Fisheries Journal, 16 (1), 387-399 (2026)
http://doi.org/10.29303/jp.v14i3.2126

MANAGEMENT OF HANDLINE FISHING VESSEL SUPPLIES PRIOR TO FISHING OPERATIONS AT BUNGUS OCEANIC FISHING PORT, WEST SUMATRA

Manajemen Perbekalan Kapal *Hand Line* Sebelum Melakukan Penangkapan di Pelabuhan Perikanan Samudera Bungus Sumatera Barat

Rizky Janatul Magwa[1*], Khairun Najah[1], Ester Restiana Endang Gelis[1], Yoppie Wulanda[2], Farhan Ramdhani[1], Septy Heltria[1], Lauura Hermala Yunita[2]

[1]Fishery Resources Utilization Study Program, Faculty of Animal Husbandry, Jambi University [2]Fishery Product Technology Study Program, Faculty of Animal Husbandry, Jambi University

Jambi - Muara Bulian Highway, Mendalo Darat Village, Jambi Luar Kota District, Muaro Jambi Regency, KM-15 – Jambi Province

*Corresponding Author: rizkymagwa@unja.ac.id

(Received February 20th 2026; Accepted March 6th 2026)

ABSTRACK

Supply management is a critical component in hand line fishing vessel operations lasting 10–20 days at sea, as it directly affects operational cost efficiency and catch quality. This study aimed to identify and analyze the supply management system of hand line vessels at Bungus Oceanic Fishing Port, covering procurement, storage, maintenance, and control stages, as well as identifying the main constraints faced by fishers. A descriptive method with a qualitative approach was employed through observation and purposive interviews involving captains, crew members, vessel owners, port officers, and logistics suppliers from October to December 2023. The results indicate that the supply management system has been relatively well-structured; procurement is based on estimated trip duration and crew size with an average cost of IDR 25–30 million per trip for 24–30 GT vessels, storage is organized by categorizing wet, dry, and high-demand goods, maintenance includes ice protection, freshwater monitoring, and controlled daily consumption, while control mechanisms involve daily recording, usage limitation of high-demand items, and post-trip evaluation of remaining supplies. The main challenges include limited storage space on smaller vessels and the absence of standardized supply requirements based on vessel tonnage and trip duration. Overall, the supply management system is considered adequate but remains experience-based, highlighting the need for standardized supply guidelines and a more systematic logistics recording system to improve efficiency and planning accuracy.

Keyword: Bungus Oceanic Fishing Port; Fisheries logistics; Hand line fishing vessel; Supply control; Supply management

ABSTRAK

Manajemen perbekalan merupakan komponen vital dalam operasi kapal hand line yang beroperasi selama 10–20 hari di laut karena berpengaruh langsung terhadap efisiensi biaya dan mutu hasil tangkapan. Penelitian ini bertujuan mengidentifikasi dan menganalisis sistem manajemen perbekalan kapal hand line di PPS Bungus yang meliputi tahap pengadaan, penyimpanan, pemeliharaan, dan pengendalian, serta mengidentifikasi kendala yang dihadapi nelayan. Penelitian menggunakan metode deskriptif dengan pendekatan kualitatif melalui observasi dan wawancara purposive terhadap nakhoda, ABK, pemilik kapal, petugas pelabuhan, dan pemasok logistik pada Oktober–Desember 2023. Hasil penelitian menunjukkan bahwa sistem manajemen perbekalan telah berjalan cukup terstruktur; pengadaan dilakukan berdasarkan estimasi lama trip dan jumlah ABK dengan biaya rata-rata Rp25–30 juta per trip untuk kapal 24–30 GT, penyimpanan dilakukan melalui pengelompokan muatan basah, kering, dan enak/bagus, pemeliharaan dilakukan dengan perlindungan es balok, pengawasan air bersih, dan pembagian konsumsi terukur, serta pengendalian melalui pencatatan harian, pembatasan bahan high-demand, dan evaluasi sisa perbekalan. Kendala utama meliputi keterbatasan ruang kapal kecil dan belum adanya standar kebutuhan baku berbasis GT dan durasi operasi. Secara umum, manajemen perbekalan tergolong baik namun masih berbasis pengalaman nakhoda sehingga diperlukan standar kebutuhan dan sistem pencatatan logistik yang lebih sistematis untuk meningkatkan efisiensi dan akurasi perencanaan.

