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DYNAMICS OF FISH CATCH PRODUCTION AT FISHING PORTS IN THE NORTH COAST OF WEST JAVA

DINAMIKA PRODUKSI IKAN HASIL TANGKAPAN PADA PELABUHAN PERIKANAN DI PANTAI UTARA JAWA BARAT

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ABSTRACT

The North Coast of West Java is a strategic fish landing corridor in Indonesia, but production performance varies among fishing ports. This study analyzes changes in production volume and value and evaluates their relationship with port facilities, land status, and institutional management during 2020–2024. We compiled secondary data from official port records and government fisheries databases and analyzed them using trend analysis, contribution analysis, and descriptive assessments of facility, land, and institutional conditions. The results showed that total production volume increased from 180,054.087 tons (in 2020) to 228,313.425 tons (in 2024), while production value rose from IDR 3.32 trillion to IDR 6.38 trillion. The annual average production reached 216,990.037 tons, with an average value of IDR 5.36 trillion. However, production growth was mainly concentrated in Karangsong, Eretan Kulon, and Gebang Mekar, indicating uneven performance among ports. The analysis also showed that high-production ports were not always supported by fully complete and optimal basic facilities, while land status and institutional capacity remained important management issues. These findings indicate that production dynamics in the North Coast of West Java are related not only to fishing activity, but also to facility readiness, land legality, and port management effectiveness. Therefore, port development should be directed toward a performance-based and integrated fishing port network to support sustainable capture fisheries management in the region.

Keywords: fishing port, North Coast of West Java, port infrastructure, production value, production volume

ABSTRAK

Pantai Utara Jawa Barat merupakan koridor strategis pendaratan ikan di Indonesia, namun kinerja produksi hasil tangkapan antarpelabuhan masih tidak merata. Penelitian ini bertujuan untuk menganalisis perubahan volume dan nilai produksi serta mengevaluasi keterkaitannya dengan fasilitas pelabuhan, status lahan, dan tata kelola kelembagaan selama periode 2020–2024. Data sekunder diperoleh dari laporan resmi pelabuhan dan basis data perikanan pemerintah, kemudian dianalisis menggunakan analisis tren, analisis kontribusi, dan penilaian deskriptif terhadap kondisi fasilitas, lahan, serta kelembagaan. Hasil penelitian menunjukkan bahwa volume produksi meningkat dari 180.054,087 ton (tahun 2020) menjadi 228.313,425 ton (tahun 2024), sedangkan nilai produksi naik dari Rp 3,32 triliun menjadi Rp 6,38 triliun. Rata-rata produksi tahunan mencapai 216.990,037 ton, dengan nilai rata-rata Rp 5,36 triliun. Namun, peningkatan produksi terutama terkonsentrasi pada Karangsong, Eretan Kulon, dan Gebang Mekar, sehingga menunjukkan adanya variasi kinerja antarpelabuhan. Hasil analisis juga menunjukkan bahwa pelabuhan dengan produksi tinggi belum selalu didukung oleh kelengkapan dan kondisi fasilitas dasar yang optimal, sementara status lahan dan kapasitas kelembagaan masih menjadi isu penting dalam pengelolaan pelabuhan. Temuan ini menunjukkan bahwa dinamika produksi di Pantai Utara Jawa Barat tidak hanya berkaitan dengan aktivitas penangkapan, tetapi juga dengan kesiapan fasilitas, legalitas lahan, dan efektivitas pengelolaan pelabuhan. Oleh karena itu, pengembangan pelabuhan perlu diarahkan pada jaringan pelabuhan perikanan yang terintegrasi dan berbasis kinerja untuk mendukung keberlanjutan perikanan tangkap di wilayah tersebut.

Kata kunci: infrastruktur pelabuhan, nilai produksi, Pantai Utara Jawa Barat, pelabuhan perikanan, volume produksi

INTRODUCTION

The North Coast of West Java is a major landing corridor for fish catches in Indonesia, directly facing the Indonesian National Fisheries Management Area (WPPNRI) 712 or the Java Sea. It is also a capture fisheries center connected by land distribution networks to Jakarta, Bekasi, Karawang, and Bandung, as well as fish processing industries in Indramayu and Cirebon. The Nusantara Fishing Port (NFP), Coastal Fishing Port (CFP), and Fish Landing Base (FLB) along this area form a logistics hub that determines the flow of fishery commodities from sea to market.

