

***Original Research Article***  
**EFFECTIVENESS OF LIGHT USING ON THE  
NUMBER OF BAGAN RAMBO'S CATCHES IN  
BARRU DISTRICT**

Comment [N1]: It should be translate to English, giant lift net

### ABSTRACT

**Aims:** This study aims to determine the effectiveness of the use of light on the catches of the Bagan Rambo

**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 Bagan Rambo per trip. Furthermore, data regarding the description of the Bagan Rambo 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 Bagan Rambo is 300-400 watts. The color of the light that is good for using the Bagan Rambo operation is white.

*Keywords: Bagan Rambo, Catch, Fish, 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 Bagan Rambo. 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 Bagan Rambo is usually carried out at night, by taking advantage of the nature of the fish, namely positive phototaxis . Bagan Rambo fishermen in Barru District use LED ( Light Emitting Diode ) lights to stimulate fish to approach the light source on the Bagan Rambo . 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 Bagan Rambo .

## 2. MATERIAL AND METHODS

### Tool

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

### Methods

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1. Catch unit analysis. The description of this fishing unit is used to describe in general the condition of the bagan rambo 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 Bagan Rambo 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 Rambo chart using LED (Light Emitting Diode) lamps with a capacity of 200-300 watts in white and 300-400 watts in yellow [(Arial, normal, 10 font, justified) (Detailed instruction about this section is given below. After reading these instructions, please delete this paragraph and begin typing your text here. If you are using copy-paste option then select 'match destination formatting' in paste option OR use 'paste special' option and select 'unformatted Unicode text' option).

**Comment [N2]:** How many lift net did you measured ? What is the population size ? How many sample you took from the population and how did you select sample ?

## 3. RESULTS AND DISCUSSION

### Description of the Bagan Rambo

In general, the description of the Rambo net fishing gear consists of boats, net frames, net frames, nets and chart 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 Bagan Rambo 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 Bagan Rambo 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 Bagan Rambo 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.

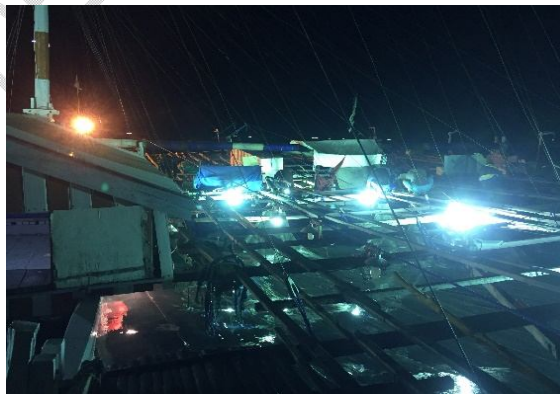


Figure 1. Operating Chart in Barru District

## Catch Composition

Based on the results of research on **chart rambo** 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 **bagan rambo** 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).

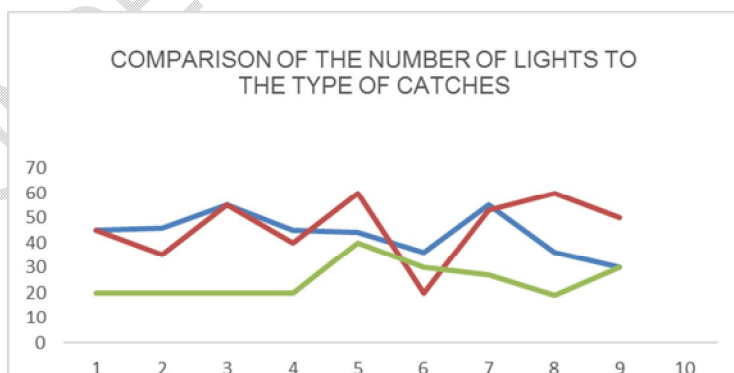
The amount of catch obtained per hauling ranges from 30-100 kg consisting of anchovies and squid using LED (Light Emitting Diode) lamps with a capacity of 200-300 watts in white and 300-400 watts in yellow. figure 1 below shows the relationship between the number of lights installed on the Bagan Rambo 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
<b>AMOUNT</b>	<b>418</b>	<b>226</b>	

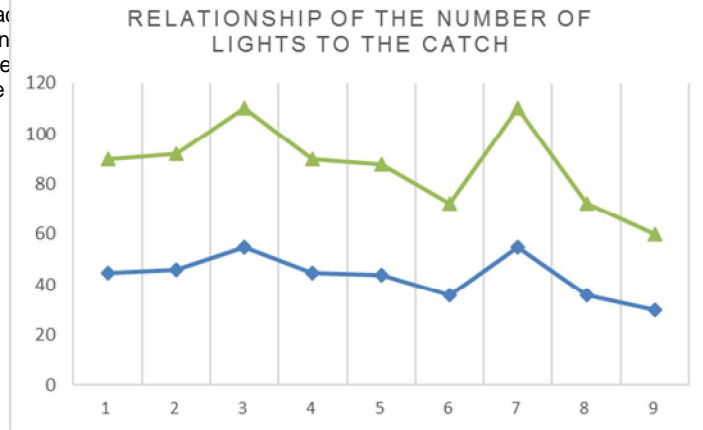
**Comment [N3]:** How do you calculate the lights ? The light could be measured in term of intensity, however in this case, may be you mean light bulb ?

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).



**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 side, so that the movement of fish is getting to the surface. Alfa Nelwan to the presence of food for the



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

Figure 3. The relationship between the number of lights installed in the Bagan Rambo and the results Overall Catch

Based on figure 3, it shows that the number of LED lights installed on the Bagan Rambo 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 Bagan Rambo 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 Baruu waters in June- August ranges from 27.23-29.455 ppt, so that Baruu 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 Bagan Rambo is 300-400 watts, The color of the light that is good to use in the operation of the Bagan Rambo is white.

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UNDER PEER REVIEW