



The Role Of Traditional Shipping In Supporting Logistics Distribution At Pasar Baru Babang Port, South Halmahera

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Abstract

The archipelago region of South Halmahera relies on sea transportation to maintain the continuity of supply for community needs and to expand market access for local commodities. This study analyzes the characteristics and role of traditional shipping (pelayaran rakyat), assesses the effectiveness of logistics distribution services, and formulates strengthening strategies through Pasar Baru Babang Port. The study uses a descriptive-evaluative case study approach with a dominant qualitative orientation, supported by descriptive quantitative analysis. Research evidence includes operational data for 2021–2025 contained in separate documents from the Department of Transportation of South Halmahera Regency, obtained through a Head of Division (Kabid) at the agency, along with documents on existing conditions and port layouts and field documentation on fleets, routes, cargo, facilities, and loading/unloading activities. The exact title or number of the operational documents and the date they were obtained have not been specified in the available information. The results show that around 20 barebo vessels, consisting of motorized wooden boats generally under 500 GT, serve Gane, Makian, Kayoa, Obi, Kasiruta, Mandioli, and other small islands. During 2021–2025, a total of 5,248 ship calls were recorded. Unloaded general cargo reached 226,130.81 m³ and loaded cargo was 236,714.74 m³, while unloaded fuel (BBM) reached 246,976 m³ and loaded fuel was 14,332 m³. Based on the sum of both cargo groups, total loaded cargo was equivalent to 53.06% of total unloaded cargo, indicating a cumulative flow imbalance. Traditional shipping is functionally effective as a feeder and last-mile connectivity, but remains sub-optimal due to limited berthing space, a trestle transition point approximately 3.40 m wide, shared apron usage, schedule information uncertainty, and weak operational record-keeping. Service enhancement is prioritized through return-cargo consolidation, operational zone management, data standardization, safety improvements, inter-actor coordination, and gradual facility development.

Keywords: community shipping (traditional shipping / folk shipping), logistics distribution, barebo vessel (bareboat), inter-island connectivity, Pasar Baru Babang Port

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INTRODUCTION

As an archipelagic country, Indonesia requires a transportation system capable of connecting production centers, trade centers, coastal areas, and consumption areas separated by the sea. Sea transportation supports accessibility,

supply continuity, and the distribution of economic activity. Traditional shipping (pelayaran rakyat) remains important where small islands and shallow-water ports are not efficiently served by larger commercial vessels. Research on Indonesian island logistics has examined port performance and

its relationship with regional economic development [1], sustainable logistics for remote islands [2], and maritime logistics costs in eastern Indonesia [3], while other studies have discussed inter-island service performance and partnership models [4], [5]. Studies specifically on traditional shipping have also examined logistics integration and operational competitiveness [6], [7]. Together, these studies show that infrastructure, cargo aggregation, service coordination, and logistics costs are important, but their analytical focus and geographic coverage differ.

An evidence gap remains at the individual port-node level: there is limited integrated assessment that connects traditional-vessel visits, loaded and unloaded cargo, physical bottlenecks, service-timing information, and operational coordination at one small-island port. This study addresses that gap through a case study of Pasar Baru Babang Port, South Halmahera. Its specific contribution is to combine five-year operational records (2021–2025), facility dimensions, route information, and documented field conditions in one descriptive assessment, then use the results to propose staged management and facility priorities. The study aims to: (1) describe the characteristics and distribution role of traditional shipping; (2) assess service effectiveness using the evidence available for accessibility, capacity, continuity, reach, timeliness, flow smoothness, facilities, safety, and coordination; and (3) identify internal and external factors for strengthening strategies. Because complete service-time data are unavailable, the study does not claim to measure punctuality or end-to-end delivery performance quantitatively.

METHOD

The research uses a descriptive-evaluative case study approach with a dominant qualitative orientation supported by descriptive quantitative analysis. The case study is bounded by the traditional-shipping service system operating through Pasar Baru Babang Port, Babang Village, East Bacan District, South Halmahera Regency. The evidence described in the manuscript comprises 2021–2025 operational data contained in separate documents from the Department of

Transportation of South Halmahera Regency (Dinas Perhubungan Kabupaten Halmahera Selatan), obtained through a Head of Division (Kabid) at the agency, documents on port layout and existing conditions, and field documentation of vessels, routes, cargo, facilities, and loading/unloading activities. The supplied operational tables are the immediate source of the reported vessel-call and cargo-flow totals. The exact document title or number and the date the documents were obtained have not been provided and must be added by the authors after checking the original documents. The authors should verify the annual totals against the source records, check for duplicate entries and missing months, and reconcile the units and definitions used for general cargo and fuel.

