

Original Research Paper

# Analysis of Added Value of Various Rendang Products in Strengthening Regional Innovation System in the City of Payakumbuh, West Sumatera

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**Abstract:** This research aims to determine the regional core competencies to strengthen the city of Payakumbuh's Regional Innovation System by developing processed livestock products such as Rendang, a traditional dish popular in the Province of West Sumatera. Rendang is processed meat obtained from a long low-temperature cooking process using chilies and coconut milk. The city of Payakumbuh, located in West Sumatera, is one of the centers for the rendang processing industry that produces different types of rendang products including beef rendang, chicken rendang, egg rendang, lung rendang, sweet potato rendang, etc. This research discusses the added value of rendang products as an effort to increase the food industry to increase competitiveness and food production within the framework of a regional innovation and development through livestock product processing industry. Primary data were obtained through interviews with actors within the rendang industry. While secondary data derive from rendang industry literature. The data analysis used is the value-added analysis drawing on the Hayami method. The results show that the highest ratio of added value is egg rendang product (16.19%), followed by lung rendang with a value-added ratio of 8.44%.

**Keywords:** Regional Innovation System, Value Added, Rendang Products, Payakumbuh City

## Introduction

In 2015, the City of Payakumbuh through the Regional Development Planning Agency began to compile a Roadmap for strengthening Payakumbuh City Regional Innovation System, which has one of the priority themes for regional development, namely the development of processed livestock products. The innovation system is a system built from various elements/factors that relate to each other and interact to influence the development and acceleration of economic innovation by using science and technology to provide added value. Whereas a regional innovation system is a system or a unit consisting of a group of actors, institutions including policies, networks, partnerships, interaction relations and productive processes in the regions that affect the direction of development, the speed of innovation and its diffusion, and the learning process, which includes science and technology distribute products in society (Sulaeman and Subajo, 2011).

The regional innovation system is a system aimed at regional economic development based on the potential and resources of the region. The mapping of this competency begins with an analysis of the potential support for natural resources, human resources, regional environmental aspects and community prospects for the development of superior dairy products. This potential analysis is carried out to determine the availability of the supporting aspects of product development in terms of the availability of sustainable natural resources and human resources maintenance and business management in increasing production, regional environmental aspects with the ability to develop supporting facilities and infrastructure, as well as the socio-cultural appreciation of the community, which can support the continuity of increased production and markets. With the implementation of this regional innovation system, it is expected that the local government, especially the local government of Payakumbuh City, can accelerate regional economic development based on the potential and advantages of the region.

Animal husbandry is one of the leading businesses in the industrial development (Nuhung, 2003). The agro-industry study intended in this research is food processing management in a company that processes agricultural products. According to Soekartawi (2005), agro-industry is a stage of agricultural development before the development stage reaches the stage of industrial development. The livestock business as a sub-sector of the agricultural sector is often used as a side business to increase the income of the farmer's family. Besides, it can spur the pace of economic growth in society and has the main objective of providing food of animal origin in the form of meat, eggs and milk to improve the quality of human resources. The livestock business is not only about farming, but also livestock product processing. The livestock product processing business is usually managed in the form of Micro, Small and Medium Enterprises (MSMEs). Payakumbuh is one of the agro-industrial centers of livestock product processing businesses in West Sumatra. There are a lot of processed livestock products, one of which is the rendang business, where the City of Payakumbuh is the center of rendang business in West Sumatra Province.

Rendang has been around for a long time and is known as a dish that has a distinctive taste because in its manufacture it uses various kinds of herbs and spices and the cooking process is done traditionally using wood. The characteristic of rendang is that it has a savory aroma and taste and is a combination of salty, slightly sweet and spicy flavors. However, rendang, which is a traditional Minangkabau cuisine with meat, coconut milk and spices as main ingredients, also has different cooking methods and uses of spices in each region so that rendang has a distinctive aroma and taste in each region. The process of cooking the meat goes through several processes before it finally becomes rendang, starting from curry, then kalio and finally rendang. The making of rendang takes a long time to reach a brown to blackish-brown color. In this condition, the rendang can last a long time at room temperature because the water content in the rendang is already low.

