

# Descriptive analysis of catching blue swimmer crab (*Portunus pelagicus*) in Pejarakan Hamlet, Danasari Village, Pemalang District, Pemalang District, Central Java Province

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## Abstract

Fisheries management is an effort made by the government to utilize fish resources sustainably. Folding trap (badong) is a type fishing gear used by Blue Swimmer Crab fishermen in Pejarakan Hamlet, Pemalang Regency, Indonesia. The main target of this fishing operation is Blue Swimmer Crab (*Portunus pelagicus*). Blue Swimmer Crab is a fishery commodity that has a high selling value, both as a local commodity and an export commodity. The purpose of this study is to find out the construction of the folding bubu that is used by the Pejarakan hamlet fishermen and the possible number of crabs caught by the folding trap/bubu in the area of capture in Pemalang waters. This research was conducted from January to March 2019 in Pejarakan hamlet. The method used in this research is descriptive method with purposive sampling method. Data analysis was performed by data reduction, data presentation, and making conclusions. The results showed that the number of fishery households catching small-scale fishermen's Blue Swimmer Crab in Pejarakan Hamlet is 150 units. The fishermen used folding traps with simple construction with dimensions of 29x25x17cm<sup>3</sup>, metal frames and walls made of PE nets. The average volume of catches (productivity) of crab fishing vessels was 3.3kg per tonnage trip or 18 grams / folding trap of Blue Swimmer Crab catches (six folding traps or bubu installed have the opportunity to catch one blue swimmer crab weighing 100 grams).

**Keywords:** Small scale fishermen, folding trap, Pejarakan.

## Introduction

Sukoharjo Village, Rembang Regency, Wedung Village and Betahwalang Village, Demak Regency, and Danasari Village, Pemalang Regency are blue swimmer crab producing areas in the north coast of Java, Central Java Province<sup>1-5</sup>. The northern waters of Central Java which are part of the Java Sea are also part of the Sunda Exposure with relatively shallow water depths. This condition is suitable for crab habitat (*Portunus pelagicus*), which is shallow water to a depth of 50 meters with a type of mud, sand and muddy sand substrate<sup>6,7</sup>. This shows the potential use of crab resources in the north sea area of Java is supported by the characteristics of the waters that support the crab habitat.

Small crab is a small-scale fishery product which is the third largest export commodity in Indonesia in 2014<sup>8</sup>. Therefore, small fishermen as businesses have the right to catch fish as well as the obligation to use responsibly, in an effort to sustain the blue swimmer crab's resources<sup>9</sup>. Generally small scale fishermen catch fish only to fulfill their daily needs. This makes fishermen with a relatively small business capital inclined to make various fishing efforts even by using limited fishing facilities, and a limited understanding of the aquatic

environment around the coast<sup>10,11</sup> to maintain their livelihood as fishermen.

Blue swimmer crab is one of the main fisheries commodities produced by the Java Sea within the territory of the Republic of Indonesia 712 fisheries management. Law of the Republic of Indonesia has regulated the Fisheries sector in Law No. 45/2009 concerning Amendments to Law No. 31/2004<sup>12</sup> concerning Fisheries. In it Fisheries are defined as all activities relating to the management and utilization of fish resources and the environment starting from preproduction, production, processing to marketing carried out in the fisheries business system. Furthermore, Fisheries Management is also defined as all efforts, including integrated processes in information gathering, analysis, planning, consultation, decision making, allocation of fish resources, and implementation and enforcement of laws and regulations in fisheries, which are carried out by the government or the authorities others aimed at achieving sustainable productivity of aquatic biological resources and agreed objectives. This provision is defined as fisheries management which is a very important aspect as an effort to use fish resources sustainably. The concept of sustainability in fisheries management has become an important

issue in recent years, but it is difficult to define it clearly because the interpretation of the concept continues to grow<sup>13</sup>. As stated in Article 6.2 of the Code of Responsible Fisheries (CCRF), fisheries management must ensure the quality, diversity and availability of fish resources that are adequate for current and future generations, in the context of realizing food security, poverty reduction and sustainable development<sup>14</sup>. This is in accordance with the Fisheries Law in Indonesia. The sustainability of fisheries is intended for the sake of sustainability from the perspective of the sustainability of fish resources, economic benefits, and fisheries communities that are supported by institutional sustainability that includes the quality of sustainability in regulations, policies and organizations in order to support the achievement of ecological, economic and fisheries communities<sup>15,16</sup>.

