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# **Analysis of Added Value of Shredded Catfish in Bandung Regency, West Java, Indonesia (The Case Study of Abon Ikan Lele Sejahtera Maruyung Village, Pacet District)**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

The purpose of this study was to determine added value from the processing of fresh catfish into shredded catfish at "Abon Ikan Lele Sejahtera" in Maruyung Village, Bandung Regency, West Java, Indonesia. The research method used is a case study and quantitative descriptive analysis. The sampling technique in this research used the purposive sampling method. The method of data analysis in this study used Hayami's method. This research was conducted in Bandung Regency from August 2021 until September 2021. The results show that the added value generated is 69,4%. It means the price of shredded catfish is increase 69% from the price of fresh catfish. The added value is classified as high but can be higher if the business owner reduced the cost of other input contributions.

**Keywords:** *Catfish; shredded; added value; processing.*

## 1. INTRODUCTION

Bandung Regency is an area close to the capital city of West Java, namely Bandung City and has 31 sub-districts, and has an area of 1,762.4 km<sup>2</sup>. There are various kinds of fishery processing businesses such as salted fish, surimi, and other processing spread across 31 sub-districts. Bandung regency is one of regency in West Java that had many fish product entrepreneurs with 230 entrepreneurs [1]. One of the fishery entrepreneurs in Bandung Regency processes shredded catfish.

Fish is one of the foods that have a high protein content, so it is good for daily nutritional needs. However, fish is a product that quickly decays so it must be processed immediately [2]. Catfish is a popular fish in Bandung Regency [3]. Processing catfish into shredded fish can increase the shelf life of fishery products. The shelf life of shredded catfish is 28 months [4]. Shredded catfish is a processed fishery product made from catfish with a high protein if the value of protein is compared to shredded beef [5]. There are businesses of shredded catfish in Bandung Regency, one of them is the "Abon Ikan Lele Sejahtera" business.

The existence of this shredded catfish processing industry is expected to provide added value to business owners. On the other hand, the processing of shredded catfish is also expected to contribute positively to the potential of fishery processing in Bandung Regency. Therefore, a study was conducted on the analysis of the added value of processed catfish (*Clarias* sp.) processed products in Maruyung Village, Pacet District, Bandung Regency.

## 2. METHODOLOGY

This research was conducted in Maruyung Village, Pacet District, Bandung Regency from August 2021 until September 2021. The research method used is a case study. The research takes a case study in the business of "Abon Ikan Lele Sejahtera". The location of this study was determined by purposive sampling. Sampling is determined through the criteria that have been made. These criteria include:

- 1) The entrepreneur of shredded catfish live in Bandung Regency
- 2) Have a minimum of 5 years of business experience.
- 3) Located at Pacet District
- 4) Classed as Micro, Small and Medium Enterprises (MSMEs)
- 5) Respondents are willing to be interviewed.

The types of data collected consist of primary and secondary data. Data analysis used in this research is descriptive analysis and quantitative analysis.

### 2.1 Research Site

Maruyung Village is one of the villages located in Pacet District, Bandung Regency, West Java Province. This village is directly next to several villages such as Cipeujeuh Village, Mandalahaji Village, Mekarjaya Village, Pangauban Village, and Cinangela Village in Pacet District. The business location of "Abon Ikan Lele Sejahtera" is in Maruyung Village. The location map of Maruyung Village is presented in Fig. 1.

