



LEVEL OF CAPTURE HOSPITALITY BASED ON THE TYPE AND SIZE OF SHRIMP CAPTURE IN PANGANDARAN

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ABSTRAK

This study aims to determine the fishing gear used to capture shrimp commodities and analyze the productive and eco-friendly fishing gear in Pangandaran. Data collection was conducted from November 1 to December 18, 2019 using fishing gear to capture shrimp commodities; three-layer nets (trammel net), dogol nets, beach seine and bernong nets. The method used in this research is the case-study method. Data analysis includes composition of catch types, catch size composition, composition of catch utilization and analysis the level of eco-friendly. The results from this study showed that the fishing gear most widely used by Pangandaran fishermen to catch shrimp commodities is the bernong nets. Fishing gear that has the highest level of eco-friendly is a three-layer net (trammel net) which belongs to the category of eco-friendly fishing gear. While fishing gear bernongnets, dogol nets and trawlers are included in the category of fishing gear that is not eco-friendly

Keywords : Fishing Gear, Pangandaran, Productivity, Eco-friendly.

1. INTRODUCTION

Pangandaran is one of the districts in West Java that has potential in the fisheries. Pangandaran has a potential marine biological resources, that indicated by the value of potential sector in Pangandaran i.e. 1,666.813 tons capacity of fisheries resources, with a production rate 1,578.184 tons, this production is produced by optimal efforts with the total trip is 22,325.93 trips/year (Nurhayati 2013). That is supported by the condition of the waters that are directly related to the Indian Ocean, thus affecting the potential of marine resources.

One of the commodities that are tremendous in Pangandaran is shrimp. The value of shrimp production in Pangandaran in 2016 reached around 2,900 tons. According to the Maritime Affairs and Fisheries and Food Security Office (2015), shrimp is the second highest catch production after hairtail (*Trichiurus*). The amount of shrimp production is around 54% more than the production yield of hairtail. Fishing activities become the main source of income for the community, especially in the coastal region. Those become a source of economic growth triggered by the increasing demand for fish resources as a food source. One of the economic resources of Pangandaran fishermen is also because of the shrimp demand quite large. The impact is increasing of fishing activities for production technology of shrimp. Considering fisheries resources have limited carrying capacity to grow, so management actions are needed so that fish utilization activities can continue to be sustainable (Fauzi 2010).

Study about fishing gear for shrimp commodity is very essential for the sustainability of shrimp resources in the future. Changes in shrimp resources and marine ecosystems have long occurred due to the influence of anthropogenic and the effects of capture (Coll et al. 2016). Developmental efforts to determine the shrimp commodity fishing gear is by looking at fishing productivity. Supporting those efforts, then this conducted research aimed at looking at the status of shrimp commodity resources through the study of eco-friendly of shrimp commodity fishing gear in the waters of Pangandaran Regency as the basis for the creation of sustainable capture fisheries.

2. METHODOLOGY

2.1 Time and Place of Research

This research was conducted in Pangandaran Regency, West Java with the focus on shrimp commodity. This research was conducted in August-October 2019.

2.2 Methods of Research

This research uses the case study method. The case in Pangandaran is that there is shrimp production throughout the year, but there is no management of eco-friendly fishing. In addition, methods of catching shrimp commodities are also observed in person or interviews with respondents.

2.3 Procedure of Research

This research procedure will be carried out as follows:

2.3.1 Research Preparation and Survey

1. Identification of area and field survey
2. Check all equipment needed during the study
3. Determining the capture equipment and the location of fish landing that has shrimp commodities

2.3.2 Data Collection Technique

1. Primary Data that collected in the field is the number of trips and the number of production (weights and individuals) of each capture, composition and type of fish catches, the proportion of the utilization of catches and length of shrimp carapace. Based on the fishing target of fishermen, the catches are differentiated into the main catches (HTU) and the side Capture (HTS). They are calculated by identifying the catches that are sold and consumed (utilized) as well as the catches thrown (not utilized). The length of the carapace (in the Crustacean group) is carried out to determine the biological feasibility of the fish caught by the length of the first-time ripe gonads (length at first maturity).
2. Secondary data that used is data of the number and type of capture equipment used by fishermen to capture shrimp, production Data, the number of trips and the number of units of capture in Pangandaran.
3. Interviews, interviews on fishermen using the questionnaire/interview Guide (appendix 1) to explore information about the capture method operation, the composition of the catches, the number of land catches, the fishing season and the fishing area. The method that used is purposive sampling method. Samples were taken by 10% per capture equipment of the total unit of the capture. If a 10% of sample of the population is considered large (more than 30) then the usable alternative is to sample as many as 30 individuals/units (Ardianto 2009 in Rahman et al. 2013). The number of respondents for each capture device is determined proportionally to the number of existing capture

equipment. Each of the main capture equipment used as sample is 4 units of capture equipment namely; trammelnet, gillnet, beach Trawler and Dogol.

