

# Grouper Fish Fisheries in Bays of Kwandang, Gorontalo Province are reviewed from Economic Social Aspects

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**Abstract**— Socio-economic information is needed in the formulation of responsible grouper management. This study aims to determine the socio-economic conditions of grouper fishermen in Bays of Kwandang. This research was conducted from January to July 2018. Primary data was collected through surveys and direct interviews with fishermen and fishermen figures.. The Collecting data using questionnaire assistance on 35 people respondents. Grouper fishermen in Bays of Kwandang were still in the category of traditional fishermen. The income of fishermen is below of Rp. 200,000/trip with the catch per trip less than 25 kg. To improve welfare, fishermen need subsidies from the local government. The subsidies are in form of fishing fleets and capital to develop business diversification in the fisheries sector.

**Keywords**—Grouper fish, socio-economic, and bays of kwandang.

## I. INTRODUCTION

Bays of Kwandang is one of the main bases of fishing activities in the Sulawesi Sea (Faizah et al., 2014). There are three fishing efforts, namely large (Rahmat, 2007)small pelagic (Faizah et al., 2014), and demersal (Fahmi and Adrim, 2002) in the area . Of the various types of fish caught, groupers are one of the most dominant fish and have high economic value. Market

demand for live groupers, both at domestic and abroad is very high (Kristanto et al., 2015).

To meet domestic and export market needs, the fishing of grouper is carried out on a large scale (Mujiyanto and Sugianti, 2014). More intensive exploitation of groupers occurs because of the high economic benefits (Ramadhani et al., 2017). The intensive fishing leads to over-exploitation (Santoso, 2016). Sustainable management is needed to anticipate problems. Regarding sustainable management, the socio- economic conditions of grouper fishermen need to be known. Therefore, a study was conducted to determine the socio-economic conditions of grouper fishermen in Bays of Kwandang.

## II. MATERIALS AND METHODS

The research was conducted from January to July 2018, in Bays of Kwandang. Sample collection areas consisting of three islands, namely Pulau Malambe, Dudepo, and Ponelo. Primary data collected through surveys and direct interviews with fishermen and fishermen figures. Questionnaires arranged to collect data as modifications of Lorwens & Wouthuyzen (Lorwens and Wouthuyzen, 2015) (Table 1). The distribution of respondents in this study were 15 people in Malambe Island, 10 people in Dudepo, and 10 people in Ponelo.

Table 1. Questionnaires

1	Name:		Age:	
2	Education	a. Elementary school	b. Junior high school	c. High school
3	Catching tool	a. Fishing rod	b. Speragun	c. Combined
4	Fishing season	a. Transition west to	b. Transition east to west season	

		east season		
5	Arrest fleet	a. Without engine	b. Machine	
6	Target of arrest	a. Pelagic fish	b. Coral fish	c. Combined
7	Long sail	a. One day fishing	b. > 1 day	
8	Range collaps	a. Far	b. Permanent	c. Close
9	Mileage	a. <5 miles	b. 5-10 miles	c. > 10 miles
10	Traveling time	a. <1 hour	b. 1-2 hours	c. > 2 hours
11	Size of fish	a. Smaller	b. Permanent	c. Big
12	Catch	a. <25 kg	b. 25-50 kg	c. > 50 kg
13	Subsidy	a. Really need	b. Not really needed	c. No need
14	Handling	a. Consumption	b. Sell	c. Processed
15	Expected assistance	a. Catching tool	b. Capital	c. ship
16	Income / trip	a. <Rp. 200,000	b. Rp. 200,000-400,000	c. > Rp.400,000
17	Amenities	a. Ice factory	b. First time	c. Cooperative
18	Expenditures /			
	a. <1.5 million	b. 1.5-2.5 million	c. > 2.5 million	
	month			

**III. RESULTS AND DISCUSSION**

Bays of Kwandang is one of the centers of capture fisheries in North Gorontalo Regency. At the beginning of 2011, the Kwandang Fishery Port has been built at whose position on the edge of the Sulawesi Sea. The port is the main base of reef fish fisheries. The economically important reef fish that are caught in Bays of Kwandang are five species. The species are mud grouper fish (*Epinephelus coioides*), tiger grouper (*Epinephelus fuscoguttatus*), rat grouper (*Cromileptis altivelis*), sunu grouper (*Plectropomus leopardus*), and moon tail grouper (*Variola albigmarginata*). The fish were caught by stretching, fish trap, and speargun.

