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Enhancing fisheries resilience in East Java, Indonesia: Impact on economic aspects

S Maemunah[1*], A Prasetyo[2] and H Wahyudianto[3]

[1] Research Center for Domestic Government, Indonesian National Research and Innovation Agency, Jakarta, Indonesia
[2] Regional Development Planning Agency of Magelang City, Magelang, Indonesia
[3] Regional Development Planning Agency of Papua Province, Jayapura, Indonesia
[*]Corresponding author email: kajiankomunal@gmail.com

Abstract

This research explores efforts to enhance fisheries resilience in East Java Province, Indonesia, by promoting collaboration among various stakeholders with vested interests in the fishing industry. The study prioritizes an approach that actively engages stakeholders as key elements in sustainable fisheries management. Research methods encompass the analysis of prevailing fisheries policies in East Java and their effects on the economy and the environment. The involvement of diverse parties, including fishermen, local government, entrepreneurs, and community members, constitutes a pivotal aspect of holistic fisheries management efforts. The study's findings reveal that collaboration among multiple stakeholders in the fishing industry has yielded positive outcomes. The implementation of fisheries policies involving stakeholders has made substantial contributions to economic growth in the region, the preservation of marine resources, and the improvement of the well-being of local communities. This study provides profound insights into the pivotal role of stakeholder collaboration in driving fisheries resilience and its positive impact on economic development in East Java Province. The implications of this research can serve as a valuable reference for policymakers, community leaders, and stakeholders involved in fostering sustainable fisheries development in the region.

Keywords

Fisheries resilience, Economic aspects, Policy

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Introduction

Indonesia, with its vast maritime territory comprising 17,504 islands [1] and a sea area three times larger than its landmass, plays a crucial role in national development. Approximately 77% of the country's total area is covered by the sea, making marine resources a significant contributor to the gross national product (GNP). However, despite the immense marine potential, the fisheries sector's economic contribution has historically lagged other sectors. Indonesia's capture fisheries production from 2013-

2018 showed an increase except in 2016 when it declined. Indonesia's capture fisheries production in 2018 reached 6.7 million tons with a contribution to the national economy of around 2% each year: 2.32% in 2014 and 2.6% in 2018 with a nominal value that continues to increase from IDR 245.4 trillion in 2015 to IDR 385.9 trillion in 2018. Paradoxically, although the nominal value of production continues to increase, the Non-Tax National Revenue from fisheries resources is not the largest [2]. fisheries resources is not the largest.

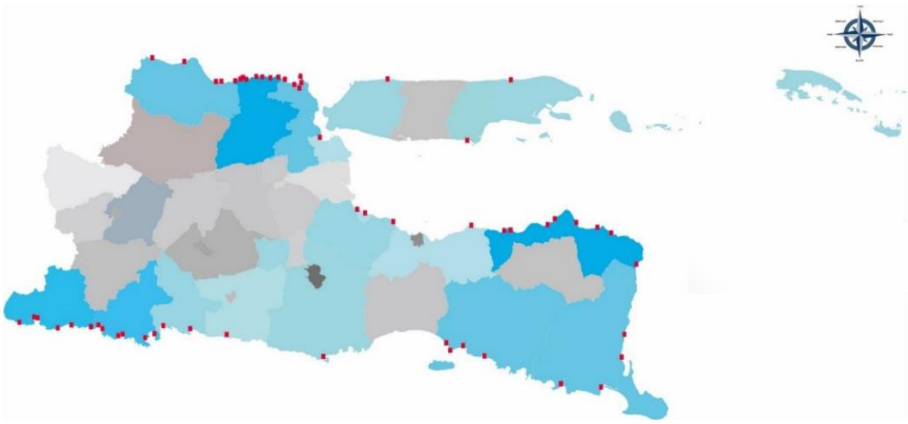

Figure 1. Map of ports in East Java Province [3].

In Jawa Timur, a province in Indonesia, the situation is similar. During 2020, from quarter 1 to 3 there was an increase in the volume of fish landed per day while in quarter 4 there was a decrease. The volume in quarter 1 was the lowest at 412.80 tons per day, then quarter 2 at 574.90 tons per day and then in quarter 3 was the highest at 668.20 tons. In quarter 4 there was a decrease in the volume of fish caught by 37.50 tons to 630.70 tons [3]. Despite having access to modern facilities, these communities are highly vulnerable to disasters, especially with the increasing frequency of storms and rising sea levels due to global warming (Figure 1).

