*Original Research Article*

# EFFECTIVENESS OF LIGHT USING ON THE NUMBER OF GIANT LIFT NET CATCHES IN BARRU DISTRICT, INDONESIA


## ABSTRACT

**Aims:** This study aims to determine the effectiveness of the use of light on the catches of the Giant lift net

**Place and Duration of Study:** The research was conducted for six months, from March to August 2022. The research was carried out in the waters of Barru Regency, South Sulawesi Province.

**Methodology:** Data collection was carried out using survey and interview methods as well as literature studies. Field data collection is carried out by participating in direct operations with fishermen. Primary data includes catch ( main catch ), data on the duration of the stages of catching ( setting time, towing time, and hauling time ). The data collected from the interviews are the catch (species, kg/trip, tail/trip) and the trip period. Sampling of the catch is done by taking the fish caught by the Giant lift net per trip. Furthermore, data regarding the description of the Giant lift net was carried out by means of interviews, observations and direct measurements of fishing gear. Secondary data ( desk study ) will be obtained from an inventory of official publications and fisheries statistical data from the local government.

**Results:** The effectiveness of using the number of lamps and the wattage of the lamps is directly proportional to the catch, the more and brighter the LED lights are used, the more catches will be. The most optimal watt size used in the operation of the Giant lift net is 300-400 watts. The color of the light that is good for using the Giant lift net operation is white.



*Keywords: Catch, Fish, Giant lift net, Light*


## 1. INTRODUCTION

Barru Regency has an area surrounding marine fishing area 56,160 Ha, ponds around 2,570 Ha, 1,400 Ha beach and cultivation area pond/fresh water 39 Ha. There is various capture fisheries potential in Barru Regency, including fish small pelagics (Bubun and Mahmud, 2016).

One of the most widely used fishing gears in fishing in the waters of Barru Regency, South Sulawesi, is the Giant lift net. Bagan is a fishing gear that uses light fishing in its operation (Chaidir, Z,. La Sara and Naslina Alimina, 2019), in general this fishing gear is intended to catch anchovies (Stolephorus sp).

The operation of the Giant lift net is usually carried out at night, by taking advantage of the nature of the fish, namely positive phototaxis . Giant lift net fishermen in Barru District use LED ( Light Emitting Diode ) lights to stimulate fish to approach the light source on the Giant lift net . The fish that are the target of catching Rambo's chart are pelagic fish schools. For this reason, a study was carried out to determine the effectiveness of using light on the catches of the Giant lift net .

## 2. MATERIAL AND METHODS

### Tool

The tools used are a single unit Giant lift net, current meter, GPS map, hand refractometer and fish identification book (Marine Fishes of South-East Asia).

### Methods

Data collection was carried out using survey and interview methods as well as literature studies. Field data collection is carried out by participating in direct operations with fishermen. Primary data includes catch (main catch), data on the duration of the stages of catching ( setting time, towing time, and hauling time). The data collected from the interviews are the catch (species, kg/trip, tail/trip) and the trip period. Sampling of the catch is done by taking the fish caught by the Giant lift net per trip. Furthermore, data regarding the description of the Giant lift net was carried out by means of interviews, observations and direct measurements of fishing gear. Secondary data (desk study) will be obtained from an inventory of official publications and fisheries statistical data from the local government.
The method used in this research is descriptive method, namely making descriptions, drawings or drawings systematically, factually and accurately regarding the facts, characteristics and relationships between the phenomena being investigated, in the form of:

1. Catch unit analysis. The description of this fishing unit is used to describe in general the condition of the Giant lift net fishing unit in the waters of Barru Regency. A detailed description includes the design and construction of the fishing gear used by fishermen and how the Giant lift net operates.

2. Catch composition analysis. Before being analyzed, catches were first identified using the Fish Identification Book. After identifying the data, it is processed using Microsoft Excel software to determine the composition of the main catch and bycatch based on weight (kg).

3. Operation of the Giant Lift Net using LED (Light Emitting Diode) lamps with a capacity of 200-300 watts in white and 300-400 watts in yellow .

## 3. RESULTS AND DISCUSSION

### Description of the Giant Lift Net

In general, the description of the Giant Lift Net gear consists of boats, net frames, nets and Giant Lift Net Houses. Bagan in Barru Regency is usually installed at a depth of 15-25m with a sandy mud bottom. The frame of the bagan consists of 250-350 bamboo sticks, the average height of the bagan is 20-27 meters measured from the seabed to the poles and the height of the building from sea level is 10-15 meters. The functions of the frame on the Giant lift net are: a place to hang nets, maintain the balance of the boat, a place for setting and hauling, a place to hang lights, and other activities (repairing nets, sorting catches, fishing). The nets used are made of polypropylene (PP), the nets used are 16 x 16 meters in size with a mesh size of 0.2 cm attached to a bamboo frame, and each corner is attached with a weight weighing 12 kg which is useful for sinking the net into the water. The size of this chart house is 2-3.5 meters long, 4-5 meters wide and 1-2 meters high. This charter house

functions as a resting place, a place for light panels and switches, generators, and other equipment.

