ANALYSIS OF CONTAINER YARD NEEDS AT SORONG CONTAINER PORT

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Abstract

Indonesia, which consists of many islands and is strategically located at the crossroads of global trade routes, relies heavily on the role of ports in supporting economic growth, social mobility and trade. This research focuses on the condition of hinterland cargo in four catchment areas in Indonesia, namely Sumatra, Java & Kalimantan, Sulawesi, and Papua & other islands in Eastern Indonesia. By using a quantitative approach and the Yard Occupancy Ratio (YOR) method for analysis, this research evaluates yard usage at container terminals during a certain period. The research results reveal fluctuations in efficient field use from time to time, although total use is still relatively low despite an increase in container flows from 2022 to 2026. Recommendations for this research include optimizing field use, improving operational processes, developing appropriate infrastructure, and collaboration between stakeholders to improve port efficiency. Future research is proposed to analyze the performance of infrastructure investment, comparative studies with other ports, investigation of the influence of external factors, and exploration of logistics and supply chain management at the Sorong Container Port.

Keywords: Ports, Hinterland Cargo, Efficiency.

INTRODUCTION

Indonesia is a country consisting of many islands, where two-thirds of its territory is ocean, and its position is very strategic because it is at the crossroads of global trade routes. For this reason, the role of ports is very significant in supporting economic growth, social mobility and trade in this region. As a result, ports have a very important role for the government in running the country's economy (Husen, 2021).

The condition of hinterlands cargo in Indonesia is divided into 4 catchment areas, namely Sumatra, Java & Kalimantan, Sulawesi, Papua & other islands in Eastern Indonesia, as illustrated below.

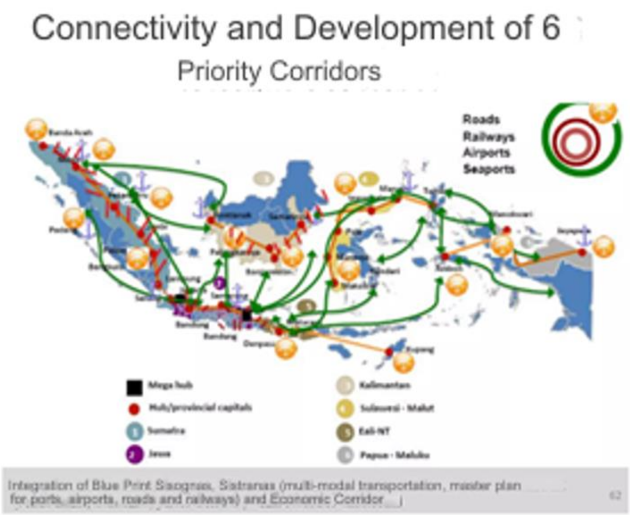

Figure 1: Intermodal Distribution Map of Goods

Based on the distribution map, ports function as entrances to a region or country and as a tool to connect regions, islands, or even countries, continents and nations. Ports play an important role in the flow of trade and distribution of goods in Indonesia and throughout the world, with 85% of world trade carried out by sea, and 90% of trade in Indonesia carried out by sea (Hakim & Sabaruddin, 2022).

The development of Indonesian ports continues to be encouraged by the program under President Joko Widodo's government to make Indonesia the world's maritime axis. Ports are an important element in building a strong maritime territory (Afpriyanto, 2023). The definition of port itself according to Law no. 17 of 2008 concerning Shipping is a place consisting of land and/or waters with certain boundaries as a place for government activities and business activities which are used as a place for ships to dock, boarding and disembarking passengers, and/or loading and unloading of goods, in the form of terminals and berths ships equipped with shipping safety and security facilities and port support activities as well as a place for intra- and inter-mode transportation transfers (Darsono, 2021).

Looking at the current condition of the port, the traffic flow is quite dense, the high flow of containers and the limited area of container stacking yard facilities need to be balanced with good service management which can facilitate the process of leaving and entering containers in the container terminal environment, so as not to cause high utilization of the piling yard (Yard Occupancy Ratio/ YOR) (Pakpahan, 2020)

Basically, the phenomenon of improving the global economy and the growth of international trade relations has caused major disasters for many transportation sectors (Koilo & Grytten (2019). The maritime supply chain is the sector most affected (Koilo & Grytten, 2019). Maritime container terminals are very important in global supply chains. According to Grzelakowski (2019), 17.1% of global trade volume is transported in containers; in 2017, ports handled more than 80% of global freight trade. Due to their cheapness, container traffic also accounts for a large share of international trade Therefore, maritime transportation is very important for the economic health of many countries (Kotachi et al., 2018).