Empirically, data from the Regional Technical Implementation Unit (RTIU) of Muara Ciasem Fishing Port and Information Center (FPIC) of the Ministry of Marine Affairs and Fisheries (MMAF) show an increasing trend in fish catch production at the ports of the north coast in West Java during 2020–2024. Total production volume increased from 180,054.087 tons (in 2020) to 228,313.425 tons (in 2024), while production value increased from IDR 3.32 trillion to IDR 6.38 trillion (PIPP KKP 2024; UPTD Pelabuhan Perikanan Muara Ciasem 2024). However, this growth was concentrated in Karangsong, Eretan Kulon, Gebang Mekar, Dadap, and Juntinyuat, while other ports contributed less, so the performance disparity between ports needs to be analyzed in relation to production distribution, facilities, land status, and management institutions.

Within the distribution network, catches from the North Coast of West Java flow through direct marketing channels at fish auction facilities (FAF), wholesalers, and processing industries, thus linking port-level supply directly to local, regional, and industrial market demand. The concentration of production at certain ports also places a heavy burden on landing facilities and their distribution systems, thus impacting distribution efficiency and the stability of fish supplies to regional markets (Gumilang *et al.* 2016; Aura *et al.* 2019).

The dynamics of capture fisheries production are also influenced by environmental factors and climate change (Wiryawan *et al.* 2020; Olivera-Espinosa *et al.* 2024), as variability in sea surface temperature, rainfall, and seasonal patterns impacts the migration and species composition of the catch. Long-term fishing pressure in the Java Sea demands evidence-based management (Izzati and Ummah 2018), necessitating adaptive service capacity for fishing ports.

Fishing ports are crucial nodes in the fisheries supply chain, from landing and post-harvest handling to distribution to markets and processing industries (Aura *et al.* 2019). The availability of docks, port basins, fish auction facilities (FAF), cold storage, clean water, electricity, and road access supports the quality and economic value of the catch. Therefore, ports with better facilities tend to attract more landing activity (Aprilla *et al.* 2022). Production performance thus reflects not only the potential of fish resources but also the readiness of facilities, land legality, institutional effectiveness, and port logistics integration.

This performance disparity indicates that the fishing port network in the North Coast of West Java is suboptimal, primarily due to limited basic facilities, unclear land status and use, limited cold chain access, uneven digitization of fish auction facility services, changing fishing season patterns (Olivera-Espinosa *et al.* 2024), and institutional constraints at ports with extensive management areas. Concentrating production at major ports has the potential to create imbalances in the fisheries logistics system. From a regional economic development perspective, optimizing port networks is crucial to ensuring supply stability, distribution efficiency, and added value for fishery commodities through integrated performance-based management encompassing infrastructure, institutions, and market connectivity (Wahyudi *et al.* 2018).

Studies on the dynamics of catch production at the North Coast of West Java are still limited and have not been conducted longitudinally, utilizing an integrative approach combining quantitative production data with analysis of facilities, land status, and port institutions. This study aims to (1) analyze the dynamics of catch production volume and value at the North Coast of West Java during 2020–2024; and (2) evaluate their relationship to the condition of facilities, land status, and port institutions, thereby providing an empirical basis for planning the development of a more integrated, efficient, and performance-based fishing port network.

METHODS

This study employed a quantitative descriptive approach, supported by qualitative descriptive analysis, to examine the dynamics of catch production volume and value at fishing ports along the North Coast of West Java from 2020 to 2024, as well as their relationship with facility conditions, land status, and port institutional arrangements.

Time and location of research

The study was conducted in 2025 using production data from 2020–2024. The research sites encompassed a network of fishing ports along the North Coast of West Java, spanning Bekasi, Karawang, Subang, Indramayu, and Cirebon City and Regency, and included Nusantara Fishing Port, Coastal Fishing Port, and Fish Landing Base classifications; these sites were selected based on their representativeness as a fish landing corridor directly facing WPPNRI 712. The distribution of the sites is presented in Figure 1.

Data types

The data used consisted of quantitative data, specifically production volume (tons) and production value (IDR) for each port from 2020 to 2024, as well as supporting qualitative data regarding facility conditions and completeness, land status and area, institutional structure, and port management aspects.

Data collection method

Data were collected through document review and the compilation of secondary data from official sources, namely port annual reports, the Muara Ciasem Fishing Port Technical Implementation Unit (RTIU) database, Fishing Port Information Center of the Ministry of Marine Affairs and Fisheries (FPIC-MMAF), Directorate General of Capture Fisheries (DGCF) documents, port technical and planning documents, relevant regulations, management reports, and limited field verification where available. The facilities examined included the wharf, harbor basin, fish auction facility (FAF), access roads, clean water supply, electricity, sanitation facilities, administrative buildings, and other supporting facilities.

Data analysis

Quantitative data analysis involved examining annual trends, year-on-year growth, and the contribution of each port to the total production volume and value of the West Java North Coast region, alongside a ranking of port performance. Key contributing ports were identified based on accumulated production volume and value, percentage contribution to total production, and performance consistency throughout the observation period.