The research design also refers to observation, semi-structured interviews, and operational logging; however, interviewee numbers, selection criteria, interview dates, and a verification protocol are not reported in the available manuscript. Accordingly, the present analysis interprets only the documented tables, facility dimensions, and field descriptions, and does not attribute findings to unreported interview data. The unit of analysis is the traditional-shipping service system, with embedded units consisting of vessels and trips, cargo, loading/unloading processes, facilities, routes, and ship–land relations. Quantitative data were analyzed using sums, averages, percentage changes, and loaded-to-unloaded flow ratios. Total unloading was calculated by adding general cargo unloaded and fuel unloaded; total loading was calculated by adding general cargo loaded and fuel loaded. Qualitative and visual data were used to interpret the operational context. Alternative strategies were formulated using a SWOT/TOWS matrix.

AUTHOR ACTION REQUIRED BEFORE SUBMISSION: Confirm and insert the exact title and/or document number of the separate operational documents supplied by the Department of Transportation of South Halmahera Regency through a Head of Division (Kabid), and the date the documents were obtained. Also confirm that the annual totals were checked against the source records, including checks for duplicate entries, missing

months, and consistent cargo units/definitions. Do not invent these details if they are not documented.

Alternative strategies were formulated using a SWOT matrix that connects strengths, weaknesses, opportunities, and threats. In drafting the article, period labels and figures follow the provided operational tables; interpretations do not use claims that cannot be traced to the tables or documentation.

Fasilitas/ Unsur	Spesifikasi/ Kondisi	Implikasi Operasional
Kepala dermaga	80,90 × 9,96 m; luas geometris sekitar 805,76 m ²	Ruang utama untuk tambat, bongkar muat, penumpukan sementara, dan pergerakan pekerja.
Trestel/p enghubu ng	16,80 × 5,56 m; luas geometris sekitar 93,41 m ²	Koridor hubungan dermaga–daratan untuk barang, pekerja, dan kendaraan.
Titik peralihan	Lebar sekitar 3,40 m	Bagian tersempit dan berpotensi menjadi bottleneck saat arus bertemu.
Kolam dan alur	Kedalaman sekitar 0,5– 4,99 m	Memengaruhi olah gerak, waktu sandar, dan kesesuaian sarat kapal.
Pos jaga/oper asional	Satu unit pada sisi trestel	Mendukung pengawasan akses, pencatatan, dan koordinasi.
Area sekitar	Dekat pasar dan akses jalan kendaraan	Mempermudah alih moda, tetapi membutuhkan pemisahan arus.

Figure 1. Research stages of traditional shipping and logistics distribution

RESULTS AND DISCUSSION

General Overview of Pasar Baru Babang Port

Pasar Baru Babang Port is located on the coast of Bacan Island at approximately $0^{\circ}37'46.0''$ South Latitude and $127^{\circ}36'33.5''$ East Longitude. The port is adjacent to

the market area, residential settlements, and a road network accessible by vehicles. This proximity supports the modal transfer process, as goods from ships can be transferred to vehicles and carried onward to the market or merchants' warehouses. At the same time, the close proximity of spatial functions requires regulation so that the activities of vehicles, workers, goods, and ships do not impede one another.

Tables, figures and equations



Figure 2. Profile of Pasar Baru Babang Port

Table 1. Main facility conditions and operational implications

The extended quay wall provides the main service area, but the geometric length does not equal the effective mooring length. Ship positioning, safety clearances, mooring lines, hatch opening clearance, cargo placement, and worker pathways reduce the space that can be used simultaneously. The transition point, about 3.40 m wide, becomes the most critical section because vehicles, workers, and goods can converge in the same corridor. Therefore, service capacity must be understood as the result of the interaction between physical dimensions and operational governance, rather than merely the building area.