According to Marsudi (2022), container terminals are an important part of container transportation. Depending on the goods being transported and the terminal owner's desire to remain competitive, container terminals must run smoothly and be cost-effective. Apart from that, container terminals greatly influence the process of loading, stacking and unloading containers (Nugroho, 2020). The container stacking yard consists of several blocks, with a number of rows and bays in each block, and tiers in each row and bay. As stated by Fahirah (2020), the increase in container flow every year is certainly positive. However, when the port is not ready to handle the increased flow of containers, this can become a problem.

Container yard is a place to collect, store and stack containers; The container containing the cargo is given to the consignee, and the empty container is taken by the consignor (Somadi, 2020). Modern container terminals consist of several parts, namely: for export/import, reference, and empty (Somadi et al., 2020). According to Port Reference series 3 Port Operations, *container yard* is the area used to hand over and receive containers (*receiving/delivery*), stacking export/import containers, empty containers, and container loading and unloading equipment *standby* (Fetriansyah & Buwono, 2019).

One of the ports with heavy sea transportation flows is Sorong Container Port. Sorong Container Port is a container terminal located in West Papua Province (Pelindo, 2022). This port was inaugurated as a container port in 2021 (Media Indonesia, 2021). The Sorong Container Terminal is planned to become the center of container activity (hub) in the Eastern Indonesia region (Widarti, 2023). This can encourage effective delivery to the Eastern Indonesia region and have an impact on cost efficiency (Pelindo, 2023). The Sorong Container Terminal has also been operated 24 hours a day (Pelindo, 2022). The construction of the Sorong Container Port was carried out by Pelabuhan Indonesia II and the Sorong Regency Government in 2011. In the 2022 period, the flow of containers at TPK Sorong was recorded at 48,048 TPK (Pelindo, 2023). However, the potential flow of containers at TPK Sorong when it becomes a center of activity (hub) in the Eastern Indonesia region is estimated to reach 243,000 TPK (Widarti, 2023).

With the growth of container flows at the Port of Sorong which tends to increase every year in line with port development, research is needed to determine the need for a container yard at the Port of Sorong Container Yard. Therefore, the author is interested in carrying out an analysis of "Container Yard Needs Analysis at the Sorong Container Port". The formulation of the problem is to determine the level of need for Container Yard facilities at the Sorong Container Port, while the aim is to analyze the level of need for these facilities. The benefits of this research include providing recommendations to port managers for infrastructure development that can support economic growth in the Eastern Indonesia region, increasing service user satisfaction by improving container handling services, and becoming literature material for further research on the Sorong container port.

RESEARCH METHODS

A. Types of Research

The type of research used in this research uses a quantitative approach Sugiyono (2018), with technical analysis using the Yard Occupancy Ratio (YOR) method. YOR is the quantity of container stacking yard usage at the container terminal per certain period. The choice of problem-solving method is based on the relationship between existing problems and analysis related to overcapacity in the company

B. Research Sites

The location of the research was at the Sorong Container Port. This research uses data collection techniques using documentation and observation studies. Documentation studies are used to collect secondary data, while observations are carried out to complete information regarding existing container types, company Gate in and Gate Out data, as well as stacking methods in container yards.

C. Data Collection

Data collection consisted of primary and secondary data;

1. Primary Data: This data is collected from surveys and field operational data, including:
    a. Stacking Field Area and
    b. Data on the number of loading and unloading equipment.

