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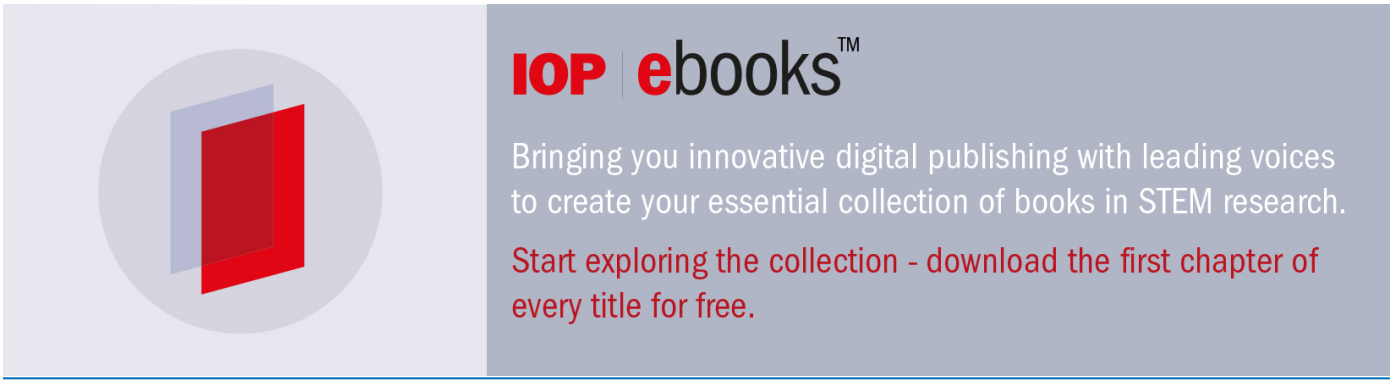

Economic policy in the development of capture fisheries in Jayapura City

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Abstract. Capture fisheries production has increased very rapidly, and its contributions to the economic growth of the region and the welfare of the people in Jayapura City have been quite significant. Up to now, the micro-analysis of capture fisheries, especially skipjack tuna, has often been carried out. Nevertheless, the competitiveness analysis of skipjack tuna is still limited, and capture fisheries development policies based on economic analysis are also lacking. Therefore, this analysis aimed to come up with economic policies in the development of capture fisheries in Jayapura City. The data collection was carried out in Jayapura City. The types of data used included fisheries production data, production costs and fishermen's income. Policy Analysis Matrix (PAM) method was used to reach the objective of the study. The study findings showed that the Private Cost Ratio (PCR) was 0.395, the Domestic Resources Cost Ratio (DRC) was 0.387, the value of Private Profit (PP) was Rp.140.618.375, and the value of Social Profit (SP) was Rp.140.298.375. The research implication showed that the skipjack fisheries business generated economic and financial benefits for local fishermen, and it would be more competitive to be able to compete with skipjack tuna from other regions as well as other countries, particularly if supported by government policies on consistent and sustainable stabilization of input prices and production output of skipjack fisheries.

1. Introduction

Skipjack tuna (Cakalang fish) commodity is one type of capture fish that has very high economic value and has become one of the fish consumers' popular choices. In fact, the consumption demand both at home and abroad is relatively high. Another factor is that there are several processed skipjack products that can create very diverse added values. Types of processed skipjack include smoked fish, abon (shredded meat), flour, kamplang crackers [4] and other preparations in the form of preserved tuna, cut tuna, whole fresh tuna, whole frozen tuna [21].

The regional economic development and the rapid population growth in the city of Jayapura have brought about the increasing need for fish for consumption. As a result, this increase leads to an increased exploitation of capture fish resources, resulting in reduced fish stocks in the waters and oceans of Jayapura City.

Jayapura City, as the center of government and the center of the economy in Papua Province, has a wealth of capture fisheries resources that have not been optimally utilized. One type of the fish is skipjack tuna. Based on the data, in 2016 skipjack tuna production reached 756.32 tons, and the total economic value was Rp.37.815.850.000. The number of marine fisheries households was 1.012 [1].

Jayapura City is a landing center as well as trade center for capture fisheries in Papua Province, which is supported by good fish landing sites (TPI), sea and land transportation. The fishing gear used to catch skipjack is the mini purse seine with a fleet capacity of ≤ 12 GT. To produce superior and competitive skipjack tuna, it is necessary to use good fishing gear, adherence to the rule of catch limit, and the correct handling of fish after capture. These measures are expected to produce superior and competitive skipjack tuna.

