



# Strategy for development of fishery products processing industry in Rembang Regency, Indonesia

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**Abstract.** The potential of coastal and marine resources in Rembang Regency is enormous, especially fish, in improving the community's welfare and encouraging the movement of the regional economy. However, the magnitude of these resources has not had a real impact on improving the community's welfare, in line with the high level of poverty, one of which surged coastal communities. For this reason, it is necessary to increase the added value of fish commodities by developing the fish processing industry. This study aims to develop a strategy for developing a fishery product processing industry in Rembang Regency. The method of analysis used descriptive analysis and analysis of Strengths, Weaknesses, Opportunities, and Threats. The study's results produced several strategies needed for the development of the industry, namely strategies for strengthening human resources and production processes, strategies for institutional strengthening, strategies for integrating supply and marketing networks, and strategies for product development and innovation.

**Key Words:** competitiveness, downstream fishery products, regional prestige, SWOT.

**Introduction.** Rembang Regency is one of the regencies and municipalities in Central Java Province that has great potential in developing the fisheries sub-sector. The potential can be seen at least from the geographical conditions of the regency, such as a sea area reaching 442.80 km<sup>2</sup>, with a coastline of 61.50 km (the longest coastline among regencies and municipalities in Central Java Province). The conditions firmly support the development of capture fisheries, mainly marine fisheries (BPS 2020; Wijayanto et al 2020; Ayuningrum & Purnaweni 2020). In addition, the regency has a coastal area of 35% of the total area of the regency (Matitaputty 2013), creating it very conducive to the development of aquaculture, especially brackish aquaculture. However, due to the enormous potential of marine and fishery resources above, it turns out that the regency is dealing with a high level of poverty. Based on BPS (2021), the poverty rate in the regency in 2020 is 15.60%, higher than the Central Java Province and national poverty rates of 11.41% and 9.78%, respectively. Most of the poor people in the regency live in coastal areas (Matitaputty 2013).

To improve the welfare of the people of Rembang Regency, especially in coastal areas, it is necessary to accelerate the development of the processing industry sector based on local resources through the downstream fishery products. The downstream efforts aim to increase the added value of fishery products, strengthen the regional industrial structure, increase business opportunities, and provide more employment opportunities in the region. One of the efforts to strengthen the fishery product processing industry in Rembang Regency requires a study to formulate some strategies for developing the industry.

Several other researchers have studied the fisheries sector's development in the Rembang Regency. However, based on the literature track, there have been no reports of studies concerning formulating strategies for developing fishery product processing industries in a macro-regional context and coverage. The studies that have been carried

out discuss planning for developing the marine fisheries sub-sector through identifying commodities and regions, each based on comparative and competitive advantages and completeness of infrastructure (Ameriyani 2014). Meanwhile, Lubis et al (2019) analyzed the need for fish raw materials for a fish processing industry supplied from one of the fish auction sites in the Rembang Regency. Rikah et al (2020) examined efforts to empower fish processing business groups in a village in the regency. Nurhidayati & Maslichan (2015) and Nurhidayati & Rikah (2016) elaborated on the effectiveness and partnership strategies between business actors in processing a fish product in the regency. Khairushubhi et al (2017) explained distribution channels, marketing margins, and profits obtained by business actors from a fishery product supplied from a fish auction site in Rembang Regency. Adhitama (2018) discussed the strategy for developing a particular fish product processing business in a village in Rembang Regency. The present study aims to develop a strategy for developing a fishery product processing industry in Rembang Regency.

## Material and Method

**Overview of study location.** The study is located in Rembang Regency, Central Java Province, Indonesia. Geographically, Rembang Regency stands between 6°30' and 7°06' South Latitude and 111°00'–111°30' East Longitude. This regency has an area of 101,408 ha. The amount of 46.39% of the area of Rembang Regency is lowland, located in the northern part. Meanwhile, in the southern part, it is relatively higher. The area in the southern part has an altitude between 100 and 500 meters above sea level (30.42% of the total area of the regency). The rest are at 0-25 m and 500-1000 m. Administratively, Rembang Regency includes 14 sub-districts, six of which are found in coastal areas, namely Kaliore, Rembang, Lasem, Sluke, Kragan, and Sarang sub-districts. In 2021, this regency's population was projected to reach more than 647 thousand people. In 2020, 39.35% of the population worked in the tertiary sector, while 38.55% worked in the primary sector. The rest, 22.10%, worked in the secondary sector (BPS 2022a).

**Data collection.** The study relies on the collection of secondary data sourced from the study results from the Ministry of Industrial Affairs regarding the preparation of regional industry core competencies, the Statistics Indonesia, and related literature searches.

**Analysis.** The study employs descriptive analysis and analysis of Strengths, Weaknesses, Opportunities, and Threats (SWOT). The use of descriptive analysis aims to describe the condition of the fish processing industry in the Rembang Regency. Meanwhile, SWOT analysis is utilized to summarize several problems faced in the development of the fish processing industry in the regency, based on internal factors (strengths and weaknesses) and external factors (opportunities and threats). In the end, the results of these two analyzes are employed as input to develop a strategy for developing a fishery product processing industry in Rembang Regency.

