highest value. According to Sugiyono (2016), the determination of the interval distance can be done by calculating the following formula:

$$\text{Interval} = \frac{100}{\text{total score (likert)}}$$

The scoring assessment interval is 100/3 = 33.33%.

1. Good= 66.66% - 100%
2. Fair = 33.33% - 66.65%
3. Poor = 0% - 33.32%

ESCAS assessment

According to the research questionnaire, the assessment of the application of animal welfare was observed during maintenance in the feedlot until it was sold to the Slaughterhouse. The ESCAS assessment is modified from the ESCAS Animal Welfare Standard issued by the Department of Agriculture, Fisheries and Forestry Australia in 2016. ESCAS assessment has been done for 120 days in the feedlot with the following indicators in the Table 1.

The observation regarding animal welfare assessment was conducted in the feedlot. A total sample of 10% of the population of BX cattle that arrived was collected for randomly sampling from each pen. Observation has been done in several stages, including the following: 1) First observation at 30 days of maintenance starting on days 1-7; 2) Second observation during 60 days of maintenance starting from days 61-67; 3) Third observation during 90 days of maintenance starting from days 91-97; 4) Fourth observation during 120 days of maintenance starting from days 113-120.

The proportion of logistics costs is calculated based on logistics activities, including procurement, material handling, transportation, maintenance, inventory, and customer communication. A more detailed explanation will be shown in Table 3.

Table 2. Result of observation based on day on farm (DOF)

Observation based on day on farm (DOF)	
First observation	DOF 1-7
Second observation	DOF 61-67
Third observation	DOF 91-97
Fourth observation	DOF 113-120

Results and Discussion

Cost calculation has been done to determine the costs incurred in producing the product (BX cattle). A more specific calculation was carried out to determine the amount of costs incurred. This is intended as a basis for decision-making in the sustainability of the BX cattle business. Calculation of costs can be done by calculating the cost analysis. ABC is a good system for evaluating costs in a BX cattle business. An ABC system is based on products that use certain general activities inside the farm, which require some resources to be done (Carli and Canavari, 2013). The ABC method corrected errors in allocating overhead costs by interpreting an activity

Table 1. ESCAS assessment

No.	Indicators	Scoring
1	Feed is given according to cattle needs, and they seem to eat voraciously, feed is not moist, rancid and moldy	Score 2: The feed is given according to the schedule, and the amount is specified, not moist, rancid and moldy Score 1: The feed is given according to the schedule, and the amount is specified, and there is moist/rancid/moldy feed Score 0: The feed is not given according to the schedule, and the amount is specified, and there is moist/rancid/moldy feed
2	Clean water must be available, not smell, and no feces should be found in it	Score 2: Drinking water is always available, drinking tanks are clean and not smelly, and there is no contaminant/object Score 1: Drinking water is always available, and drinking tanks are clean and not smelly, but contaminants are found Score 0: Drinking water is always available, but drinking tanks are mossy, smell no good, and contaminants are found
3	Good handling and movement of livestock is done slowly and carefully so as not to cause stress and prevent injury to livestock	Score 2: Cattle are herded calmly and properly handled without being yelled at, hit or broken tails Score 1: Cattle are herded calmly and properly handled, the tails are not hit or broken. Stockmen shout at the cattle, so they feel uncomfortable while handling Score 0: Cattle are herded calmly and properly handled, the tails are not hit or broken. Some stockmen shout at and hit the cattle, so they feel uncomfortable while handling
4	In the feedlot environment, there were no predatory animals that could cause fear. Cattle are not shouted at or chased by stockmen while in the feedlot	Score 2: No predatory animals found in the feedlot environment can cause fear or disturb the cattle. Cattle are not shouted at or chased by stockmen while in the feedlot Score 1: In the feedlot environment, predatory animals were found that can cause fear or disturb the cattle (lizards, flies). Cattle are not shouted at or chased by stockmen while in feedlot Nilai 0: In the feedlot environment, predatory animals were found that can cause fear or disturb cows (lizards, flies). The cattle were shouted at and chased by stockmen while in the feedlot
5	Cattle are kept in a feedlot construction based on a combination of cement, iron and wood. There is a protective roof to protect cattle from the weather. The floor surface of the pen is not slippery and has holes	Score 2: Cattle are kept in the feedlot with strong construction to protect cattle from the weather, as well as a stable floor that is not slippery and has holes Score 1: Cattle are kept in the feedlot with strong construction to protect cows from the weather, but the floor is slippery/with holes Score 0: Cattle are kept in the feedlot with not strong/sturdy construction, and the floor is slippery/with holes
6	Feedlot has an isolated enclosure for sick or injured cattle to be separated from the herd	Score 2: The feedlot has an isolation pen separate from the rearing pen Score 1: The feedlot has an isolation pen, but they are not separate from the rearing pen Score 0: The feedlot has no isolation pen
7	In the feedlot, it is seen that cattle can move, eat, sleep and stand	Score 2: In the feedlot, cattle can move, eat, sleep and stand freely Score 1: In the feedlot, cattle can move, sleep and stand freely. It's just that when eating, cattle need to queue because the feeder trough is limited Score 0: In the feedlot, cattle cannot move, eat, sleep and stand freely because of the dense population in the pen