Kata Kunci: Kapal hand line; Logistik perikanan; Manajemen perbekalan; Pengendalian perbekalan; PPS Bungus

INTRODUCTION

Supply management is a crucial component in fishing vessel operations, particularly in handline fishing units, which typically operate for 10–20 days at sea. Therefore, supply management is crucial for maintaining the productivity and efficiency of fishing operations (Pangerapan et al., 2023; Rumaf et al., 2025; Sora et al., 2016). In tuna fishing operations, adequate fuel, ice, clean water, lubricating oil, and consumable supplies are crucial for operational success and catch quality. Limited ice and improper onboard handling have been shown to reduce fish quality and prolong trip productivity (Asni et al., 2022; Rumaf et al., 2025). This situation is relevant to operations at the Bungus Fishing Port (PPS), where small- to medium-sized tuna fishing vessels make regular landings, and the quality of the tuna produced is significantly influenced by the availability of clean water and ice during operations, as well as sanitation and handling at the time of landing (Mustarudin et al., 2022).

Furthermore, challenges in the field indicate that ship supplies are often not based on standardized standards, but rather on the captain's habits. This leads to inaccurate procurement, resulting in both excess and shortages. Lack of supplies such as clean water and ice can disrupt the fish handling process. Research by Asni et al. (2022) shows that fresh fish handling requires sufficient clean water and ice to maintain the cold chain; a lack of ice or clean water will accelerate fish quality deterioration. Furthermore, logistics procurement without proper planning and demand forecasting can lead to excess inventory and inefficient operational costs (Dinarwati & Pitriani, 2020). These issues reinforce the urgency of research related to more systematic supply management, particularly at the Bungus Port (PPS).

Operationally, coordination between ships, ship service agents/companies, and port authorities is crucial to ensure smooth ship and cargo services, including the provision of operational needs for ships during berthing, such as fuel, clean water, and other related services (Arianto & Sutrisno, 2020). A study by Muslim et al. (2021) on logistics shows that in logistics management, reliance on a single vendor is considered risky because it can lead to supply

disruptions when there is a surge in demand or disruptions at that supplier. A similar situation occurs at the Bungus Fishing Port (PPS), where the number of suppliers is limited and demand spikes during the tuna season, making supply management even more crucial.

Furthermore, the implementation of planned logistics management, including demand planning, procurement, storage, and distribution, aims to minimize operational costs, accelerate order fulfillment, and reduce service times, allowing for more efficient core activities (Dinarwati & Pitriani, 2020; Muslim et al., 2021). Therefore, strengthening supply management is not only about material sufficiency but also the efficiency of the entire operational chain.

Based on these findings, this study was conducted to identify the supply management system on handline vessels at the Bungus Ocean Fishing Port, encompassing the procurement, storage, maintenance, and control stages. This study also aims to identify the main obstacles frequently encountered by fishermen in the supply management process and formulate recommendations for improvement. The benefits of this research are the preparation of the basis for developing standard supply requirements based on ship GT and duration of operation, increasing the efficiency of fishermen's operational costs, and supporting the strengthening of logistics management at fishing ports through improving governance and documentation systems.

RESEARCH METHODS

Place and Time

This research was conducted at the Bungus Ocean Fishing Port (PPS), located in Bungus Teluk Kabung District, West Sumatra Province. This location was chosen because it is an active center of capture fisheries activity, particularly for vessels using handline fishing gear. The research was conducted from October to December 2023.

Tools and Materials

The tools used in this study included a questionnaire to collect data on the type and quantity of handline vessel supply requirements and their management system. Field observations were supported by field notes and documentation using a camera or mobile phone. The data obtained was then processed using a computer with Microsoft Excel to calculate average supply requirements and present them in tabular form.

The research materials consisted of primary and secondary data. Primary data included information on operational supply requirements (fuel, clean water, lubricating oil, and ice cubes), consumption supplies, vessel size (GT), number of crew (ABK), and fishing trip duration. Secondary data were obtained from the annual report and production data of the Bungus Fishing Port (PPS) for 2023, as well as relevant literature on fishing vessel supply management.