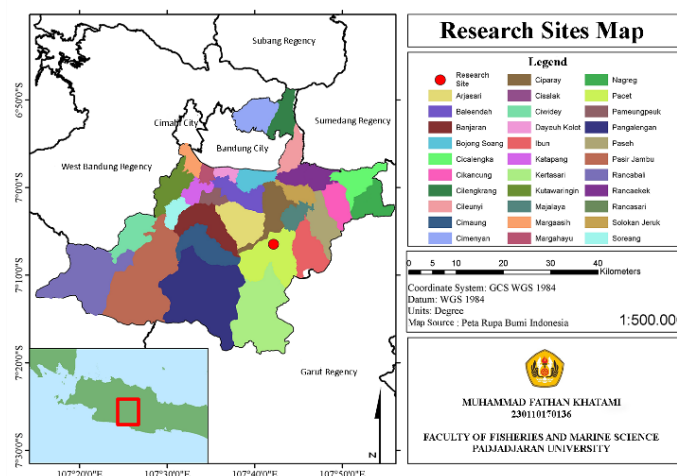


Fig. 1. Maruyung village on map

**Table 1. Hayami's method table**

Variable	Score
<b>I. Output, Input and price</b>	
1. Output (kilogram/process)	A
2. Input (kilogram/process)	B
3. Labor (People/proses)	C
4. Conversion Factor	$D = A/B$
5. Labor Coefficient (DWP/kilogram)	$E = C/B$
6. Output Price (IDR)	F
7. Labor Wages (IDR/DWP)	G
<b>II. Revenue and Profit</b>	
8. Price of Raw Materials (IDR/kilogram)	H
9. Contribution of Other Inputs (IDR/kilogram)	I
10. Value of Output (IDR/kilogram)	$J = D \times F$
11. a. Added value (IDR/kilogram)	$K = J - H - I$
b. Added value Ratio (%)	$L(\%) = (K/J) \times 100\%$
12. a. Labor Income (IDR/kilogram)	$M = E \times G$
b. Labor Share (%)	$N(\%) = (M/K) \times 100\%$
13. a. Profit (IDR/kilogram)	$O = K - M$
b. Profit Ratio (%)	$P(\%) = (O/K) \times 100\%$
<b>III. Remuneration to the Owner of the Factors of Production</b>	
14. Margin (IDR/kilogram)	$Q = J - H$
a. Labor Income (%)	$R(\%) = (M/Q) \times 100\%$
b. Other Input Contributions (%)	$S(\%) = (I/Q) \times 100\%$
c. Entrepreneur's profit (%)	$T(\%) = (O/Q) \times 100\%$

There are several public facilities available in Maruyung Village. The facilities include mosques, health centers, elementary to high school, and village offices. This village is thirty kilometers from the capital city of Bandung Regency.

## 2.2 Analysis of Added Value

Added value is the result of the value of the final product minus the intermediate cost consisting of the cost of raw materials and auxiliary costs [6]. The advantage of using Hayami's methods is that it can see the value of output and productivity and the owner's remuneration to the owner factors of production [7,8]. The methods of data analysis in this study were carried out by explaining the analysis of Hayami's methods which aims to determine the advantages and added value. Hayami's methods table is presented in Table 1.

This added value analysis research has several criteria as indicators of the size of the added value. The size of the added value is certainly influenced by several factors such as the contribution of other inputs, the price of raw

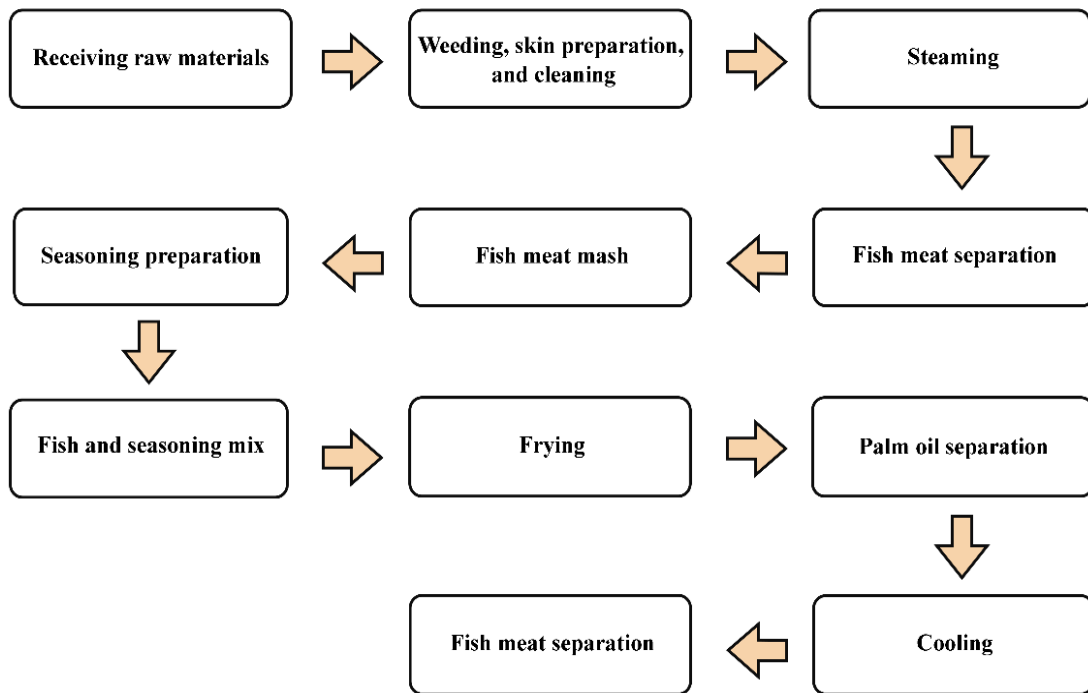
materials and the value of the output. The following are the added value criteria according to [9,10]:

- 1) Added value ratio <15 % is low
- 2) Added value ratio 15 – 40 % is moderate
- 3) Added value ratio > 40% is high

## 3. RESULTS AND DISCUSSION

### 3.1 Shredded Catfish Processing

The process of making shredded catfish goes through several stages, starting from separating the thorns from the meat to packing the shredded fish which aims to make the shredded catfish have the best quality. The heat source used for frying the shredded catfish used a stove and 3 kilograms of gas. The oil separation technology used is by using a spinner which can guarantee a much better oil separation than conventional presses. This process also makes shredded catfish have a distinctive texture and are not easily rancid so that they can be stored for a long time. The process of processing shredded catfish is as follows in Fig. 2.



**Fig. 1. Shredded catfish processing steps**

The process of making shredded catfish begins with the preparation of tools such as a boiler, wok stove, and others as well as the preparation of ingredients, fresh catfish. After the tools and materials are prepared, then the raw materials are skinned, and the organs are cleaned so that the raw materials used are hygienic. After that, the catfish is put into a pot to be steamed so the meat becomes softer. The next step is to separate the fish spines from the fish flesh. This process requires precision in the process because the thorns left behind will greatly affect the results of shredded fish. After becoming soft fish meat, the next step is the catfish meat is seasoned and then fried until it has a brown color. The fried raw materials are then put into the spinner so that the oil in the shredded is reduced. The last step is the cooling process and then the shredded fish is ready to be wrapped in a zip lock package to make it more durable.

This process is categorized as a traditional process and had trial and error from the beginning of pioneering this business. Trial and error are done by distributing product samples to the public so that they are assessed of taste, texture, color, and aroma. After going through some trial and error, this business product was produced which is known to the public and has a taste that is not boring. In addition, the time for

making shredded catfish in this business only takes one day, which means it is shorter than the La Tansa shredded catfish business which requires 3 working days [11].

### 3.2 Equipment Cost

The equipment used in this business is various, such as a pot, frying pan, stove, and others. The most expensive piece of equipment is a freezer for 5,700,000 IDR for one piece and the cheapest price is a knife 75,000 IDR for 3 pieces. The total cost incurred by this business is Rp. 10,887,667. Equipment cost on this business is presented in Table 2.

The biggest depreciation cost was obtained by a freezer with a lifetime of 5 years and the depreciation cost was 1,140,000 IDR with a 52.4% proportion. The lowest depreciation cost is the stainless basin with a lifetime of 2 years and the depreciation cost is 63,000 IDR with a 1.2 % proportion. The depreciation cost from all of the equipment by this catfish shredded business is 3,615,222 IDR/Year. The depreciation cost obtained by this business is greater than the business of shredded catfish La Tansa which is only 624,276 IDR / year. This difference can be influenced by the number of tools used and the different lifetime [11].

**Table 2. Equipment cost**

No	Equipment	Volume (Pcs)	Unit Price (IDR/Unit)	Total Cost (IDR)	Proporti on (%)	Lifetime (Year)	Depreciation (IDR/Year)
1	Steamer Pot	2	135,000	270,000	2.5	3	90,000
2	Pan and Spatula	2	75,000	150,000	1.4	1	150,000
3	Stove	2	445,000	890,000	8.2	2	445,000
4	Knife	3	25,000	75,000	0.7	1	75,000
5	Stainless Basin	4	31,500	126,000	1.2	2	63,000
6	Sealer	1	150,000	150,000	1.4	2	75,000
7	Packaging jar	100	5,000	500,000	4.6	1	500,000
8	Spinner	2	1,100,000	2,200,000	20.2	3	733,333
9	Scale	1	416,667	416,667	3.8	3	138,889
10	Stainless Tray	4	65,000	260,000	2.4	2	130,000
11	Freezer	1	5,700,000	5,700,000	52.4	5	1,140,000
12	Stainless Sieve	1	150,000	150,000	1.4	2	75,000
<b>Total</b>				<b>10.887,667</b>	<b>100</b>		<b>3,615,222</b>

### 3.3 Raw Material and Supporting Ingredients Cost

This business carries out the production process sixteen times a month. The raw material for fresh catfish used in one production process is 50 kilograms. This raw material is obtained from partner catfish sellers or cultivators. The size of catfish used as raw material is 1 kilogram and above. Based on research, the cost of raw materials incurred by this business in a month is 5.400.000 IDR. This cost is higher than La Tansa business with only 918,000 IDR per month [11]. This difference is influenced by the amount of fresh catfish needed in one month of production.