The method of operating the Giant lift net in Barru Regency is as follows:

a. In preparation for the fishing ground, usually check and prepare everything that is needed in the operation of the Giant lift net first. Inspections and repairs are mainly carried out on the ship's lights and engines. Other preparations that are considered important are the need for supplies for fishing operations such as fresh water, diesel fuel, kerosene, salt and foodstuffs. When arriving at the fishing ground location and it is getting dark, the lights are turned on and the nets are usually not lowered immediately until the time when the fish are seen congregating at the chart location or wanting to enter the area of the light. However, this does not rule out the possibility that some fishermen immediately lowered their nets after the lights were turned on.
b. Lowering nets (setting), after waiting several hours and fish begin to appear to gather at the fishing location, the nets are lowered into the waters. The net is usually lowered slowly by turning the rollers. Lowering the net along with the hanging rope is carried out until the net reaches the desired depth. The setting process depends on weather conditions and catch situations, as well as water conditions during fishing operations.
c. Net immersion (soaking), as long as the net is in the water, fishermen observe the presence of fish around the boat to estimate when the net will be lifted. The length of time the net is in the water (immersion of the net) is not arbitrary, because fishermen never determine and calculate the length of time the net is in the water and when the net will be lifted, but only based on vision and observations of fish gathering under the lights.
d. Lifting nets (hauling), hauling is done after a flock of fish is seen gathering at the fishing location. The hauling activity begins with a gradual blackout of the lights. This is so that the fish are not surprised and remain concentrated on the part of the boat around the lights that are still on. When the fish have gathered in the middle of the net, the net begins to be pulled to the surface until finally the fish are caught by the net.

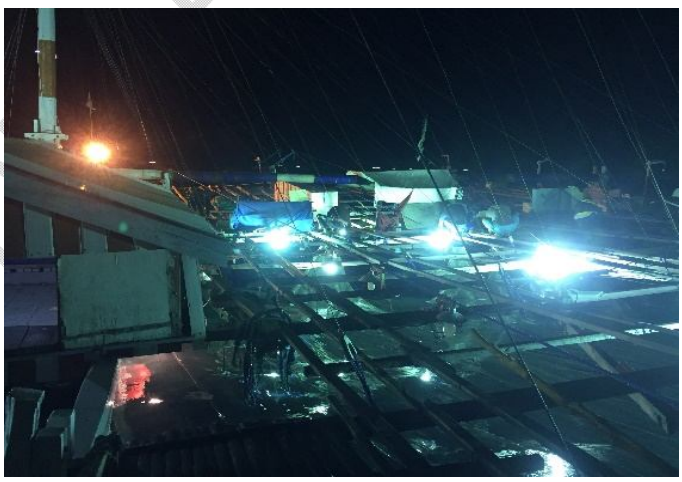


Figure 1. Operating Chart in Barru District

## Catch Composition

Based on the results of research on Giant Lift Net operating in Barru Regency, the main catch species were dominated by anchovies (Stolephorus sp) as much as 65% and squid (Loligo sp) as much as 35%. Chaidir, Z. La Sara and Naslina Alimina, (2019) in their research in Lazolo Bay, North Konawe found catches dominated by anchovy (Stolephorus commersoni) as the main catch of 73.83% of the total catch. Nelwan et al. (2015) stated that the species composition of Giant Lift Net catches in the waters of Sinjai Regency was dominated by anchovies (Stolephorus sp) as much as 32.98%. One of the factors that influence the large number of anchovies caught is based on the behavior of anchovies which are pelagic and live in groups in coastal areas, often migrating so that their presence is greatly influenced by the season (Chaidir, Z,. La Sara and Naslina Alimina, 2019).
The amount of catch obtained per hauling ranges from 30-100 kg consisting of anchovies and squid using LED (Light Emitting Diode) lamps with a capacity of 200-300 watts in white and 300-400 watts in yellow. figure 1 below shows the relationship between the number of lights installed on the Giant lift net and the catches of anchovies and squid.