These four criteria were used to classify ports into three performance categories. "Dominant ports" exhibited the highest and most consistent accumulated production volumes and values; "key contributing ports" ranked next based on accumulated volume and/or value and/or significant volume growth; while "supporting ports" made relatively small cumulative contributions, despite some showing positive growth. Additionally, the annual share of each port and the growth rates of production volume and value from 2020 to 2024 were calculated to assess shifts in the port network structure.

Figure 1. Distribution of fishing port locations on the North Coast of West Java.

Analysis regarding facilities, land, and institutional aspects was conducted using a descriptive-qualitative approach, comparing the condition of each port against established fishing port management indicators. These indicators included the completeness and condition of primary, functional, and supporting facilities; land area and ownership status relative to applicable regulations; and management structures, spans of control, and service coordination patterns. The findings were then correlated with production volume and value patterns to explain performance variations across the ports.

RESULTS AND DISCUSSION

Dynamics of catch production volume

Between 2020 and 2024, fishing ports along the North Coast of West Java exhibited an increase in catch volumes, albeit with variations across years and individual ports. Total production volume rose from approximately 180,000 tons in 2020 to over 228,000 tons in 2024, representing an average annual growth rate of 6.1%. The most significant increase occurred in 2021, driven by the recovery of fishing, landing, and distribution activities following the disruptions caused by the COVID-19 pandemic.

While this growth indicates intensified landing activities at certain ports, it cannot be automatically interpreted as an overall improvement in port operational systems. Tabulated data reveal that Juntinyuat, Gebang Mekar, Eretan Kulon, Bungko Lor, and Dadap experienced relatively substantial volume increases, thereby playing an increasingly significant role in the fish landing landscape of West Java's North Coast. These developments align with findings by Aprilla *et al.* (2022), which indicate that landing volumes are linked to the availability of port infrastructure and can be influenced by the operational characteristics of fishing gear and the composition of landed fish species (Kaliyamoorthy *et al.* 2022).

The rise in volume at specific ports may reflect shifts in landing patterns or increased utilization of certain ports by fishing boats. However, any hypothesis regarding a shift in landing routes requires cautious interpretation, as this study relies on secondary production data rather than direct tracking of fleet movements. Variations in volume performance across ports are associated with supporting facilities and distribution chain efficiency (Gurung *et al.* 2016), as well as differences in fishing gear types, fishing seasons, and species composition; ecological characteristics and species behavior can influence landing patterns and the resulting pressure on fishery resources (Mbaru *et al.* 2019). Production volumes by port are presented in Figure 2, illustrating the annual trends for eleven major ports: Karangsong, Eretan Kulon, Gebang Mekar, Dadap, Juntinyuat, Bungko Lor, Muara Ciasem, Ciparage, Blanakan, Bondet, and Rawa Meneng. Gebang Mekar and Eretan Kulon showed consistent growth, rising from approximately 15,000 tons in 2020 to over 40,000 tons in 2024; this underscores the importance of developing ports that are aligned with regional potential and adaptable to spatial shifts in capture fisheries. These findings indicate a need for selective facility upgrades based on performance analysis results, rather than relying solely on a port's administrative status.

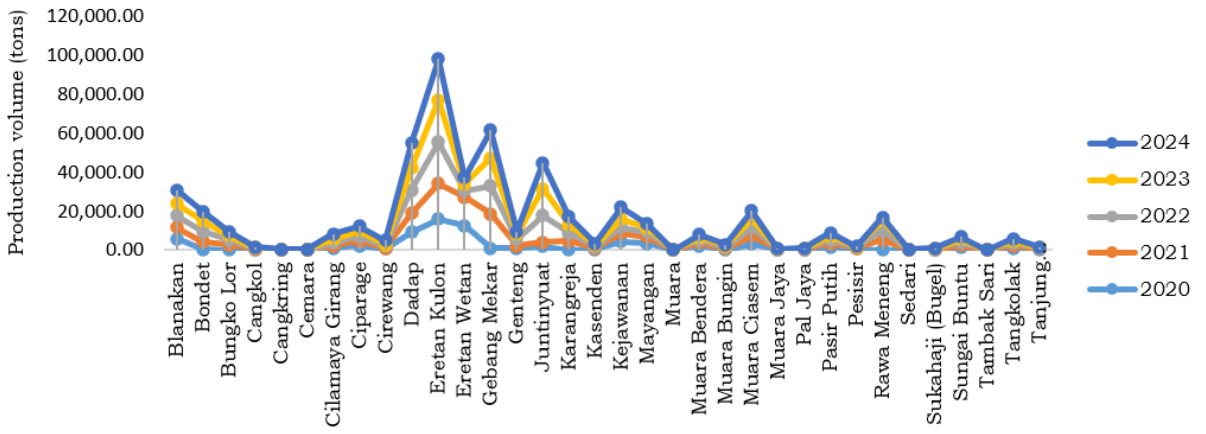

Figure 2. Production volume of West Java's North Coast (Pantura) fishing ports, 2020–2024.