Fishing gear and catch per unit effort for blue swimmer crab catch needs to be analyzed in the effort of blue swimmer crab management based on the Decree of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia Number 70 / KEPMEN-KP / 2016 concerning Fisheries Management Plan for the State of the Republic of Indonesia National Fisheries Management 712<sup>9,17</sup>. Catches of small fishermen in Pemalang Regency are one of the contributors to the blue swimmer crab commodity from WPPNRI 712. The catch of blue swimmer crab is processed by collectors and the process of boiling strips is done in Danasari Village, Pemalang District, Pemalang Regency as one of the suppliers of raw material for exporting crabs in Central Java Province.

As mentioned earlier, that blue swimmer crab fishing was carried out by small-scale fishermen but significantly contributed to Indonesia's fisheries as the third largest export of commodities after tuna and shrimp<sup>8</sup>. Thus, the data collection and recording of the crab catches and the blue swimmer crab fishing fleet, including fishing gear among small-scale fishing communities in coastal areas, needs to be done so that the sustainability of the crab resources is maintained. This is the goal of fisheries management. Fisheries management is an activity that focuses on human resources and its activities in the fisheries sector. So that research is needed on fishermen's behavior towards biological, economic and regulatory changes that apply in the fisheries sector. This is an important part of fisheries management to ensure the sustainability of resources and fishing activities<sup>11,18,19</sup>. The relationship between perceptions, socio-economic characteristics and fishermen's compliance with applicable rules<sup>11</sup>. The results of the study state that the behavior of the existence of fish resources is one of the factors that influence in supporting sustainable fisheries. Evaluation of crab fishing efforts can be done by knowing the fishing effort (size of the boat, trip, and the number of fishing gears used) and the number of catches obtained from these efforts. This is done to find out the perceptions and participation of crab fishermen on regulations made related to the process of fisheries activities using crab resources. Catching efforts must be balanced with the conservation concept, so that recruiting

crab resources is given the opportunity to develop into reproductive crab groups and increase the availability of spawning populations to provide opportunities to grow and spawn at least once<sup>20-22</sup>.

The purpose of this study is to describe fishing gear and catch per unit effort by blue swimmer crab vessel and fishing gear used by Pejarakan fishermen. The fishing gear used is folding trap/folding bubu. Folding bubu is a type of fishing gear that is included into the trap category. The local name for folding tarp/folding bubu in the research location is called *Badong*. Efforts to preserve crab resources according to KP Permen No. 56 / KEPMEN-KP / 2016 concerning Prohibition of Catching and / or Expanding Lobster (*Panulirus* spp.), Crab (*Scylla* spp.), And Rajungan (*Portunus* spp.) From the Territory of the Republic of Indonesia are used as references in this research.

## Methodology

The research method used is a descriptive method that pays attention to certain cases carefully and in detail<sup>17</sup>. The case investigated was the construction of folding traps used in blue swimmer crab fishing operations and catches per unit of fishing effort.

**Data retrieval method:** The data collected in this study are secondary data and primary data. The primary data needed is the specification of fishing gear, the size of the ship/gross tonnage, the number of trip days, and the results of the crab catch obtained. While secondary data are general conditions, production values and the number of crab production.

**Sampling method:** The sampling method in this study was purposive sampling. The number of samples is 3 blue swimmer crab fishing fleets with folding trap fishing gear at the study location. Data collected during January - March 2019.

