Analysis of Income Disparity Fishermen in Papua Barat Daya Regency

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ABSTRACT

This study analyses income disparity between fishermen and mangrove crab fishermen in Papua Barat Daya Village, Papua Barat Regency. Quantita-tive methods were used with descriptive analysis and statistical tests, in-cluding the Gini Index and two-sample independent t-test. Data were col-lected from 50 fishermen and 50 mangrove crab fishermen through ques-tionnaires related to their monthly income. The results showed that the av-erage income of fishermen was IDR 6.13 million higher than the average in-come of mangrove crab fishermen of IDR 5.26 million. The Gini Index anal-ysis showed a value of 0.32 for fishermen and 0.45 for mangrove crab fish-ermen, indicating greater income inequality among mangrove crab fishermen. The two-sample independent t-test showed that the difference in in-come between the two groups of fishermen was statistically significant ($p < 0.05$). This study concludes that there is significant inequality in income between fishermen and mangrove crab fishermen, with higher inequality oc-curring in mangrove crab fishermen. Policy recommendations to reduce this inequality include improving market access, cultivation technology, and government intervention to support the welfare of fishermen in the man-grove crab sector.

INTRODUCTION

Papua Barat Daya Village in Papua Barat Regency is known as a coastal area with enormous economic potential, especially through the utilization of marine natural resources and the surrounding ecosystem. One of the natural resources that has signif-icant economic and environmental value in this area is mangrove forests. Mangrove forests not only play an important role in maintaining the balance of coastal ecosys-tems but also have economic potential that can support the welfare of the local com-munity [1]. However, the economic potential of mangrove forests in Papua Barat Daya has not been optimally managed until now, and there are many challenges faced in its management. The mangrove forests in Papua Barat Daya Village not only function as natural pro-tection for the coast from abrasion and flooding, but also serve as an important habi-tat for various marine species, including crabs, shrimp, and fish. A healthy mangrove ecosystem creates an ideal environment for the breeding of marine fauna with high economic value. In recent years, mangrove crabs have become one of the leading commodities produced by the Papua Barat Daya community. Fishermen in this area utilize mangrove crabs to increase their income, especially with the high market de-mand for fishery products from the mangrove ecosystem [2].

According to reports received from local communities, the fisheries sector, especially related to mangrove crab cultivation, has made a significant contribution to the vil-lage economy. However, the low level of technology applied, as well as limited ac-cess to wider markets, are the main obstacles in

developing this economic potential. Traditional mangrove crab cultivation faces various challenges, including the decline in habitat quality due to pollution and overfishing. Furthermore, the cultivation methods used by fishermen are often inefficient, resulting in low productivity and inconsistent product quality. Therefore, better mangrove forest management and the application of appropriate technology are needed to optimize this economic potential [3]. In addition to mangrove crabs, another economic potential of the mangrove forest in Papua Barat Daya Village is as a source of raw materials for various marine-based products. For example, derivative products from mangrove forests such as mangrove honey, as well as medicinal plants and mangrove-based cosmetics are increasingly gaining attention in local and global markets. These products have significant eco-nomic value if managed and developed properly [4]. Unfortunately, limited knowledge and technology in utilizing this natural resource means that the Papua Barat Daya community has not been able to fully access the economic benefits of the mangrove forest they have.