Research methods

This study uses a descriptive method with a qualitative approach. This approach was chosen to provide an in-depth overview of the supplies of Hand Line vessels operating at the Bungus Ocean Fishing Port. Qualitative research allows researchers to understand phenomena from the perspective of the research subjects holistically and contextually, especially in identifying the types of supplies, as well as the obstacles faced by fishermen during the procurement and use of supplies at sea. The sample in this study was determined purposively, that is, selected based on their direct involvement in the process of managing Hand Line vessel supplies. consisting of:

1. Fisherman and Hand Line boat captain.

2. Crew members (ABK) involved in operational activities.
3. Port officer/representative from port management unit.
4. The party providing or selling ship logistics needs.

Research Procedure

The research procedures carried out during the research were: :

1. Direct observation, carried out in the ship's mooring area, storage warehouse, and supply area to observe the ship's logistics procurement, storage, and distribution processes.
2. In-depth interviews using semi-structured interview guides to gather information related to the supply management system, obstacles faced, and solutions implemented by fishermen.
3. Questionnaires, used to obtain quantitative data regarding the volume of supplies needed (fuel, clean water, oil, ice, and consumables) based on the size of the vessel and the length of the fishing trip.
4. Documentation, including recording secondary data from port agencies, annual reports, as well as ship technical data and number of operational trips.

Data Analysis

The data obtained was analyzed in two stages:

1. Descriptive qualitative analysis was used to explain inventory management patterns, including planning, procurement, storage, maintenance, and control. Interview results were coded and categorized based on key themes in accordance with fisheries logistics management theory.
2. A simple quantitative analysis was carried out to calculate the average supply requirements for each type of ship (liters, tons, icebergs, kilograms, or packages), as well as the proportion of the costs of each component to the total operational costs per trip.

The results of the analysis are presented in the form of tables, graphs and narratives to provide a comprehensive picture of the condition of hand line vessel supply management at PPS Bungus.

RESULT

Hand Line Ship Supply Management System

The supply management system on handline vessels is an integrated series of activities encompassing planning, procurement, storage, maintenance, and control of supplies throughout a fishing trip. Handline vessels at the Bungus Port Fishery Port generally measure 9–30 GT and operate for 10–20 days, making supply requirements a vital factor in determining operational efficiency and catch quality.

Generally, the supply management system begins with a needs planning process by the captain, who best understands the vessel's operating patterns. This planning process involves estimating the trip length, crew size, and daily needs based on previous trip experience. The captain then plans for supply requirements based on the estimated trip length, crew size, and previous operational experience. Once the plan is developed, a list of requirements is submitted to the vessel owner for procurement.

Following planning, the system progresses to supply procurement, involving the vessel owner, the vessel's management, and suppliers. Procurement is conducted through established suppliers with established partnerships with the vessel, including SPDN KUD Mina for diesel fuel, PT Danitama Mina for block ice, and local agents for consumables and daily necessities. Once supplies are available, they are stored on board according to the type and nature of the materials. During the trip, maintenance is carried out by the crew to ensure the quality of the

supplies. The final stage is control, which involves recording usage and evaluating remaining supplies after the ship returns to port.

Procurement of Supplies

Procurement of supplies is the initial and most fundamental stage in the logistics management of a handline vessel before embarking on fishing operations at sea. Based on observations and interviews with the captain, crew, and supply agent at the Bungus Port, the supply procurement process involves several systematic steps: requirements planning, ordering, budgeting, and coordination with suppliers.

During the planning stage, the captain, as the party best versed in the characteristics of the vessel's operations, compiles a list of requirements based on the estimated trip duration, crew size, weather conditions, and fishing season. The captain calculates these requirements based on years of experience managing trip durations and the daily consumption of crew members. The list of supplies carried on the handline vessel is shown in Table 1.

Tabel 1. Daftar perbekalan konsumsi pada kapal *Hand Line* di PPS Bungus

	Consumables		Medicine	Etc
1.	Rice	Chilies	Headache medicine	Cigarettes
2.	Sugar	Tempe	Cough medicine	Matches
3.	Vegetables	Beans	Flu medicine	Soap
4.	Meat	Jengkol Beans	Cold repellent	Shampoo
5.	Oil	Candles	Wound plaster	Toothpaste
6.	Eggs	Shallots	Betadine	Toothbrush
7.	Milk	Garlic	Eucalyptus oil	Detergent
8.	Salt	Mineral Water	Massage oil	Plastic
9.	Tea	Scallions		
10.	Coffee	Celery Leaves		
11.	Soy Sauce	LPG Gas		
12.	Sauce	Cassava		
13.	Potato	Pete		
14.	Instant noodles			

The ordering and procurement process is typically carried out by the ship owner or ship manager through established suppliers. Interview data indicates that SPDN KUD Mina supplies diesel fuel, PT Danitama Mina supplies ice, and consumables are supplied by local agents. These long-term relationships with suppliers facilitate the procurement process, especially during peak tuna seasons.