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2. Secondary Data: This data comes from data obtained from Sorong Container Port operations. This data includes:
   a. Facility
   b. Flow of Goods
   c. Ship Flow
   d. Container Flow
   e. Stacking Field Capacity

D. Data analysis

Calculation of container stacking yard usage (*yard occupancy ratio*) is used to calculate the use of available moorings at a port. This is a percentage comparison between the use of container stacking yard facilities and the available capacity. Calculation of the use of the stacking yard can be calculated using the formula:

Information:

- *Dwelling time* = Maximum stacking time in the field/port determination (existing 7 days)
- Field capacity = slot x tier

Table 1: Classification *Yard Occupancy Ratio* (YOR)

Level	Information
< 20 %	Very low
20 % - 39%	Low
40 % - 59%	Enough
60% - 79%	Height
>80 %	Very high

Source: UNCTAD Standards

It is known that containers are placed for a short time in the stacking yard after arriving at the port. The field is divided into several sections: those intended for export and import, those that are rejected or returned, those that are considered dangerous (dangerous goods), and those that are empty. In several ports that have container terminals, there are also those *Container Freight Station* (CFS), an office that specifically serves "*stripping*" and "*stuffing*". *Stuffing* is the transportation of various goods from various places into one container for later export, whereas *stripping* is the process for goods imported in one container for different purposes.

The required area of the stacking yard can be calculated using the formula:

With:

T: Container flow per year (teu's)

A: Area of container stacking yard required (m2)

D: *Dwelling Time* or the average number of days containers are stored in the storage yard.

Ateu: The area required for one teu's depends on the container handling system and the number of stacked containers in the field.

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BS: *Broken Stowage* (The area lost due to roads or distance between containers in the stacking yard, depending on the operating pattern applied, ranges from 25-50%).

RESEARCH RESULTS AND DISCUSSION

A. Research Result

1. General Description of Sorong Container Port

Sorong Port is a port that has extraordinary potential to support the economy in West Papua. Sorong Port is one of the maritime transportation gateways in West Papua and Papua Provinces which serves the flow of passengers and goods. The Port of Sorong was inaugurated as a Container Terminal on Monday 20 September 2021. And it was inaugurated by the Mayor of Sorong Lambert Jitmau, accompanied by the Head of the Sorong Class I Harbormaster and Port Authority Office (KSOP), Jece Julita Piris and the Main Director of Pelindo IV Prasetyadi, inaugurating the Port of Sorong as Sorong City Port Container Terminal in this case is managed by PT. (Persero) Indonesian Port, Sorong Branch, provides facilities and infrastructure, including channels, moorings/piers, storage warehouses, stacking yards, loading and unloading equipment and navigation.

Sorong Port has a Main class or National class port type. From a technical perspective, the port of Sorong is a natural port, because there is no need to build a breakwater to ensure the safety of ships when loading and unloading.

2. Natural Conditions

a. Topographic and Hydrographic Conditions

Sorong Harbor is located at 00"53'00 South Latitude and 131"14'00 East Latitude. Sorong Harbor has relatively narrow plains, most of which are hilly. The waterbed in front of the pier has a depth of between 11-13 meters. From the pier, the water depth has reached 20 meters.

b. Climatology and Hydro-Oceanography

Based on data from the Sorong Meteorology, Climatology and Geophysics Agency, rainfall and temperature data show that the average rainfall/year is 2,385 millimeters. With an average temperature of 32°C.

Data obtained from the Pelindo IV Sorong branch office shows that the average wind speed is 7 knots/hour between September and December. The tide data is as follows:

- High Water Spring (HWS): 1,50 m LWS
- Low Water Spring (LWS): 1,00 m LWS

The nature of the tides that occur in the port are double daily tides, that is, in one day there are two high tides and two low tides

The water conditions of Sorong Harbor are relatively protected naturally by the surrounding islands and from the west to Doom and Dofior islands and from the south between Ombre Island and Nana Island. The length of the entrance to Sorong Harbor is 3.5 miles with a width of 0.5 miles, so that the wave generation distance due to wind is relatively short and the waves produced are not too large. The wave height that occurs in Sorong harbor waters is generally around 1.8 meters.

The current speed in the pool waters of Sorong Harbor is 3 knots/hour. So the influence of currents is very important for ships that move and carry out activities at the port of Sorong.

