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# THE ROLE OF THE COMMUNITY IN THE DEVELOPMENT OF MANGROVE FOREST ECOTOURISM IN PASAR BANGGI, REMBANG REGENCY

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## ABSTRACT

*Mangrove forests are one of the most productive ecosystems, located in tropical and subtropical coastal waters and river estuaries. Mangroves provide benefits to humans and the environment by providing shelter for brackish water organisms such as fish and shrimp. Pasar Banggi Mangrove Forest in Rembang Regency has a geographic location with a geographical position of 6º41'52.45 "- 6º41'52.66" LS and 111º23'19.80"-111º23'20.01" East. The Pasar Banggi area experienced a 353-meter coastline setback due to abrasion. This has resulted in degradation. Given the importance of the function of mangrove forests, it is appropriate to take serious measures to reduce the effects of degradation. One possible utilization effort is through mangrove conservation activities. An appropriate alternative to mangrove conservation to be developed in Pasar Banggi is the development of the ecotourism sector. The purpose of this study was to determine the role of the community and the development of mangrove ecotourism in the Pasar Banggi Mangrove Forest area. The method used in this research is convergent parallel mixed-method. Data collection methods using interviews and FGDs with relevant stakeholders. The results showed that the Pasar Banggi mangrove forest ecosystem was classified as the best ecosystem condition along the Pantura Line. Conservation efforts and community participation in suppressing mangrove degradation in Pasar Banggi Mangrove Forest is the establishment of the Sido Dadi Maju Farmer Group which is fully responsible for mangrove management and mangrove ecotourism development in Pasar Banggi Mangrove Forest.*
***Keywords**: Conservation; Ecotourism; Mangroves; Pasar Banggi.*

## ABSTRAK

*Hutan Mangrove merupakan salah satu ekosistem yang paling produktif, yang terletak di perairan pantai tropis dan subtropis serta muara sungai. Mangrove memberikan manfaat bagi manusia dan lingkungan dengan menyediakan tempat berlindung bagi organismo air payau seperti ikan dan udang. Hutan Mangrove Pasar Banggi di Kabupaten Rembang memiliki letak geografik dengan posisi geografis 6º41'52.45"- 6º41'52.66" LS dan 111º23'19.80" – 111º23'20.01" BT. Kawasan Pasar Banggi mengalami kemunduran garis pantai hingga sepanjang 353 meter dikarenakan pengaruh abrasi. Hal ini mengakibatkan terjadinya degradasi. Mengingat pentingnya fungsi hutan mangrove, maka sudah selayaknya dilakukan penanganan serius untuk mengurangi efek dari degradasi tersebut. Salah satu upaya pemanfaatan yang memungkinkan adalah melalui kegiatan konservasi mangrove. Alternatif konservasi mangrove yang tepat untuk dikembangkan di Pasar Banggi adalah pengembangan sektor ekowisata. Tujuan dari penelitian ini adalah untuk mengetahui peran masyarakat dan pengembangan ekowisata mangrove di kawasan Hutan Mangrove Pasar Banggi. Metode yang digunakan dalam penelitian ini adalah metode campuran konvergen paralel (convergent parallel mixed-method). Metode pengumpulan data dengan metode wawancara dan FGD dengan stakeholder terkait. Hasil peneliian menunjukkan bahwa ekosistem hutan mangrove Pasar Banggi tergolong dalam kondisi ekosistem terbaik di sepanjang Jalur Pantura. Upaya konservasi dan peran serta masyarakat dalam menekan degradasi mangrove di Hutan Mangrove Pasar Banggi adalah dengan dibentuknya*

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*Kelompok Tani Sido Dadi Maju yang bertanggung jawab penuh dalam pengelolaan mangrove dan pengembangan ekowisata mangrove di Hutan Mangrove Pasar Banggi.*
***Kata Kunci**: Konservasi; Mangrove;Pariwisata; Pasar Banggi.*

## A. INTRODUCTION

The world's mangrove forests cover an area of about 16,530,000 hectares, spread across all continents. In Asia, mangrove forests span 7,441,000 hectares, while in Africa they reach 3,258,000 hectares, and in the Americas they reach 5,831,000 hectares. Indonesia alone has a significant contribution to the global mangrove forest area, accounting for almost 50% of the total mangrove area in the Asian continent, and almost 25% of the total mangrove forest area worldwide (Kasai et al., 2024; Onrizal, 2010; Polidoro et al., 2010; Saintilan et al., 2014). The distribution of mangrove forests in Indonesia shows significant variation, with most of the area found in Papua, accounting for 69.43% of the total mangrove forest area in the country (Arifanti et al., 2022; Ilman et al., 2016; Karimah, 2017; Rizal, 2018). In addition, Sumatra has 15.46%, Kalimantan 9.02%, Sulawesi and Maluku about 2.35% each, while Java, Bali, Nusa Tenggara, have smaller contributions (Arifanti et al., 2022; Arifin & Wijaya, 2012; Karimah, 2017).