Sources of consumable supplies are divided into three groups: consumables, medicines, and others (Table 2). Consumables generally consist of food, which is a source of nutrition and energy needed by the body to cope with various activities and perform various tasks.

Table 2. Average Consumable Supplies for Hand Line Vessels in 2023

Boat (Gt)	Average Supply Requirements per Trip		
	Consumables (Kg)	Medicine (Box)	Others (Pack)
9 – 16	116	15	263
17 -23	139	15	302
24 – 30	141	15	300
Amount	396	45	865

Source: Bungus PPS Production Data 2023

For consumable supplies, the largest requirement is for consumables. Consumables on handline vessels can vary depending on the number of crew members and the length of the fishing trip. The longer the fishing trip, the more supplies are needed. Likewise, the larger the crew, the greater the need. The budgeting process begins after the needs plan is submitted to the vessel owner. Procurement costs for handline vessels at the Bungus Port (PPS) range from IDR 25–30 million per trip for vessels measuring 24–30 GT, with the largest proportion allocated to diesel fuel, ice cubes, and consumables. Coordination with suppliers is a crucial part of the procurement process. Supplies are delivered one day before departure or several hours before the vessel is untied. This process is chosen to prevent damage to consumables and ensure the ice cubes do not melt before use. Therefore, delivery time is an indicator of procurement efficiency.

Supply Storage

Storage of supplies on handline vessels at the Bungus Port is a crucial stage in logistics management, as the quality of supply handling determines the durability of consumables, the effectiveness of operational material use, and the quality of the catch during fishing operations. Observations indicate that storage activities consist of three main processes: receiving supplies, arranging and grouping supplies by type, and arranging storage locations on board. Sea supplies on handline vessels can be grouped based on activity type, intensity, and nature, as shown in Table 3.

Table 3. Grouping of sea supplies at the Bungus Port, based on activity, intensity of use, and nature (quality) of supplies

Supplies	Activity		Level of Need		Nature (Quality)		
	OK	KO	PR	SK	BM	BK	BE
Diesel Fuel	V	-	V	-	V	-	-
Clean Water	V	-	V	-	V	-	-
Lubricating Oil	V	-	V	-	V	-	-
Ice Blocks	V	-	V	-	-	V	-
Consumables	-	V	V	-	-	V	V
Medicines	-	V	-	V	-	V	-
Others	-	V	-	V	-	V	-

Description: OK = Ship Operation, KO = Consumption, PR = Primary, SK = Secondary, BM = Wet Cargo, BK = Dry Cargo, BE = Good Cargo

Grouping of supplies is done so that each material with different properties can be placed in a place that is appropriate to the type of material, for the type of supplies on the Hand Line ship itself, it is divided into three parts, the first is wet materials, dry materials and good/nice materials. Each material will be stored according to its type so that it will not damage other materials of a different type.

Supply Maintenance

Supply maintenance is a crucial step in maintaining the quality of operational and consumable materials during fishing trips lasting between 10 and 20 days. Observations at the Bungus PPS indicate that maintenance is carried out through three main approaches: (1) separating materials based on their physical properties, (2) protecting materials from environmental damage, and (3) managing their use to align with the duration of operations. The first stage of maintenance is the separation of supplies based on their properties. Crew

members divide materials into wet cargo, dry cargo, and good cargo, each of which is stored in a separate location to prevent damage and odor contamination. Wet materials such as vegetables and meat are placed in the refrigerated hold, while dry materials are stored in the galley or living room to prevent spoilage.

