

Supply and Value Chain Models in Cattle Marketing and Its Derivative Products in East Nusa Tenggara Province

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Abstract. In general, the determination of the price of cattle is based on the condition of the cattle's body. This will result in an unsatisfactory transfer of revenue value for farmers, because the bargaining position is still weak. In addition, transactions in the marketing chain of beef products and their by-products have not yet been solidly established, so the obligations and rights of some parties are not guaranteed. The objective was to analyze the role of stakeholders in each supply chain and distribution of value chains as revenue in the marketing transactions of cattle, beef, and derivative products. The study was conducted in West Timor, which has 85.0% of the cattle population in NTT. Four sample districts (Kupang, TTS, TTU and Belu) in 8 sample sub-districts or 16 sample villages were included in the study. Respondents in marketing activities consisted of farmers, village traders, sub-district/district traders, slaughter traders, inter-island traders, by-product/waste traders, as well as beef, cowhide, bone, and fat/blood processing industries. Data collection were conducted by a questionnaire-based interview. The data were analyzed descriptively-quantitatively with a supply chain analysis model. It can be concluded that (1) Market supply chains include cattle traders (farmers, village traders, sub-district traders, inter-island traders and slaughtering traders), as well as beef traders (fresh beef retailers, frozen beef exporting traders, and processed beef products traders); (2) The ideal model of the value chain in the form of revenue share from marketing of cattle, beef, processed beef products, by-products, and cattle waste has not been fully established in NTT; (3) The ideal model includes five marketing blocks (cattle block, beef block, processed beef block, by-product block, and waste block).

Keywords: market chains, supply chains, value chains, beef cattle marketing

Abstrak. Secara umum, penentuan harga sapi dengan penaksiran berdasarkan kondisi tubuh sapi. Ini akan berakibat terjadinya transfer nilai penerimaan kurang memuaskan peternak, karena posisi tawar masih lemah. Selain itu, transaksi dalam rantai pemasaran produk daging dan hasil ikutannya belum terbentuk solid, sehingga kewajiban dan hak sebagian pihak belum terjamin. Tujuan penelitian adalah menganalisis peran stakeholder pada setiap supply chains dan distribusi value chains sebagai penerimaan pada transaksi pemasaran ternak, daging, dan produk turunan. Metode: Lokasi penelitian di Timor Barat (memiliki 85.0% populasi sapi di NTT) dengan 4 kabupaten contoh (Kupang, TTS, TTU dan Belu) pada 8 kecamatan contoh atau 16 desa contoh. Responden dalam aktivitas pemasaran terdiri dari peternak, pedagang desa, pedagang kecamatan/kabupaten, pedagang pemotong, pedagang antar-pulau, pedagang by-product/limbah, serta industri pengolah daging, kulit, tulang, dan lemak/darah. Pengumpulan data dengan wawancara berbasis kuisioner. Data dianalisis secara deskriptif-kuantitatif dengan model supply chain analysis. Dapat disimpulkan bahwa: (1) Mata rantai pasok pemasaran (market supply chains) meliputi pelaku jual-beli ternak (peternak sapi, pedagang desa, pedagang kecamatan, pedagang antar-pulau dan pedagang pemotong), serta pelaku jual-beli daging (pedagang pengecer daging segar, pedagang pengepor daging beku, dan pedagang hasil olahan daging); (2) Model ideal dari rantai nilai (value chains) berupa bagian penerimaan dari pemasaran ternak, daging, hasil olahan daging, hasil ikutan, dan limbah ternak sapi belum terbentuk secara lengkap di NTT; dan (3) Model ideal ini mencakup lima blok pemasaran (blok ternak, blok daging, blok olahan daging, blok hasil ikutan, dan blok limbah).

