DECISION MAKING PROCESS AND FACTORS THAT INFLUENCE FISHERMEN IN SHARK FISHING IN KARANGSONG VILLAGE INDRAMAYU REGENCY WEST JAVA

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ABSTRACT

This research aims to analyze factors and fishermen's dominant perceptions, which tend to make them do shark fishing. This research was conducted in Karangsong village Indramayu Regency. Sampling technique used Slovin formula and data were collected by questionnaire from 80 respondents. The result of questionnaire was arranged by Likert Scale, and then data were analyzed by using Principal Component Analysis (PCA). The result shows that there was one factor and three variables considered by fishermen to catch sharks that was shark sustainability and the three variables were biology, population, and rules. From the variables, biology was the most dominant. But, the result in field concludes that economic reason also played a role in catching sharks.

Keywords: *Sharks, Fishermen, Indramayu regency*

INTRODUCTION

Indonesia is known as the largest shark producer in the world, with the catch more than 10 thousand tons every year. The high price of shark fin on the market causes the increasing of shark fishing and threats the sustainability in nature (Daley et al, 2002 cited in Fahmi and Dharmadi 2013). One of the places in Indonesia, which produce sharks as bycatch is Indramayu Regency, precisely at Karangsong Small Port as Fish Landing Base.

Karangsong Fish Landing Base in Indramayu is one of the fishing ports that are active in Indramayu. Based on the fish production data from 2007-2016 reported by Indramayu Fisheries Department (2016), Karangsong small port had the most fish production than other fishing ports in Indramayu. According to Fahmi and Dharmadi (2013a) states in her research that shark production in 2012 landed in Karangsong Small Port was 605 tons, it was lower than previous

years such as in 2011 shark production landed in Karangsong Small Port was 921,1 tons. The low production caused by over-fishing done by fishermen without any good management of related government.

Therefore, government and related parties such as fishermen need to put an effort to stabilize shark population. Each fisherman has different preference about the use of resource, it depends on personal goals or target groups. Limitation set by environment variability or the market can also influence the ways fishermen exploit the resource. In other words, fishermen develop and implement strategies and tactics of catching fish to respond obstacles and intended purpose, particularly adjusted to social, cultural, and economic context where fishermen live (Bane 1996; Hart and Pitcher 1998 *cited in* Salas and Gaertner 2004).

Based on explanation above it can be concluded that to maintain shark sustainability social approach, doing some reviews on subjects which directly related to sharks are needed, they are decision making process and factors that influence fishermen in shark fishing in Karangsong village of Indramayu Regency of West Java.

MATERIALS AND METHODS

This research was conducted in Karangsong Village, Indramayu Regency West Java. Survey and preparation of the research conducted in February 2017. Main research was started in March-April 2017. Techniques used to collect data were observation and respondents interview. Sample size determination in this research done by using Slovin formula as follows (Sugiyono 2011):

$$n = \frac{N}{1 + N\,e^2}$$

Where:

n = Sample size
N = Population size
e = Error

As for taking the number of sample which was going to be examined Slovin formula was used with level of accuracy 10%, which the number of shark fishermans population were 400, so:

$n = \frac{N}{1 + Ne^2}$
n = 400 / ((1 + 400(0.01))
n = 80 respondents

Based on the calculation above, the number of samples were 80 respondents. The data which was analyzed was perception, it was proceeded and analyzed quantitative descriptively, scale used to measure one's or group's attitude, opinion and perception on social phenomena was likert scale (Sugiyono, 2011), for quantitative analysis, the answers were able to be given scores, for instance:

1. SU = Strongly Understand Score = 4
2. U = Understand Score = 3
3. D = Doubtful Score = 2
4. NU = Not Understand Score =1

The purposes of this research were answered by using factor analysis with Principal Component Analysis (PCA) extraction model and varimax rotation to rotate the factors. Probability of the decision making process for fishermen in catching sharks in this research influenced by six factors:

F: Principal Component Factor

X1: Fishermen's perception on biological value of shark

X2: Fishermen's perception on shark population

X3: Fishermen's perception on rules

X4: Fishermen's perception on culture

X5: Fishermen's perception on economic value of shark

P: The variables which are examined (6), and

ℓ: Weight of linear combination (Loading)

RESULTS AND DISCUSSION

Based on the result of interview Karangsong fishermen knew the shark fishing ground, in Java Sea, Makassar Strait, Karimata Strait, Natuna Sea, borders waters between Indonesia and Philippines and even Papua waters.