The second stage is protecting materials from physical and environmental damage. For ice cubes, maintenance is carried out by covering them with thick plastic before being placed in the hold. This method prevents the ice from melting too quickly due to direct contact with the hold walls. The third stage is managing the use of supplies to align with the duration of operations. This arrangement includes the daily distribution of consumables and special items such as cigarettes or coffee. Based on interviews, the captain places certain restrictions on items that are consumed most quickly. The captain distributed cigarettes in a measured manner to each crew member to ensure they were sufficient for the duration of the trip.

Inventory Control

Supply control is the process of ensuring that all supplies carried by handline vessels during fishing trips are used efficiently, meet operational needs, and avoid shortages or waste. Based on observations at the Bungus PPS and interviews, supply control is carried out through three main mechanisms: (1) regular recording and monitoring, (2) limiting use by the captain, and (3) evaluating remaining supplies after operations.

The first mechanism is regular recording and monitoring. The captain records the use of diesel, oil, water, and ice daily or each time hauling and setting operations are conducted. This recording is important because diesel and ice consumption are directly related to fishing patterns. The second mechanism is the captain's control of supply use. Based on interviews, the captain regulates the use of consumables, especially those with high consumption rates such as cigarettes, instant noodles, and coffee. The captain distributes cigarettes in a measured manner to ensure they are not used up before the end of the trip, considering that cigarettes are a perishable commodity and affect the crew's working comfort.

DISCUSSION

Hand Line Ship Supply Management System

According to Fitriyashari et al. (2014), good supply management is the foundation of successful fishing operations because it determines the smooth operation of the vessel and the quality of the fish caught. This planning process by the captain aligns with research by Astarini et al. (2022), which states that in ship supply management practices, supply requirements planning is carried out by the captain and several crew members based on the estimated trip length, number of crew members, and previous operational experience to determine the quantity and type of supplies needed during the voyage. Furthermore, the planning stage serves as the basis for determining the amount of diesel fuel, oil, ice cubes, clean water, consumables, and other additional needs. Planning the ship's supply requirements by the captain is an integral part of ship operations management to ensure sufficient supplies and smooth operations (Astarini et al., 2022; Michis, 2025; Mouschoutzi & Ponis, 2022).

Handline vessels at the Bungus Port (PPS) maintain long-term relationships with regular suppliers, enabling prompt supply deliveries. Studies on ship procurement emphasize that the procurement of food and other ship necessities requires a fast and flexible supplier network, as well as strong supplier relationships to ensure timely delivery according to the ship's needs (Lau & Yip, 2017; Susanto et al., 2021). The next stage is the stowage of supplies, which is carried out by grouping materials based on their physical properties: wet cargo, dry cargo, and good/good cargo. Wet materials such as vegetables, meat, and ice are stored in the hold and cold storage, while dry materials are placed in the galley and midships. This grouping aligns with research on ship supply handling, which indicates that food supplies are stored separately

by material category to maintain quality and reduce deterioration during the voyage (Astarini et al., 2022; Syamsudin et al., 2021).

The maintenance phase is carried out while the ship is operating at sea. The crew maintains the quality of materials by covering ice blocks with plastic, ensuring clean water is not contaminated, and securing oil and diesel fuel in protected areas. This aligns with the opinions of Ginting et al. (2025) and Wijaya et al. (2024) who stated that handling of materials on board, such as wrapping fish in ice and plastic to prevent contamination and maintaining low temperatures to maintain quality, is part of good handling techniques from the ship to the consumer. (Mulić & Tomić, 2020) emphasized that maintaining clean water quality is crucial on board, including storage systems and contamination control to ensure safe consumption by crew during sea operations.

The final stage is inventory control, which is carried out through daily records by the captain, restrictions on the use of certain materials, and evaluation of remaining supplies after returning to port. Ship owners conduct leftover evaluations to improve planning for the next trip. This aligns with the opinion of Nabila & Maliki (2025), who stated that in ship inventory management, stock control and planning for the use of materials such as food can be optimized, including recording daily consumption and evaluating leftovers, which can improve planning for the next trip.

Procurement of Supplies

This provision procurement aligns with the findings of Fitriyashari et al. (2014), who stated that good provisioning begins with precise needs planning based on previous trip experience and the number of crew members. This stage serves as the basis for handline vessels at the Bungus Port, where primary supplies include diesel fuel, oil, ice cubes, clean water, consumables, medicines, and other minor necessities such as cigarettes and daily necessities. According to Yazdani et al. (2023), the procurement process in the maritime supply chain includes determining needs, planning deliveries, and placing reserve supplies to anticipate demand fluctuations and the risk of distribution delays. Therefore, the captain's experience is crucial for ensuring adequate supplies during a voyage.

