

## Modification of Hayami value-added analysis calculations in the processing of cayenne pepper

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### ABSTRACT

*The problem in this research is the durability of the chili harvested and the fluctuations in the price of chili that are not certain. This opportunity to improve the standard of living did not last long because many chilies from other regions flooded the surrounding markets and were more in demand by consumers because they were cheaper. This situation is very worrying because it impacts the decline in selling power so that there is a buildup of harvests and spoilage of chilies. The above problems must be the attention of all parties to find the best solution so that farmers can take advantage of opportunities. Efforts taken to extend the shelf life of chili are applying chili processing technology to food products, such as chili shreds. This research aims to assist farmers in increasing their income and getting solutions to their business problems audience for other researchers. Analysis of the data used in this study is the analysis of added value (Added Value). The Hayami method is carried out in two stages, the first stage is calculating output, input and price, and then the second stage is calculating revenue and advantage. In this study, the Hayami method was used, adapted to the modification, which was the basis of calculation using the value of money. The management of fresh cayenne pepper commodities to shredded cayenne pepper is feasible to run. The added value of shredded cayenne pepper products is Rp 145,000/kg with every Rp 1, the product's value contains an added value of Rp 145. It proves that the use of fresh cayenne pepper into shredded cayenne pepper is a profitable business and can help reduce damage to easily damaged chilies. If not sold immediately.*

### Keywords:

Diversification, Hayami products, Shredded chili

### 1. Introduction

With a strong and advanced industrial sector that is backed by resilient agriculture and vice versa, Indonesia can progressively transform from an agrarian to both an industrial and robust society. Therefore, the development of the agro-industry will be indicative of both industrial development activities as well as agricultural product processing and marketing operations. Cayenne pepper production data in Wajo Regency in 2019 was 24,128, in 2020 it was 17,157 and in 2021 it was 18,015 quintals per hectare [1].

Due to the abundance of natural resources, Indonesia's food industry has very promising prospects. To manufacture goods with a high added value, particularly ready-made products serving as examples, practicality, and attention to quality issues, industrial growth should make use of domestic raw materials. According to Soekartawi, agroindustry operations can boost the revenue of agribusiness actors, be a source of employment, boost foreign exchange earnings, and, most crucially, be a catalyst for the growth of other sectors [2].

A change in value brought on by how inputs are handled during a production process is known as added value. According to Coltrain et al. [3], agricultural products with higher value flow from upstream to downstream in each supply chain, starting with the farmer and ending with the final customer. Added value



changes according to the input and handling provided by each supply chain participant. Customers are now more connected, informed, and active than they were a few years ago, when they were more passive and isolated. Customer orientation is the foundational premise of business, and successfully managing the customer connection is essential to the company's success. Making jerky, shredded, and *se'i* (smoked meat) beef also serves the nutritional needs of the community [4]. One strategy to combat the drop in the selling price of chili, where the increase in harvested area in South Sulawesi was 24.41 before 2017, is product diversification. This agriculture is quite promising, as evidenced by the increase in chili prices to Rp 90,000 in 2014 [5].

Many chili growers have time to purchase homes, vehicles, sign up for the hajj, etc. This chance to raise the level of living was short-lived because other regions' chilies swamped the local marketplace and were more popular with customers because they were less expensive. This circumstance is quite concerning since it affects on the fall in selling power, causing harvests to accumulate and chilies to rot. The above problems must be the attention of all parties to find the best solution so that farmers can take advantage of opportunities and solve their issues. One of the efforts taken to help farmers extend the shelf life of chili is applying chili processing technology to food products, such as shredded chili. In the Macero area, Ongkoe Village, many farmer groups, including women's farmer groups. In that village, the women farmers gathered in the Women's Farmer's Group of Flowers Cateloya.