Fleet Characteristics, Routes, and Distribution Functions

The main fleet analyzed consists of approximately 20 *barebo* vessels. These vessels are generally motorized wooden ships with capacities under 500 GT, featuring open deck space, and capable of carrying mixed cargo. This flexibility allows the vessels to

serve diverse needs on routes where volumes are not always sufficient for large commercial ships. However, mixed cargo—such as sacks, cardboard boxes, LPG cylinders, building materials, and commercial packages—requires proper segregation, lashing, and weather protection. The service network connects Bacan Island with Gane, Makian, Kayoa, Obi, Kasiruta, Mandioli, and other small islands. On the outbound journey from Babang, the ships carry basic necessities, fuel, building materials, and trade goods. On the return trip, they carry fish, copra, nutmeg, cloves, coconuts, agricultural produce, and local commodities. This pattern illustrates the dual function of traditional shipping (*pelayaran rakyat*): maintaining supply continuity and opening market access. Network-wise, the *barebo* vessels act as feeders and last-mile connectivity, connecting consolidation hubs to destination islands that are not always directly served by larger ships.

Ship Visit Trends

Table 2. Barebo ship visits in 2021–2025

Tahun	Kunjungan Kapal (call)		Indikasi Rata-rata Call per Kapal	
Tahun	Baran Umum Bongkar (m ³)	Barang Umum Muat (m ³)	BBM Bongkar (m ³)	BBM Muat (m ³)
2021	37.817	58.972	33.900	0
2022	42.247	61.058	32.230	0
2023	37.543,81	62.135,74	46.715	0
2024	60.605	26.043	50.775	1.539
2025	47.918	28.506	83.356	12.793
Jumlah	226.130,81	236.714,74	246.976	14.332

2021	1.241	62,1
2022	1.268	63,4
2023	1.137	56,9
2024	700	35,0
2025	902	45,1
Jumlah rata-rata	5.248 / 1.049,6 per tahun	52,5 per kapal per tahun

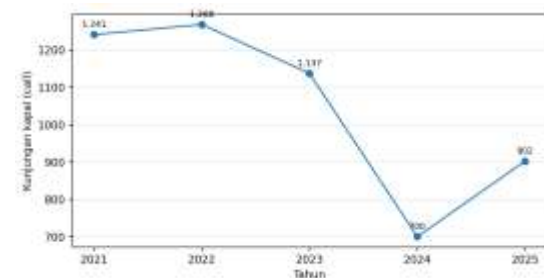


Figure 3. Trends in barebo ship visits in 2021–2025

Over five years, a total of 5,248 visits or an average of 1,049.6 calls per year were recorded. The highest number of visits occurred in 2022, reaching 1,268 calls, while the lowest value occurred in 2024 with 700 calls. In 2025, visits increased to 902 calls, representing a growth of approximately 28.86% compared to the previous year, but still below the 2021–2023 levels. Assuming around 20 active vessels, the indicative average reached 52.5 calls per vessel per year. This figure shows that service intensity is formed through repeated trips by a relatively limited fleet.

General Cargo and Fuel Traffic

Table 3. General cargo and fuel flow for the years 2021–2025

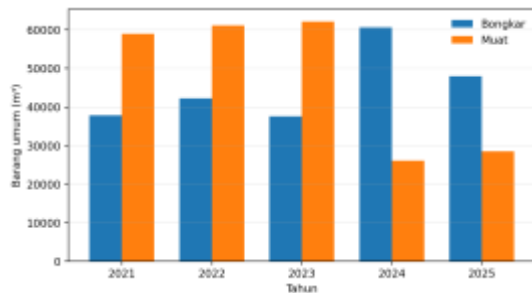


Figure 4. Development of general cargo loading and unloading for 2021–2025

General cargo unloaded during 2021–2025 reached $226,130.81 \text{ m}^3$, while general cargo loaded reached $236,714.74 \text{ m}^3$. The cumulative loaded-to-unloaded ratio for general cargo was 104.68% , indicating that non-fuel commodity flows were relatively balanced and even slightly higher in the loading direction. The annual pattern shifted after 2023: loaded general cargo, which was previously greater than unloaded cargo, dropped sharply in 2024 and had not fully recovered by 2025. Fuel flow exhibited a different pattern. Total fuel unloaded reached $246,976 \text{ m}^3$, while fuel loaded was only $14,332 \text{ m}^3$, or 5.80% of the unloaded volume. The dominance of inbound flow highlights the service region's dependency on energy supply from distribution centers. When general cargo and fuel are combined, total unloading reached $473,106.81 \text{ m}^3$ and total loading reached $251,046.74 \text{ m}^3$. The overall loaded-to-unloaded ratio stood at 53.06% , meaning that cumulatively, vessels still face a round-trip cargo imbalance. This condition has the potential to increase per-unit costs on return journeys and reduce capacity utilization.