Kata kunci: rantai tataniaga, rantai pasok, rantai nilai, pemasaran sapi potong

Introduction

Generally, in the Province of East Nusa Tenggara (NTT) the marketed cattle come from farms of breeding, fattening, and a combination of both. Cattle marketing has objectives of: 1)

for production, namely productive cows (PC), yearling cows for breeding (YCB), productive bulls (PB), and yearling bulls for fattening (YBF); and 2) for consumption, namely fattening bulls (FB), culled cows (RC), and culled bulls (RB). The

fact shows that the farmers are in weak bargaining position, because price determination tends to be dominated by traders, which have the stronger position. The dominance of traders is reflected in the ability to estimate the weight of cattle more accurately, mastery of market price information and bargaining power, because they have large capital, and there is no effective government regulation of marketing transactions at the farmer level. This transaction condition should be addressed systemically, so that the obligations and rights of farmers are more secure, without eliminating the obligations and rights of traders and other stakeholders. Thus, the use of time, energy and costs by farmers which are quite large during the maintenance process can be reasonably priced at an adequate level of price or income. This ideal condition can be created if every buying and selling transaction activity is carried out openly and fairly. This ideal condition can be created if every buying and selling transaction activity is carried out openly and fairly (Keban et al. 2020).

The market chain that is directly related to the farmers is the collector traders (village/sub-district level) who transact at the location of livestock raising (cage, house, and farmer's garden), group owned housing, cooperative unit, weekly market, or livestock market. Generally, price judgment is based on body condition, body weight, and age phase of livestock. For a long time, the most dominant price judgment was by estimating the animals' body condition. This method is thought to be giving more advantage on traders because it is understood that traders are more adept at estimating the price of cattle, compared to farmers. These results are also consistent with previous studies by Keban et al. (2020) and Nalle and Tiro (2019).

Pricing based on body weight standards (weighed) has been applied on a limited basis, because the local government (particularly in Kabupaten Kupang) provides several livestock

scales at the livestock market and several locations. This method is proven to be more fair and helps farmers determine the price of livestock, because body weight can be known with certainty. However, nowadays the pricing system has returned to the way of transaction based on body condition, because all livestock scales have been damaged (for various technical or non-technical reasons). This method is certainly preferred by traders because it is thought that they will be able to obtain profit above normal.

Determining the price of cattle is generally through an estimate based on the body condition, providing opportunities for the transfer of revenue values that are not satisfactory for farmers, because of the farmers low-bargaining position. In addition, transactions in the marketing chain of meat products and their by-products have not been solidly formed, so the obligations and rights of some parties are not guaranteed. Policies for a comprehensive and integrated realignment of the marketing chain need to be implemented to accelerate the development of cattle farming. Along with this, this arrangement is expected to be able to increase the income of farmers and other stakeholders fairly according to their respective roles.

The present study was aimed to: 1) Knowing the role of each actor (stakeholder) in each supply chain in the marketing of livestock and beef; and 2) Analyzing the distribution of value chains as part of the revenue in each marketing transaction of livestock and their derivative products to the end consumer.

Materials and Methods

The study was conducted in West Timor, which has 85.0 % of the cattle population in NTT, with 4 sample districts in West Timor namely Kupang Regency, TTS (South Central Timor), TTU (South Central Timor), and Belu), 8 sample sub-districts, and 16 sample villages. This study comprehensively covered the flow of

commodities in the form of cattle, beef, processed products, by-products, and waste in the marketing channel of cattle from farmers in NTT to various types and levels of consumers (local and outside NTT). Surveys were conducted on various interested parties (stakeholders) related to livestock/beef marketing activities. Respondents consisted of 112 farmers, 35 village level traders, 16 sub-district/district level traders, 10 slaughter traders, 3 inter-island traders, 13 beef processing industries, 7 by-product traders, 11 waste processors, 5 skin processors, 2 bones processors (2 people), and 2 fat/blood processors. Primary data collection were through questionnaire-based in-depth interviews and secondary data from various related sources. Data analysis was carried out through descriptive-quantitative analysis with

supply chain analysis models, including marketing supply chain analysis and value chain analysis in marketing cattle and their derivatives (Hayami et al. 1987; Monczka et al. 2011; Paul 2014; Marimin and Maghfiroh 2011).

Results and Discussion

Marketing Supply Chain of Cattle

Generally, individual transactions of cattle sales to village-level livestock traders (VLCT) take place in cattle pens, but on a larger scale it occurs in the animal market (AM) namely AM Lili. However, in practice, transactions can occur between farmers, village-level livestock traders (VLCT), sub-regency/regency-level cattle traders (SRCT), inter-island cattle traders (IICT), and cattle slaughter traders (CST). The supply chain model for cattle and beef marketing in NTT is shown in Figure 1.