Mangrove forest is one of the coastal ecosystems that has a very important role in various aspects of life. According to Islam & Bhuiyan (2018), mangrove forests have ecological, social, economic, and physical functions. In particular, some of the important functions of mangrove ecosystems include: first, as a spawning, breeding, hatching, and nursery ground for a variety of aquatic fauna; second, in reducing the impact of tsunamis with the role of complex root systems that are able to absorb wave energy; third, protecting the coastline of communities in coastal areas from abrasion and erosion; and fourth, in reducing the impact of global climate change through carbon storage in soil and mangrove biomass (Ilman et al., 2016). Despite its important role, mangrove vegetation is increasingly under pressure in the form of degradation at an alarming rate.

The main factor accelerating mangrove forest degradation is rapid population growth, resulting in increased development in the vicinity. Mangrove land is often diverted for the development of settlements, industries, ponds, and other activities, causing the area of mangrove forests to shrink (Sari & Saidah, 2021). Lack of public knowledge about the role of mangrove ecosystems also exacerbates this problem, resulting in overexploitation due to overlapping sectoral and regional interests.

With the continued pressure on mangrove forests, conservation measures are becoming increasingly urgent. These actions aim to restore, maintain and strengthen the

functions of mangrove ecosystems, based on the principles of ecosystem balance and environmental sustainability (Baskara Andika et al., 2019; Tamrin Salim, Risma Illa

Maulany, 2020). Mangrove forest conservation can be interpreted as an effort to protect and preserve nature that involves securing areas as nature reserves, both for marine and coastal waters, as well as the mangrove forest itself (Mulyadi & Fitriani, 2014). Thus, solid and sustainable conservation efforts are key in maintaining the sustainability of mangrove forests and their benefits for human life and the environment (Das & Mandal, 2016).

Of the many mangrove forest ecosystems scattered in Indonesia, one example is in Pasar Banggi Village, Rembang Regency. Based on the previously described context regarding the importance of mangrove conservation and the challenges faced, it seems relevant to conduct further research on the role of the community and the potential for ecotourism development in Pasar Banggi Village. This research is directed at understanding more deeply how local communities can play a role in maintaining the sustainability of mangrove forests as well as the potential of ecotourism as a means of generating sustainable income (Arifin & Wijaya, 2012). By exploring the social aspects of mangrove conservation and ecotourism development, it is hoped that more effective and inclusive strategies can be found in involving communities in environmental conservation efforts. Therefore, this research can be a concrete step in supporting mangrove conservation efforts in Indonesia, especially in Pasar Banggi Village, as well as a model for other areas that have similar mangrove ecosystems.

## B. MATERIALS AND METHODS

The research was conducted in January 2023 in Pasar Banggi Mangrove Forest, Rembang Regency. The materials used in this study consisted of primary data and secondary data. The approach applied in this research is convergent parallel mixed-method, which combines quantitative and qualitative data together. The data were analyzed separately, and the results of the analysis of each data were combined to build an interpretation as part of the data analysis. The data sources used include observations in the field, interviews (FGDs) with the community and the management of the Pasar Banggi Mangrove Forest, data from sampling in the Pasar Banggi Mangrove Forest, and references from various scientific journals.

Socio-economic data collection was conducted through interviews and FGDs (Das & Mandal, 2016). Respondents were categorized into two groups, namely the community around the observation location and the management of the Pasar Banggi Mangrove Forest. FGDs were conducted to measure community perceptions and attitudes regarding issues related to the Pasar Banggi Mangrove Forest. Meanwhile, interviews with the management aimed to obtain information on management and conservation efforts. The questions asked were prepared in advance in the form of a questionnaire sheet to ensure consistency and relevance in data collection.

## C. RESULTS AND DISCUSSION

Rembang Regency, located in Central Java Province, has a direct border with the Java Sea in its northern part. Within this district is Pasar Banggi Village, a coastal area largely dominated by mangrove ecosystems, known as Pasar Banggi Mangrove Forest. The location of the Pasar Banggi Mangrove Forest area in Rembang Regency has geographical coordinates located between 6º41'52.45" - 6º41'52.66" LS and 111º23'19.80" - 111º23'20.01" BT.

### Flora and Fauna

The biodiversity of flora and fauna in the Pasar Banggi mangrove forest area is amazing. No less than 18 endemic bird species are found living there, providing a variety of beautiful sights and distinctive natural sounds. Among them, 7 bird species have been declared as protected, such as Kuntul Kecil, Raja Udang Biru, Kipasan Bergaris, Kuntul Kerbau, Cekakak Suci, Sungai Cekak dan Dara Laut. Their presence not only adds to the beauty of nature, but also enriches the ecosystem in this area.

Pasar Banggi is a very important place for the survival and development of these species. The mangrove forest is home to them, providing shelter and a rich source of food. The presence of these endemic and protected birds also reflects the success of conservation efforts carried out in this region.

