

Characteristics of fishermen and tourist boat rental service providers in the Karimunjawa Marine Protected Area

Dian Wijayanto, Faik Kurohman, Ristiawan A. Nugroho

Faculty of Fisheries and Marine Science, Universitas Diponegoro, Tembalang, Semarang, Central Java, Indonesia. Corresponding author: D. Wijayanto, dianwijayanto@gmail.com

Abstract. The Karimunjawa Islands is one of Indonesia's marine protected areas that is prone to conflicts of interest. The tourism sector in the area potentially fosters the economic growth and job opportunities that even local fishermen have begun offering tourist boat rental services. This study aims to delineate the characteristics of tourist boat rental businesses in the Karimunjawa Islands, focusing on the key actors involved in conservation initiatives. Interviews and observation were conducted between July and August 2023 to collect primary data from 100 respondents comprising both fishermen and tourist boat service providers. In this quantitative descriptive research, the RC ratio was used to evaluate the income of these professions. The findings indicated that fishing remains the primary occupation, with tourist boat rental services acting as a supplementary source of income. Fishing profession was perceived to yield higher income, while tourism-related activities were rather seasonal. The tourist boat rental business, however, demonstrates a robust RC ratio of 3.7 (highly profitable).

Key Words: coastal tourism, conservation, fishermen, Karimunjawa Islands, RC ratio.

Introduction. The Karimunjawa Islands, situated at coordinates 5°40'39" to 5°55'00" South Latitude and 110°05'57" to 110°31'15" East Longitude, have held the status of a conservation area since 1986, as declared by the Indonesian Government (Campbell et al 2013; BTNKJ 2019; Wibowo et al 2022, 2023). The decision to designate these islands as a conservation area was influenced by their remarkable biodiversity and the presence of protected species, notably serving as the nesting ground for turtles. Among the protected animals in the Karimunjawa Islands are *Haliaeetus leucogaster*, *Sterna hirundo*, *Pelargopsis capensis*, *Gallinago cinerea*, *Halcyon chloris*, *Pycnonotus goiavier*, *Cervus* sp., *Hystrix brachyura*, *Chelonia mydas*, *Eretmochelys imbricata*, and *Lepidochelys olivacea*. Diverse ecosystems, including lowland tropical rainforests, mangroves, seagrass beds, and coral reefs, contribute to the islands' rich biodiversity. Additionally, the remnants of a World War II ship sunk in Karimunjawa waters add historical significance (BTNKJ 2019; Wijayanto et al 2022).

Conversely, the inhabitants of the Karimunjawa Islands predate the conservation designation, with many relying on fishing as a livelihood for generations. The coexistence of conservation goals and the local population's interests, encompassing social and economic aspects, presents a potential for conflict if not managed effectively. Various tribes, such as the Javanese, Bajo, Bugis, Banjar, Betawi, Buton, Madura, and Sumbawa, call the Karimunjawa Islands home, with the Bugis and Bajo tribes being recognized for their seafaring and fishing traditions (Wibowo et al 2022, 2023). The islands' natural beauty has attracted both national and international tourists, fostering the growth of tourism-related businesses, including accommodations, culinary ventures, vehicle, and equipment rentals (cars, motorcycles, boats, snorkeling, and diving equipment), souvenir shops, and tour guides (Campbell et al 2013; Wijayanto et al 2023; Wibowo et al 2023). Chen et al (2021) suggest that tourism can effectively alleviate poverty in traditional communities, stimulate economic growth, create employment opportunities, and boost national income. Marine tourism, particularly on small islands and coastal areas, is

identified as one of the fastest-growing forms of tourism globally. Local fishermen on Karimunjawa Island have also adapted by offering boat rental services to cater to tourists. Successful conservation initiatives hinge on strong support from local communities (Kennedy et al 2020; Wibowo et al 2022; Wijayanto et al 2023). This study aims to analyze the characteristics of tourist boat rental businesses in the Karimunjawa Islands.

Material and Method

Research location. The research location is Karimunjawa Island (Indonesia) as a tourism center in the Karimunjawa Islands. Administratively, the Karimunjawa Islands are a sub-district which is part of Jepara Regency in Central Java Province (BPS-Statistics of Jepara Regency 2022, 2023).