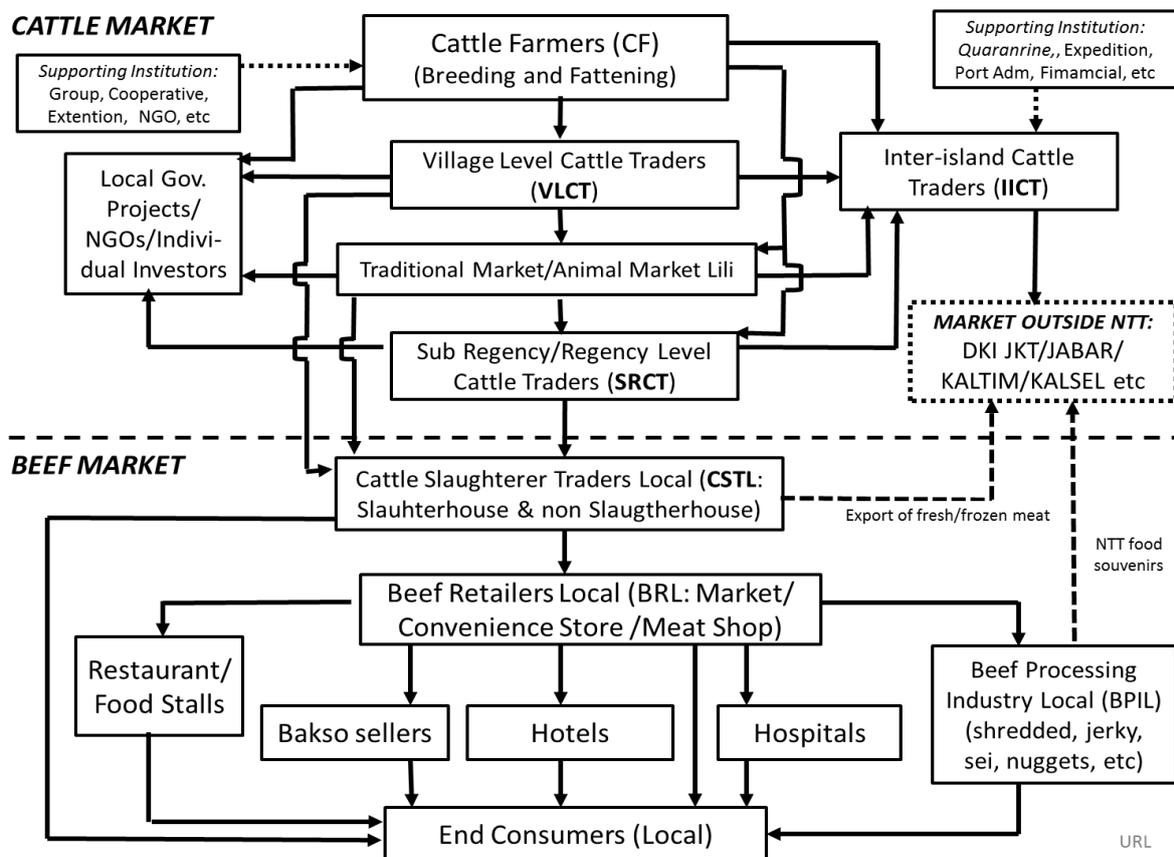


Figure 1. Supply chain of cattle and beef in Regency/City of Kupang

It can be seen that all levels of traders can choose to transact directly with farmers to shorten the marketing chain while increasing their marketing margins. The description of the roles and conditions of transaction actors in this study can be described as follows (where these are supported by previous research by Keban et al. (2020), Nalle and Tiro (2019), and Hadi et al. (2012):

a. Village-Level Cattle Traders (VLCT)

