Study on the needs of tuna fish as raw material for macro scale fish processing industry in Banda Aceh

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Abstract. Aceh Province has a great potential fish resource, sustainable Potential on Capture Fisheries about 272,707 tons and total Capture Fishery Production is 208,200,830, moreover this potential has not been utilized optimally. The cached Fish at Koetaradja Fishing Port Banda Aceh are still abundant, so it is possible to be proceed industrially either at micro or macro scale. This study aims to examine the needs of the fishing industry in Aceh Province about the need of fish raw materials and to find out the type and amount of raw materials needed by a fish processing industry (macro scale) in Banda Aceh city. In addition, interviews and questionnaires were used as the instruments in collecting data. This research was conducted to five macro-scale fishery processing companies in Banda Aceh City there are PT. Aceh Samudera Bahari, PT. Aceh Lampulo Jaya Bahari, CV. Thunnus Saputra, PT. Sure Tuna Pacific and CV. Barakah Sumber Bahari. The results showed that there were 3 types of fish used as the processed raw materials, there are skipjack, tuna and kite fish. Skipjack tuna is the most fish needed by every processed industry. The need for fish raw materials at PT. Aceh Samudera Bahari requires skipjack tuna raw materials about 58,098 Kg/month (697,176 Kg/year), At PT. Aceh Lampulo Jaya Bahari requires the raw materials for skipjack tuna about 25,972 Kg/month (311,664 Kg/year), PT. Yakin Tuna Pasifik requires raw materials for skipjack tuna about 52,788 Kg/month (633,456 Kg/year), and CV. Barakah Sumber Bahari requires 20,498 Kg/month of skipjack fish raw materials (245,976 Kg/year). The total of all skipjack tuna raw materials needed by these 5 companies in one year is 3,205,224 Kg.

1. Introduction
These guidelines, written Aceh Province has a great potential fish resources with a Sustainable Potential on Capture Fisheries is 272,707 Tons, with a total Capture Fishery Production is about 208,200,830 Tons [1], moreover this potential has not been utilized optimally. The cached Fish at Koetaradja Fishing Port Banda Aceh are still abundant, so it is possible to be proceed industrially either at micro or macro scale. The fish processing industry can be carried out to increase the value added of fishery products so that it can help support the economic growth of the community in Banda Aceh City.
The fish catches data collected from the Directorate General of Monitoring of Marine Resources and Fisheries Lampulo [2, 3] in Banda Aceh City, the annual catch at the Koetaradja Ocean Fisheries Port in 2016 is 6,008,530 kg, in 2017 is 4,022,697 kg, in 2018 is 12,262,853 kg, in 2019 is 21,064,260 and in 2020 is 11,262,923 kg. The availability of raw materials for the fish processing industry is needed to anticipate the shortage of raw materials when the catch is small, in order to ensure the sustainable of the business because it affects on the amount of costs that must be incurred if the production process does not work.

The data about the need of raw materials is not known yet. According to [4] there are 6 macro-scale fish processing industries in Banda Aceh, so that the goal of this study is the need of the industrial raw materials. Therefore, it is necessary to analyze the raw material needs of a macro-scale fish processing industry to determine the needs of each industry [5-9]. The objective of this research are to identify the type of fish as raw material for the fisheries processing industry (macro scale); and to find out the amount of raw material needed by the fish processing industry (macro scale) in Banda Aceh City.

2. Materials and Method

2.1. Site and Time

This research was conducted in January 2020. The location of the research is the Fish Processing Unit (UPI) Macro Scale, Banda Aceh City. The map of the research location can be seen in Figure 1.

![Figure 1. Research location](image_url)

The data collection used in this study was a survey which was conducted directly in the field to find out the type and amount of raw materials needed for a fish processing industry (macro scale) in Banda Aceh city. In addition, interviews and questionnaires are used to some respondents using the direct observation method. The data for this research is divided into two parts, there are primary and secondary data. Primary data is collected directly in the field by the researcher. Secondary data were
obtained from the Aceh Maritime Affairs and Fisheries Service, the Aceh Marine Food Agriculture and Fisheries Service (DPPKP) and the Kutaraja PPS Regional Technical Unit (UPTD) Banda Aceh.

2.2. Data analysis
The data prediction model used is time series data. If the prediction model is based on monthly data, so monthly production must be available. Meanwhile, if it is based on annual data, annual time series data is required. The data obtained at the initial stage is displayed in a scatter model (data scattering pattern), then the justified distribution pattern or dynamics is used to find the right formula related to time. The chosen formula used the lowest bias and the strongest correlation, and then the obtained model used to show the growth of raw material needs according to time [10].

