Characteristics and Market Opportunities of Block Ice Factories at Batulicin Fishing Port Tanah Bumbu District

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Abstract.
Batulicin Fishing Port is a center of capture fisheries activities supported by the presence of block ice factories as an essential component of the cold chain system. This study aimed to analyze the characteristics of block ice factories in the Batulicin Fishing Port area and to assess the market opportunities for block ice at the port. The analytical method used was descriptive analysis. The results show that the block ice factories at Batulicin Fishing Port share similar characteristics in terms of machine-based production processes, dependence on water and electricity supplies, and direct marketing systems without intermediaries and with limited market coverage. The analysis of block ice demand indicates that total demand reached 476,325 kg/month, while total supply amounted to 472,300 kg/month. This gap indicates a positive market opportunity of 4,025 kg/month, suggesting that the availability of block ice at Batulicin Fishing Port is still insufficient to meet the needs of port service users.
Keywords: *Block Ice Factory, Business, Demand and Batulicin Fishing Port.*

I. INTRODUCTION

Tanah Bumbu Regency, with Batulicin as its capital, is a coastal region located in the southeastern part of South Kalimantan Province. This area has a strategic geographical position in supporting port activities, fisheries-based industries, and the trade of fishery products. As a fish landing center, Batulicin Fishing Port plays an important role in supporting capture fisheries activities through the provision of various supporting facilities, including block ice factories. The functional role of fishing ports as centers of landing, handling, distribution, and fisheries business development has been emphasized in previous studies on fishing port conditions and development potential (Jaysuman et al., 2017; Telaumbanua & Betzy V. T., 2025). In this context, the availability of block ice is essential because it supports the implementation of the cold chain system, which is required to maintain the quality and freshness of fishery products from harvesting to marketing.

The use of ice as a cooling medium is a crucial factor in maintaining the quality of fish catches. Nugroho et al. (2021) stated that appropriate cooling media, including block ice and other cooling alternatives, can improve the performance of fish storage systems for fishermen's catches. Similarly, Widodo (2020) explained that block ice factories, including small-scale units, have an important role in supplying ice for fishermen as a fish preservation medium. The importance of ice availability is also closely related to the marketing of fishery products, as product quality, distribution efficiency, and market acceptance are strongly influenced by proper post-harvest handling (Abidin et al., 2017). Therefore, the existence of block ice factories in the Batulicin Fishing Port area is not only a supporting facility but also a strategic component in sustaining capture fisheries operations and fishery product marketing.

Fishery activities at Batulicin Fishing Port have shown fluctuations in the number of vessels, with a declining tendency in recent years. Nevertheless, the demand for block ice in the port area remains high and has not been fully met. As a result, some fishermen still have to obtain block ice from outside the port area, which increases operational costs and reduces the efficiency of fishery activities. This situation is consistent with the view that the performance of fishery-related businesses is influenced by the availability of

production inputs, operational efficiency, and market support systems (Lutfiyanah & Iin Siti D., 2020). In addition, production and operational constraints in ice factory businesses have also been reported in previous studies, such as the analysis of ice factory production at the Technical Implementation Unit in Dumai, which showed that production capacity and operational factors affect the ability of ice factories to meet user demand (Rasyid et al., 2020).

Currently, three private block ice factories operate in the Batulicin Fishing Port area; however, their production capacities are still insufficient to meet the total demand for block ice. This condition indicates that block ice has a crucial role in supporting fishery activities, particularly in maintaining the quality of fish catches from harvesting to distribution. From a business perspective, the imbalance between demand and supply may indicate a market opportunity that needs to be analyzed further. Market opportunity analysis is important in assessing the feasibility and development potential of a business, as demonstrated in studies on business feasibility and marketing systems (Lazuardi et al., 2014). Furthermore, marketing activities in fishery-based businesses require attention to distribution channels, consumer access, and promotional strategies, as discussed by Rahmasari et al. (2020) in the context of processed fishery product marketing.