The ordering and procurement stages (Table 1) are typically carried out by the ship owner or ship manager through established suppliers. This aligns with the findings of Hotmaida et al. (2024), who explain that the ship's provision procurement system is implemented through collaborative relationships with established suppliers such as fishing cooperatives and local agents. This strategy aims to maintain supply stability and ease logistics in providing ship needs, including fuel, ice, and daily crew consumption materials. The budgeting process is carried out after the needs planning is submitted to the ship owner. This process is in line with the research results of Ashilah & Junaidi, (2025), which stated that the operational costs of hand line vessel supplies at PPS Bungus are dominated by the needs for diesel, ice, and crew consumption materials. According to Hotmaida et al., (2024), coordination between ship management and suppliers is key to the success of the supply procurement process, where logistics deliveries such as diesel, ice, and consumption materials are carried out one day or several hours before the ship departs to maintain freshness and time efficiency. Therefore, delivery time is one indicator of efficiency in procurement.

Supply Storage

The storage of supplies on this handline vessel aligns with the findings of Fitriyashari et al. (2014), who emphasized that the receipt and inspection of supplies is a crucial factor in ensuring appropriate quantity and quality before the ship departs. Primary needs are the primary or most important requirements to be met to maintain operations. Secondary needs, on

the other hand, complement primary needs, while tertiary needs are optional (optional). Lau & Yip (2017) emphasized that a structured procurement procedure, grouped by type and arranged for storage locations, helps maintain the quality and safety of consumables on board.

The receipt process begins after the supplier delivers diesel fuel, oil, clean water, ice cubes, and consumables to the dock. Based on interview data, the captain and one to two crew members conduct inspections to match the quantity of supplies with the purchase receipt before recording them in the ship's ledger. This aligns with research by Hotmaida et al. (2024), which shows that ship supply handling activities must involve identifying needs, actual supply quantities, and implementing an effective on-board handling system to support sustainable operations at sea.

After receiving, supplies are organized and grouped according to their nature and type. Supplies are separated into three main groups: wet cargo (ice, meat, vegetables), dry cargo (rice, sugar, staples), and palatable cargo (cigarettes, spices, ready-to-eat foods). This grouping aims to prevent material damage, odor mixing, and facilitate access at sea. According to Rushton et al. (2010), proper supply storage, including systematic inventory management and control, is a key factor in ensuring the quality and durability of goods and logistical effectiveness.

Storage locations on board are adjusted according to space capacity and the nature of the materials. On handline vessels at the Bungus Port, operational materials such as diesel, oil, and clean water are stored at the stern (rear deck) and below deck in drums or jerry cans. Ice blocks are stored in the main hold, lined with large plastic bags to reduce direct contact with the hold's surface. Consumables are stored in the ship's galley, crew quarters, and the middle hold. Fresh produce, such as meat and vegetables, is stored in the refrigerated hold to prevent spoilage. This storage strategy was also found in research by Makodongan et al. (2021), which found that storing food items in an organized and classified manner is crucial to maintaining their quality and preventing them from spoiling during consumption logistics storage.

Furthermore, stowage patterns are significantly influenced by ship size. Ships measuring 9–16 GT have more limited storage space, requiring more compact material arrangements, sometimes requiring crew to carry some supplies in the sleeping area. Meanwhile, ships measuring 24–30 GT have larger holds, allowing for better separation of storage spaces. Ships with larger main dimensions have more hold capacity and storage space, allowing for greater storage capacity. This is consistent with Ramdhani et al., (2023), who stated that the main dimensions of a ship affect the ship's load capacity and technical operational aspects. Research by Ramadhanti et al., (2022) and Tandipuang et al., (2015) also stated that differences in hold capacity between GT classes cause significant variations in material storage capabilities and ship logistics arrangements. Storage time is also an important aspect. Operational supplies (diesel, oil, ice, and clean water) are shipped one day before departure, while consumables are shipped several hours before the ship departs. This is done to prevent spoilage of food, especially vegetables and meat. This finding aligns with research by Hidayah & Yasinto (2023), which emphasized that fresh food has a high rate of deterioration at ship cabin temperatures and therefore must be stored close to departure time.

