

Analysis of main facilities utilization level in Kuala Langsa Fish Landing Base, East Aceh, Aceh

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Abstract. Fishing ports are an important factor in supporting various capture fisheries activities in Aceh. One of the fishing ports in East Aceh is the Kuala Langsa Fish Landing Base (*PPI*). The problems in managing *PPI* Kuala Langsa are inadequate facilities and supporting infrastructure, therefore good port facility management is needed to be able to provide facilities and infrastructure more effectively and efficiently. This study aims to find out the actual condition of the fishing port dock and port pond facilities, and determine the utilization level of the fishing port dock and port pond facilities according to spatial and time in *PPI* Kuala Langsa. The research was conducted in August 2020 using survey methods and interviews with 18 fishermen. The actual conditions were then analyzed descriptively, whereas a level of used facilities was analyzed by using a formula from the Director-General of Capture Fisheries (1981), namely by using a percentage of the level of utilization. The results showed that the condition of the fishing port dock and port pond in *PPI* Kuala Langsa is good. The level of spatial utilization on the fishing port dock has crossed the limit (105%) and based on time was not optimal (45%). While the level utilization of the port pond facilities based on space and time level are still within optimal (100%).

1 Introduction

The Fishing Port is a fundamental part of fishery industry activities, especially in the Capture fisheries aspect. Fishing ports are classified into 4 classes, one of which is class D fishing port or fish landing base. The fishing port is a place consisting of the land and waters around it with certain boundaries as a place for government activities and fishery business system activities used as a place for fishing boats to dock, anchor, and load and unloads fish, equipped with shipping safety facilities and fishery support activities [1]. A fishing port equipped with facilities functions as a center for fostering and increasing fishery economic activities. Noverianto et al. [2] stated that if stakeholders such as fishermen, government, consumers, managers, and traders and fishery entrepreneurs utilize optimally existing port facilities, it gives ease and benefits for fisheries businesses.

The research conducted by Putri et al. [3] states that to achieve its functions and objectives as a fishing port, proper facilities and infrastructures are urgently needed so that all activities in a fishing port can be implemented properly. Fishing port facilities have to be built according to current and future needs. These facilities include basic facilities, functional facilities, and support

facilities [4]. Basic facilities are facilities that must be provided in a fishing port consisting of breakwaters, revetments, grayness, docks, jetty, port ponds, shipping lanes, complex roads, drainage, and land [5].

The fishing port in East Aceh is classified in class D, namely Kuala Langsa fish landing base, where the port is equipped with several basic facilities, including a port pond, shipping lanes, docks, complex roads, drainage, and land. Other facilities include a fish auction place, cold storage, a gas station, an ice factory and, others. The availability of basic facilities in Kuala Langsa fish landing base is expected to provide benefits for fishermen in carrying out fishing activities. However, the condition of the basic facilities at Kuala Langsa fish landing base is still improper, such as a narrow port and neglected land. The available facilities in Kuala Langsa fish landing base are currently not being used optimally by fishermen, there are many neglected buildings. This condition is much uncondusive when the fishing season arrives, the loading and unloading activities will become heavier, with the result that requiring a wider and more spacious landing area. Problems in fishing port management in Kuala Langsa fish landing base are limited facilities, weaknesses in human resources as managers, and lack of supporting infrastructure. The effectiveness and efficiency of port fishing facilities can

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be obtained through good facility management. This study aims to find out the actual condition of the fishing port dock and port pond facilities in Kuala Langsa fish landing base, and determine the utilization level of the fishing port dock and port pond facilities according to spatial and time in Kuala Langsa fish landing base.

Research on the level of utilization of basic facilities at fishing ports has been conducted in different places. Research conducted by Mufadzal et al. [6] shows that the level of utilization of facilities at the Calang fishing port for the anchoring pond is 100% and the dock is 80%. Research by Sundari et al. [7] at the Wonokerto fishing port shows that the level of utilization of the port dock facilities is 76.4%, the port pond is 83% and the port land is 29.1%.

2 Materials and Methods

2.1 Location and time research

This research was conducted in August 2020. The research location is located in the Kuala Langsa Fish Landing Base, East Aceh, Aceh.

2.2 Data collection methods

The data collection method is a very important stage in the research. The correct data collection technique will produce accurate data and vice versa. The data used are primary and secondary. Primary data collection techniques are carried out by surveys, interviews, and documentation. The survey method was carried out by direct observation at the research location. Interviews were conducted using direct communication techniques based on questionnaires to obtain the required data. Documentation is done by taking the necessary pictures at the research location. Secondary data collection techniques are carried out with literature studies that aim to study theories that support research. The literature study in question can be obtained from related agencies, including the port administration office, books, and journals related to research.