These conditions, an analysis of the characteristics of block ice factories and ice requirements at Batulicin Fishing Port is necessary. The analysis should include business profiles, production capacity, marketing systems, distribution mechanisms, and the level of demand for block ice. A descriptive approach is relevant for explaining the actual condition of block ice supply in the study area, particularly because descriptive and qualitative data can provide a comprehensive understanding of business characteristics and field conditions (Adlini et al., 2022). In addition, proper data analysis is required to support the presentation of scientific findings and strengthen the interpretation of research results (Dhewy, 2022). Therefore, this study is expected to provide an overview of the current condition of block ice factories and market opportunities as part of the supporting system for fishery activities at Batulicin Fishing Port.The research aims to analyze the characteristics of the ice block factory in the Batulicin Fisheries Port area and analyze the market opportunities for ice blocks in the Batulicin Fisheries Port.

II. METHODS

Time and Location

This study was conducted from January to June 2026. The research location was determined using purposive sampling at block ice factories in the Batulicin Fishing Port area with production capacities of more than 100 blocks/day. These criteria, three ice factories were selected as research sites: PT. Maming Sumber Sewangi with a capacity of 403 blocks/day, CV. Ridho Antasari with a capacity of 250 blocks/day, and Andi Matahari Ice Factory with a capacity of 130 blocks/day.

Data Sources

The data sources in this study consisted of primary and secondary data. Primary data were obtained through observation and direct interviews at block ice factories in the Batulicin Fishing Port area, covering business profiles, marketing systems, and block ice demand at the port. Secondary data were obtained from Batulicin Fishing Port to support the analysis of block ice demand, as well as from relevant literature as supporting data for understanding the characteristics of block ice factories and the condition of ice demand in the study area.

Research Respondents

The respondents in this study consisted of three groups: block ice factory managers, fishermen, and representatives of Batulicin Fishing Port. Factory managers were selected purposively to obtain information related to business characteristics, including production processes, capacity, distribution systems, and marketing. Fishermen, as block ice users, were selected to determine ice demand, availability, and quality in supporting fishing activities, with a sample size of 43 respondents (30% of the population) representing the heterogeneous conditions of fishermen at the port. Meanwhile, representatives of Batulicin Fishing Port served as sources of secondary data to obtain supporting information related to block ice demand and port operational conditions.

Data Analysis

The analysis of block ice factory characteristics in this study used descriptive analysis presented in narrative form based on observation and interview results. The characteristics of block ice factories covered two main aspects: factory profile and marketing system. The factory profile included information on the factory name, year of operation, daily production capacity, number of workers, type of block ice produced, and production facilities owned. Meanwhile, the marketing system included distribution channels, sales mechanisms, market coverage, and factors influencing the selling price of block ice. This analysis aimed to provide an overview of the current condition of block ice factory businesses at Batulicin Fishing Port.

The analysis of block ice demand was conducted by calculating the difference between demand and supply of block ice at Batulicin Fishing Port. Demand was calculated based on the total ice requirement of users in the port area, while supply was obtained from the total production of ice factories within a specific period. The formula used was as follows:

$$D = Qd$$
$$S = Qs$$
$$P = D - S$$

Information:
D = Total demand for block ice
Qd = Amount of block ice required in the port area
S = Total supply of block ice
Qs = Amount of ice produced by ice factories within a specific period
Furthermore, market opportunity was calculated using the difference between demand and supply:
Criteria:
If P > 0, block ice production has not met demand.
If P = 0, ice production is balanced with demand.
If P < 0, ice production exceeds demand.

III. RESULT AND DISCUSSION

Characteristics of Block Ice Factories in the Batulicin Fishing Port Area

1. Profile of PT. Maming Sumber Sewangi Block Ice Factory

PT. Maming Sumber Sewangi is a block ice factory that began commercial operations in 2020 in the Batulicin Fishing Port area. This factory was established to meet the need for block ice as a supporting supply for fishery activities, particularly as vessel provisions for maintaining the quality of fish catches. With a land area of approximately 2,100 m², this factory has potential for production capacity development in the future.

