An Analytical Study on the Fishing Communities Adaptation to the Impact of the COVID-19 Pandemic in Sungai Apit District

Darwis\textsuperscript{1}, T Ramadona\textsuperscript{1*}, F Septya\textsuperscript{2}, F Nugroho\textsuperscript{1}, R Metalisa\textsuperscript{1}, P Rengi\textsuperscript{1}, S M Ngesti\textsuperscript{3}
\textsuperscript{1}Faculty of Fisheries and Marine, Universitas Riau, Indonesia
\textsuperscript{2}Faculty of Agriculture, Universitas Riau, Indonesia
\textsuperscript{3}Faculty of Engineering, Universitas Bung Karno
\textsuperscript{*Corresponding author: tomi.r@lecturer.unri.ac.id

Abstract. This study aimed to analyze the adaptation patterns of fishing communities in dealing with the impact of COVID-19 pandemic in Sungai Apit District. The methods used in this study include a survey method, observations and interviews with fishing communities at the research location. This research is based on qualitative and quantitative approaches by adopting a multi-criteria analysis. The analysis of the form of adaptation was carried out using three indicators, i.e., health, economic, and socio-cultural variables. This study found that the adaptation patterns of the fishing communities are adopting healthy lifestyles, which is in the first rank with a score of 0.223, followed by restrictions on gathering activities in the second rank with a score of 0.168, and not participating in community activities in the third rank with a score of 0.121.

1. Introduction

Many studies have proven that capture fisheries business is affected by various natural disturbances such as climate change, decreasing resources, environmental pollution, and high vulnerability [1]. The income of fishermen’s family is generally very dependent on fisheries and alternative sources of income [2]. Besides, unpredictable capture fisheries business’ income can also increase the sensitivity of fishermen [3].

The COVID-19 pandemic has brought about several policies related to social engineerings in the community, such as Large-Scale Social Restrictions (LSSR) (Indonesian: Pembatasan Sosial Berskala Besar or PSBB), health protocols, and the New Normal lifestyle. These policies have affected society in general, including the fishing communities. This study aimed to describe the adaptation patterns of the fishing communities on the impact of the Covid-19 pandemic in Sungai Apit District in terms of health, economic, and socio-cultural aspects.

2. Methodology

2.1 Sources of Information

This research was conducted in Sungai Apit District, Siak Regency, Riau Province, Indonesia. The location of the research focus was at the capture fisheries center, i.e.; Teluk Batil Village, Sungai Kayu Ara Village, Bunsur Village, Lalang Village, and Kayu Ara Permai Village (Fig. 1).

This research was conducted from June to August 2020. The data collected were primary and secondary data. Primary data obtained from 28 key informants. Secondary data were obtained from scientific publications, fisheries statistical reports, and government agency literature.
2.2. Multi Criteria Analysis
To analyze the adaptation patterns of the Sungai Apit fishing communities, multi-criteria analysis was used [4] [5]. One of the most widely used multi-criteria analysis is the Analytic Hierarchy Process or AHP [6]. This method is one of the techniques or methods generally used to support the selection of alternative priorities [4].

3. Result and Discussion
The multi-criteria analysis which was used to analyze the adaptation patterns of the Sungai Apit fishing communities had several indicators. Based on a multidimensional perspective, an indicator influences other indicators [7]. The Sungai Apit fishing communities' health indicators refer to the patterns of adaptation that occur, which are developed from four aspects, i.e.; healthy lifestyle, adherence to health protocols, the intensity of access to health facilities, and self-medication. Adaptation patterns in economic indicators include involvement of family members in businesses, alternative livelihoods, savings and emergency funds, and access to financial institutions. Subsequently, adaptation patterns in socio-cultural indicators involve; restricting gathering activities, minimizing community activities, minimizing religious activities, and minimizing cultural arts activities.

| Health | Economy | Socio-Cultural |
|--------|---------|----------------|
| Healthy lifestyle (H1) | Involvement of family members in the business (E1) | Restricting gathering activities (S1) |
| Adherence to health protocols (H2) | Alternative livelihoods (E2) | Minimizing community activities (S2) |
| The intensity of access to health facilities (H3) | Savings and emergency funds (E3) | Minimizing religious activities (S3) |
| Self-medication (H4) | Access to financial institutions (E4) | Minimizing Cultural arts activities (S4) |

Based on the results of the multi-criteria analysis, there is an assessment of the priority aspects in the adaptation patterns of the fishing community. The health aspect is in the first rank that forms the adaptation patterns of the fishing community with a value of 0.637. This is supported by a healthy lifestyle and protocol campaigned by both the central and local governments. The economic aspect is
in the second rank with a value of 0.258. This shows how the efforts of fishermen households in saving their economic sustainability by involving family members to earn money or alternative income. The third rank is the socio-cultural aspect with a score of 0.105 which is formed from the restriction of social activities and social interactions during the COVID-19 pandemic.