From an environmental perspective, mangrove forests in Papua Barat Daya also play an important role in mitigating climate change, especially through carbon storage. Mangrove forests are able to absorb large amounts of carbon, so they have the poten-tial to be utilized as part of a carbon credit program [5]. Such programs can provide additional economic benefits to local communities through incentive schemes for environmental conservation. However, there has been no real initiative to integrate the carbon economy potential of mangrove forests with environmental conservation pro-grams at the local level. Therefore, the role of government and non-governmental organizations (NGOs) in facilitating such initiatives is very important. One of the main challenges in developing the economic potential of mangrove forests in Papua Barat Daya Village is the lack of infrastructure and transportation access. Limited road access makes it difficult for people to move around, especially in dis-tributing marine and mangrove products to larger markets. Currently, the Papua Barat Daya community relies on water transportation routes, which are not only slower but also increase logistics costs. This dependence on water transportation also makes access to wider markets difficult, so that product selling prices are often low and un-stable. Therefore, improving infrastructure is one of the main priorities to support the development of the economic potential of mangrove forests in this area. The devel-opment of the economic potential of mangrove forests in Papua Barat Daya Village must also be carried out with a sustainable approach. Environmental sustainability must be one of the main pillars in this effort, considering the importance of mangrove ecosystems in maintaining the balance of nature in coastal areas [6]. In recent years, environmental damage due to human activities, including land clearing for infrastruc-ture and agricultural development, has caused a decrease in the area of mangrove for-ests in several regions in Indonesia, including in Papua Barat Regency. Therefore, programs that prioritize mangrove forest conservation, while still developing its eco-nomic potential, are urgently needed [4].

At the policy level, government support in sustainable mangrove forest management is also key to success. Local governments can play an important role in formulating policies that support local communities to manage mangrove forests optimally, both economically and environmentally. One

important step that can be taken is to provide training and education for local communities on environmentally friendly cultivation techniques and sustainable mangrove forest management. Thus, the community can better understand the importance of maintaining the mangrove ecosystem while utilizing its economic potential [7]. Furthermore, collaboration between the government, academics, and the private sector can also be a catalyst in developing the economic potential of mangrove forests in Papua Barat Daya Village. The private sector, especially companies engaged in fisher-ies and marine-based products, can be strategic partners in supporting the develop-ment of mangrove-based industries. Meanwhile, academics can play a role in conduct-ing research and technological innovation needed to increase the productivity and efficiency of mangrove forest utilization [8]. This multi-stakeholder approach is ex-pected to create positive synergy in supporting sustainable economic development in this region.

Overall, the mangrove forests in Papua Barat Daya Village have great economic po-tential if managed properly. The development of the mangrove ecosystem-based fish-eries sector, infrastructure improvement, and the involvement of various stakeholders are key steps that must be taken to optimize this potential [4], [9], [10], [3]. With an integrated and sustainable approach, the mangrove forests in Papua Barat Daya Vil-lage will not only be a source of income for local communities, but will also contrib-ute to environmental conservation and the welfare of coastal communities in Papua Barat Regency. This study is a quantitative descriptive and explanatory study that aims to measure income inequality between two groups of people, namely fishermen and mangrove crab fishermen. The inequality analysis used in this study includes inequality indices such as the Gini Index and income distribution between the two groups.

RESEARCH METHOD

The inequality analysis used in this study includes inequal-ity indices such as the Gini Index and income distribution between the two groups. The population of this study is all fishermen and mangrove crab fishermen in Papua Barat Daya Village. A purposive sampling technique was used to take samples from both groups. Each group will consist of around 30-40 respondents randomly selected from the population of fishermen and mangrove crab fishermen. The main Variable of this research is fishermen's income: Measured in Rupiah per month from the sale of and Mangrove crab fishermen's income: Measured in Rupiah per month from the sale of mangrove crab. Supporting Variables is number of catches/productions: Number of mangrove crab catches and the amount of produced. Market access: Distance and frequency of seafood distribution to the market. Capital and technology: Level of investment and use of technology in crab or cultivation.

Primary data, using questionnaires to obtain income data for and mangrove crab fishermen will be collected through questionnaires asking about monthly income, production costs, market access, and use of technology [12]. In-depth interviews will be conducted to obtain additional information on factors that influence fishermen's income, such as challenges in distribution or access to markets. Secondary data

sourced from the fisheries office related to income statistics and the number of fish-ermen and village economic reports. This study uses several inequality analysis techniques: The use of the Gini Index is used to determine the level of income inequality within each group, as well as overall between the two groups. Calculation Method:

$$G = 1 - \sum (X_i - X_{i-1})(Y_i + Y_{i-1})$$

Where X is the cumulative percentage of fishermen and Y is the cumulative percentage of income. Independent Two Sample T-Test Analysis was used to compare the average income between fishermen and mangrove crab fishermen to see if there is a statistically sig-nificant difference. An independent two sample t-test is used to test whether the difference in income between the two groups is statistically significant.