The people of West Sumatra not only know rendang which comes from processed beef, but also other types of rendang such as chicken rendang, pulmonary rendang, egg rendang, Lokan rendang and eel rendang. All types of rendang have a distinctive aroma and taste that are also produced from the types of raw materials and spices used. According to the Department of Cooperatives, MSMEs, Industry and Trade in Payakumbuh City (2016), there are 36 rendang business units. These rendang businesses produce various types of rendang in the form of wet meat rendang, egg rendang, chicken rendang, pulmonary rendang and others. This rendang processing aims to extend the durability of the product. It is also aimed at increasing the selling value/added value of livestock products. In Indonesia, rendang research generally

revolves around evaluating the nutritional value of rendang, as reported by several studies including that of Murhadi (1994) regarding the heat resistance of bacteria in beef rendang, research by Yenrina *et al.* (2015) regarding the effect of repeated heating of the fatty acid profile and research by Azima *et al.* (2016) on the evaluation of the nutritional value of Minangkabau rendang. However, the amount of added value of rendang produced is not yet known, for that it is necessary to research how much added-value is produced through processing beef, chicken, eggs and lungs into rendang products that are processed by small industries in Payakumbuh City.

The concept of added value in an industry has a very important role, especially for the agricultural product processing industry. Staden (2000) defines added value as the value created by the activities of a company and its workers or employees, calculated by reducing sales by the costs of purchasing materials and services. The calculation of the added value of rendang products made from livestock commodities needs to be done to increase competitiveness. A study by conducted in Palu City, which uses the Hayami method (Hayami *et al.*, 1987), shows that the added value produced by Mutiara Hj. Mbok Sri is Rp. 50,416.67/kg and the profit obtained is Rp. 46,305.78 with a profit rate of 91.84%. Based on the explanation above, UMKM rendang has produced a variety of rendang products, of course, it will also produce different added values. Until now, it is not known what the added value of this rendang product variant is, so it is not known which rendang product variant has the highest added value. Thus, the purpose of this study is to analyze the added value of rendang products made from livestock in Payakumbuh City and to analyze the business profits of this rendang processing business.

## Methods

This research was conducted in Payakumbuh, especially in *Kampung Rendang*, a rendang processing center. Eight Small and Medium enterprises process rendang in this rendang village. This research uses a case study method. The research data were analyzed using the Hayami method. The Hayami method (Hayami *et al.*, 1987) calculates added value by combining the added value method for processing and added value for marketing. then the observed variables are Output, Input and Price variables:

- a. The output or production results are beef rendang, chicken rendang, pulmonary rendang and lung rendang
- b. Input/raw material
- c. The raw materials in this study were fresh beef, chicken, eggs and lungs

- d. Supporting raw materials are coconut milk, chilies, shallots, garlic, ginger, galangal, tamarind and other spices
- e. Labor is the number of working hours and labor involved in the production process to produce beef rendang in one day

## Results

One of the great potentials possessed by the City of Payakumbuh is the livestock sub-sector. The level of regional competitiveness for the livestock sub-sector in Payakumbuh City is better than that of Solok City and Tanah Datar Regency. (Suresti *et al.*, 2020). This shows that as a city, Payakumbuh has made its city a center for production, an industrial city and a center for processing livestock products. The development of processed livestock products in Payakumbuh City has a domestic market that is ready to play an important element in generating competitiveness. Based on the potential of the livestock sub-sector as a base in this city, one of the processed livestock products, namely various rendang, is a priority product in this area. Payakumbuh City through the One Village One Product (OVOP) program by the central government established by the Indonesian Ministry of Industry The presence of Kampung Rendang Payakumbuh is a tangible form of the commitment of the local government which is fully supported by the business community to strengthen the essence of Payakumbuh identity as a destination city for culinary tourism in West Sumatra. Payakumbuh has various types of small to medium scale industrial businesses such as food and beverage industry, handicrafts, metal industries and others, totaling  $\pm 1,738$  business units. Nearly 40% of this amount consists of industrial businesses engaged in the snack business. Among the snack food industry, Rendang is one of the superior products since it has a very prospective business development.