The production process at this factory uses two machine units with a capacity of approximately 403 blocks/day, although one machine was not operating during the study due to damage. The products produced include 25 kg block ice and crushed ice, with a production time of approximately 10-12 hours per cycle. The main raw material is water from the Sewangi River, processed using a Freon-based freezing system, and supported by a cold storage facility with a capacity of 10,000 ice blocks, although it has not yet been utilized optimally.

Marketing is carried out directly without intermediaries at a price of approximately Rp11,000/block, excluding transportation costs. The main operational constraints include production machine damage, water pump disruptions, and unstable electricity supply, which may interfere with the smoothness of the production process.

2. Profile of CV. Ridho Antasari Block Ice Factory

CV. Ridho Antasari is one of the block ice factories that has operated since the early development of Batulicin Fishing Port and is strategically located less than 100 meters from the port area. This proximity is a key advantage in supporting rapid ice distribution to fishermen and fishery business actors.

The factory has two machine units with a production capacity of approximately 500 blocks/day; however, only around 234 blocks can be marketed because part of the product is used in the continuous production process. Production takes place for 24 hours using PDAM water stored in tanks as the main raw material. The products produced include 25 kg block ice and crushed ice for fish distribution needs.

Marketing is conducted directly to consumers at a price of approximately Rp13,000-Rp14,000/block. Operational constraints include high electricity costs, dependence on PDAM water supply, and machine damage due to the age of the equipment.

3. Profile of Andi Matahari Ice Factory

Andi Matahari Ice Factory was established in 2020 in response to the limited supply of block ice at Batulicin Fishing Port. This factory focuses on providing ice for fish shipment needs by utilizing the owner's experience in the fishery product distribution business.

The factory has a production capacity of approximately 130 blocks/cycle with a production time of about 12 hours. Unlike other factories, the ice produced is smaller in size, ranging from 6 to 7.5 kg/block, and most of it is marketed in the form of crushed ice. Production is carried out twice a day using PDAM water as the main raw material; when the water supply is disrupted, additional water is purchased.

Sales are conducted in box packages at a price of approximately Rp30,000 per box containing 4-5 ice blocks. The main constraints include limited land for production capacity expansion, dependence on PDAM water supply, and suboptimal storage facilities.

Block Ice Marketing System

The block ice marketing system at Batulicin Fishing Port is conducted directly by producers to consumers without intermediaries, using a simple marketing channel from factories to end users such as fishermen and fish shipment business actors. This system is chosen because ice demand is daily in nature and must be fulfilled quickly, supported by the proximity of factories to the port and production capacity that has not fully met demand.

Distribution is carried out in two ways: consumers collect ice directly from the factory, or the factory assists with delivery for an additional fee. Products marketed include whole block ice for vessel provisions and crushed block ice for fish distribution. Orders are generally placed one day in advance, although direct purchases can also be made if stock is available, with most consumers being regular customers.

Sales are generally made in cash, although under certain conditions, payment flexibility is provided to regular customers based on trust-based relationships. Market coverage remains limited to the Batulicin Fishing Port area. Block ice prices vary among factories depending on production and distribution costs, but tend to remain stable despite fluctuations in demand and operational costs, allowing consumer needs to continue to be fulfilled.

Block Ice Demand at Batulicin Fishing Port

The demand for block ice at Batulicin Fishing Port was calculated based on block ice demand and supply. Demand includes the need for vessel provisions and fishery product distribution.