3. Condition of Port Facilities

a. Sailing Flow

Shipping channel length 3.5 miles, width 0.5 miles, minimum depth 20 meters.

b. Harbor Pool

The area of the port pool is 93.3 Ha, the minimum pool depth is 11 meters, the maximum depth is 20 m LWS, the depth at the dock is 11-13 meters.

c. Sorong Harbor Pier

The length of the Sorong port public pier is 340 meters, located on Jl. Gen. A. Yani No. 13 Sorong West Papua was built in 1954. This pier is made of reinforced concrete construction on piles, which is designed with a floor carrying capacity of 2.5 tons/m^3. The water depth ranges from 11-13 meters, with an elevation of ±3.20 meters LWS.

d. Stacking Field Area

The area of the container stacking yard is 40,356 meters^2 (existing) and 50,000 meters^2 (PMN).

e. It is. Warehouse

This line I warehouse was built in 1954 with a corrugated asbestos roof, plate iron walls and concrete floors/iron poles and has an area of approximately 2210 m^2, has a bearing capacity of 2 T/M^2.

f. Passenger Terminal

The passenger terminal at the port of Sorong consists of a two-story building with a ground floor area of 1,226.71 m^2 and the top floor area is 773.29 m^2 with the year of manufacture 1992-1993. Parking area for passengers with a capacity of 150 cars. For the forecast for the next five and ten years, passenger flows will increase at Serui port using exponential regression, passenger flows will decrease using linear regression, flow of ship visits will use logarithmic regression, loading and unloading of goods will use exponential regression and loading and unloading of containers will use logarithmic regression.

g. Data on the Number of Loading and Unloading Equipment

1) 2 unit QCC (Quay Container Crane)
2) 2 unit RTGC (Rubber Tyred Gantry Crane)
3) 5 unit RS (Reach Stacker)
4) 2 unit FL
5) 8 unit HD. Truck (Head Truck)

h. Other Facilities

1) Wharf: 470 meters (TOTAL), 250 meters (Container)
2) Container Yard: 40.356 meter^2 (existing), 50.000 meter^2 (PMN)

i. Flow of Goods

Table 2: Sorong Container Port Goods Flow

Description	Unit	Year				
		2017	2018	2019	2020	2021
Freight Flow (Public Jetty)	T/M3	668,519	784,025	800,421	767,483	763,331
Container Flow (Public Jetty)	Box	42,003	46,078	56,439	48,398	47,157
	Your	45,181	49,686	60,708	52,041	51,256
Passenger Flow	Person	294,174	305,301	369,266	145,051	149,048

Table 2 shows the flow of goods at the Sorong Container Port during the period 2017 to 2021. This data is presented in three main categories: the flow of goods at the public pier, the flow of containers at the public pier, and the flow of passengers.

For the flow of goods at public docks, the volume handled has fluctuated over the five years. In 2017, the number reached 668,519 tonnes per cubic meter (T/M3), increasing to 784,025 T/M3 in 2018, then increasing again to 800,421 T/M3 in 2019. However, there was a decline in 2020 and 2021, in where the figures fell to 767,483 T/M3 and 763,331 T/M3 respectively.

Meanwhile, the flow of containers at public docks also shows a fluctuating trend. The volume in boxes in 2017 was 42,003, increased to 56,439 in 2019, but decreased in 2020 and 2021. Likewise, the volume in standard container units (teus), which rose from 45,181 in 2017 to 60,708 in in 2019, but experienced a decline in 2020 and 2021.

Passenger flows, on the other hand, show more complex trends. The number of passengers reached 294,174 people in 2017, increased to 369,266 people in 2019, but suddenly experienced a significant decline to 145,051 people in 2020, then increased slightly to 149,048 people in 2021.

j. Ship Flow

Table 3: Sorong Container Port Ship Flow

Description		Unit	Realization (Year)				
			2017	2018	2019	2020	2021
Ship Flow	Public Jetty	Call	939	976	973	1,027	1,020
		GT	6,674,211	7,050,053	7,738,855	6,261,917	6,755,201
	Non-Public Pier	Call	998	1,108	1,174	914	914
		GT	4,635,184	5,740,389	4,977,642	5,532,216	7,219,995
Total		Call	1,937	2,084	2,147	1,941	1,934
		GT	11,309,395	12,790,442	12,716,497	11,794,133	13,975,196

The table above shows that the data is divided into two main categories, namely ship flows at public docks and ship flows outside public docks.