**Table 1.** Fauna at Pasar Banggi

| No | Famili | Indonesian Name | Fauna Name | Description |
|---|---|---|---|---|
| 1. | Acanthizidae | Remetuk Laut | Cyomis Rufigastra | Remetuk Laut is a small bird often found in lowland forests. Its plumage is brown with white stripes on the underside. |
| 2. | Alcedinidae | Cekakak Suci | Todiramphus Sanctus | Cekakak Suci is a forest-dwelling bird that has bright blue and white plumage. They are often seen around calm waters. |
| 3. | Alcedinidae | Raja Udang Biru | Alcedo Coerulescens | Raja Udang Biru is a bird that has bright blue feathers and a long beak. They arefound along small, fast-flowing rivers. |

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| No | Famili | Indonesian Name | Fauna Name | Description |
|---|---|---|---|---|
| 4. | Apopidae | Walet Linci | Collocalia Linchi | Walet Linci are small birds. They are famous for their nests made from saliva. |
| 5. | Ardeidae | Kokokan Laut | Butorides Striata | Kokokan Laut is a medium-sized bird with a long neck. They are often seen around brackish waters and swamps. |
| 6. | Ardeidae | Kowak Malam Kelabu | Nycticorax Nycticorax | Kowak Malam Kelabu are swamp and river-dwelling birds that are nocturnal. They have gray-black plumage. |
| 7. | Ardeidae | Kuntul Besar | Ardea Alba | Kuntul Besar are large birds with long necks. They are often found along rivers and calm waters. |
| 8. | Ardeidae | Kuntul Kecil | Egretta Garzetta | Kuntul Kecil is a small bird with white feathers. They are often seen around swamps and shallow waters. |
| 9. | Campephagidae | Kapasan Sayap Putih | Lalage Sueurii | Kapasan Sayap Putih is a small bird with gray and white plumage. They are often seen in lowland forests. |
| 10. | Charadriidae | Cerek Jawa | Charadrius Javanicus | Cerek Jawa is a shore dwelling bird that has grayish-brown plumage. They are often seen foraging along sandy beaches. |
| 11. | Charadriidae | Cerek Tilil | Charadrius Alexandrinus | Cerek Tilil is a shore-dwelling bird of small size. They have pale brown feathers with white circles around the eyes. |
| 12. | Charadriidae | Cerek Pasir Besar | Charadrius Leschenaultii | Cerek Pasir Besar is a medium- sized shore-dwelling bird. They have gray and white plumage with a black ring around the neck. |
| 13. | Columbidae | Dederuk Jawa | Streptopelia Bitorquata | Dederuk Jawa is a medium-sized bird with gray feathers |
| 14. | Columbidae | Tekukur Biasa | Spilopelia Chinensis | Tekukur Biasa is a medium sized bird with a gray plumage color and a pink breast. They are often seen in urban and rural areas. |
| 15. | Dicaeidae | Cabai Jawa | Dicaeum Trochileum | Cabai Jawa is a small bird with bright greenp lumagecolor and a long tail. They are often seen in trees with lots of flowers or fruits. |
| 16. | Estrildidae | Bondol Peking | Lonchura Punctulata | Bondol Peking is a small bird with brown and white feathers and a long tail. They are often seen in open areas, such as grasslands and plantations. |
| 17. | Hirundinidae | Layang -Layang Batu | Hirundo Tahilica | Layang-layang Batu is a small bird with dark brown plumage color and a white breast. They are famous for their nests madeof mud and saliva. |
| 18. | Laridae | Dara Laut Putih | Chlidonias Hybrida | Dara Laut Putih is a medium-sized water bird with white feathers and black wings. They are often seen in waterways terbuka dan rawa-rawa yang dangkal. |

Witnessing the diverse flora and fauna at Pasar Banggi can provide visitors with an unforgettable experience. From the splashing water to the joyful singing of birds, the natural beauty realized here is an inspiration for the preservation of the environment and wildlife. By preserving this mangrove forest, we are not only protecting the existence of endangered species, but also preserving the incredible beauty of nature for future generations.

**Table 2.** Flora at Pasar Banggi

| No | Flora Name | Description |
|---|---|---|
| 1. | Rhizophora mucronata | Mangrove trees with strong aerial stalk roots (pneumatophores) and towering branches. |
| 2. | Avicennia marina | Mangroves are broad-leaved with white flowers and have aerialroots for breathing. |
| 3. | Sonneratia alba | Mangrove trees are often found along the coastline and havestriking white flowers. |
| 4. | Bruguiera sexangula | Mangroves with oval-shaped leaves and pink flowers, thrive intidal areas. |
| 5. | Ceriops tagal | A small mangrove tree with grayish-green leaves and yellow flowers that grows at low tidal heights. |
| 6. | Acanthus ebracteatus | A flowering plant with heart-shaped leaves and white to purpleflowers. |
| 7. | Excoecariaagallocha | A small mangrove tree with poisonous leaves, often found in swamps and riverbanks. |
| 8. | