

Fish marketing analysis in Karimunjawa Islands

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Abstract. This research analyzed the distribution and marketing margin of fish trade on Karimunjawa Island from July to August 2024. Interviews were conducted with 100 fishermen and 30 fish traders and fish processors. The results showed that business actors involved in the fish trade on Karimunjawa Island include fishermen, fish wholesalers, fish retailers, fish processors, culinary business actors and fish traders from outside Karimunjawa Island. Fish commodities caught by fishermen on Karimunjawa Island are sold to local consumers, tourists, and consumers from outside Karimunjawa Island. The average BEP of fish commodities on Karimunjawa Island per kg (wet) reached IDR 16,832 for fishermen, IDR 20,679 per kg (wet) for wholesalers, IDR 21,223 per kg (wet) for retailers, and IDR 46,279 per kg (dry) for dried fish processors and traders. The marketing margins were IDR 4,416 per kg (wet) for fishermen, IDR 2,296 per kg (wet) for wholesalers, IDR 3,755 per kg (wet) for retailers, and IDR 14,261 per kg (dry) for dried fish processors and traders.

Key Words: break-even point, distribution channels, marketing margin, profit, Karimunjawa Islands.

Introduction. The effectiveness of fish commodity marketing affects the sales, profits, and welfare of fishery business actors, including in the Karimunjawa Islands. Effective fish marketing strategy should be applied to catch up with the development in the global marine and fisheries sector (Pokhrel & Thapa 2007; Advani et al 2024).

The Karimunjawa Islands consist of 27 islands located at coordinates 5°40'39" to 5°55'00" South Latitude and 110°05'57" to 110°31'15" East Longitude (BTNKJ 2019; Wijayanto et al 2022; Wibowo et al 2023). Karimunjawa Islands has been designated as a marine conservation area since 1986. Karimunjawa Island is the largest island that serves as the centers of the government and economic activities in the islands.

The local people in Karimunjawa Islands have occupied the islands for generations prior to the designation of Karimunjawa Islands as a marine conservation area (Wibowo et al 2022; Wijayanto et al 2022). The community welfare is one of the indicators of the success of marine conservation programs (Yuliana et al 2016; Rakotonarivo et al 2017; Newing et al 2024). In the context of Karimunjawa Islands, the effectiveness of fish marketing is essential as it determines the economic welfare of local people, which positively affects the success of the conservation program in the Karimunjawa Islands. The purpose of this study was to analyze the distribution and marketing margin of fish trade in Karimunjawa Islands.

Material and Method

Location and time of research. This research was conducted from July to August 2024 at sites located on Karimunjawa Island as shown in Figure 1.

Interview. Based on the results of the interviews with 100 fishermen, there are some common fishing gear used by fishermen that include hand lines, traps, and spears. The interviews conducted with 30 people fish traders and fish processors also revealed the data

related to the investment costs, maintenance costs, operational costs, and administration costs of their business.

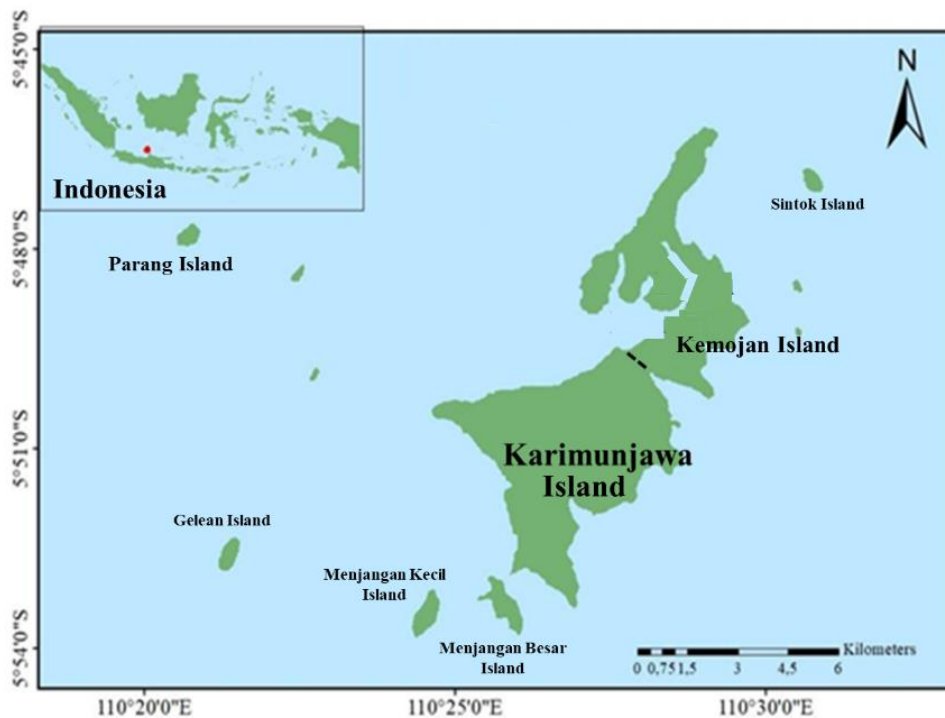


Figure 1. Research site.