The challenges faced by traditional fishermen [4-6], who constitute a significant portion of the population, include limited access to capital and a subsistence-oriented lifestyle. Global warming [7-10] exacerbates their difficulties, leading to coastal erosion and displacement of fishing communities. The government has initiated various development programs aimed at poverty alleviation, such as the Return to the Village Movement [11, 12], Integrated Poverty Alleviation Movement [13, 14], and Another Path to Prosperity Program [15, 16]. However, the lack of clear social structures in fishing communities complicates development interventions. In response to these challenges, some local organizations, have emerged to address the economic struggles of traditional fishing communities [4, 6]. These organizations have been instrumental in finding alternative income sources, involving women and children in income-generating activities, and adapting consumption patterns to cope with economic hardships.

The potential research areas arising from the summary include focusing on the identification of factors hindering the economic growth [17-19] of the fisheries sector in Indonesia, including policies, resource management, and supporting infrastructure. The

next research focus could be the exploration of the impact of climate change [20, 21], [22] on the lives of fishermen and efforts to enhance their resilience to disasters. Investigating the complexity of social structures within fishing communities would contribute to understanding its influence on the effectiveness of development programs. Analyzing consumption patterns and economic adaptation strategies among fishing communities is also a crucial aspect for further study. Conducting in-depth evaluations of existing development programs could offer insights into their success, challenges, and overall impact. By delving into these aspects, research can significantly contribute to a better understanding and formulation of more effective policies to support sustainable growth [23-25] in the Indonesian fisheries sector. This research aims to analyze the limiting factors affecting the economic growth of the fisheries sector in Indonesia, including policies, resource management, and infrastructure. Additionally, the study will explore the impact of climate change on fishing communities and identify solutions to enhance their resilience. The complexity of social structures within fishing communities will be examined, along with an analysis of consumption patterns and economic adaptation strategies. The evaluation of existing development programs will also be a focal point to provide insights into their success, challenges, and overall impact. Thus, the research aims to make a significant contribution to understanding and formulating more effective policies to support sustainable growth in the Indonesian fisheries sector.

The limitations of this research include potential data constraints, limited time and budget affecting the study's scope, especially in engaging a substantial number of respondents. If qualitative, subjectivity in data interpretation and limitations in generalizing findings to a broader population should be considered. Constraints in accessing and involving fishing communities or other stakeholders may impact the validity of findings. Changes in the field context over time can also affect the relevance of research findings. Respondent diversity in terms of knowledge, experience, and perspectives, along with external variables beyond the researcher's control, such as government policy [26-28] changes or climate shifts, are crucial considerations. Transparent identification of these limitations ensures a careful interpretation of research results.

Methods

This research adopts a mixed-methods approach, combining qualitative and quantitative methods, with a focus on the Rapid Assessment Procedure (RAP) technique. is research adopting the Rapid Assessment Procedure (RAP) approach involving steps such as identifying the target fishing communities, selecting representative respondents, engaging in participatory observations in their daily activities, and conducting in-depth interviews to gain a holistic understanding of their daily life, social structures, and religious values. The combination of quantitative data collection through surveys or questionnaires and qualitative data analysis provides a

comprehensive overview of the fishing communities' conditions. The research findings are interpreted considering cultural and social contexts and presented in a clear and comprehensive research report. With this approach, the study aims to provide an in-depth understanding of the dynamics and life of fishing communities in East Java. RAP is utilized to gain a profound understanding of the fishing communities in East Java, encompassing social structures, livelihood patterns, and religious aspects, presented ethnographically. The research location spans along the East-Northern coast of East Java, covering Pasuruan Regency, Probolinggo City, Situbondo Regency, and Banyuwangi Regency. The selection of this location is based on the consideration of a longer coastline and a higher number of fishermen compared to the West-Northern coast [3]. The primary unit of analysis is the family, with the head of the family and the fisherman's wife as subjects. Community leaders, such as the Chairperson of the Association of All Indonesian Fishermen group, serve as key informants for developing an ethnographic portrayal of East Java's fishing communities.

Results and Discussion

Fishing communities in Indonesia experience a strict division of labor based on gender and age, where only men are involved in fishing activities. Most of the population is of indigenous origin, with some intermarriage with other ethnic groups, and the main ethnic groups are Javanese and Madurese, with Madurese language use predominating [3]. Formal education levels among the fishing community tend to be low, with many individuals choosing work over continuing their education. Furthermore, the community is divided based on ownership of fishing gear, with different categories of fishers depending on ownership and use of fishing gear. Employment as a fisherman proved to be financially unstable, affected by fluctuations in income linked to weather conditions, gear costs, and middlemen's interference. These economic challenges led to the accumulation of debt among community members, having a significant impact on their financial stability.

The low profitability of the fishing profession in Indonesia is influenced by multifaceted societal and economic factors. The concept of a deprivation trap is evident, where fishing, considered a last resort due to its perceived lack of complex skills, perpetuates poverty and vulnerability. Fishermen experience income fluctuations, with profitability limited to only one month in a year, resulting in significant economic challenges. In the profitable month, profits may exceed 50%, while in other months, income can plummet to as low as Rp. 4,000, significantly below the expected minimum of Rp. 27,1333.33 [29]. Vulnerability to external factors such as weather conditions and physical ailments, coupled with the dependence on borrowing from middlemen due to insufficient income, creates a cycle of indebtedness and financial instability. Additionally, the ownership and distribution of fishing equipment contribute to low profitability, as fishermen face challenges like repairing damaged boats or coping with the high costs of

fishing gear. Collectively, these societal and economic factors create a challenging and financially precarious environment for fishermen in Indonesia.

The division of labor within fishing communities manifests economic vulnerability through several interconnected factors. The document emphasizes the stratification of the fishing community into distinct economic classes, such as owners of fishing equipment, laborers (pandega), and sellers [29]. This categorization aligns with a Marxian class structure analysis, with the majority falling into the laborer category. The economic vulnerability [30-32] emanates from this division due to the unequal distribution of profits, where laborers constitute the largest group, leading to financial instability and limited economic prospects. Furthermore, the laborers often find themselves dependent on middlemen for fish processing and sales, diminishing their bargaining power and reducing profitability, thereby intensifying their economic vulnerability. The ownership and utilization of fishing equipment emerge as additional factors contributing to the division of labor, creating disparities in income and economic opportunities, further amplifying the economic vulnerability of the laborers. Economic vulnerability is heightened by the necessity for laborers to borrow money from boat owners or fish collectors due to insufficient income, resulting in a cycle of indebtedness and financial instability. In summary, the intricate interplay of factors within the division of labor in fishing communities perpetuates economic vulnerability by sustaining an uneven distribution of profits, fostering dependence on middlemen, limiting ownership of fishing equipment, and entrenching a cycle of borrowing and indebtedness among laborers. These cumulative elements significantly contribute to the economic challenges faced by the laborers within the fishing community [33, 34].

The debt relationships between fishermen and creditors wield substantial ramifications for both economic vulnerability and social dynamics within fishing communities. These implications unfold in several key dimensions. Firstly, they give rise to economic dependence among fishermen, particularly affecting laborers (pandega) and boat owners (juragan). The necessity to borrow money from creditors, such as fish collectors or traders, creates a situation where fishermen must sell their catch to repay debts, leading to limited control over pricing and product sale. This economic dependence sets the stage for a perpetual cycle of indebtedness and financial instability within the community. Secondly, the debt relationships introduce unequal power dynamics, with creditors holding significant influence over fishermen. Fish collectors, for instance, wield the authority to determine fish prices and may impose interest on debts, leaving fishermen with limited bargaining power and vulnerable to exploitation. This unequal power dynamic further exacerbates the economic challenges faced by the fishermen. Thirdly, these debt relationships extend beyond the economic realm, intertwining with social and kinship-based organizations. This intricate web of social and economic interactions adds complexity to the relationships within fishing communities. Additionally, the inability to repay debts can have significant social and cultural implications, impacting major life events like circumcisions or marriages. This creates a

perpetuation of financial obligations and social pressures within the community. Lastly, the debt relationships contribute to the overall vulnerability of fishermen, compelling them to borrow money due to insufficient income. This inability to repay debts fosters a sense of limited agency and economic disempowerment, intensifying the economic challenges faced by the fishermen. In essence, the complex interplay of debt relationships within fishing communities' shapes economic stability, power dynamics, social interactions, and the overall well-being of the community, perpetuating a cycle of economic vulnerability [35, 36] and dependency.

The disruptions caused by adverse weather conditions, such as strong winds and high waves, to fishing activities have a significant impact on economic vulnerability within fishing communities. The unpredictability of weather patterns can impede fishing operations, resulting in reduced catches and, consequently, diminished income for fishermen who heavily rely on marine natural resources. Furthermore, the damage inflicted on fishing boats due to harsh weather conditions adds to the economic burden, as fishermen are then confronted with the costly task of repairing or replacing their vessels. This can lead to financial strain and a decrease in the ability to generate income from fishing activities. The economic vulnerability is further compounded by the necessity for fishermen to borrow money from boat owners, fish collectors, or traders when their income is insufficient. This reliance on borrowing can result in indebtedness and limited financial stability, perpetuating a cycle of economic vulnerability within the fishing community. In summary, the impact of weather conditions on fishing, encompassing disruptions in fishing activities and damage to fishing equipment, significantly contributes to the economic vulnerability of fishermen, underscoring the precarious nature of their livelihoods.

The fishing communities in Indonesia exhibit a distinct division of labor based on gender and age, where solely men partake in fishing activities. Predominantly indigenous, with notable intermarriage with other ethnic groups, the communities mainly consist of Javanese and Madurese ethnicities, employing the Madurese language. Characterized by lower formal education [37, 38] levels and a preference for work over education, the community is stratified by ownership of fishing equipment, leading to varied categories of fishermen. The economic instability of the fishing profession, influenced by income fluctuations tied to weather conditions, equipment costs, and middlemen's interventions, results in substantial debt accumulation among community members, significantly impacting their financial stability. This economic vulnerability [30, 31] is compounded by intricate debt relationships with creditors, creating economic dependence, unequal power dynamics, and intertwining with social and kinship-based organizations. Additionally, the impact of adverse weather conditions on fishing activities introduces further economic challenges, including reduced catches, damage to fishing equipment, and subsequent financial strain. Collectively, these multifaceted factors contribute to the intricate economic and social landscape, underscoring the

need for comprehensive policy considerations to enhance the resilience of fishing communities in Indonesia.

Conclusion

In conclusion, the presentation highlights the complex and diverse economic challenges faced by fishing communities in Indonesia. The strict division of labour, income fluctuations influenced by weather conditions, reliance on borrowing, and intricate debt relationships with creditors all contribute to a high level of economic vulnerability among fishermen. These factors, coupled with the impact of adverse weather conditions that can disrupt fishing activities, collectively create an unstable and vulnerable economic environment. The well-being and financial stability of fishermen are threatened by income uncertainty, dependence on debt, and an uneven division of labor. Confronting these challenges requires a comprehensive policy approach to enhance resilience and prosperity within fishing communities. The focus could involve efforts to reduce income uncertainty, strengthen access to capital, and build a more stable economic structure in the fisheries sector. Additionally, safeguarding fishermen from the impacts of climate change and implementing policies that support a fairer social structure are crucial factors in improving the living conditions of fishermen in Indonesia.

To address the complex challenges confronted by fishing communities in Indonesia, a multifaceted approach is recommended. First, efforts should focus on diversifying income sources for fishermen through training programs and support for alternative livelihoods. Facilitating improved access to financial resources, such as low-interest loans and financial literacy programs, is crucial to breaking the cycle of debt dependence. Promoting weather-resilient fishing practices, community-based support systems, and advocacy for supportive government policies are essential steps. Additionally, investing in research and education to understand socio-economic dynamics, implementing climate change adaptation strategies, and fostering stakeholder collaboration are vital for creating a holistic and sustainable support system. These recommendations collectively aim to enhance resilience, promote sustainable economic growth, and improve the overall well-being of fishing communities in Indonesia.

References

[1] DJPRL RI, "Jumlah Pulau di Indonesia," Direktorat Pendayagunaan Pesisir Dan Pulau-Pulau Kecil. Accessed: Oct. 05, 2023. [Online]. Available: https://kkp.go.id/djprl/p4k/page/4270-jumlah-pulau

[2] BKF RI, Optimalisasi PNBP Sektor Kelautan dan Perikanan berbasis Sumber Daya Alam. 2021.

[3] BPS Jawa Timur, "Statistik Perikanan Provinsi Jawa Timur 2020," 2021. [Online]. Available: https://flaticon.com

[4] K. Kusumajanti, N. P. E. Widiastuti, and A. Kamaluddin, "Strategies And Role Of Local Government In Improving The Competitiveness Of Traditional Fishermen In Pandeglang, Banten," Ekspresi Dan Persepsi : Jurnal Ilmu Komunikasi, vol. 3, no. 1, 2020, doi: 10.33822/.v3i1.1360.

[5] H. B. Anriani, H. Halim, and A. Arifin, "Social Justice In Palu Bay: Traditional Fishermen And Modern Fishermen," Asian Journal of Environment, vol. 3, no. 2, 2019.
[6] Amir, Akhmad, B. Romadhoni, and Z. Abidin, "Factors Affecting Household Income of Traditional Fishermen in Galesong District, Takalar Regency, Indonesia," European Journal of Business and Management Research, vol. 7, no. 6, 2022, doi: 10.24018/ejbmr.2022.7.6.1597.
[7] M. Gunnemyr, "Causing Global Warming," Ethical Theory and Moral Practice, vol. 22, no. 2, 2019, doi: 10.1007/s10677-019-09990-w.
[8] IPCC, Global Warming of 1.5°C. 2022. doi: 10.1017/9781009157940.
[9] N. S. Diffenbaugh and M. Burke, "Global warming has increased global economic inequality," Proc Natl Acad Sci U S A, vol. 116, no. 20, 2019, doi: 10.1073/pnas.1816020116.
[10] L. Al-Ghussain, "Global warming: review on driving forces and mitigation," Environmental Progress and Sustainable Energy, vol. 38, no. 1. 2019. doi: 10.1002/ep.13041.
[11] R. Faturohman, M. Muhdi, and G. Abdullah, "Implementasi Kebijakan Biaya Pendidikan Dari Dana Desa Di Kecamatan Bantarkawung Kabupaten Brebes," Jurnal Manajemen Pendidikan (JMP), vol. 8, no. 1, 2020, doi: 10.26877/jmp.v8i1.5374.
[12] T. E. Tandiyono and I. A. Maruta, "Gerakan Kembali Ke Desa Melalui Peningkatan Keterampilan Masyarakat Desa Wisata Budaya," Society : Jurnal Pengabdian dan Pemberdayaan Masyarakat, vol. 1, no. 2, 2021, doi: 10.37802/society.v1i2.124.
[13] H. Yulistiyono, D. Prodi, E. Pembangunan, – Fakultas, and E. Utm, "Implementasi Program Gerdu Taskin Terhadap Pemberdayaan Lembaga Keuangan Mikro Di Jawa Timur (Studi Kasus Kabupaten Bojonegoro dan Tuban)," Media Trend, vol. 10, no. 2, 2015.
[14] I. Murdiansyah, "Evaluasi Program Pengentasan Kemiskinan Berbasis Pemberdayaan Masyarakat: Studi Kasus Pada Program Gerdu-Taskin di Kabupaten Malang," Wiga : Jurnal Penelitian Ilmu Ekonomi, vol. 4, no. 1, 2014.
[15] A. Husna, H. Hermawan, and A. Wachid, "Evaluasi Kebijakan Program Penanggulangan Kemiskinan Jalin Kesra (Jalan Lain Menuju Kesejahteraan Rakyat) Sebagai Upaya Mendukung Pencapaian Target MDG's (Millenium Development Goals) Di Provinsi Jawa Timur," Jurnal Administrasi Publik (JAP), vol. 1, no. 3, 2013.
[16] U. K. Abidin, "Korelasi Program Jalin Kesra Dengan Mutu Pendidikan Agama Islam Anak Masyarakat Miskin," Marâji`: Jurnal Ilmu Keislaman, vol. 1, no. 2, 2015.
[17] E. Fukase and W. Martin, "Economic growth, convergence, and world food demand and supply," World Dev, vol. 132, 2020, doi: 10.1016/j.worlddev.2020.104954.
[18] B. Surya, F. Menne, H. Sabhan, S. Suriani, H. Abubakar, and M. Idris, "Economic growth, increasing productivity of smes, and open innovation," Journal of Open Innovation: Technology, Market, and Complexity, vol. 7, no. 1, pp. 1–37, 2021, doi: 10.3390/joitmc7010020.
[19] Z. Yu, W. Liu, L. Chen, S. Eti, H. Dinçer, and S. Yüksel, "The effects of electricity production on industrial development and sustainable economic growth: A VAR analysis for BRICS countries," Sustainability (Switzerland), vol. 11, no. 21, 2019, doi: 10.3390/su11215895.
[20] A. Rai, D. P. Ayadi, B. Shrestha, and A. Mishra, "On the realities of gender inclusion in climate change policies in Nepal," Policy Design and Practice, vol. 4, no. 4, 2021, doi: 10.1080/25741292.2021.1935643.
[21] M. G. Muluneh, "Impact of climate change on biodiversity and food security: a global perspective—a review article," Agric Food Secur, vol. 10, no. 1, pp. 1–25, 2021, doi: 10.1186/s40066-021-00318-5.
[22] X. Yang et al., "Climbing the mountain fast but smart: Modelling rubber tree growth and latex yield under climate change," For Ecol Manage, vol. 439, pp. 55–69, May 2019, doi: 10.1016/J.FORECO.2019.02.028.
[23] A. Kasztelan, "Green growth, green economy and sustainable development: Terminological and relational discourse," Prague Economic Papers, vol. 26, no. 4, pp. 487–499, 2017, doi: 10.18267/j.pep.626.
[24] S. Girdzijauskas, D. Streimikiene, I. Griesiene, A. Mikalauskiene, and G. L. Kyriakopoulos, "New Approach to Inflation Phenomena to Ensure Sustainable Economic Growth," Sustainability (Switzerland), vol. 14, no. 1, 2022, doi: 10.3390/su14010518.
[25] L. Liao, M. Du, B. Wang, and Y. Yu, "The impact of educational investment on sustainable economic growth in Guangdong, China: A cointegration and causality analysis," Sustainability (Switzerland), vol. 11, no. 3, 2019, doi: 10.3390/su11030766.
[26] P. Patanakul and J. K. Pinto, "Examining the roles of government policy on innovation," Journal of High Technology Management Research, vol. 25, no. 2, 2014, doi: 10.1016/j.hitech.2014.07.003.
[27] N. O. Obaji, "The Role of Government Policy in Entrepreneurship Development," Science Journal of Business and Management, vol. 2, no. 4, 2014, doi: 10.11648/j.sjbm.20140204.12.

[28] A. Prasetyo et al., "Comparison of Innovation Processes In The Perspective of Local Government Policy and Regional Competitiveness," Riset Ekonomi Pembangunan, vol. 5, no. 1, 2020, doi: 10.31002/rep.v5i1.
[29] Balitbang Jawa Timur, "Kajian Pemberdayaan Organisasi Lokal Dalam Meningkatkan Kesejahteraan Nelayan Di Jawa Timur ," 2021.
[30] I. Noy and R. Yonson, "Economic vulnerability and resilience to natural hazards: A survey of concepts and measurements," Sustainability (Switzerland), vol. 10, no. 8. 2018. doi: 10.3390/su10082850.
[31] J. J. Selvaraj, D. Guerrero, M. A. Cifuentes-Ossa, and Á. I. Guzmán Alvis, "The economic vulnerability of fishing households to climate change in the south Pacific region of Colombia," Heliyon, vol. 8, no. 5, 2022, doi: 10.1016/j.heliyon.2022.e09425.
[32] Y. Wang, L. Han, and X. Ma, "International tourism and economic vulnerability," Ann Tour Res, vol. 94, 2022, doi: 10.1016/j.annals.2022.103388.
[33] I. Chapsos, J. Koning, and M. Noortmann, "Involving local fishing communities in policy making: Addressing Illegal fishing in Indonesia," Mar Policy, vol. 109, 2019, doi: 10.1016/j.marpol.2019.103708.
[34] E. Torell, J. Castro, A. Lazarte, and D. Bilecki, "Analysis of Gender Roles in Philippine Fishing Communities," J Int Dev, vol. 33, no. 1, 2021, doi: 10.1002/jid.3520.
[35] L. Richmond and L. Casali, "The role of social capital in fishing community sustainability: Spiraling down and up in a rural California port," Mar Policy, vol. 137, 2022, doi: 10.1016/j.marpol.2021.104934.
[36] A. J. Woodhead, K. E. Abernethy, L. Szaboova, and R. A. Turner, "Health in fishing communities: A global perspective," Fish and Fisheries, vol. 19, no. 5, 2018, doi: 10.1111/faf.12295.
[37] P. Rahabav and T. R. Souisa, "Evaluation of non-formal education management in Maluku Province, Indonesia," International Journal of Evaluation and Research in Education, vol. 10, no. 4, 2021, doi: 10.11591/IJERE.V10I4.21116.
[38] M. Pienimäki, M. Kinnula, and N. Iivari, "Finding fun in non-formal technology education," Int J Child Comput Interact, vol. 29, 2021, doi: 10.1016/j.ijcci.2021.100283.