2.4 Data Analysis Method

Analysis of eco-friendly is assessed based on type composition, size as well as the utilization of catches. Based on the fishing target of fishermen, the catches are differentiated into main goal catches (HTU) and side catches (HTS). They are calculated by identifying the catches that are sold and consumed (utilized) as well as the catches thrown (not utilized).

2.4.1 Proportion Analysis and composition of catch-yield types

The proportions of the main and side target catches, each data of the number and weight of the main target catches (HTU) and the side catches or by catch (HTS). Species rare or protected by law that caught is also included in the category by catch of the capture operation calculated in the form of percentages (Takwin, 2005).

2.4.2 Analysis Composition of Catch Size

The proportion of shrimp that feasible to catch biologically is obtained based on the length of shrimp Carapace at first maturity. Length data of shrimp carapace of the main target catches for each fishing gear is processed by calculating the frequency distribution. Further comparing the length data of shrimp carapace that caught during the study with the length of shrimp carapace on length at first maturity (Lm).

2.4.3 The eco-friendly rate of fishing gear

According to Mallawa (2006) and Syamsudin (2008), factors used as indicators of assessing the level of eco-friendly of fishing gear, such as calculated data and scoring on criteria of eco-friendly fishing gear which divided into four (4) sub-criteria referring to Monitja (2000) which is useful to facilitate the assessment of fishing gear. The assessment is carried out as follows (table 1).

Table 1. Assessment of eco-friendly rate

Eco-friendly factor	Indicators	Criteria	Score
I. number of main catches (%)	81-100	Very eco-friendly	4
	61-80	Eco-friendly	3
	41-60	Less eco-friendly	2
	1-40	Not eco-friendly	1
II. Fish size main catch (<i>length at first maturity</i>) (%)	81-100	Very eco-friendly	4
	61-80	Eco-friendly	3
	41-60	Less eco-friendly	2
	1-40	Not eco-friendly	1
III. The use of catches (%)	81-100	Very eco-friendly	4
	61-80	Eco-friendly	3
	41-60	Less eco-friendly	2
	1-40	Not eco-friendly	1

Sources: Mallawa, 2006

Furthermore, the total of score is accumulated to determine the rate of eco-friendly of the fishing gear (table 2).

Table 2. Overall assessment of eco-friendly rate

No	Number of Scores	Criteria
1	3-5	Not eco-friendly
2	6-8	Less eco-friendly
3	9-11	Eco-friendly
4	12	Very eco-friendly

Sources :Mallawa, 2006

3. RESULT AND DISCUSSION

Fishing fleet in Pangandaran which operates in the waters of Pangandaran is dominated by the size of < 5 GT, this is due to the limitation of capital needed by fishermen and lacking skills of fishermen to operating a

fishing fleet. The fishing gear that used in Pangandaran is very diverse. Fishing gear used by fishermen to capture shrimp in Pangandaran is presented in table 3. The most widely fishing gear used to capture shrimp is *berong* net (Gill net) with a total of 459 units and then followed by trammel net with the amount of 315 units. Those can be seen in Table 3.

Table 3. Types of fishing gear operating in Pangandaran Regency

No	Types of fish capture equipment	Number (unit)
1	A pitted net (<i>Gill Net</i>)	459
2	<i>Trammel Net</i>	315
3	Dogol Nets	25
4	Beach trawler	27

Sources: Capture Fisheries Sector DKPKP Kab. Pangandaran in 2019

3.1 Composition of catch-yield types

3.1.1 Trammel Net

The catch-yield of Trammel net in Pangandaran is dominated with *Jerbung* shrimp as a main target of the Trammel net, due to the main target for trammel net is *Penaeus merguensis* and *Metapenaeus tenuipes*. According to Iskandar (2009), the catches of Trammel net were mostly dominated by white shrimp as a target of fishing. The total catches on the trammel is 1,792 tails with a weight of 114.16 kg. Based on the results of study, the catch composition in Pangandaran shows that trammel net is quite good for the main target compared with by-catch. It can be interpreted that trammel net is very selective fishing gear at capturing the shrimp and increasing the level of eco-friendly to the environment. In detail, the composition of the catches obtained by trammel net can be seen in table 4.