Based on the survey and interviews of social aspects, the highest percentage of grouper fishermen age is 30- 40 years (49%). Then followed by more than 40 years (29%) and under 30 years (23%) (Figure 1a). The majority of fishermen's education only elementary school with a percentage of 57% followed by junior high school with a percentage of 29%, and high school only 14% (Figure 1b). The low an educational level of fishermen is caused by two factors. The factors are the lack of awareness of the community island about the importance of education and the difficult access to schools that very far from the fishermen's settlements.

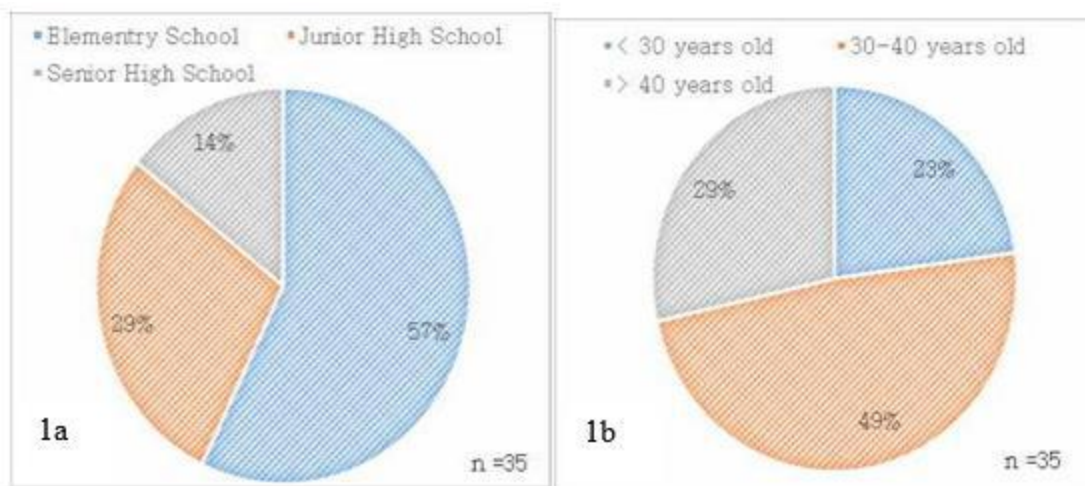


Fig.1: The age (a) and educational level of fishermen in Bays of Kwandang, Gorontalo Province

Based on the of fishing gear and fishing area aspects, fishermen in Bays of Kwandang are traditional fishermen category. The fishing gear used in the area are fishing rods with a percentage of 54%, speargun 40%, and a

combination of the two fishing gear at 6% (Figure 2a). District Marine and Fisheries of North Gorontalo reported in 2017 that the catch of mud groupers used stretch fishing rods is 74, 2 tons, sunu grouper 61, 8 tons, and rat grouper

24, 7 tons. Thus, the catch of speargun fishing gear is mud grouper fish of 47.5 tons. All grouper fishermen in Bays of Kwandang have used boats with 5.5-15 HP engine capacity (Figure 2b). The engine is a small engine capacity category that use to cover a distance to the fishing area ( fishing ground ) as far as below of 5 miles (Figure 2c).

The grouper fishing area in Bays of Kwandang is concentrated in several locations such as around Mohinggito Island, Malambe Island, Saronde Island, and the most remote one is Lampu Island. The areas are directly next to the Sulawesi Sea. As many as 91% of

fishermen said that the travel time needed to get to the farthest fishing ground (Pulau Lampu) was around 45 minutes to 1 hour. Thus, only 9% of fishermen needed 1-2 hours to get to fishing ground (Figure 2d). Therefore, the operation length of grouper fishermen is only around 12 hours/trip (one-day fishing) (Figure 2e). Furthermore, 94% of grouper fishers in Bays of Kwandang make arrests in the eastern season and only 6% also make arrests in the western season (Figure 2f). The fishermen decision based on oceanographic conditions such as strong currents and bad weather and the limitations of adequate fishing facilities (Achmad et al., 2017; Yulianto et al., 2013).