Competitive commodities are the main requirements that must be prepared to compete in the global market. The consistency of government policies in favor of fishermen greatly influences the creation of competitive and comparative advantages of skipjack tuna. The policy becomes an urgent need to be implemented in the context of the development of capture fisheries. Based on the description, the research objective is to analyze economic policies in the development of capture fisheries in Jayapura City.

2. Material and Methods

This research was carried out in Jayapura City which took place from July to August 2017. The data used was a combination of primary data and secondary data. The primary data included production data of fish, ice cubes, supplies, freezer, oil, fuel, number of laborers, light. The secondary data consisted of general description of capture fisheries, fishing population, local fishermen conditions, type and number of fishing gear.

The research sample comprised 10 people using a purposive sampling approach. The research site was in Jayapura City. The data collection method used was a field study. The research techniques included interviews with questionnaires, observation, data archiving and surveys.

2.1. Analysis of the economic policy in the development of the capture fisheries in Jayapura City using the Policy Analysis Matrix (PAM) approach.

Table 1. Component of PAM Arrangement [15]

Component	Reveuue	Cost of Production Factor		Benefit/Profit
		Tradable Input	*Non -Tradable*	
Private cost	A	B	C	D
Social cost	E	F	G	H
Divergence	I	J	K	L

Table description:
A: Private revenue
B : Cost of private tradable input
C: Cost of private non-tradable input
D: Private benefit
E: Social acceptance
F: Cost of social tradable input
G: Cost of social non-tradable input
H: Social benefit
I: Output transfer
A: Transfer of tradable inputs
K: Factor Transfer
L: Net transfer

The PAM method can identify 3 (three) analyzes, namely profit analysis (private and social), competitiveness analysis (comparative advantage and competitive advantage), and policy impact analysis [19].

3. Results and Discussion

3.1. Competitiveness analysis of capture fisheries (cakalang) in Jayapura City

Commodities that can be produced efficiently are benchmarks of competitive commodities. Commodity efficiency is created if the product is produced optimally followed by a small production cost, so that the business profits increase. One measure that looks at the competitiveness of skipjack fish is the PAM approach.

a. The stages to calculate the comparative and competitive advantages of the cakalang fishery business: grouping the inputs of skipjack fisheries into tradable and non-input tradable categories, b) calculating economic values and benefits as the basis for calculating input and transfer transfers output [6]. In the PAM method, there are assumptions used in, among others:
b. Calculations based on private prices (private cost) that are the prices actually received by producers and consumers or prices that occur after the policy. Calculation based on social prices (social costs) or shadow prices, namely prices on perfect competitive market conditions. In the tradable commodity the shadow price is the price that occurs in the international market.
c. tradable Output and inputs are classified into tradable and non-tradable components.
d. Positive and negative externalities are considered mutually eliminating

Table 2. Budget for private and social budgets for tradable inputs and non-tradable inputs for skipjack fisheries in Jayapura City, 2017.

No	Description	Private (Rp)		Social (Rp)	
		Foreign Input (Tradable)	Domestic Input (Non-Tradable)	Foreign Input (Tradable)	Domestic Input (Non-Tradable)
1	Fuel	90.000.000	-	105.000.000	-
2	Oil	13.750.000	-	14.050.000	-
3	Kerosene	8.500.000	-	7.580.000	-
4	Consumption/supplies	107.500.000	-	109.500.000	-
5	Ice cubes	-	24.500.000	-	22.000.000
6	Fresh/clean water	-	5.250.000	-	4.450.000
7	Freezer	7.500.000	-	10.250.000	
8	Lighting	2.000.000	-	3.040.000	
9	Machine depreciation	16.562.500	-	16.562.500	
10	GPS depreciation	560.000	-	810.000	
11	Labour	-	62.059.125.	-	62.059.125
	Total	246.372.500	91.809.125	266.792.500	88.509.125

Source: Hutajulu et al.,[8], primary data (processed).

The study results showed that there were 3 (three) parties in the skipjack fishing business in the city of Jayapura: a) the ship owner (who acts as a funder), and captain, b) the ship captain who is responsible for operations and ship safety, and c) crew members who play a role in catching fish and are not responsible for venture capital.

The amount of the difference between the costs of catching skipjack of tradable private and social Rp.20.420.000, while the non-tradable input Rp.3.300.000. The biggest difference was found in foreign tradable fuel inputs reaching 58.69%, while big light inputs 4.07%. Based on the findings of Damayanti et al., [3], the cost of lighting reached 68.52%. Other findings Rodhouse et al., [20]; Solomon & Ahmed [22] showed that the use of LED lights was very efficient in catching squid. The difference in findings was caused by the strategy of catching squid which was very suitable by using LED lights while for skipjack LED lights did not have a significant effect.

3.2. Competitiveness analysis of cakalang fisheries business based on comparative and competitive advantages in Jayapura City

The results of the analysis of this study were to measure the level of competitiveness of skipjack fisheries in Jayapura City, which was measured using the PAM approach. Approach PAM is used to assess the level of government support for specific commodities, and the source of distortions that producers must face [16]. DRC analysis is also used for aquaculture assessment [11].

Table 3. PAM of Skipjack Capture fisheries in Jayapura City

Description	Revenue (Rp)	Costs (Rp)		Benefit/Profit (Rp)
		Input Tradable	Input Non Tradable	
Private Cost	478.800.000	246.372.500	91.809.125	140.618.375
Social Cost	495.600.000	266.792.500	88.509.125	140.298.375
Divergency Effect	(16.800.000)	(20.420.000)	3.300.000	320.000

Source: Hutajulu, et al. [8], primary data (processed).

The results of PAM analysis illustrated that private profits were higher than social benefits. The amount of profit was Rp.320.000 compared to the analysis of financial benefits, so that skipjack tuna fishing activities were feasible to develop. Research findings are different by of Hayandani et al., [7]; Lindawati et al., [12] where social benefits were higher than private profits. This difference was caused by the types of fisheries activities, namely capture fisheries and cultivation. Fish patin and Catfish aquaculture is very dependent on feed, which experiences price fluctuations every year.

Table 4. Value of Competitiveness and PAM Indicators

Indicator	Value
Competitive advantages:	
1. Private Benefit (PP / Rp)	140.618.375
2. Private Cost Ratio (PCR / %)	0.395
Comparative Advantages:	
1. Social Benefits (SP / Rp)	140.298.375
2. Domestic Resource Cost Ratio (DRCR / %)	0.387
Impact of Input Policy:	
1. Input Transfer (IT / Rp)	(20.420.000)
2. Factor Transfer (FT / Rp)	3.300.000
3. Nominal Input Protection Coefficient (NPCI / %)	0.923
Impact of Output Policy:	
1. Nominal Output Protection Coefficient (NPCO / %)	0.966
2. Transfer Output (TO / Rp)	(16.800.000)
Impact of Input-Output Policy:	
1. Net Transfer (NT / Rp)	320.000
2. Effective Protection Coefficient (EPC / %)	1.016
3. Profit Coefficient (PC / %)	320.000
4. Subsidy Ratio Producer (SRP / %)	0.001

Source: Primary data (processed).

The indicator of private profit or net income (PP) was 140.618.375 Because the value was greater than zero, it meant that the skipjack fishery business generated profits for fishermen and was worthy of effort. It is expected that fishermen can reduce the business production costs so as to increase business

profits. To realize this, one of the Jayapura City's local government policies should be concerned with providing fuel subsidies, providing welfare assistance.

Private cost ratio (PCR) is the ratio of the domestic costs to added values in private prices. The PCR value is used as an indicator of competitive advantage. The PCR value of 0.395 means that skipjack fisheries business in Jayapura City had high competitiveness and could compete with the fish produced by other countries. The findings of Hayandani et al., [7] showed that the PCR values of 0.49 pellet feed and 0.30 alternative feed had comparative and competitive advantages. This commodity had a competitive advantage as reflected in the product being marketed in the international market.

3.3. Analysis of Comparative Advantage (SP and DRCR)

The social benefit value (SP) was Rp.140.298.375 or positive, meaning that the skipjack fishery business produced economic benefits. Another meaning is that the business could compete with other skipjack fisheries businesses. These benefits were obtained without intervention from the Jayapura City government policies.

The research results showed that the DRCR value was 0.387, meaning that skipjack fisheries business in Jayapura City did not only show economic efficiencies and comparative advantages, but also it had competitiveness which was suitable for export. The data showed that the amount of the skipjack tuna export in Jayapura City in 2015 reached 364.86 tons [5]. The findings of McGilliard et al., [13] showed that the optimal DRC value of 90% of cumulative catches was based on optimal fishing rules (CER). The study of Kaliba & Engle [9] indicated that the DRC value of catfish culture was below average. The difference explains that skipjack have a good economic value, superiority and competitiveness which are higher than catfish.

