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VALUE-ADDED ANALYSIS OF THE MEAT AGROINDUSTRY IN INDONESIA

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ABSTRACT: This study analyzes the added value of processing fresh beef into beef jerky, shredded beef, and se'i (smoked beef) products in Kefamenanu. The research was conducted in February and March 2021. The research method used was the survey method. Data was collected from cattle slaughterers (butchers) in abattoirs (n = 7), meat retailers (n = 13), and MSMEs in the meat processing industry (n = 15) and consumers (n = 90). The sample was selected through a purposive sampling method, with the criteria for selecting a sample of MSMEs in the processing industry as follows: 1) entrepreneurs have beef jerky, shredded beef, and se'i (smoked beef); 2) entrepreneurs who have sold their products in the past year and their three products are circulating in the market; 3) entrepreneurs produce these three products sustainably. The data was analyzed using descriptive statistics, and the added values of beef jerky, shredded, and se'i (smoked beef) products were calculated using the Hayami method. The results showed that each processing of one kilogram of fresh beef could produce 0.70 kg (shredded), 0.73 kg (jerky), and 0.68 kg (se'i). The added value obtained is USD 3,56 for shredded products, USD 4,03 for jerky products, and USD 2,91 for se'i products. The profit from shredded beef is USD 3,34, with beef jerky of USD 3,80 and se'i (smoked beef) of USD 2,64.

Keywords: Beef fresh, Beef product, Farm management, Meat processing, Se'i, Value added.

INTRODUCTION

The role of the livestock sub-sector is becoming increasingly essential and strategic with the increasing demand and per capita consumption of various livestock products. This significant increase in demand for livestock products is thought to be due to the increasing population, income level, changes in lifestyle, especially in consumer tastes, and the increase in the number of industrial-scale livestock processing businesses. One form of the downstream industry in the livestock sector is the meat processing industry (Kadju et al., 2020). Meat is an essential food ingredient in meeting nutritional needs and also has high protein content with complete and balanced essential amino acids. Another advantage of meat protein is that it is easier to digest than vegetable protein. Meat contains several types of minerals and vitamins. Therefore, to compensate for many meat processing industries, it is necessary to analyze the condition of the availability of meat both in quality and quantity (Putri and Lamusa, 2017).

Kefamenanu city is the seat of government and the capital of the district of North Central Timor (TTU), which is astronomically located between 9°0'06" and 9°39'41" South Latitude and between 124°05'36" and 124°51'14" East Longitude. TTU Regency itself is one of the districts directly adjacent to the Democratic Republic of Timor Leste (RDTL), with an area of 2,669.70 km², or only about 5.6% of the land area of East Nusa Tenggara province (NTT), and is one of the national beef cattle producing areas that annually sends Balinese cows for beef needs to Samarinda city, DKI Jakarta, and West Java. Cattle slaughter activities in slaughterhouses (RPH) tend to increase with a growth rate of 3.89%. 1,528 cows were cut in 2015 and rose to 1,960 cows in 2019 (BPS) (TTU, 2020).

The number of beef cuts continues to increase due to beef consumption. This is to increase the demand for beef in the TTU district every year. The increasing proportion of beef consumption is due to easy availability, better public consumption awareness, and the development of agroindustry in the form of culinary businesses (houses providing beef-based menus) and the needs of home industries that specifically produce processed beef products. The beef processing industries that have developed well are the Shredded, Jerky, and Se'i (smoked beef) manufacturing industries. Beef processing industry players based in Kefamenanu city are downstream beef cattle agroindustry that produces ready-to-eat products directly consumed by consumers and can be stored longer. Therefore, it is necessary to focus on supply chain management to provide fast and cheap products and prevent product vacancies from reaching consumers (Febrianto et al., 2020; Ardiansyah et al., 2020).

Added value is a change in value that occurs due to the treatment of inputs in a production process. Increased value-added agricultural commodities flow upstream to downstream in each supply chain, beginning with the farmer and

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ending with the final consumer (Coltrain et al., 2000). Added value varies depending on input and treatment by each member of the supply chain (Setiadi et al., 2018; Lestari et al., 2019). The current state of customers has become connected, informed, and active rather than isolated and passive as it was a few years ago (Agapitou et al., 2017). The core principle of business is customer orientation, and the success of the company depends on effectively managing the relationship with them (Nguyen et al., 2007).

