

## Business feasibility and fishing seasonal pattern of trolling fisheries in Trenggalek Waters, East Java, Indonesia

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### -----ABSTRACT-----

Trolling fisheries is the most dominant fishing gear recorded in Archipelagic Fishing Port (AFP) Prigi, Trenggalek. FV Harapan Jaya (14 GT) was the trolling vessel chosen as a sample which is based on port at AFP Prigi, Trenggalek. The objective of this research is to calculate business feasibility and to analyze fishing seasonal pattern of trolling fisheries. Business feasibility was approached based on business earning analysis whether fishing seasonal pattern by fishing seasonal index. Annual total cost reached about Rp. 274,629,500. and annual net income was Rp. 114,074,500. Net benefit cost ratio was 2.13, payback period was 2 years 5 months and internal rate of return (IRR) was 45.56%. The results of business analysis of trolling fisheries at FV Harapan Jaya explained that the business was profitable and worth the effort. Based on fishing seasonal index that the peak fishing season is on July to November, and the low is on December to February.

**KEYWORDS:** archipelagic fishing port, business analysis, fishing seasonal pattern

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### I. BACKGROUND

Production of pelagic fish in East Java region mostly count on the production in the Trenggalek Waters. Main commodity both of the waters at fish landing place of Archipelagic Fishing Port (AFP) Prigi in Trenggalek were tunas (*Thunnus* spp), bullet tuna (*Auxis thazard*), and skipjack (*Katsuwonus pelamis*). The commodity caught by hook selective gear namely trolling which introduced in 2004 related with increasing of fish aggregating device development in the waters. Fishing vessel of trolling fisheries is wood vessel sized below 20 gross tonnage.

### II. METHODOLOGY

The study conducted in March to May 2019 focusing at trolling fisheries. Sample of business feasibility was taken of one of trolling fishing vessel of 14 gross tonnage that landed at AFP Prigi Trenggalek. Analysis of fishing season pattern was calculated based on landing catch and trip of trolling fisheries which recorded at the AFP Prigi during last 5 (five) years :

1. Business feasibility developed for 10 (ten) year activity due to technical age of fishing vessel was 10 (ten) years.
2. Discount factor used rate of Bank Rakyat Indonesia i.e 19 %.
3. Revenue was based on catch sale.

### Fishing Season Index

Fishing season was estimated on fishing seasonal index which derived from catch per unit effort during the last 5 (five) years. Then average monthly catch per unit effort was analysed to approximate fishing seasonal index with such formula :

1. Monthly average

$$\bar{x}_i = \frac{\sum x_{ij}}{n}$$

2. General average

$$\bar{\mu} = \frac{\sum_{i=1}^{12} i \sum_{j=1}^n j}{ij}$$

3. Seasonal index

$$IM = \frac{\bar{x}_i}{\bar{\mu}} - 1$$

Information :

$\bar{x}_i$  :Average monthly catch of certain year

$\bar{\mu}$  :Average monthly catch of total year

IM :Fishing season index

n :Total of year

xij :Catch of month – j year of – i

**III. RESULTS AND DISCUSSION**

Trolling fisheries at AFP Prigi mainly by fishing vessel of 10 gross tonnage to 20 gross tonnage with 7 (seven) day operation of each trip. Owner of the vessel usually both as skipper of their vessel. Trolling is one of hook fishing consist of polyamide monofilament rope with hook of number 7 (seven) with dia 1.5 centimeter and added artificial bait.. The hook is possible to be joined of 2 (two) to 3 (three) hooks so that formed as a anchor. The trolling is operated by pulling them aft the vessel. Fishing ground of the trolling is around fish aggregating device (FAD) with 3 (three) hours from AFP Prigi on 7 (seven) knots speed of vessel. Catch of sample trolling primarily big pelagic fish and economically important such skipjack (*Katsuwonus pelamis*), dolphinfish (*Coryphaena hippurus*), yellowfin tuna(*Thunnus albacares*) dan spanish mackerel(*Scomberomorus spp*).

**Business Feasibility of Trolling Fisheries**

Calculation of financial feasibility of trolling fisheries based on the sample vesel at AFP Prigi was feasible to be continued. Description of the feasibility as below :

1. Invesment

Invesment is used to operate business of trolling fisheries was Rp 273.500.000 with asumption for economic value of vessel, machineries and fishing gear covered 10 (ten) years.

2. Cost of business

This covered of fix cost and variable cost. The fix cost was Rp. 33.027.500consisted of depreciation vessel unit and maintenance whenever the variable cost was Rp.241.602.000 covered production cost. So that the total cost was Rp. 274.629.500.

3. Revenue

Revenue	Number of Trip	Average (Rp)	Total (Rp)
Peak season	10	25.000.000	250.000.000
Medium season	8	15.463.000	123.704.000
Low season	3	5.000.000	15.000.000
			388.704.000

**Table 1.** Revenue ofFV. Harapan Jaya

Note : 1 trip = 7 days at sea

Total annual trip based on observation and AFP Prigi data that was 21 trip,

Total revenue	388.704.000
Total cost	274.629.500
Net revenue	114.074.500

**Table 2.** Net revenue at FV Harapan Jaya

This condition showed that trolling fisheries in Prigi Waters was feasible to be prolonged.

#### 4. Net B/C Ratio

This analysis to know comparison value between revenue and production cost, and was 2.13 based on the calculation. It was meaning that the business of trolling fisheries can be continued.

#### 5. Payback period

To know time of cycling investment based on benefit achievement. The analysis showed that payback period of the trolling fisheries business was 2 years and 5 month. It said that the business cycling was good due to it was less than 3 year (Antika *et al.*, 2014).

#### 6. Internal rate of return

Result of calculation was 45.56% and it was higher than the Bank Rakyat Indonesia of 19% that the discount rate which categorized feasible to continue the trolling fisheries business (Karningsih *et. al.* 2018).

### Income System for Fishing Vessel Personnel

Income system based on net revenue that it divided into 2 (two) portion, owner and crew received 1(one) portion each. The other hand, crew also received additional income for each multiple catch of 10 basket (500 kgs). Illustration of the income system can be described as, revenue of 1(one) trip was Rp. 15.940.000, and production cost was Rp. 4.500.000 o that owner received Rp. 5.720.000 and the crew received Rp. 5.720.000 for all in each trip.

### Fishing Seasonal Index for Trolling Fisheries

Fishing seasonal index (FSI) was calculate over monthly catch per unit effort during 5 years according to Setiyawan *et al.*(2013). The FSI was not limited on certain spesies but all catch from the trolling fisheries.

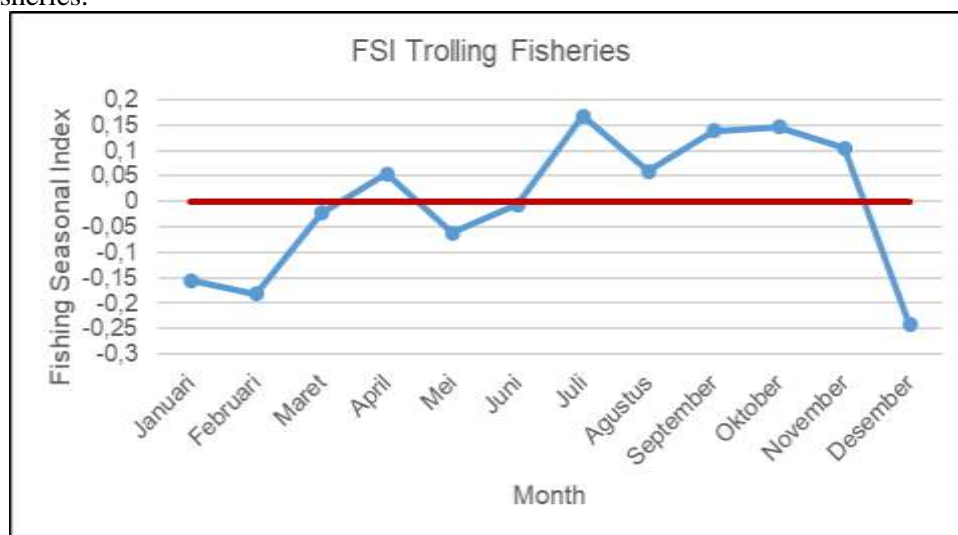


Figure 1. Fishing Seasonal Index(January 2014 to December 2018)

The effective fishing season was showed at value of FSI which higher than 0. The peak season was on July to November with the highest at July, and the low season on December to February. This condition was mostly same as information from and discussion with fishers that peak fishing season started on April with the peak on July to November, and the low season on December to March. This study aligned with study of Setiyawan *et al.* (2013) that known fishing seasonal of skipjack by trolling fisheries was on Juni to July and September to November, and low season on Januari to May, August and December.

## IV. CONCLUSION

Analysis of business feasibility for trolling fisheries showed that it achieved net revenue Rp. 114.074.500 and payback period was 2 years 5 months. Assessment of FSI indicated that peak season of

fishing on July, and the low season on December to February. This condition have to adjust with the activity of docking and gear maintenance of the trolling fisheries.

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