# Performance of Gillnet Fishing Equipment to Support Capture Fisheries in Nunukan District, Indonesia

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## ABSTRACT

Nunukan Regency has great fishery potential considering that it is located in two fisheries management zones (WPP), namely WPP 713 and WPP 716 which include the Makassar Strait and the Sulawesi Sea. In 2013, the contribution of the fisheries sector to the regional economy was 2.16 percent, or an increase of 30.93 percent compared to 2012. Many fishermen in Nunukan Regency use gillnet fishing gear in their fishing operations. Data and information on the performance of fishing units are needed for sustainable capture fisheries management. This study aims to enrich data and information on gillnet fishing gear as a basis for formulating optimal and sustainable fisheries development and management policies in the Nunukan Regency area. The research was conducted in August 2015 located at PPN Nunukan, Mansapa, Mamolo, Sebatik Island, and PPI Sebatik. . The method used is a descriptive survey method. The data was collected in the form of primary data obtained from direct observations and interviews with respondent fishermen and secondary data obtained from statistical data from the Fisheries Service and Bappeda Nunukan Regency. The data obtained were then analyzed descriptively. The results showed that there are 2 types of gillnets used by fishermen in Nunukan, namely fixed gill nets (trawl nets) and drift gill nets (drift gillnets). The ship used has a length of about 11 meters, a width of 1.5 meters, and a draft of 1 meter. The net is made of nylon or PA (Polyamide). The fishing ground of the gill net fishing operation is in the waters not far from Nunukan Regency with a travel time of about 1-2 hours. The catch of gillnet is threadfin, red snapper, spanish mackerel, and others.

**Keyword**: *fisheries management, fishing gear, fishing operation.*

## 1. INTRODUCTION

Geographically, Nunukan Regency is located at 03°15'00"–04°24'55" North Latitude 115°22'30"–118°03'00" East Longitude. The area of Nunukan Regency is around 14,263.68 Km2 with a coastline length of 314,592 Km and a water area of 304,857 Ha. The fishery potential in Nunukan Regency is very large, considering that it is located in two fisheries management zones (WPP), namely WPP 713 and WPP 716 which include the Makassar Strait and the Sulawesi Sea. In 2013, the contribution of the fisheries sector to the regional economy was 2.16 percent, or an increase of 30.93 percent compared to 2012. Fish resources are renewable resources. This means that the reduction in the number of individuals in a population due to natural death or death due to fishing will recover to a certain equilibrium point by the carrying capacity of the waters [1].

According to the Regulation of the Minister of Fisheries and Marine Affairs and of the Republic of Indonesia No. 6 of 2010 concerning fishing gear in the Indonesian Fisheries Management Area (WPPRI), there are 10 classifications or groupings of fishing gear, namely circular nets (surrounding nets), seine nets, and drag nets (trawls, dredges, lift nets, falling gears, gillnets and entangling nets, hooks and lines and grappling and wounding) [2]. Meanwhile,

according to the Food and Agriculture Organization (FAO), there are 12 classifications of fishing gear [3]. Other fishing gear is fishing gear that is not included in the previous group classification, where the principle of catching is not by trapping, fishing, trapping, gripping, hooking/pinning, injuring, or killing the target catch [4].

The construction of fishing gear is usually adjusted to the behavior of the fish that are the target of catching and their habitat. Gillnet fishing gear is the most widely used fishing gear by fishermen in Nunukan Regency. The fishing fleet in the Integrated Marine and Fisheries Center Area (SKPT) of Sebatik, Nunukan Regency uses 9 (nine) types of fishing gear, namely dogol, fixed gill nets, lift nets, drift gill nets, three-layer nets (tramel net), drifting longlines, circular gill nets, step-by-step charts and fixed longlines [5]. The results of Husin's research (2018) show that the fishing gear used by sebatik fishermen are Three Layers Net, Bagan Tancap, Lobster Pukat, Bawal Pukat, Tenggiri Pukat and Hela Pukat [5]. Data and information regarding the condition of fisheries, one of which is regarding the condition of the fishing unit, is very necessary for sustainable capture fisheries management. So far, the data and information related to this matter are still not widely known and mapped [6]. With the research related to the performance of gill net fishing gear, it is hoped that it can enrich data and information as a basis for formulating optimal and sustainable fisheries development and management policies in the Nunukan Regency area.