Thus, the supply storage system on handline vessels at the Bungus Port can be categorized as good, as it meets the principles of material grouping, space efficiency, and timely storage. However, small vessels still face the challenge of limited space, requiring improvements to hold arrangement systems or modifications to storage facilities to optimize the quality and durability of supplies during fishing operations.

Supply Maintenance

The maintenance of supplies on handline ships aligns with Hotmaida et al. (2024) who stated that maintenance of consumable supplies includes material rotation, monitoring storage conditions, and periodic inspections during ship operations. Astarini et al. (2022) stated that post-sea evaluation of supplies is necessary to maintain effective management and prevent loss due to damage or improper storage.

In the second stage, Fitriyashari et al. (2014) confirmed that the use of plastic wrapping on ice cubes can reduce the melting rate by 12–18% during the first 3–4 days of a trip. Furthermore, clean water stored in tanks (1–3 tanks per ship) must be ensured to be free from oil or other engine residue. Therefore, the captain checks the tanks every 2–3 days. Research by Hotmaida et al. (2024) stated that protecting ship supplies includes efforts to maintain the quality and durability of materials such as oil, clean water, and consumables to ensure they remain suitable for use during the voyage.

This third stage aligns with Mouschoutzi & Ponis (2022), who state that on-board logistics procurement must be carried out according to operational needs to achieve material and cost efficiency. Furthermore, handling of sea supplies is a collection of activities to maintain the durability of supplies so that they can be used by fishermen. Handling is necessary to ensure supplies are used on time, in the correct quantities, and for their intended purpose (Hotmaida et al., 2024).

The supply maintenance system on handline vessels at the Bungus Port has been running well, characterized by the separation of materials according to their nature, systematic storage space arrangement, and measured consumption management. However, small vessels (9–16 GT) still experience limited storage space, resulting in a higher risk of material damage. Therefore, the development of additional storage facilities such as small insulated containers or the use of portable cooling boxes is necessary to support the durability of supplies during longer trips.

Inventory Control

Supply control aligns with the findings of Astarini et al. (2020), who emphasized that seafaring supply management requires attention to the quantity of supplies, operating duration, and weather conditions to determine the optimal amount of consumables to be maintained and prepared before the ship departs. In the first mechanism, Fitriyashari et al. (2014) asserted that daily monitoring of diesel fuel usage can reduce waste by 10–15%, especially on vessels that frequently move fishing grounds. Ice monitoring is also crucial because ice is a major determinant of catch quality.

The second mechanism is supported by research by Lau & Yip (2017), who stated that food consumption on ships has complex supply chain dynamics and requires sound control and procurement procedures to ensure sufficient and safe supplies for the crew during long voyages. The captain typically sets a water usage schedule to avoid shortages in the final days of the trip. Research by Yulianto et al. (2025) also states that effective freshwater management is a crucial aspect of ship operations, as water consumption must be predicted and optimized to ensure sufficient supplies throughout the voyage and prevent logistical shortages at sea. The third mechanism is an evaluation of remaining supplies after the ship returns to port. This evaluation includes checking the amount of remaining supplies, recording any waste, and recalculating operational costs. The ship owner records the amount of leftovers to use as a reference for subsequent trips, particularly when managing the amount of diesel fuel, consumables, and other additional needs.

CONCLUSION

Based on the research results, the hand line vessel supply management system at PPS Bungus encompasses four main stages: procurement, storage, maintenance, and control. The procurement process is carried out through planning based on the captain's experience, supported by a network of established suppliers. Storage is carried out by grouping materials based on their physical properties to maintain quality and prevent damage. Maintenance of supplies during the trip is carried out by protecting materials from environmental factors and regulating daily consumption by the captain. Control is carried out through recording usage and evaluating remaining supplies after the trip as a basis for subsequent planning.

ACKNOWLEDGEMENT

The authors would like to thank the Bungus Ocean Fisheries Port (PPS) for permission and support during the research. They also thank the captains, crew members, supply agents, and all parties who provided information and assisted with data collection in the field. Appreciation is also extended to the Fisheries Resource Utilization Study Program, Faculty of Animal Husbandry, University of Jambi, for their academic support in completing this research.

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