VLCT collects all cattle in the village from beef cattle farmers (CF). VLCT sells cattle to SRCT or IICT in their village or at the market. Many VLCTs are agents of SRCT or IICT. Payments to farmers are made in cash (cash and carry). This form of cash is in accordance with the urgent needs of farmers in relatively large amounts of money. VLCT can come from the village itself or a neighbouring village, that is still in the same sub-district. The role of VLCT is very vital in determining the real income of farmers, because the two interact directly. The weak bargaining position of farmers can be strengthened through collective marketing mechanisms in farmer groups or village cooperatives. These results are also consistent with previous studies by Lole (2020), Mutiah (2018) and Suryana (2008).

b. Sub Regency/Regency Cattle Traders (SRCT)

SRCT buys and sells cows for slaughter, breeding, or export. SRCT buys cattle from CF and VLCT in villages, traditional markets, or animal markets. SRCT sells cows (PC for breed) and bulls (YBF for breed and FB for export). SRCT also sells cattle for slaughter at the abattoir in the form of cows (PC and RC) and bulls (FB and RB), it is hoped that there will be no PC.

c. Inter-Island Cattle Trader (IICT) or Cattle Exporter

IICT operating in NTT are 4–5 companies and generally have >10 years of experience, both for breeding and slaughtering. The government

only allows the delivery of FB outside NTT, for example to DKI Jakarta, West Java, East Kalimantan (Samarinda), and South Kalimantan (Banjarmasin); while PC has been banned (except PC for destinations in other NTT areas). The role of PTAP is very important because it is able to absorb all production of fattening cattle that meet export requirements. The amount of expenditure depends on the quota in the range of 50,000–70,000 heads per year, thus involving a very large investment. These results are also consistent with previous studies by Lole (2012), Nalle and Tiro (2019), and Ningsih (2017).

d. Cattle Slaughterer Trader (CST)

CST buys cattle from VLCT and SRCT. The government allows the slaughtering of FB, RB and RC, while PC is prohibited. However, it is suggested that the trend of slaughtering PC will continue despite being monitored by the relevant agencies. The problem is that the number of cows (PC and RC) slaughtered at the abattoir (and non-abattoir) is out number (even at the Abattoir Oeba Kupang it reaches 75–80%) the bulls (FB and RB). This happens because it is suggested that regional regulations are less effective, due to weak supervision and no firm sanctions. The purchase of cattle for slaughter by CST (from CF, VLCT and SRCT) occurs in villages, traditional markets or the Lili Animal Market. The types of cattle slaughtered at local abattoirs are generally bulls weighing 200–250 kg or female cattle weighing 175–225 kg. These results are also consistent with previous studies by Lole dan Keban (2020), Keban et al. (2020), and Purba and Hadi (2012).

Marketing Supply Chain of Beef and Processed Products

a. Beef Retailer (BR)

In Kupang City, BR buys fresh pure beef from CST at Abattoir Oeba and sells it in traditional markets. Most of the beef is sold to food stalls and meatball vendors (75–80 percent) and to ordinary households. There is also some beef that retailers sell in butcher shops or even on

mobile retailers (door to door). The development of marketing fresh meat through specialty butcher shops is very good for meeting the middle/upper consumer segment, hotels, restaurants, and other institutions. These results are also supported by previous studies by Lole and Keban (2020), Hadi (2012), Nalle and Tiro (2019).

b. Exporting Traders of Fresh and Frozen Beef (ETFB)

CST in modern abattoir acts as an exporter of fresh/frozen beef (ETFB). However, to meet the large and continuous demand for beef, abattoir management is needed that is able to prepare quality and continuous raw materials (live cattle). Modern abattoirs have not yet operated due to technical and non-technical obstacles. Exports of fresh/frozen beef are superior because they are easy to transport, have many transport options, are inexpensive, and are free from the risk of death and shrinkage. Note, if the operation of modern slaughterhouses is not closely monitored by government, it is believed that massive PC slaughtering for exports will continue to occur.

c. Producers/Traders of Processed Beef Products (TPBP)

Diversification of processed beef products has developed, played by traders of processed beef products (TPBP). Processed products in the form of shredded beef, beef jerky, se'i (local smoke beef in Timor), and meatball, sausage, and nuggets are superior products that are in demand by local and foreign consumers. Generally, it is produced by home industries on a limited scale. This is due to limited capital and labor, availability of raw materials, limited market (not yet expansive), quality of human resources, and lack of technology.