## 2. RESEARCH METHODS

The research was conducted in August 2015 located at PPN Nunukan, Mansapa, Mamolo, Sebatik Island, and PPI Sebatik. The research location can be seen in Figure 1. The method used is a descriptive survey method. This method is used to collect data or information about the capture fisheries activities of the Nunukan fishermen. Primary data were obtained from direct observation and interviews with respondent fishermen. Direct observation is done by visiting places associated with capture fisheries activities. Interviews were conducted on 2 fixed gill net fishermen (trawl nets). The secondary data was obtained from the Fisheries Service and Bappeda of Nunukan Regency, in the form of statistical data on capture fisheries in Nunukan Regency. The data obtained were then analyzed descriptively.

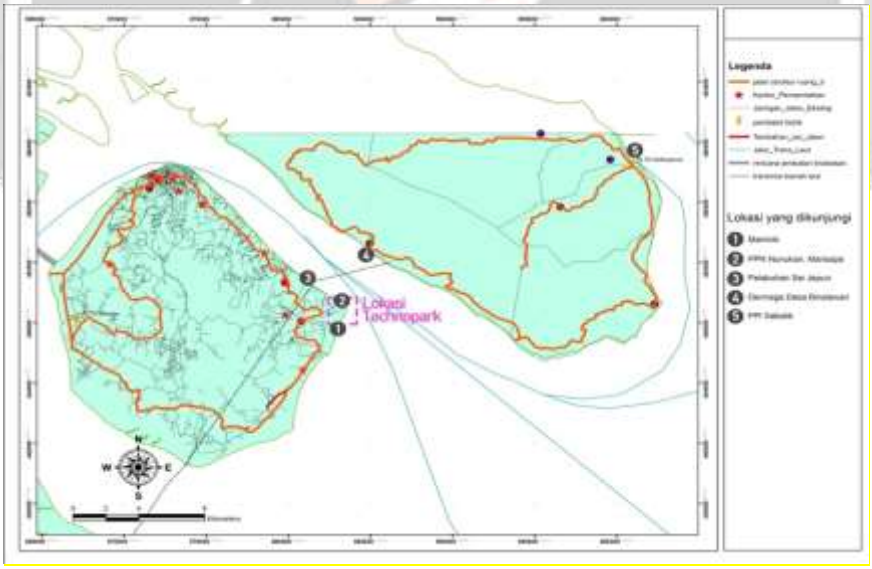



Figure 1. Observation Locations for Capture Fisheries Data Collection

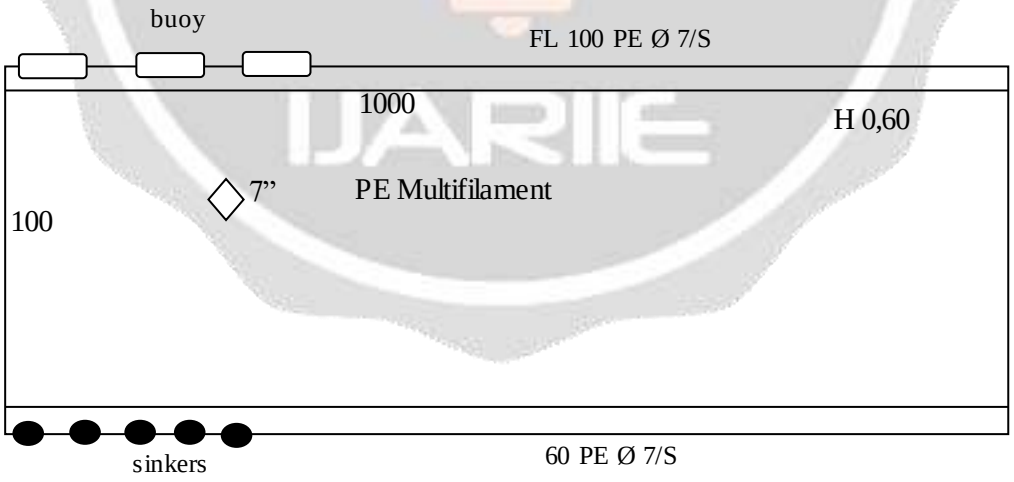
## 3. RESULTS AND DISCUSSION

One of the fishing gear used to catch pelagic fish in the Nunukan Regency is a gillnet. There are 2 types of gillnets used by fishermen in Nunukan, namely set gillnets and drift gillnets. Set gillnet or what the Nunukan people call rope trawl is one of the fishing gear used to catch pelagic fish. The trawl consists of a buoy, net body, top rigging

rope, bottom rigging rope, weights, and sign buoys. The construction of the gill net consists of a web body (webbing), the upper ris rope, the lower ris rope, and a ballast buoy [7].