Research time. Implementation of the research survey was conducted in July to August 2023.

Data collection and analysis. The main data collection was carried out by interviews (100 respondents) and observation. Respondents work as fishermen and providers of tourist boat rental services. Data analysis was carried out using a quantitative descriptive approach. Analysis of respondents' income was carried out using the RC (revenue/cost) ratio (Bekoe et al 2021; Wijayanto et al 2022, 2023).

Results. Table 1 provides an overview of the respondent profile in this study. In general, the major of respondents have lower educational backgrounds and belong to the Javanese tribe. The Javanese constitute the largest ethnic group in Indonesia, and their prominence is notable given the proximity of Java Island to the Karimunjawa Islands (Wijayanto et al 2022, 2023). Despite the growth of the tourism sector, fishing remains the predominant occupation for the people of the Karimunjawa Islands. The respondents, with an average age of 46, indicate a trend where the younger generation is increasingly hesitant to pursue careers in fishing. Fishing operations are typically conducted with boats averaging a length of 11.5 meters, powered by engines with an average size of 20 horsepower.

On average, respondents report a family expenditure of Rp 4,229,500, with approximately 49% allocated to food consumption. This suggests a relatively favorable economic well-being among the respondents. As a point of reference, the minimum wage for Jepara Regency in 2023 stands at Rp 2,272,626 according to the Central Java Governor Decree Number 561/54 of 2022. Notably, 91% of respondents express a desire for their descendants to not pursue a career in fishing. The primary rationale behind this sentiment is the perceived high risks associated with the fishing profession, as illustrated in Figure 1. Respondents also cite factors such as income uncertainty, low earnings, and a perception that land-based professions offer better prospects. Conversely, those respondents who endorse the idea of their descendants becoming fishermen often highlight reasons such as providing their children with career freedom, continuing a family tradition, and viewing the fishing profession as essential for supplying fish to the community.

The findings from this research survey reveal that a majority of respondents (81%) lean towards choosing the fishing profession over engaging in tourist boat rental services. Several reasons underpin this preference, including the seasonal nature of tourism and the potential for higher income from fishing. Despite the comparatively lighter workload and more predictable income associated with boat rental services, respondents perceive greater financial gains and resource savings in the fishing profession (refer to Figure 2). Table 2 provides an overview of the income derived from fishing businesses and tourist boat rental services for the respondents. When assessing the return on capital (RC) ratio, the tourist boat rental service business emerges as highly lucrative, boasting an average RC ratio of 3.7. This implies that for every Rp. 1 spent, respondents can expect to receive Rp. 3.7.

Table 1

Respondent profile

<i>Categories</i>	<i>Values</i>
<i>Education of respondents</i>	
Did not graduate from elementary school	12.9%
Elementary school	68.3%
Junior high school	8.9%
Senior high school	9.9%
<i>Ethnicity</i>	
Javanese	91.1%
Non-Javanese	8.9%
<i>Age (years)</i>	
Min	20
Average	46
Max	66
<i>Length of boat (m)</i>	
Min	3.0
Average	11.5
Max	17.0
<i>Machine</i>	
Min	12.0
Average	20.3
Max	33.0
<i>Family budget (Rp per month)</i>	
Min	1,650,000
Average	4,229,500
Max	8,000,000
<i>% of family budget for food</i>	
Min	23%
Average	49%
Max	88%
<i>Do you want your descendants to continue their profession as fishermen?</i>	
No	91%
Yes	9%
<i>Do you choose the profession of fisherman or tourist boat rental service provider as your main profession?</i>	
Fishermen	81%
Tourist boat rental service provider	19%