Supporting Facilities and Infrastructure

a. Animal Market (AM)

Transactions of buying and selling cattle in AM Lili occur on an uncertain scale. The use of

electronic scales for cattle has been discontinued, even though it is important for farmers in determining weight and price. The weighing activity is not liked by traders because according to them what is important is the weight of the beef and not the weight of the cattle. There are large/heavy sized cows but the beef produced by these cows is not worth it. Therefore, the price of cattle per kilogram of live weight cannot be used to calculate the price of livestock, so the price estimation method is used. The assumptions of these traders need to be studied further about the truth, so that they are not only an excuse to reject the use of livestock scales. The results of this study are also supported by a study by Nalle et al. (2017) regarding costs, revenues, and profits in small-scale cattle business in West Timor.

b. Slaughterhouse (SH)

The slaughter of cattle at the Oeba Abattoir in 2019 reached 6,536 heads (59.1–68.0% female cows). The reasons for slaughtering a large number of cows are insufficient supply of FB, low price of PC (due to large population), more carcasses, and weak law enforcement. The SH holds the main key in preserving germplasm, so it must be responsible for stopping the slaughter of PC for local consumption in NTT (Keban et al. 2020; Hadi 2012; Lole and Keban 2020; Nalle and Tiro 2019). Beef will be distributed to traditional markets (80.0%), meat depots/meat shops (15.0%), and restaurants/ restaurants (5.0%). Cowhides and bones were bought by traders and sold to Java.

c. Agricultural Quarantine Center (AQC)

The Class 1 Kupang Agricultural Quarantine Center (AQC) is in charge of supervising animal traffic. The length of time for holding in quarantine cages is 4 days, but due to limited ships, traders can add 4-7 days.

d. Sea Freight Expedition (SFE)

Sea Freight Expedition (SFE) provides cattle transportation. In Kupang there are only 2 owners of SFE cattle transporting services, but they do not have their own boats. Since 2011, more cattle have been sent to Kalimantan, using small-chartered vessels. For the purpose of Jakarta, large ship cannot be chartered, so only renting part of space on the ship is possible.

e. Port Administrator Office (PAO)

The Kupang Port Administrator Office (PAO) is responsible for the safety of the ship and the contents of the ship from the port of origin to the port of destination. Ordinary ships transporting cattle to Kalimantan are usually small size, which is chartered to load only cattle, while ships destined for Surabaya are large. There are 91 units of ordinary ships as cattle carriers in various sizes, with a loading capacity of around 6–704 heads per trip.

f. Cattle Special Vessel (CSV)

Since November 10, 2015, the first cattle special vessel (CSV), namely KM Camara Nusantara I, was inaugurated, and the first shipment of 358 heads from Kupang was directly to Jakarta. In 2020, there are 6 units of CSV serving all of cattle production centers (5 units from the base port in Kupang). According to shipping regulations, the travel time for cattle ships is 3-5 days, feed/drinking water is available, the amount of cargo is according to the capacity, and the number of kleders (livestock guards) is according to the number of livestock.

Supporting and Barrier Policies and Regulations

Important regulations are expected to have a positive impact on the development of cattle farming, including: ban on PC slaughtering and exporting, minimum export on live weight limit (weight quota), mandatory use of animal scales, provisions for profit sharing, and so on. The

regulation on the export ban on PC has a positive impact on NTT because it protects the germplasm and maintains the region's comparative advantage. These results are also supported by previous studies by Lole and Keban (2020), Krova *et al.* (2018), and Priyanto (2011).

Regulations for limiting the minimum live weight of FB for export (≥ 300 kg) or export weight quotas are a good choice of regulation, so that there is no depletion of the livestock population and can maintain high quality export cattle (but these regulations were not made or not implemented). This regulation is sometimes violated in the interests of several parties, including to meet the export quota target. The export weight quota is more beneficial than the export quantity quota.