If traced, this unique tasting food comes from Sumatra, especially the Minangkabau area. Rendang has been around for a long time and has become a traditional dish that is served in various traditional events and daily dishes for the Minangkabau community. As a traditional cuisine, food is thought to have been born since the Minangkabau people held their first traditional event. Because of the delicious taste of this rendang, then the art of cooking rendang has developed to other areas of Malay culture; starting from Mandailing, Riau, Jambi, to the other country in Negeri Sembilan which turns out to be mostly inhabited by migrants from Minangkabau. Therefore, rendang is widely known both in Sumatra and the Malay Peninsula. Payakumbuh is now famous as a producer of various types of dry rendang which are sold in packs. This dry rendang is also a recipe from generation to generation and it has only been sold and developed for the last six years. Previously it was only for family meals. Various

kinds of dried rendang are now sold, including egg rendang, suir meat rendang, pulmonary rendang and cassava rendang. Unlike the wet beef rendang known so far as Padang rendang, this dry rendang is crunchier and drier and not soggy like rendang.

The development of rendang products in Payakumbuh City from year to year has increased along with the increasing number of business actors who are engaged in this rendang business and the average production value is always increasing so that it is still very potential to be developed. In 2015, new businesses began to emerge, namely business groups, namely 5 groups and in 2016 increased 4 groups. This rendang business develops along with the development of farms, especially laying hens and beef cattle because Payakumbuh and District 50 Kota are one of the egg centers in West Sumatra, while the City of Payakumbuh no longer allows for development in the upstream of livestock due to limited land, this city is very suitable for downstream. processed livestock and agricultural products such as this rendang. The shredded beef rendang, for example, is only left with the fibers of the meat along with the completely dry marinade. The taste is similar to shredded, but spicier and thicker shredded meat. Meanwhile, pulmonary rendang, similar to lung rendang, only smells rendang and is spicier. As for the egg rendang, this is the most unique: It's crunchy like fried, even though it's not fried. This egg rendang is made by mixing eggs with flour and fried spices, then cut into sides and put in coconut milk with the rendang spices until the coconut dries, the result is egg rendang which is crunchy like crackers. While the distribution of Small and Medium Seize Entreprises Rendang in Payakumbuh City is spread in several villages such as the durian river village, Balai Nan Duo, Tanah Mati, Padang Tengah, Balai Panjang etc. Approximately 31% of MSMEs rendang in Payakumbuh City are located in an area which is also called the Kampung Rendang area which is in Sungai Durian Village. The potential of MSMEs rendang in Payakumbuh City continues to increase, where the number of rendang MSMEs in 2014 was 18 and increased in 2016 by 29 MSMEs. (Department of Cooperatives, UMKM, Industry and Trade of Payakumbuh City 2017).

### *Supply Chain and Rendang Entreprises Value Chain*

The supply chain is a linkage between the flow of materials or services, the flow of money (return/recycle) and the flow of information from suppliers, manufacturers, distributors, warehouses, retailers to the end customer (upstream ↔ downstream). In other words, a supply chain is a network of companies that work together to create and deliver products to the end consumers. This chain or network extends from miners of raw materials (upstream) to retailers or stores (downstream). Activities in the supply chain convert natural resources, raw materials and basic components

into finished products that will be distributed to the final consumer. By knowing the parts contained in the supply chain theory, we can also find out the institutions related to the marketing of rendang in Payakumbuh City.

The supply chain includes three parts:

1. Upstream Supply Chain: This section covers the first-tier suppliers of the organization and suppliers with which a relationship has been established
2. Internal Supply Chain: This section covers all the processes used by the organization in converting the input sent by the supplier into output, starting from the time the material enters the company until the product is distributed outside the company
3. Downstream Supply Chain: This section covers all the processes involved in delivering the product to the end customer

The distribution of rendang products is carried out directly to consumers, some are distributed by distributors.