3. Results and Discussion
Based on the research conducted in the field, the researcher obtained the fish raw materials data from 5 companies in Banda Aceh City. Each of these companies, there are PT. Aceh Samudera Bahari, PT. Aceh Lampulo Jaya Bahari, CV. Thunnus Saputra, PT. Sure Tuna Pacific and CV. Barakah Sumber Bahari. These companies produce various types of processed fisheries such as shredded fish, wood fish, tuna loin and frozen fish with the main raw materials including skipjack, tuna and kite fish as shown in Table 1.

| Table 1. Types of products and fish production raw materials |
|---------------------------------------------------------------|
| No | Company name                      | Types of products | Fish Type |
|----|-----------------------------------|-------------------|-----------|
| 1  | PT. Aceh Ocean Bahari            | X                 | X         |
| 2  | PT. Aceh Lampulo Jaya Bahari     | ü                 | ü         |
| 3  | CV. Thunnus Saputra              | ü                 | ü         |
| 4  | PT. Sure Pacific Tuna            | X                 | ü         |
| 5  | CV. Blessings of Marine Resources| X                 | ü         |

The need of fish raw materials every month at each company is different and can be seen in tables 4.2 and 4.3. The need for fish raw materials differs based on the size of the company. Apart from these factors, which affects the amount of raw materials needed by each company depends on the marketing of fish processing products [11, 12].

| Table 2. The need for fish raw materials per month |
|---------------------------------------------------|
| No | Company name                      | Raw Material per month (kg) |
|----|-----------------------------------|----------------------------|
|    |                                   | Skipjack | Tuna | kite |
| 1  | PT. Aceh Ocean Bahari            | 58,098   | 380  | 240  |
| 2  | PT. Aceh Lampulo Jaya Bahari     | 109,746  | 600  | 520  |
| 3  | CV. Thunnus Saputra              | 25,972   | 150  | 0    |
| 4  | PT. Sure Pacific Tuna            | 52,788   | 200  | 130  |
| 5  | CV. Blessings of Marine Resources| 20,498   | 0    | 215  |
| Total|                                   | 267,102  | 1,330| 1,105|
Table 3. Fish raw material needs per year

| No | Company name                        | Raw Material per year (kg) |
|----|-------------------------------------|---------------------------|
|    |                                     | Skipjack | Tuna  | kite  |
| 1  | PT. Aceh Ocean Bahari               | 697,176  | 4,560 | 2,880 |
| 2  | PT. Aceh Lampulo Jaya Bahari       | 1,316,952| 7,200 | 6,240 |
| 3  | CV. Thunnus Saputra                 | 311,664  | 1,800 | 0     |
| 4  | PT. Sure Pacific Tuna               | 633,456  | 2,400 | 1,560 |
| 5  | CV. Blessings of Marine Resources   | 245,976  | 0     | 2,580 |
|    | Total                               | 3,205,224| 15,960| 13,260|

The need for fish raw materials graph for each fishing industry company in Banda Aceh City can be seen in Figure 4.1 to find out the level of production of fishery raw materials.

The study of the need of fish raw materials is a study that discusses about the availability of fish catches as the main raw material in a fishery production, either in macro or micro production [13]. The results of the observations from table 4.2 and table 4.3 can be seen that PT. Aceh Samudera Bahari requires 58,098 Kg/month of skipjack tuna fish (697,176 Kg/year), 380 Kg/year of tuna (4,560 Kg/year) and 240 Kg/year of scad fish (2,880 Kg/year). At PT. Aceh Lampulo Jaya Bahari requires raw materials for skipjack tuna is 109,746 Kg/month (1,316,952 Kg/year), tuna fish of 600 Kg/month (7,200 Kg/year) and scad fish is 520 Kg/month (6,240 Kg/year). CV. Thunnus Saputra needs raw materials for skipjack tuna about 25,972 Kg/month (311,664 Kg/year), tuna fish is 150 Kg/month (1,800 Kg/year) and do not use scad fish.

PT. Yakin Pacific Tuna requires skipjack tuna about 52,788 Kg/month (633,456 Kg/year), tuna fish at 200 Kg/month (2,400 Kg/year) and scad fish at 130 Kg/month (1,560 Kg/year) and CV. Barakah Sumber Bahari requires skipjack tuna as raw material about 20,498 Kg/month (245,976 Kg/year), scad fish about 215 Kg/month (2,580 Kg/year) and does not use tuna as raw material for processed products. The total needed of all skipjack raw materials by the 5 companies in one year is 3,205,224 Kg/year, the need for tuna in one year is 15,960 Kg/year and the need for scad fish is 13,260 Kg/year.
4. Conclusions

The conclusions obtained from this research are as follows:
1. The main types of products found in the micro-scale industry in Banda Aceh City are shredded fish, wooden fish, tuna loin and frozen fish with raw materials including skipjack, tuna and scad.
2. The total needed of raw material for skipjack tuna every month is 267,102 Kg, tuna fish is 1,330 Kg and scad fish is 1,105 Kg. For the total needs each year, raw materials for skipjack tuna are 3,205,224 Kg, tuna fish for 15,960 Kg and kite fish for 13,260 Kg.

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