

The Status of Sustainability of Anchovy Resources in the Labuhanbatu Territorial Waters, North Sumatra Province

by Trisla Warningsih

Submission date: 17-Apr-2021 09:48AM (UTC+0700)

Submission ID: 1561540732

File name: Status_Sustainability_Anchovi.pdf (1.35M)

Word count: 4535

Character count: 24116

PAPER · OPEN ACCESS

The Status of Sustainability of Anchovy Resources in the Labuhanbatu Territorial Waters, North Sumatra Province

¹¹
To cite this article: T Warningsih *et al* 2020 *IOP Conf. Ser.: Earth Environ. Sci.* **430** 012021

View the [article online](#) for updates and enhancements.



240th ECS Meeting ORLANDO, FL

Orange County Convention Center Oct 10-14, 2021

Abstract submission deadline extended: April 23rd

SUBMIT NOW

The Status of Sustainability of Anchovy Resources in the Labuhanbatu Territorial Waters, North Sumatra Province

T Warningsih*, H Hendrik, Y Suaseh
Department Socio Economic of Fisheries, Faculty of Fisheries and Marine Science, Universitas Riau, Pekanbaru, Indonesia
*Corresponding author: trisla.t.warningsih@lecturer.unri.ac.id

Abstract. This research was conducted in August 2017 to analyze the sustainability status of anchovy resources in the Labuhanbatu territorial waters. This study used a method of secondary data analysis and surveys with samples. The data were analyzed following Multi Dimensional Scaling (MDS) method through the RAPFISH (Rapid Assessment Technique for Fisheries) approach. Results indicate that the resources management in Labuhanbatu waters is less sustainable with the index value of 42.76 (<50)

Keywords: Sustainability, Labuhanbatu District, Anchovy

1. Introduction

One of the potential areas in North Sumatra rich of anchovy is the Labuhanbatu territorial waters, located on the East Coast of North Sumatra with an area of 2,561.38 km² facing the Malacca Strait. The area has 2 (two) watersheds, Barumon and Bilah, making it a considerable area for the capture of fishes.

Anchovy in Labuhanbatu territorial waters is mainly captured using trawls with one fishing fleet consisting of two 20 GT motorboats equipped with a 3 GT outboard motorboat. One single trip to capture anchovy usually lasts for two days and one night. The amount of anchovy caught in Labuhanbatu territorial waters is declining per year along with the decreasing effort of the fishermen [1]. This is allegedly due to the ban on the operation of trawls based on the regulation of the Minister of Maritime Affairs and Fisheries of Indonesia (PERMEN KP: 18 /PERMEN-KP/ 2013) [2] and massive exploitation.

If the decline is not immediately dealt with, the anchovy might be unsustainable. Sustaining the resources requires appropriate management, where the fish resources are maximally deployed without neglecting their sustainability. The fishery development, therefore, must be seen from various aspects as the activities only prioritizing one aspect while ignoring another can damage the ecosystem and eventually threaten the sustainability of resources. There are four sustainability aspects that should be taken into account: ecological sustainability (maintaining stocks/biomass and increasing ecosystem capacity and quality), socio-economic sustainability (the welfare of fishermen and related parties at the individual level), community sustainability (the welfare of community), and institutional sustainability (the sustainable and efficient administration) [3] [4].

A good fishery management is, therefore, necessary to maintain the sustainability of anchovy resources. This is to ensure abundant resources for sustainable fishery [5]. For this reason, a sustainability analysis of anchovy resources is needed to determine the sustainability status of anchovy in terms of ecological, economic, social, technological and institutional aspects by means of sustainability analysis (Rapfish).

This study aims to find out the index value and the sustainability status of Anchovy resources in Labuhanbatu Regency waters based on five dimensions of sustainability (ecology, economics, social, technological and institutional).



Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

2. Materials And Methods

2.1 Location and Time of Research

The research was conducted in August 2017 in the Labuhanbatu territorial waters, North Sumatra. Questionnaires were used to collect primary and secondary data. In addition, stationery and mobile phone were employed to record respondents during interviews, while camera was used to take pictures of the research field. Finally, the researchers used laptop to analyze the data.

2.2 Research Procedure

In this study, the results from secondary data analysis and surveys were examined. The primary and secondary data are related to the attributes of sustainability dimensions, namely: ecological dimensions (5 attributes), economics (6 attributes), social (8 attributes), technology (8 attributes) and institutions (6 attributes). The primary data were obtained from field observation and the results of interviews with 11 respondents selected using the following sampling formula [6][7].

$$n = \frac{NZ^2P(1 - P)}{Nd^2 + Z^2P(1 - P)}$$

In addition to respondents, institutions related to capture fisheries, including the Department of Marine and Fisheries of Labuhanbatu District, were also considered as the key informant in this study. The secondary data were obtained from relevant agencies such as the Central Bureau of Statistics (BPS), the Central Department of Marine and Fisheries, and the results from other related studies.

2.3 Data Analysis

The data were analyzed using the Rapfish (Rapid Assessment Technique for Fisheries) technique developed by Fisheries Center, University of British Columbia [8][9][10][11]. Below are the steps of analysis according to Rapfish:

- 1) Evaluating and determining attributes of the five dimensions.
- 2) Analyzing the fisheries data of Labuhanbatu territorial waters through statistics.
- 3) Analyzing the data from field observation and literature studies.
- 4) Scoring the sustainability of anchovy resources in Labuhanbatu waters.

Monte Carlo analysis should be carried out and replicated 25 times following the RAPFISH method to find the error value [8]. The Leverage analysis was done to find out any attributes sensitive to each dimension of sustainability employed in this study. In this analysis, the most sensitive attribute in each dimension was re-analyzed in a multidimensional manner to determine the sustainability status. The Stress value is able to measure how close the two-dimensional distance value is to the multidimensional one. The Stress value, symbolized by S, and the coefficient of determination (R²) were used in measuring the goodness of fit. A good analysis is indicated with low Stress value (S < 0.25) and high R² values [12].

The assessment of the overall attributes of each dimension of sustainability in the management of anchovy in Labuhanbatu waters is categorized into good, good enough, not good enough, and bad. Clear details of each category can be seen in Table 1.

Table 1. Sustainability Status Assessment Categories

No	Dimension	Index Value	Category Description
1	0.00 – 24.99	Bad	Not sustainable
2	25.00 – 49.99	Not good enough	Less sustainable
3	50.00 – 74.99	Good enough	Quite sustainable
4	75.00 – 100.00	Good	Sustainable

26 **3. Results And Discussion**

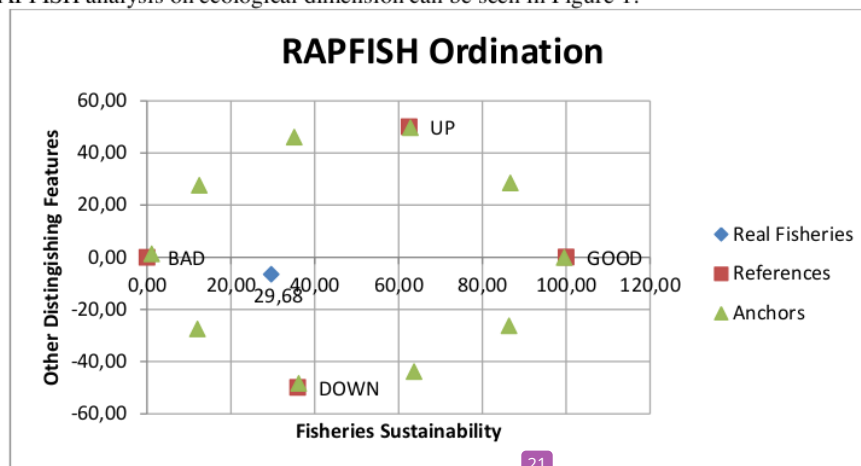
3.1 Ecological Dimension

The score of each attribute in the ecological dimension of anchovy resources can be seen in Table 2.

18 **Table 2.** Score of each attribute in the ecological sustainability dimension of anchovy resources

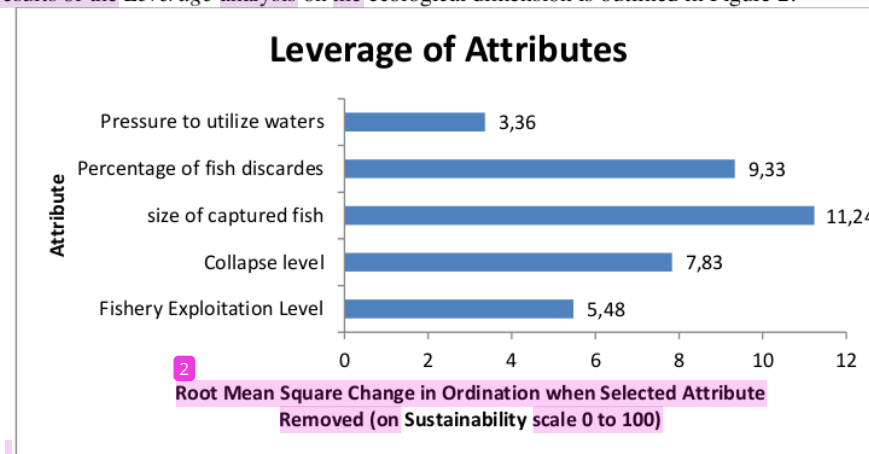
No	Indicator	Good	Bad	Score	Assessment Basis
1	Exploitation level	0	2	2	Bio-economic analysis
2	Collapse level	0	2	2	Modus value
3	Size of captured fish	0	2	1	Modus value
4	Percentage of fish discards	0	2	1	Modus value
5	Pressure to utilize waters	0	2	2	Modus value

RAPFISH analysis on ecological dimension can be seen in Figure 1.



21 **Figure 1.** Results of RAPFISH Analysis of Ecological Dimension

The results of the Leverage analysis on the ecological dimension is outlined in Figure 2.



2 **Figure 2.** Results of Leverage Analysis on the Ecological Dimension

6 Table 2 shows that Labuhanbatu territorial waters as a strategic coastal area located on the east coast of North Sumatra are the gateways of marine economic activity towards the Tanjung Balai Asahan and Belawan port in Medan. This means that the pressure of utilization of Labuhanbatu territorial waters is

undeniably high, not only due to the marine nature of the area, but also because of the great volume of economic activities originating from the mainland of Labuhanbatu district. The waters of Labuhanbatu district are densely packed with all economic activities, from being the site for fisheries, transportation, and industry to a place where waste is disposed from the land. This condition has direct implications for capturing fisheries activities as the fishing area is declining significantly, resulting in the lower volume of sea creatures being captured.

Furthermore, the restriction on the operation of trawls as regulated by the Minister of Maritime Affairs and Fisheries of Indonesia (PERMEN KP: 18/PERMEN-KP/2013) makes it even harder for fishermen to catch anchovy. Meanwhile, bio-economic analysis of anchovy resources shows that the percentage of actual effort compared to the level of effort in the MSY condition is 101.97 percent. The percentage over one hundred percent indicates that the actual value is greater than the optimal value of resources to be exploited. This means there has been more input (fishing trips) than what is deemed normal that directly impact on the output (the falling production of anchovy). It indicates that the exploitation of anchovy resources in Labuhanbatu territorial waters has exceeded the maximum sustainable potential (MSY), known as biological overfishing. Moreover, the addition of inputs does not align with the increase in output, signaling fishing inefficiency of anchovy in the territory. In other words, anchovy has been overexploited. The size of captured anchovies is also getting smaller than they were in the last ten years, and there was a significant reduction in fishing area in Labuhanbatu territorial waters due to the increasing waste disposal flowing from the mainland to the waters, which was also caused by the regulation of the Minister of Maritime Affairs and Fisheries of Indonesia (PERMEN KP: 18/PERMEN-KP/2013).

Figure 1 exhibits that the anchovy resources in Labuhanbatu waters are ecologically less sustainable (index value 29.68). In addition, Figure 2 explains three of the most sensitive attributes: the reduction rate of fishing area, the proportion of fish discarded, and the changes in the size of caught fish in the last 10 years.

3.2 Economic Dimension

Table 3 shows the results of assessment on each attribute within economic dimension for anchovy resources in the Labuhanbatu territorial waters.

Table 3. Score of each attribute in the economic sustainability dimensions of anchovy resources

No	Indicator	Good	Bad	Score	Assessment Basis
1	Profit	4	0	4	Bio-economic analysis
2	The fishery contribution towards PDRB	2	0	1	Percentage of PDRB fishery in comparison to the total of PDRB (BPS)
3	Ownership	2	0	1	Modus value
4	Other income	0	3	3	Modus value
5	Market orientation	0	2	0	Modus value
6	Employment	0	2	1	BPS Kabupaten Labuhanbatu

The results of RAPFISH analysis are laid out in Figure 3.

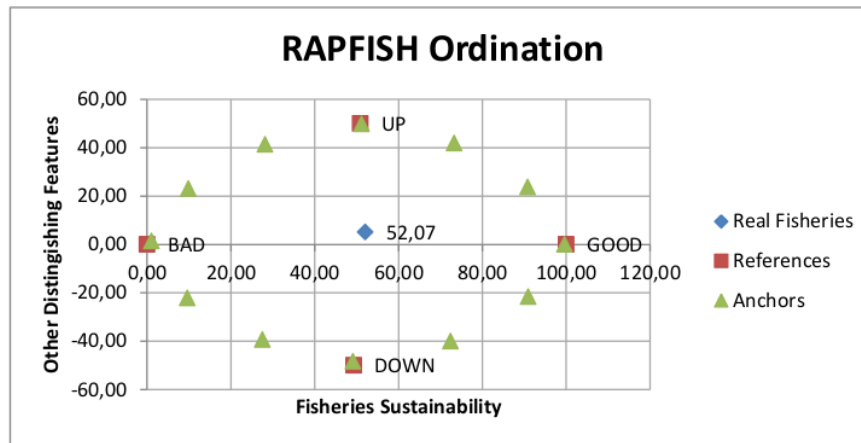


Figure 3. Results of the RAPFISH Analysis of Economic Dimension

Meanwhile, the results of leverage show that ‘Other income’ is the most sensitive attribute, as seen in Figure 4.

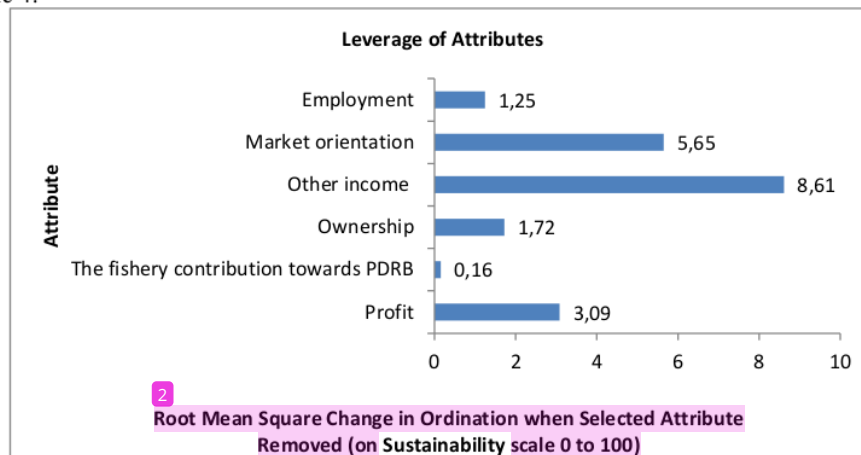


Figure 4. Results of Leverage Analysis on Economic Dimension

Based on bio-economic analysis as outlined in Table 3, the profit of anchovy business in actual condition is Rp. 447,805.860, while the profit at the time of MSY is Rp. 466,751.51 million. Looking at the contribution of the fisheries sector to the total GDP of Labuhanbatu district, which is very small and with a tendency to decline every year, the government of Labuhanbatu clearly does not consider marine and fisheries sector to be a priority in the overall development of the region. Based on data of Fisheries Households – the number of households employed in fishery sector – from 2007 to 2016 (10 years) as issued by the Central Statistics Agency of Labuhanbatu district, anchovy fisheries only contributed an average of 0.18% to the employment in Labuhanbatu District. It is also known that the fishing facilities for anchovy fishermen are mostly owned by local owners. Being fishermen is the main job of the people in the area. All anchovies are sold in the local market to meet the needs of people in Labuhanbatu.

Figure 3 shows that the economic dimension has a fairly sustainable status with an index value of 52.07. In addition, the most sensitive attribute after the Leverage analysis as shown in Figure 4 is ‘Other income’.

3.3 Social Dimension

Table 4 shows the results of assessment on each attribute within social dimension for anchovy resources in the Labuhanbatu territorial waters.

Table 4. Results of Assessment of Attributes within Social Dimensions of Anchovy Resources

No	Indicator	Good	Bad	Score	Assessment Basis
1	The growth rate of the number of fishermen in 10 years	0	2	0	BPS District Labuhanbatu
2	Knowledge	2	0	0.5	Modus value
3	Fishermen's level of education	2	0	0	Modus value
4	Status and conflict frequency	0	2	1	Modus value
5	Family participation	1	0	0	Modus value
6	Socialization of fishing	2	0	1	Modus value
7	Socialization frequency	3	0	2	Modus value
8	Fishermen's influence	2	0	0	Modus value

The results of the RAPFISH and Leverage analysis on the social dimension are outlined in Figure 5 and Figure 6.

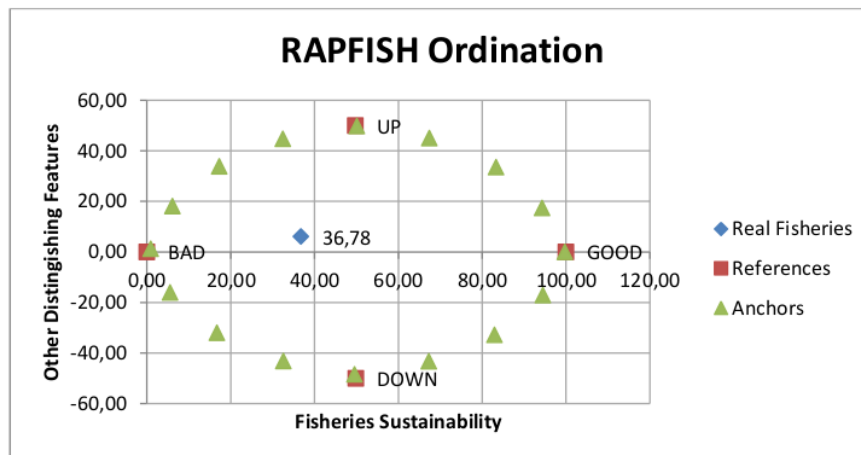


Figure 5. Results of RAPFISH Analysis of Social Dimension

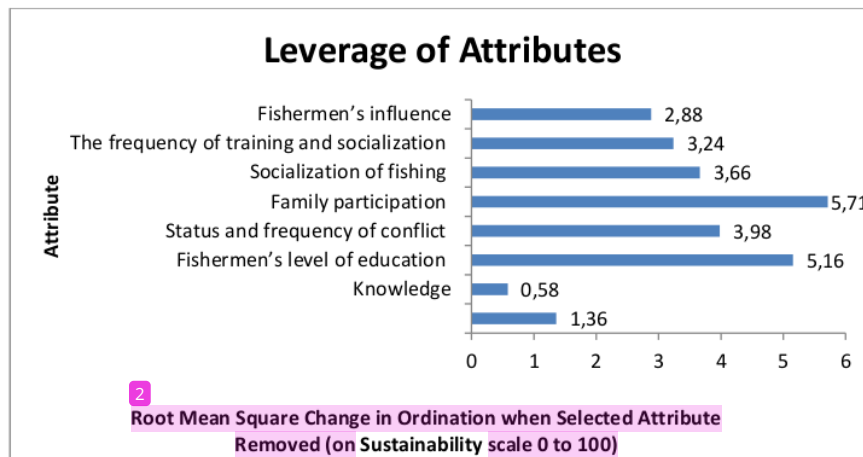


Figure 6. Results of the Leverage Analysis on Social Dimension

Data from the Central Statistics Agency of Labuhanbatu District show that the average growth rate of anchovy fishermen for the past ten years is -0.056. The smaller the number of people engages in fisheries, the smaller the need for fisheries resources (thus minimizing the sustainability of fisheries in the region [14]). Moreover, most fishermen only pass elementary school level. The low level of education is the primary cause of their limited understanding of environmental issues. It is rare for conflicts between locals or between locals and migrants to occur. Unfortunately, in most instances, almost none of family members involve in the anchovy business – most fishermen do not want children to follow their career. It is also uncommon for the anchovy fishermen to have meetings as most of them have formed a local joint business group (KUB).

The results of the analysis in Figure 5 show that the sustainability index value is 36.78 (categorized 'less sustainable'), while Figure 6 demonstrates three dominant attributes: family participation in fisheries resource utilization, fisherman level of education, and frequency of conflict status.

3.4 Technological Dimension

The results of assessment for each technological dimension attribute of anchovy resources are presented in Table 5.

Table 5. Results of assessment of each attribute of technological sustainability dimension of anchovy resources

No	Indicator	Good	Bad	Score	Assessment Basis
1	Places where to land captured fish	0	2	0	Direct observation
2	Length of fishing trip	0	2	1	Modus value
3	Types of fishing tools	0	2	2	Modus value
4	Selectivity of fishing tools	2	0	2	Modus value
5	Handling in vessel before fish being landed	3	0	2	Modus value
6	Size of fishing vessel	0	2	2	Modus value
7	The usage of destructive fishing tools	0	2	0	Modus value
8	Change in capture power	0	2	2	Modus value

The results of RAPFISH and Leverage analysis on the technological dimension can be seen in Figure 7 and Figure 8.

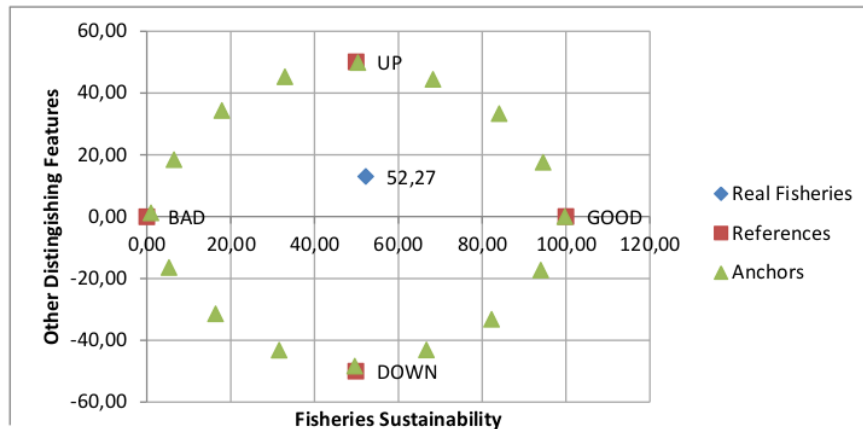


Figure 7. Results of RAPFISH Analysis on Technological Dimension

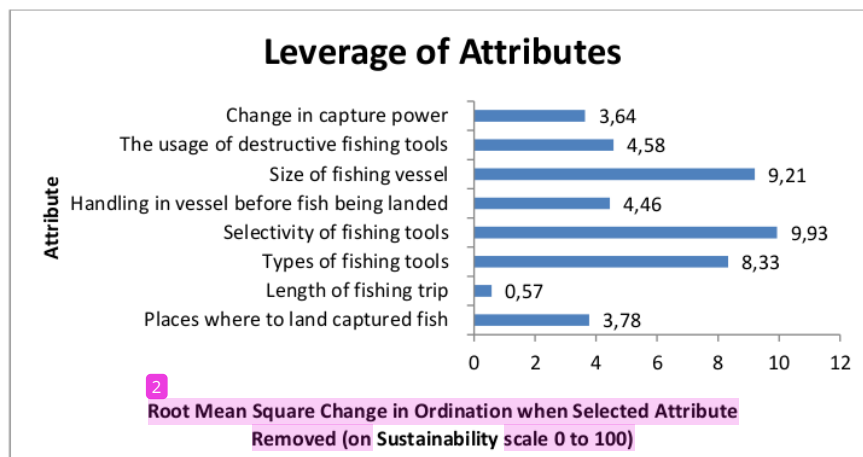


Figure 8. Results of the Leverage Analysis on Technological Dimension

The fishing tool actively used to capture anchovy is trawls, using 10 GT and 20 GT vessels and equipped with a 3 GT vessel. A single fishing trip lasts for two days and one night since fisheries activities in Labuhanbatu territorial waters are dominated by small-scale fishing businesses. Moreover, the usage of destructive auxiliary fishing tools is less common. Most fishermen sell anchovy the day after going back from the sea. The fish sold are dried anchovy because after being caught, the fish are cleaned, boiled using salt, drained and dried on the roof of fishing boats. 24

The results of the RAPFISH analysis on the technological dimensions outlined in Figure 7 show a sustainability index value of 52.27, which is in a fairly sustainable status. The most sensitive attributes based on the leverage analysis shown in Figure 8 are fishing vessel size, the selectivity of fishing tools, and kinds of fishing tools.

3.5 Institutional Dimension

Surveys and interviews with key informants reveal that the government of Labuhanbatu has sufficient formal regulations in fisheries management. The regulations, however, come from the Minister of Maritime Affairs and Fisheries Ministry so that fishermen have no position in the management of fisheries (just management). Meanwhile, illegal fishing sometimes occurs in Labuhanbatu territorial waters. The fishermen are also geographically and historically not close to one another in fisheries

management. Some fishermen have side jobs, such as selling groceries. Meanwhile, there have been formal institutions supporting fisheries resource management, but their influence is still minimal. The results of analysis in Figure 9 show the index value of 42.99 (less sustainable status), while the results of leverage analysis in Figure 10 reveal that the three most influential attributes are: the position of fishermen in fisheries business, other jobs outside fisheries, and illegal fishing. Table 6 details the assessment of attributes of institutional dimension.

Table 6. Results of assessment of each attribute within Sustainability Institutional Dimension

No	Indicator	Good	Bad	Score	Assessment Basis
1	The presence of formal regulation of fishery management	2	0	1	Secondary data, modus value from interviews with respondents
2	Just management	4	0	0	Modus value
3	Illegal fishing	0	2	1	Modus value
4	Adjacency and reliance	3	0	1	Direct observation, modus value
5	Alternatives	2	0	1	Modus value
6	Formal Institutional Role (DKP)	3	0	1	Direct observation, modus value

Figure 9 and Figure 10 detail the results of RAPFISH and Leverage analysis on the social dimension.

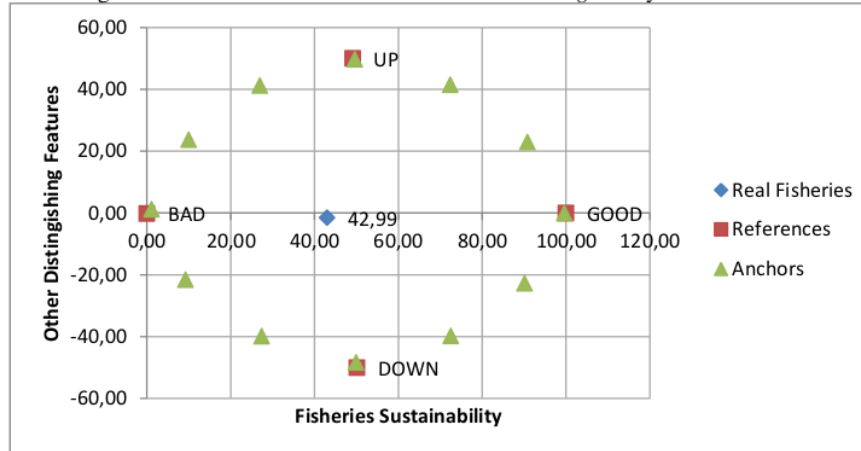


Figure 9. Results of the RAPFISH Analysis of Institutional Dimension

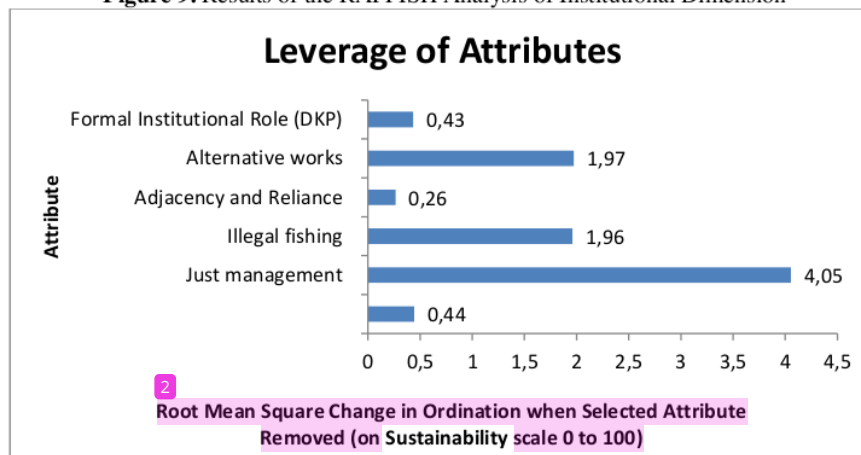


Figure 10. Results of the Leverage Analysis on Institutional Dimension

3.6 Results of Monte Carlo Analysis

The comparison between the sustainability index of MDS results and the results of Monte Carlo analysis is presented in Table 7.

Table 7. The Comparison between MDS Sustainable Indices and Monte Carlo Analysis (Reliability Interval of 95%) of Anchovy Resources

Dimension	MDS	Monte Carlo	Difference
Ecology	29.68	31.80	2.12
Economy	52.07	52.39	0.32
Social	36.78	37.78	1.00
Technology	52.27	52.24	0.03
Institution	42.99	43.40	0.41

Table 7 indicates that the sustainability index values obtained in each dimension show small differences. The small difference indicates that (1) the error in scoring each attribute is relatively small, (2) the variety of scores due to differences in opinion is relatively small, (3) the analysis process is repeated in a stable manner, and (4) error in data entry and lost data can be avoided. Thus, the results of the sustainability analysis carried out with the Rapfish technique for anchovy resources are highly credible.

3.7 The Sustainability Status of Anchovy Resources

The kite diagram below is created based on the index values of each dimension of sustainability as shown in Figure 11.

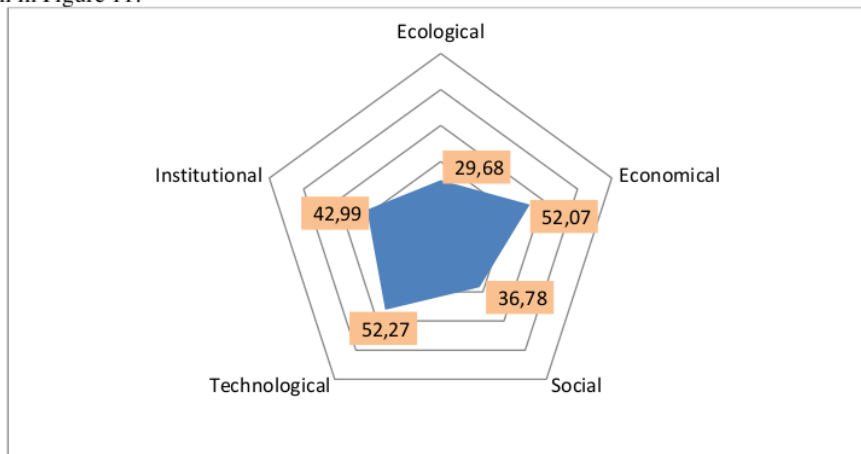


Figure 11. Kite Diagram for Anchovy Resources

From all index values from the five dimension as detailed in Figure 11, the sustainability index value for anchovy resources in Labuhanbaru territorial waters is 42.76 (<50), meaning that the resources are less sustainable.

25 Conclusions

Based on the findings of this study, it can be concluded that all assessment basis demonstrates that the sustainability index of anchovy resources in terms of the five sustainability dimensions is 42.76 (<50), categorized as less sustainable.

Considering the results of this study, the researchers propose some suggestions as follows:

- 1) The use of Rapfish analysis as a method in this study can answer the problems offered, but future studies should employ other attributes in each dimension in the assessment.
- 2) The government needs to issue policies to regulate overexploitation to ensure sustainability of anchovy resources.

References

- [1] Dinas Kelautan dan Perikanan Kabupaten Labuhanbatu. 2016. Labuhanbatu dalam Angka. Provinsi Sumatera Utara.
- [2] Siregar, I., H., K. 2015. Pengembangan Teknologi Penangkapan Ikan Yang Bertanggung jawab di Perairan Kabupaten Labuhanbatu Provinsi Sumatera Utara. Thesis. [8] Alder, J. (2000). How Good is Good? A Rapid Appraisal Techniques for Evaluation of The Sustainability Status of Fisheries of The North Atlantic. In Paul amd Pitcher (eds). Methods for Evaluation The Impact of Fisheries on The North Atlantic Ecosystem. *Fisheries Center Research Report*, 8(2).
- [3] Charles, A. T. 1994. Towards sustainable: The Fishery Experience. *Ecological Economics*.
- [4] Charles, A. T. 2001. Sustainable Fishery Systems. United Kingdom: Blackwell Science Ltd.
- [5] Zulbainarni, N. 2012. Teori dan Praktik Pemodelan Bioekonomi dalam Pengelolaan Perikanan Tangkap. Bogor (ID). PT Penerbit IPB Press.
- [6] Suparmoko. 2003. Penilaian Ekonomi: Sumberdaya Alam dan Lingkungan (Konsep dan Metode Perhitungan). LPPEM Wacana Mulia, Jakarta.
- [7] Hutagalung, Y., Bambang, N., dan Sardiyanto. 2015. Analisis Bioekonomi Perikanan Menggunakan Model Schaefer dan Fox Pada Cumi-Cumi (*Loligo sp*) yang Tertangkap dengan Cantrang Di TPI Tanjungsari Kabupaten Rembang. *Journal of Fisheries Resources Utilization Managemnt and Technology*, 4: 70-78.
- [8] Alder, J. 2000. How Good is Good? A Rapid Appraisal Techniques for Evaluation of The Sustainability Status of Fisheries of The North Atlantic. In Paul amd Pitcher (eds). Methods for Evaluation The Impact of Fisheries on The North Atlantic Ecosystem. *Fisheries Center Research Report*, 8(2).
- [9] Kavanagh, P., dan Pitcher, T. J. 2004. Implementing Microsoft Excel Software for Rapfish: A Technique for The Rapid Appraisal of Fisheries Status. [Fisheries Centre Research Reports 125]. Vancouver, Canada: The Fisheries Centre, University of British Columbia.
- [10] Pitcher, T. J., dan Preikshot, D. B. 2001. Rapfish: A Rapid Appraisal Technique to Evaluate The Sustainability Status of Fisheries. *Fisheries Research* 49 (3): 255-270.
- [11] Cisse AA, Blanchard F and Guyader O. 2014. Sustainability of tropical small-scale fisheries: Integrated assessment in French guinea. *J. Marine Policy* 44(44)-397-405
- [12] Fauzi, A., dan Anna. S. 2002. Evaluasi Status Keberlanjutan Pembangunan Perikanan : Aplikasi Pendekatan Rapfish (Studi Kasus Perairan Pesisir DKI Jakarta). *Jurnal Pesisir dan Lautan Indonesia*, 4(2) 20-49.
- [13] Nurmalina, R. 2008. Keberlanjutan Sistem Ketersediaan Beras Nasional: Pendekatan Teknik Ordinas RAP-RICE dengan Metoda Multidimensional Scalling (MDS). Fakultas Ekonomi dan Manajemen Institut Pertanian Bogor: Bogor.
- [14] Hartono. 2005. Pengembangan Teknik Rapid Appraisal for Fisheries (RAPFISH) untuk Penentuan Indikator Kinerja Perikanan Tangkap Berkelanjutan di Indonesia. *Buletin Ekonomi Perikanan VI*(1).

The Status of Sustainability of Anchovy Resources in the Labuhanbatu Territorial Waters, North Sumatra Province

ORIGINALITY REPORT

20%
SIMILARITY INDEX

%
INTERNET SOURCES

20%
PUBLICATIONS

%
STUDENT PAPERS

PRIMARY SOURCES

- 1** Yeyen Mardyani, Tahmat Kurnia, Luky Adrianto. "PENGELOLAAN PERIKANAN SKALA KECIL DI PERAIRAN PESISIR KABUPATEN BANGKA DENGAN PENDEKATAN BIOEKONOMI", Jurnal Kebijakan Sosial Ekonomi Kelautan dan Perikanan, 2020
Publication **3%**
- 2** Frimawaty, Evi, Adi Basukriadi, Jasmal A. Syamsu, and T.E. Budhi Soesilo. "Sustainability of Rice Farming based on Eco-Farming to Face Food Security and Climate Change: Case Study in Jambi Province, Indonesia", Procedia Environmental Sciences, 2013.
Publication **2%**
- 3** Syahrul Syahrul. "STRATEGI PENGELOLAAN SUMBERDAYA PERIKANAN PELAGIS SECARA TERPADU DAN BERKELANJUTAN DI PERAIRAN TELUK TOMINI", Jurnal Kebijakan Sosial Ekonomi Kelautan dan Perikanan, 2020
Publication **2%**

4

O N Chashchin, D A Podoinikov. "Numerical Simulation of Stratified Values of the Vertical Gravity Gradient Generated by a Pair of Closely Spaced Isolated Inhomogeneities with Excessive Density", IOP Conference Series: Earth and Environmental Science, 2021

Publication

1 %

5

Marzuki, Muhammad, I Wayan Nurjaya, Ari Purbayanto, Sugeng Budiharso, and Eddi Supriyono. "Sustainabiliy Analysis of Mariculture Management In Saleh Bay of Sumbawa District", Environmental Management and Sustainable Development, 2014.

Publication

1 %

6

Adi Susilo. "The sustainable management design of oxbow lake to determine the factors in lake management in Buluh Cina village, Indonesia", Journal of Science and Technology Policy Management, 2020

Publication

1 %

7

N B E Sulistyono, Z Fanani, M M D Utami. "Sustainability status of integrated rice-corn and beef cattle farming agriculture business in Jember regency", IOP Conference Series: Earth and Environmental Science, 2018

Publication

1 %

8

Yuyun Erwina, Rahmat Kurnia, Yonvitner Yonvitner. "STATUS KEBERLANJUTAN SUMBER DAYA PERIKANAN DI PERAIRAN BENGKULU", Jurnal Sosial Ekonomi Kelautan dan Perikanan, 2016

Publication

1 %

9

Jupitar Jupitar, Susiana Susiana, Febrianti Lestari. "The utilization rate of painted sweetlips fish (*Diagramma pictum*) on Mapur waters anchor in Kelong Village, Bintan Regency, Indonesia", Akuatikisle: Jurnal Akuakultur, Pesisir dan Pulau-Pulau Kecil, 2020

Publication

1 %

10

Marimin, Muhammad Arif Darmawan, Rum Puspita Widhiarti, Yuliana Kaneu Teniwut. "Green productivity improvement and sustainability assessment of the motorcycle tire production process: A case study", Journal of Cleaner Production, 2018

Publication

1 %

11

YP Paulangan, A Fahrudin, D Sutrisno, DG Bengen, MA Al-Amin, Taryono, Y Wahyudin. "Socio-economic and institutional sustainability management of coral reef ecosystem based on local communities in Teluk Tanah Merah (Depapre), Jayapura,

1 %

Indonesia", IOP Conference Series: Earth and Environmental Science, 2019

Publication

12

I A A Pongoh, W Dhamayanthi, R Iskandar. "Evaluation of multidimensional sustainability status of vannamei shrimp hatchery in Situbondo regency", IOP Conference Series: Earth and Environmental Science, 2021

Publication

1 %

13

Semuel Frederik Tuhumury, Miarah Bachmid, Masudin Sangaji. "STATUS KEBERLANJUTAN BUDIDAYA RUMPUT LAUT DI NEGERI SAWAI KECAMATAN SERAM UTARA KABUPATEN MALUKU TENGAH", TRITON: Jurnal Manajemen Sumberdaya Perairan, 2019

Publication

1 %

14

Arif Surahman, Peeyush Soni, Ganesh P. Shivakoti. "Are peatland farming systems sustainable? Case study on assessing existing farming systems in the peatland of Central Kalimantan, Indonesia", Journal of Integrative Environmental Sciences, 2017

Publication

<1 %

15

La Ode Muhammad Yasir Haya, Masahiko Fujii. "Assessment of coral reef ecosystem status in the Pangkajene and Kepulauan Regency, Spermonde Archipelago, Indonesia, using the rapid appraisal for fisheries and the

<1 %

analytic hierarchy process", Marine Policy,
2020

Publication

16

Siti Hajar Suryawati, Tajerin Tajerin.
"PENILAIAN KESIAPAN MALUKU SEBAGAI
LUMBUNG IKAN NASIONAL", Jurnal Sosial
Ekonomi Kelautan dan Perikanan, 2016

Publication

<1 %

17

Muhammad Marzuki, Sunarpi Sunarpi,
Amiruddin Amir, Muhammad Ridwan.
"Analysis of the Potential for Sustainable
Development Based Food Products to
Support Tourism Fisheries and Economic
Community in the Province of Bali",
Environmental Management and Sustainable
Development, 2017

Publication

<1 %

18

R Novianty, S Ananta, M A Karim. "Herbal
plants from Riau Province as inhibitors of
COVID-19 binding to ACE2 receptor by
computer aided molecular design an in-silico
method", Journal of Physics: Conference
Series, 2021

Publication

<1 %

19

lim Mucharam, Ernan Rustiadi, Akhmad Fauzi,
Harianto. "Assessment of Rice Farming
Sustainability: Evidence from Indonesia

<1 %

20

Sriyoto Sriyoto, Irnad Irnad, Bambang Sumantri, Basuki Sigit Priyono. "FOOD SECURITY AND PERFORMANCE OF RICE AGRIBUSINESS INSTITUTIONAL IN COASTAL AREAS OF SELUMA REGENCY", Journal of Agri Socio-Economics and Business, 2020

Publication

<1 %

21

Zainal Abidin, Budi Setiawan, Soemarno, Mimit Primyastanto, A. Sulong. "Ecological and Socio-economic Sustainability of Ornamental Fish Business in Minapolitan Area of Blitar Regency, East Java, Indonesia", IOP Conference Series: Earth and Environmental Science, 2019

Publication

<1 %

22

S. M. Garcia. "Sustainability reference systems and indicators for responsible marine capture fisheries: a review of concepts and elements for a set of guidelines", Marine and Freshwater Research, 2000

Publication

<1 %

23

Rachmiwati Yusuf, Usman Muhammad Tang, Rahman Karnila, Usman Pato. "Index and Sustainability Status of Economic Dimension for Wetland Rice Business in Siak Regency,

<1 %

Riau, Indonesia", Journal of Environmental Science and Technology, 2019

Publication

24

Permana Ari Soejarwo, Risna Yusuf, Armen Zulham. "ANALISIS KEBERLANJUTAN USAHA BUDI DAYA RUMPUT LAUT DI SUMBA TIMUR, NUSA TENGGARA TIMUR", Jurnal Sosial Ekonomi Kelautan dan Perikanan, 2019

Publication

<1 %

25

R Priyanda, N Fadhelina, R N Ariska. "Analysis of the effectiveness of students' worksheets assisted by Google Form in junior high school in Langsa Kota as an alternative of independent learning during Covid-19 pandemic", Journal of Physics: Conference Series, 2021

Publication

<1 %

26

Raden Faridz, Ariffin ., Soemarno ., Henny Pramodyo. "Determining Sustainability Index of Tobacco Planted in Various Types of Land Typology in Pamekasan, Madura", Journal of Agriculture and Ecology Research International, 2019

Publication

<1 %

27

Juhadi Juhadi, Eva Banowati, Tjaturahono Budi Sanjoto, Satya Budi Nugraha. "Rapid Appraisal for Agricultural Land Utilization in the erosion and landslide vulnerable mountainous areas

<1 %

of Kulonprogo Regency, Indonesia",
Management of Environmental Quality: An
International Journal, 2020

Publication

28

Petir Papilo, Marimin, Erliza Hambali, Imas S. Sitanggang. "Sustainability index assessment of palm oil-based bioenergy in Indonesia", Journal of Cleaner Production, 2018

Publication

<1 %

29

Dwipayana, Iwa Garniwa, Herdis Herdiansyah. "Sustainability Index of Solar Power Plants in Remote Areas in Indonesia", Technology and Economics of Smart Grids and Sustainable Energy, 2021

Publication

<1 %

30

Helmy A. Wurlianty, Johny Wenno, Mariana E. Kayadoe. "Catch per unit effort (CPUE) periode lima tahunan perikanan pukat cincin di Kota Manado dan Kota Bitung", JURNAL ILMU DAN TEKNOLOGI PERIKANAN TANGKAP, 2015

Publication

<1 %

Exclude quotes Off

Exclude matches Off

Exclude bibliography Off