Source: Adapted from ESCAS Animal Welfare Standards (Department of Agriculture Fisheries and Forestry, Australia 2016).

Table 3. Cost of logistics activities and classification in feedlot

Logistics activities	Classification
Cattle procurement	The cost of procuring feeder cattle, the cost of purchasing cattle ready for slaughter, the cost of transporting cattle (port-feedlot), the cost of unloading, quarantine, taxes, levies, and cutting costs.
Maintenance	Feed, labor, vitamins, medicine, electricity, and water.
Exporter Supply Chain Assurance System (ESCAS)	Feedlot facilitator services, ESCAS auditor services, ESCAS supporting tools (RFID scanner, ear tag applicator, cattle talker, boots, jigger/cattle prod, administration, SOP, guest book, and checklist).
Handling	Induction and selection/grading, monthly sampling, travel depreciation, carcass depreciation.
Selling	Communication costs, transportation costs (feedlot to slaughterhouse)

Source: Adapted from Tanuputri and Bai (2022).

as a cost driver. According to this method, every procedure that consumes overhead resources is an activity in production (Kartalis *et al.*, 2020). There are two steps involved in calculating ABC. The first stage has five components: 1) activity classification, 2) cost pool determination, 3) cost driver determination, 4) homogeneous cost pool determination, and 5) pool rate determination. The initial stages of logistics activities are classified according to their hierarchy. Next is the determination of the cost pool (cost group).

Costs are grouped based on their main activities, then the proportion of costs in each logistics activity can be known. If there is a cost pool that can be controlled by the same cost driver, then the cost pool is classified as a homogeneous cost pool. The cost hierarchy, cost driver, and cost pool for each activity can be seen in Table 3. Next, the pool rate is determined by dividing the total cost of a cost pool by the unit cost driver used in a cost pool. The second stage is tracing and assigning each cost pool to the product (BX cattle). The calculation results showed the total logistics costs incurred per kilogram of BX cattle. After the calculation used by the ABC method is completed, it is continued to calculate the proportion of each logistics activity.

Logistics activities in the BX cattle business that occur in the feedlot are presented in Table 5. In terms of logistics activities, they are divided into five: 1) cattle procurement, 2) maintenance, 3) ESCAS feedlot, 4) cattle handling, and 5) cattle selling. After knowing the logistics activities, find out about the hierarchy of costs and resources and then will be grouped to know the number of costs incurred and make it easier to calculate ABC.

Based on Table 5, it can be seen that the costs incurred in the BX cattle feedlot. The cost of procuring BX cattle is Rp. 49.484 per kg, with a proportion 94%. The highest cost in procuring BX cattle is the cost of procuring feeders, with a proportion 94.71%, then tax 2.37%, transportation facilities 0.86%, quarantine cost 0.15%, and unloading cost 0.01%. The handling cost is Rp. 1.406,06 per kg with a proportion 2.70%, the highest are the induction and grading costs 67% and monthly sampling 33%. Costs incurred for selling amounted to Rp. 802,01 per kg with a proportion 1.52% consisting of transportation cost 69.82% and communication cost 30.18%. The cost