Dynamics of catch production value

Between 2020 and 2024, the value of catch production at fishing ports along the North Coast of West Java rose from IDR 3.32 trillion to IDR 6.38 trillion, despite year-to-year fluctuations. While this increase indicates a rise in the economic value of landed catches, it does not necessarily reflect a volume increase at every port; the 2021 rise, for instance, can be attributed to the post-pandemic recovery of marketing and distribution, alongside potential shifts in fish prices and catch species composition.

As shown in Figure 3, Gebang Mekar, Eretan Kulon, and Juntinyuat make significant contributions to the production value of the West Java North Coast, even though their production volumes do not always match that of Karangsong. This demonstrates that production value is determined not only by the quantity of the catch but also by fish prices, species composition, handling quality, and access to market distribution.

This trend aligns with the findings of Gurung *et al.* (2016), who stated that economic value is also determined by commodity quality, market prices, and supply chain efficiency; consequently, ports with superior post-harvest handling and market access have the potential to achieve higher production values, even without handling the largest volumes (Aprilla *et al.* 2022).

Year-to-year fluctuations in production value reflect the sensitivity of capture fisheries to fishing seasons, marine weather conditions, fish species composition, catch quality, market prices, and demand from both domestic markets and the processing industry (Gurung *et al.* 2016; Wiryawan *et al.* 2020; Olivera-Espinosa *et al.* 2024); therefore, monitoring these trends is crucial for port development planning and the prioritization of area-based interventions. Among all the fishing ports analyzed, Karangsong consistently dominates in terms of production performance, warranting a more detailed examination of its operations.

Production performance and production value of Karangsong Port

The Karangsong Fishing Port warrants specific discussion as it was the largest contributor to the fish landing system on the North Coast of West Java between 2020 and 2024, consistently recording annual volumes exceeding 100,000 tons. Based on aggregated data from 2020 to 2024, Karangsong accounted for 557,487 tons or 51.4% of the total production volume for the North Coast of West Java, which amounted to 1,084,950.187 tons. Figure 4 presents the annual dynamics of Karangsong's production volume from 2020 to 2024. Karangsong's production volume rose from 106,500 tons in 2020 to 116,147 tons in 2021, dipped to 111,045 tons in 2022, and subsequently increased again to 111,544 tons in 2023 and 112,251 tons in 2024; thus, its landing volume remained relatively large and stable, despite some fluctuations.

Figure 5 presents the annual dynamics of Karangsong's production value from 2020 to 2024. Karangsong's production value increased from IDR 2.00 trillion in 2020 to IDR 3.34 trillion in 2024, although it fluctuated across the observation period, with the highest value recorded in 2023 at IDR 3.41 trillion. This increase is more appropriately interpreted as the result of a combination of landing volume, fish prices, composition of catch types, and smooth distribution, rather than direct evidence of success in maintaining commodity quality or supply chain efficiency. Karangsong's share of the total regional production value also decreased, from 60.4% in 2020 to 52.4% in 2024, although the absolute value continued to increase.

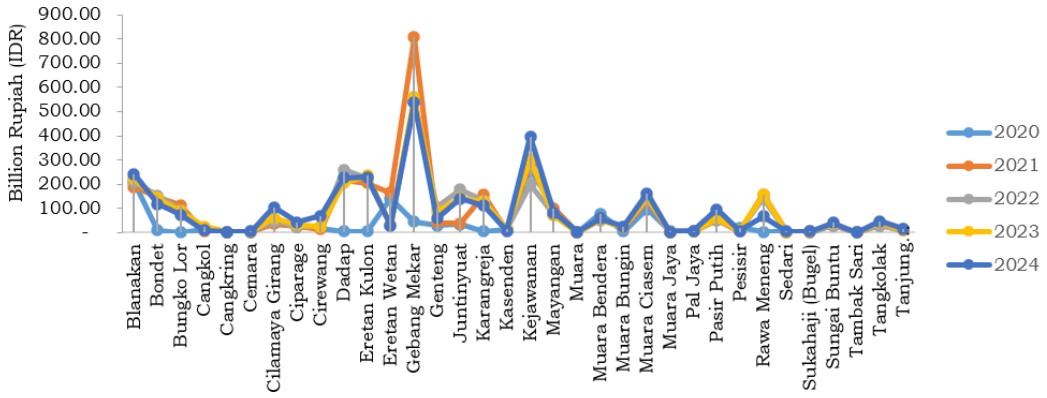

Figure 3. Production value of North Coast West Java fishing ports, 2020–2024.