Data analysis. The variables of this study include profit, break-even point, and marketing margin. The following formulas were used (Wijayanto et al 2020; Perdana et al 2021; Indriyani et al 2022):

$$\Pi = TR - TC \quad (1)$$

$$BEP = TC / Q \quad (2)$$

$$MM = PC - BEP \quad (3)$$

In this context, Π represents profit (IDR), TR denotes total revenue (IDR), and TC refers to total cost (IDR). The break-even point (BEP) is expressed in IDR per unit of production. Q is the quantity produced, measured in wet kilograms for fishermen and fresh fish traders, and in dry kilograms for dried fish processors. MM represents the marketing margin, calculated in IDR per kg wet (for fishermen and fresh fish traders) or IDR per kg dry (for dried fish processors). Finally, PC is the selling price from the producer to the consumer measured in IDR per kg (either wet or dry, depending on the product type).

Results

Respondent profile. The data of the respondents in this research are shown in Table 1. Most of the respondents have low education (63% elementary school graduates, and 12% did not graduate from elementary school). The Javanese ethnic group dominates by 95%, followed by other ethnic groups; namely the Bajo, Banjar, Betawi, Buton, Bugis, Madura, and Sundanese. The average age of respondents is 46 years, and there is a tendency for the younger generation to be reluctant to work as fishermen and fishery business.

The local people in Karimunjawa Islands are known for their strong maritime traditions. As mentioned by other researchers, it is difficult for fishermen to change professions due to their limited skills. On the other hand, respondents did not want their descendants to work in the fisheries business (Agimass & Mekonnen 2011; Wu et al 2023; Wibowo et al 2022; Wijayanto et al 2022, 2023).

Table 1

Respondents' characteristics

Category	Value
<i>Profession (%)</i>	
- fisherman	77
- fish trader (wholesaler)	8
- fish trader (retailer)	2
- fish culinary seller	7
- dried fish processor and trader	6
<i>Age (years)</i>	
- minimum	21
- maximum	67
- average	46
<i>Education (%)</i>	
- did not graduate from elementary school	12
- graduated from elementary school	63
- graduated from junior high school	16
- graduated from high school	8
- bachelor's degree	1
<i>Ethnicity (%)</i>	
- Javanese	95
- non-Javanese (Bajo, Banjar, Betawi, Buton, Bugis, Madura, Sundanese)	5

Distribution channels. There are several actors in the fish trade on Karimunjawa Island, including fishermen, fish traders (wholesalers), fish traders (retailers), dried fish processors, and fish culinary traders with target markets being local consumers and tourists (final consumers), as well as fish traders outside the island (intermediate consumers). The fish distribution pattern is presented in Figure 2.

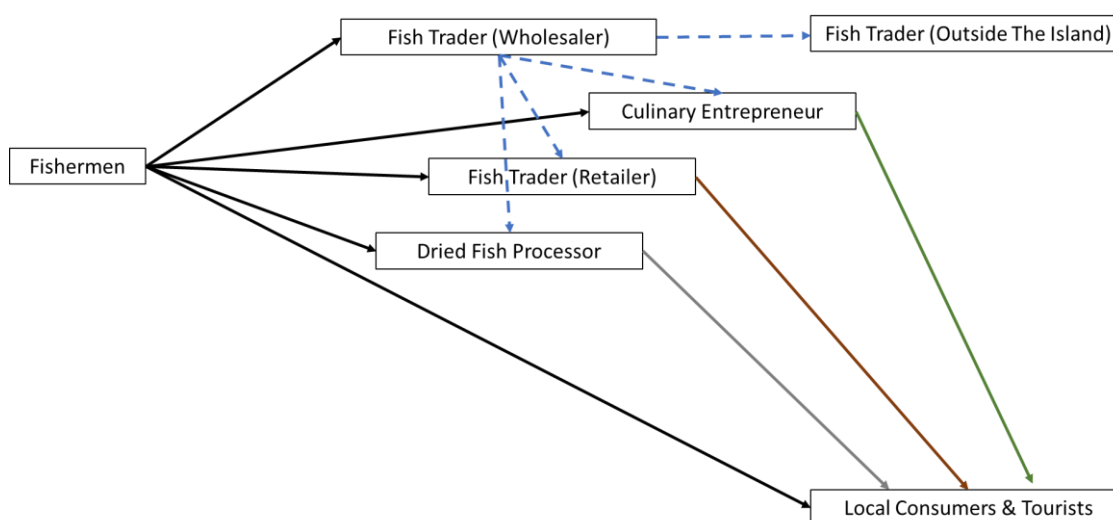


Figure 2. Fish distribution patterns on Karimunjawa Islands.