Table 4. Grouping of logistics activities of BX cattle in feedlot

Logistics activities	Cost Hierarchy	Resource	Cost driver	Cost pool
Purchase of feeder cattle	Unit	BX Feeder Cattle	Number of feeder cattle	1
Vehicles (Port - Feedlot)	Unit	Number of means of vehicles	Distance and volume	2
Unloading costs	Unit	Unloading costs	Total heads	3
Quarantine	Unit	Quarantine services	Total heads	4
Tax	Unit	Tax fees	Total heads	5
Depreciation of Purchases	Unit	Depreciation	Purchase prices	6
Feed	Unit	Feed Ration	Number of raw materials	7
Labor	Unit	Labor	Total labors	8
Vitamin & medicine	Unit	Vitamin and medicine	dose	9
Electricity & water	Package	Electricity and medicine	Monthly usage	10
Feedlot facilitator services	Unit	Labor	Total labors	11
ESCAS Auditor Services	Unit	Labor	Total labors	12
ESCAS Supporting Tools	Unit	Tool	Types and quantities	13
Induction & grading	Unit	Livestock	Total heads	14
Monthly sampling	Unit	Livestock	Total heads	15
Communication cost	Unit	Labor	Total labors	16
Vehicles (Feedlot - slaughterhouse)	Unit	Conveyances	Total trucks	17

Source : Adapted from Tanuputri and Bai (2022).

Table 5. Recapitulation of Logistics Costs in Supply Chains

Logistics activities	Cost (Rp/kg)	Proportion (%)
Procurement		
Purchase of feeder cattle (live weight prices/kg)	46.869	94,71
Vehicles (port - feedlot) (loading cost/average weight per heads)	426,20	0,86
Unloading cost (average weight per heads x total cattle)	4,96	0,01
Quarantine (quarantine cost/average weight per heads)	75,30	0,15
Tax (total cattle x weight per heads x cattle prices x 2,5%)/cattle weight	1.171,70	2,37
Depreciation of purchases (depreciation of cattle weight x cattle prices/cattle weight)	937,40	1,89
Sub Total	49.484	94
Maintenance		
Feed (total feed x prices/cattle weight)	108,68	86,80
Labor (labor cost/cattle weight per heads)	6,02	4,80
Vitamin and medicine (vitamin and medicine prices/cattle weight per heads)	9,04	7,20
Electricity and water (electricity cost/30 days/total cattle weight)	1,46	1,20
Sub Total	125,19	0,24
ESCAS		
Feedlot facilitator services (facilitator cost/total cattle weight)	10,21	1,24
ESCAS auditor services (auditor cost/total cattle weight)	46,65	5,68
ESCAS supporting tools (equipment cost/total cattle weight)	764,68	93,08
Sub Total	821,53	1,56
Handling		
Induction and grading (depreciation of cattle weight x cattle prices/cattle weight)	937	67
Monthly sampling (depreciation of cattle weight x cattle prices/cattle weight)	469	33
Sub Total	1.406,06	2,70
Selling		
Communication cost (communication cost/total cattle weight)	242,01	30,18
Vehicles (feedlot – slaughterhouse) (vehicles cost/cattle weight)	560,00	69,82
Sub Total	802,01	1,52
Total	52.639,10	100

Source: Prices were obtained from a feedlot company.

of ESCAS in the feedlot is Rp. 821,53 per kg with a proportion 1,56%, the highest costs are ESCAS supporting tools 93.08%, ESCAS auditor services 5,68%, and facilitator services 1.24%. While the lowest cost component is maintenance costs Rp. 125,19 per kg with a proportion 0.24%, and the highest is the feed component 86,8%, vitamin and medicine 7.20%, labor 4.80%, and electricity and water 1.20%.

Procurement of BX cattle

Based on the ABC calculation of the five components of costs incurred during the cattle fattening business in the feedlot. The highest cost component from the calculation results is when procuring BX cattle. A more in-depth analysis showed that the highest cost of procurement is the purchase of BX feeder cattle from Australia. The research result from Suhendar and Sukardi (2022) showed since August 2020, the price of feeder cattle from Australia has increased to US$ 3.7 per kg from previously US$ 3 per kg, meaning that the landing cost will reach Rp. 52,000 per kg of live cattle. The costs of purchasing feeder cattle and feed are the two highest variable costs for the feedlot industry in Indonesia (Agus and Widi, 2018).