Regulations for the use of livestock scales at the farmer level are very necessary and have a positive effect on efforts to increase farmers' income. The absence of animal scales has perpetuated transactions with assessments based on cattle conditions. This process is quite detrimental to farmers, because of their low ability to estimate the weight of cattle. Enforcement of the rules for the use of these scales must be carried out widely and must be one of the requirements in the marketing of cattle. The results of this study are also consistent with Hariningsih (2012), Budisantoso *et al.* (2008), and Fatahilah *et al.* (2010) regarding the role of information in supply chain management.

Model of the Revenue Value Chain in Cattle/Beef Marketing

The revenue value chains model in marketing cattle, beef, processed beef products, by-products, and cattle waste can be seen in Table 1 and Figure 2. In general, this ideal model includes 5 marketing blocks, namely the cattle market block (CMB), beef market block (BMB), beef processed market block (BPMB), cattle by-product market block

(CBMB), and cattle waste market block (CWMB).

The cattle market block (CMB) describes the flow of cattle commodities from transactions at the farmer level to the abattoirs (local and outside NTT). This traditional market block has been practiced for a long time, but various regulations need to be addressed related to price determination and the application of export quotas. Based on the share of revenue specifically in the cattle market block only, the share received by farmers is around 75.0% assuming a price of Rp 30,000 per kilogram of live weight according to a mutually agreed regional regulation. However, in practice this price assumption is not effective because cattle are not weighed using an electronic animal scale. Therefore, the share of 75.0% for this breeder is only an estimate, or is not an objective average of income, so that in the end the farmer will receive a smaller income from the sale of cattle. Thus, every rupiah decrease in farmer's income will automatically become every rupiah increase in income among intermediary traders (VLCT, SRCT, or IICT). This result is supported by Lole's research (2012) related to the process of determining the price of livestock that is not fair in cattle buying and selling transactions at the farmer level.

The cattle from CF are purchased by local CST (abattoirs), where the beef will subsequently be distributed to consumers through BR. In addition, beef is also distributed to local producers/traders of processed beef products (TPBP), where the production of processed beef products will be distributed by retailers/trader of processed beef products (TPBP) to end consumers. This result is also supported by the studies of Keban *et al.* (2020), Lole (2012), and Lence *et al.* (2007). In other

marketing channels, CF sells cattle to VLCT, then VLCT sells to SRCT, and then SRCT sells to IICT (CSV). All cattle from IICT will be purchased by cattle wholesaler traders (CWT) in Jakarta (or other cities). The cattle will then be distributed to several abattoir in the destination city. In the cattle market block, the position of village traders greatly determines the income and welfare of the breeder so that the farmer can continue the cattle business or otherwise stop the business. Cattle slaughtering traders also determine the sustainability of the germplasm of cattle, if it is associated with the slaughter of productive cows. Likewise, inter-island traders determine the sustainability of the beef cattle business because they play a role in distributing cattle to national consumer centers.

In the beef market block and processed beef market block, fresh beef from local slaughterhouses is distributed directly to consumers through BR as well as to local TPBP to be reprocessed before being consumed by end consumers. In addition, some beef from local slaughterhouses is exported and accommodated by beef wholesalers (BWS) outside NTT. Fresh beef is exported from local abattoirs along with beef from abattoirs outside NTT. They are collected by BWS outside NTT and are distributed to BR and TPBP outside NTT before being used by end consumers of fresh beef and processed beef in the beef market block. The role of meat distributors and meat processors such as meatball sellers and restaurants is very vital because the absorption capacity of various meat categories is very large. The results of this study are also in accordance with the studies of Keban *et al.* (2020), Hosami (2014), Purba and Hadi (2012), Noach and Lalus (2020), and Lalus *et al.* (2020).