The price of raw materials paid by this business tends to remain the same. This is because the stock of raw materials is always available. The raw materials obtained come from cultivators' partners or their cultivation.

The supporting ingredients used in this business are garlic, coriander, cinnamon, ginger, turmeric, galangal, salt, and sugar. The costs incurred for supporting materials in one production are 57,550 IDR. This fee includes costs for other supporting materials.

### 3.4 Production Process

The production carried out by the catfish shredded business is sixteen times a month or four times a week. The amount of raw material needed in one production process is 50 kilograms of fresh catfish and after processing it becomes 20 kilograms of shredded catfish. The number of raw materials processed is currently in the low category due to the declining demand for shredded fish products.

The production process is carried out by 6 workers who are in the age range of 18 - 26 years. This age group is categorized as productive age group [12]. This workforce consists of women and men. Several workers have worked for more than ten years in this business.

### 3.5 Added Value

The added value analysis in this study uses Hayami's method. Processing fresh catfish into shredded fish can provide added value for shredded entrepreneurs. The analysis table of the added value from this business presented in Table 3.

**Table 3. Added value shredded catfish**

Variable	Score
<b>I. Output, Input and price</b>	
1. Output (kilogram/process)	30
2. Input (kilogram/process)	50
3. Labor (People/process)	60
4. Conversion Factor	0,6
5. Labor Coefficient (DWP/kilogram)	1,2
6. Output Price (IDR)	250.000
7. Labor Wages (IDR/DWP)	62.500
<b>II. Revenue and Profit</b>	
8. Price of Raw Materials (IDR/kilogram)	18.000
9. Contribution of Other Inputs (IDR/kilogram)	27.836
10. Value of Output (IDRkilogram)	150.000
11. a. Added value (IDR/kilogram)	104.164
b. Added value Ratio (%)	69%
12. a. Labor Income (IDR/kilogram)	75.000
b. Labor Share (%)	72%
13. a. Profit (IDR/kilogram)	29.164
b. Profit Ratio (%)	28%
<b>III. Remuneration to the Owner of the Factors of Production</b>	
14. Margin (IDR/kilogram)	132.000
a. Labor Income (%)	57%
b. Other Input Contributions (%)	21%
c. Entrepreneur's profit (%)	22%

**Table 4. Input and output comparison**

Name of Business	Input (kg)	Output (kg)
Sejahtera	50	30
Dwi Tunggal Group	6	2

### 3.5.1 Output, input, and price

Based on the results of the study, the input was 50 kilograms of fresh catfish that had not been processed into shredded catfish products. After processing, the output result is 30 kilograms. The reduction in the number of fresh catfish that has been processed because not all parts of the catfish are used as raw material, only the meat is used as raw material. The output of shredded catfish produced in this study was higher than the research of [13] regarding shredded catfish in Dwi Tunggal Group which only produced 2 kilograms of shredded catfish from 6 kilograms of fresh catfish per one production process. This is certainly related to the production capacity that can be carried out in each business. The production capacity that can be carried out by this business is 480 kilograms of shredded catfish per month.

The shredded production process in this business requires six workers. This worker come from residents around the business place, in

Maruyung Village, Pacet District. Workers who work in this business are in the age range of 18-26 years, so they are included in the productive age group, which means they can work effectively and have high productivity compared to the old age group [12,14]. This can be seen from the conversion factor value of 1.2 which means that everyone employee can convert one kilogram of fresh catfish into 1.2 kilograms of shredded catfish. The conversion factor generated by this study is greater than the research conducted by [11] regarding the business of shredded catfish in the La Tansa Agroindustry, which is only 0.39 kilogram.