The purchase price of feeder cattle significantly affects the selling price of live cattle when the cattle are ready to sell. When the purchase price of live cattle is too high, the selling price of the final consumer level will automatically be high. The research results by Rusdianto *et al.* (2015) showed that the purchase of feeder cattle in the animal market strengthens the effect of cattle prices on feeder cattle prices. The price problem is certainly not easy to solve, considering that the supply of Indonesian cattle is very dependent on Australia as a single supply country. Breeders in Australia largely determine the purchase price of feeder cattle. Purchasing conditions will be exacerbated when the dollar price increases while the Rupiah exchange rate weakens.

The results showed that there was an increase in the price of cattle from October 2021 to April 2022. The price of male feeder cattle tended to increase significantly compared to the female breed. The increase in the price of Australian BX

cattle is presented in detail in Figure 1. The price of BX feeder cattle varies within 6 months of research. It can be seen in Figure 1, that from October 2021 to April 2022, the price of BX feeder cattle tends to fluctuate. The highest price for male BX feeders was in March at 4.09 USD, while the lowest for males was in October 2021. The highest price for female BX feeders was in February 2022 at 3.83 USD, and the lowest in October 2021 was 3.14 USD. The trend of increasing male feeder prices from October to November was 4%, and from November to December, there was a significant increase of 34% from the previous 3.14 USD to 3.48 USD. Then December to January 22% to 3.82 USD. January to February by 10% to 3.91 USD, February to March experienced an increase of 18% to 4.09 USD. Furthermore, from March to April, it decreased significantly by -25% to 3.58 USD, and in April, the price of feeder males again decreased by -13% to 3.96 USD.

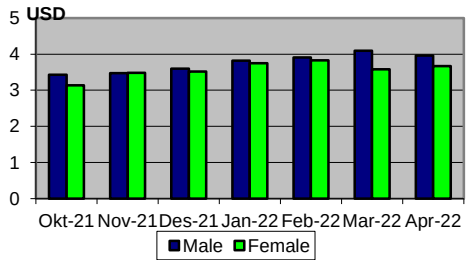

Figure 1. Australian BX cattle crice increased.

The price of feeder cattle price fluctuated in October 2021. The price of female feeder cattle was 3.14 USD, then from October to November, it increased by 34% to 3.48 USD. Furthermore, from November to December, it increased by 4% to 3.52 USD; from December to January, it increased by 23% to 3.75 USD. The increase occurred from January to February by 8% to 3.83 USD; from February to March, the price decreased significantly by -25% to 3.58 USD. Then in April, the price of female feeder cattle increased again by 9% to 3.67 USD. The price increase for male and female feeder cattle is very volatile. Feedlot, a company that conducts cattle fattening, must carefully read the market situation. The increase in the price of feeder cattle will certainly affect the selling price of live at the consumer level. Komalawati *et al.* (2018) noted that the factors influencing beef prices' volatility are on the supply side. It depends on the number of imported feeder cattle. Furthermore, Komalawati *et al.* (2019), found that the volatility of beef prices in Indonesia was found to be low and persistent in the long run. Price uncertainty has a negative effect on Indonesian beef production. The slow adjustment of farmers to supply and demand shocks indicates the importance of import as a temporary policy to fulfill domestic beef needs in the short and medium run.

International trade between Indonesia and Australia uses the US Dollar currency, so the increase and decrease in the dollar exchange rate are very influential. Because most primary agricultural commodities are traded in U.S. dollars, the world demand depends on the dollar's value, especially agricultural products (Rosenstein, 2016). The feeder cattle price tends to increase significantly, despite several periods of decreasing feeder prices. The increase in the feeder cattle price certainly needs to be addressed by the company carefully, including looking at changes in the dollar exchange rate and using the right strategy to anticipate problems. Table 6 presents changes in the dollar exchange rate used by Bank Indonesia.

BX cattle maintenance activities

Maintenance activities were the following activities that significantly affect the selling price of live BX feeder cattle. Maintenance has a percentage 0.25% of the total cost, with the highest cost, cattle feed 86.80%. Vitamin and medicine 7.20%, labor 4.80%, and electricity and water were the lowest components 1.20%. According to Sartorello *et al.* (2018) cattle daily cost is not directly related to the effect of economies of scale, and the most representative item is animal feed cost. Therefore, feed is an essential activity. One of the important production factors for fattening beef cattle is feed. Therefore, errors in the allocation of feed production factors can reduce profits or even inflict a financial loss for farmers, although they can provide a good production performance (Sukanata *et al.*, 2014). Economically, the feed must be made at the minimum cost, but scientifically the feed farm needs to be made ideally without reducing its nutrients.