There are 2 types of ballast used, namely large weights that are installed at each end of the trawl and small weights that are installed along the bottom ris line. The trawl used in Nunukan is classified as a gillnet with a net material of PE (polyethylene) and a mesh size of 7 inches. Nylon is often used by fishermen for gillnet fishing gear [8]. The advantage of nylon-based nets is that the net material is clear in color when in the water, so it is difficult for fish to detect the presence of nets in the water, and fish can be entangled or trapped [9]. The construction of the trawler operated in Nunukan Regency can be seen in Figure 2. and the design of the trawler in Nunukan Regency can be seen in Figure 3.


Figure 2. Gillnet Fishing Gear in Nunukan District




Gambar 1. Design and Contruction Gillnet in Nunukan Regency

This fishing gear is operated by using a vessel made of wood. The ship used has a length of about 11 meters, a width of 1.5 meters and a draft of 1 meter. Ship is a form of construction that can float in water and has the property of loading in the form of passengers or goods with the nature of its motion being able to use paddles, wind, and engines [10].

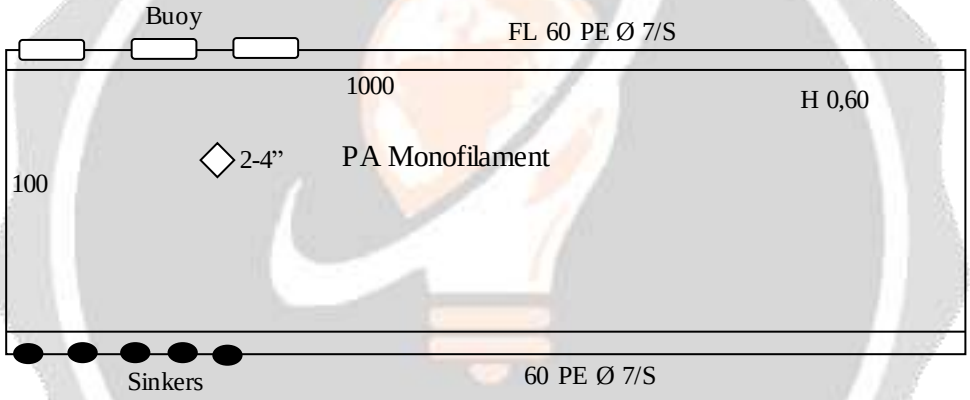
Fishing vessels generally use wood as the main material, because wood as a material is relatively cheap and easy to work with when compared to steel and fiber boats [11]. Fishing vessels must have the ability to load fish, speed, good maneuverability, stability, and ship worthiness [12]. The ship's engine used has a power of 30 PK. The time it takes to get to the fishing ground is about 1-2 hours depending on the distance to the fishing ground. The use of labor on gillnet fishing gear is between 2-3 fishermen.