This research aims to assist farmers in increasing their income and getting solutions to their business problems and as a reference for other researchers. This research is a follow-up study from previous research. Padapi et al. [6] research in 2021 showed that the durability of these things increases with their production. E-commerce can be used in marketing to ensure that the effects of shredded cayenne pepper are well known to the general public outside of the region where the Women Farmers Group produces them. To reduce the marketing chain and raise farmers' revenue, e-commerce is used to sell the outcomes of product diversification.

The problem in this study is the durability of harvested chilies, and the unpredictable fluctuations in chili prices are problems that need immediate solutions. Itto can categorize them as one of the steps to streamline the marketing of agricultural products. It is limited to the KWT Bunga Cateloya in the Ongkoe Village, Belawa sub-district, Wajo Regency, South Sulawesi.

## 2. Methods

The location of this research was determined purposively in Ongkoe Village, Wajo Regency, South Sulawesi Province, considering that the area is a producer of cayenne pepper compared to the surrounding area. The number of samples that will use in the study is 1 group of women. This research was carried out for 3 months, namely September to November 2021. Located in the Macero area, Wajo Regency. This research is a descriptive study which describes the analysis of the added value of cayenne pepper using an analytical tool, namely **the Hayami method**. This analysis consists of 3 stages, the first stage is calculating the output input and price. The second stage is calculating Revenue and profit and the final stage is calculating the percentage of added value [7].

The added value of processing and the added value of marketing can both be calculated. The variables that determine processing's added value were divided into technical and market variables. The production capacity, total amount of raw materials used, and labor force were all determined by technological considerations. Prices, workforce wages, raw material prices, and other input values besides raw materials and labor are the market elements that have an impact on output. The reduction in the price of raw materials and other inputs, excluding labor costs, allowed for the calculation of the total added value brought about by the processing process. Additionally, market and technical considerations have a significant impact on the determination of added value [8]. The following are the details of the variables

**Table 1. Analysis of the added value of the Hayami method**

Variable	Numb.	Sub Variable	Description
Output input and price	1	Output (kg)	(1)
	2	Raw material input (kg)	(2)
	3	Labor input (JKO)	(3)
	4	Conversion factor	(4) = (1) : (2)
	5	Labor coefficient (JKO)	(5) = (3) : (2)
	6	Output price (Rp)	(6)
	7	Labor wages (JKO)	(7)
Revenue and advantage	8	Price of raw material input (Rp/kg)	(8)
	9	Contribution of other inputs (Rp/kg)	(9)
	10	Output value (Rp/kg)	(10) = (4) × (6)
	11	A. Value added (Rp/kg)	(11a) = (10) - (8) - (9)
		B. Value added ratio (%)	(11b) = (11a)/(10) × 100
	12	A. Labor income (Rp/hour)	(12a) = (5) × (7)
		B. Labor share (%)	(12b) = (12a)/(11a) × 100
	13	A. Profit (Rp/kg)	(13a) = (11a) - (12a)
		B. Profit rate (%)	(13b) = (13a)/(10) × 100

- a. Cost or Total Cost (TC). The costs used in this study include the total value of the financial inputs spent to finance the production process of shredded chili products.

$$TC = TVC + TFC \quad (1)$$

TC : Total Cost (Rp)

TVC : Total Variable Cost (Rp)

TFC : Total Fixed Cost (Rp)

- b. Acceptance or Total Revenue (TR)

$$TR = P \times Q \quad (2)$$

TR : Total revenue

P : Price (Rp)

Q : Quantity (kg)

c. Gain or profit ( $\Pi$ )

$$\Pi = TR - TC \quad (3)$$

d. R/C Ratio

$$R/C = \text{Revenue} / \text{Cost} \quad (4)$$

Criteria used to assess the R/C Ratio are as follows:

- R/C Ratio > 1 means that the business of processing shredded chili products is profitable
- R/C Ratio < 1 means that the business of processing beverage products from shredded chili is detrimental
- R/C Ratio = 1 means that the business of processing shredded chili products has a return on investment (Break Even Point/BEP)

In this study, the Hayami method was used, adapted to the modification, which was the basis of calculation using the value of money. The processing time base took a year to take the total expenditure and income of the year by comparing the revenue from the sale of raw cayenne pepper to collectors, then compared with the analysis of the added value of cayenne pepper is processed into shredded chili. Therefore, there is consistency in the calculation, so only one actor/group of Women Farmers is used, namely KWT Catelya.