#### *Distribution Patterns*

This section describes the flow of product, finance and information among members of the supply chain for rendang products in Payakumbuh City.

#### *Product Flow*

There are 4 supply chain channels for rendang from producers to consumers. This flow also involves 3 institutions, namely local distributors, regional distributors and retailers. The flow of products in the rendang supply chain starts from the supply of raw materials for production inputs from breeders and farmers. Institutions that are the destination of sale of breeders and farmers, namely traders. The beef cattle will then be slaughtered by the RPH and then distributed to retailers in the market. Broiler chickens after being purchased by collectors will be distributed to retailers in traditional markets, as well as eggs. Additional ingredients include chili, laos, ginger, turmeric, red onion, garlic and so on, also through new collectors marketed to retailers. Rendang IKM entrepreneurs buy the input from traditional markets which will then be processed into various kinds of processed rendang products. The marketing of this processed rendang product goes through several channels, namely:

1. Rendang products are sold directly to consumers through outlets owned by Rendang MSMEs
2. Marketing of rendang products by MSME directly to outlets or stores in Payakumbuh, Bukittinggi and Padang and several other cities after that only to consumers

3. Marketing of rendang products through distributors, then the distributors sell them to retailers (mini markets) after that to consumers
4. Marketing of rendang products through distributors, then the distributors sell them to retail outlets or souvenir shops, especially those outside the city and even outside the province, after that only to consumers

Of the four distribution channels of rendang products on channels 2,3 and 4, producers can reach market segments or customers that cannot be reached directly by producers. the rendang distribution system on channels other than channel 1 is also called a multi-channel marketing system. The following is a picture of the Supply Chain and value chain of the rendang business in the city of Payakumbuh.

#### *Financial Flow*

Financial flow refers to money for payment for products obtained. End consumers who buy rendang from retailers and distributors make cash payments. The purchase of rendang by retailers, both inside and outside the City of Payakumbuh, is always paid directly to the supplier. Payment is made in cash or by transfer from the bank account of the transacting party. The availability of funds in a short time is needed to purchase the next rendang product. In general, the transaction process between the parties to the agreement is relatively fast. This considers the capital requirements of all members of the supply chain to continue or expand their business.

#### *Information Flow*

The flow of information on the supply chain of rendang in the City of Payakumbuh takes place reciprocally starting from the UMKM rendang to the final consumer. This differs from a one-way product and financial flow. A transparent and high-intensity information flow can build trust among partner supply chain members. Producers inform about production plans, prices, product quality and product durability. The distributor will then share the information with retailers or subsequently to consumers.

#### *Added Value of Various Rendang*

The output (processed products) produced in this process is rendang products, including beef rendang, chicken rendang, egg rendang and pulmonary rendang. This product is diversification of processed livestock products. In the research process, the researcher converts the resulting output into units of kg, to facilitate the final calculation of added value according to the analytical tool used.

Based on the results of the research, it was found that the average production of rendang per day was 4 kg for meat and egg rendang and 3.5 kg for chicken rendang and pulmonary rendang. In the analysis of added value based on Hayami's approach, it can be seen the value-added of the product and the profits of the processing business. From Table 1 above, it can be explained that the added value obtained from the processing of several rendang products is IDR 23,600/kg for beef rendang, IDR 41,433 for chicken shredded rendang, IDR 51,800 for egg rendang, IDR 49,600 for pulmonary rendang. This added value is obtained from reducing the output value with the cost of raw materials and costs of other supporting materials. Meanwhile, the value-added ratio of rendang products was 2.95% for beef rendang, 6.34% for chicken shredded rendang, 16.19% for egg rendang and 8.44% for pulmonary rendang. Based on the results of this study, it can be seen that the ratio of added value for rendang products originating from animal husbandry commodities is the product of egg rendang the highest. This is because the raw material costs for egg rendang products are not that high, meanwhile for other rendang products the cost of raw materials is high even though the selling price of the product is also high.