## Results and Discussion

**An overview of the fish processing industry in Rembang Regency.** Based on BPS (2018a), the number of fish processing industries in the Rembang Regency was 2,740 in 2017. The majority of these industries were engaged in drying/salting (970 units), smoking (580 units), and pindang processing (535 units). Pindang is a traditional fish processed by Asian people, especially Indonesian people, through processing and preserving fish by combining boiling (cooking) and salting. Most fish processing industries in the regency were traditional (Soebandriyo 2015). The total industrial production quantity reached 193,909 tons, with a production value of almost Rp 1.89 trillion in the same year. The most significant production quantity was provided by drying/salting businesses 84,448 tons, pindang processing 54,479 tons, and freezing 33,939 tons, with each contributing 43.55%, 28.10%, and 17.50% respectively. However, based on the production value, the pindang processing business occupied an enormous value reaching 735.47 billion IDR, followed by the drying/salting business at 489.80 billion IDR, and the

freezing business at 390.30 billion IDR. These businesses created the contributions were 38.96%, 25.94%, and 20.67%, respectively (BPS 2018b).

The fish processing industry not only plays a role in increasing the added value of the fish caught but also in the absorption of labor in a region. According to BPS (2018a), the number of workers in the industry reached 21,584 in 2017. The business fields that create the most job opportunities in the industry were drying/salting businesses (11,029 people), pindang processing (5,237 people), and smoking (1,176 people). However, based on the ratio of workers per unit, the business fields that absorb most workers were freezing and surimi businesses, with 40 to 41 workers per industrial unit.

In outline, there were three types of fish processing industries in the Rembang Regency. The first type was a small-scale home-based industry, with business fields including pindang processing and smoking. The second type was a small and medium-scale industry that used slightly more modern machines and equipment compared to the first type of industry. The third type was large-scale industry, which operated a lot of equipment and is relatively modern, with business fields such as freezing and canning.

The first industrial-type production equipment was still simple, did not have good business management, and did not even have standard operating procedures for sanitation (SSOP) and good manufacturing practices (GMP). SSOP is applied to prevent contamination of processed products while at the same time supporting the achievement of cleaner production. Meanwhile, GMP is also a consumer requirement for producers to create quality and safe products for consumption. The second type of industry already had good business management but had not implemented SSOP and GMP. Finally, the third type of industry already had good business management and had implemented SSOP and GMP.

Concerning marketing, there are two patterns of industry people when marketing their products: direct marketing and through intermediaries. The industry people of small-scale household-based such as pindang processing and smoking products were marketed directly to consumers. Company owners in the industry played an essential role in the company's operational activities, especially sales. The owner looked for orders, made sales, served customers, and even delivered products. These industry's products could only enter traditional markets that did not pay lookout to product standards. In addition, the industry's products were marketed through intermediary traders to be further marketed in traditional markets.

Meanwhile, the marketing pattern of the more significant industry was carried out through intermediaries by cooperating with the established business person (distributors). The industry's product has reached markets outside the Rembang Regency area and overseas. However, the industry people had not been able to manage the marketing of their products directly. They generally send their products to distributors in great cities such as Surabaya, and then the distributors export the products with other better labels and packaging.

Another obstacle to limited efforts to market the industry's product was that there were still industries that did not yet have distribution permits and halal certification. The industry must have the distribution permit from the Food and Drug Supervisory Agency (BPOM) and the Home Industry Food Production Certificate (SPP-IRT) issued by the Rembang Regency Health Office. Meanwhile, halal certification issued by the Indonesian Ulema Council (MUI) is required to declare the halalness of a product following Islamic sharia (Kemenperin 2013).

***The urgency of developing the industry.*** The economy of Rembang Regency relies on two sectors, namely the agricultural and manufacturing industry. It is indicated through the contribution of these sectors to the gross regional domestic product in 2020 of 25.87% and 23.34%, respectively. The fisheries sub-sector assists 6.27% of the agricultural sector's contribution (BPS 2022a). Based on the data above, developing a fish resource-based industry can potentially work because it provides a reasonably high added value (Wijayanto et al 2019; Wicaksana et al 2022).

In addition, the development of the fish processing industry has an impact on increasing regional prestige and competitiveness and raising high local attributes,

considering that Rembang Regency is famous for its fishery products. These industrial development efforts have received high support from stakeholders, particularly government and community support (Kemenperin 2015; Yusuf et al 2018; Yusuf et al 2021).

The availability of fish raw materials, particularly those sourced from capture fisheries activities, and facilities to accommodate marine fish catches from other areas have supported efforts to develop the fish processing industry in Rembang Regency. The regency has one fishing port and ten fish auction sites, with a total marine fishery production reaching more than 111,721 tons in 2020. This amount of production is the second largest in Central Java Province, after the Pati Regency of 118,002 tons (BPS 2022b; Nurnaini et al 2019; Yusuf & Suyanto 2019; Wijayanto et al 2021).

