

Productivity and Profit-Sharing System Cantrang Fisheries in Eretan Kulon Indramayu District West Java Indonesia

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-----ABSTRACT-----

Cantrang is a (seine net) that uses a relatively small net, which is 1.5 inches. With this size, cantrang is not selective towards target fish and catches fish of all sizes, including small fish. The objectives of this study are; calculating cantrang fisheries productivity; calculating the profit and loss of cantrang ship operations and profit sharing system. Collection of primary data through surveys in the field by classifying the volume of vessels cantrang 10-15 GT, and 16-20 GT; then search secondary data, namely collecting data on the distribution of the number of ships and cantrang fisheries in the form of reports from Village Unit Cooperation (VUC) Mina Bahari Eretan Kulon. The cantrang operation in Indramayu was only carried out by Eretan kulon fishermen with 43 units of fishing fleets that are still operating today under the auspices of the Mina Bahari VUC. The catch of cantrang is demersal fish which have high economic value, in cantrang operations with MV. Arema II (14 GT) recorded 15 species of fish caught which were dominated by ponyfish (*Leiognathus nuchalis*), as many as 5,040 kg (47.59%), then fish of deepwater goatfish (*Upeneus moluccensis*) 2,100 kg (19.83%), and whipfin silverbiddy (*Gerres filamentosus*) amounting to 1,650 kg (15.58%) of the total catch. The cantrang 10 GT fishery productivity up to 15 GT was obtained at 30,091 kg. The income obtained from the results of the cantrang fishing business in Eretan Kulon received by local fishermen in one trip with 4 fishing days amounting to Rp. 1,602,889, -

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I. BACKGROUND

The use of fish resources in the sea is carried out by fishermen by using different fishing gear both in terms of the size and type of fishing gear used. Cantrang is a (seine nets) that uses a relatively small net, which is 1.5 inches. With this size, cantrang is not selective towards target fish and catches fish of all sizes, including small fish (Sudirman *et al*, 2008).

The catch of small fish, especially juvenile, causes the fish population not to breed. This is what causes cantrang to be considered an environmentally friendly fishing tool that threatens the sustainability of fish resources.

Today the impact of the cantrang ban has drawn protests from Indonesian fishermen groups, especially fishermen on the north coast of Java. Until finally the government allowed the cantrang to be used again with the issuance of the Discretion letter from the Minister of Maritime and Fisheries Affairs No. 18 of 2018, concerning Discretion of Extension of Transition Period of Fishing Equipment Prohibited to the Regional Government of Central Java Province. with the condition not to add to the fleet, to re-measure the volume of the ship, and to register fishermen to obtain replacement fishing gear. West Java Province is one of the provinces affected by the cantrang ban. It is recorded that around 1033 cantrang/rawl units are owned by fishermen in West Java, spread across 5 regencies/cities.

As the largest fish producer in West Java, Indramayu Regency has a very vital position as the main pillar of the fisheries subsector. One of the centers of the marine industry in Indramayu Regency is located in Eretan Kulon Village. The operation of cantrang in Indramayu is only carried out by fishermen Eretan Kulon, with 43 units of catching fleets still operating today under the auspices of the VUC Mina Bahari.

Cantrang consists of wings, body and cod-end. Operated at the bottom of the waters with 3 stages, namely preparation, setting and hauling. Fisheries Management Area of the Republic of Indonesia 712. The catch of cantrang is demersal fish, in cantrang operations on ships that are invaded by MV. Arema II, there were 15 species of fish caught which were dominated by ponyfish (*Leiognathus nuchalis*), as many as 5,040 kg (47.59%), then fish deepwater goatfish(*Upeneus moluccensis*), 2,100 kg (19.83%), and whipfin silverbiddy fish

(*Gerres filamentosus*), amounting to 1,650 kg (15.58%) of the total catch. However, the three types of fish above are not fish species that have high economic prices compared to 3 other types of fish, namely squid (*Loligo* sp), which are caught only at 150 kg (1.42%), then purple-spotted bigeye fish (*Priacanthus tayenus*), 465 kg (4.39%) and stingrays (*Dasyatis* sp) (0.14%).