Table 1. Prices and revenue values in marketing of cattle, beef, processed beef products, cattle by-products, and cattle waste in NTT

Seller	Buyer	Code	Price (Rp000)	Revenue Difference*		
				(Rp000)	%	
1. Market Block for Live Cattle						
a. Farmers/farmers group/ village cooperative (VC)	a. Village level cattle trader (VLCT)	M11	30	30	75.0	
b. Farmers/farmers group/ village cooperative (VC)	b. Abattoir - Local (AL)	M12	31	1	2.5	
c. Village level cattle trader (VLCT)	c. Sub Regency/Regency Cattle Trader (SRCT)	M21	32	1	2.5	
d. Village level cattle trader (VLCT)	d. Abattoir - Local (AL)	M22	31	1	2.5	
e. Sub Regency/Regency Cattle Trader (SRCT)	e. Inter-island Cattle Trader (IICT)	M31	32	1	2.5	
f. Sub Regency/Regency Cattle Trader (SRCT)	f. Abattoir - Local (AL)	M32	32	1	2.5	
g. Inter-island Cattle Trader (IICT)	g. Cattle Wholesaler - Outside NTT (CWSO)	M4	34	2	5.0	
h. Cattle Wholesaler - Outside NTT (CWSO)	h. Abattoir - Outside NTT (AO)	M5	40	6	15.0	
2. Market Block for Fresh/Cold Beef						
a. Abattoir - Outside NTT (AO)	a. Beef Wholesaler - Outside NTT (BWSO)	M6	90	50	47.6	
b. Beef Wholesaler - Outside NTT (BWSO)	b. Beef Retailer - Outside NTT (BRO)	M7	95	5	4.8	
c. Beef Retailer - Outside NTT (BRO)	c. End Consumers of Beef – Outside NTT (ECBO)	M8	105	10	9.5	
d. Abattoir - Local (AL)	d. Beef Wholesaler - Outside NTT (BWSO)	M12	90	58	55.2	
e. Abattoir - Local (AL)	e. Beef Retailer - Local (BRL)	M13	85	53	58.9	
f. Beef Retailer - Local (BRL)	f. End Consumers of Beef - Local (ECBL)	M14	90	5	5.6	
3. Market Block for Beef Processed						
a. Abattoir - Outside NTT (AO)	a. Beef Wholesaler - Outside NTT (BWSO)	M6	90	50	22.7	
b. Beef Wholesaler - Outside NTT (BWSO)	b. Beef Processing Industry - Outside NTT (BPIO)	M9	95	5	2.3	
c. Beef Processing Industry - Outside NTT (BPIO)	c. Retailer Processed Beef - Outside NTT (RPBO)	M10	210	115	52.3	
d. Retailer Processed Beef - Outside NTT (RPBO)	d. End Consumers of Processed Beef - Outside NTT (ECPBO)	M11	220	10	4.6	
e. Abattoir - Local (AL)	e. Beef Wholesaler - Outside NTT (BWSO)	M12	85	58	26.4	
f. Abattoir - Local (AL)	f. Beef Processing Industry - Local (BPIL)	M15	85	53	26.5	
g. Beef Processing Industry - Local (BPIL)	g. Retailer Processed Beef - Local (RPBL)	M16	190	105	52.5	
h. Retailer Processed Beef - Local (RPBL)	h. End Consumers of Processed Beef - Local (ECPBL)	M17	200	10	5.0	