Secondary data obtained from Batulicin Fishing Port (2025) show that the average use of block ice for vessel provisions reached 17,403 blocks/month. Each ice block weighs an average of 25 kg. Thus, the total ice requirement for vessel provisions is calculated as follows:

Vessel provisions = 17,403 x 25

= 435,075 kg/month

In addition to vessel provisions, block ice is also used in fishery product distribution activities. Secondary data from Batulicin Fishing Port (2025), the average total fishery product distribution reached 165 vehicles/month, with each vehicle carrying an average of 250 kg of crushed ice. Thus, the total ice requirement for distribution needs is calculated as follows:

Fish distribution = 165 x 250

= 41,250 kg/month

The total block ice requirement or demand in the Batulicin Fishing Port area is as follows:

Qd = 435,075 + 41,250

= 476,325 kg/month

The supply of block ice was calculated from the total production of three ice factories in the port area. PT. Maming Sumber Sewangi produces an average of 10,000 blocks/month (250,000 kg), CV. Ridho Antasari produces 7,020 blocks/month (175,500 kg), and Andi Matahari Ice Factory produces 1,560 blocks/month (46,800 kg). The total supply of block ice reached 472,300 kg/month. Details of the total block ice supply in the fishing port area are presented in Table 1.

Table 1. Block Ice Supply

Factory Name	Production (blocks/month)	Ice Size	Production (kg/month)
PT. Maming Sumber Sewangi	10,000	25	250,000
CV. Ridho Antasari	7,020	25	175,500
Andi Matahari	1,560	6	46,800
Total			**472,300**

Table 1. above, the total block ice supply in the Batulicin Fishing Port area is as follows:

Qs = 472,300 kg/month

Market Opportunity

Market opportunity was obtained from the difference between total demand (Qd) and total supply (Qs). The calculation of market opportunity identifies whether the available block ice production has been able to meet demand or whether a supply shortage still exists. The market opportunity calculation is as follows:

$$P = D - S$$

$$P = 476{,}325 - 472{,}300$$

$$= 4{,}025 \text{ kg/month}$$

The calculation results show that the market opportunity value is positive, amounting to 4,025 kg/month. This figure indicates that the available block ice production in the Batulicin Fishing Port area has not fully met the needs of port service users; therefore, a shortage of block ice supply remains.

The characteristics of block ice factories in the Batulicin Fishing Port area indicate that ice production is closely related to the operational needs of capture fisheries. The three factories observed in this study have similar business characteristics, namely machine-based production systems, dependence on water and electricity supply, direct marketing channels, and operational constraints related to machinery and supporting facilities. These findings are in line with Rasyid et al. (2020), who stated that the production performance of ice factories is strongly influenced by production capacity, equipment condition, and operational efficiency. The strategic location of the factories near the port also supports the functional role of Batulicin Fishing Port as a fish landing and distribution center, as described by Jaysuman et al. (2017) and Telaumbanua and Betzy V. T. (2025), who emphasized that fishing ports require adequate supporting facilities to strengthen fisheries activities. Therefore, the existence of block ice factories in the port area is an important component in supporting the continuity of fishery operations.

The marketing system of block ice in Batulicin Fishing Port is relatively simple because producers sell directly to consumers without intermediaries. This direct marketing pattern occurs because block ice is needed daily and must be available quickly to support vessel provisions and fish distribution activities. This finding is consistent with Abidin et al. (2017), who explained that the marketing of fishery products and supporting inputs is strongly influenced by distribution efficiency, product availability, and proximity to consumers. In addition, Rahmasari et al. (2020) emphasized that marketing activities in fishery-based businesses require appropriate distribution channels to ensure that products reach consumers effectively. The dominance of regular customers and trust-based payment flexibility also shows that the block ice business in Batulicin Fishing Port is still strongly influenced by direct relationships between producers and users. However, the limited market coverage indicates that the marketing system has not yet developed into a broader commercial network.