Effectiveness of Logistics Distribution Services

Service effectiveness cannot be evaluated solely by the number of ship calls. Service is deemed effective if it can reach regions, maintain continuity, provide appropriate capacity, facilitate intermodal transfers, maintain safety, and provide reliable information. Based on available evidence, physical accessibility and route coverage represent the strongest dimensions, whereas time certainty and information coordination

remain dimensions that cannot yet be adequately measured.

Table 4. Effectiveness profile based on available evidence

Dimensi	Bukti Empiris	Penilaian	Batas Kesimpulan
Aksesibilitas	Dekat pasar; apron dan jalan dapat diakses kendaraan	Relatif mendukung	Belum tersedia data waktu dan biaya akses pengguna.
Jangkauan	Melayani Gane, Makian, Kayoa, Obi, Kasiruta, Mandioli, dan pulau kecil	Mendukung fungsi penghubung	Frekuensi per rute belum tersedia.
Kapasitas	Sekitar 20 kapal; kepala dermaga 80,90 m; titik sempit 3,40 m	Cukup, tetapi tertekan saat kedatangan berdekatan	Berth occupancy dan faktor muat per kapal belum tersedia.
Kontinuitas	Aktivitas tercatat setiap tahun 2021–2025	Pelayanan tetap berlangsung	Keteraturan harian/bulanan belum dinilai.
Ketepatan waktu	Data jadwal, keterlambatan, pembatalan, dan waktu tunggu tidak lengkap	Belum dapat dinilai	Memerlukan logbook perjalanan dan catatan waktu.
Kelancaran arus	Alih moda kapal–apron–kendaraan	Cukup mendukung, perlu penataan	Produktivitas bongkar muat belum tersedia.

	berlangsung langsung		
Keselamatan/fasilitas	Muatan campuran, kapal berdekatan, ruang terbuka, kedalaman bervariasi	Perlu penguatan pengendalian risiko	Bukan audit teknis kelaiklautan.
Koordinasi/informasi	Belum terdapat sistem jadwal dan pencatatan yang seragam	Belum optimal	Memerlukan SOP dan kanal informasi resmi.

The smooth operation of loading and unloading is supported by the short distance between the vessel, apron, and vehicle access. However, open space is shared for temporary stacking, worker movement, vehicles, and mooring lines. Goods that remain on the apron for too long reduce space capacity and increase exposure to heat and rain. These conditions emphasize the need for unloading zones, loading zones, worker pathways, vehicle lanes, stacking time limits, and temporary weather protection.

From a safety perspective, the flexibility of barebo vessels needs to be accompanied by risk control. Mixed cargo must be segregated according to type and hazard level, properly secured, and must not block walkways or emergency exits. The available guard posts can serve as operational control points if supported by signs, road markings, lighting, fire extinguishers, recording, and directional officers during peak hours. This assessment is not intended as a ship seaworthiness audit, but rather as an identification of risk management needs within the service system.

Internal Factors, External Factors, and Strengthening Strategies

Internal factors supporting services are the flexibility of around 20 barebo vessels, the ability to transport mixed cargo, experience on inter-island routes, and direct relationships

between operators, traders, and users. Inhibiting internal factors include non-uniform cargo arrangement, limited manifests and capacity recording, and the unavailability of load factor data per vessel and per route. Supporting external factors include the port's position as a consolidation hub, proximity to markets, vehicle access, and an extensive route network. External inhibiting factors consist of limited effective berthing space, trestle bottlenecks, varying water depths, cargo imbalance, and data inconsistency.

The findings are consistent with, but add a local operational perspective to, previous empirical studies. Research on remote and rural islands in Indonesia identifies infrastructure, human resources, logistics providers, institutions, and key commodities as important drivers of sustainable connectivity [2]. A study of maritime logistics in eastern Indonesia links local-port performance with regional economic development [1], while a later analysis of island-province logistics costs highlights the relationship between local economic activity, cargo throughput, and maritime transport costs [3]. Research on inter-island transport in Makassar likewise identifies infrastructure and service-planning issues as priorities for improving performance [4], and research on traditional shipping integration stresses stakeholder coordination and policy support [5], while freight-network integration research also emphasizes the need to coordinate distribution links across the archipelago [12]. These studies support the importance of port facilities and coordination, but they do not provide a directly comparable cargo-flow ratio for Pasar Baru Babang.