**Data analysis method:** All data obtained from respondents are processed and arranged in tables, then data processing is done so that conclusions can be drawn according to the research objectives. Data analysis performed is: i. Descriptive Analysis: Catching Operations Rajungan is described based on the specifications of the fishing gear used (folding trap) and the productivity of fishing gear. ii. Catch per unit effort: Productivity is defined as the ability to produce something. Productivity referred to in this research is ship productivity and folding traps. Fishing vessel productivity based on Decree of the Minister of Maritime Affairs and Fisheries No. 38 of 2003 is the level of the ability of fishing vessels to get fish per unit of time or fishing trip (number of sails for fishing purposes in one unit of time), while the productivity of the tool is the level of the ability of a fishing gear to get fish per unit of time or trip fishing. Boat and fishing gear productivity or called catch per unit effort in this study is calculated based on crab catch volume and number of trips, with the equation:

$$\text{Cath per unit effort or Vessel productivity} = \frac{\text{Volume of catch (kg)}}{\text{Amount of trip (times)} \times \text{GT}} \quad (1)$$

$$\text{Cath per unit effort of folding trap} = \frac{\text{Volume of catch (kg)}}{\text{Number of trips (times)} \times \text{Number of folding traps used}} \quad (2)$$

## Results and discussion

**General Conditions of Research Location:** Geographically the area of Pemalang Regency is located between 8°52'30"-7°20' 11" Sand between 109 °17 '30"- 109° 40'30" E, with an area of 1,115.30 km<sup>2</sup> or equal to 3,11% of the land area of Central Java Province. The administrative boundaries of Pemalang Regency are: Java Sea in the North, Purbalingga Regency in the South, Tegal Regency in the West, and Pekalongan Regency in the East<sup>23</sup>. Pemalang district waters are part of the Republic of Indonesia's 712 fisheries management area. Shallow water conditions and sandy or muddy base substrates make this region suitable for blue swimmer crab habitat<sup>4</sup>.

**Potential of Rajungan Fisheries in Hamlet of Pejarakan, Danasari Village, District of Pemalang:** Some of the regency's marine productions are pelagic, demersal, and other types of

fish with a total production in 2017 of 24.15 tons with a value of 118.2 billion IDR. The blue swimmer crab commodity (*Portunus pelagicus*) is included in other types of marine products, although it is recorded in a relatively small amount during 2017, which is 0.389 tons with a production value of 0.013 billion IDR or an average price per kilograms is 33,974 IDR. Pejarakan hamlet in Danasari Village is one of the villages in Pemalang Sub-District located in the coastal area of Pemalang District (Figure-1). One of the main livelihoods of the villagers is fishermen. In this village there are 150 small-scale business capture fisheries households that use folding traps to catch blue swimmer crabs (*Portunus pelagicus*) and 4 blue swimmer crab stripping business units (mini-plan).

**Technical Specifications of Bubu Lipat (Traps):** As mentioned earlier, folding trap / folding bubu is a fishing gear that included into the trap category. This fishing gear is designed so that the target species (in this study is the crab) can enter the trap through the door/gap that is designed in such a way and cannot come out again. This fishing gear is passive or silent in a place without any effort but because of the entry of the catch target into the trap for the interest and movement initiative of the target species of the catch itself (blue swimmer crab).