Figure 4. Gillnet Fishing Vessel Unit

The operation of the trawler is divided into several stages, namely the preparation stage, setting the net, soaking the net (soaking), and lifting the net (hauling). The preparatory stage includes the trawler that will be operated on the boat deck. Lowering the net begins with lowering the sign buoy and then the net body until the last sign buoy. The time required for setting is 30-60 minutes. The third stage is soaking the net (soaking). The installed net will be left in the water for 2-3 hours after the net is installed. The last stage is lifting the net or hauling. The process of lifting the net begins with lifting the sign buoy, then the net body and weights. After that, the net is lifted and then releases the catch caught in the net is. The catch obtained by the rope trawl is pelagic fish. The catch of gillnet is threadfin, red snapper, spanish mackerel, and others.

Drift gill nets are gill nets in which the operating method is allowed to drift in the water, whether it is drifting on the surface, column, or bottom of the water. Drift gill nets are gill nets that are operated by allowing them to drift in waters, whether they are drifting on the surface, the water column, or the bottom of the water [13, 14]. This fishing gear is operated by using a boat made of wood. The ship used has a length of about 11 meters, a width of 1.5 meters, and a draft of 1 meter. The ship's engine used has a power of 30 PK. The time it takes to get to the fishing ground is about 1-2 hours depending on the distance to the fishing ground. The use of labor in fishing gear for drift gill nets is between 2-3 fishermen. Drifting gill nets consist of buoys, net bodies, upper rigging ropes, lower ris ropes, weights, and sign buoys. Drift gill nets are included in the classification of gillnet fishing gear with nylon multifilament net material and mesh size of 2-4 inches. The drift gill net fishing gear operated in Nunukan Regency can be seen in Figure 5. and the design of the drift gill net construction can be seen in Figure 6.

Figure 5. Drift Gillnet Fishing Gear in Nunukan District




Gambar 6. Design and Contruction Drift Gillnet in Nunukan Regency

The operation of drift gill nets is generally carried out at night, starting with preparations before departure. The preparations include providing fuel, ice, and food ingredients and checking the equipment to be used during fishing operations. The journey to the fishing ground (fishing ground) takes about 1-2 hours depending on the intended fishing location. Arriving at the fishing location, the fishermen begin to make settings, namely to spread nets by cutting the current direction to block the movement of the swimming fish. Currents greatly affect the distribution of fish, the relationship of currents to the distribution of fish is that currents divert eggs and chicks of pelagic fish and spawning areas to grow-out areas and to foraging sites [15]. The spread of the net begins with throwing the main buoy then spreading the body of the net and lowering the top rope at the same time so that the lowered net is stretched and does not roll in the water. After the netting is completed, a rope is tied to the boat so that the net does not drift away from the boat.

After the setting process is complete, the nets are allowed to drift for 7-8 hours before hauling. As long as the net is in the water, fishermen take the time to rest, but some use this time to fish to increase their income. Hauling is carried out by two fishermen, one person pulling the top rope and buoy and the other person pulling the net body and releasing the catch. The hauling process takes between 2 to 3 hours, depending on the number of fish caught. After the hauling is done, the boat is dispatched to the fishing base. The caught fish are collected in a fiber hold which has been filled with ice. This aims to maintain the freshness of the fish. The hold is a place for storing caught fish, both permanent and non-permanent (which can be lifted and lowered) in the hull of the ship [16].

## 4. CONCLUSIONS

Based on the results of data analysis on capture fisheries in Nunukan Regency, the following conclusions can be drawn:

1. There are 2 types of gillnet fishing gear used by fishermen in the Nunukan Regency, namely fixed gill nets (trawl nets) and drift gill nets (drift gillnets).
2. The fishing vessel used has a length of about 11 meters, a width of 1.5 meters, and a draft of 1 meter.
3. The net is made of nylon or PA (Polyamide).
4. The fishing ground of the gill net fishing operation is in the waters not far from Nunukan Regency with a travel time of about 1-2 hours
5. The catch of gillnet is threadfin, red snapper, spanish mackerel, and others.

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