Most fishermen in Indramayu Regency Fishing Port were residents of the local area, Indramayu fishermen divided into two major groups, owner (HF – Household Fishery) and worker (HFW – Household Fishery Worker). Owner is fisherman who has units of fish catching and he is generally called as the boss, while worker is fisherman who works to his owner, generally works as the ship's crew.

Based on the data from Indramayu Ministry of Marine Affairs and Fisheries (both owner and worker) tends to increase in the last 10 years. The increasing of the number of fisherman was caused by population growth that increased each year.

Ship in the fishing port in Indramayu regency uses motor ship (MS) and ship with attached motor (SAM) to go to the fishing ground. Motor ship is a ship or boat which has a permanent machine (in board) and usually the size upper than 10 GT, while a ship with attached motor (out board) is a ship or boat which the machine is able to be removed from the body of the ship and the size lower than 10 GT. Each year the number of fishing fleet in Indramayu does not change significantly. The highest number of fleets was in 2006 for 6,707 ships, while the lowest was in 2011 for 5,757 ships. The owner of motor ship is usually the boss who has big capital because the cost of a unit along with fishing equipment can reach billions of Rupiah (thousand USD).

Fishing equipment operated in Indramayu Regency are *paying, dogol,* purse seine, beach seine, gillnet, fishnet, trammel net, fishing rod, *sero*, and other equipment. The most fishing equipment is dominated by gillnet. The fishing equipment which often catches sharks is Gillnet (millennium net and *rampus* net) and fishing rod. In general, shark is non-target species (bycatch), so the catch of sharks by other fishing equipment often occurs.

The composition of the result of fish catching landed in Karangsong Small Port consists of mackerel, mackerel tuna, black pomfret, sailfish, roughback sea catfish, pacific hagfish, shark, red snapper, mix fish, etc. sharks are bycatch landed in Karangsong Small Port, the number of shark in Karangsong Small Por tis not stable per month, but in a day it can reach 3,000-5,000 kg in peak season and 300-500 kg in regular season.

Fishery production in Indramayu Regency gave the biggest contribution than other regencies in coastal areas of northern West Java, which was 61.50% of the total production in West Java (CSA of West Java, 2017). The highest number of fish auctioned in Indramayu Regency was mackerel tuna for 9,730,611 kg with the highest production value was Rp. 119,933,380,500 (USD 8.4 Million). The number of shark was 616.187 kg with the highest production value was Rp. 7,166,585,000 (USD 501,660). The total number of fish in 2015 auctioned in Indramayu Regency was 24,634,140 kg with the highest production value was Rp. 369,292,012,765 (USD 26,9 Million).

The high shark production can be caused by high market demands. The higher consumers the higher shark production landed by fishermen. It explains that there was increasing income in 2014 to 2016. The highest income was in 2016 for 13 billion Rupiah (USD 910,000). It is stronger by the result of Purnomo and Apriliani's (2007) review which states that shark and

stingray production gives significant contribution towards fisherman's income, either catching shark as the main target or bycatch target.

The level of increasing shark production in Karangsong Small Port had linear correlation with equation y = -20,952x + 863,01. Based on the equation the value of a = 863,01 and b = -20,952 and coefficient of determination (R^2) 0,0548. This equation explaines that in Karangsong Small Port in 2012 produced 863.3 ton of shark, and estimated that there was reducing production for 20.95 in the following year.

According to Effendie (1997) defines that mortality of catching caused by the rate of exploitation of a stock due to human activity (catching) in a certain period, which all of the factors influence the population. Natural death caused by inappropriate aquatic environment, lack of food, predation, disease, and death due to aging, is known as natural mortality (M), while death caused by catching is known as catching mortality (F). The combination of natural and catching is known as total mortality (Z).

Based on the result of the research, Scalloped Hammerhead, Brownbanded Bambooshark, andCommon Blacktip Shark had catching pressure (E≈5) and because of catching factor which was done continuously and there was no rule which regulate the size of shark allowed to be caught, it caused the decreasing of shark stocks. While other sharks such as Milk Shark, Blackspot Shark, Hooktooth Shark, Spot-tail Shark, and Whitecheek Shark did not reach the optimum limit considered as non-dense catch phase.

