

Awareness and Attitude of Local Communities towards Mangrove Conservation in Tapak Tugurejo, Semarang City

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Abstract. This research focuses on the awareness and attitude of local communities towards mangrove conservation in Tapak Tugurejo, Tugu District, Semarang City. Mangrove forests must be preserved so that they grow sustainably to obtain the resources needed to meet the needs of local communities along with the development of the community-based tourism industry. However, successful collaborative management of mangrove forests is challenging because there are no mutual obligations and clear legal commitments regarding community rights in utilizing the mangrove ecosystem. This research aims to (1) determine local community awareness of Tugurejo Semarang mangrove conservation regarding regeneration, restoration, and recreation, and (2) determine local community attitudes towards the Tugurejo Semarang mangrove forest. The relevance of this study is to provide information regarding mangrove conservation which increases the mangrove population in the area thereby providing protection and environmental services for wildlife, ecosystems, and communities in the Tugurejo area of Semarang. The descriptive method is used to identify different variables and presents quantitative research that uses survey methods to collect data from respondents. The findings are expected to show a significant relationship between local community attitudes towards mangrove forests and local community awareness of mangrove conservation in terms of regeneration, restoration, and recreation. The involvement of local communities in preserving the Tugurejo Semarang mangrove forest is very important because both are mutually beneficial. The novelty of this Environmental History perspective assumes the total interaction of local communities with the mangrove forests in their area.

Keywords: awareness and attitudes, local communities, mangrove conservation, Tugurejo Semarang.

1. Introduction

Mangroves are among the most threatened ecosystems in the world. Mangrove populations are estimated to have declined by 30-50% since the 1980s [1]. The main threat to mangroves is humans, the agents that change their structure. Mangroves have

been cleared for aquaculture and agriculture (e.g. rice fields, coconut and oil palm plantations), commercial logging, firewood and charcoal production, urban expansion, and coastal development. Aquaculture, especially shrimp, has the largest footprint on mangroves. This is especially true in Southeast Asian countries like Indonesia, the Philippines, Thailand, and Vietnam [2].

Semarang City is a coastal city in Indonesia that is currently one of the most developed cities on Java Island and is the capital of Central Java Province. It is undeniable that mangrove damage has occurred in Semarang City, both caused by humans and nature. Mangrove forest damage in Semarang City began in 1980-1990 due to illegal control of mangrove forest areas and conversion into shrimp ponds or industry. Until 2009, the coast of Central Java had experienced abrasion of 5,600 hectares (16%). This figure does not include damage to surrounding coral reefs and former mining areas. Consequently, environmental problems such as tidal flooding, abrasion, land subsidence, and seawater intrusion occurred [3].



Figure 1. Map of Tugurejo Village, Tugu District, Semarang City
Source: <https://kectugu.semarangkota.go.id/kelurahan-tugurejo>

The coastal area zone protected by mangrove forests or mangroves according to the Semarang City Spatial Plan (Rencana Tata Ruang dan Wilayah) for 2011-2031 has an important role in maintaining coastal and marine ecosystems. The RTRW also sets priority one for Tugurejo and Karanganyar Villages for land development and mangrove area embryos. The Tapak mangrove forest is located in Dukuh Tapak, Tugurejo Village, Tugu District, Semarang City. It has a special role in protecting the coast from negative impacts such as abrasion, intrusion of well water into brackish water, flooding, and pollution of the Tapak River by industrial waste, especially in the upstream area of the Tapak Watershed.

The condition of mangrove forests in Semarang City has been degraded for years as a result of abrasion and changes in land use. Many efforts have been made, both by the government and the community in the coastal areas of Semarang City. Even so, the damage is still ongoing, so preservation is a very important need as a step to adapt to climate change in the most effective coastal areas. Mangrove conservation can protect coastal areas from abrasion, rising sea levels, and extreme weather due to climate change. In addition, mangrove forests also have a significant capacity to reduce carbon emissions, so they can be part of a global climate change mitigation strategy [4].

The environmental problems that have occurred have harmed the social and economic life of the Tapak population, especially the shrimp farmers because their land has been damaged, affecting the productivity of the shrimp ponds. Residents who are members of the Tapak Environmental Care Youth Association (Prenjak) have taken real action to overcome environmental problems as a way to rise from adversity. Some community groups in the Tapak mangrove forest environment: Prenjak (Perkumpulan Pemuda Peduli Lingkungan Tapak), 'Sido Rukun' Shrimp Farmers Group, 'Rukun Makmur' Fishermen Group.