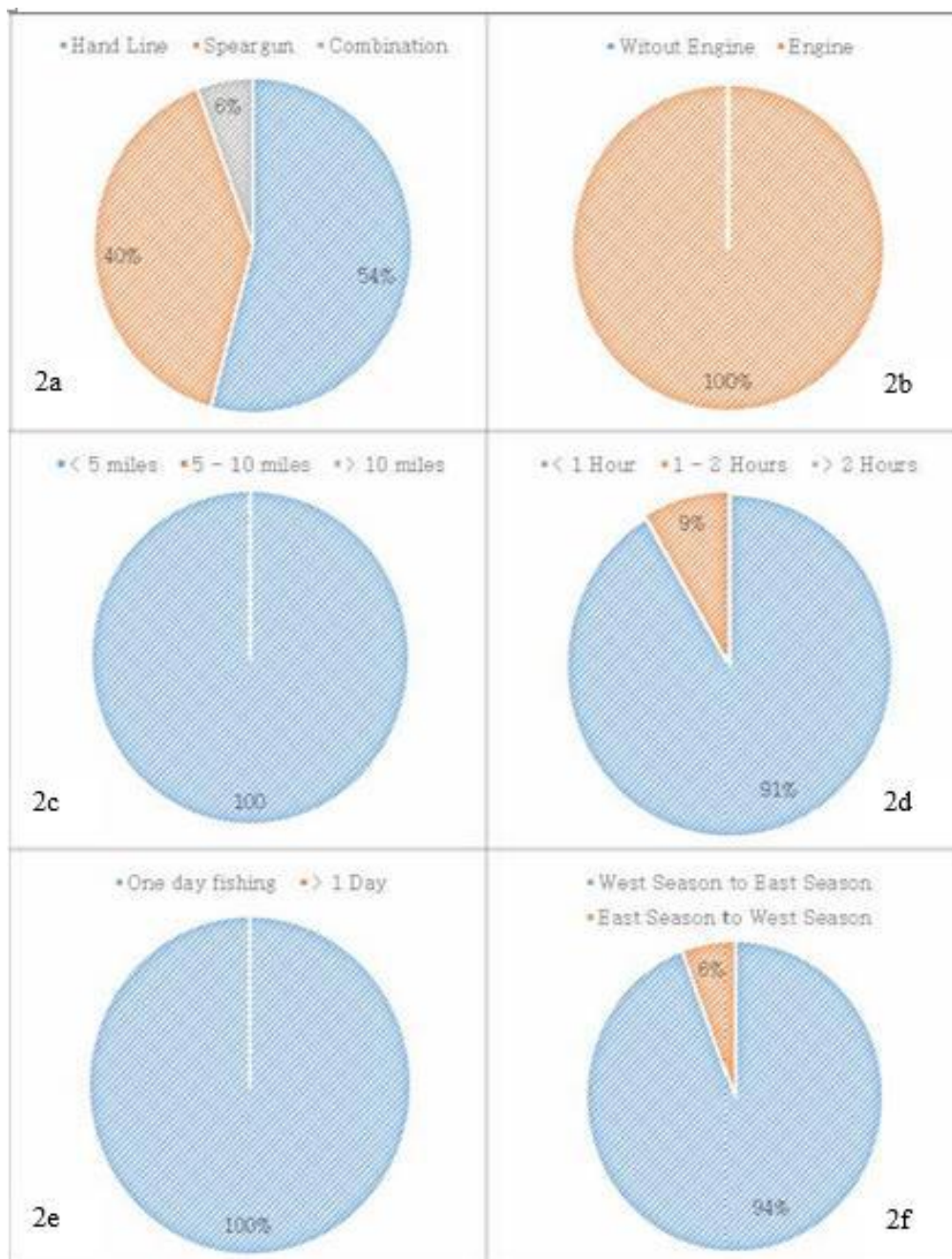


Fig.2: The Types of fishing gear (a), Capture fleet (b), Distance to fishing ground (c), Travel time to fishing ground (d), Length of sea (e), and Season of grouper fishing (f) in Bays of Kwandang, Gorontalo Province.