### 3. Results and Discussion

Value added is defined as a measure of loss that will lead to an increase in domestic revenue and the expansion of the global economy. Furthermore, it was stated that value-added is a performance indicator when it comes to a company's economic profit. Value added is the finished product's value less all materials, inputs, and services obtained from outside vendors. Value added was employed in an agrifood research study to describe food products that are processed from their raw state to add value to manufactured goods [9].

The added value and competitiveness of processed agricultural commodity-based goods can both be improved by agro-industrial activities. Red chilies in a variety of processed forms, including ground red chilies, powdered red chilies, and more, were discovered. The sale of ground and shredded red chili goods is typically done door-to-door, with orders and sales being handled by the closest kiosks. Although items made with fresh ingredients have a relatively short shelf life, much of the cayenne pepper that is now in circulation is still fresh.

The loss of product added value and investment growth makes this situation negative for a corporation. As a result, it is required to switch from agricultural commodities in their current form to new products that can be produced in a way that is more financially viable. The transformation of agricultural commodities into a product [10]. Add value due to a change in form (form utility), which enables an extension of shelf life (time utility), facilitates transportation, and can maintain the nutrients present in these commodities.

Increasing the product's added value in the face of competition is one of several considerations for new product development [11]. A value-added method can be used to assess the competitiveness of processed cayenne pepper products.

According to Hayami [10] added value is the difference in the commodity's worth as a result of the treatment at a certain stage, less any associated costs. Technical factors (production capacity, technological application, product quality, raw material quality, and ancillary inputs) and market factors (output selling price, labor costs, and raw material prices) both have an impact on value added. To present a summary of the advantages for the organization, it is required to examine the added value of processed cayenne pepper shredded items to determine how much was sacrificed for the services offered. This study aims to analyze the added value of processed cayenne pepper shredded products from fresh cayenne pepper.

### ***3.1. Analysis Added Value of Shredded Chilies***

The best way to improve people's lives is to ensure their access to food; therefore, the use of yard-based farming is expected to support the development of an agricultural business. The majority of rural economies are based on the production and trade of primary (fresh) goods, whose value has been dropping in terms of the share of consumer expenses. In order to evolve into processed products, added value analysis is crucial, which means the agro-industry's function will grow. Value added is the added worth a commodity has as a result of being handled, lifted, or stored during manufacture. The difference between the product's worth and the cost of the raw materials and other inputs, excluding the cost of labor, is another definition of added value in the processing process. The margin, on the other hand, represents the discrepancy between the product's value and the cost of raw materials alone. Production margin elements like labor, other inputs, and processing costs are all included [12].

The cayenne pepper crop obtained in a year produces roughly 725 kg. Throughout the year, production ranges between 50 and 60 kg/month, with an unreasonably low selling price of Rp 5000/kg. The highest price at the farm level for a year is Rp 80,000/kg. To do a value-added analysis, freshly ground cayenne pepper must be processed into shredded cayenne pepper. Discover the benefits of using fresh cayenne pepper in sliced cayenne pepper as opposed to only selling fresh cayenne pepper for an unprofitable price. Another reason is that it's critical to calculate the compensation received by business players and gauge the number of new jobs generated.

Value capturing and value creation are ways to develop added value. Typically, capturing value entails processing and marketing part of the added value. A created-value strategy, on the other hand, is dependent on goods or services that are distinct from their mainstream counterparts [13]. Because it is more profitable, the added value of a product will lead to fiercer competition in the acquisition of raw materials and product marketing. The higher added value of agricultural goods has the potential to contribute to economic growth and, of course, to increase business opportunities and community revenue, both of which have the potential to benefit human welfare in the long run.

There are several ways to add value to processed goods, including: 1) the creation of new technology; 2) the discovery of new knowledge; 3) the enhancement of current products (goods and services); and 4) the discovery of novel approaches to the production of more goods and services using fewer resources [14].

In this decade, agricultural products' added value has risen, increasing both customer demand for fully processed goods and awareness of this process [10]. The concept of added value refers to the increase in value that occurs as a result of the treatment of an input in a commodity. A commodity's added value can be observed through modifications to the commodity, namely changes to its shape, location, and time. False. Depreciation—or, more specifically, replacement costs for wear and tear and obsolescence of capital utilized in production—is one factor influencing added value.

Since 2001, numerous studies and scientific publications have centered on ways to support and increase the added value of agricultural goods [15]. 105 kg of dried cayenne pepper, salt, garlic, and flavorings to taste are among the basic ingredients needed to produce shredded cayenne pepper. 210 kilograms of fresh cayenne pepper are utilized as raw materials, yielding 105 kg of shredded cayenne pepper and 3500 bottles of 30 g-sized shredded cayenne pepper. Shredded cayenne pepper was sold for Rp 8,000 per bottle of 30 g, which works out to Rp 266,667 per kilogram. The computation of the added value analysis of cayenne pepper in the form of shredded cayenne pepper has not yet been examined in any research on shredded cayenne pepper. The results of the analysis of the added value of the cayenne pepper shredded product are presented in detail in Table 2.

**Table 2. Analysis of the added value of cayenne pepper using the Hayami method**

Variable	No	Sub Variable	Cayenne Pepper
Output input and price	1	Output (kg)	105
	2	Raw material input (kg)	210
	3	Labor input (JKO)	130
	4	Conversion factor	0.5
	5	Labor coefficient (JKO)	0.6
	6	Output price (Rp)	28,000,000
	7	Labor wages (JKO)	100,000
Revenue and advantage	8	Price of raw material input (Rp/kg)	5,000
	9	Contribution of other inputs (Rp/kg)	116,667
	10	Output value (Rp/kg)	266,667
	11	A. Value added (Rp/kg)	145,000
		B. Value added ratio (%)	145
	12	A. Labor income (Rp/hour)	61,905
		B. Labor share (%)	-
	13	A. Profit (Rp/kg)	83,095
		B. Profit rate (%)	83

According to the Hayami method's valuation, one kilogram of shredded cayenne pepper is worth Rp 266,667. Based on this value, the added value produced by processing fresh cayenne pepper will be Rp 145,000/kg if the output value is lowered by the cost of purchasing raw materials and other inputs. Assuming that it costs Rp 28,000,000 to produce 105 kg of shredded cayenne pepper. The ratio of cayenne pepper's additional value is 145% based on this value. Since 145% is greater

than 40%, it falls within the high category. By Hayami's standards, added value is defined as  $> 0$ , which denotes a positive added value. If the value-added ratio is greater than 40%, it is considered high.

Workers make Rp 61,905 per kilogram to produce 1 kg of shredded cayenne pepper. It can be shown that the sliced cayenne pepper products have a higher value than new commodities, with a value of Rp 83.095/kg when compared to sales of a new form of cayenne pepper. 83% of the margin was secured. The sale of shredded cayenne pepper is more profitable than the sale of fresh cayenne pepper, as seen by the sizable amount of profit from the processing margin. It denotes that adding value to cayenne pepper by using fresh cayenne pepper to make sliced cayenne pepper will be more advantageous than simply selling it as-is.