Good feed management is by looking at the type of feed given, the amount of feed given as needed, the balance of forage and concentrate, and the frequency and method of giving the right feed (Sandi *et al.*, 2018). Therefore, the feed components generally used in BX cattle are concentrate and forage, formulated into a feed ration. The provision of feed rations will be adjusted to several considerations such as age, weight, maintenance length, sex, and breed.

The concentrate component consists of domestic agricultural waste such as starch of cassava dreg (*onggok*), waste from a tapioc factory, palm oil meal waste from palm oil processing, copra, soybean meal and many other types of feed. In addition to domestic waste, concentrate uses imported raw materials such as pollard from wheat flour, Soybean Meal (SBM) from

Tabel 6. Fluctuations of Australian BX cattle price

Sex of cattle	Feeder cattle price/kg (USD)						
	Oct 2021	Nov 2021	Dec 2022	Jan 2022	Feb 2022	Mar 2022	Apr 2022
Male	3,43	3,47	3,6	3,82	3,91	4,09	3,96
Female	3,14	3,48	3,52	3,75	3,83	3,58	3,67

Source: Prices were obtained from a feedlot company.

soybean oil processing, Corn Gluten Feed (CGF) from corn waste, and macro-micro minerals imported from other countries.

Feed raw materials that are not sourced from within the country will increase when there is turmoil in the country of origin. For example, the war between Russia and Ukraine caused Indonesia problems producing pollard raw materials. As a wheat-producing country, Russia was forced to reduce exports to Indonesia because of the war. The present war may result in a sharp drop in wheat exports from Russia and Ukraine (ben Hassen and el Bilali, 2022). As a result of demand and stock of goods that are not following economic needs, scarcity occurs, resulting in price increases. Domestic feed had the same problems when feed ingredients increased in rainy and dry seasons. Therefore, the feedlot needs to make a reasonably high purchase when prices are low to reduce production costs and carry out good storage so that the stored feed is not easily damaged before use.

ESCAS cost

The cost activity that distinguishes between local cattle and BX cattle is ESCAS (Exporter Supply Chain Assurance System). ESCAS focuses on animal welfare elements. ESCAS cost activities consist of three components: ESCAS supporting tools, service fees for the ESCAS auditor team, and facilitator fees from the feedlot. ESCAS contributed Rp. 135,41 per kg to the cost with a percentage of 0.27% of the total cost. According to Fernandes *et al.* (2021) the cost of infrastructure changes and staff training can be significant; access to capital is important in improving farm animal welfare. Therefore, Ahmed *et al.* (2021) farm animal welfare improvements can be costly for farms, and these costs should be considered while taking policy decisions regarding improvements in farm animal welfare standards. The cost of ESCAS is very important considering that the feedlot and exporter already have an agreement to apply the principles of animal welfare from the feedlot to the slaughterhouse. According to (Windsor, 2021), livestock must be collected at a place before loading and during loading, the duration of the trip and the conditions during transportation, with spelling periods and access to water, then the unloading and holding times.

ESCAS supporting tools, such as a Radio Frequency Identification (RFID) scanner to detect RFID data on BX cattle. Cattle talkers are used to assisting in handling cattle. Monitor scales are used to determine body weight connected to an RFID scanner and cattle load bars. And other equipment was used for recording, medicinal treatment and other treatments that used cattle crushes. The feedlot must have a stunning gun and knife used when cattle are subjected to a forced slaughter incident, and a cattle prod (an electric shock) is used to help when the cattle is difficult to handle. Other activities include printing Standard Operating Procedures (SOP) and other administration such as guest books, and service books.

