International Journal of Multidisciplinary Research and Development
www.allsubjectjournal.com
Online ISSN: 2349-4182, Print ISSN: 2349-5979
Received: 04-01-2022, Accepted: 19-01-2022, Published: 04-02-2022
Volume 9, Issue 2, 2022, Page No. 4-12

Community perception towards conservation of mangrove ecosystem at Untung Jawa-Indonesia

Yusri Ilyas, Untung Setiyo Purwanto, Aryo Sahid Sujiwo, Muhaimin, Fikriah
Tim Abdimas Mangrove UID, Jakarta Islamic University, Indonesia

Abstract
The majority of the people of Untung Jawa Island have the view that the mangrove ecosystem on the island has a very important impact and role for the lives of the people on the island. The impact and role of the mangrove ecosystem on Untung Jawa Island can be divided into physical functions, biological functions, chemical functions, economic functions, and tourism functions. However, the mangrove ecosystem on Untung Jawa Island is under increasing pressure due to both human activities and natural factors. Pressures and threats require all stakeholders to carry out various efforts to conserve mangroves on the coast of Untung Jawa Island. In order for mangrove conservation efforts on Untung Jawa Island to run effectively, it is necessary to measure public perceptions of the mangrove ecosystem. This study aims to investigate the perception of the people of Untung Jawa Island towards the preservation of the mangrove ecosystem. The results of the analysis show that the majority of the people of Untung Jawa Island have a positive and relatively high perception of the preservation of the mangrove ecosystem on the island. There are three factors that significantly influence the perception of the people of Untung Jawa Island on the preservation of the mangrove ecosystem; education level, place of origin, and type of work. This finding implies the importance of building a special system that can synergize economic interests and environmental interests in Untung Jawa Island.

Keywords: community perception, conservation of mangrove ecosystems, untung Jawa Island

Introduction

Mangrove forest is a resource that has an important role for human life. In addition to acting as a buffer for flora and fauna life in the balance of the ecosystem, mangrove forests are also a form of natural wealth that can become an economic source for the community. Mangrove forests are one of the most productive forest ecosystems in the world. The literature suggests that mangrove forests are one type of ecosystem that is widely used by coastal communities in supporting their lives. Communities can use mangrove forests directly or indirectly. Mangrove forests can provide various economic benefits and food reserves for coastal communities (Uddin *et al*., 2013) [19].

Furthermore, the literature explains that mangrove forests have three main functions, namely physical functions, biological functions, and economic functions. The physical functions of mangrove forests include preventing abrasion, protecting against wind and waves, storing carbon stocks, and producing nutrients. The biological functions of mangrove forests include spawning grounds and care for biota, bird nesting sites, and other marine biota habitats. The economic functions of mangrove forests include sources of wood, fishery products, agriculture, fruit, paper raw materials, leather and medicines (Prasetiyo *et al*., 2016) [12].

The literature also suggests that the existence of mangrove forests can provide various benefits, including as a stabilizer of coastal conditions, preventing abrasion and seawater intrusion, as a source of diversity of aquatic and non-aquatic biota, as a source of materials that can be consumed by the community and so on (Yuliasamaya). *et al*, 2014). For coastal communities, mangrove ecosystems play an important role in sustaining their lives, both from the economic and ecological aspects. In the economic aspect, mangroves are used for charcoal, firewood, traditional fishing gear, and places to catch fish, shrimp and crabs. From an ecological point of view, the mangrove ecosystem functions as a producer of weathering material which is an important food source for small invertebrates that eat weathering materials. Furthermore, mangroves also act as food for larger animals. The mangrove ecosystem is also a nursery ground for fish and shellfish (Setiawan *et al*., 2017) [16].

One of the main potentials of Indonesia's coast is the mangrove ecosystem, which plays a role in storing species richness and providing various ecosystem services and services. At least three million hectares of the world's mangrove area are in Indonesia. The mangrove ecosystem is spread out with other important regional ecosystems on the islands of Papua, Kalimantan and Sumatra. Mangrove is a general term for a variety of tropical coastal communities dominated by several species of typical trees or shrubs. As an ecosystem, mangroves do not only consist of mangrove trees, but also trees, shrubs, bush lianas, ferns, and mangrove palms (Rahardi and Suhardi, 2016) [14]. Mangrove ecosystem is a productive ecosystem, because the avalanches of mangrove litter supply nutrients to the environment. Nutrients are then utilized by plankton in photosynthesis, so

that mangrove forest waters have high productivity. This causes the abundance of organisms at the trophic level in the food chain to be high as well. The availability of plankton and benthos in the waters of the mangrove forest is food for fish. Under these conditions, fish utilize mangrove aquatic ecosystems as areas for foraging, spawning, and rearing (Indrayanti *et al*., 2015) [8].

Mangrove forest is a coastal resource that has a high carrying capacity for people's lives. Mangrove forests have several functions: biological, chemical, physical, and economic functions. Therefore, the coastal area becomes a very important part of development and economic activities. As expected, with the trend of increasingly scarce land resources, coastal and marine resources will become a new source of growth and a pillar of hope for development in Indonesia (Harahab, 2011) [5, 6].