Distribution channels refer to the business networks through which commodities passed from producers to final consumers. For many commodities, including fish, final consumers cannot make direct purchase from producers due to geographical constraints. The limited resources available to producers also prevent them from selling goods directly to consumers, despite their desire for the goods to reach consumers in good condition and on time. This logistical and resource-related gap requires intermediaries in the distribution process. Distribution channels need to be managed to ensure food safety, prevent fraud, and increase efficiency (Kotler & Armstrong 2018; Alwi et al 2024). Micro and small

business actors need institutional strengthening, including in marketing in order to solve the problems collectively. An effective marketing chain affects the ability to meet demand and maintain product quality (Pokhrel & Thapa 2007; Mirera et al 2023).

BEP, marketing margin and profit. The results of BEP, MM and profit analyses are shown in Table 2. Some aquatic commodities traded on Karimunjawa Island include narrow-barred Spanish mackerel (*Scomberomorus* sp.), trevally (*Platycaranx* sp.), red snapper (*Lutjanus* sp.), grouper (*Epinephelus* sp.), bullet tuna (*Auxis rochei*), kawakawa (*Euthynnus affinis*), redbelly yellowtail fusilier (*Caesio cuning*), parrotfish (*Scarus* sp.), mackerel (*Rastrelliger* sp.), scad (*Selar* sp.), spinefoot (*Siganus* sp.), and squid (*Loligo* sp.) with different economic values. The price of fish is also influenced by location, season/time, stock, size of fish quality, and the sales process. Consumer preferences for fish are influenced by taste, price, and quality (Guillen & Maynou 2015; Samy-Kamal et al 2015; Shimose et al 2019). At the time of this study, fish prices on Karimunjawa Island varied by species: narrow-barred Spanish mackerel - IDR 50,000 to 60,000/kg, red snapper - IDR 55,000 to 65,000 per kg, squid - IDR 55,000 to 60,000 per kg, grouper - IDR 25,000 to 30,000 per kg, redbelly yellowtail fusilier - IDR 19,000 to 21,000 per kg, spinefoot fish - IDR 25,000 to 27,000 per kg, trevally, bullet tuna, and kawakawa - IDR 15,000 to 20,000 per kg, and parrotfish - IDR 18,000 to 20,000 per kg. Fishermen's catch is multispecies, influenced by fishing gear and seasonal factors.

Table 2

BEP, marketing margin and profit

Type of actor	Average sales (IDR per year)	Average BEP (IDR per kg)	Average marketing margin (IDR per kg)	Average income (IDR per month)
Fishermen	202,285,514	16,832*	4,416*	3,759,406
Fish wholesalers	1,335,437,500	20,679*	2,296*	11,122,104
Fish retailers	335,950,000	21,223*	3,755*	4,208,866
Dried fish processors and traders	296,400,000	46,279**	14,261**	5,818,333
Culinary entrepreneur***	1,305,470,833			4,170,833

Note: *wet weight; **dry weight; ***types of dishes are not only based on fish.

Discussion. Karimunjawa Island is a village within Karimunjawa Islands sub-district in Jepara Regency (BTNKJ 2019; Wijayanto et al 2022). Fishermen are the main profession of the Karimunjawa population. Fishermen in Karimunjawa predominantly use handline fishing gear. Other fishing gear used include: gill nets, traps, and trammel nets. The fishermen in Karimunjawa Islands use small boats measuring 6 to 17 meters long with 16-23 HP outboard motor (Wijayanto et al 2023; BPS-Statistics of Jepara Regency 2024). This study found that fishermen's average monthly income is IDR 3,759,406, while Wibowo et al (2022) reported an average income of IDR 2,840,000. For comparison, the 2024 minimum wage in Jepara Regency is IDR 2,450,915. The high quality of fish and strong demand from tourists for fish cuisine positively influence fish prices, which, in turn, boosts fishermen's income.

The increase in tourist visits to Karimunjawa is followed by an increase in the demand for fish commodity. Tourism has also driven the development of infrastructure in Karimunjawa, including transportation, communication, electricity, clean water, and other public facilities. The tourism industry also expands the employment opportunities for the surrounding community (Kautsary 2017; Putro et al 2020; Setiyanto et al 2024). At the same time, fishermen's catch on Karimunjawa Island directly impacts the performance of fish traders, processors, and culinary businesses. This interdependent business chain is well understood by fisheries stakeholders on the island. The average BEP of fishing businesses on Karimunjawa Island is IDR 16,832 per kg (wet). The BEP value varies depending on the type of fishing gear, target fish and business scale. The largest cost components are operational costs (average 49% of total costs) and labor costs (average 44%). Meanwhile, the largest operational cost component is on the diesel fuel (average

58% of operational costs). Diesel fuel is a fossil fuel that is high in price yet unrenowable. Therefore, the development of engine technology using renewable and more environmentally friendly energy is crucial, such as using solar energy. Unfortunately, solar-powered boat engine technology has not yet been developed in Indonesia.

The BEP value tends to increase as the chain of business actors increases. Short distribution chains appears more efficient yet it has lower economic multiplier effects. In areas that rely on capture fisheries, changes in fishing activities can affect the economic activities of the area (Jacobsen et al 2014; Shimose et al 2019; Indriyani et al 2022; Mirera et al 2023; Seung & Waters 2024). In Karimunjawa Islands, fishermen sell their fish catch to fish traders (wholesalers), which are then purchased by fish traders (retailers), culinary entrepreneurs, or dried fish processors to be eventually sold to end consumers. Fish traders (retailers), culinary entrepreneurs, dried fish processors, local consumers, and tourists can also buy fish directly from fishermen. Consumer preferences and fish selling prices at the producer level are influenced by fish type, taste, size, freshness, and seasonality. The seafood supply chain is an important factor in food security, where effective seafood marketing strategy can shorten the gap between producers and consumers. Improved welfare of fisheries stakeholders can foster greater awareness of ethical and moral practices (Mirera et al 2023; Solgaard et al 2023; Advani et al 2024).

Fishermen's MM tend to be larger than fresh fish traders (wholesalers and retailers). However, the turnover of fish wholesalers is significantly larger than the turnover of fishermen as affected by different scales of the business. Larger business scales generate greater potential profit. The BEP and MM for fresh and dried fish cannot be directly compared due to the weight loss associated with dried fish products that reaches approximately 31%. Additionally, the catch of fishermen is influenced by the condition of fish resource stocks and the health of the aquatic environment, including coral reef, seagrass, and mangrove ecosystems. Environmental conditions have a positive relationship with the condition of fish resource stocks (UN 2013; Chandran et al 2023). Therefore, the success of marine conservation and fishing practices affects the catch of fishermen on Karimunjawa Island. Fishermen's compliance is an important factor in successful marine conservation programs in the Karimunjawa Islands.

In the conservation management, local fishermen actively help monitor and send report to BTNKJ (as conservation area manager) when they encounter vessels coming from outside Karimunjawa. External fishermen often use mini trawls and purse seines that cause coral reef destruction (Wijayanto et al 2020, 2021, 2022). Local people also report to BTNKJ if they find shipwrecks on coral reefs. The awareness of local people to participate in conservation in the Karimunjawa Islands is a valuable social capital that supports the success of conservation programs (Wijayanto et al 2020, 2021; Purnomo et al 2022; Setiyanto et al 2023).

Prior researchers have noticed the strong awareness of the local Karimunjawa population regarding the importance of the aquatic environment for their lives. They also show strong support to the marine conservation programs (Lukman et al 2022; Azzahra et al 2023; Setiyanto et al 2023, 2024). Various stakeholders have interests in the development of the Karimunjawa Islands, resulting in a complexity in development of the region (Putro et al 2016; Kennedy et al 2020; Prihantono et al 2021; Wibowo et al 2022; Zharif et al 2022). Marine conservation does not only affects fish production but also influences tourism activities. As the Karimunjawa Islands have become a tourist destination for both domestic and international visitors, fishing remains the predominant occupation yet more diverse employment options are available. Some fishermen even work two different jobs as fishermen and tourism service providers. This diversification is important in improving the welfare of fishermen, which indirectly affects the conservation programs (Wijayanto et al 2020; Wibowo et al 2022). The development of fisheries infrastructure is essential to the welfare of fisheries business actors. Wijayanto et al (2022) urged the need for the development of fishing ports, ship docking facilities, and fish marketing facilities for more effective outcomes.

Conclusions. Several business actors are involved in fish trade on Karimunjawa Islands, including fishermen, fish wholesalers, fish retailers, fish processors, culinary business

actors and fish traders from outside Karimunjawa Island. Karimunjawa Island fish commodities are consumed by local consumers, tourists, and consumers outside the island. The average break-even point for fish commodities on Karimunjawa Island are as follows: IDR 16,832 per kg (wet) for fishermen, IDR 20,679 per kg (wet) for fish wholesalers, IDR 21,223 per kg (wet) for fish retailers, and IDR 46,279 per kg (dry) for dried fish processors. In terms of marketing margins, fishermen have a margin of IDR 4,416 per kg (wet), fish wholesalers have IDR 2,296 per kg (wet), fish retailers have IDR 3,755 per kg (wet), and dried fish processors have a margin of IDR 14,261 per kg (dry).

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

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