The size of shredded catfish sold by this business is usually in the proportions of 100 grams at for 25,000 IDR then in the proportions of 1 kilogram, the price becomes 250,000 IDR. The wages given by the manager of the shredded fish business are given daily. The nominal wage given to workers is 62,500 IDR/Daily Working Person.

### 3.5.2 Revenue and profit

The price of raw materials listed in Table 2 is based on the prevailing market price in the area, which is 18,000 IDR/kilogram. The raw materials come from partner cultivators or the results of their cultivation. If partner cultivators are unable to meet fish needs, the stock will be taken from the catfish that are bred themselves.

Other input contributions come from the sum of all costs except for the cost of catfish raw materials and employee salaries divided by the number of raw materials used during production in one month [15]. The value of other input contributions obtained is 27,836 IDR/kilogram. This value is derived from the calculation between depreciation expense and variable costs such as cooking oil, packaging materials, fuel, seasonings, electricity, and water.

The output value of shredded catfish is the result of multiplying the price of shredded catfish per kilogram with the conversion factor. The value obtained is 150,000 IDR/kilogram means that from 1 kilogram of the production process of shredded catfish, 150,000 IDR is obtained from the sale of shredded catfish. The output value is equal to the entrepreneur's gross revenue for every 1 kilogram of input used [15].

The added value generated in this business is 104,164 IDR. The added value generated is certainly higher than the research conducted by [13] in Dwi Tunggal Groups which only resulted in an added value of 61,583 IDR. The amount of added value is influenced by the output value of shredded catfish, the contribution of other inputs and the price of raw materials. The added value of 104,164 IDR resulted in a added value ratio of 69%. The resulting added value ratio is the added value contribution to the output value. Then it can be interpreted from the output value of 150,000 IDR per kilogram, there is 69,4% added value from the output value of shredded catfish. The added value obtained is classified as a high added value according to [9] because it has a ratio of > 40%. This means that the production of shredded catfish provides high added value to the entrepreneur.

Direct labor income is obtained from the multiplication of direct labor wages with the labor coefficient. The direct labor income obtained by

the entrepreneurs is 75,000 IDR per kilogram of raw materials processed into shredded catfish. The share of labor results from the division between added value and direct labor income. So that it can be interpreted that the share of labor in added value is 72 %. Direct labor income in this business is greater than the business of Dwi Tunggal Group which only amounted to 23,333 IDR. This difference is caused by the value of the conversion factor and labor wages

Profits are obtained from added value minus by direct labor income. Based on this, the business owner's profit is 29,164 IDR per kilogram of catfish produced into shredded catfish. The profit rate obtained is 28% of the added value generated. The profit generated by this business is smaller than the Dwi Tunggal Group. The factors that cause it are added value and direct labor income.

### 3.5.3 Remuneration to the owner of the factors of production

Remuneration for factors of production consists of remuneration for factors of production of labor, other inputs, and the level of profit. According to [9] margin is the difference between the price or value of the product with the value of the input of raw materials. The margin will be distributed for labor benefits, other input contributions, and company profits.

Based on the added value analysis, the margin obtained in this business is 132,000 IDR. The margin is obtained by the difference between the added value and the price of catfish raw materials. The margin obtained is greater than the La Tansa Catfish Shredded Business which only obtained 60.777 IDR. This difference occurs because the output value and the price of raw materials are different [11].

The remuneration obtained is direct labor income of 57% followed by the contribution of other inputs with a proportion of 21% and lastly from the profit of the owner of the company by 22%. This result is different from that obtained by the La Tansa catfish shredded business. The most significant difference is in the direct labor remuneration with a proportion of 5.48% for La Tansa business while for this business it is 57%. This is influenced by the amount of direct labor income [11].

**Table 5. Added value, direct labor income and profit comparison**

Name of Business	Added Value (IDR)	Direct Labor Income (IDR)	Profit (IDR)
Sejahtera	104,164	75,000	29,164
Dwi Tunggal Group	61,583	23,333	38,250

#### 4. CONCLUSION

Based on the research, it was found that the added value obtained by this business was 104,164 IDR with a added value ratio of 69,4%. The added value obtained belongs to the high category because the added value ratio is > 40%. The profit obtained from the manufacture of shredded catfish is 29,164 IDR per kilogram of shredded catfish with a profit ratio of 28%. Therefore, it can be concluded that the processing of shredded catfish can provide high added value. This business can reap added value and greater profits by increasing the price of shredded catfish or reducing costs on other input contributions.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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