From the results of the profit and loss analysis, the Eretan Kulon cantrang fisheries business is categorized as a profitable fishery business where the net income of ship owners in one fishing operation is IDR. 21,292,410. The purpose of this study: 1) to calculate the productivity of cantrang fisheries on 10 GT - 15 GT vessels, and 16 GT - 20 GT; and 2) calculating the profit and loss of cantrang ship operations and profit sharing system.

II. METHODOLOGY

Secondary data collection begins by collecting distribution data and the number of cantrang vessels in the form of capture fisheries statistical data Eretan Kulon, then collecting primary data through surveys in the field regarding cantrang operation and catch composition by classifying the volume of vessels cantrang 10-15 GT and 16-20 GT.

Ship Productivity

Productivity is calculated based on vessels between 10 GT - 15 GT and size 16 GT - 20 GT. Productivity is the catch result per day per trip per GT vessel in the range of size 10 GT - 15 GT and size 16 GT-20 GT.

Operating Revenues

Profit analysis aims to determine the amount of profit obtained from a business activity carried out. Operating income in the development of capture fisheries uses the following formula (Djamin, 1984) :

$$\mu = TR - TC \dots\dots\dots(1)$$

Information :

- μ : Profit (IDR)
- TR : Total revenue (IDR)
- TC : Total cost (IDR)

Criteria :

- TR>TC : Profitable business
- TR<TC : Efforts to experience losses
- TR=TC : Profitable business

Profit Sharing of Fishing

The revenue sharing system explains the income received between employers (shipowners) and crew members in one trip fishing operation.

III. RESULTS AND DISCUSSION

Eretan Kulon Cantrang Ship

Of the various types of fishing vessels in Indramayu Regency, for cantrang vessels there are only 43 units in Eretan Kulon with a volume of between 10-30 GT (with 10 units measuring 10-15 GT, 18 units measuring 16-20 GT, 15 units of size 21-30 GT) which in the anchoring and demolition (auction) of catch and loading supplies using the fish auction facility Eretan Kulon under the auspices of the VUC Mina Bahari. The following is a graph showing the quantity of GT cantrang vessels in Eretan Kulon based on the volume of the vessel.

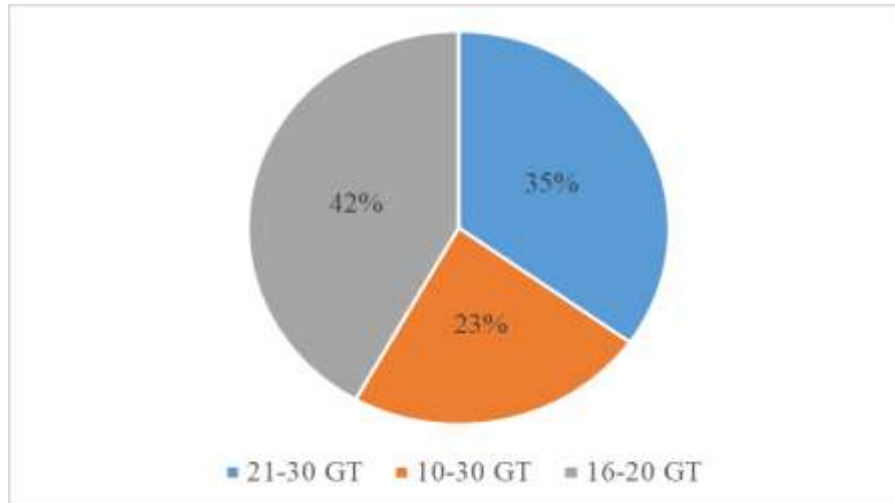


Figure 1. Percentage of Vessels Based on GT

Based on figure 1, it can be seen that cantrang vessels operating under the coordination of VUC Mina Bahari are dominated by vessel volume size 16 to 20 GT by 42%, then ships with a size of 21-30 GT by 35%, and 23% namely cantrang vessels with size 10 to 15 GT.

Based on Mina Bahari VUC auction results data in 2017, Eretan Kulon cantrang vessels for sizes 10-20 GT were able to land captured fishes as many as 2,829,552 kg. The data was obtained from fishing efforts carried out in January to December 2017, with the operation day for ships measuring 10-15 GT for 4 days per trip and vessels measuring 16-20 GT for 6 days per day. The catch data obtained based on the size of the ship can be seen in the following table and figure.