Respondents selected in this research based on conducted case study method and subjects in researcher's criteria. Fishermen who were interviewed had various characteristics of age, noted that the age of fishermen who became respondents were from 21 to 50 years. While the level of education of fishermen noted that majority of them were people with elementary school education only. Meanwhile 24 fishermen did not even take formal education, only 8 people who took junior high education and 2 people who took senior high education.

Respondents used as source of data were fishermen operated in Karangsong beach, however, not all of them operated their ships in Karangsong beach were from Karangsong village, most respondents lived in Pabean village were 32 people, Paoman village were 19 people, Karangsong village were 22 people, Dadap village were 4 people, Pasekan village were 2 people, and Brondong village was 1 person. The fishermen who became respondents of this research had various experience of going out to sea, from 10 to 30 years, fishermen who had <10 year experience were 27 people, while 10 to 20 years were 33 people, and whose who had 20 to 30 years experience were 20 people.

There were 6 variables with 18 questions given to 80 respondents. Based on the output result of IBM SPSS 21 for data of 6 variables with 18 questions answered by 80 respondents in the questionnaire, the result is as follows:

There was only one factor in the total difference which could be explained was 74.505%. It means that by using the first component only could explain the variable for 74.505%. After ordered the contributions, the variable of fishermen's perception on shark population (X2) was the highest contribution in explained the variable for 89.6% then the fishermen's perception on biological shark (X1) was in the second order in explaining the variable for 87% and fishermen's perception on rules of shark fishing (X3) was in the third order in explaining the variable for 82.1%.

All of the variables were in a factor which had positive correlation, it means that the bigger related loading variable the bigger fishermen's tendency in preserving shark (74.505%), it shows that fishermen are aware of shark extinction, because it loads important features for sharks, that consists some variables: Fishermen's perception on biological value of shark, fishermen's perception on shark population and fishermen's perception on rules. Biological value, population and rules affect the shark sustainability, which show the importance of shark in the waters, because without shark it is not stable.

The tendency of fishermen in choosing Shark Sustainability Factor as the most dominant factor shows that fishermen are aware of lower shark population, most sharks are threatened due to over-catching, knowing that shark is protected animal, means that fishermen tend to preserve sharks, but they have not found the right ways, because sharks always cluster with target fish so sharks are also caught or unintentionally caught by them (by catch). From the explanation, the sensitivity of fishermen's perception of sharks is not on and people's tendencies value, but on population, biological, and rules which is shark sustainability that gives bigger advantage for waters.

However, the result of data calculation and result in field is different, the researcher concludes that economic factor also influence shark catching. It is because sharks could be sold for local and export market. The quality of good shark and has high economic value is sold to export market while the common quality is sold to local market. Fresh shark is sold for Rp10,000-Rp15,000 (0.7 upto 1.1 USD) per kg and the fin is sold for Rp 300,000-Rp2,000,000 (21.81 upto 140 USD) to depends on the size of the fin.

The high shark production is also caused by high market demands. The higher consumer, the higher shark production landed by fishermen. Based on the data of shark Production in Karangsong Small Port in 2012-2016 explained that there was increasing income in 2014 to

2016. The highest income was in 2016 for 13 billion rupiahs. It indicated that shark fishery positively influenced because it gave an advantage in economic for direct businessmen such as catchers and processors. It is stronger by Fahmi and Dharmadi (2013b) result of the review which states that shark and stingray production gives significant contribution towards fishermen's income, either for catching sharks as the main target or bycatch.

Based on the interview to fishermen, they said they knew the fishing grounds even they caught hammerhead sharks, they cut the hammers on the way back to fish landing base in order to deceive officers because hammerhead shark is one of protected sharks.

CONCLUSION

A Factor which influenced fishermen in catching sharks was sharks sustainability factor, it was 74.505% consisted of fishermen's perception on shark population, fishermen's perception on biological shark, and fishermen's perception on rules. The most dominant perception influenced fishermen in catching sharks was fishermen's perception on shark population for 86.9%. They were aware of shark sustainability, but they revealed that they unintentionally caught sharks so shark catching occurred continuously. However, the result of data calculation and result in field is different, the researcher concludes that economic factor also influence shark catching.

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