Handling

Handling BX cattle is in the second largest position after procurement, with a proportion 2.70% at the cost of Rp. 1.406,6 per kg. The handling costs in the feedlot are calculated based on the company's activities. Handling activities were conducted in the feedlot at the beginning of induction and grading and monthly sampling to determine the weight gain. The amount of depreciation of BX cattle during induction and grading 2% and contributes to costs of Rp. 937 per kg, or equivalent to 67%. Meanwhile, the monthly sampling loss at 1%, with a cost of IDR 469 or equivalent to 33%. The number of expenditure when handling BX cattle can be reduced by good handling with animal welfare principles. Cattle should not be treated harshly, not beaten and shouted. Therefore, BX cattle will feel threatened and stressed. When cattle are stressed, it will increase their weight loss, and when BX cattle have severe stress, it can cause death. According to MLA (2012) animals must be rested for 12-18 hours before slaughter. Cattle must have fasted to obtain optimal carcass weight. It is purposed that the cattle are not stressed when slaughtered, so the blood comes out profusely during the rigor mortis process.

Selling

The costs incurred during the sale are based on the calculation results, in the amount of 1.52% or Rp. 802,01 per kg. Sales costs consist of communication costs and transportation facilities for BX cattle from the feedlot to the slaughterhouse. The transportation costs for BX cattle are calculated based on kilograms of live weight of livestock of Rp. 560 per kg or 69.82%, and communication costs of Rp. 242,01 per kg or 30.18%. According to Novalia *et al.* (2021), the difference in location when buying feeder cattle affects the transportation costs incurred. Astiti (2022) the activity of distributing or distributing beef cattle depends on the length and shortness of the marketing chain that determines the prices at the slaughterhouse and inter-island traders. Furthermore, Setiadi *et al.* (2020) transportation

Table 7. US dollar rate (USD)

Month	Selling rate (Rupiah)	Median rate (Rupiah)	Buying rate (Rupiah)
October 2021	14.269	14.198	14.127
November 2021	12.335	14.246	14.192
December 2021	14.401	14.329	14.257
January 2022	14.407	14.335	14.246
February 2022	14.423	14.351	14.279
March 2022	14.420	14.349	14.277
April 2022	14.441	14.369	14.297

Source : Bank Indonesia (2022).

and communication costs influenced income significantly. Transportation and communication cost would occur to buy gasoline and quota cellphone.

ESCAS assessment

Based on Table 8, the results of the animal welfare assessment in the feedlot for 120 days were considered good, with the average value in the first observation in the first month 86.40%, then in the second month 88.50%, in the third month 92.14% and the fourth month 94.29%. Based on an assessment of 7 indicators, from maintenance in the feedlot that is ready for sale to the slaughterhouse. The observations regarding the feedlot capacity at DOF 1-7 showed a low value but were still classified as good. It is because when the cattle first arrive, they are placed according to an empty pen in the feedlot with a standard size of 2.5 square meters per head to 3 square meters per head. According to (Kuswati *et al.*, 2020) feedlot size capacity of 80 heads (3 square meters per head).

Based on the observation of the first indicator, the application animal welfare in the feedlot is included in good condition. Feeding was carried out three times in the morning, afternoon. and evening with a combination of forage and concentrate. The feed will be distributed from the feed warehouse to the feedlot using a truck. Furthermore, the observation of the second indicator, the application animal welfare in the feedlot is included in good condition. It's in accordance with the procedure, as long as the cattle are in the shelter, they must be able to access feed and drink in a clean condition (MLA, 2012).

Based on observation of the third indicator, good handling and movement of livestock is done slowly and carefully so as not to cause stress and prevent injury to livestock. The result is included in the good category. Furthermore, the observation of the fourth indicator, the application animal welfare in the feedlot is included in good condition. It's in accordance with the procedure, allowing the animal to walk at its own pace (MLA, 2012).

Table 8. The results of the animal welfare assessment in the feedlot for 120 days