No	Month	10-15 GT (kg)	16-20 GT (kg)
1.	January	81.412	167.101
2.	February	76.267	156.098
3.	March	81.342	160.245
4.	April	67.765	156.432
5.	May	53.789	165.881
6.	June	68.098	170.001
7.	July	76.235	163.254
8.	August	63.890	160.097
9.	September	53.654	167.043
10.	October	90.783	162.331
11.	November	87.056	160.122
12.	December	89.652	151.004
Amount of fishing/year		889.943	1.939.609
Total overall fishing		2.829.552	

Table 1. Catches based on 2017 GT Vessels (kg)

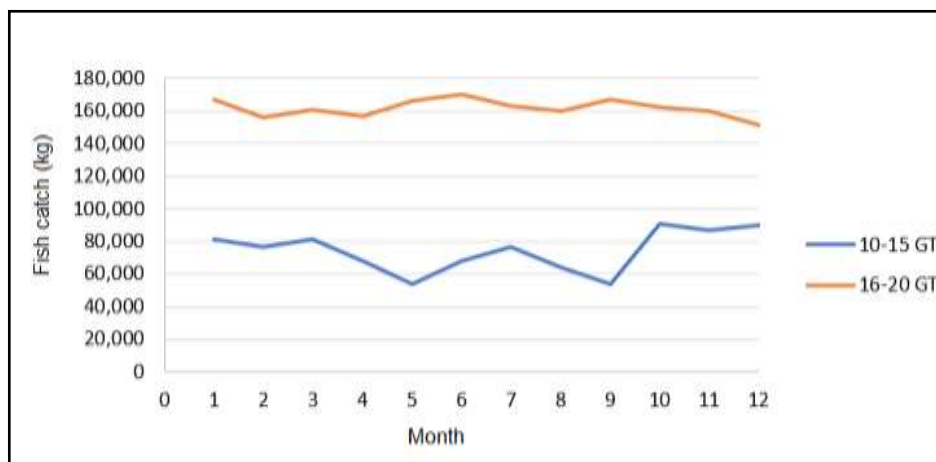


Figure 2. Catches based on GT Vessels in 1 Year

The highest capture ability of cantrang vessels of 10-15 GT occurred in October amounting to 90,783 kg and the lowest in September was 53,654 kg, while ships 16-20 GT the highest capture ability occurred in January at 167,101 kg and the lowest in December 151,004 kg. Whereas according to Aji, *et al* (2013) the small size of the ship GT has no significant effect. In the process of fishing the ship is in a stationary position so that it does not affect fishing operations. Ships with small GT can also get more results from ships with larger GT.

Catch Composition

According to Hakim and Nurhasanah (2016) the group of cantrang catches namely commonponyfish, deepwater goatfish, largefin croaker, groupers, stingrays, blacktip reef shark, octopus, greaterlizardfish, and kinds of shrimp. While fish caught by MV. Arema II has 16 (sixteen) species of fish. The 3 (three) most fish caught were ponyfish(*Leiognathus nuchalis*)5,040 kg, then deepwater goatfish(*Upeneus moluccensis*)2,100 kg, and whipfin silverbiddy(*Gerres filamentosus*), as many as 1,650 kg.