The fish processing industry in Rembang Regency has integration from upstream to downstream and is supported by leading industries. The upstream industry is related to the shipping industry that fishing activities at sea need fishing vessels. The shipping industry has become the leading industry of Rembang Regency. Meanwhile, downstream, the salt processing industry, also the leading industry of Rembang Regency, has a link in the supply of salt raw materials for fish processing activities. In addition, upstream-downstream linkages regarding labor absorption, that the development of the fish processing industry will provide job continuity for workers in the upstream sector to more than 25,200 fishermen (BPS 2019).

Institutionally, fish processing industry people in Rembang Regency have formed business groups, among other industry people group of smoking businesses in Rembang Regency (Rikah et al 2020). The formation of the group's roles as a solidarity forum for the industry people to solve their business problems independently. Efforts to solve problems in groups are pursued, among others, through learning interactions, exchange of experiences, cooperation between industry players, and technology and innovation adoption.

Efforts to develop the fish processing industry in this regency have been supported by the availability of infrastructure, including road access and adequate electricity supply (BPS 2022a). A road network's availability can facilitate transportation and distribution access, both for supplying raw materials and sending finished products to customers. Meanwhile, the existence of the Steam Power Plant (PLTU) of Rembang is expected to guarantee electricity supply for industries, including the fish processing industry.

**The industry development strategy.** According to the description above, various things can be summarized about the strengths, weaknesses, opportunities, and threats faced in the development of the industry using a SWOT analysis (Table 1). Theoretically, the SWOT matrix describes various opportunities and threats from the company's external environment that are anticipated with its strengths and weaknesses. The SWOT matrix can simplify the formulation various strategies (Rangkuti 2008).

Table 1  
SWOT matrix on the development of the fish processing industry in Rembang Regency

<i>Strengths (S)</i>	<i>Weaknesses (W)</i>
Natural resources and infrastructure: - availability of abundant fish raw materials, mainly sourced from 10 fish auction sites in 5 sub-districts, which can receive fish supplies from other areas; - availability of road network and port support the continuous supply of raw materials and product distribution; - availability of adequate electricity supply through PLTU Rembang can ensure the continued running of production activities.	Process and marketing: - industry people have not noticed the cleaner production concept because they have not implemented SSOP and GMP; - the marketing of the products of some of these industries has not been able to reach a broader market because they do not have distribution permits and halal certificates.

Human resources: - industry people can process fish; - industry people have formed business groups so that they can support business independence.	Human resources: - knowledge and understanding of industry people regarding the concept of cleaner production and the urgency of implementing SSOP and GMP are still lacking; - the ability of industry people to penetrate the market is still lacking because they only rely on traditional markets.
Profitability: - the industry business activity has been running sustainably and absorbs many workers.	
<i>Opportunities (O)</i>	<i>Threats (T)</i>
Market: - high market demand for the industry product, both for the domestic market (especially from large cities such as Jakarta, Semarang, and Surabaya) and the international market.	Market: - there is market competition with the same industry people from other regions.
Policy: - the industry has received attention and support from the central and local governments through several policies to increase the added value of fish commodities.	

Following the matrix above, various strategies are formulated to pursue opportunities with existing strengths and improve weaknesses to seize opportunities. Furthermore, various strategies are developed to prevent weaknesses from external threats and use strengths to reduce threats (Table 2).

Table 2  
The strategies for fish processing industry development in Rembang Regency

<i>Strength – Opportunity (S-O)</i>	<i>Strength – Threat (S-T)</i>
Supply and marketing network integration strategy: - utilizing many available raw materials to meet the demand for processed fish in the domestic and international markets; - develop the existing fish processing industry by streamlining promotional agencies, and marketing personnel, through cooperation between entrepreneurs and the government to enter domestic and international markets.	Developing products and innovation strategy: - utilizing the potential of available raw materials and creating products that meet national standards to succeed in the market competition with other regions.
<i>Weaknesses – Opportunities (W-O)</i>	<i>Weaknesses – Threats (W-T)</i>
Strategy for strengthening human resources and production processes: - guide industry people to increase awareness of cleaner production.	Strategy for strengthening human resources and production processes: - improve processing and managerial capabilities for certain industry people to compete with other regions.
Institutional strengthening strategy: - provide institutional assistance for certain industrial people (mainly household and small scale) to meet the requirements (distribution permits and halal certificate) so that they afford to penetrate the modern market.	

**Conclusions.** The study delivers the strategies needed for developing the fish processing industry in Rembang Regency. These strategies are (1) strengthening human resources and production processes, (2) strengthening institutions, (3) integrating supply and marketing networks, and (4) developing products and innovation. The various strategies above are applied to increase the competitiveness of industries and regions. Suggestions for further research, the study can develop strategic priorities that must be executed first and, most notably, by stakeholders so that these strategies can implement effectively.

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**Conflict of interest.** The authors declare that there is no conflict of interest.

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