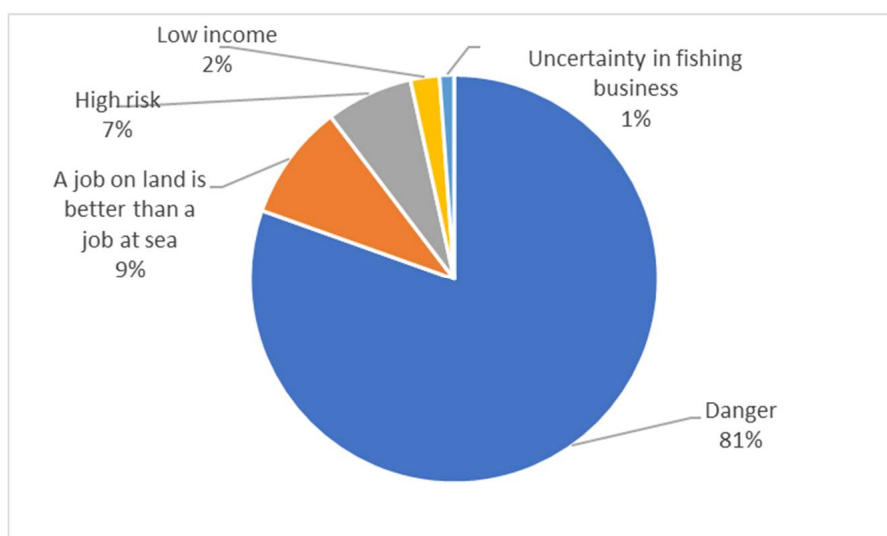


Figure 1. Reasons for not wanting their descendants to continue their profession as fishermen.

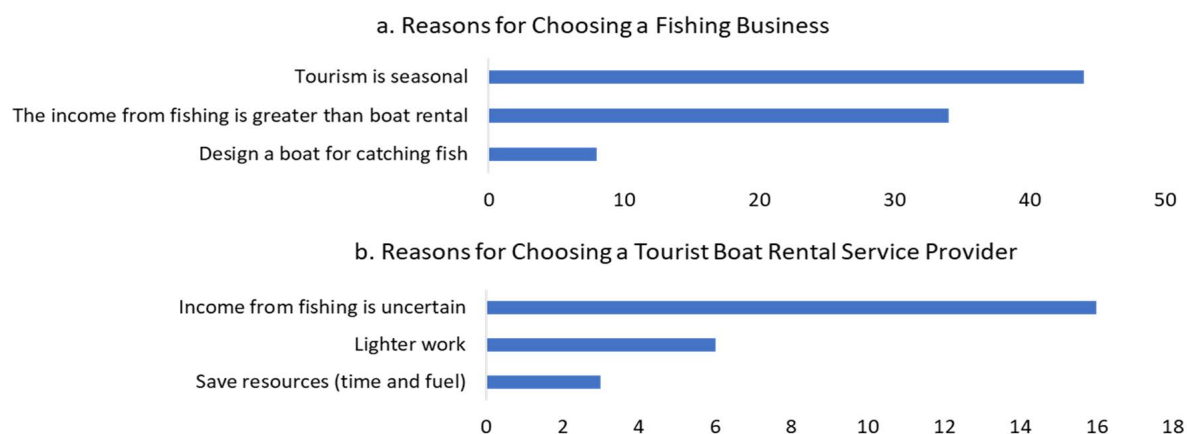


Figure 2. Reasons for choosing a fishing business or tourist boat rental service provider.

Table 2

Respondent income	
Categories	Values
<i>Income as a fisherman (Rp per year)</i>	
Min	12,000,000
Average	43,065,306
Max	120,000,000
<i>Income as a tourist boat rental service provider (Rp per year)</i>	
Min	400,000
Average	10,565,306
Max	11,200,000
<i>Proportion of income from tourist boat rental service providers to total income as fishermen and tourist boat rental service providers (%)</i>	
Min	1%
Average	17%
Max	73%
<i>Tourist boat rental rates (Rp per transaction)</i>	
Min	300,000
Average	531,633
Max	900,000
<i>Average capital for a tourist boat rental business (Rp/day)</i>	
Boat depreciation	36,114
Machine depreciation	24,282
Maintenance of boat and machine	11,426
Fuel	76,470
<i>RC ratio for a tourist boat rental business</i>	
Min	1.7
Average	3.7
Max	8.3

The peak of tourism in the Karimunjawa Islands occurs in December, coinciding with the holiday period (Figure 3). Notably, tourism activities are influenced by school holidays in Indonesia, particularly in June to July and December. Eid al-Fitr, celebrated in May 2022 and April 2023, represents the holiday with the longest duration. Setiyanto et al's study in 2023 indicates that foreign tourists to Karimunjawa include visitors from Australia and several Western European countries. Given that summer holidays in Australia span from December to February, there is a substantial influx of Australian tourists due to the proximity of the country to Indonesia. Similarly, in England, summer holidays fall between June and September, contributing to the timing of tourism activities in the Karimunjawa Islands.