No.	Indicator	DOF 1-7			DOF 61-67			DOF 91-97			DOF 113-120		
		Score	%	Grade	Score	%	Grade	Score	%	Grade	Score	%	Grade
1	Feed is given according to cattle needs, and they seem to eat voraciously, feed is not moist, rancid and moldy.	16	80	Good	17	85	Good	19	95	Good	20	100	Good
2	Clean water must be available, not smell, and no feces should be found in it.	19	95	Good	18	90	Good	18	90	Good	18	90	Good
3	Good handling and movement of livestock is done slowly and carefully so as not to cause stress and prevent injury to livestock.	16	80	Good	17	85	Good	17	85	Good	19	95	Good
4	In the feedlot environment, there were no predatory animals that could cause fear. Cattle are not shouted at or chased by humans while in the feedlot.	20	100	Good	18	90	Good	20	100	Good	20	100	Good
5	Cattle are kept in a feedlot construction based on a combination of cement, iron and wood. There is a protective roof to protect cattle from the weather. The floor surface of the pen is not slippery and has holes.	19	90	Good	20	100	Good	20	100	Good	20	100	Good
6	Feedlot has an isolated pens for sick or injured cattle to be separated from the herd.	17	85	Good	16	80	Good	18	90	Good	18	90	Good
7	In the feedlot, it is seen that cattle can move, eat, sleep and stand.	17	75	Good	18	90	Good	17	85	Good	17	85	Good
Total value of livestock transportation facilities		123			124			129			132		
Average value of livestock transportation facilities		17,00	86,40		17,7	88,50		18,43	2,14		18,86	94,29	

Table 9. Cost decreased strategies in feedlot

Problem	Strategy	Detail
BX price increase	- Optimizing the existing stock in the feedlot.	- The stock of feeder cattle that have been purchased before the price increase is optimized for intensive maintenance by being given additional feed and vitamins to reduce the rate of rejection or death of livestock in the feedlot. - Consider the dollar exchange rate when buying feeder cattle. - Able to analyze the increase in BX prices in the previous period or year, which is used as a plan in business decisions.
Feed price increase	- Efficiency cost in feed ingredients without reducing feed quality.	- Efficiency cost in feed using relatively cheaper ingredients without reducing feed quality.
Depreciation of livestock during handling	- Applying animal welfare rules to minimize handling cost.	- Improving the facilities that can cause injury to livestock, such as slippery floors uncomfortable pens and other things - Improving the livestock handling, that can reduce the high percentage o depreciation livestock.
The high price of ESCAS support facilities	- Selecting vendors or third parties who want the lower price in providing ESCAS support facilities	- Make the purchases of facilities and infrastructure that are relatively cheaper. You must consider the cost and dollar exchange rate against the rupiah if you impor tools from abroad. - Establishing regular maintenance of the ESCAS supporting tools.

Based on the observation of the sixth indicator, the application animal welfare in the feedlot is included in good condition. Sick cattle are separated from their herd, treated, and placed in isolation pens and continue to be observed in isolation pens until completely healed. Suppose, during observation, it turns out that the cattle diagnosed by a veterinarian have not been cured. In that case, a rejected sale or an emergency slaughter in critical condition will be carried out. Feedlots have to build isolated pens to separate and treat sick or injured animals (MLA, 2012).

Based on the observation of the seventh indicator, the application animal welfare in the feedlot is included in good condition. Good animal welfare can be seen with livestock that can still move, turn and stand, easily get drink and feed in place (MLA, 2012).

Conclusions

Australian Brahman Cross (BX) feeder cattle price has increased for both male and female breeds. The increase in feeder cattle prices could be due to a lack of stock in Australia while market demand is high. In addition, the increase in feeder cattle prices can be caused by the rise in the US dollar price. Based on the results of ABC calculations, it was found that procurement costs, including the purchase of feeders, contributed to 94% of the cost. Therefore, to fatten BX Australian cattle, a specific strategy is needed, while other costs were handling costs 2.70%, cost of ESCAS 1.56%, selling cost 1.52%, and the lowest maintenance cost 0.24%. Based on the results of the animal welfare assessment in the feedlot for 120 days were considered good, with the average value in the first month observation 86.40%, then in the second month 88.50%, in the third month 92.14%, and the fourth month 94.29%. Therefore, to fatten Australian BX cattle, special strategies are needed, such as: optimizing stock in the feedlot; efficiency cost in feed ingredients without reducing quality; applying animal welfare rules to minimize handling costs and selecting vendors who want the lower price in providing ESCAS support facilities and establishing regular maintenance of the ESCAS supporting tools.

Acknowledgement

I would like to thank the Faculty of Animal Husbandry, Universitas Padjadjaran and the campus academic community, especially the supervisors Dr. Ir. Andre Rivianda Daud, S.Pt, M.Si, IPM. and Ir. Diky Ramdani, S.Pt., M.Anim.St., P.hD., IPM. for guiding me to do my research and preparation of writing. Also, my parents, wife, research partners, and other parties supported me throughout the writing process.

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