One of the mangrove ecosystems in Jakarta Province is a mangrove forest located on Untung Jawa Island, Thousand Islands Administrative District. At present, the condition of the mangrove ecosystem on Untung Jawa Island has experienced a fairly high degradation. Various efforts to conserve the mangrove ecosystem on Untung Jawa Island continue to be carried out by the government and non-governmental organizations. However, efforts to conserve mangrove ecosystems on the island often experience problems due to the unequal perception of the community towards mangrove conservation. Perception in general is often defined as the perspective of society or a person on an object, be it physical or social objects. Perception can also be seen as a process for making judgments or building impressions about various things contained in one's sensory field. Perception is a basis for the formation of attitudes or behavior (Setiawan *et al*., 2017) [16].

The literature emphasizes that mangrove forests cannot be preserved and managed properly without first knowing the perceptions and attitudes of the community towards the conservation of mangrove ecosystems. Based on this concept, this research is aimed at assessing the public's perception of the conservation of mangrove ecosystems on Untung Jawa Island. The perception of the people of Untung Jawa Island towards the mangrove ecosystem will affect the attitude and support of the community towards mangrove conservation efforts on the island. The perception of the people of Untung Jawa Island is closely related to the behavior of the community in supporting the conservation of the mangrove ecosystem on the island.

Research Methodology

Research sites

This research activity was carried out in Untung Jawa Island, Untung Jawa Island Village, South Thousand Islands District, Thousand Islands Administrative District, Jakarta Province. The activity time is from November to December 2021. Untung Jawa Island is located on the north side of the mainland of Jakarta Province. Geographically, Untung Jawa Island is located at a position of 05 degrees 58' 45.21" south latitude and 106 degrees 42" 11.07" east longitude.

Sampling

This study uses a quantitative approach. This approach prioritizes empirical studies to collect, display, and analyze data in numerical form. In this study, sampling was carried out using the simple random sampling method. The unit of analysis used is the head of the household or the head of the household. This study selects the head of the household as the respondent who represents the household in Pulau Untung Jawa Village. Village statistics show that the number of families in Untung Jawa Island Village is 746 families. Referring to Suharsimi's (2018) suggestion, the number of respondents that must be taken is 76 respondents. Primary data collection was done by using interviews and questionnaires. Interviews were also conducted with key respondents, namely three community leaders who have knowledge of the research topic. The questionnaire used in this study used open questions and closed questions. Open-ended questions were used to gather information from the people of Untung Jawa Island regarding the conservation of mangrove ecosystems. Closed questions were used to measure the level of community perception of Untung Jawa Island on the conservation of the mangrove ecosystem on the island.

Analysis method

The analytical method used in this research is the descriptive method and the multiple linear regression method. Descriptive method is used to describe the performance and distribution of data from interviews and questionnaires. Multiple Linear Regression method was used to assess the factors that influence the level of community perception of Untung Jawa Island on the conservation of mangrove ecosystems. Data analysis was performed using SPSS Release 10 software.

Variable measurement

Table 1 presents the indicators used to measure the perception of the people of Untung Jawa Island towards the conservation of the mangrove ecosystem on the island. these indicators are adapted from various references that are relevant to the topic of this research. In this study, the level of community perception of Untung Jawa Island towards mangrove ecosystem conservation was measured using a five-point Likert scale; ranging from 1 (strongly disagree) to 5 (strongly agree). Furthermore, this study also seeks to examine individual characteristics that have the potential to influence the perception of the people of Untung Jawa Island towards the conservation of mangrove ecosystems. Individual characteristics referred to here are gender, age, education level, number of family members, type of work, area of origin, income level.

Table 1: The indicators used to measure the perception of Untung Jawa Island society towards the mangrove ecosystems conservation

No.	Variables	Indikators
1	Physical function of mangrove forest	a. As a damper for ocean waves b. As a damper for the sea breeze c. As a beach protector from abrasion d. As a mud retainer e. As a sediment trap f. As a barrier to sea water seepage into the land
2	Chemical function of mangrove forest	a. As a place for the oxygen recycling process b. As a carbon dioxide absorber c. As a treatment for waste materials
3	Biological function of mangrove forest	a. As a breeding area for birds and animals b. As a source of germplasm and genetics c. As a natural habitat for various types of land and marine biota d. As a producer of weathering materials which are important food for small animals e. As a spawning ground for marine animals f. As a nursery ground for shrimp and fish g. As a feeding ground for marine animals
4	Economic function of mangrove forest	a. As a provider of industrial raw materials b. As a producer of fish, shrimp, crab seeds c. As a producer of firewood and charcoal d. As a producer of wood for buildings and household furniture
5	Tourism function of mangrove forest	a. As a coastal natural tourist area b. As a learning resource for students c. As a conservation area d. As a research area

Source: Bengen (2000)

Results and Discussion

Overview of Untung Jawa Island and its inhabitants

Administratively, Untung Jawa Island is one of the 15 islands in Untung Jawa Island Village, South Thousand Islands District, Thousand Islands Administrative District, DKI Jakarta Province, Indonesia. During the Dutch colonial period, the islands in the area of Untung Jawa Island Village were already controlled by indigenous people. The indigenous people who control the islands in the village of Pulau Untung Jawa are people who come from the island of Java. In the 1920s, the area of Untung Jawa Island Village was led by someone who was usually called Bek Fi'i and Bek Kasim. Defender Fi'i and Defender Kasim are domiciled on Kelor Island, but also lead several islands around Kelor Island, including Amsterdam Island.