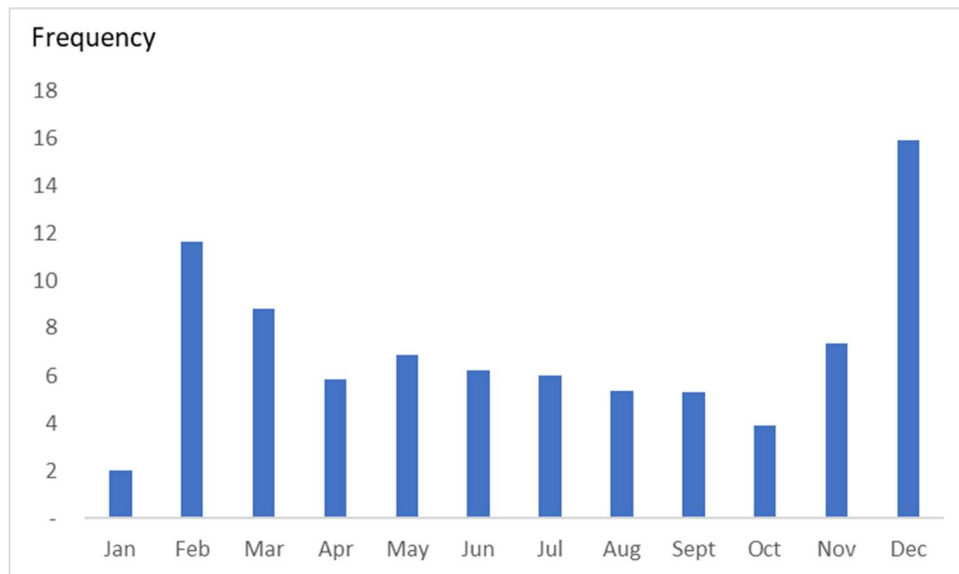


Figure 3. Average frequency of boats rented for tourism per respondent.

Discussion. The Karimunjawa Islands draw attention from various stakeholders, touching upon not just marine conservation but also fisheries, forest preservation, tourism, settlement, and hotel development. The multitude of vested interests contributes to the intricate complexity of developmental challenges faced by the Karimunjawa Islands. It underscores the necessity to align conservation efforts with the well-being of local communities. The success of conservation programs is intricately tied to the prosperity of these communities, a sentiment echoed in the works of Yuliana et al (2016), Fafurida et al (2020), Kennedy et al (2020), Prihantono et al (2021), Zharif et al (2022), Wibowo et al (2022), and Wijayanto et al (2022, 2023).

The inhabitants of the Karimunjawa Islands, residing there for generations, primarily engage in fishing as their main profession. The male population on the islands totals 5,183 people, with 3,846 individuals aged 15 years and over, and 1,386 people working as fishermen (BPS-Statistics of Jepara Regency 2022, 2023; Wijayanto et al 2022, 2023).

Tourism emerges as a newfound economic driver for the people of the Karimunjawa Islands, offering alternative livelihoods to the traditional occupation of fishing. The growth of tourism has spurred infrastructural enhancements, encompassing electricity, public ports, airports, telecommunication, and land transportation. Many fishermen have diversified their professions, concurrently engaging in both fishing, and providing tourism-related services. The diversification of fishing businesses is recognized as a crucial strategy to uplift the welfare of fishermen, thereby fostering positive contributions to ongoing conservation initiatives (Wijayanto et al 2020; Wibowo et al 2022; Winchenbach et al 2022).

Studies indicate that fishermen often face challenges when transitioning to other professions. In a case study involving a fishing ban on the Yangtze River in China aimed at protecting biodiversity, fishermen experienced difficulties due to factors such as old age, low education, and a lack of alternative skills (Wu et al 2023). Similar challenges are likely to occur in Indonesia, where the average age of respondents in this study is 46 years, and the majority have elementary school education. Conservation efforts, if not carefully implemented, may lead to social conflicts among the fishing communities.

Research on fish resource management in Lake Tana, Ethiopia, illustrates that local fishermen may resist changing professions despite facing overfishing issues. Instead, they prefer controlling fishing activities. This resistance underscores the importance of understanding and addressing the socio-economic factors that influence fishermen's livelihood choices (Agimass & Mekonnen 2011). Despite the potential threats to marine resources, a study by Anna et al (2019) suggests that Indonesian fishermen generally exhibit happiness and optimism in the face of future challenges.

Fishermen's income is influenced by various factors, including education, age, boat and gear size, capital, fuel consumption, fishing trip frequency, productivity, and skills (Tikadar et al 2022; Wibowo et al 2023). Strengthening fisheries institutions and tourism service providers in Karimunjawa is crucial for successfully mobilizing business actors to support conservation and enhance their welfare. Cooperative development, supported by government intervention in the initial stages, can facilitate collective benefits for members and play a role in transforming the fishing industry toward sustainable resource management (Su et al 2023).

Local communities should be informed about the benefits of conservation to garner support for conservation programs (Rakotonarivo et al 2017). Prioritizing environmentally friendly fishing practices, enforcing laws against illegal fishing, strengthening capital, improving infrastructure, and enhancing cooperatives are key recommendations for stakeholders involved in the development of Karimunjawa (Wibowo et al 2022). Effective management of recreational fisheries can contribute to economic development while preserving fish resources and ecosystem health (Angulo-Valdes et al 2022).

Diversifying fishing businesses into tourism is recognized as a potential solution to the global decline in fishing. However, the transition process requires careful preparation. Fishermen entering the tourism profession must adapt and prioritize being user-friendly to tourists. Ecotourism, highlighted by Chen et al (2021), is emphasized as a type of tourism with minimal negative impacts on the environment and socio-culture, emphasizing the importance of nature education and ecological cultural reinforcement in its implementation.

The research findings indicate that the primary occupation in the Karimunjawa Islands is still fishing, with the provision of tourist boat rental services being more of a secondary profession. The diversification of fishing enterprises has the potential to enhance the well-being of fishermen. Notably, Karimunjawa fishermen exhibit a tendency to endorse water conservation initiatives, recognizing the crucial role of preserving natural resources for their livelihoods in both fishing and tourist boat rental services (Wijayanto et al 2022, 2023). Consequently, active involvement of fishermen in the management of marine protected areas in the Karimunjawa Islands is imperative. As suggested by Bennett et al (2020), conservation policy makers should identify target community groups for conservation area management, tailoring their approach to the unique characteristics of these groups. The research emphasizes the importance of aligning conservation efforts with social justice, as local communities are more likely to lend their support under such circumstances. Furthermore, insights from Campbell et al (2013) underscore that effective policy and management of the Karimunjawa conservation area can enhance the welfare of fishermen through the provision of economic and legal incentives.

Conclusions. The research findings reveal that the respondents predominantly engage in the fishing profession as their primary occupation, while the provision of tourist boat rental services is more of a supplementary endeavor. The fishing profession is favored for its higher income, contrasting with the seasonal nature of tourism activities. Notably, the business of offering tourist boat rental services boasts a commendable RC ratio of 3.7, signifying its profitability. On average, individuals involved in fishing and tourist boat services on Karimunjawa Island are around 46 years old, possess a lower level of education, and express a reluctance to have their offspring pursue the fishing profession, citing its perceived dangers and high risks.

Acknowledgements. Gratitude is expressed to the LPPM Universitas Diponegoro for funding grant this research (Contract Number 569-77/UNJ.D2/PP/IV/2023).

Conflict of interest. The authors declare that there is no conflict of interest.