For ship flows at public docks, the number of ship calls shows a steady increase from year to year. In 2017, 939 ship calls were recorded, which increased to 1,020 ship calls in 2021. However, the gross tonnage (GT) handled experienced significant fluctuations. GT in 2019 peaked at 7,738,855, but experienced a sharp decline in 2020 to 6,261,917, and rose again in 2021 to 6,755,201.

Meanwhile, for ship flows outside public docks, the number of ship calls also shows fluctuations, with the highest recorded in 2019 (1,174 calls) and the lowest in 2020 (914 calls). GT handled also fluctuates, with the peak occurring in 2021 with 7,219,995 GT.

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Overall, total ship calls at Sorong Container Port experience slight fluctuations from year to year, with the highest total GT recorded in 2021 (13,975,196 GT).

k. Container Flow

Table 4: Sorong Port Container Flow

Year	Current Box (no's)
2017	45.000
2018	50.000
2019	61.000
2020	52.000
2021	55.000
2022	46.000

Table 4 displays data on container flows or container productivity in standard container units (Teus) at the Sorong Terminal during the period 2017 to 2022. This data provides an idea of how efficient the terminal was in handling containers during that period.

From the data presented, it can be seen that container flows experienced fluctuations during this period. In 2017, the number of containers handled reached 45,000 TEUs, then increased to 50,000 TEUs in 2018, and reached the highest peak in 2019 with 61,000 TEUs. However, there was a decline in 2020 to 52,000 Teus, then recovered slightly in 2021 by reaching 55,000 Teus. It should be noted that in 2022, the number of containers will again fall to 46,000 TEUs. This is clearly visible in the graph below.

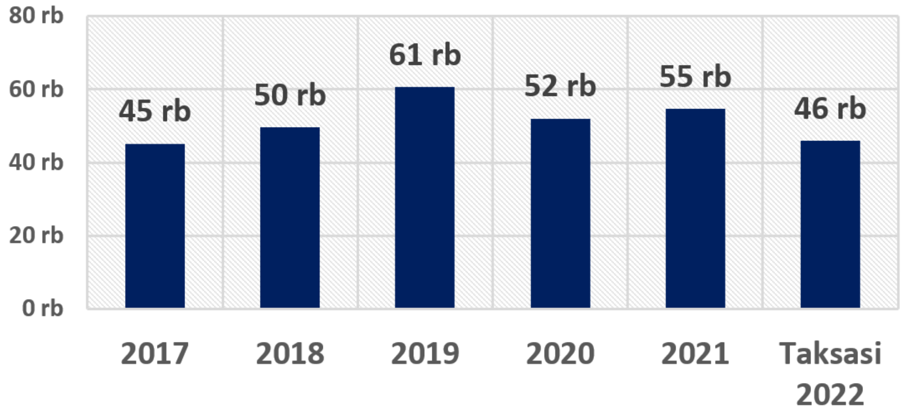

Figure 2: Sorong Port Container Flow Graph

l. Stacking Field Capacity

Table 5: Sorong Container Port Stacking Field Capacity

Years	Static Layout	Broken Space	Effective	% Teus With Void	% Broken Space
2017	3994	408	3586	89,8%	10,2%
2018	3994	391	3603	90,2%	9,8%
2019	3994	424	3570	89,4%	10,6%
2020	3994	447	3547	88,8%	11,2%
2021	3994	488	3506	87,8%	12,2%

Table 5 provides data on the capacity of the stacking yard at the Sorong Container Port during the period 2017 to 2021. This data is divided into several categories, including static layout, broken space, effective, percentage of containers with voids (% Teus with Void), and the percentage of damaged space (% Broken Space).

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From the data provided, it can be seen that the capacity of the stacking yard tends to be stable during this period. The static layout remained at 3,994 throughout the time period under review. However, broken space has increased from year to year, starting from 408 in 2017 to 488 in 2021.

Even though damaged space has increased, the effective capacity of the stockpiling yard shows a decreasing trend from year to year. In 2017, its effective capacity reached 3,586, but then decreased to 3,506 in 2021.

In addition, there are two percentage indicators given, namely the percentage of containers with voids (% Teus with Void) and the percentage of damaged space (% Broken Space). The percentage of containers with voids tends to be stable, with the highest figure recorded in 2021 (87.8%), while the percentage of damaged spaces has a tendency to increase from year to year, reaching 12.2% in 2021.

