Profile and Prospects of Fish Processing In Rokan Hilir Regency

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Abstract. Post-harvest handling and processing of fishery products is an aspect of the development of the fisheries industry in an area. Rokan Hilir Regency is one of the main fish-producing areas in Riau. This study aims to describe the profile of processed fishery and its development prospects in the future. This research was conducted from July to September 2020. Primary data was obtained through direct field observations of fish processing objects and accompanied by interviews with the owners and workers of the fish processing businesses. Interviews were also conducted with community leaders, related industries, government officials and academics. Secondary data was collected from reports of government and other agencies. Includes SWOT analysis, situation analysis, participatory analysis, problem analysis, objective analysis, and development analysis. Processed fish products in Rokan Hilir are; dried prawns, salted fish, prawn powder, fish meal, dried trash fish, fish lamps, shrimp paste and smoked fish. The centers for producing fish are sub-districts; Bangko, Pasir Limau Kapas, Sinaboi, Babussalam and Rantau Kopar. The long distance to consumers, difficulty in accessing production centers and limited supporting infrastructure are problems in processing fishery products in this area. The types of processed fish products that are more prospective are shrimp flour, salted fish and smoked fish. The recommended development strategies include; human resource training in the field of business management, providing stimulants and ongoing guidance from the government and industry.

1. Introduction

Fishery development in Rokan Hilir Regency is a sustainable development in order to utilize the potential of existing natural resources by improving the quality of fishery products through the empowerment of fishery business actors. Fishery potential must be managed responsibly and sustainably. The strategy that has been implemented is the management and control of fishery resources that are oriented towards community welfare [1-3]. Basically this is one of the processes of human efforts to utilize aquatic resources through fishing and fish maintenance activities as well as aquatic and coastal environmental services [4].

Development in the marine and fisheries sector should not be seen as only a way to eliminate poverty and unemployment. The fisheries and marine sector is the basis of the national economy, so it
is only natural that this sector is developed to become a leading sector in Indonesia's national development [5]. Therefore, support from the industrial sector for development in the fisheries and marine sector is a must. The development of the fisheries and marine industry is not the chosen alternative, but is complementary and mutually supportive for both inputs and outputs of nation development [6-7].

Fishery and marine production of Rokan Hilir Regency consists of capture fisheries and aquaculture, both from the sea and inland waters. Fishery production figures increase from year to year [2] and are dominated by fish caught from the sea (80.67%) compared to aquaculture production (19.33%). Fish production in 2019 was recorded at 67,914.08 tons, which is an increase compared to production in 2016 (62,843.35 tons), 2017 (60,315.80) and 2018 (67,113.60 tons) [8].

The fishery product processing and marketing development program is implemented in order to support efforts to increase the quantity, quality and continuity of fishery processing business by improving facilities and infrastructure and facilitating access to technology. This study was aimed to determine the state of fish processing production in Rokan Hilir Regency. Then proceed with analyzing and developing strategies for developing this fishery processing sub-sector.

2. Materials and Methods

2.1 Time and place.
Data collection was carried out in all districts (Bangko, Pasir Limau Kapas, Sinaboi, Rantau Kopar and Kubu Babussalam) that have fishery processing activities in Rokan Hilir Regency, Riau Province, Indonesia. This study was conducted from July to December 2020.

2.2 Methodology
Primary data was obtained from observations in the field of fish processing objects and supporting facilities that are affect them. Interviews were also conducted with fish farmers, community leaders, the fishing industry, local government and other stakeholders. The aspects observed include; technical processing and preservation of fish, production capacity, aspects of hygiene, sanitation and waste disposal. In addition, they were also asked about the obstacles to their business, the future prospects of their business and other things that were considered related to their business. Meanwhile, secondary data were obtained from government and private agencies. Included data on production, volume and trade value of main commodities in each producer sub-district

2.3 Data analysis
The data obtained in this study were analyzed descriptively by logically reviewing and comparing them with theories, opinions and the results of previous studies. Includes SWOT analysis and development analysis.

3. Results

3.1 General Condition of Rokan Hilir Regency
Rokan Hilir Regency is located on the east coast of Sumatra Island between 101°14' - 2030' North Latitude and 100°016' - 101°021' East Longitude. The total area is 8,881.59 Km2, where Tanah Putih Subdistrict is the largest subdistrict, namely 1,915.23 Km2 and the smallest subdistrict is Tanah Putih Tanjung Melawan Subdistrict with an area of 198.39 Km2. The population of the regency based on the 2020 Population Census is 637,161 people. It has territorial boundaries as - In the north: North Sumatra Province and the Malacca Strait - In the south: Bengkalis Regency and Rokan Hulu Regency - In the East: Dumai City - In the West: North Sumatra Province [9].

In the area of Rokan Hilir Regency, there are 16 rivers that can be navigable by pompong boats, canoes and boats to far upstream areas. Among the rivers that are very important as the main means of transportation in the economy of the population is the Rokan River with a length of 350 kilometers.
3.2 Fish processing and marketing potency

In an effort to maximize fishery products and provide high economic value, it is necessary to process fishery products to obtain quality products so as to provide convenience in marketing fishery products. Processing products that are currently in demand in Rokan Hilir Regency and are well known in other areas are salted fish, salai fish, fish nuggets, fish balls, fish crackers, shrimp crackers and shrimp paste or belacan. Currently, the activities are carried out by 49 processing and marketers groups. Generally, fish processing businesses are seasonal based on the abundance of raw materials from the type of business being developed.

The amount and value of trade in fresh fish and processed fish in Rokan Hilir Regency is divided into three, namely for the inter-local market and for the inter-island and export markets. The highest number and value of trade in fresh fish and processed fish for local markets is in Kubu Babussalam District with a total trade of 5,798,792 Kg, and the trade value reaches Rp. 74,007,884,382. Meanwhile, the lowest amount and value of trade was found in Rantau Kopar District with a total trade amount of 7,392 Kg, and the trade value only reached Rp 328,234,368 (Table 1).

Table 1. The amount and value of fish trade in Rokan Hilir Regency in the local market (2019).

| No. | District               | Trade Amount (Kg) | Trade Value (Rupiah) |
|-----|-----------------------|-------------------|----------------------|
| 1   | Bangko                | 1,255,894         | 34,498,152.286       |
| 2   | Pasir Limau Kapas     | 91,462            | 503,406.848          |
| 3   | Sinaboi               | 62,480            | 1,259,534.320        |
| 4   | Rantau Kopar          | 7,392             | 328,234.368          |
| 5   | Kubu Babussalam       | 4,381,564         | 37,418,556.560       |
| 6   | Total                 | 5,798,792         | 74,007,884.382       |

Source: [8].

The highest number of trades and the value of fish trade for the inter-island market is in Bangko District with a total trade of 7,174,817 Kg, and the trade value reaches Rp. 107,457,234,209. While the lowest amount and value of trade is in the Rantau Kopar District with a total trade of 8,712 Kg, and the trade value only reaches Rp. 239,083,416 (Table 2).

Table 2. The amount and trade value of fish trade in Rokan Hilir in the inter-island market (2019).

| No. | District               | Trade Amount (Kg) | Trade Value (Rupiah) |
|-----|-----------------------|-------------------|----------------------|
| 1   | Bangko                | 7,174,817         | 107,457,234.209      |
| 2   | Pasir Limau Kapas     | 2,638,515         | 49,728,092.205       |
| 3   | Sinaboi               | 676,657           | 19,377,426.509       |
| 4   | Rantau Kopar          | 8,712             | 239,083,416          |
| 5   | Kubu Babussalam       | 3,076,593         | 18,010,375.422       |
| 6   | Total                 | 13,575,294        | 194,812,211.761      |

Source: [8].

3.3 Bangko District

Total and trade value for fish for the local market in Bangko District amounted to 1,161,354 Kg with a trade value of Rp 25,242,332,830 (Table 3).

Table 3. Total and trade value of fish in Bangko District in the local market (2019).

| No  | Commodity    | Trade Amount (Kg) | Trade Value (Rupiah) |
|-----|--------------|-------------------|----------------------|
| 1   | Fresh fish   | 195,802           | 6,724,232.284        |
| 2   | Fresh shrimp | 88,754            | 2,927,461.936        |
The total and trade value for the inter-island market in Bangko District (2019) were 7,353,216 Kg and Rp. 117,555,464.52. The commodity that has the highest trade amount was fresh shellfish, which is 2,483,465 Kg with a trade value of Rp. 12,613,518,735. The commodity with the highest trade value was fresh shrimp, reaching Rp. 53,001,280,904. Meanwhile, the commodity with the lowest total and trade value is shrimp paste, which is 336,768 Kg with a trade value of only Rp. 1,624,568,832 (Table 4).

Table 4. Number and trade value of fish in Bangko District in the inter-island market (2019).

| No. | Commodity       | Trade Amount (Kg) | Trade Value (Rupiah) |
|-----|-----------------|-------------------|----------------------|
| 1   | Fresh fish      | 476.933           | 15,413,043.761       |
| 2   | Fresh shrimp    | 2,154.874         | 53,001,280.904       |
| 3   | Fresh cockles   | 2,483.465         | 12,613,518.735       |
| 4   | Fish paste      | 336.768           | 1,624,568.832        |
| 5   | Salted fish     | 943.292           | 3,550,551.088        |
| 6   | Salted fish     | 957.884           | 31,352,501.204       |
| Total|                | 7,353.216         | 117,555,464.52       |

Source: [8].

3.4 Pasir Limau Kapas District

The amount and trade value of fish for the local market in the Pasir Limau Kapas District is only two commodities, namely eco shrimp and fish meal with a total trade value of 315,679 Kg and a trade value of Rp 9,625,502,121. Consists of 226,172 Kg fresh eco prawns with a trade value of Rp. 9,076,734,704 and 89,507 Kg fish meal with a trade value of Rp. 548,767,417.

The total and overall trade value of fish for the inter-island market in the Pasir Limau Kapas District were 3,730,468 Kg and Rp. 40,927,509,447. The highest trade amount was salted fish, which was 2,149,567 Kg with a trade value of 16,704,285,157. The highest trade value is fresh fish, reaching Rp. 23,536,006,014. Meanwhile, the commodity with the lowest total and trade value is fresh form of eco shrimp, which is 89 Kg with a trade value of only Rp. 4,103,879 (Table 5).

Table 5. Total and trade value of Pasir Limau Kapas District fish in the inter-island market (2019).

| No. | Commodity       | Trade Amount (Kg) | Trade Value (Rupiah) |
|-----|-----------------|-------------------|----------------------|
| 1   | Fresh fish      | 1,524.254         | 23,536,006.014       |
| 2   | Fresh eco prawn | 89                | 4,103,879            |
| 3   | Salted fish     | 2,149.567         | 16,704,285.157       |
| 4   | Fish powder     | 11.979            | 33,960.465           |
| 5   | Salted jellyfish| 44.597            | 649,153.932          |
| Total|                | 3,730.468         | 40,927,509.447       |

Source: [8].
3.5 Sinaboi District
The total and overall trade value of fish in the local market in Sinaboi District are 58,410 Kg and Rp 1,353,330,000, respectively. The commodity with the highest trade amount is fresh fish, which is 25,740 Kg with a trade value of IDR 592,020,000. However, fresh fish is not a commodity with the highest trade value. The commodity with the highest trade value is processed fish with a trade value of Rp. 618,750,000. Meanwhile, the commodity with the lowest trade amount is shrimp in fresh form, which is 7,920 Kg with a trade value of Rp. 142,560,000 (Table 6).

Table 6. Total and trade value of fish in Sinaboi District in the local market in (2019).

| No. | Commodity     | Trade Amount (Kg) | Trade Value (Rp) |
|-----|---------------|-------------------|------------------|
| 1   | Fresh fish    | 25.740            | 592,020,000      |
| 2   | Fresh shrimp  | 7.920             | 142,560,000      |
| 3   | Salted fish   | 24.750            | 618,750,000      |
|     | Total         | 58.410            | 1,353,330,000    |

Source: [8].

The total and overall trade value of fish in the inter-island market in Sinaboi District are 904,357 Kg and Rp 20,787,567,000, respectively. The commodity that has the highest trade amount is shrimp in fresh form, which is 526,680 Kg with a Trade Value of Rp 6,846,840,000. However, the highest trade value is ekov shrimp with a trade value of Rp 9,110,784,000. Meanwhile, the commodity with the lowest trade amount is processed shrimp, which is 5,278 Kg with a trade value of Rp 269,178,000. The commodity with the lowest trade value is shellfish, with a trade value of only Rp. 148,500,000 (Table 7).

Table 7. Total and trade value of Sinaboi District fish in the inter-island market (2019).

| No. | Commodity   | Total Trade (Kg) | Trade Value (Rupiah) |
|-----|-------------|------------------|----------------------|
| 1   | Fresh fish  | 148.797          | 3,719,925,000        |
| 2   | Fresh shrimp| 526.680          | 6,846,840,000        |
| 3   | Fresh eco prawn | 142.356   | 9,110,784,000        |
| 4   | Fresh cockles| 14.850           | 148,500,000          |
| 5   | Salted fish | 18.018           | 450,450,000          |
| 6   | Dried shrimp| 5.278            | 269,178,000          |
| 7   | Fish powder | 48.378           | 241,890,000          |
|     | Total       | 904.357          | 20,787,567,000       |

Source: [8].

3.6 District Kubu Babussalam
The total and overall trade value of fish in the local market in the Kubu Babussalam District are 5,458,818 Kg and Rp 39,090,344,500, respectively. The highest total and trade value is salted fish, which is 2,821,035 Kg with a trade value of Rp 28,210,350,000. Meanwhile, the lowest trade amount is Lampung Fish, which is 37 Kg with a trade value of IDR 37,000,000. The lowest trade value is shrimp ash with a trade value of only Rp. 7,672,500 (Table 8).

Table 8. Total and trade value of fish in the Kubu Babussalam District in the local market (2019).

| No. | Commodity   | Total Trade (Kg) | Trade Value (Rupiah) |
|-----|-------------|------------------|----------------------|
| 1   | Fresh fish  | 362.241          | 3,622,410,000        |
| 2   | Salted fish | 2,821.035        | 28,210,350,000       |
| 3   | Trash fish  | 105.732          | 528,660,000          |
The total and overall fish trade value in the inter-island market in the Kubu Babussalam district is 3,390,424 Kg and Rp 22,885,325,000. The highest total and trade value is 2,862,338 kg of shrimp paste, with a trade value of Rp 18,605,197,000. Meanwhile, the commodity with the lowest total and trade value was shrimp ash, which was 27,720 Kg with a trade value of only Rp. 277,200.000 (Table 9).

**Table 9.** Total and trade value of fish in the Kubu Babussalam in the inter-island market (2019).

| No. | Commodity       | Total Trade (Kg) | Trade Value (Rupiah) |
|-----|-----------------|------------------|----------------------|
| 1   | Salted fish     | 500.366          | 4,002,928,000        |
| 2   | Fish paste      | 2,862.338        | 18,605,197,000       |
| 3   | Shrimp ash      | 27.720           | 277,200,000          |
|     | Total           | 3,390.424        | 22,885,325,000       |

Source: [8].

3.8 Rantau Kopar District
The total number and trade value of fish in the local market in the Rantau Kopar District are 7,734 Kg and Rp 323,402,000, respectively. The highest trade amount is fresh fish, which is 4,084 Kg with a trade value of Rp. 89,848,000. The highest trade value is salmon with a trade value of IDR 135,926,000. Meanwhile, the commodity with the lowest quantity and trade value is fresh shrimp, which is 223 Kg with a trade value of Rp. 24,084,000 (Table 10). The total number and trade value of fish in the inter-island market in the Rantau Kopar District are 9,901 Kg and Rp 141,189,000, respectively. Fresh fish as much as 3,416 Kg with a Trade Value of Rp. 66,612,000 and 6,485 Kg salted fish with a Trade Value of Rp. 74,577,500.

**Table 10.** Number and trade value of fish in the Rantau Kopar District in the local market (2019).

| No. | Commodity     | Total Trade (Kg) | Trade Value (Rupiah) |
|-----|---------------|------------------|----------------------|
| 1   | Fresh fish    | 4,084            | 89,848,000           |
| 2   | Fresh shrimp  | 223              | 24,084,000           |
| 3   | Salted fish   | 1,963            | 70,668,000           |
| 4   | Smoked fish   | 1,387            | 135,926,000          |
|     | Total         | 7,657            | 320,526,000          |

Source: [8].

4. Discussions

4.1 Processed Fish Potency
The amount and Trade Value of fresh fish and processed fish for the local market is 5,798,792 Kg, and the trade value reaches Rp. 74,007,884,382. The highest number and value for the local market comes from the Kubu Babussalam District with a trade amount of 4,381,564 Kg with a trade value of Rp. 37,418,556,560. Then followed by Bangko (1,255,894 Kg and Rp. 34,498,152,286), Pasir Limau Kapas (91,462 Kg and Rp. 503,406,848) and Sinaboi (62,480 Kg and Rp. 1,259,534,320). While the
The lowest amount and value of trade is in the Rantau Kopar District with a trade amount of 7,392 Kg, and a trade value of only Rp. 328,234,368 [8].

The highest total production and trade value in the inter-island market is in Bangko District with a trade amount of 7,174,817 Kg, and a trade value of Rp 107,457,234,209. Then followed by Kubu Babussalam (3,076,593 kg and Rp. 18,010,375,422), Pasir Limau Kapas (2,638,515 kg and Rp. 49,728,092,205) and Sinaboī (676,657 kg and Rp. 19,377,426,509). While the lowest amount and value of trade is in the Rantau Kopar District with a trade amount of 8,712 Kg, and a trade value of only Rp. 239,083,416.

This research shows that generally fish processing business is seasonal based on the abundance of raw materials. The processed products developed in Rokan Hilir Regency are salted fish, smoked fish, fish nuggets, fish balls, fish crackers, shrimp crackers, shrimp paste or belacan and others. Currently, the activities of processing and marketing fisheries are carried out by 49 groups of processors and marketers. In an effort to maximize fishery products and provide high economic value, it is necessary to process fishery products to obtain good quality and marketable products [10].

### 4.2 Processed Fish Center

Based on the volume and trade value for fresh fish and processed fish in Rokan Hilir Regency in 2019, there were 5 districts; Bangko, Pasir Limau Kapas, Sinaboī, Kubu Babussalam, and Rantau Kopar. Total and trade value for fresh fish and processed fish for local and inter-island markets in Bangko District as a whole amounted to 8,514,570 Kg. Then followed by Pasir Limau Kapas (4,046,147 Kg), Sinaboī (1,484,767 Kg), Kubu Babussalam (8,849,242 Kg) and Rantau Kopar (13,985 Kg).

The existence of centers for the production of these processed products is closely related to the location of catching and landing of caught fish. In addition, it is also influenced by access to transportation and the business location of these business owners. Until now, almost the landing centers are still relatively isolated and have not been connected to public transportation by road. This situation certainly affects the selling value and market absorption of the commodities produced [11]. Fishery products are products that quickly decay so that post-harvest handling of fish is one of the most important activities to maintain fish quality and increase fish consumption [12] for that it can be recommended that in the future the local government is more intense in fixing transportation to these fish processing centers.

### 4.3 Development Strategy and Prospects

The Fisheries Service of Rokan Hilir Regency has formulated a strategy and policy direction for fisheries development. Specifically in the processing and marketing sub-sector, there are at least two policy directions, namely 1) Increasing exports, developing the processing industry, and utilizing resources efficiently and effectively as well as increasing fishermen's income. 2) Increase product diversification and processing of fishery products, both through large-scale industry and household scale. This policy direction is considered appropriate considering the strategic role of the fisheries sector, more specifically the processing of fishery commodities in this area [13]. The allocation and priority scale policies should be proportional and in accordance with the importance of each development sector in a region [14]. This important role is increasingly felt considering the geographical position of the downstream Rokan Regency which is directly adjacent to neighboring Malaysia. Some ports have become ports of export and import of goods, especially fishery products.

If viewed from the point of view of commodity prices, salted fish is a processed fish product that is more prospective to be developed. The price of salted fish (Rp. 25,000/kg) is far above the price of other commodities such as shrimp paste, fish meal and rotten fish, which averagely costs Rp. 5,000/Kg. These three commodities are actually catches that are wasted because they have started to rot when they arrive at the fish landing or landing site [15]. In addition, there are certain species that have low economic value but are caught, so they can only be sold after being processed into these low-priced commodities [16]. Poor handling and the percentage of catches that have decayed by the time they reach the farm have been a story for a long time. For this reason, improving the handling process
will reduce the decay rate so that the caught fish can still be sold as fresh fish or processed into processed commodities with high economic value such as salted fish [15].

Fish meal is a commodity that has been known as a raw material for animal feed and fish pellets. The price is also relatively low, which is only around Rp. 5,000/Kg. But in fact, if it is designed from the start, for example by selecting the raw material, then fish meal can also be used as a source of protein in human food. For example, it is further processed into fish balls, shrimp balls, shrimp nuggets, fish nuggets, fish chips and so on. Changes in its function will increase the economic value of the commodity [17].

Fish filet is a processed fish commodity in the form of slices of fish meat that have been separated from the bones, head, tail, skin and other parts. These commodities are usually packaged and stored and marketed in frozen form. This conversion to fish fillet makes this commodity easier and more efficient in transportation, has a longer market reach, is more hygienic and has a higher price [18-19]. When viewed from the position of several fish production centers in Rokan Hilir Regency which are relatively far from consumers, then processing fresh fish into fish filets is a good alternative in the future.

Human resources are the key words for the development of a region. The development of the fish processing industry in this area will emphasize the preparation of skilled human resources. Both technically and in business management. This activity should always be prioritized and invite various parties and carry out business assistance on an ongoing basis.

5. Conclusions
The processed fish commodities in Rokan Hilir are; dried prawns, salted fish, prawn powder, fish meal, dried trash fish, fish lamps, shrimp paste and smoked fish. The center for producing fish is the district; Bangko, Pasir Limau Kapas, Sinaboi, Babussalam and Rantau Kopar. Processed fish products that are more prospective to be developed are shrimp flour, salted fish and smoked fish. The recommended development strategies include; training on resources and business management, providing stimulants and continuous guidance from the government and industry.

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