### 3.2 R/C Analysis

The overall cost for turning 210 fresh cayenne peppers into 105 kg of shredded cayenne pepper, including the cost of purchasing spices, packaging, and raw materials, is IDR 15,330,000. By selling it for Rp 266,667/kg or Rp 8,000 per bottle (30 g), generating Rp 28,000,000 in revenue. The corporation must establish the product's price before marketing its goods on the market. In today's trading environment, especially in an environment of intense rivalry for every company, price is an essential corporate component.

The following is an R/C analysis of shredded cayenne pepper in the 1x production cycle.

$$\frac{R}{C} = \frac{28.000.000}{15.330.000} = 1.8$$

An R/C value of 1.8 (R/C ratio  $> 1$ ) suggests that manufacturing shredded chili products is lucrative. The R/C number in the analysis of the cayenne pepper business is  $>1$ , which suggests this business is lucrative [16]. The processing of cayenne pepper into shredded cayenne pepper is very helpful for the profit earned and can extend the product's shelf life. Processing agricultural products into derivative products can boost added value and increase profitability [17], and improve shelf life, noting that agricultural commodities are perishable and easily destroyed. The development of a variety of locally processed food items indirectly stimulates raw materials to overcome the availability of consumption levels and sustain food security [18]. This supports the findings of Indriani et al. [19] that every kilogram of fresh cayenne pepper has an added value of Rp 1,126,688, or 90.27% of the production value. According to Hayami's analysis of added value, each kg of dried chiles has an added value of Rp 7,400, or 59.20% of the product value. The profit rate is 58.1% of the production value, which translates to a profit of 58.1 kg for every 100 kg of production value.

This research similar with Putri's et al. [20] research. The value added provided from chili processing in one production is Rp 356,776.7 per kg to increase the difference between the input price and the selling price of the output. It can be said that from processing chili into a product per output can be of high value. The chili sauce business has been efficient because the R/C ratio value of more than one, which is 1.63, means that it can be concluded that this business is feasible.

This research is an example of an agroindustry business. This is supported by Santosa's [21] assertion that there is an agro-industry that promotes the added value of products. Since agricultural products tend to be readily destroyed by additional processing, and these processed products have a higher selling value than unprocessed agricultural items, agriculture plays a vital role in increasing income. Entrepreneurs engage in high-production, low-cost activities to increase their income.

The ability of the agroindustry to create added value from fresh agricultural products gives it a significant role. The agro-industry in rural areas, which includes small and medium-sized businesses as well as the home industry, has a strategic position and role in the creation of an economic structure that can support economic services, uphold equity, promote economic growth, and achieve economic stability. Based on a protracted crisis, it nonetheless manages to survive. The industry needs to advance more to be autonomous, grow into a successful firm, and also have benefits in giving customers pleasure and opening up additional market opportunities. This requires ongoing development and coaching. Product diversification is done to give products more value, and it can also increase consumer choice and public interest in consumption. From processing technology to marketing activity plans, this effort includes attracting the public's interest to boost revenue through better marketing techniques.

With online media, value contributed demonstrates compensation for labor, capital, and corporate management. Measuring the level of service provided to the owner of the production-related inputs is one use of computing added value. The value of manufacturing with raw materials and supporting materials utilized in the production process is, in essence, added value. To determine the additional value created by each link, value-added analysis is therefore required. Given that agricultural commodities are perishable, processing them into derivative goods can boost added value, earnings, and shelf life [22].

#### **4. Conclusion**

When prices drop drastically, farmers are usually reluctant to sell their cayenne pepper harvest to the market. It is hoped that making shredded cayenne pepper will be able to help farmers recover their capital so they can continue replanting their cayenne pepper and meet other household needs. It is possible to transform fresh cayenne pepper into shredded cayenne pepper. The additional value of items containing sliced cayenne pepper made from fresh cayenne pepper is Rp 145,000/kg or Rp 145 for every Rp 1 of the product's worth. Demonstrates that adding fresh cayenne pepper to shredded cayenne pepper is advantageous and can limit harm. If chili isn't sold, it might easily get destroyed.

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