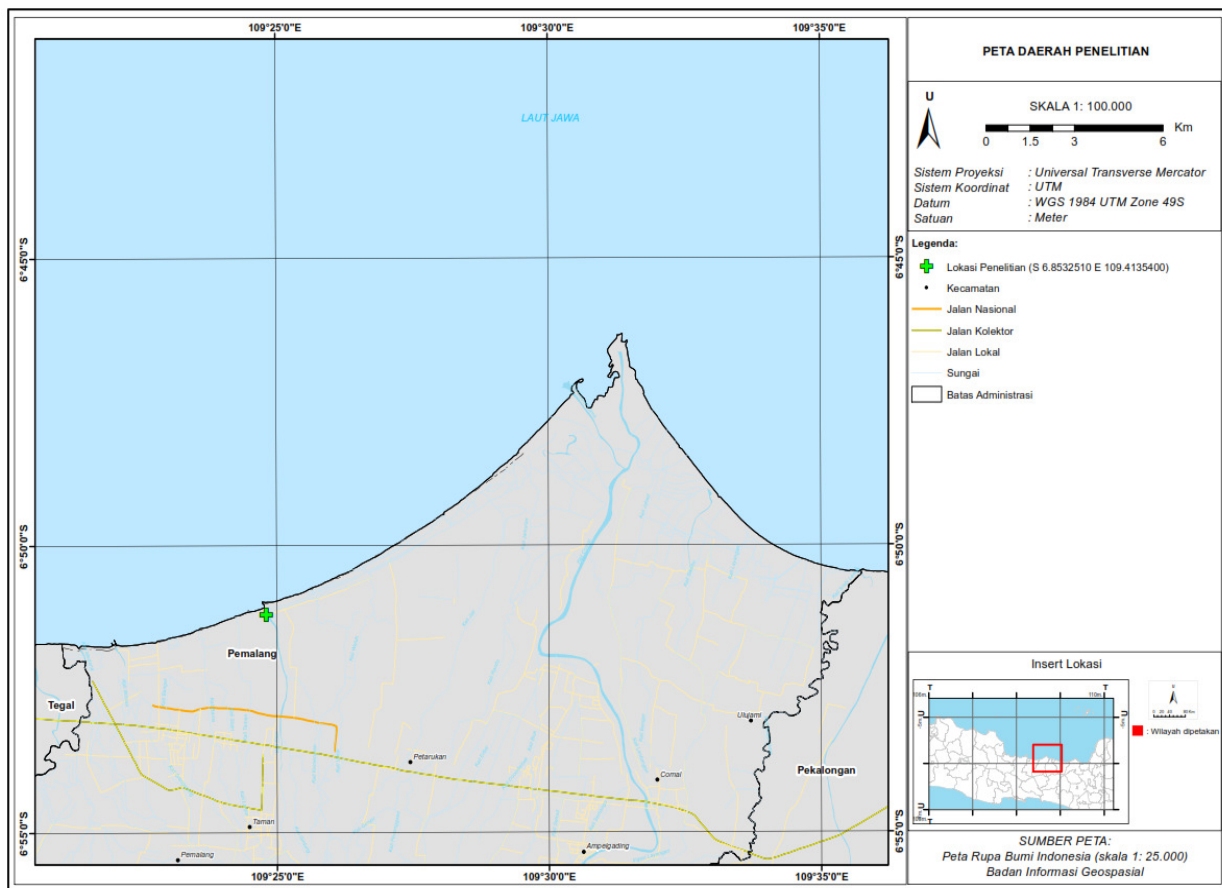
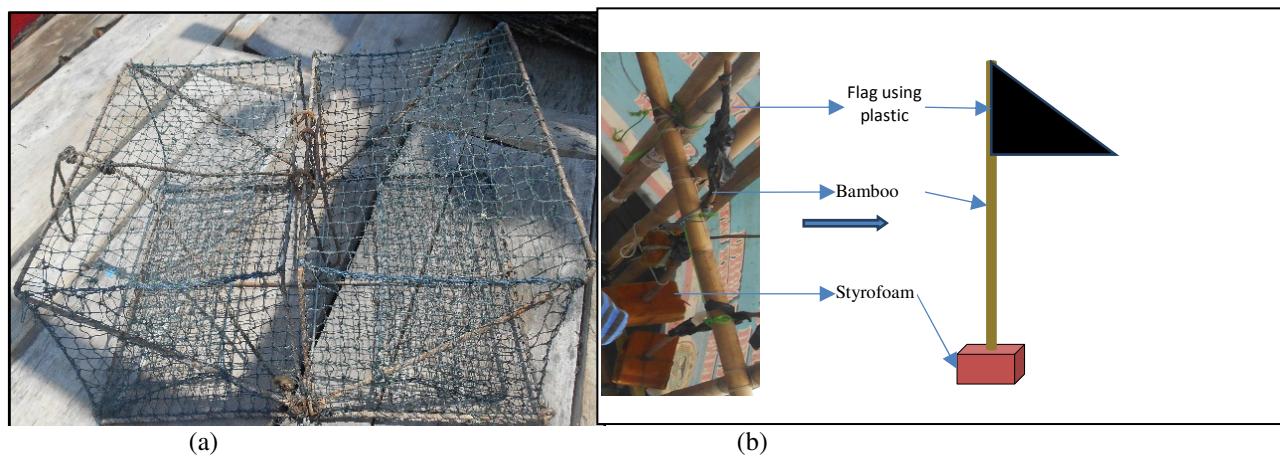


Figure-1: Research Location Map.

Folding trap/folding bubu operated by Pejarakan fishermen is a folding trap with an iron frame. The size of the folding trap is presented in Table-1 and Figure-2.