The sampling method using the method of simple random sampling is sampling utilizing each population are given a number then the sample is drawn randomly by using a lottery. According to Usman and Akbar [8], the number of data samples of the research is taken about the following formula:

$$n = \frac{NZ^2P(1-P)}{Nd^2 + Z^2P(1-P)} \quad (1)$$

Where:

- n : Number of samples to study
- N : Number of population
- d : The maximum Error that can be accepted (0,1)
- Z : Anormal Variable the standard (1,64)
- P : The Percentage of the variance set (0.05)

The number of fishermen in Kuala Langsa fish landing base are 537 people. The 18 respondent were collected from the total number of fishermen. Fishermen who become the sample in this research is boat crew.

The number of samples is obtained from the following calculation :

$$n = \frac{537 \cdot (1,64)^2 \cdot 0,05 (1-0,05)}{537 \cdot (0,1)^2 + (1,64)^2 \cdot 0,05 \cdot (1-0,05)}$$

$$n = \frac{97,98}{5,55}$$

$$n = 17,65 \rightarrow 18 \text{ respondent}$$

2.3 Data analysis

This research is only limited to an assessment of the utilization level of the main facilities, namely the fishing port dock and port pond.

2.3.1 Analysis of the actual condition of fishing port dock and port pond facilities in Kuala Langsa fish landing base

The actual conditions of the fishing port dock and port pond facilities in the Kuala Langsa fish landing base were analyzed using descriptive analysis. Descriptive analysis is an analysis that describes the object of research based on visible facts on observations. The data and information are described so that the actual condition of the main facilities can be clearly illustrated.

2.3.2 Analysis of facility utilization level

The analysis of the utilization level facilities using a formulation from the Directorate General of Fisheries [9], namely by using a percentage of the utilization level, it can be seen or assessed the utilization level of facilities in a fishing port. The utilization level of the facility is measured based on spatial and time function.

Facility utilization based on spatial function is on the ratio of the area of space used to the available space capacity of the facility. The facility utilization based on time function is based comparing on the number of vessel using the spacial (within a certain period) with the time capacity available in a facility.

The utilization rate of the fishing port dock and port pond based on the spatial function uses is as follows:

$$\text{The utilization level} = \frac{\text{Area of space used}}{\text{Available space capacity}} \times 100\% \quad (2)$$

The formula for the utilization level of the fishing port dock and port pond based on the time function is as follows:

$$\text{The utilization level} = \frac{\sum \text{Vessel using spacial}}{\text{Time capacity available}} \times 100\% \quad (3)$$

According to the Directorate General of Fisheries [9], the limits for knowing the use of facilities are as follows.

- If utilization > 100%, the utilization rate of port facilities exceeds the optimal limit.

- If the percentage of utilization = 100% then the utilization of port facilities is still within the optimal limit
- If the utilization percentage is <100%, the utilization rate of port facilities is not optimal.

3 Results and Discussion

3.1 The actual condition of fishing port dock and port pond facilities in Kuala Langsa fish landing base

Based on the research results, the Kuala Langsa fish landing base currently has 17 port facilities, namely basic facilities such as port land, port pond, fishing port dock, complex roads, and drainage. Functional facilities such as administrative offices, fish auction building, clean water facilities/water tanks, SPD installation (Solar Packed Dealer for Fishermen), electrical installations, ice factory, cold storage and parking lots as well as supporting facilities such as guard posts, meeting hall, public toilets buildings, and fishermen's shops. However, this research is only limited to an assessment the utilization level of the main facilities, namely the fishing port dock and port pond facilities. The conditions of the fishing port dock and port pond facilities in Kuala Langsa fish landing base are as follows:

3.1.1 Fishing port dock

The fishing port dock in Kuala Langsa fish landing base is used for catch landing activities with a fishing port dock length of 110 m and a width of 8 m, it is good conditions, currently, the fishing port dock is used by fishermen for loading and unloading activities, and mooring, and anchoring activities. The fishing port dock is made of reinforced concrete construction and piles that are equipped with additional tools, namely cranes that are used to transport fishermen's catches. The type of crane available in the Kuala Langsa fish landing base is the Harbor Mobile Crane. Harbor Mobile Cranes are usually used to transport light objects under 100 tones. The condition of the crane in the Kuala Langsa fish landing base is damaged, because of the lack of maintenance, so fishermen use local workers to transport their catch. The fishermen's catch is put into fiber and then pulled using a rope to a car carrying the catch by several workers at the fish landing base. The catch is then taken to the vessel owner's warehouse or brought to the market directly.