The analysis of block ice demand and supply shows that total demand reached 476,325 kg/month, while total supply was only 472,300 kg/month, resulting in a positive market opportunity of 4,025 kg/month. This indicates that the existing production capacity has not fully met the needs of port service users. The shortage of block ice supply is important because ice plays a crucial role in maintaining the quality and freshness of fish catches during handling, storage, and distribution. Nugroho et al. (2021) stated that the use

of appropriate cooling media can improve the performance of fish storage systems, while Widodo (2020) highlighted the importance of block ice factories in supplying ice for fishermen as a fish preservation medium. From a business perspective, the positive gap between demand and supply reflects a potential market opportunity, as business feasibility and development potential can be assessed through demand, supply, and market needs (Lazuardi et al., 2014). Thus, increasing production capacity, improving machine maintenance, and optimizing storage facilities are necessary to strengthen the role of block ice factories in supporting fishery activities at Batulicin Fishing Port.

IV. CONCLUSION

The characteristics of block ice factories at Batulicin Fishing Port show that the three factories (PT. Maming Sumber Sewangi, CV. Ridho Antasari, and Andi Matahari Ice Factory) play important roles as block ice providers in supporting capture fisheries activities. In general, the three factories have relatively similar characteristics, namely operating with machine-based production systems, depending on water and electricity supplies, and facing operational constraints such as machine damage and limitations in supporting facilities. The marketing system applied is also the same, namely direct marketing from producers to consumers without intermediaries, with market coverage still limited to the port area.

The analysis of block ice demand at Batulicin Fishing Port shows that total block ice demand reached 476,325 kg/month, while total supply amounted to 472,300 kg/month. The difference between demand and supply indicates a positive market opportunity of 4,025 kg/month, suggesting that the availability of block ice is still not fully sufficient to meet the needs of port service users.

REFERENCES

[1]. Abidin, Z., Nuddin, H., and Lina, A. 2017. Marketing of Fishery Products. Malang: UB Press. 238 pp.

[2]. Adlini, M. N., Anisya, H. D., Sarah, Y., Octavia, C., and Sauda, J. M. 2022. Qualitative Literature Review Research Methods. ***Edumaspul Journal***, 6(1).

[3]. Dhewy, R. C. 2022. Quantitative Data Analysis Training for Student Scientific Paper Writing. Community Service Journal, 2(3).

[4]. Jaysuman, N., Iriansyah, and Irhamsyah. 2017. Study of the Condition of the Batulicin Fish Landing Base (PPI) in Tanah Bumbu Regency, South Kalimantan Province. Fish Scientiae, 7(2).

[5]. Lazuardi, R. R., Lisye, F., and Abu, B. 2014. Feasibility Analysis of a Mobile Carwash Business in Bandung City. ***Online Journal of the National Institute of Technology***, 01(03).

[6]. Lutfiyanah, A., and Iin Siti, D. 2020. Performance of Catfish (Clarias sp.) Cultivation Business in the "Mutiara" Catfish Farmer Group, Kaligelang Village, Taman, Pemalang. ***Journal of Fisheries and Marine Extension***, 14(3).

[7]. Nugroho, T. A., Kiryanto, and Arswendo. 2021. Experimental Study of the Use of Fish Cooling Media in the Form of Ice Basa and Ice Packs to Improve the Performance of Storage Facilities for Fishermen's Catches. ***Journal of Marine Engineering***, 9(10).

[8]. Rahmasari, Gusto, H., and Qoriah, S. 2020. The Role of Social Media as a Promotional Tool for Marketing Amplang Processed Products in Sanga Sanga District, Kutai Kartanegara Regency. ***Journal of Fisheries and Agribusiness Development***, 7(1).

[9]. Rasyid, M.E.I., Nasution, P., and Syaifuddin. 2020. Analysis of Ice Factory Production at the Dumai City Technical Implementation Unit (UPT). JOM Faperika, 7(1).

[10]. Telaumbanua, D.M.L., and Betzy, V.T. 2025. Fishing Port on Tello Island: Functional Review and Development Potential. PERAUT: ***Journal of Fisheries and Marine Affairs***, 2(2).

[11]. Widodo. 2020. Theoretical Study of a Mini-Scale Ice Block Factory to Supply Fishermen's Needs as a Preservative for Their Catch. ***Scientific Journal of Maritime Technology***, 1(2).