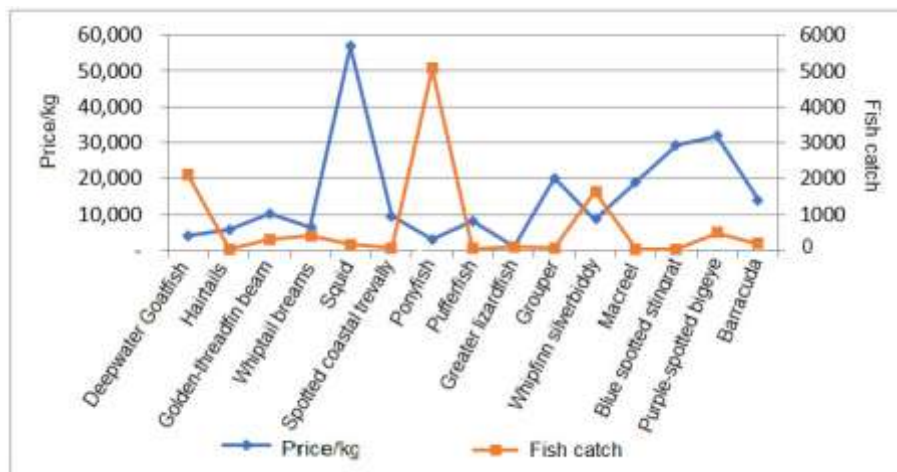


Figure 3. Catch Composition

From the catch data, it is also known that the selling price of the catch is very varied. This price is obtained through the results of complete operations carried out by cantrang vessels at fish auction Eretan Kulon. The price of fish caught by MV. Arema II per kilogram which has high economic value is squid (*Loligo sp*), where the price per kilogram is IDR. 56,666.67, then the type of purple-spotted bigeye(*Priacanthus tayenus*), with selling value per kilo gram of IDR. 31,849.46. Stingray (*Dasyatis sp*), with selling price per kilo gram of IDR. 29,333.33.

With the variety of types of fish caught can be concluded that cantrang vessels have a small level of selectivity. This has an impact on the ecology of fish in the Indramayu range, where based on the Decree of the Minister of Marine and Fisheries Affairs No. 47 of 2016 concerning the Estimation of Potential, Allowable Catches, and Level of Utilization of Fish Resources in the Fisheries Management Region of the Republic of Indonesia, as a whole the level of fish resource utilization in the FMA-RI 712 (Java Sea) includes small pelagic fish of 0.59, which means that the utilization rate is fully-exploited, large pelagic fish is 1.16, which means that the utilization rate is in an over-exploited, demersal amounting to 0.83, which means that the utilization rate is fully-exploited, reef fish is 0.67, which means that the utilization rate is fully-exploited, squid is 1.60, which means that the utilization rate is in an over-exploited condition. With such conditions, small pelagic fishing, demersal fish and reef fish in the FMA-RI 712 are maintained with tight monitors. And for the effort of catching large pelagic fish, and squid must be reduced.

Analysis of Profit and Loss

Income statement analysis is an analysis to measure the operational success of a ship owner for a certain period of time. Usually shipowners use this analysis to determine the profit and value of investments. This analysis presents information to help ship owners in predicting the amount of cash flows in the future (Amry, *et al* 2017).

Analysis of profit and loss for 10 - 15 GT vessels (MV. Arema II samples) in 1 fishing trip by taking into account the results of the income from fish auction minus the fishing operation costs in 1 fishing operation for 4 days. Furthermore, the results were set aside 8.1% for the Mina Bahari VUC cash fund, then divided equally for ship owners and crew members. The distribution of income for the crew is evenly distributed to 15 people, but specifically the captain of the ship gets an additional from the boat owner of IDR. 1,000,000 to IDR.

1,500,000, - taken from the portion of the owner's income depending on the catch. Calculation of analysis as follows:

Profit and Loss Analysis		
Income from fishing		IDR.72.780.000,-
Cost for fishing operations		IDR.20.000.000,-
Diesel oil 1.500 liter @ 6.500,-/liter	IDR.9.750.000,-	
Oli 15 jerrycan @ Rp 100.000/jerrycan	IDR.1.500.000,-	
Raw material inventory	IDR.5.000.000,-	
- snack		
- rice		
- instant noodles		
- cigarettes		
- drink water 10 galon		
- seasoning		
- gas 12 kg @ 2 gasometer		
Ice cube 150 pieces @ IDR.25.000,-/ice cube	IDR.3.750.000	
Gross profit		IDR.52.780.000,-
VUC cash amounting 8.1% to gross profit	IDR.4.300.000	
Gross profit		IDR.48.480.000,-
Profit sharing ship owner and the crew	IDR.24.240.000,-	
Additional income	IDR.1.000.000,-	
Total salary expenditure for the crew		IDR.25.240.000,-
Net profit		IDR.23.240.000,-

Table 2. Calculation of Profit and Loss

Because the results of the productivity calculation show that the size of 10-15 GT is greater than the size of 16-20 GT, the discussion on the analysis of profit and profit sharing only discusses vessels with a size of 10-15 GT.