In the 1930s, the mainland of the island of Kelor experienced massive abrasion. Because of that, the ruler of the island of Kelor asked the people living on the island of Kelor to move to the island of Amsterdam. The original inhabitants of the island of Amsterdam accepted the transferees from the island of Kelor with open arms. In the 1940s, Amsterdam Island changed its name to Untung Jawa Island, which meant good luck for people who at that time moved from mainland Java. Some of the Lurah figures who have led Untung Jawa Island include Defender Marah, Defender Midih, Defender of Headquarters, and Defender of Saenan.

In the 1940s, Untung Jawa Island was attacked by a large malaria epidemic. Therefore, Bek Saenan suggested to the people of Untung Jawa Island to move to Ubi Besar Island. However, not long after the people of Untung Jawa Island moved to Pulau Ubi Besar, it turned out that Ubi Besar Island was experiencing massive abrasion. Seeing the increasingly critical condition of the island, the Lurah Maesan asked the people of Ubi Besar Island to move back to Untung Jawa Island. After Indonesia's independence, there was a change in the governance mechanism. At that time, Defender Saenan was replaced by the first Lurah, namely Lurah Maesan. In 1954, the Lurah of Untung Jawa Island, together with the residents of Untung Jawa Island, took the initiative to establish a special monument, as a commemoration of the migration of the population from Ubi Besar Island to Untung Jawa Island. Since then, the people of Untung Jawa Island have become more advanced with the support of the DKI Jakarta Provincial government. Some of the figures who became the Lurah of Untung Jawa Island, among others, were the Head of Maesan, Muran, Sumawi, Marzuki, Safi'i, Abdul Manaf, Machbub Sanadi, Haman Sudjana, Ambas, Slamet Riyadi S.sos. Lurah Agus Irwanto, Lurah Eko Suroyo, S.Sos., M.Si, Lurah Supriyadi S.Ip. Figure 1 shows the characteristics of the respondents studied in this study. As shown in the figure, it is known that the majority of the population of Untung Jawa Island are men (84.2 percent) while the rest are women. In general, the majority of the population of Untung Jawa Island are indigenous people who have lived

on the island for a long time (89.5 percent) while the rest are immigrants who come from various regions, mainly from the island of Java. In terms of age, this study found that the majority of the population of Untung Jawa Island are aged between 41 – 50 years (44.7 percent), followed by residents aged 30 – 40 years (35.5 percent), residents aged over 50 years (11.8 percent), and residents aged over 50 years (11.8 percent). aged under 30 years (7.8 percent).

The next characteristic of respondents is their type of work. The results of the analysis show that the majority of the livelihoods of the residents of Untung Jawa Island are farmers and fishermen (35.5 percent). The rest, almost evenly distributed, are employees who work in government agencies (23.6 percent), tradesmen and entrepreneurs (22.3 percent), and crew members (18.4 percent). For the education level of the population of Untung Jawa Island, the results of the analysis show that the majority of the population is high school education (47.3 percent).

Next are the population with a junior high school education (32.9 percent), the population with a bachelor's education (14.4 percent), and the population with an elementary school education (5.2 percent). The last is the number of family members from the population of Untung Jawa Island.

As shown in Figure 1, it is known that the majority of the family members of the population of Untung Jawa Island are 4 people (42.1 percent). This is followed by the number of family members of 3 people (31.8 percent), the number of family members of 5 people (14.4 percent), the number of family members of 2 people (11.8 percent).

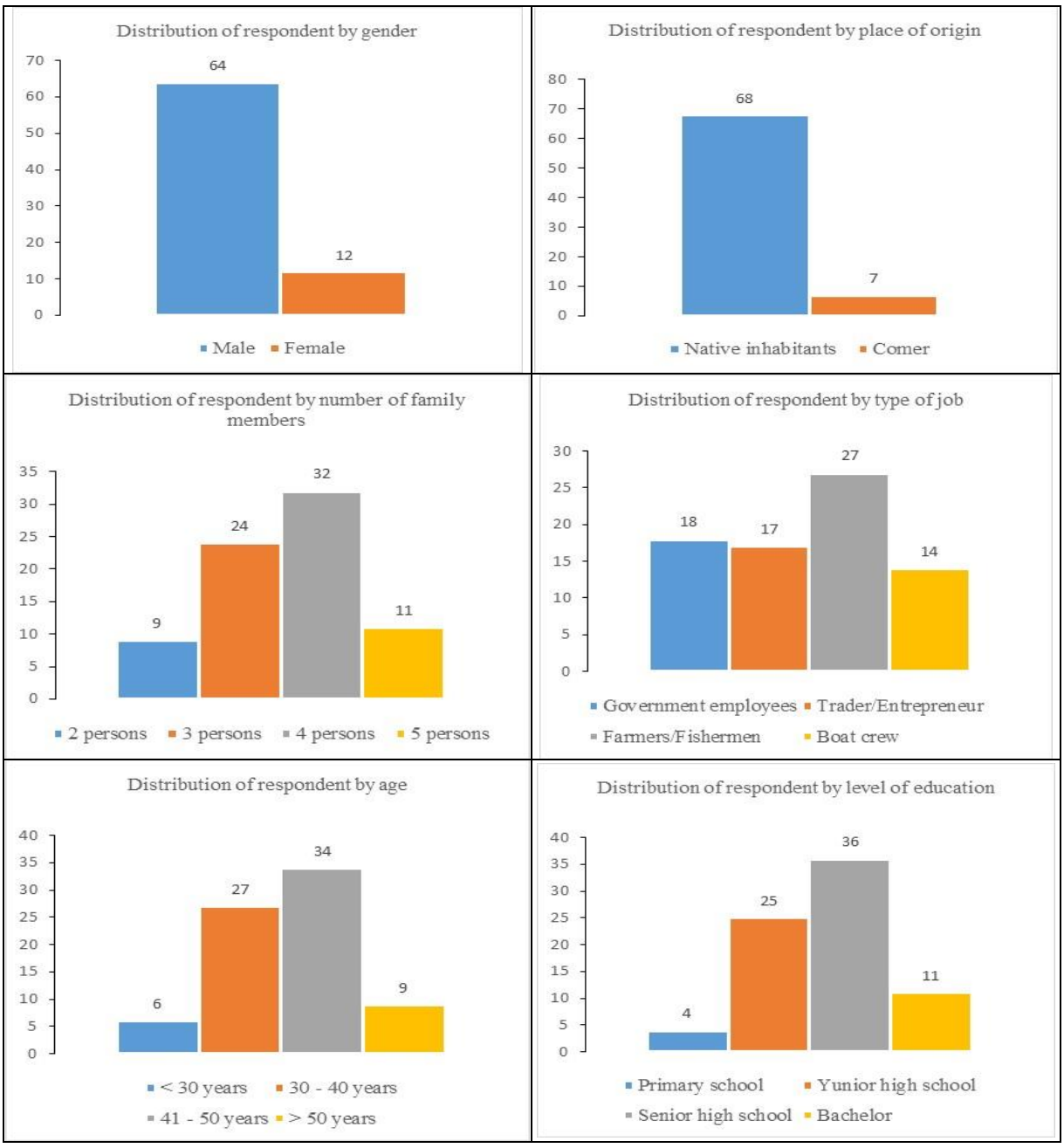

Fig 1: Characteristics of the population of Untung Jawa Island

Descriptive analysis

To provide a clearer picture of the indicators used to measure the research variables, the following is a descriptive analysis of each indicator used in this study.

Physical function of mangrove forest

In this study, the perception of the people of Untung Jawa Island on the physical function of the mangrove ecosystem was measured using six indicators. Figure 2 below shows the response performance of the respondents for the five indicators. as shown in Figure 2, it is known that the indicator of the physical function of the mangrove forest that has the highest score is the function of the mangrove ecosystem as a damper for sea breezes (PF1 = 4.49 points). This is followed by the function of the mangrove ecosystem as a mudguard (PF4 = 4.27 points), the function of the mangrove ecosystem as coastal protection from abrasion (PF3 = 3.95 points), the function of the mangrove ecosystem as a sediment trap (PF5 = 3.72 points), the function of the mangrove ecosystem as a wave absorber. the sea (PF1 = 3.53 points), and the function of the mangrove ecosystem as a barrier to seawater seepage to the land (PF6 = 3.18 points).

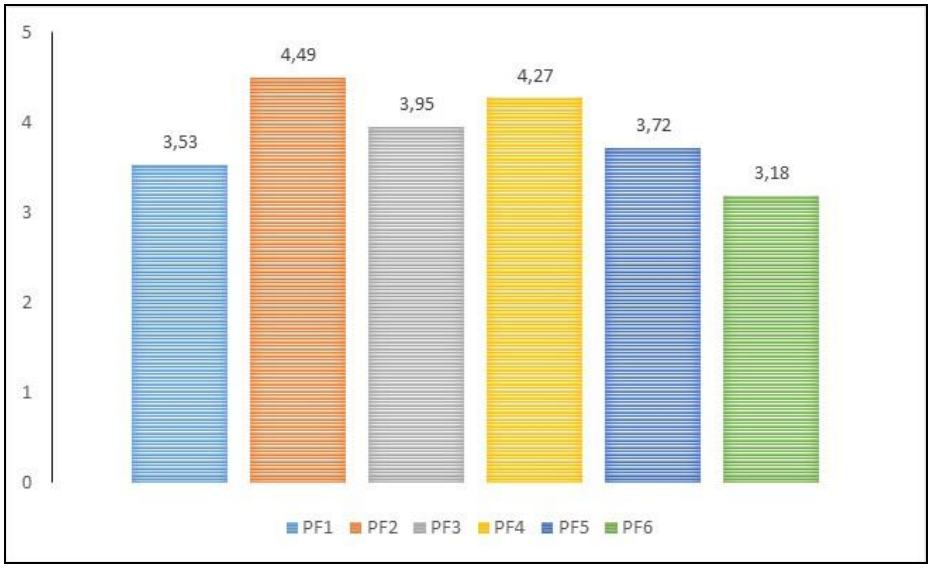

Fig 2: Society perception towards physical function of mangrove ecosystem

Chemical function of mangrove forest

In this study, the perception of the people of Untung Jawa Island on the chemical function of the mangrove ecosystem was measured using three indicators. Figure 3 below shows the response performance of the respondents for the five indicators. as shown in Figure 3, it is known that the indicator of the chemical function of the mangrove forest that has the highest score is the function of the mangrove ecosystem as a carbon dioxide absorber (CF1 = 4.26 points). This is followed by the function of the mangrove ecosystem as processing waste materials (CF3 = 3.53 points), and the function of the mangrove ecosystem as a place for the oxygen recycling process to occur where the oxygen recycling process occurs (CF1 = 3.31 points).

Fig 3: Society perception towards chemical function of mangrove ecosystem

Biological function of mangrove forest

In this study, the perception of the people of Untung Jawa Island on the biological function of the mangrove ecosystem was measured using seven indicators. Figure 4 below shows the response performance of the respondents for the five indicators. as shown in Figure 4, it is known that the indicator of the biological function of mangrove forests that has the highest score is the function of the mangrove ecosystem as a feeding ground for marine animals (BF7 = 4.39 points). This is followed by the function of the mangrove ecosystem as a source of germplasm and genetics (BF2 = 4.24 points), the function of the mangrove ecosystem as a producer of weathering materials which are important food for small animals (BF4 = 4.18 points), the function of the mangrove ecosystem as a nursery ground.) shrimp and fish (BF6 = 3.95 points), the function of the mangrove ecosystem as a natural habitat for various types of land and marine biota (BF3 = 3.59 points), the function of the mangrove ecosystem as a breeding area for birds and animals (BF1 = 3.43 points), and function of the mangrove ecosystem as a spawning ground for marine animals (BF5 = 3.25 points).

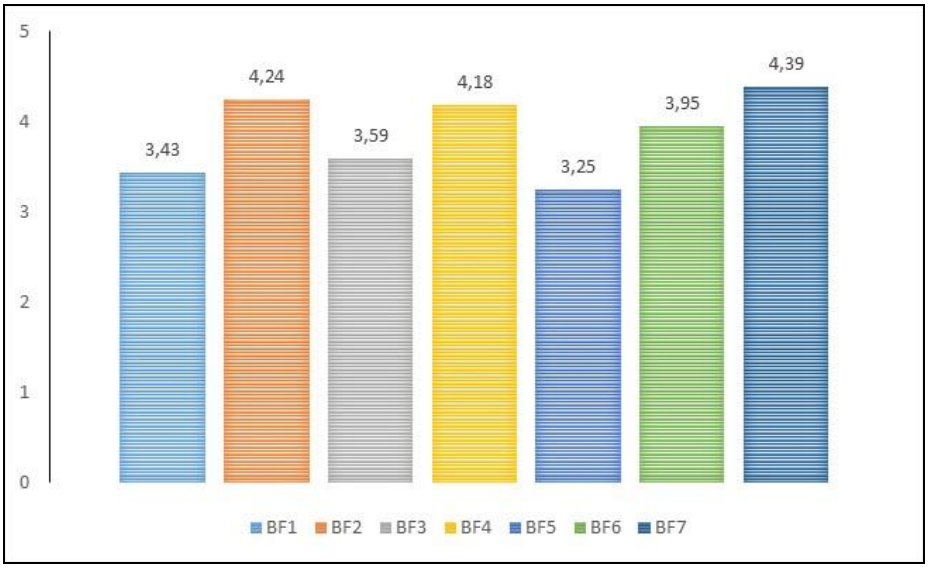

Fig 4: Society perception towards biological function of mangrove ecosystem

Economic function of mangrove forest

In this study, the perception of the people of Untung Jawa Island on the biological function of the mangrove ecosystem was measured using seven indicators. Figure 5 below shows the response performance of the respondents for the five indicators. as shown in Figure 5, it is known that the indicator of the economic function of mangrove forests that has the highest score is the function of the mangrove ecosystem as a provider of industrial raw materials (EF1 = 4.17 points). This is followed by the function of the mangrove ecosystem as a producer of firewood and charcoal (EF3 = 3.99 points), the function of the mangrove ecosystem as a producer of wood for buildings and household furniture (EF4 = 3.62 points), and the function of the mangrove ecosystem as a producer of fish seeds, shrimp, crab (EF2 = 2.83 points).