Another purpose of making jerky, shredded, and se'i (smoked meat) beef is to meet the community's nutritional needs because jerky, shredded, and se'i beef as foodstuffs from livestock are rich in nutrients (Syarif et al., 2013). Agroindustry downstream activities also aim to increase the added value of fresh beef products. These three products (jerky, shredded, and se'i) are currently the superior products of meat processing MSMEs that are always awaited to be enjoyed by the people of Kefamenanu city. Until now, there has been no research on the added value of processed products, so it is necessary to analyze the amount of added value generated from processing beef into jerky, shredded, and se'i in Kefamenanu city.

MATERIALS AND METHODS

The research was conducted from February to March 2021 in Kefamenanu city, North Central Timor Regency, East Nusa Tenggara. The research method used is the survey method (Singarimbun and Effendi, 2006). Data was collected from livestock-cutting traders (pejagal) in abattoirs (n = 7), meat retailers (n = 13), MSMEs in the meat processing industry (n = 15) and consumers (n = 90). Samples are selected through the purposive sampling method (Campbell et al., 2020), with the criteria for selecting samples of MSMEs in the processing industry being as follows: 1) entrepreneurs have jerky, shredded, and se'i (smoked beef) products; 2) entrepreneurs who have sold their products in the past year and all three of their products are on the market; 3) entrepreneurs produce all three products on an ongoing basis. Snowball sampling follows the instructions of Drăgan and Isaic-Maniu (2012) to determine the participants involved in the production process, ranging from the provision of meat raw materials (cutting merchants) in RPH to product buyers (consumers).

Data collection is carried out by in-person interviews with respondents using questionnaires that have been prepared. Data collection in this study includes primary data and secondary data (Sugiyono, 2017). Primary data is data obtained through in-person interviews with respondents. The secondary data, namely data obtained from the TTU Regency Livestock Office, the TTU Regency Industrial and Trade Office, the Central Statistics Agency of TTU Regency, and several related data sources that support the research's substance, is analyzed using descriptive analysis methods. The Hayami method calculates the added value of jerky, shredded, and se'i (smoked beef). The value-added criteria follow the below equation.

VA = VPP - (VRM + VSM)

Where: VA= Value-added (IDR/kg); VRM = Value of raw materials (IDR/kg); VSM = Material support value (IDR/kg); VPP = Value of processed product (IDR/kg)

The calculation procedure for value-added analysis uses the Hayami method (Table 1).

Table 1 - Stages of calculation of value added Hayami method (modified)

Variable		Value
Output, Input and Price	1) Output (kg)	(a)
	2) Raw material input (kg)	(b)
	3) Labor input (DWH)	(c)
	4) Conversion factors	(d) = (a) / (b)
	5) Field labor coefficient (DWH/kg)	(e) = (c) / (b)
	6) Output price (USD/kg)	(f)
	7) Average labor wage (USD/DWH)	(g)
Profit and Revenue (IDR/kg Raw Material)	8) Input price (USD/kg)	(h)
	9) Transaction fees (USD/kg)	
	10) Output value (USD/kg)	(j) = (d) x (f)
	11) a. Added value (USD/kg)	(k) = (j)-(i)-(h)
	b. Value-added ratio (%)	(l) = (k)/(j)
	12) a. Labor income (USD/kg)	(m) = (e)x(g)
	b. Labor incentives (%)	(n) = (m)/(k)
	13) a. Profit (USD/kg)	(o) = (k)-(m)
	b. Profit rate (%)	(p) = (o)/(j)
Production Factor Services (IDR/kg of Raw Materials)	Margin (USD/kg)	(q) = (j)-(h)
	a. Direct labor income (%)	(r) = (m)/(q) x 100
	b. Other input donations (%)	(s) = (i)/(q) x 100
	c. Company profits (%)	(t) = (o)/(q) x 100

Source: Hayami et al., (1987); DHW= Daily human works; USD= American dollar (value of 1 USD exchange rate IDR 14,500)

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RESULTS AND DISCUSSION

Beef shredded products' added value

Added value is a change in value that occurs due to changes in input in a production process (Setiadi et al., 2018). Technical factors that affect added value are production capacity, the number of raw materials used, and labor. At the same time, the market factors that affect output are the price of output, work wages, the price of raw materials, and the value of other inputs. The concept of "added value" is highly dependent on existing demand and often changes based on the values in a product that consumers want.

The value-added analysis of beef shredded products is per 1-time production; the standard price used for raw materials, labor, and other input donations is the price at the processing or producer level. The average calculation of the added value obtained by MSMEs from shredded products is presented in Table 2.