Profit-Sharing System

The wage system or profit sharing applied at Eretan Kulon is still traditional and a family system, there is no binding agreement or agreement between the crew and the ship owner. Usually the profit sharing system is carried out by the owner or ship owner after the auction process is finished. which at the latest is that the crew can get a salary one day after the auction of the caught fish.

$$\begin{aligned} \text{The revenue sharing system for each crew member} &= \text{Crew Salary/Number of all crew members} \\ &= \text{IDR. 24.240.000/15} \\ &= \text{IDR 1.616.000,-} \end{aligned}$$

Ship Productivity

The productivity of fishing vessels per year is calculated based on the division between the number of ship catches in 1 (one) year and the vessel's GT, then presented in the following table and figure:

Month	Fishing Vessel Productivity	
	10-15 GT (kg)	16-20 GT (kg)
January	33.922	21.758
February	31.778	20.325
March	33.893	20.865
April	28.235	20.369
May	22.412	21.599
June	28.374	22.136
July	31.765	21.257
August	26.621	20.846
September	22.356	21.750
October	37.826	21.137
November	36.273	20.849
December	37.355	19.662
Average	30.901	21.046

Table 3. Vessel Productivity based on GT in 2017

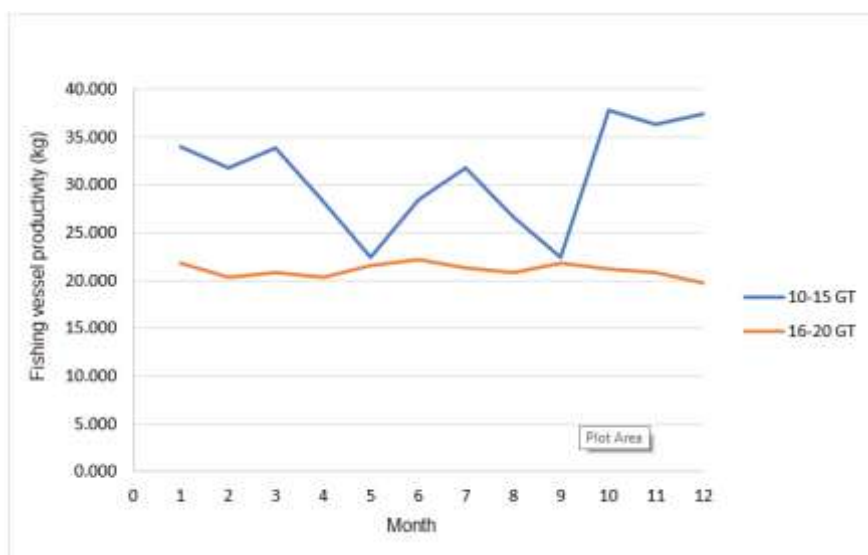


Figure 4. Vessel Productivity based on GT in 2017

The image shows the productivity for two classes of ship sizes namely 10-15 GT and 16-20 GT. For ships measuring 10-15 GT, the average value of productivity in one year is 30,901 kg, which is bigger than ships size 16-20 GT, which is 21,046 kg.

In general, the productivity of ships measuring 16-20 GT in one year tends not to increase. While ship productivity in the size of 10-15 GT in one year is seen to experience ups and downs, in one year it has increased three times, namely in January to March, July and October to December, and twice has decreased the value of productivity in May and September.

IV. CONCLUSION

1. Cantrang vessels operating under the coordination of the Mina Bahari VUC are 43 units, with a vessel volume size of 16 to 20 GT at 42%, then ships with a size of 21-30 GT by 35%, and 23% namely cantrang vessels with a size of 10 s / d 15 GT.
2. The composition of the catch consists of 16 (sixteen) types of demersal fish. The 3 (three) most fish species caught were 4,440 kg of ponyfish, then 2,100 kg of deepwater goatfish, and 1,650 kg of whipfin silverbiddy. The price of fish per kilogram that has high economic value is squid, where the price per kilogram is IDR. 56,666.67, then the type of purple-spotted bigeye fish with a selling value per kilo gram of IDR. 31,849.46. Stingray with a selling price per kilo gram of IDR. 29,333.33.
3. The income obtained from the results of the cantrang fishery business in Eretan Kulon greatly helped the economy of local fishermen where the average income of crew in one (4) day fishing operation was IDR. 1,602,889, -.
4. Productivity for ships measuring 10-15 GT has an average productivity value in one year of 30,901 kg, which is larger than ships size 16-20 GT which is equal to 21,046 kg.

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