The survey and interview revealed that 86% of the distance of fishing ground was increased while only 14% said it remained (Figure 3a). In the last few years, the fishing ground has shifted somewhat to the outer islands. Before that time, catch activity of fishermen only in around of Mohinggito Island and Malambe Island. The

islands are close to their settlements. However, it is currently shifting far to Saronde Island and Lampu Island. The shift in the fishing ground was also followed by the increasing number of small-sized fish caught (71%) while only 29% of fishermen said the size of the caught fish did not change (Figure 3b)



Fig.3: The Range collaps (a) and (b) Fish size in Bays of Kwandang, Gorontalo Province

The results of surveys and interviews for economic aspects show that the majority of grouper fishermen have income below Rp. 200,000/trip (54%), Rp. 200,000-400,000/trip

(40%), only a small portion of the income is above Rp. 400,000 trip (6%) (Figure 4a). While the monthly expenditure of fishermen is mostly above Rp. 2,500,000 (66%), and other fishermen have in the range of Rp. 1,500,000- Rp.2,500,000 (34%) (Figure 4b). The high expenditure of fishermen is sometimes not accompanied by the amount of catch obtained. Percentage of catch per trip shows that 69% of fishermen obtained catches below 25 kg/trip, 26% in the range of 25-50 kg/trip, and only 6% above of 50 kg/trip (Figure 4c). The catch of 96% of fishermen is directly sold to collectors and 6% for self-consumption (Figure 4d).

The survey results also revealed that fishermen need subsidies from the local government (Figure 4e). The subsidies needed are capture fleets (86%), fishing gear

(3%), and capital assistance (11%) (Figure 4f). So far, many fishermen have spent funds to repair their fleet catches. The capture fleet that has a more distance travel capacity enables fishermen to expand into the open sea which has been exploited so far. Besides, the capital assistance help to develop business diversification in the fisheries sector.

Facilities needed by fishermen in Bays of Kwandang are ice factories (51%), Fuel stations (46%), and cooperatives institutions (3%) (Figure 5). The access collectors away from fishing ground cause the fish catches sometimes not so fresh that it affects the price of fish. With the existence of an ice factory on the islands around the fishing ground, the quality or freshness of the fish can be maintained. Fishermen also need the fuel stations around the island to guarantee the availability of fuel. So far the fuel for fishing boats has been obtained from traders around the Kwandang Fishery Port and the price reaches Rp. 10,000/liter while the normal price is only Rp. 8,000/liter.