Analysis of this data shows that although overall stacking yard capacity remains relatively stable, there is a significant increase in damaged space, which could impact the operational efficiency and productivity of the Sorong container port.

m. Dwelling Time

6) Accumulation Time 1:

- 1a = 1-3 days = 1 day of production
- 1b = 4-10 days = calculated per day

7) Stacking time 2:

- 11 etc. = daily rate 200% of the daily rate for period 1

8) The average number of days that containers are stored in the stacking yard is 3 days the average container is stored

4. Stacking Field Performance

Table 6: Calculation of Yard Occupancy Ratio (YOR)

Year	Container Flow / Productivity (teu's)	Field Capacity	Dwelling Time	Effective Working Days	Broken Stowage	YOR	Growth	Category	A (m2)
2017	45181	3586	3,00	365	10,22%	10,36%		Very Low	413,60
2018	49686	3603	2,92	365	9,79%	11,03%	0,68%	Very Low	440,62
2019	60708	3570	3,22	365	10,62%	15,00%	3,97%	Very Low	599,17
2020	52041	3547	3,21	365	11,19%	12,90%	-2,10%	Very Low	515,35
2021	51256	3506	3,40	365	12,22%	13,62%	0,71%	Very Low	543,91

Table 6 presents the calculation of the Yard Occupancy Ratio (YOR) at the Sorong Container Port. YOR is a metric used to measure how efficiently stacking yard space is used at ports, with a percentage indicating how much space is occupied.

From the data provided, it can be observed that YOR varies over time. In 2017, the YOR was 10.36%, which indicates a very low level of space utilization. Furthermore, there was an increase of 0.68% in 2018, bringing YOR to 11.03%, but it still remains in the very low category.

A more significant increase occurred in 2019, where YOR reached 15.00%, indicating a substantial increase in the use of stacking field space. However, in 2020, there was a decline of 2.10%, bringing YOR back to 12.90%. In 2021 in the data presented, YOR rose slightly to 13.62%. Even though there has been an increase, YOR remains in the very low category.

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Data analysis shows that although there are fluctuations in YOR from year to year, the use of stacking yard space at the Sorong Container Port still tends to be low. This can be influenced by various factors. Firstly, regional economic conditions play an important role, with international trade volumes remaining low in the remote Sorong region. Limited infrastructure is also an obstacle, where an inadequate land transportation network increases overall logistics costs. Lack of investment in the maritime sector is another factor, resulting in a lack of modern equipment and technology at the Sorong Container Port.

On the operational side, slow loading and unloading processes and lack of coordination between various parties involved in port activities cause inefficiencies and congestion. Competition from other ports also adds pressure to the Sorong Container Port. Natural disasters such as earthquakes and tsunamis can cause unexpected disruptions to port operations.

To increase the utilization ratio of the stacking yard, several steps can be taken. This includes increasing the volume of international trade with further trade promotion and infrastructure investment. Greater investment in the maritime sector, including the procurement of more modern equipment and technology, is also needed. Improvements in loading and unloading processes and increased coordination between the various parties involved will also help overcome this problem. Apart from that, strategies to face competition from other ports and develop infrastructure that is resistant to natural disasters are also needed.

5. Container Flow Projection

Table 7: Projection of Container Flows Until 2026

Year	Container Flow/Productivity (teu's)
2017	45181
2018	49686
2019	60708
2020	52041
2021	51256
2022	51774
2023	53093
2024	53774
2025	52388
2026	52457

Table 7 displays the projected flow or productivity of containers (TEUs) at the Sorong Container Port until 2026. This data provides an overview of the estimated number of containers that will be handled by the port during the specified period.

Projections show a steady upward trend in container flows from 2022 to 2024. Starting from 51,774 TEUs in 2022, the projections increase gradually to 53,774 TEUs in 2024. However, there is a slight decline in 2025, when the number is projected to be 52,388 TEUs, before recovering slightly in 2026 with 52,457 TEUs.