Table 2 - Average Value Added of Beef Shredded, Jerky and Se'i products in Kefamenanu city in 2021

Variable		Value		
		Shredded	Jerky	Se'i
Output, Input and Price	1) Output (kg)	35	55	25
	2) Raw material input (kg)	50	75	30
	3) Labor input (DWH)	2,43	3.20	1,86
	4) Conversion factors	0,70	0.73	0,68
	5) Field labor coefficient (DWH/kg)	0,049	0.043	0,074
	6) Output price (USD/kg)	13,10	13,10	12,41
	7) Average labor wage (USD/DWH)	4,66	5,52	3,69
Profit and Revenue (IDR/kg Raw Material)	8) Input price (USD/kg)	5,52	5,52	5,52
	9) Transaction fees (USD/kg)	0,09	0,06	0,01
	10) Output value (USD/kg)	9,17	9,61	8,44
	11) a. Added value (USD/kg)	3,56	4,03	2,91
	b. Value-added ratio (%)	39%	42 %	34 %
	12) a. Labor income (USD/kg)	0,23	0,24	0,27
	b. Labor incentives (%)	6,4%	5,8 %	9,4%
	13) a. Profit (USD/kg)	3,34	3,80	2,64
	b. Profit rate (%)	36,6%	39,5 %	31,2%
Production Factor Services (IDR/kg of Raw Materials)	Margin (USD/kg)	3,66	4,09	2,92
	a. Direct labor income (%)	6,2%	5,8%	9,4%
	b. Other input donations (%)	1,8%	1,4%	0,4%
	c. Company profits (%)	92,0%	92,8%	90,2%

Source: Primary data processed (2021)

Table 2 shows that the conversion value for the shredded product is 0.70. The product conversion factor understands that every 1 kg of fresh beef input will produce a shredded output of 0.70 kg. The decrease in meat weight is due to shrinkage during the production process (Soeparno, 2009). The conversion factor value affects the output value (IDR/kg) of the product produced. The average main raw material (fresh beef) needed in one production process is 50 kg and will produce 35 kg of shredded products. The value-added activity requires input donations from other materials (supporting materials), with a total cost of USD 0,09 for each kilogram of input (main raw material) used. These supporting ingredients include peanuts, granulated sugar, salt, cumin, onions, garlic, coriander, and coconut.

The output value obtained using beef shredded products is USD 9,17/kg. The added value obtained is USD 3,56 with a ratio of 38.83% of the total output value. The income received by labor per kilogram of output amounted to USD 0,23 or 6,36% of the total added value. The profit value is obtained from added value minus direct labor income, so that the profit received by MSMEs for each kilogram of output is USD 3,34, or 36.36% of the total output value.

The margin value is the difference between the output value and the input price. For each cycle, the production cycle of shredded MSMEs gets a margin of USD 3,66/kg shredded. The margin value of 91.25% is profit. In comparison, the remaining (8.75%) is divided into 6.20% of the margin is direct labor income, and 2.55% is a contribution of other inputs (supporting material costs) incurred by MSMEs in producing shredded. This indicates that the greater the output produced, the greater the added value obtained, and the more efficient the producer in trying, the greater the workforce's competitiveness (Sumardi et al., 2017).

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Added value of jerky products

Beef jerky is a traditional beef processed product native to Indonesia that is important to develop because it can support nutrition improvement programs and as a source of protein (Satmalawati et al., 2017). Beef jerky is made from the main raw material of fresh beef (Lau et al., 2021). The process of making jerky at the commercial level is generally given the addition of nitrate or nitrite salts with the main purpose of producing a red color and serving as a preservative. The results showed that MSME actors avoid nitrates and nitrites because they can produce nitrosamine compounds that are mutagenic and carcinogenic, which endanger health, so it needs to be considered (Andrade et al., 2005; Santarelli et al., 2008). The application of liquid smoke in the manufacture of beef jerky can significantly affect water activity, microbes, color, and preferences (Rahayu et al., 2012).

Calculation of value-added analysis of jerky products is per 1-time production using standard prices of raw materials, labor, and other input donations at the processing or producer level. The average calculation of the added value obtained by MSMEs from jerky products is presented in Table 2.