Table 4. Catch-yield of Trammel Net

	Species	Weights Kg	Subtotal Kg	Proportion (%)
HTU	<i>Penaeus Merguensis</i>	35.18	67.87	59.45
	<i>Metapenaeus Ansis</i>	32.68		
	<i>Parapenaeopsis Sculptilis</i>	6.66		
	<i>Johnius Trachycephalus</i>	5.75		
	<i>Cynoglossus Lingua</i>	5.40		
Hts	<i>Penaeus Monodon</i>	2.48	46.29	40.55
	<i>Sepia Sp</i>	6.05		
	<i>Sepiida</i>	5.35		
	<i>Loligo Sp</i>	5.05		
	<i>Portunus Pelagicus</i>	6.00		
	Mix	3.55		
Amount		114.16	114.16	100

Sources: Primary Data, 2019

3.1.2 Dogol Nets

The composition of the catch from the *Dogol* net is very diverse, whether it is shrimp or fish, the main target of *Dogol* net in Pangandaran is *Parapenaeopsis sculptilis* and *Metapenaeus lysianassa*. Based on table 5 it can be seen that *Dogol* net catch more by-catch rather than main target of capture.

Table 5. Catch-yield of Dogo/Net

	Species	Weights Kg	Sub totals Kg	Proportion (%)
HTU	Shrimp Krosok(<i>ParapenaeopsisSculptilis</i>)	15.70	26.35	30.85
	Cashew Shrimp (<i>MetapenaeusLysianassa</i>)	10.65		
Hts	Tongue Fish (<i>Cynoglossus Lingua</i>)	22.87	59.05	69.15
	The King (<i>PortunusPelagicus</i>)	7.22		
	Sotong(<i>Sepia Sp</i>)	1.93		
	Squid (<i>LoligoSp</i>)	1.93		
	Layur(<i>TrichiurusLepturus</i>)	1.90		
	PeteK(<i>LeiognathusDussumieri</i>)	3.15		
	Teri (<i>StolephorusDevisi</i>)	7.58		
Mix	12.48			
Amount		85.40	85.40	100

Sources: Primary Data, 2019

3.1.3 BeachTrawl

Based on the interview results with the beach trawl fisherman, the main target of this fishing gear in Pangandaranis consist by *Parapenaeopsisculptilis* dan *Mysis relict*a. The total of catch-yield from this fishing gear (beach trawl) around 206,668 ind/trip with the weight around 160.32 kg. Based on date in table 6. show that beach trawl in Pangandaran is passable on catching the main target rather than the by-catch. Those means that this fishing gear is selective at capturing the shrimp and increasing the level of eco-friendly to the environment.

Table 6. Catch-yield of Beach Trawl

	Species	Weights Kg	Sub totals Kg	Proportion (%)
HTU	<i>ParapenaeopsisSculptilis</i>	1.32	122.15	76.19
	<i>Mysis Relicta</i>	120.83		
	<i>LeiognathusDussumieri</i>	6.08		
	<i>ScomberomorusCommersoni</i>	2.63		
	<i>JohniusTrachycephalus</i>	7.64		
	<i>LoligoSp</i>	2.48	38.17	23.81
HTS	<i>CaranxIgnobilis</i>	2.52	160.32	100
	<i>Cynoglossus Lingua</i>	1.15		
	<i>ThunnusTonggol</i>	3.35		
	<i>Atule Mate</i>	1.70		
	<i>Sepiida</i>	1.20		
	<i>DecapterusRuselli</i>	1.80		
	<i>TrichiurusLepturus</i>	0.80		
	<i>Pampus Argenteus</i>	1.00		
	Other	5.82		
Amount		160.32	160.32	100

Sources:Primary Data, 2019

3.1.4. *Bernongnet* (Gill Net)

Based on the results of interviews, the main target of *Bernongnet* (Gill Net) in the Pangandaran Regency is *Metapenaeuslysianassa*. According to catch-yield this fishing gear, the type of *bernongnet* that operated in Pangandaran Regency is bottom gill net due to the function of this gear is for catching the shrimp.Total of the gill netcatch-yieldinPangandara during 1 trip capture is around 6,568 individu with a total weight of 30.55 kg. The catch composition of this gear can be seen in table 7 which is indicating that the main catch is greater than the by-catch. That means *bernong* net (gill net) is very selective in capturing the shrimp and increase the level of eco-friendly to the environment. The catch-yield of *bernongnet* (gill net) can be seen in Table 7 below.