The strategy to increase regional competitiveness, according to Budiharsono [2], is by encouraging the use of innovation and creativity. The rescue strategies and the development of Indonesian tuna fisheries, according to Kusumastanto [10], should be performed by: 1) overcoming the problems of illegal fishing, licensing, vision and mission; 2) revising less populist policies; 3) having a coordinating agency that deals with tuna issues in a comprehensive and systemic manner; 4) increasing Indonesia's participation in regional fisheries; 5) developing the upstream-downstream integrated concept; 6) building industrial cooperation with other countries.

The ways to improve the competitiveness of Indonesian tuna, according to Sunoko & Huang [23], are by: a) building capacity, b) increasing compliance with conservation and management of tuna RFMOs measures, c) strengthening data collection, d) developing its products to improve quality, diversify the products, and enhance international cooperation. In order to achieve the competitiveness of fishery products, the government can provide incentives in the form of providing agricultural technology to improve the production and processing [18].

3.4. Analysis of the Government Policy on Inputs (NPCI and FT)

The indicator value of the input transfer (IT) was Rp -20.420.000, this means that the policy in the form of subsidies to input resulted in a decrease in costs borne by fishermen at the level of private prices compared to social prices. The impact of this policy was to provide benefits to local fishermen.

The NPCI value of 0.923 means that farmers received subsidies for foreign inputs so that they could buy at a lower price. A research by Oluwasola et al., [17] found that the value of NPCI was 0.979. According to Mobasser et al., [14], if the NPCI value is > 1, then the tradable input cost is higher at the private price than the social price. This means that the policy of subsidizing fuel input by the government was for the fishermen to be able to buy fuel at a lower price compared to other industries.

The value of transfer factor (FT) was Rp.3.300.000 This means that there was no government policy on non-tradable inputs used by fishermen. Based on the findings of Fajriah et al., [6], the FT value was Rp.-622.774. The difference in findings was caused by the indecisiveness of the Kendari City Government to crack down on shipowners who paid regional minimum wages (UMR) under Kendari City standards. The conditions were different in Jayapura City, where the amount of UMR was higher at Rp.491.068 compared to Kendari in 2017. The Regional Government of Jayapura City is very strict in cracking down on fisheries entrepreneurs who do not pay UMR according to local regulations.

3.5. Analysis of the Government Policy on Outputs (NPCO and TO)

The NPCO value of 0.966 means that the price of local skipjack fish was lower than the price on the international market. This is due to the policies of the central and regional governments to provide subsidies for inputs used by local fishermen. Based on the findings of Fajriah et al., [6], the NPC value of skipjack was 0.65. The implication of the two studies illustrates that the local government policies in protecting local fishermen had not been effective and had an effect on low business incomes.

The output transfer value (TO) was Rp.-16.800.000. This means that the private income of the fishermen was lower than the revenue that should have been obtained if the market had not experienced distortion or there was a transfer of output from producer to consumer amounting to Rp.-16.800.000. The implication is that the price of the local skipjack fish was lower than the condition before the commodity price policy issued by the government. Another implication is that the decline in the welfare of fishermen was due to the decline in the price of skipjack tuna.

3.6. Government Policy on Input-Outputs (NT and EPC)

A net transfer (NT) value is one indicator to see inefficiencies in the fisheries system. The NT value of Rp.320.000 means that the impact of the government policy on providing fisheries incentives for local fishermen resulted in an increase in producer surplus of Rp.320.000.

The EPC value was 1.016, meaning that the local government provided protection for local fishermen. Hayandani et al., [7] confirmed the findings of the study where the EPC value was 2.31 for catfish pellet feed. The findings of the study illustrated that there were differences in the selling prices of imported skipjack tuna and catfish with the local fish prices, and there were subsidies for tradable inputs.

4. Conclusion

The results of the competitiveness analysis of skipjack tuna using the PAM method showed that the indicator values of PCR and DRC were 0.395 and 0.387 respectively. The value of PP was Rp.140.618.375 and the value of SP was Rp.140.298.375. The indicators of PCR and DRC showed that skipjack fish produced profits for fishermen and had comparative advantages. Another advantage was that the skipjack fishery business using mini purse seine was very competitive compared to other regional and international tuna production methods. The competitiveness of the skipjack tuna production in Jayapura City was the impact of the preservation policy of the skipjack price at the level of collectors. Government policies relating to input-output prices have resulted in higher profits received by fishermen (private) than those received by (social).

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