Table 2 shows that the conversion value in beef jerky products is 0.73, meaning that every 1 kg of fresh beef input will produce jerky of 0.73 kg. The need to produce jerky consists of the primary raw material in the form of fresh beef amounting to 75 kg with a value of USD 413,79 and donations from other inputs (supporting material costs) in the form of spices, which are generally garlic, onions, coriander, pepper, acid, and sugar (Suryati et al., 2012) with a total cost of USD 0,06 per kilogram of input (primary raw material) used. The output value obtained by the jerky production business is USD 9,61/kg. The added value obtained is USD4,03 with a ratio of 42% of the total output value. The profit received by labor for each kilogram of output amounted to USD 0,24 or 5,8% of the total added value. The value of profit is obtained from added value minus direct labor income. The profit received by MSMEs for each kilogram of output is USD 3,80 or 39,5% of the total output value. The margin value is the difference between the output value and the input price. The margin value of MSME jerky production of USD 4,09/kg of jerky is divided into 92,8% margin is UKKM profit, 5,8% margin is direct labor income, and 1,4% is a contribution of other inputs (supporting material costs) issued by MSMEs.

Se'i (smoked beef) product added value

Making Se'i (smoked beef), there are several stages, namely the production of thick meat connective tissue, cutting to form elongated pieces similar to mine rope (called lalolak), curing, and smoking, and finally, ready to be consumed or packaged (Supit et al., 2013). The average calculations of added value obtained by MSMEs from se'i (smoked beef) products are listed in Table 2.

Based on Table 2, it can be seen that the conversion value in se'i (smoked beef) products is smaller than other products (shredded and jerky), which is only 0,68, which means that every 1 kg of fresh beef input will produce se'i of 0,68 kg. The price of fresh meat raw materials per kg is USD 5,52 with a beef requirement of 30 kg. Other input needs (salt, onion, flavoring, pepper, saltpeter, kesambi wood, and packaging/label) with a total cost of USD 0,01 for each kilogram of input. The output value obtained from se'i products is USD 8,44. The added value obtained is USD 2,91/kg se'i, with a ratio of 34% of the total output value. The workforce's profit per kilogram of output amounted to USD 0,27 or 9,4% of the total added value. The profit received from the se'i production business per kilogram of output is USD 2,64 or 31.2% of the total output value. MSMEs get a margin of USD 2,92/kg divided into 90.2% is the benefit of MSMEs, 9.4% is a direct labor benefit, and 0.4% is a contribution of other inputs (supporting material costs). If examined further, the distribution of added value for shredded, jerky, and se'i products in Tables 2, 3, and 4 indicates that the existence of MSMEs contributes to the increase in regional economic growth. This is indicated by the large labor ratio of only 6.3% (shredded), 5.8% (jerky), and 9.4% (se'i). This figure illustrates that the balance between labor income and capital income is smaller than the business owners' income share, which reaches 90.2%-92.8%.

Hasanah et al., (2015) explain that if the agro-industry has a high level of profit obtained (in percent), then the agro-industry is suitable for increasing regional economic growth; otherwise, if the agro-industry has a high share of labor, then the type of agro-industry is ideal for equalization of employment opportunities. If you want to increase opinion and market share, it is necessary to coordinate the flow of integrated information; there will be agreements and cooperation on product availability, quality, and price. Related to the current condition of the COVID-19 pandemic, the information exchange process also occurs online through social media (Sikone, at al., 2022). Typical social media platforms commonly used by business actors to market livestock products and exchange information are Facebook applications, WhatsApp, Instagram, online networking websites, and other start-up marketing models.

CONCLUSION

Processed meat products, involving shredded beef, beef jerky, and se'i provides added value for MSMEs. Each processing of one kilogram of fresh beef can produce 0.70 kg (shredded), 0.73 kg (jerky), and 0.68 kg (se'i). The difference in treatment in the manufacturing process of each product has an impact on the amount of depreciation value of the resulting product, and provided added value of USD 3,56 of shredded products; USD 4,03 of jerky products; and USD 2,91 of se'i products. The profit obtained by agroindustry actors from producing shredded beef was USD 3,34 for jerky products of USD 3,80 and se'i products of USD 2,64. To empower and strengthen MSMEs, there needs to be continuous coaching and assistance from relevant agencies to be independent, resilient, and superior in providing services for consumer satisfaction and creating more excellent market opportunities.

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DECLARATIONS

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Authors' contribution

HY Sikone conceptualizes research, collected and analyzed data, and written scripts. B Hartono, Suyadi, and HD Utami and BA Nugroho designed the research and evaluated the manuscript before submission.

Conflict of interests

The author has no possible conflicts of interest in this paper's research, authorship, or publishing.

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