Table 7. Catch-yiled of *BernongNet* (Gill Net)

	Species	Weights	Sub totals	Proportion
		Kg	Kg	(%)
HTU	<i>MetapenaeusLysianassa</i>	15.60	15.60	51.06
	<i>JohniusTrachycephalus</i>	2.75		
Hts	<i>JohniusTrachycephalus</i>	3.97	14.95	48.94
	<i>CaesioErythrogaster</i>	3.92		
	Mix	4.32		
Amount		30.55	30.55	100

Sources:Primary Data, 2019

3.2 Composition of Main Catch Size

The length of the fish catches is one of the criteria for determining the proper or not proper those fish to be caught by knowing the limit of the fish length atfirst maturity. The capture above size at first maturity can provide the opportunities for shrimp as a catch target to reproduce and spawn before being caught, so the recruitment process can be occurring from small shrimp to mature shrimp (Maulidin 2011). The proportion of shrimp which is proper to caught biologically can be known by measuring the length of the carapace (in shrimp). This following is a proportions of the main catch size on the fishing gear that used by fisherman in Pangandaran Regency (table 8).

Table 8. Composition of main catch size more than Lm

No	Fishing Gear	Main catch proportion	
		More thanLm	Less than Lm
1.	Trammerl Net	76%	24
2.	<i>Dogol</i> Net	34%	66%
3.	Beach trawl	22	78%
4.	<i>Bernongnet</i>	80%	20

Sources:Primary Data, 2019

The percentage of the measurements result on the composition of the main catch size can be seen in table 8, those table indicating thattrammel net, *dogol* net, beach trawl and *Bernong* net has a different assessment proportions. The best result of main catch size composition is shown in the trammel net and *Bernongnet* (gill nets) with relative uniform result in term of size on the both fishing gear. The percentage of uniformity around 80%, thus those fishing gear can be classified selective fishing gear due to can capture more shrimp which has size more than Lm rather than less than Lm. According to Monintja (1997) The selectivity of the fishing gear determines the diversity of catches, the more uniform the catch means the more selective the fishing gear is. The result from proportion of the main catches on the *Dogol*net and beach trawl has a percentage less than 35%, so that means those fishing gear is less selective because it catches more shrimp which not reached the size of Lm yet.

Dogol net and beach trawl are classified less-selective fishing gear because at the bag on *dogol*net and beach trawl are using a *waring* material which has a very small mesh-size, so both of fishing gear have caught a various types of shrimp with many different size. That causes the operation of this fishing gear capture the catch that are not yet feasible to catch, thus causing selectivity from both of fishing gear is very low. Those is in line with study from Sarmintohadi (2002) who said that eco-friendly fishing gear should have a good level of selectivity towards species and size. The solution to improve the selectivity of fishing gear by changing the size of mesh-size on the *dogol* net and beach trawl with a larger mesh-size.

3.3 Assessment of eco-friendly level results of each fishing gear

Based on the eco-friendly level assessment, from the four identified fishing gear shows that trammel net and *bernong* net are classified as an eco-friendly fishing gear. Meanwhile, *dogol*net and beach trawl are classified as non-eco-friendly fishing gear with the less eco-friendly criteria. The results of this study showed that the cause of low number of scores triggered by the high value of the proportion of the catch-size that not yet reached gonad maturity, those refers to the basis operation of both fishing gear (*dogol*net and beach trawl) which has character dredging bottom of the waters and has a small mesh-size causing all the organism even garbage have caught by this fishing gear. From the result, we recommend that it must be stop to using this fishing gear and should find another fishing gear as an alternative which classified into eco-friendly fishing gear. Here are the results of comparison of eco-friendly level on each fishing gear (table 9).

Table 9. Size composition of main catch result more than Lm

No	Capture Tool	Environmental Hospitality Indicator		Score	Criteria
		Composition of type of catch result	Size of main catch result		
1.	Three layers Mesh	59.40%	82%	6	Less eco-friendly
2.	Dogol Nets	30.90%	34%	2	Not eco-friendly
3.	Beach trawler	76.20%	22	4	Not eco-friendly
4.	A luddly net	51%	80%	5	Not eco-friendly

Sources: Primary Data, 2019

4. CONCLUSION

The results of this study determine the level of eco-friendly fishing gear that used by fisherman in Pangandaran, which is landed in the PPI Pangandaran and can be concluded as follows:

1. Fishing gear used to capture shrimp commodity in Pangandaran is using trammel net, *dogol*net, beach trawl and *bernong*net (gill net)
2. Based on the eco-friendly level assessment of four fishing gear used in Pangandaran, can be conclude that the eco-friendliest fishing gear is a Trammel net (three-layer net fishing gear).

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