References

- Agimass F., Mekonnen A., 2011 Low-income fishermen's willingness-to-pay for fisheries and watershed management: an application of choice experiment to Lake Tana, Ethiopia. *Ecological Economics* 71:162-170.
- Angulo-Valdes J., Pina-Amargos F., Figueredo-Martin T., Fujita R., Haukebo S., Miller V., Bone-Moron E., Whittle D., 2022 Managing marine recreational fisheries in Cuba for sustainability and economic development with emphasis on the tourism sector. *Marine Policy* 145:105254.
- Anna Z., Yusuf A. A., Alisjahbana A. S., Ghina A. A., Rahma, 2019 Are fishermen happier? Evidence from a large-scale subjective well-being survey in a lower-middle-income country. *Marine Policy* 106:103559.
- Bekoe J., Balana B. B., Nimoh F., 2021 Social cost-benefit analysis of investment in rehabilitation of multipurpose small reservoirs in northern Ghana using an ecosystem services-based approach. *Ecosystem Services* 50:101329.
- Bennett N. J., Calò A., Di Franco A., Niccolini F., Marzo D., Domina I., Dimitriadis C., Sobrado F., Santoni M. C. Charbonnel E., Trujillo M., Garcia-Charton J., Seddiki L., Cappanera V., Grbin J., Kastelic L., Milazzo M., Guidetti P., 2020 Social equity and marine protected areas: perceptions of small-scale fishermen in the Mediterranean Sea. *Biological Conservation* 244:108531.
- BPS-Statistics of Jepara Regency, 2022 [Karimunjawa Subdistrict in figures 2022]. BPS-Statistics of Jepara Regency, 146 pp. [in Indonesian and English]
- BPS-Statistics of Jepara Regency, 2023 [Jepara Regency in figures 2023]. BPS-Statistics of Jepara Regency, 407 pp. [in Indonesian and English]
- BTNKJ, 2019 [Statistics of Karimunjawa National Park Office 2019]. Balai Taman Nasional Karimun Jawa (BTNKJ), 154 pp. [in Indonesian]
- Campbell S. J., Kartawijaya T., Yulianto I., Prasetya R., Clifton J., 2013 Co-management approaches and incentives improve management effectiveness in the Karimunjawa National Park, Indonesia. *Marine Policy* 41:72-79.
- Central Java Governor Decree Number 561/54 of 2022 about Minimum Wages 35 Regency/City in Central Java Province in 2023. [in Indonesian]
- Chen F., Liu J., Wu J., Sjafrie N. D. M., Rahmadi P., Putranto R. Y., 2021 Measuring the relationship among stakeholders from value-satisfaction-demand in the development of ecotourism of Marine Park. *Marine Policy* 129:104519.
- Fafurida, Oktavilia S., Prajanti S. D. W., Maretta Y. A., 2020 Sustainable strategy: Karimunjawa National Park marine ecotourism, Jepara, Indonesia. *International Journal of Scientific and Technology Research* 9(3):3234-3239.
- Kennedy E. V., Vercelloni J., Neal B. P., Ambariyanto, Bryant D. E. P., Ganase A., Gartrell P., Brown K., Kim C. J. S., Hudatwi M., Hadi A., Prabowo A., Prihatinningsih P., Haryanta S., Markey K., Green S., Dalton P., Lopez-Marcano S., Rodriguez-Ramirez A., Gonzalez-Rivero M., Hoegh-Guldberg O., 2020 Coral reef community changes in Karimunjawa National Park, Indonesia: assessing the efficacy of management in the face of local and global stressors. *Journal of Marine Science and Engineering* 8(10):760.
- Prihantono J., Yulius, Husrin S., Ramdhan M., Gemilang W. A., 2021 Assessment of underground water quality in Karimunjawa Island, Central Java – Indonesia. *Jurnal Segara* 17(1):23-32.
- Rakotonarivo O. S., Jacobsen J. B., Larsen H. O., Jones J. P. G., Nielsen M. R., Ramamonjisoa B. S., Mandimbiniaina R. H., Hockley N., 2017 Qualitative and quantitative evidence on the true local welfare costs of forest conservation in Madagascar: are discrete choice experiments a valid ex ante tool? *World Development* 94:478-491.
- Setiyanto I., Wijayanto D., Wibowo B. A., Dewi D. A. N. N., 2023 Important-performance analysis of marine tourism development in Karimunjawa Island. *AAFL Bioflux* 16(6):2912-2922.