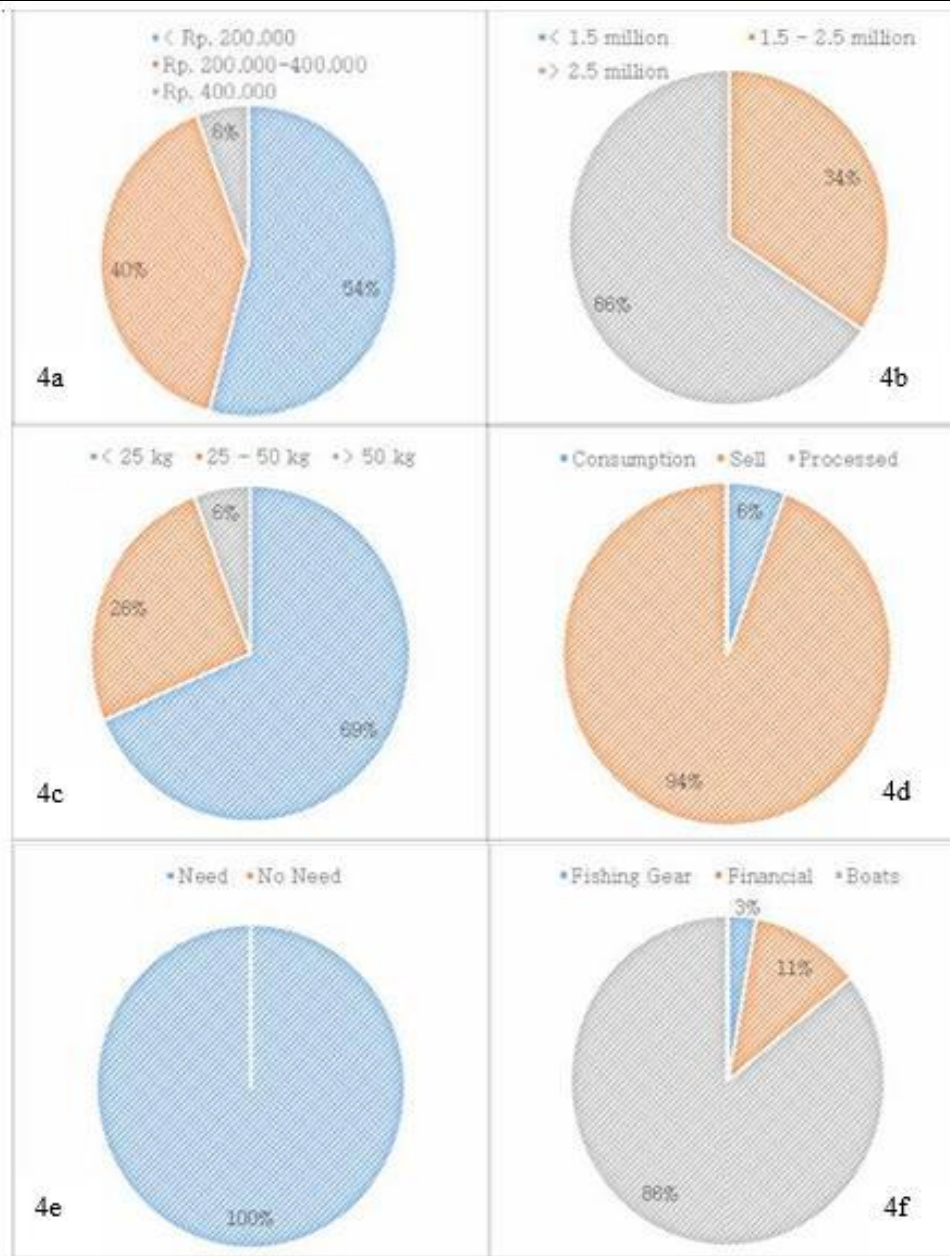


Fig.4: The Fishermen's income per trip (a), monthly fishermen's expenditure (b), one-trip catch (c), handling of catches (d), fishermen who need subsidies (d), and assistance expected by fishermen (f), in Bays of Kwandang, Gorontalo Province.

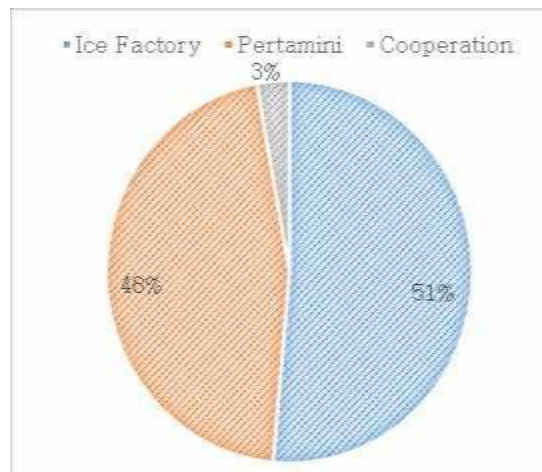


Fig.5: facilities needed by fishermen in Bays of Kwandang, Gorontalo Province.

**IV. CONCLUSIONS AND RECOMMENDATIONS**

Grouper fishermen in Bays of Kwandang are a traditional fishermen category who income below Rp. 200,000/trip and less than 25 kg catch/trip. To improve welfare, fishermen need subsidies from the local government like fishing fleets and capital to develop business diversification in the fisheries sector.

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