Asian Journal of Aquatic Sciences, April 2024. Vol 7, Issue (1) 88-93
e-issn: 2716-4608
p-issn: 2655-366X

SUSTAINABILITY STATUS OF TRAP FISHERIES IN THE SOUTHERN PART OF RANGSANG ISLAND

Arthur Brown[1*], Valentine Vanda Simamora[1], Alit Hindri Yani[1]
[1]Department of Utilization of Fishery Resources, Faculty of Fisheries and Marine, Universitas Riau, Pekanbaru, 28293 Indonesia
*arthur.brown@lecturer.unri.ac.id

ABSTRACT

On Rangsang Island, many still work as fishermen or depend on the sea, especially in the southern part of Rangsang Island. Fishermen in the south part of Rangsang Island still use a lot of traditional fishing gear, such as the grinder. The polluted waters on Rangsang Island and destructive technology will impact the fishermen's fishing economy. This study aims to determine and assess the sustainability of fishing gear in terms of ecological, economic, and technological aspects in the southern part of Rangsang Island using the rapfish technique. The method used was a survey method, and the sampling used a purposive sampling technique. The analysis of the rapfish technique found that sustainability in the ecological dimension was 33.53% or less sustainable. In the economic dimension, it was 36.01% or less sustainable. In comparison, it was 76.71% sustainable in the technological dimension.

Keywords: Capture fishery, Rangsang Island, Sustainability

1. INTRODUCTION

Rangsang Island is one of the main islands in the Meranti Islands Regency and consists of three sub-districts: West Rangsang, Rangsang Pesisir, and Rangsang[1]. On Rangsang Island, many still work as fishermen or depend on the sea, especially in the southern part of Rangsang Island. Fishermen in the south part of Rangsang Island still use a lot of traditional fishing gear; one example of conventional fishing gear is pengerih.

Fishermen who use pengerih fishing gear in the southern part of Rangsang Island are still classified as small-scale fisheries. According to Halim et al.[2], small-scale fisheries or artisanal fisheries as traditional fisheries involve fishing households (as opposed to commercial companies), using relatively small capital and labor, using conventional fishing materials and tools, relatively small fishing boats (if any), short fishing trips, near the coast, mainly for local consumption.

Rangsang Island has experienced overfishing[3]. This may be caused by the use of technology that is not selective. According to Fitra[4], Curler fishing gear is non-selective in size and type.

In addition, the waters in southern Rangsang Island have been polluted due to the disposal of sago waste by the sago factory industry[5]. According to Yusmaida et al.[6], Polluted waters due to sago waste entering the aquatic environment of Southern Rangsang Island will impact transportation routes and fishing grounds.

Impact on transportation routes and fishing areas for local fishermen. Then, it is on the southern part of Rangsang Island that abrasion occurs yearly; according to residents, the abrasion rate on Rangsang Island is 12 m / year. As a result of the pollution of the waters of southern Rangsang Island, abrasion will impact the fishermen's economy. If the fishing area is disturbed, fishermen's catch decreases, and the income generated by fishermen

Received : 24 January 2024
Accepted : 20 March 2024

decreases so that it cannot meet the needs of fishermen's lives.

Therefore, the researcher wants to see the sustainability status of the drift gillnet fishery in the southern part of Rangsang Island. What is meant by sustainability status is a human condition towards the balance of the human ecosystem itself. According to Yusuf et al.[7], regarding sustainability status, it is necessary to take a holistic approach, which is an approach that accommodates various aspects. This study used three aspects to determine Rangsang Island's sustainability status: ecological, economic, and technological. Then, the sustainability status of multi-aspect capture fisheries will be analyzed using Rapfish (Rapid Appraisal for Fisheries) analysis. This study aims to determine and assess the sustainability of fishing gear in terms of ecological, economic, and technological aspects in the southern part of Rangsang Island using the rapfish technique.

2. RESEARCH METHOD

Time and Place

This research was conducted from June 28 to July 15, 2022, in Bantar Village, Tanah Sialang Pasung Village, Beting Village, Rangsang Island, Meranti Islands Regency, Riau Province.

Methods

This research was conducted using a survey method, namely direct observation of the field in the southern part of Rangsang Island. The sampling technique used in this study was purposive sampling. Purposive sampling is a sampling technique from population representatives, where the number of respondents taken represents the research interests (key respondents).

Data analysis

Data analysis in this study used the Rapfish (Rapid Appraisal for Fisheries) technique. This technique was developed by the University of British Columbia, Canada, and is used to evaluate the sustainability of fisheries in a multidisciplinary manner.

3. RESULT AND DISCUSSION

Sustainability Status of Dredger Capture Fisheries

This study aims to determine the sustainability status of small-scale capture fisheries on Rangsang Island. First, it must create profitable capture fisheries activities and processing of capture fisheries resources to create a good life for small-scale capture fishermen. It can also ensure the sustainability of the aquatic environment and natural resources that support activities in the capture fisheries sector. In this case, it is seen from various dimensional points of view. It consists of several attributes that analyze the sustainability of capture fisheries in the southern part of Rangsang Island. So, in this analysis, 3 dimensions and their characteristics are proposed in assessing the sustainability status of the drift gillnet fishery in the southern part of Rangsang Island.

Ecological Dimension

This dimension reflects the good or bad quality of the capture fisheries environment and resources and their natural processes, which may or may not sustainably support any economic activities carried out in the capture fisheries sector.

The ecological aspect sustainability index obtained an ordination value of 33.53%, categorized as less sustainable. The ordination value describes the condition of Rangsang Island waters experiencing pressure from the ecological side. According to Mahida[8], if the position of the value of 33.53% is below the value of 0 on the x and y axes. Statistically, this indicates a decrease in a less sustainable status and describes the condition of the waters of Rangsang Island under pressure from an ecological perspective.

e-issn: 2716-4608
p-issn: 2655-366X

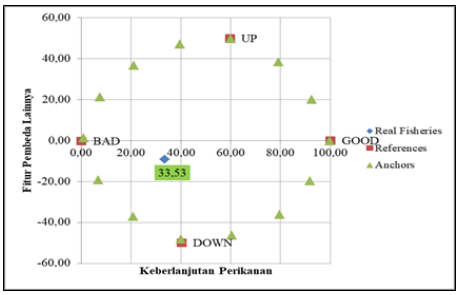

Figure 1. Ordination Value of the Ecological Dimension of the Trap

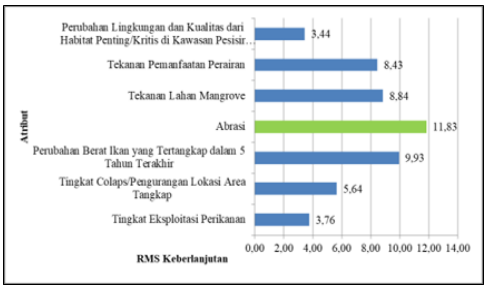

Figure 2. Leverage Dimensions of the Ecological Trap.

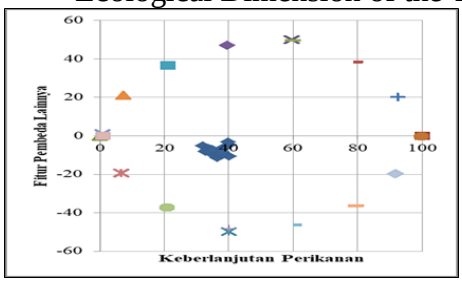

Figure 3. Trap Ecology Monte Carlo Analysis Plot

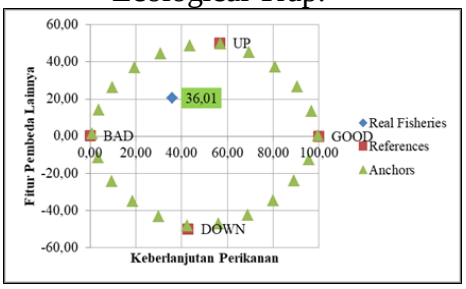

Figure 4. Trap Economic Dimension Ordination Values.

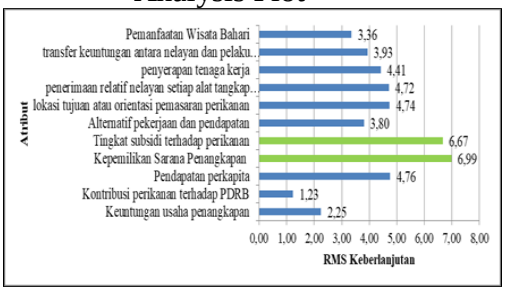

Figure 5. The Economic Dimension of Pengerih

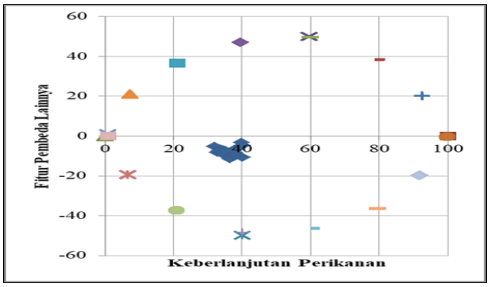

Figure 6. Economic Monte Carlo Analysis Plot of Pengerih

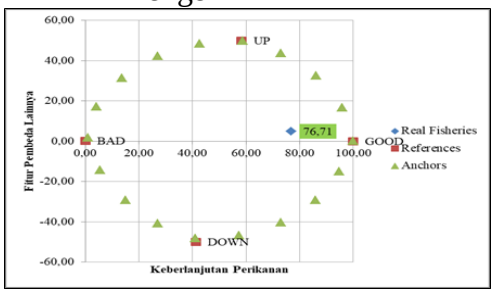

Figure 7. Technology Dimension Ordination Score Pengerih

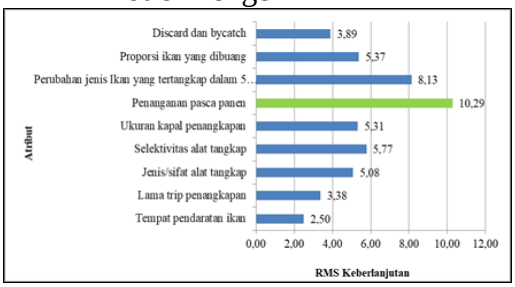

Figure 8. Technology Dimension Leverage of Pengerih

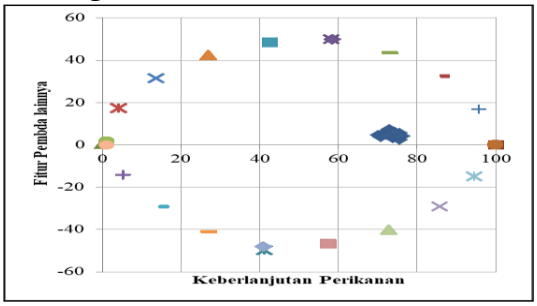

Figure 9. Technology Monte Carlo Analysis Plot of Pengerih

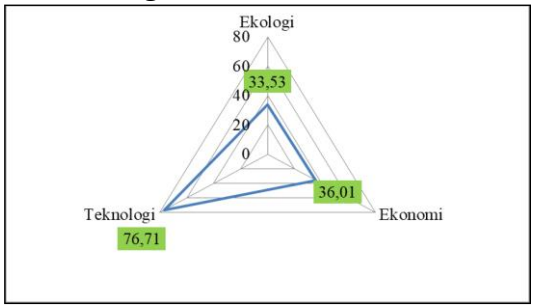

Figure 10. Sustainability Value Kite Graph of Pengerih

The leverage analysis used to determine the leverage attributes in ecological aspects can be seen in Figure 2. The output of the leverage of attribute analysis for ecological aspects is that one attribute is the most sensitive factor on Rangsang Island, namely abrasion.

According to Fitriani & Meiwanda[9], the most extended length of coastal shrinkage on Rangsang Island was between 1998 and 2004, reaching ±116 ha/year. This impacts the income of fishermen, who are reduced due to this abrasion disaster because if this abrasion disaster occurs, the community cannot go to sea. The Kepulauan Meranti Regency Public Works Office, in understanding disaster risk, proposes the physical development of disaster management such as geronjong stones and breakwaters every year based on input from related actors, namely BPBD, Head of Border Affairs, DLH in overcoming abrasion disasters. In proposing disaster management to the province through BAPPEDA. Monte Carlo analysis in the ecological dimension shows that visually, the replication points are pretty good, where the index distance between Monte Carlo values is not much different from the value of the sustainability analysis rap ordination.

Figure 3 explains that the difference between Monte Carlo and ordination analysis of 1.46% is quite good because, according to Kavanagh & Pitcher in Abdullah et al.[10], attributes that affect ordination by more than 8% can no longer be indicators that show the actual multivariate situation.

Economic Dimension

This dimension reflects whether or not a capture fisheries resource utilization activity can obtain results that can economically run in the long term and be sustainable. The economic aspect of the sustainability index obtained an ordination value of 36.01%, categorized as less sustainable. The ordination value describes the condition of Rangsang Island waters experiencing pressure from the ecological side. According to Mahida[8], if the position of the value of 36.01% is below the value of 0 on the x and y axes. Statistically, this indicates a decrease in a less sustainable status and illustrates that the sustainability status of capture fisheries on Rangsang Island is experiencing pressure on the economic aspect. The output of the leverage of attribute analysis for ecological elements is that two attributes are the most sensitive factors on Rangsang Island: Ownership of fishing gear and subsidy level (Figure 5).

Ownership of fishing gear by fishermen on Rangsang Island needs to be improved, as many fishermen's fishing gear is partly severely damaged, so net fishing gear can no longer be used. Fishermen sometimes need the capital to buy new fishing gear. Then, the distance of the fish landing site in the village of Beting and the need for ice cube supplies for handling catches reduce the quality of fish. For this reason, the government, especially the Kepulauan Meranti Fisheries and Marine Service, pays more attention to fishermen by providing subsidized assistance in the form of fishing gear or by helping to build a dock close to the fishermen's fishing ground.

Monte Carlo's analysis of the ecological dimension shows that the replicate points are pretty good visually. In contrast, the index distance between Monte Carlo values differs significantly from the sustainability analysis rap ordination value. Figure 6 explains that the difference between Monte Carlo and ordination analysis of 1.12% is quite good because, according to Kavanagh and Pitcher in Abdullah et al.[10], attributes that affect ordination by more than 8% can no longer be an indicator that shows the actual multivariate situation.

Technology Dimension

This dimension reflects the degree of utilization of captured fisheries' resources using technology. Good technology can increasingly support any economic activity

in the capture fisheries sector in the long term and sustainably. The sustainability index of the technology aspect obtained an ordination value of 76.71%, categorized as sustainable. This explains that the sustainability of the existing gear technology on Rangsang Island is good.

The leverage analysis used to determine the leverage attributes in the technology aspect can be seen in Figure 8. The leverage of attribute analysis for the technology aspect shows that there is 1 main leveraging attribute for sustainability: post-harvest handling. Fine net fishermen in Beting Village, Rangsang Island, carry out post-harvest handling using ice cubes. The action of post-harvest handling using ice cubes is appropriate. Still, the ice cubes brought by fine net fishermen are very few because the cost of ice cubes is relatively high, so the fish landing place is quite far away, reducing the catch's quality value. This needs to be considered by the government and related agencies to assist fishermen, such as freezer box assistance.

Monte Carlo's analysis of the ecological dimension shows that the replication points are visually pleasing visually. In contrast, the index distance between Monte Carlo values is not much different from the value of the sustainability analysis program.

Figure 9 explains that the difference between Monte Carlo and ordination analysis of 3.37% is quite good because, according to Kavanagh & Pitcher in Abdullah et al.[10], attributes that affect ordination by more than 8% can no longer be indicators that show the actual multivariate situation.

Figure 10 displays a kite diagram that illustrates the criteria of the 3 dimensions at once. The kite diagram depicts a score from 0%-100% with an interval of 25%, i.e., poor, fair, and reasonable; the more the index goes out, the better the sustainability status and vice versa. In the kite diagram, it can be seen that the overall index of drift gillnet fisheries in the southern part of Rangsang Island is in the interval of 25% to 75%, indicating that the sustainability status of drift gillnet fisheries is in a less sustainable status. The ecological and economic dimensions could be more sustainable. At the same time, the technological dimension is sustainable.

Table 1. Presents the Stress Values and R^2 (Coefficient of Determination) for each Dimension, which is Multidimensional.

No	Attributes	Ordinasi Value	Stress Value	R^2	Number of Iterations
1	Ecology	33,53	0,140880	0,929592	2
2	Economy	36,01	0,135146	0,947683	2
3	Technology	76,71	0,143369	0,924562	3

Based on Table 1, each dimension has a stress value much smaller than the provisions. According to Yusuf et al.[7], the stress value is acceptable because the S value is <0.25. The smaller the stress value obtained, the better the quality of the analysis results. In contrast to the coefficient of determination (R^2) value, the quality of the analysis results will be better if the R^2 value is more excellent or closer to 1. Thus, these two explanations, namely the stress value and R^2, show that all attributes used in the sustainability of curling nets in the southern part of Rangsang Island are good enough to explain the 3 dimensions being analyzed.

4. CONCLUSION

Conclusions drawn from this study include: Rapfish analysis can be used as an initial analysis to obtain a general and comprehensive overview of the sustainability status of capture fisheries in the research location. Judging from the results of the analysis of fishing gear for each dimension show that the ecological dimension has an index value of 35.05% (less sustainable), the economic dimension

has an index value of 36.01% (less sustainable), and the technological dimension has the highest index value of 76.71% (sustainable). Then, the most sensitive attributes are finally used to identify efforts (recommendations) that can be done to improve the sustainability of fisheries in the research location.

REFERENCES

1. Mufriadi. Analisis Pengambilan Keputusan dan Mitigasi terhadap Kerentanan Pantai (Studi Kasus : Pantai Pulau Rangsang, Kabupaten Kepulauan Meranti). *Jurnal APTEK*, 2019; 11(1):3-39.
2. Halim, A., Wiryawana, B., Loneragan, N.R., Hordyk, A., Sondita, M.F.A., White, A. T., Yunif, C. Merumuskan Defenisi Perikanan Skala Kecil untuk Mendukung Pengelolaan Perikanan Tangkap di Indonesia. *Journal of Fisheries and Marine Research*, 2020; 4(2): 239-262.
3. Isma, M.F. Analisa Bioekonomi Sumberdaya Alat Tangkap Ikan Pelagis di Kepulauan Meranti Provinsi Riau. *Jurnal Ilmiah Samudra Akuatika*, 2017; 1(1): 72-87.
4. Fitra, A.B. *Studi Teknologi Penangkapan Pengerih di Desa Teluk Kecamatan Kuala Kampar Kabupaten Pelalawan Provinsi Riau*. Fakultas Perikanan dan Kelautan. Universitas Riau. Pekanbaru, 2013.
5. Munawir, M. *Strategi Dinas Lingkungan Hidup dalam Penanganan Pencemaran Limbah Industri Sagu di Kecamatan Tebing Tinggi Timur Kabupaten Kepulauan Meranti*. Universitas Islam Riau. Pekanbaru, 2020.
6. Yusmaida, Y., Nasution, S., Karnila, R. Analisis Kualitas Perairan dan Ekonomi Masyarakat Nelayan pada Wilayah Pengolahan Sagu di Selat Asam Desa Mekarsari Kecamatan Merbau Kabupaten Kepulauan Meranti. *Jurnal Ilmu Lingkungan*, 2015; 9(2): 131-142
7. Yusuf, M., Wijaya, M., Surya, R.A., Taufik, I. *MDS-RAPS Teknik Analisis Keberlanjutan.* CV. Tohar Media. Makasar, 2021.
8. Mahida, M. Pendekatan Multidimensional Scaling untuk Penilaian Status Keberlanjutan ATCS Kota Pintar Semarang. *Warta Penelitian Perhubungan*, 2020; 32(2): 103-112.
9. Fitriani, F., Meiwanda, G. Disaster Governance: Bencana Abrasi di Kecamatan Rangsang Pesisir Kabupaten Kepulauan Meranti. *Journal of Public Administration and Local Governance*, 2021; 5(1): 1-14.
10. Abdullah, R.M., Wisudo, S.H., Monintja, D.R., Sondita, M.F.A. Keberlanjutan Perikanan Tangkap di Kota Ternate pada Dimensi Ekologi. *Buletin PSP*, 2011; 19(1).