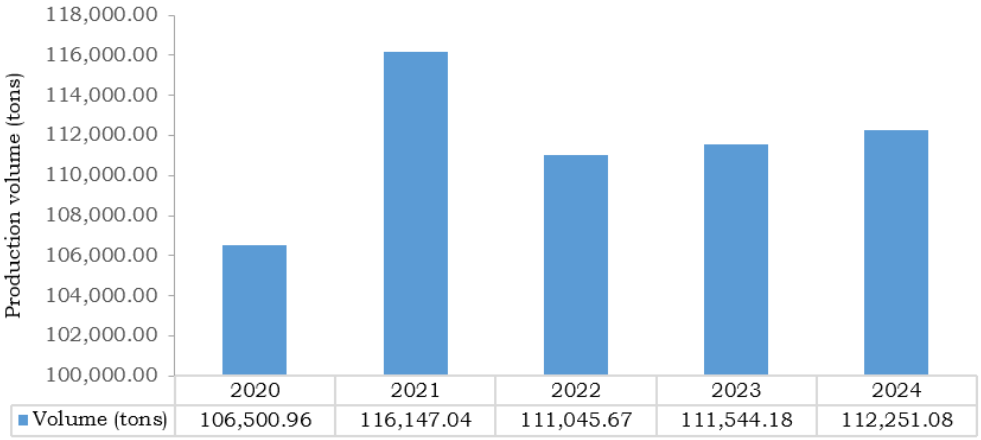

Figure 4. Dynamics of production volume at Karangsong Fishing Port, 2020–2024.

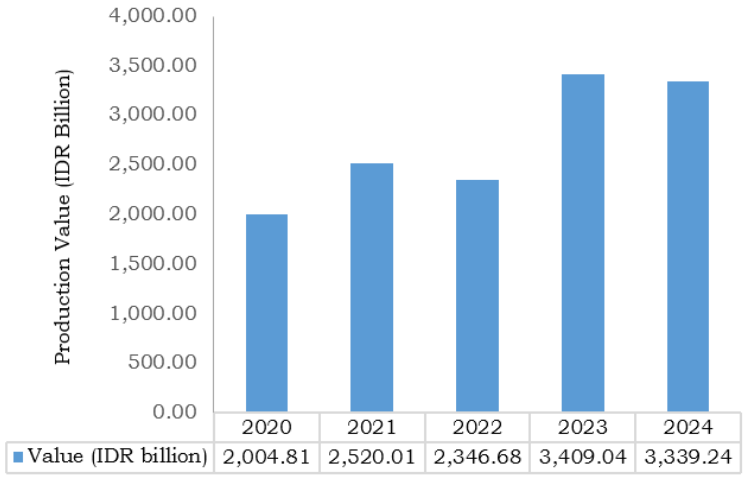

Figure 5. Dynamics of production value at Karangsong Fishing Port, 2020–2024.

Geographical factors also support Karangsong's performance because its location faces the Java Sea and is connected to land distribution routes, while the availability of landing facilities and fish auction facility activities supports high fish landing activities (Aprilla *et al.* 2022).

However, the high volume of landings in Karangsong can put pressure on service facilities if it is not balanced with maintenance and increasing capacity, so management needs to be directed at maintaining landing facilities, improving fish auction facility services, organizing distribution, and strengthening production data recording, along with increasing the capacity of other ports that have the potential to grow to form a more balanced port network.

In aggregate, Table 1 shows that production volume increased from 180,054.087 tons in 2020 to 228,313.425 tons in 2024, and production value rose from IDR 3.32 trillion to IDR 6.38 trillion, with annual averages of 216,990.037 tons and IDR 5.36 trillion.

Table 1. Dynamics of catch production volume and value at North Coast West Java fishing ports, 2020–2024.

No.	Year	Production Volume (tons)	Production Value (IDR trillion)
1	2020	180,054.087	3.32
2	2021	225,763.316	5.59
3	2022	224,799.239	5.18
4	2023	226,020.120	6.36
5	2024	228,313.425	6.38

The largest increase occurred in 2021 as activity recovered post-pandemic, while 2022 showed a mild correction in production values despite relatively stable volumes. This aggregate pattern reflects not only the availability of fish resources, but also port infrastructure, management systems, distribution efficiency and market prices (Gurung *et al.* 2016), so it needs to be analyzed together with facilities, land status, and port institutional factors.

Key ports and performance variations across ports

Performance analysis was conducted by applying the four ranking criteria outlined in the methodology section, namely, accumulated production volume, accumulated production value, percentage contribution to the region's total production, and annual performance consistency, complemented by calculations of annual market share and growth rates for each port. The results are presented in Table 2, with distinct background colors used to differentiate each performance category.