- Su M., Cheng K., Kong H., Xue Y., Liang D., 2023 Tripartite evolutionary game and simulation analysis of fishermen participating in cooperative management under government supervision. *Ocean and Coastal Management* 236:106491.
- Tikadar K. K., Islam M. J., Saha S. M., Alam M. M., Barman S. K., Rahman M. A., 2022 Livelihood status of small-scale fishermen and determinants of their income: insights from north-eastern floodplains of Bangladesh. *Geography and Sustainability* 3(3):204-213.
- Wibowo B. A., Wijayanto D., Setiyanto I., Dewi D. A. N. N., 2022 Important-performance analysis of capture fisheries development in Karimunjawa Islands. *AACL Bioflux* 15(5):2396-2404.
- Wibowo B. A., Wijayanto D., Setiyanto I., Dewi D. A. N. N., 2023 Factors affecting fishermen's income on Karimunjawa Island. *AACL Bioflux* 16(1):457-464.
- Wijayanto D., Bambang A. N., Nugroho R. A., Kurohman F., 2020 The impact of planting distance on productivity and profit of *Euचेuma cottonii* seaweed cultivation in Karimunjawa Islands, Indonesia. *AACL Bioflux* 13(4):2170-2179.
- Wijayanto D., Kurohman F., Nugroho R. A., 2022 A study on the socio-economic characteristics of seaweed farmers on Kemojan Island to support the conservation in Karimunjawa Marine Protected Area. *AACL Bioflux* 15(5):2638-2650.
- Wijayanto D., Kurohman F., Nugroho R. A., 2023 The fishermen's socio-economic characteristics that support conservation among the community in Karimunjawa Marine Protected Area. *AACL Bioflux* 16(5):2517-2527.
- Winchenbach A., Hanna P., Miller G., 2022 Constructing identity in marine tourism diversification. *Annals of Tourism Research* 95:103441.
- Wu Z., Tian G., Li Y., Xia Q., 2023 Compensation mechanisms for fishermen quit fishing: a case of Jiangsu province, China. *Heliyon* 9(7):e17648.
- Yuliana E., Fahrudin A., Boer M., Kamal M. M., Pardede S. T., 2016 The effectiveness of the zoning system in the management of reef fisheries in the marine protected area of Karimunjawa National Park, Indonesia. *AACL Bioflux* 9(3):483-497.
- Zharif N., Rizal A., Maulina I., Mulyani Y., Suryana A. A. H., 2022 Term trade analysis of fisher in Karimunjawa Village, Jepara. *Asian Journal of Fisheries and Aquatic Research* 18(3):40-50.

Received: 23 November 2023. Accepted: 15 December 2023. Published online: 27 December 2023.

Authors:

Dian Wijayanto, Faculty of Fisheries and Marine Science, Universitas Diponegoro, Tembalang, Prof. Jacob Rais street, Semarang, Central Java, Indonesia, e-mail: dianwijayanto@gmail.com;
dianwijayanto@lecturer.undip.ac.id

Faik Kurohman, Faculty of Fisheries and Marine Science, Universitas Diponegoro, Tembalang, Prof. Jacob Rais street, Semarang, Central Java, Indonesia, e-mail: faikkurohman@gmail.com;
faikkurohman@lecturer.undip.ac.id

Ristiawan Agung Nugroho, Faculty of Fisheries and Marine Science, Universitas Diponegoro, Tembalang, Prof. Jacob Rais street, Semarang, Central Java, Indonesia, e-mail: ristiawan_1976@yahoo.com;
ristiawan_1976@lecturer.undip.ac.id

This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

How to cite this article:

Wijayanto D., Kurohman F., Nugroho R. A., 2023 Characteristics of fishermen and tourist boat rental service providers in the Karimunjawa Marine Protected Area. *AACL Bioflux* 16(6):3357-3364.