The fishing port dock in the Kuala Langsa fish landing base is also equipped with bollards and fenders. The bollard on this fishing port dock is made of cast iron at the end of the fishing port dock surface which functions to tie the mooring rope at the dock. This is following Mahyudin's [10] statement that a bollard is a form of a structure at the end of the port dock surface (quay edge) used to tie vessel mooring ropes. Bollard conditions are in good condition so it can make it easier for fishermen to moor their vessel.

Fenders are bearings that are placed in front of the port dock which is made of rubber. The main function of the fender is to prevent damage to the structure of the port dock and to protect the damage to the vessel's hull paint due to friction between the vessel and the port dock caused by motion due to waves, currents, and wind [11]. However, fishermen still use used car tires that are placed on the sides of the hull to protect the boat from hard collisions with the fishing port dock walls which can cause the hull of the vessel to be damaged. Some of the fishing port dock building conditions were damaged so that there was a pool of water in the fishing port dock building. Apart from being used for loading and unloading landings, the jetty in Kuala Langsa fish landing base is also used as a ferry dock. Other activities carried out in the Kuala Langsa fish landing base port dock include refuelling for boats, drinking water, and clean water.

3.1.2 Port pond

The port pond in Kuala Langsa fish landing base is currently a natural channel pond, where the port pond waters are formed naturally. Based on the results of interviews with the port administration office and fishermen, it was stated that the dredging ponds in the Kuala Langsa fish landing base had never been done. This is the same as the condition in the Ujung Seurangga fish landing base, which has a port pond, which is a natural pond, however, the dredging of the port pond at the fish landing base has not been used [12].

The port pond in Kuala Langsa fish landing base is quiet because it is located in the bay. According to Theo et al. [13], the condition of port waters is relatively protected naturally by the bay and surrounding islands so that the wave generation distance due to the wind is relatively short and the resulting waves are not too large. The area of the port pond is 1 ha with a depth of 8 m with good conditions so that it makes the vessel move without depending on the tides. Following the opinion of Armanda et al. [14], which states that the safety of vessel at anchor is highly dependent on the depth of the water pond at a fishing port, especially at the lowest water level.

The port pond in Kuala Langsa fish landing base is currently used as a shipping channel, a vessel swivel pool, loading and unloading activities, and mooring activities for vessel measuring 5-60 GT. The Kuala Langsa fish landing base port pond is also used as a shipping channel by outboard motorboats intending to carry out fishing activities. Outboard motorboats that are used as shipping lines measuring 0-10 GT catch fish using gill net, fishing rod, or traps. Apart from fishing, the Kuala Langsa fish landing base port pond is also used as a port dock for the crossing of Telaga Tujoh villagers, East Langsa District, Langsa.

3.2 The utilization level of fishing port dock and port pond facilities in Kuala Langsa fish landing base

3.2.1 The utilization level of fishing port dock facilities

The results of field observations during the study showed that the range number of vessel utilizing the dock was the vessel that >10-60 GT. The distance between vessel that land on the dock is 1-2 m. Based on the results of the calculation, it is found that the average number of vessel that frequently in and out of the port dock was 4 units per day. The length of fishing trips for fishing boats in PPI Kuala Langsa ranged from 12-24 hours, 2-5 days and some reaches 8-10 days. The PPI Kuala Langsa fishing port dock capacity is 110 m long and 8 m wide. The length of the fishing port dock required is currently 116.6 m. Research conducted by Aprilla et al. [15] at Sawang Ba'u fish landing base showed the length of the fishing port dock is 164 m, and the depth of the port dock is lower than 3 m, which the value has fulfilled the standard criteria based on regulation of the Minister of Marine Affairs and Fisheries No. 08 / MEN 2012.

Port activities in the Kuala Langsa fish landing base port dock are crowded in the morning because loading and unloading the catch activities were happening in the morning. The loading and unloading activities of the catch are carried out by workers at the port, by pulling each fiber from the vessel onto the transport car, the fiber is pulled by a rope by the workers with a total of 5-10 people. Vessel loading and unloading their catch is carried out at 07.00-18.00 WIB.