The ranking results classify Karangsong as a dominant port, with a production value share of 60.4% in 2020 and 52.4% in 2024. Annual performance analysis reveals a pattern more significant than mere dominance: Karangsong's volume share declined consistently from 59.2% in 2020 to 49.2% in 2024. This decline was not caused by a contraction in Karangsong's production but rather by a significantly slower growth rate; Karangsong's volume grew by only 5.4% between 2020 and 2024, whereas the combined volume of the other ports grew by 57.8%. Regarding production value, Karangsong's growth was 66.6% compared to 130.6% for the others. These findings indicate that the port network structure along the north coast of West Java is shifting from a centralized pattern toward a more distributed structure, even though Karangsong remains the largest node.

The "major contributor" port category comprises Eretan Kulon, Gebang Mekar, Dadap, and Juntinyuat, which demonstrated the next highest levels of accumulated production alongside consistent volume growth. Gebang Mekar and Eretan Kulon were the primary drivers, with volumes more than doubling from 15,000 tons in 2020 to over 40,000 tons in 2024 (Table 2). The category of supporting ports includes Bungko Lor, Karangreja, Rawa Meneng, Bondet, Muara Ciasem, Ciparage, Blanakan, and certain other Fish Landing Centers (FLC) that make relatively small cumulative contributions. Bungko Lor represents a special case; while its current contribution remains small, it has shown notable volume growth, presenting an opportunity for it to move up to a higher category if its facilities and service capacity are upgraded.

Table 2. Classification of fishing port performance on the North Coast of West Java based on accumulated volume, accumulated value, contribution, and production consistency, 2020–2024.

Performance Category	Selection Criteria	Ports	Performance Characteristics (2020–2024)
Dominant port (hub)	Highest and consistent accumulated production volume and value throughout 2020–2024	Karangsong	Accumulated volume of 557,487 tons (51.4% of the total area); annual volume consistently exceeded 100,000 tons; volume share declined from 59.2% (2020) to 49.2% (2024); volume grew by 5.4% and value by 66.6%
Major contributing port	Next largest accumulated production volume and/or value and/or significant volume growth	Eretan Kulon, Gebang Mekar, Dadap, Juntinyuat	Consistent volume growth; volumes in Gebang Mekar and Eretan Kulon more than doubled, rising from the 15,000-ton range (2020) to over 40,000 tons (2024)
Supporting port	Relatively small cumulative contribution to the region's total production volume and value	Bungko Lor, Karangreja, Rawa Meneng, Bondet, Muara Ciasem, Ciparage, Blanakan, and various other Fish Landing Centers (FLC)	Minor contributions, though some showed positive growth; Bungko Lor demonstrated significant volume growth, presenting an opportunity to move up to a higher category

This pattern of concentration and performance shift aligns with the findings of Aprilla *et al.* (2022), who emphasize that the completeness of key facilities, well-maintained infrastructure, and market access are linked to a port's production capacity. The suboptimal role of small and medium-sized ports as supporting nodes can be attributed to several structural and functional factors. First, limited basic facilities, such as wharves, harbor basin depths, cold chain systems, and the condition of fish auction facilities, impede the smooth operation of landing services, causing fishermen and vessel owners to favor ports with better facilities. Second, unclear land status and availability at some ports constrain asset management, infrastructure development, and the expansion of handling capacity. Third, management coordination by provincial-level units covering vast areas limits the intensity of supervision, technical guidance, and operational response times; meanwhile, variations in human resource capacity across service units affect service quality, auction transparency, and the accuracy of production data recording (Aura *et al.* 2019).

Fourth, distribution connectivity and market integration remain uneven. Ports with better access to major transport routes, wholesalers, and processing industries have the potential to generate higher production value even if their volumes are not the largest, whereas ports with limited access face higher logistics costs and longer distribution times, which can compromise catch quality and price competitiveness. Fifth, from a network system perspective, a hub-and-spoke pattern has not been systematically established; the concentration of production at major ports has not been balanced by the strengthening of medium and small ports as supporting facilities, resulting in concentrated operational pressure while the capacity of other ports remains underutilized.

Consequently, performance variations across ports reflect disparities in infrastructure, land legality, institutional governance, and market connectivity, as illustrated in Figures 2 and 3 and Table 2, indicating that performance-based management must also focus on strengthening medium and small ports.

The relationship between production dynamics and facilities, land and institutions

Government Regulation Number 27 of 2021 stipulates that fishing ports must possess core facilities, specifically land, piers, harbor basins, and complex roads; functional facilities such as administrative offices, fish auction facilities, clean water supplies, and electricity; and supporting facilities including sanitation facilities and waiting areas for the comfort of port service users.