2. Theoretical framework

Mangrove conservation is one of the most effective ways to preserve mangrove trees, which will increase the ability of local communities to defend themselves while preserving the environment. The best type of mangrove conservation as discussed by Camacho et al. is community-based because it distributes responsibility to community groups that depend on local resources and have a strong interest in protecting the mangrove ecosystem [5]. Mangrove plants will help reduce the unclear impacts that will certainly have an impact on the community's ecological system. Mangrove forests must be preserved so that they can continue to grow sustainably, and at the same time, the environment will obtain the resources needed to meet its needs as the community tourism industry develops. Worthington et al. stated that the success of collaborative mangrove forest management is a challenge because there is no clear joint obligation and legal commitment regarding community rights to utilize the mangrove ecosystem. The most recommended action to conserve and maintain coastal mangrove forest areas is to repair the damage that has occurred in the place where the mangroves grow [6].

In mangrove forests, there are hundreds of areas that are in dire need of management, awareness, and attention for sustainable development. However, due to the negative impacts that occur in society, protecting mangrove forests is very challenging. Climate change, excessive deforestation, construction of various buildings, natural disasters, anthropogenic pollution, coral reef death, river diversion, and other adverse impacts caused by unanticipated threats are some of the negative impacts that may occur. Along with the increasing understanding of the importance of mangrove forests, local governments and communities are trying to replenish or restore

mangrove forests and strengthen legal institutions that will control the use of mangrove forests in the future, according to research by Nguyen et al. [7]. Due to its continued dependence on marine resources. Tapak Tugurejo will no longer be a diverse community if these adverse impacts continue. The overall marine ecology will also be threatened.

Mangrove forest protection prevents ocean siltation, protects land areas from storm damage, routinely degrades pollutants, filters sediment, and protects sensitive beaches in the city. According to Raihan et al., the assessment of the benefits of mangroves not utilized by the community must be carried out with social, environmental, and political experts to increase trust and eliminate conflicts of interest [8]. Therefore, this study assesses the awareness and attitudes of local communities towards mangrove conservation which provides relevant information on mangrove conservation that strengthens the mangrove population in the area so that they can continue to provide protection and environmental services for wildlife, ecosystems, and communities in the Tapak area, Tugurejo, Semarang city. It also aims to provide better opportunities for residents by providing sustainable livelihoods and ensuring a healthy environment for future generations.

3. Methodology

This study uses historical methods, which include the following steps: heuristic in the form of primary and secondary source searches, source criticism involves evaluating the reliability and credibility of the sources collected, interpretation is the process of analyzing and synthesizing the evidence from various sources to create a coherent narrative or argument about the past, and historiography is the study of how history has been written and interpreted over time. Data collection through literature studies and in-depth interviews with respondents. Respondents consist of representatives of fishermen, conservation figures, fish farmers, and residents of Tapak Tugurejo, Semarang City.

4. Result and Discussion

4.1 Residents' awareness of Tugurejo mangrove forest conservation

4.1.1 Regeneration

Respondents have a high awareness of mangrove conservation in terms of regeneration. According to respondents, after deforestation, more mangrove trees need to be planted to reduce carbon dioxide in the atmosphere. This is shown by respondents stating their agreement. Furthermore, efforts to clean up marine resources, such as expanding projects that provide opportunities to preserve mangrove areas, are carried out to ensure the sustainability of the project. In addition, maintaining beauty for better tourist attractions. In addition, continuing to monitor previously planted mangrove seedlings, generating sustainable income, and carrying

out regeneration are also important to prevent natural disasters such as floods, storm surges, etc., and planting trees is effective in maintaining beauty. The increase in environmental awareness in maintaining and preserving the mangrove ecosystem is relatively even among respondents.

Based on the interviews, residents agreed on the need for more mangrove planting practices to reduce carbon dioxide in the atmosphere after deforestation and emphasized the need to do so. The conclusion of Ellison et al.'s study is that there is a strong need to restore or rehabilitate mangroves to address the ongoing loss of mangroves worldwide and that the number of mangrove restoration projects globally has almost tripled in the last 20 years, which may be similar to what is happening today [9]. On the other hand, this study also shows that residents continue to monitor previously planted mangrove seedlings, that regeneration is important to prevent natural disasters such as floods, storm surges, etc., and that tree planting is an effective way to maintain beauty for better tourism attractions.

This may be similar to the findings of Andradi-Brown et al. research, which showed the importance of mangrove forests. As a result, many projects to restore or rehabilitate deforested mangrove areas have been implemented, many of which aim to combine biodiversity conservation with the restoration of ecosystem services for the benefit of local communities [10]. Respondents strongly agreed that the implementation of the mangrove restoration platform provides important mangrove ecosystem services such as coastal protection and fisheries. Followed by the implementation of environmental actions that help restore the loss and degradation of mangrove biodiversity.