The Kuala Langsa fish landing base has one loading dock unit so that the vessel carry out loading activities in the same place. There are catch landing activities and preparation before going to sea in Kuala Langsa fish landing base, this shows that Kuala Langsa fish landing base has performed its function as a fishing port properly. This is under the regulation of the Minister of Marine Affairs and Fisheries No. 08 / MEN 2012 which states that fishing port exploitation functions include mooring and anchoring services for fishing boats, fish loading and unloading services, fishery product processing services, marketing and distribution of fish, utilization of facilities and land in the fishing port and others. The existence of fishing port facilities in Kuala Langsa fish landing base has been optimally utilized based on the spacial function where the results obtained are 105%. This is the same as the results of research by Ardandi et al. [4], which shows that the level of utilization of dock facilities in Tanjungsari fish landing base reaches 90% because the fishermen at Tanjungsari fish landing base have used the available fishing port dock facilities as basic facilities for unloading cargo, loading supplies, and berthing fishing boats. Research conducted by Darma et al. [16] shows that the utilization rate of the fishing port dock in Birea fish landing base is 90,5%, which means that the level of the facility utilization rate of Birea fish landing base is classified as high. Very high fishing port dock utilization rates also occur at Tanjung Sari Palembang fish landing base [4]

and Lonrae Bone [17]. According to the decree of the Minister of Marine Affairs and Fisheries No.08/MEN 2012 that type D port must have a fishing port dock length of at least 50 m, while the length of the fishing port dock available in Kuala Langsa fish landing base is 110 m with 35 existing vessel and 4 vessel, the largest is 60 GT, so it takes an additional length of the fishing port of 5.4 m.

The use of fishing port dock facilities is used by fishermen for 11 hours, while the fishing port dock facilities are available for 24 hours. The utilization level of the fishing port dock based on the time function is 45%. This is because the vessel unloads around 07.00 - 18.00 WIB, so it can be concluded that the level of utilization of the fishing port dock based on time function is not optimal. The research result of Pujiastuti et al. [18] the less than optimal utilization of this port dock is due to a habit of the fishermen who tether their boats along the Pasilian River.

3.2.2 The utilization level of fishing port pond facilities

The port pond in Kuala Langsa fish landing base is used by fishermen for loading and unloading activities, supplies, mooring, and turning boats. Port ponds are also very important in the activities management, with a good pond condition, it should be very useful for fishermen. The data obtained on the total area of the port pond area that already exists in the Kuala Langsa fish landing base is 10.000 m², while the need for the Kuala Langsa fish landing base port pond needs reaches 14.606,85 m². The research of Primsa et al. [19] showed that the Pagurawan fish landing base requires a port pond area of 2.585,19 m² and a port pond depth of 2 m.

The number of vessel anchored and loading and unloading in the Kuala Langsa fish landing base is 35 purse seine. The vessel storage capacity in Kuala Langsa fish landing base is not by the decree of the Minister of Marine Affairs and Fisheries No. 08 / MEN 2012, regarding the classification of fishing ports for type D ports. Based on the decree of the Minister of Marine Affairs and Fisheries No. 08 / MEN 2012 that type D ports can accommodate there are at least 15 vessel with a size of ≥ 5 GT, while the number of vessel in Kuala Langsa fish landing base is 35 units and has 4 of the largest vessel measuring 60 GT which impacted towards the entrance and exit the port area. This is supported by the statement of Armanda et al. [14], where the size of the vessel and the number of vessel anchored in the port pond greatly affect the area of the port pond in a fishing port so that vessel leaving and entering the port area were not blocked.

The utilization rate of port ponds based on spatial and time function has reached 100% or the optimal limit. So that it can be done to develop the area of the port pond because the number of vessel in Kuala Langsa fish landing base is increasing. The development of the port pond area aims to support Kuala Langsa fish landing base activities. This is following the statement of Narindra et al. [20], the construction of fishing port infrastructure is urgently needed to help provide convenience and services so it is necessary to plan a fish

landing base equipped with supporting facilities. The actions that need to be necessary for facilities whose level of utilization exceeds optimal conditions are increasing the area of facility capacity, while for facilities that have not yet reached optimal, it is necessary to increase the utilization of these facilities [21]. Research conducted by Faisal [22] shows that the utilization rate of the port pond at the Sawang Ba'u fishing port has also reached 100%.

4 Conclusions

1. The conclusions of the research results are:
2. The condition of the fishing port dock in Kuala Langsa fish landing base is good which has a fishing port dock length of 110 m and a width of 8 m, while the condition of the port pond is also good with an area of 4 ha and a depth of 8 m.
3. The level of spatial utilization on the fishing port dock was 105% yet based on time was 45%. This showed that the use of the port dock based on spatial utilization has crossed the limit and based on time was not optimal. While the level utilization of the port pond facilities utilization based on space level is 100% and based on time is 100%. It was indicated that the use of the facility is still within optimal limits.

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