Seller	Buyer	Code	Price (Rp000)	Revenue Difference*		
				(Rp000)	%	
4. Market Block for Cattle's By-products						
a. Abattoir - Local (AL)	a. Offal Retailer - Local (ORL)	M18	40	40	80.0	
b. Offal Retailer - Local (ORL)	b. End Consumers of Offal - Local (ECOL)	M19	50	10	20.0	
c. Abattoir - Local (AL)	c. Bone Processing Industry - Local (BPIL)	M20	3	3	4.0/ 3.0	
d. Bone Processing Industry - Local (BPIL)	d. Bone Based Industry - Local (BBIL)/Outside NTT (BBIO)	M21	35/ 50	32/ 47	42.7/ 47.0	
e. Bone Based Industry - Local (BBIL)/Outside NTT (BBIO)	e. End Consumers of Bone Products - Local (ECBPL)/Outside NTT (ECBPO)	M22	75/ 100	40/ 50	53.3/ 50.0	
f. Abattoir - Local (AL)	f. Leather Processing Industry - Local (LPIL)	M23	7	7	2.8/ 2.0	
g. Leather Processing Industry - Local (LPIL)	g. Leather Based Industry - Local (LBIL)/Outside NTT (LBIO)	M24	35/ 50	28/ 43	11.2/ 12.3	
h. Leather Based Industry - Local (LBIL)/Outside NTT (LBIO)	h. End Consumers of Leather Products - Local (ECLPL)/ Outside NTT (ECLPO)	M25	250/ 350	215/ 300	86.0/ 85.7	
i. Abattoir - Local (AL)	i. Cattle Fat and Blood Processing Industry – Local	M26	5	5	33.3	
j. Cattle Fat and Blood Processing Industry -Local (CFPI)	j. Feed Processing Industry – Local (FPIL)	M27	15	10	66.7	
k. Feed Processing Industry – Local (FPIL)	k. Farmers/farmers group/ village cooperative (CF)	M28	10	10	66.7	
5. Market Block for Cattle's Waste						
a. Abattoir - Local (AL)	a. Solid Waste Treatment as Fertilizer Local (SWTFL)	M29	0.25	0.25	5.0	
b. Solid Waste Treatment as Fertilizer Local (SWTFL)	b. Farmers/farmers group/ village cooperative (CF)	M30	5	4.75	95.0	
c. Abattoir - Local (AL)	c. Waste Treatment as Biogas Local (SWTBL)	M31	0.5	0.5	7.1	
d. Waste Treatment as Biogas Local (SWTBL)	d. Farmers/farmers group/ village cooperative (CF)	M32	7	6.5	92.9	

Note: * Difference revenue is the difference between the average purchase price and the selling price of cattle, beef, waste, and their derivative products (before reducing marketing costs). Source: Primary and secondary data 2019 (processed).

Table 1 shows the largest portion is obtained by CST (abattoirs) because its production activities require cattle as the main raw material with large value and require various financing for facilities in the form of tools and machines, skilled labor, electricity, water, transportation, etc. The market block for the

beef processing industry has started to grow in NTT and still needs the support of the government and the wider community to become stronger and bigger, and able to compete with similar products from outside NTT.

cattle production. Thus, it is hoped that the added value obtained as a result of the production and processing efforts of the various by-products can be directly grown in the NTT area, so that it can also be directly enjoyed by local workers. The market block of the by-product processing industry is very vital in its position to strengthen the beef cattle business, because it will maximize the utilization of livestock parts for various further industrial needs. This is supported by several previous studies such as Lole and Keban (2020), Keban et al. (2020), and Lasaharu et al. (2020).

The cattle waste market block needs to be massively developed for use as a cheap and safe raw material for manure. In addition, this waste can be used as raw material to produce biogas, as a cheap and safe renewable energy source in rural areas. Business units or even industries that aim to process cattle waste, both solid and liquid, for commercial development are still not well developed. This is due to the relatively small scale of livestock business, not intensive, and scattered in location; so it is difficult to collect in larger quantities to be processed in the capacity as a commercial business unit.

Further processing of cow dung as pure manure into fertilizer whose composition has been rearranged according to the type and age of the plant (e.g. packaged bokasi fertilizer), in fact has a higher economic value and is effective in its utilization by different users (farmers, plant entrepreneurs, companies, offices, hotels, restaurants, schools, hospitals, ordinary households, etc.). Likewise, in terms of processing cattle waste as a renewable energy source in the form of biogas, it is still experiencing obstacles in its implementation.

Conclusions

The ideal model of the supply chain in the form of an effective role and value chains in the form of the difference in revenue in marketing (livestock, meat, processed meat products, by-products, and cattle waste) has not been fully

and solidly established in NTT, because the processing aspect of by-products and livestock waste has not been managed properly. However, this marketing channel has not been fully effective, because the method of determining the price of livestock is only by estimating based on the condition of the animal's body (not weighed). This ideal model includes five marketing blocks, namely the cattle market block, the beef market block, the beef processed market block, the by-product market block, and the livestock waste market block. Key stakeholders in the sustainability of cattle/beef production and marketing are village-level cattle traders (VLCT), because they directly determine the income of farmers, cattle slaughterers/RPH traders (CST). They are also the most responsible for the preservation of germplasm, and inter-island cattle traders (IICT), because it maintains the supply chain to consumption centers.

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