Beyond the completeness of physical facilities, post-harvest fish handling practices both on board and during landing play a crucial role in maintaining the quality of the catch before distribution. Proper handling, the availability of ice, clean water, and sanitation facilities, as well as the cleanliness of the port environment, influence the value of fish production, given that microbiological contamination can compromise the quality and safety of fishery products (Sari and Nawafil 2023; Triwibowo *et al.* 2023).

Based on a facility assessment of 23 fishing ports along the North Coast of West Java, 12 ports (52%) possessed all basic facility components (100%), eight ports (34%) met 75–89% of the requirements, and the remainder (14%) met less than 75%, as illustrated in Figure 6. These results indicate that the completeness of basic facilities varied among the fishing ports, with only slightly more than half of the assessed ports meeting all basic facility requirements.

Regarding land area, Minister of Marine Affairs and Fisheries Decree Number 109 of 2021 establishes a minimum land area of 5 hectares for Coastal Fishing Port (CFP)-class ports and 1 hectare for Fish Landing Base (FLB)-class ports. Of all the ports surveyed, only Pal Jaya, Karangsong, Juntinyuat, and Dadap met these requirements. Even among the ports that met the size criteria (Blanakan and Eretan), the land remains under cooperative ownership rather than provincial ownership, thereby complicating development and the transfer of assets to the Provincial Government (Figure 7).

Another challenge lies in the institutional aspect. All the ports are managed by the Regional Technical Implementation Unit (RTIU) Muara Ciasem Fishing Port, which covers a vast territory encompassing the regencies of Bekasi, Karawang, Subang, Indramayu, and Cirebon, as well as Cirebon City, and oversees the Port Service Units (Satpel) of Ciparage, Blanakan, Eretan, and Bondet. Under Governor of West Java Regulation Number 30 of 2022, the Fishing Port Technical Implementation Unit is responsible for operations, business services, and harbor master functions; consequently, this extensive span of control limits the ability to conduct oversight, provide technical responses, and optimize services at each port.

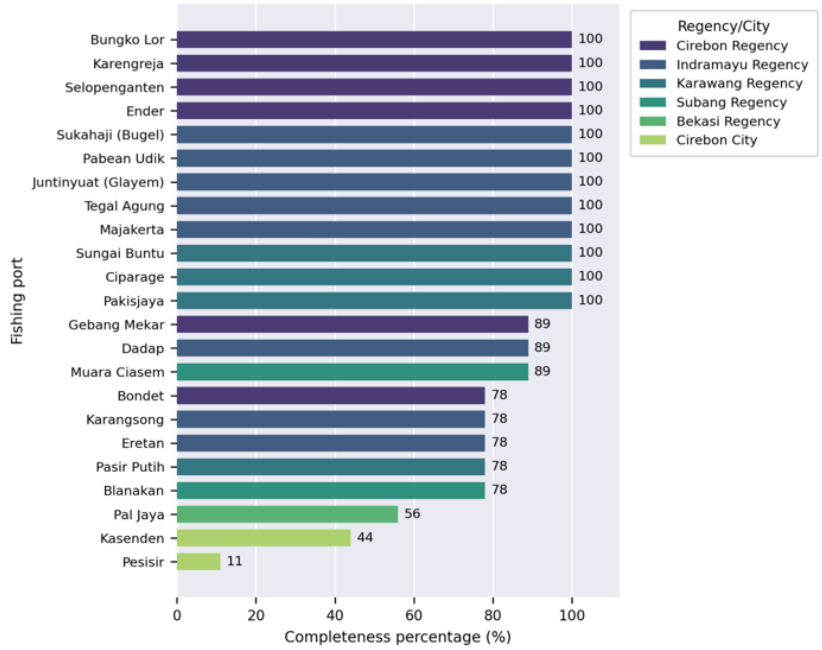

Figure 6. Percentage of basic facility completeness at each fishing port on the North Coast of West Java.