The present case adds a five-year operational profile and a specific cargo-flow comparison: general cargo loading is 104.68% of general cargo unloading, whereas fuel loading is only 5.80% of fuel unloading. When the two categories are combined as recorded in the source tables, the overall loading-to-unloading ratio is 53.06%. This aggregate ratio should be interpreted cautiously: it is a ratio of recorded volumes, not a direct measure of vessel utilization, economic efficiency, or empty-return capacity. Such conclusions would require vessel-level capacity, route-level manifests, and consistent cargo-unit

definitions. Likewise, although schedule uncertainty is identified in the field description, the absence of arrival/departure timestamps, waiting times, cancellations, and service-duration records means punctuality and service time cannot be quantified. Therefore, the most defensible immediate priorities are standardizing operational records, coordinating schedule information, organizing loading/unloading zones, and consolidating return cargo before making major capital-investment decisions.

Table 5. TOWS matrix of community shipping strengthening strategy

Kombinasi	Strategi	Aktor Utama	Indikator Awal
SO	Mengonsolidasikan ikan, kopra, pala, cengkih, kelapa, dan hasil pertanian sebagai muatan balik.	Operator, pedagang, pemerintah daerah	Rasio muatan balik dan jumlah komoditas keluar meningkat.
SO	Menyinkronkan jadwal kapal dengan kegiatan pasar, bongkar muat, dan angkutan darat.	Pengelola pelabuhan, operator, pedagang, pengangkutan	Informasi jadwal tersedia dan waktu tunggu menurun.
WO	Menata zona sandar, bongkar, muat, penumpukan sementara, jalur pekerja, dan jalur kendaraan.	Pengelola, operator, TKBM	Konflik arus berkurang dan ruang lebih tertib.

WO	Menerapkan format pencatatan kapal, rute, waktu, volume, kapasitas, dan muatan balik secara seragam.	Pengelola dan instansi perhubungan	Data bulanan lengkap dan dapat dibandingkan.
ST	Menyusun prosedur tambat, cuaca, penundaan, pengaman muatan, dan keadaan darurat.	Otoritas pelabuhan, pengelola nakhoda	Keputusan operasional dan gangguan terdokumentasi.
WT	Mengembangkan ruang terlindung, penerangan, alat keselamatan, peralatan bongkar muat, dan kapasitas dermaga secara bertahap.	Pemerintah dan pengelola pelabuhan	Kapasitas meningkat berdasarkan data kebutuhan terukur.

The short-term priority is the improvement of governance that does not require major construction investment, namely standardized record-keeping, schedule information channels, operational zones, cargo securing, and vehicle coordination. The medium-term priority is the provision of sheltered spaces, lighting, safety facilities, and simple cargo handling equipment. Pier development or dredging needs to be placed as a phased priority after verified data on berth occupancy,

service time, vessel draft, and cargo growth are available.

CONCLUSION

Traditional shipping (pelayaran rakyat) through Pasar Baru Babang Port performs a strategic feeder and last-mile role for the island region of South Halmahera. Approximately 20 wooden motor vessels serve routes to Gane, Makian, Kayoa, Obi, Kasiruta, Mandioli, and other small islands. The operational tables record 5,248 vessel calls during 2021–2025. General cargo loading reached 104.68% of unloading, fuel loading reached 5.80% of unloading, and the combined loading-to-unloading volume ratio was 53.06%. The combined ratio indicates an imbalance in the recorded aggregate flows, but it should not be treated as a direct vessel-utilization measure because vessel capacity and route-level cargo data are unavailable.

Service effectiveness is strongest in route reach and physical access, while punctuality, waiting time, berth occupancy, and cargo productivity cannot be measured adequately from the available records. The main operational constraints documented are limited effective berthing space, a trestle transition point about 3.40 m wide, shared apron use, mixed-cargo handling, uncertain schedule information, and inconsistent record-keeping. Recommended actions are return-cargo consolidation; clear berthing, loading, stacking, worker, and vehicle zones; standardized manifests and logbooks; a shared schedule-information channel; safety improvements; and phased facility development based on verified demand and service-time data.

This study is limited by its single-port case design, reliance on the operational tables and field documentation available to the authors, and the absence of complete source metadata in the manuscript. It also lacks verified vessel-level capacity/load-factor data, route-specific cargo records, and timestamped data on arrival, departure, waiting, loading, and unloading. Consequently, the results describe recorded cargo-flow patterns and documented operational conditions rather than causal effects or a complete quantitative service-performance score. Future work should

validate the original port registers, document data provenance, and collect standardized trip-level records and stakeholder interviews.

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