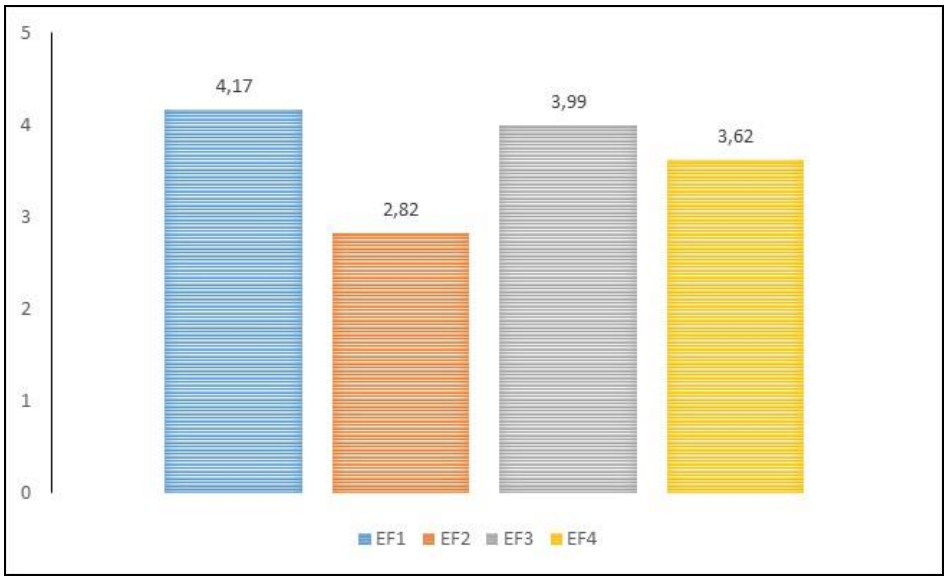

Fig 5: Society perception towards economic function of mangrove ecosystem

Ecotourism function of mangrove forest

In this study, the perception of the people of Untung Jawa Island on the biological function of the mangrove ecosystem was measured using seven indicators. Figure 6 below shows the response performance of the respondents for the five indicators. as shown in Figure 6, it is known that the indicator of the function of mangrove forest ecotourism which has the highest score is the function of the mangrove ecosystem as research area (TF4 = 3.92 points). This is followed by the function of the mangrove ecosystem as a coastal natural tourism area (TF1 = 3.68 points), the function of the mangrove ecosystem as a conservation area (TF3 = 3.25 points), and the function of the mangrove ecosystem as a learning resource for students (TF2 = 3.21 points).

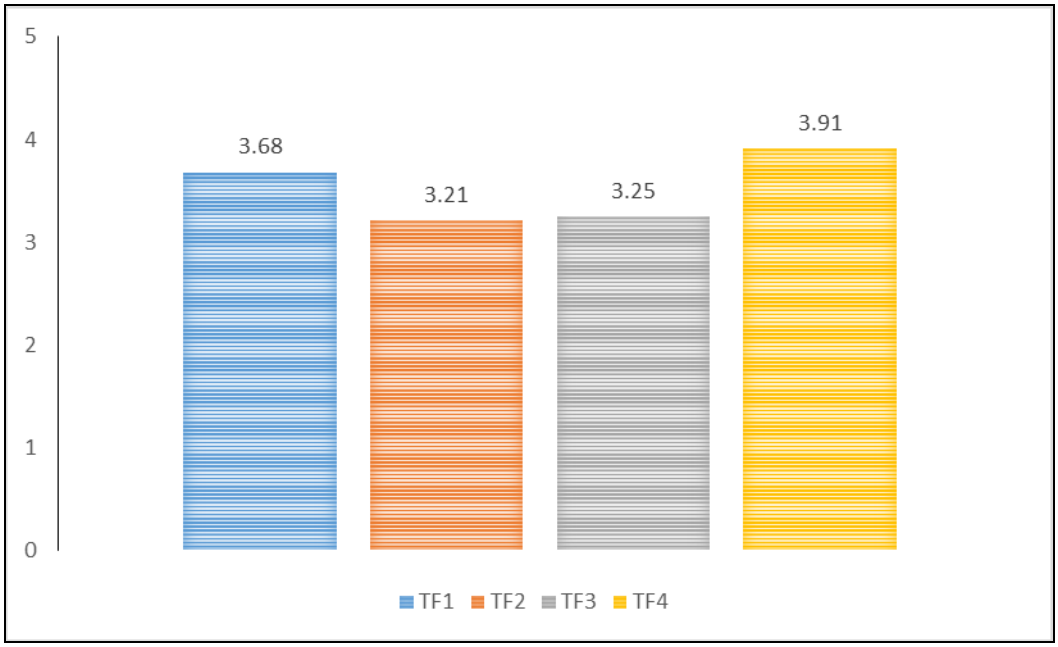

Fig 6: Society perception towards ecotourism function of mangrove ecosystem

Multiple linear regression analysis

This study uses Multiple Regression Analysis to investigate the effect of independent variables on the dependent variable. The independent variables in this study are individual characteristics, namely gender, age, education level, number of family members, type of work, area of origin, income level. The dependent variable in this study is the level of community perception of Untung Jawa Island on the conservation of mangrove ecosystems. The results of the MRA show that the correlation value between individual characteristics and the perception of the people of Untung Jawa Island on the conservation of mangrove ecosystems is 0.63 at a significance level lower than 0.01. This correlation value indicates that the relationship between the independent variables (namely gender, age, education level, number of family members, type of work, area of origin, and income level) and the dependent variable (namely the perception of the people of Untung Jawa Island on mangrove ecosystem conservation) is included in the strong enough category.