Table 2. Priority Value of All Aspects

| Aspects                | Value | Consistency Ratio(CR) |
|------------------------|-------|-----------------------|
| Health Aspect          | 0.637 |                       |
| Economy Aspect         | 0.258 | 0.04                  |
| Socio Cultural Aspect  | 0.105 |                       |

Multi-criteria analysis through AHP techniques can be taken into consideration as an input in policymaking during the COVID-19 pandemic for fishing communities. The determination of the adaptation patterns of the fishing communities due to the COVID-19 pandemic was analyzed through AHP through hierarchical structuring (Fig. 2).

Figure 2. The Hierarchy of the Sungai Apit Fishing Communities Adaptation Patterns

Based on Figures 2 and 3, the aspects formed from the adaptation patterns of the Sungai Apit fishing communities as the impact of the COVID-19 pandemic respectively from the highest value are healthy lifestyles (0.233), adhere to health protocols (0.133), involvement of family members in business (0.109), restrictions of gathering activities (0.168) and minimizing community activities (0.111). As a pattern of fishing community adaptation, those aspects form a new normal pattern that is stronger than others. Based on these findings, local governments should devise policies that continue to promote the health, economic, and socio-cultural wellbeing of the fishing communities.
Figure 3. The Sungai Apit Fishing Communities Adaptation Patterns

4. Conclusion

Based on the research findings, the adaptation patterns in fishing communities during the COVID-19 pandemic are; healthy lifestyle in the first rank with a score of 0.223. The most frequent social changes in people’s behavior due to COVID-19 pandemic are staying at home, washing their hands more often, and implementing social distancing [5]. This condition also occurs in fishing communities. The importance of healthy lifestyle behaviors has been emphasized and universally embraced as a major component of evidence-based guidelines [6]. The next position is restrictions on gathering activities, which is in the second place with a score of 0.168. Finally, in the third rank, it is minimizing community activities with a score of 0.121. Meanwhile, adherence to health protocols also forms adaptation patterns in fishing communities. The involvement of family members in business and access to finance are indicators of economic aspects that shape the adaptation patterns. Livelihood strategies adopted by fishermen related to exposure, sensitivity, and adaptation capacity, are mainly influenced by livelihood capital [8]. Therefore, the identification of the interactions between venture capital, livelihood strategies, and livelihood vulnerabilities should be the focus of the future research in facing the uncertain situations brought by this pandemic.

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References

[1] Freduah G, Fidelman P and Smith T F 2017 The impacts of environmental and socio-economic stressors on small scale fisheries and livelihoods of fishers in Ghana Appl. Geogr. 89 1–11
[2] Chen Q, Su H, Yu X and Hu Q 2020 Livelihood vulnerability of marine fishermen to multi-stresses under the vessel buyback and fishermen transfer programs in China: The case of Zhoushan City, Zhejiang Province Int. J. Environ. Res. Public Health 17 1–17
[3] Apine E, Turner L M, Rodwell L D and Bhatta R 2019 The application of the sustainable livelihood approach to small scale-fisheries: The case of mud crab Scylla serrata in South west India Ocean Coast. Manag. 170 17–28
[4] Saaty T L 2004 Decision making — the Analytic Hierarchy and Network Processes (AHP/ANP) J. Syst. Sci. Syst. Eng. 13 1–35
[5] Abba A H, Noor Z Z, Yusuf R O, Din M F M D and Hassan M A A 2013 Assessing environmental impacts of municipal solid waste of Johor by analytical hierarchy process Resour. Conserv. Recycl. 73 188–96
[6] Contreras F, Hanaki K, Aramaki T and Connors S 2008 Application of analytical hierarchy process to analyze stakeholders preferences for municipal solid waste management plans, Boston, USA Resour. Conserv. Recycl. 52 979–91
[7] Mootz M 1986 Health indicators *Soc. Sci. Med.* **22** 255–63

[8] Yamazaki S, Resosudarmo B P, Girsang W and Hoshino E 2018 Productivity, Social Capital and Perceived Environmental Threats in Small-Island Fisheries: Insights from Indonesia *Ecol. Econ.* **152** 62–75