Table 1. Relationship between Number of Lights and Number of Catches

| No. | Fish Type (kg) | | LED light (pc) |
|---|---|---|---|
| | Anchovy | Squid | |
| 1. | 45 | 20 | 45 |
| 2 | 35 | 20 | 46 |
| 3 | 55 | 20 | 55 |
| 4 | 40 | 20 | 45 |
| 5 | 60 | 40 | 44 |
| 6 | 20 | 30 | 36 |
| 7 | 53 | 27 | 55 |
| 8 | 60 | 19 | 36 |
| 9 | 50 | 30 | 30 |
| **AMOUNT** | **418** | **226** | |

The catch for each hauling shows that the number of catches varies for each number of lights (Table 1). On a boat with 44 lights, the second highest catch (100 kg) and 36 lights shows the second lowest catch (50 kg).

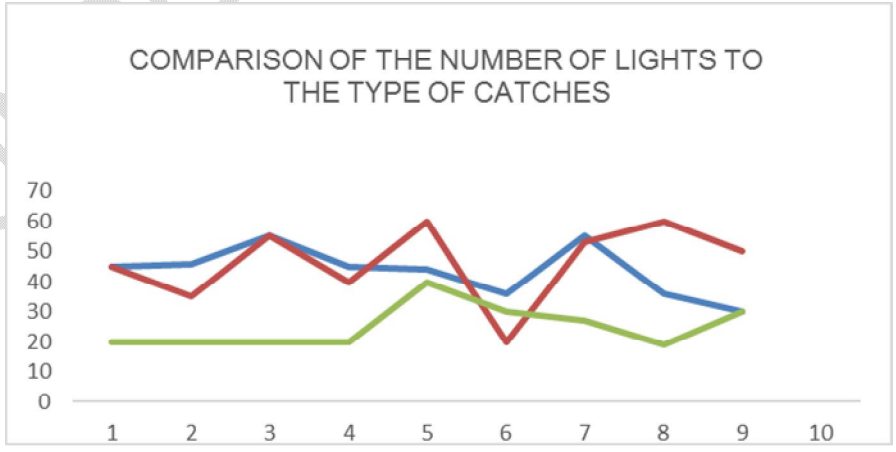
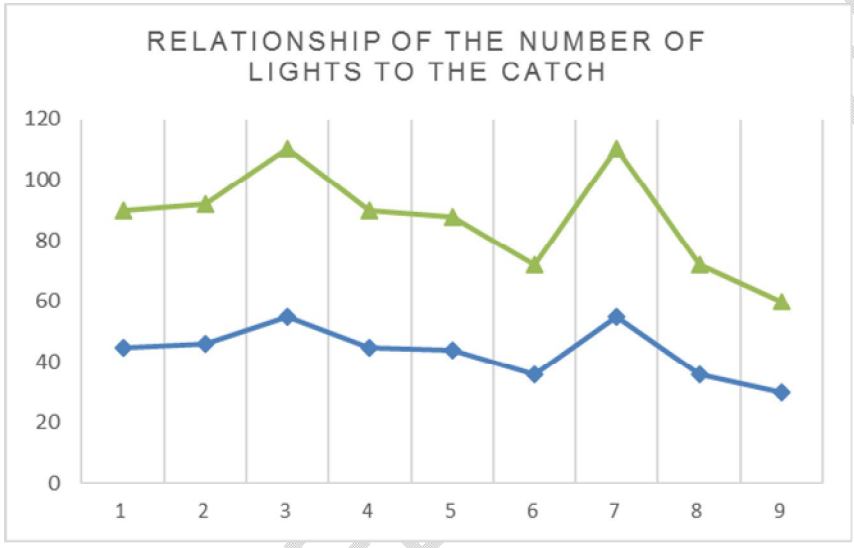



Figure 2 : Comparison of the number of lights to the type of catches

**Note:** Blue Line: Number of Light (Pcs); Red Line: Anchovies (Kg); Green Line: Squid (Kg)

Figure 2 shows that the dominant catch caught is anchovies (*Stolephorus sp*.). This is because anchovies are positive phototactic fish (like light). Positive phototaxis keeps fish oriented towards a light source, optimum light intensity for foraging and other activities, and disoriented and immobilized due to high light levels and dark conditions in the surroundings. This fish reaction is used to catch fish using light aids, so that the movement of fish is getting to the surface and entering the catchment area of the fishing gear used (Kurnia, Sudirman , Alfa Nelwan. 2015) . As for the squid, it approached the light source because it was attracted to the presence of anchovies as one of its food. Light in this case indicates the presence of food for the squid.