According to Zakaria (2000), the interaction between the level of technology, business management and the quality of human resources managers will determine the level of production and income which in turn will determine the amount of added value produced. According to Makki and Masyhuri (2001), if the

intermediate cost component is used the greater the value, then the added value of the product will be smaller. Vice versa, if the intermediate costs are getting smaller, the added value of the product will be even greater. Similarly, it is known that the added value of agricultural products is in the downstream activities, namely processing, distribution and marketing. The added value obtained is a remuneration for each production factor used. To find out how much remuneration is given from the added value obtained, it is necessary to first know the margin between the output value produced and the main raw materials used.

The amount of margin obtained is different for each rendang product, where the highest margin is for chicken rendang Rp. 275,333 and Rp. 273,000, while the pulmonary rendang has the lowest margin, namely Rp. 188,000.00 per kilogram of the main raw material. Margin is the contribution of production factors other than the main raw material in producing production output. The margin is then distributed to labor income, other input contributions and company profits. The largest amount of the margin distribution is the contribution of other inputs. This shows that in the production activities of rendang the imposition of costs on the contribution of other inputs is very large. The second-largest margin distribution is operating profit. All rendang products that are produced provide benefits to companies where the business profits for the production of pulmonary rendang are the highest compared to others. This illustrates that the rendang production business activity is already profitable.

**Table 1:** Result calculation value added of some rendang products in payakumbuh

Variable	Meat rendang	chicken rendang	Egg rendang	Cattle's lung rendang
<b>I. Output, input and price</b>				
1. Output (kg)	4,0	3,5	4,0	3,5
2. Raw Material Input (kg)	5,0	4,5	2,5	5,0
3. Labours (HOK)	2,0	3,0	4	2,0
4. Conversion Factor	0,80	0,78	1,60	0,70
5. Labour's Coefficient (HOK)	0,40	0,67	1,60	0,40
6. Price of Product (Rp.)	1.000.000	840.000	200.000	840.000
7. Wages (Rp/HOK)	40.000	40.000	40.000	40.000
<b>II. Revenue and profit</b>				
8. Raw Material Input (Rp)	550.000	378.000	45.000	400.000
9. Other inputs (Rp)	226.400	233.900	223.200	138.400
10. Production (Rp)	800.000	653.333	320.000	588.000
11a. Value Added (Rp)	23.600	41.433	51.800	49.600
11b. Value Added Ratio (%)	2,95	6,34	16,19	8,44
12a. Revenue of Labour (Rp)	16.000	26.667	64.000	16.000
12b. Segment of Labour (%)	67,80	64,36	124	32,26
13a. Profit (Rp)	23.532	41.369	51.676	49.568
13b. Rate of Profit	99,71	99,84	100	99,93
<b>III. Owner Compensation Factor of Production</b>				
14. Margin (Rp)	250.000	275.333	275.000	188.000
14a. Direct Labour Income (%)	6,40	9,69	23	8,51
14b. Contribution of Other Inputs (%)	90,56	84,95	81	73,62
14c. Company Profit (%)	9,41	15,03	19	26,37

Source: Research results

## Conclusion

Based on the results of the research, the ratio of value-added from rendang products made from livestock raw material is IDR 23,600/kg for meat rendang, IDR 41,433 for chicken shredded rendang, IDR 51,800 for egg rendang, IDR 49,600 for cattle's lung rendang. The value-added ratio of rendang products was 2.95% for beef rendang, 6.34% for chicken shredded rendang, 16.19% for egg rendang and 8.44% for pulmonary rendang. The highest added value ratio was egg rendang products with a ratio of 16.19%.

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## Author's Contributions

The authors equally contributed in the study.

## Ethics

The study has been approved by Andalas University Committee of Research Ethics. The authors confirm that no ethical issues are involved in this study. Should any ethical issue arise after the publication of this manuscript, the authors agree to be held accountable.

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