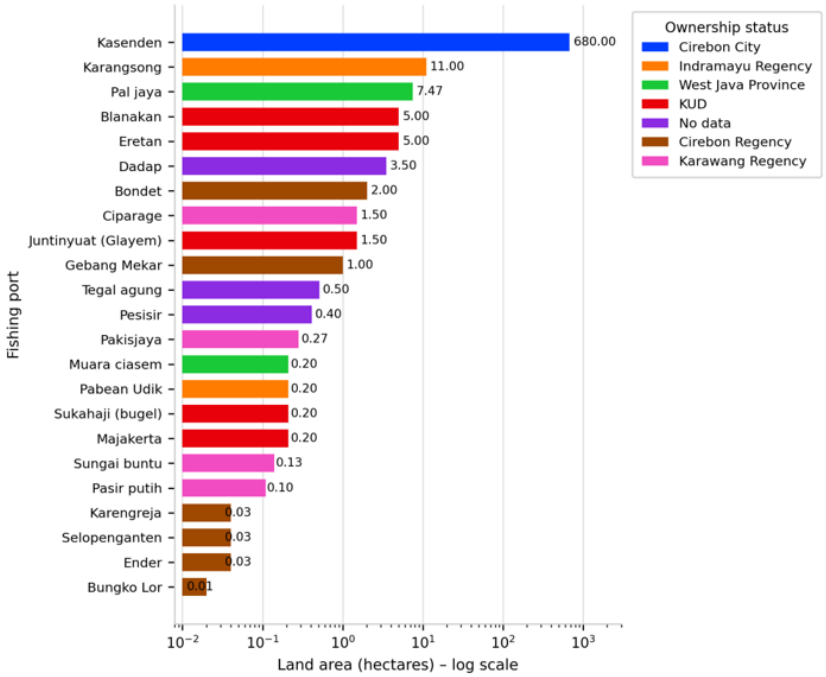

Figure 7. Land area and ownership status of fishing ports on the North Coast of West Java, based on the Minister of Marine Affairs and Fisheries Decree Number 109 of 2021.

Integrating data on facilities, land, and institutional arrangements provides a comprehensive understanding of the variations in port performance, as ports with comprehensive facilities, functional institutional structures, and sufficient, legally secure land tend to exhibit higher and more stable performance. Future development strategies should focus on improving infrastructure quality, resolving asset legality issues, and strengthening local institutional capacity based on integrated spatial data (Aura *et al.* 2019; Nyboer *et al.* 2022).

Management implications

High-performing ports demonstrating significant growth warrant priority in regional management strategies, whereas emerging ports require improvements in service

quality, institutional structuring, and inter-unit coordination to function effectively as feeder ports within a hub-and-spoke system. Consequently, the formulation of a port network master plan must take into account the concentration of production performance, growth potential, and institutional readiness (Kodeeswaran *et al.* 2023).

The concentration of production at key ports indicates that comprehensive facilities and functional institutional frameworks serve as primary drivers for achieving high production volumes and values (Aprilla et al. 2022). However, these factors do not always align perfectly; some medium-volume ports manage to generate relatively high production values through specific catch compositions, advanced handling technologies, and more integrated marketing networks (Gumilang *et al.* 2016; Gurung *et al.* 2016).

Performance disparities among ports are also linked to inequalities in infrastructure and institutional arrangements; ports with limited facilities and ambiguous land tenure status face restricted development potential, a finding consistent with studies by Hutapea *et al.* (2017), Izzati and Ummah (2018), and Cambia *et al.* (2019). Therefore, the concentration of performance at major ports needs to be balanced by strengthening emerging ports so they can function as feeder nodes (spokes) that channel catches to major ports (hubs), which serve as centers for consolidation, processing, and distribution in accordance with port network hierarchy principles (Notteboom and Rodrigue 2005; FAO 2022). This process should be supported by the development of information systems and logistics services to maximize the economic value of the catch at every node (Aura *et al.* 2019). Strengthening institutions and governance is crucial for reducing disparities between ports; this involves enhancing human resource capacity, implementing digital-based management systems, and integrating infrastructure with eco-friendly technologies to ensure ecological sustainability and economic efficiency (Sente *et al.* 2016; Nyboer *et al.* 2022; Vinothkumar *et al.* 2024). Overall, data-driven, adaptive, and integrated management policies are key to establishing a competitive and sustainable fishing port system along the North Coast (Pantura) of West Java.

CONCLUSION

The volume and value of fish landings at fishing ports along the North Coast of West Java increased between 2020 and 2024, rising from 180,054.087 tons and IDR 3.32 trillion to 228,313.425 tons and IDR 6.38 trillion, yet this growth remains uneven, as production is still concentrated in Karangsong, Eretan Kulon, Gebang Mekar, Dadap, and Juntinyuat; notably, Karangsong's share declined from 59.2% to 49.2% as other contributing ports expanded. These dynamics are directly linked to facility conditions, land status, and institutional factors: only 52% of the 23 ports possess complete basic facilities; only a small fraction meet the land area and legality requirements stipulated in the Minister of Marine Affairs and Fisheries Decree Number 109 of 2021, and Regional Technical Implementation Unit (RTIU) of the Muara Ciasem Fishing Port faces a broad span of control covering six regencies/cities. Consequently, the development of North Coast West Java fishing ports should focus on a performance-based network that strengthens emerging feeder ports, upgrades basic facilities and resolves land legality issues, and bolsters the institutional capacity of port management, thereby ensuring a more balanced, efficient, and sustainable port system.

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