The distance between traps is 10 meters. Folding trap does not need sinker because the frame of itself is made of iron, which already has enough weight to reach the bottom of the water. The float sign is installed every distance of 50 folding traps.

**Catch per unit effort of fishing gear:** The productivity of fishing gear is also defined as the catch per unit effort. In purposive sampling, 3 units of the blue swimmer crab fishing vessel using folding traps were used as samples. The data collected is the number of catches per trip, the number of folding traps used in fishing operations and the number of trip days (Table-2).



**Figure-2:** Construction of Folding Trap/Folding Bubu: a. folding trap; b. buoy sign.

**Table-1:** Construction of Folding Trap/Folding Bubu.

Folding Trap/BubuSection	Length (cm)	Width (cm)	Height (cm)	Color	Diameter (cm)	Mesh size (cm)	Material
Frame	29	25	17cm	-	-	-	-
Side of the net	-	-	-	Blue	0,1	4	PE
Main Rope	60,750	-	-	Blue	0,6	-	PE
Branch Rope	200	-	-	White	0,3	-	PE
Species-Entry	25	2	-	-	-	-	-
Buoy Sign: a. Cross section	25	15	25	White/Orange	-	-	<i>Styrofoam</i>
b. Markers (with plastic flags)	-	-	100-150	Yellow bamboo	2,5	-	Bamboo

**Table-2:** Catch per unit effort of fishing vessel and fishing gear.

Fishing Vessel	The amount of folding trap	Gross Tonnage	Total Trip (day)	Volume of Catches of Crab (kg)	Productivity of fishing gear per GT (kg / tripGT)	Productivity of fishing gear per trap (kg /tripbubu)
A	750	4	59	776,9	3,3	0,018
B	700	4	67	741,1	2,8	0,016
C	600	3	66	746,8	3,8	0,019
Average	683	4	64	754,9	3,3	0,018

In Table-2, it can be seen that the average productivity of the rajungan fishing vessel is 3.3kg/GT or 0.018kg/ folding trap (18 grams / folding trap). This means that six folding traps/bubu installed have the opportunity to catch one blue swimmer crab weighing 100 grams.

**Discussion:** The Java Sea is part of the Sunda Shelf with relatively shallow water depths and the waters north of Central Java which are part of the Java Sea. This condition is suitable for blue swimmer crab habitat (*Portunus pelagicus*) is shallow water to a depth of 50 meters with the type of mud, sand and mud sand substrate<sup>7,25,26</sup>. This shows the potential of crab resource utilization in this area is supported by the characteristics of waters that support blue swimmer crab habitat<sup>4</sup>.

In 2017, the blue swimmer crab volume recorded by the Central Bureau of Statistics of Pemalang Regency is 0.389 tons or 389 kg, while in the January to March 2019 research the average volume of catches from 3 units of crab fishing vessels is 754.9 kg. With the number of small-scale business capture fisheries households that use 150 units of folding fish. This shows that the effort to catch the crab will be very high if all the blue swimmer crab fishing units are fully operated. As stated in the Minister of Maritime Affairs and Fisheries Regulation Number 56 / KEPMEN-KP / 2016 concerning Prohibition of Catching and / or Expanding Lobster (*Panulirus spp.*), Crab (*Scylla spp.*), and Rajungan (*Portunus spp.*) From the Territory of the Republic of Indonesia, that the recording of fishing efforts and the volume of crab production need to be carried out in an effort to manage the blue swimmer crab resources in order to preserve it.

## Conclusion

In this study, it was concluded that each crab gross fishing vessel using folding traps produces 3.3 kilograms of blue swimmer crab catches or every six folding traps installed produces one blue swimmer crab weighing 100 grams. The Java Sea waters are an environment suitable for blue swimmer crab habitat, so fishing and conservation efforts in these waters need to be done. Data collection and recording of fishing efforts and volumes of crab catches need to be done as reference material in making policy on crab resource utilization. The rules that are applied need to be socialized to crab fishermen as the main actors in this resource capture business. So that the perception of crab resources as the main target of catching becomes a trigger for fishermen to utilize crab resources accompanied by the participation in preserving it.

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