Therefore, respondents strongly agree with the development of long-term solutions that help restore mangrove forests. In addition, they stated that improving coastal security will maximize the most diversified and robust mangrove environments and that preserved mangrove forests will protect the number of mangrove populations.

4.1.2 Restoration

Interview results show that residents who implement the mangrove restoration platform provide important benefits to the mangrove ecosystem such as fisheries and coastal protection. This may be similar to the findings of Imbert's study, which found that mangroves have many similarities to plant species and can thrive quickly in coastal habitats with few options. Overall, marine ecosystems recover faster due to natural causes than other marine ecosystems [11].

Initial signs of recovery can be seen within three to five years of new mangrove forest clearing, although it may take time for environmentally friendly forests to fully recover. On the other hand, these findings also suggest that locals are improving coastal security while maximizing the most diverse and resilient mangrove environments and conserving mangrove plants to maintain their abundance. This may contradict the results of Mukherjee et al., who showed that storm surge and wave

energy waste are very important in terms of risk management and insurance issues [12].

4.1.3 Recreation

Concerning regeneration in mangrove conservation, respondents agree with the strong movement for protecting and conserving resources. They strongly agree with the provision of protection and environmental services for wildlife ecosystems, and the Tapak Tugurejo community. Followed by clean coastal areas for the ecological sustainability of mangrove planting in the area they also strongly agree. Furthermore, respondents agree with outreach to increase awareness of survival in their area. They also strongly agree with the form of organization that will manage the mangrove area in the community. This is followed by ensuring a healthy environment for future generations by preserving and restoring mangrove forests in Tapak Tugurejo, installing natural barriers against storm surges and floods in the surrounding community, and rebuilding new facilities for tourists that will provide many profit opportunities.

The interview results showed that local communities are making strong movements to protect and conserve resources. This may be in line with the findings shown in the study by Firdaus et al. that local community participation in mangrove forest management is an efficient strategy to conserve and improve the protective function of mangrove forests while generating income for the community and encouraging improvements in governance and assessment of natural resources [13].

Better conservation planning and management depend on assessing the condition of mangrove forests. In addition, the two results showed that Barangay officials, residents, and tourists who conduct outreach will raise awareness of the sustainability of the area and form organizations that will manage the mangrove area in the community. This may be in line with the findings shown in the study by Kadaverugu et al., which stated that mangroves also provide cultural ecosystem services to coastal communities, including practical benefits such as recreation and intangible benefits such as aesthetic appeal and spiritual quality [14].

4.2 Residents' attitudes towards Tugurejo mangrove forest conservation

Respondents strongly agreed with the attitude that prioritizes the benefits of mangrove forests. Continued by holding meetings regarding mangrove improvement plans and actions and demonstrating perseverance through active participation in maintaining the cleanliness of the mangrove area. In addition, they agreed to attend counseling related to mangrove forest conservation.

On the other hand, respondents showed an attitude of agreement with the restoration of mangrove damage to obtain important resources. Followed by the cutting of mangroves for the construction of facilities will harm local communities also stated in the agreement. The results show that residents highly value the benefits of mangrove

forests. This may be in line with the findings shown in Roy's study that residents' privileges over common property have special significance for environmentalists, who often focus their research on methods to involve various stakeholders in ecological services (e.g., common resource guards, replanting, etc.) [15]. Consequently, local communities feel and think that mangrove forest protection has an impact on the way they utilize resources. To build traditional communities usually use local ecological knowledge (LEK) in the practice of resource extraction and utilization.

In addition, the results of the study also revealed that local people who restore mangrove damage can obtain important resources. This may be in line with the findings shown in the study by Romañach et al. that at the international, national, and local levels, sustainable conservation actions such as restoration programs and participatory management approaches are encouraged to the causes of mangrove degradation caused by human activities to stop mangrove loss and to encourage sustainable use and conservation [16].

5. Conclusion

The residents of Tapak Tugurejo in Semarang City are aware of the importance of mangrove forests, related to regeneration, restoration, and recreation in sustainable mangrove forest conservation. They show a positive attitude toward managing and monitoring the mangrove ecosystem to repair damage caused by human activities. Since the beginning of mangrove forest planting, the residents' attitude has been very enthusiastic in obtaining and creating best practices and activities for plantations to ensure sustainable growth. Maintaining biodiversity and reducing unpredictable impacts can be achieved by increasing residents' understanding of the need to protect mangrove forests in Tapak Tugurejo. Residents' participation in mangrove forest conservation is significant because they are the ones responsible for maintaining the local wildlife ecosystem and population.

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