Furthermore, the MRA results show that the calculated F value of the correlation between individual characteristics (ie gender, age, education level, number of family members, type of work, area of origin, income level) and the community's perception of Untung Jawa Island towards mangrove ecosystem conservation is 26.1 at the level of significance lower than 0.01. This calculated F value indicates that the simultaneous influence of individual characteristics (ie gender, age, education level, number of family members, type of work, area of origin, income level) on the perception of the people of Untung Jawa Island on mangrove ecosystem conservation is significant. In other words, the regression model developed in this study can be used to predict which factors of individual characteristics (ie gender, age, education level, number of family members, type of work, area of origin, income level) are significant predictors of the perception of the people of Untung Jawa Island towards the conservation of mangrove ecosystems.

Furthermore, the MRA results indicate that there are three factors of individual characteristics that are significantly predictors of the perception of the people of Untung Jawa Island towards the conservation of mangrove ecosystems. These three individual characteristic factors are education level, type of work, and area of origin. In other words, the level of education, type of work, and area of origin individually have a significant influence on the perception of the people of Untung Jawa Island on the conservation of mangrove ecosystems.

Efforts to promote mangrove forests as one of the green economic assets in Indonesia are an important agenda in the current development process. A green economy is an economy that results in increased human well-being and social equity but reduces environmental risks and ecological scarcity. The concept of a green economy emerged after the symptoms of climate change that caused environmental damage throughout the world due to economic activity. One of the main supports to meet the economic needs of the Indonesian people is the forestry sector, one of which is the mangrove forest (Prasetiyo *et al*., 2016) [12].

Untung Jawa Island is one of the tourist destinations that offers various types of water tourism and mangrove forests. Untung Jawa Island has a land area of 40.1 ha with a potential mangrove area of 3.1 ha. The types of mangroves found on Untung Jawa Island are Rhizopora mucronata and Avicenia alba. Many people use the mangroves on Untung Jawa Island as a place for fish spawning, windbreaks and wavebreaks. So far, the people of Untung Jawa Island still have a high awareness of not destroying mangroves. However, with the increase in tourism activities and population growth, it is possible for the community to expand their land by opening new land in the mangrove forest area. To anticipate these conditions, it is necessary to continuously raise awareness to the community about the function and potential of mangrove forests (Prasetiyo *et al*., 2016) [12].

Conclusion

As stated in the literature, the majority of the people of Untung Jawa Island also have a similar view that the mangrove ecosystem on Untung Jawa Island, Untung Jawa Island Village, South Thousand Islands District, Thousand Islands Administrative District, DKI Jakarta Province, has a very important role for the island community. the. In this case, the community views that the functions of the mangrove ecosystem on Untung Jawa Island can be divided into physical functions, biological functions, chemical functions, economic functions, and tourism functions.

Taking into account the large role of the mangrove ecosystem on Untung Jawa Island, the majority of the island's people expressed their disapproval if the mangrove forests on the island underwent a conversion, either into shrimp ponds, fish ponds, or other forms of conversion. However, the facts on the ground show that the mangrove ecosystem on Untung Jawa Island is under increasing pressure due to human economic activities. Some areas of the mangrove forest on Untung Jawa Island have been converted into shrimp ponds and fish ponds. If this condition is allowed to continue, the rate of mangrove degradation on the coast of Untung Jawa Island will increase. Therefore, all stakeholders need to carry out various mangrove conservation efforts on the coast of Untung Jawa Island. In order for mangrove conservation efforts on the coast of Untung Jawa Island to run effectively, it is necessary to measure the perception of the island community towards the mangrove ecosystem. The positive perception of the people of Untung Jawa Island towards the mangrove ecosystem will affect their support for the success of mangrove conservation efforts on the island.

The results of the analysis show that the majority of the people of Untung Jawa Island have a positive and relatively high perception of the conservation of the mangrove ecosystem on the island. In particular, the MRA results indicate that education level, place of origin, and type of work significantly have a positive influence on the level of community perception of Untung Jawa Island on mangrove ecosystem conservation. The positive perception of the people of Untung Jawa Island towards the conservation of mangrove ecosystems is indicated by the following phenomena. First, there is a high understanding of the people of Untung Jawa Island that mangrove ecosystems have an important role in supporting the security of coastal communities from the threat of waves and sea storms. Second, the people of Untung Jawa Island do not want the conversion of mangrove forests to occur. The majority of the people of Untung Jawa Island support mangrove ecosystem conservation activities and want the mangrove ecosystem on the island to be managed sustainably.

Acknowledgement

This research was carried out with funding assistance from the Directorate General of Higher Education, Research, and Technology