6. Analysis of Stacking Field Needs vs Container Growth Until 2026

Since Monday 20 September 2021, the Port of Sorong has started serving goods in container packaging, so it requires stacking yard facilities in accordance with the potential number of goods available, although the operating pattern at the pier is still the same, namely a multi-purpose pier. Based on this, the container stacking yard must meet the following minimum requirements:

1. The field must have sufficient stacking space, so that no containers are stacked outside the field.
2. It is recommended that only trailers and container loading and unloading equipment be allowed in the container stacking yard.
3. There is a separate area between empty containers and filled containers as well as a separate area for stuffing activities.

To meet the minimum requirements above with existing conditions that are almost congested, it is necessary to expand the stacking yard to increase container capacity. From the throughput projections that have been prepared by PT. (Persero) Sorong Branch of the Indonesian Port, as mentioned above, there is no need to expand the field to accommodate the increasing flow of container goods in the next few years, because the need for the resulting stacking yard is in the very low category.

Table 8: Analysis of Stacking Field Needs vs Container Growth Until 2026

Year	Container Flow / Productivity (teu's)	Field Capacity	Dwelling Time	Effective Working Days	0	YOR	Growth	Category	A (m2)
2017	45181	3586	3,00	365	10,22%	10,36%		Very Low	413,60
2018	49686	3603	2,92	365	9,79%	11,03%	0,68%	Very Low	440,62
2019	60708	3570	3,22	365	10,62%	15,00%	3,97%	Very Low	599,17
2020	52041	3547	3,21	365	11,19%	12,90%	-2,10%	Very Low	515,35
2021	51256	3506	3,40	365	12,22%	13,62%	0,71%	Very Low	543,91
2022	51774	3562	3,15	365	12,43%	12,58%	0,65%	Very Low	502,53
2023	53093	3558	3,18	365	12,97%	13,03%	0,78%	Very Low	520,32
2024	53774	3549	3,23	365	13,51%	13,43%	0,80%	Very Low	536,26
2025	52388	3544	3,23	365	14,05%	13,11%	0,17%	Very Low	523,67
2026	52457	3544	3,24	365	14,59%	13,15%	0,63%	Very Low	525,34

Table 8 presents an analysis of the need for stacking yards compared to the growth of container flows until 2026 at the Sorong Container Port. This data provides an idea of how well the capacity of the stacking yard can meet the demand generated by the growth in container flows. From the data presented, it can be seen that the growth of container flows (TEUs) at the Sorong Container Port shows a stable trend from 2022 to 2026, with the number of TEUs projected to increase from 51,774 TEUs in 2022 to 52,457 TEUs in 2026. On the other hand, the stockpiling yard capacity and dwelling time are also analyzed. Stacking yard capacity is measured in fairly stable numbers, ranging from 3,562 to 3,549 in 2022 to 2024, before increasing slightly in 2025 and 2026. Dwelling time, or the length of time containers remain in the stacking yard, is also relatively stable in the range of 3, 15 to 3.24 effective working days.

From an analytical perspective, the yard occupancy ratio (YOR) is also assessed. YOR shows the percentage of stacking fields that are used, and from the data presented, the level of field use is classified as very low, with the YOR percentage ranging from 12.43% to 14.59%. In this context, although there is steady growth in container flows, the stacking yards appear to have sufficient capacity to handle this growth. However, the low level of field use shows the potential to increase the efficiency of space use and port operations. This can be done by improving operational coordination, increasing throughput and loading and unloading efficiency, as well as improving the overall logistics management system. In this way, ports can maximize service potential and increase their competitiveness in the maritime market.

CONCLUSION

This study aims to analyze the need for container stacking facilities at the Sorong Container Port. Based on the analysis, it was found that there were fluctuations in the efficient use of field space at the port from time to time, with usage still relatively low. Projections show a steady increase in container flows from 2022 to 2026. Despite this, the yard occupancy ratio remains low, indicating the potential to improve operational coordination, throughput, loading and unloading efficiency and overall logistics management to improve the efficiency of space use and port operations. Recommendations include optimizing field use, improving operational processes, developing appropriate infrastructure to handle projected volumes, and increasing collaboration between stakeholders. Suggestions for future research include analyzing the performance of infrastructure investments, comparative studies with other ports, investigation of the influence of external factors, and exploration of logistics and supply chain management at the Sorong Container Port.

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