RESULTS AND DISCUSSION

Descriptive Analysis of and Mangrove Crab Fishermen's Income

From the table 1, the income of fishermen and mangrove crab fishermen in Papua Barat Daya Village varies significantly. The following are the results of the descriptive analysis of the two groups of fishermen:

Table 1. Average Income of and Mangrove Crab Fishermen's

No	Fishermen	Average Income (Rp)	Highest Income	Lowest Income
1	Fishermen	6.125.000	8.475.000	3.074.000
2	Mangrove Crab Fishermen	5.260.000	8.908.000	1.353.000

Source: Data Processed (2024)

From the data above, the average income of fishermen is higher than the average income of mangrove crab fishermen. However, there are mangrove crab fishermen with the highest income that exceeds fishermen. This shows that there is a large variation in income between the two groups of fishermen. 2. Gini Index

By using the Gini Index to measure the inequality of income distribution between the two groups of fishermen, we found that:

Table 2. Gini Index

No	Fishermen	Gini Index
1	Fishermen	0.32
2	Mangrove Crab Fishermen	0.45

Source: Data Processed (2024)

The Gini index ranges from 0 (perfect inequality, where all individuals have the same income) to 1 (maximal inequality, where one individual has all the income). From the results above, mangrove crab fishermen have higher income inequality compared to fishermen. This means that the distribution of income among mangrove crab fishermen tends to be more uneven than fishermen. 4. Independent Two-Sample t-Test

To determine whether there is a significant difference between the average income of fishermen and mangrove crab fishermen, an independent two-sample t-test was conducted. The results of the t-test show:

Table 3. T-Test

Variable (Pair1)	t	Df	Sig (2 Tailed)
Fishermen-Mangrove Crab Fishermen	2,38	49	0.022

Source: Data Processed (2024)

Since the p-value is less than 0.05, it can be concluded that there is a statistically significant difference between the average income of fishermen and mangrove crab fishermen. In other words, fishermen have a significantly higher average income compared to mangrove crab fishermen.

CONCLUSION

Fishermen tend to have higher incomes than mangrove crab fishermen. This can be caused by several factors, such as differences in production costs, access to markets, or more efficient cultivation techniques in the sector. On the other hand, the income of mangrove crab fishermen is more diverse and une-ven. This shows that there are fishermen who are very successful, but there are also those with very low incomes.

The high Gini Index of mangrove crab fishermen (0.45) indicates that there is greater inequality in the distribution of income in this sector. Some fishermen have high yields, but most fishermen are in the low-income group. Possible factors that play a role are reliance on access to markets, more traditional fishing techniques, or reliance on fluctuating natural conditions. Meanwhile, the lower Gini Index of fishermen (0.32) indicates a more equal distribution of income. This could be due to the stabil-ity of the sector, where cultivation management may be more standardized compared to the mangrove crab sector. Factors Influencing Inequality, market access mangrove crab fishermen may have more limited market access than fishermen. The market for mangrove crab may be more focused on a few specific markets, while may have a broader market, both domestically and for export. Technology and Capital: fish-ermen may have access to better technology or capital in cultivation, allowing them to achieve more stable productivity. Meanwhile, mangrove crab fishermen who use traditional methods may experience more fluctuating yields, depending on environ-mental conditions.

The results of this study can be a basis for local governments or other stakeholders to address income inequality among mangrove crab fishermen. For example, programs to improve market access, training in more modern crab farming techniques, or providing access to capital can help reduce this inequality. On the other hand, although inequality in the sector is lower, market and technology strengthening programs can also help increase fishermen's incomes further.

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