References

1. Bengen DG. “Pedoman Teknis Pengenalan dan Pengelolaan Ekosistem Mangrove”, Pusat Kajian Sumber Daya Pesisir dan Lautan - Institut Pertanian Bogor, 2000.
2. Fadhila H, Saputra SW, Wijayanto D. “Nilai Manfaat Ekonomi Ekosistem Mangrove Di Desa Kartika Jaya Kecamatan Patebon Kabupaten Kendal Jawa Tengah”, *Diponegoro Journal of Maquares*,2015:4(3):180-187.
3. Fidyansari D, Sri Hastuty S. “Valuasi Ekonomi Ekosistem Mangrove Di Desa Barowa Kecamatan Bua Kabupaten Luwu”, *Jurnal Elektronik Universitas Cokroaminoto Palopo*, 2016, 1-14. https://core.ac.uk/download/pdf/267087408.pdf
4. Hairunnisa SK, Gai AM, dan Soewarni I. “Valuasi Ekonomi Hutan Mangrove Di Wilayah Pesisir Desa Boroko Kabupaten Bolaang Mongondow Utara Provinsi Sulawesi Utara”, *Jurnal Planoearth*,2018:3(1):17-22.
5. Harahab N. “Valuasi Ekonomi Ekosistem Hutan Mangrove Dalam Perencanaan Wilayah Pesisir”, *Berkala Penelitian Hayati*,2011:7A:59-67.
6. Harahab N. “Valuasi Ekonomi Ekosistem Hutan Mangrove Dalam Perencanaan Wilayah Pesisir”, *Berkala Penelitian Hayati*,2011:7A:59-67.
7. Indartik ML, Pribadi MA. “Valuasi Ekonomi Ekosistem Mangrove Dan Kontribusinyaterhadap Pendapatan Rumah Tangga: Studi Kasus Desa Pemogan, Tuban Dan Kutawaru”, *Jurnal Penelitian Sosial dan Ekonomi Kehutanan*,2019:16(3):197-210
8. Indrayanti MD, Fahrudin A, Setiobudiandi I. “Penilaian Jasa Ekosistem Mangrove di Teluk Blanakan Kabupaten Subang”, *Jurnal Ilmu Pertanian Indonesia* (JIPI),2015:20(2):91-96.

9. Kurniawati ND, *Pangaribowo EH*. "Valuasi Ekonomi Ekosistem Mangrove Di Desa Karangsong, Indramayu", *Jurnal Bumi Indonesia*,2017:6(2):1-12.
10. Nahib I, Sudarmadji BW. "Neraca dan valuasi ekonomi hutan mangrove di Kabupaten Pohuwatu, Provinsi Gorontalo", *Globe*,2010:12(1):28-36.
11. Pearce DW. "The economic value of forest ecosystems", *Ecosystem Health*,2001:7(4):284-296.
12. Prasetiyo DE, Zulfikar F, Shinta, Zulkarnain I. "Valuasi Ekonomi Hutan Mangrove di Pulau Untung Jawa Kepulauan Seribu: Studi Konservasi Berbasis Green Economy", *OmniAkuatika*,2016:12(1):48-54.
13. Putranto S *et al*. "Valuasi Ekonomi Sumberdaya Hutan Mangrove Di Pesisir Kabupaten Banggai Dan Banggai Kepulauan Sulawesi Tengah", *Jurnal ilmu dan Tekhnologi Kelautan Tropis*,2017:9(2):645-656.
14. Rahardi W, Suhardi RM. "Keanekaragaman Hayati Dan Jasa Ekosistem Mangrove Di Indonesia", Prosiding Symbion (Symposium on Biology Education), 2016, 499-510.
15. Rospita J, Zamdial, Renta PP. "Valuasi Ekonomi Ekosistem Mangrove Di Desa Pasar Ngalam Kabupaten Seluma", *Jurnal Enggano*,2017:2(1):115-128.
16. Setiawan H, Purwanti R, Garsetiasih R. "Persepsi Dan Sikap Masyarakat Terhadap Konservasi Ekosistem Mangrove Di Pulau Tanakeke Sulawesi Selatan", Jurnal Penelitian Sosial dan Ekonomi Kehutanan,2017:14(1):57-70.
17. Setiyowati D, Supriharyono S, Triarso I. "Valuasi Ekonomi Sumberdaya Mangrove Di Kelurahan Mangunharjo, Kecamatan Tugu, Kota Semarang", *Saintek Perikanan: Indonesian Journal of Fisheries Science and Technology*,2017:12(1):67-74.
18. Suzana BOL, Timban J, Kaunang R, Ahmad F. "Valuasi ekonomi sumberdaya hutan mangrove di Desa Palaes Kecamatan Likupang Barat Kabupaten Minahasa Utara", *ASE*,2011:7(2):29-38.
19. Uddin MS, Van Steveninck EDR, Stuip M, Shah MAR. "Economic valuation of provisioning and cultural services of a protected mangrove ecosystem: A case study on Sundarbans Reserve Forest, Bangladesh", *Ecosystem Services*,2013:5(1):88-93.
20. Wahyuni Y, Putri EIK, Simanjuntak SMH. "Valuasi Total Ekonomi Hutan Mangrove Di Kawasan Delta Mahakam Kabupaten Kutai Kartanegara Kalimantan Timur", *Jurnal Penelitian Kehutanan Wallacea*,2014:3(1):1-12.
21. Widiastuti MMD, Ruata NN, Arifin T. "Valuasi Ekonomi Ekosistem Mangrove Di Wilayah Pesisir Kabupaten Merauke", *Jurnal Sosial Ekonomi Kelautan dan Perikanan*,2016:11(2):147-159.
22. Zuraidah S, Syahfitri H. "Valuasi ekonomi ekosistem mangrove di Kecamatan Samatiga Kabupaten Aceh Barat", *Acta Aquatica*,2015:2(1):8-22.