Note: Line Green: Catches (Kg) ; Blue Line: number of lights (Pcs)

Figure 3. The relationship between the number of lights installed in the Giant lift net and the results Overall Catch

Based on figure 3, it shows that the number of LED lights installed on the Giant lift net affects the number of fishermen's catches, the more the number of lights installed and the higher the number of watts, the more catches the fishermen get, and vice versa. According to Nelwan, et al (2015), the power of light has an impact on the attractiveness of fish to bright light, especially fish that have positive phototactic properties, it is suspected that the chances of being caught are higher in the number of fish species in the rambo net compared to the *purse seine* . Furthermore Putra (2012), the fish caught in the chart with 60 lamps measuring 250 W and 500 W were dominant, anchovies (*Stelophorus insularis)* were 23.28%.

The anchovy fishing season occurs from July to November, while January to June and December are not the season for anchovy. The dominant species of fish caught in the Giant lift net besides anchovies (Stolephorus sp.), also caught squid (Loligo spp). Lebarunaung (2011) states that during the western season (December–February) and east monsoon (August–September) fewer anchovies are caught than during the transition season which is the peak season for caught anchovies.

Types of anchovies (*Stolephorus* sp) can be found in water depths of 31 meters. The distribution of salinity in Barru waters in June- August ranges from 27.23-29.455 ppt, so that Barru waters are very suitable for fishing operations for anchovies. Based on Kusuma, et al

(2014), the environmental conditions of the bagan boat fishing area are an average light intensity of 260 - 1932 (lux), temperature 29.6 - 31 °C, salinity 29 - 33 ‰ and water depth 27 - 32.8 meters.

## 4. CONCLUSION

The effectiveness of using the number of lamps and the wattage of the lamps is directly proportional to the catch, the more and brighter the LED lights are used, the more catches will be, The most optimal wattage size for using a Giant lift net is 300-400 watts, The color of the light that is good to use in the operation of the Giant lift net is white.

## REFERENCES


Bubun, R. L., & Mahmud, A. (2016). Level of Utilization of Flying Fish (Decapterus spp) Based on Catches of Ring Seines in East Waters of Southeast Sulawesi. Airaha Journal, 5(1), 96-102.

Candra Pradhika Mulya Kusuma, Herry Boesono, Aristi Dian Purnama Fitri. 2014. Analysis of Anchovy (Stolephorus sp.) Catches with Bagan Boat Fishing Gear Based on Depth Differences in Morodemak Waters. Journal of Fisheries Resources Utilization Management and Technology Volume 3, Number 4, Year 2014, pp 102-110. (http://www.ejournal-s1.undip.ac.id/index.php/jfrum).

Chaidir, Z., La Sara, Naslina Alimina, 2019. Main catch and by-catch of Giant lift net in Lasolo Bay waters, North Konawe Regency. Journal of Fisheries Science and Innovation. Vo; 3, No.2, 39-44, July 2019.

Fauziyah 1, Freddy Supriyadi, Khairul Saleh and Hadi. 2013. Differences in Hauling Time for Bagan Tancap to Catches in Breech Waters, South Sumatra. Journal of Suboptimal Land. Vol. 2, No.1: 50-57, April 2013

Lebarunaung, A. 2011. Analysis of Anchovy (Stolephorus sp.) Fishing Season in Dodinga Bay, West Halmahera Regency. Journal of Peric and Tropical Marine. Vol 7 No 1.2011

Kurnia, M., Sudirman, Alfa Nelwan. 2015. Study of Fish Arrival Patterns in the Bagan Boat Fishing Area with Hydroacoustic Technology. PSP Science and Technology Journal, vol.2 (3) April 2015: 261-271

Nelwan, A. F.P., Sudirman., Nursam, M., Yunus, M.A. 2015. Pelagic Fishing Productivity in Sinjai Regency Waters during the West–East Transitional Season. Fisheries Journal. 17(1):18-25.

Putra, A.P. 2012. Study of the Correlation Between Catch Success and Oceanographic Parameters on the Rambo Chart Fishing Gear in the Waters of Barru Regency Study Program on Utilization of Fishery Resources, Department of Fisheries, Faculty of Marine Science and Fisheries. Hasanuddin University. Macassar.

Putra, R.S.R. 2013. Optimization of Floating Bagan Fishing Operations in PalabuhanRatu Bay, Sukabumi Regency, West Java. Department of Utilization of Fishery Resources, Faculty of Fisheries and Marine Sciences, Bogor Agricultural University, Bogor.

Son, RSR. 2013. Optimization of Floating Bagan Fishing Operations in PalabuhanRatu Bay, Sukabumi Regency, West Java. Department of Utilization of Fishery Resources, Faculty of Fisheries and Marine Sciences, Bogor Agricultural University, Bogor.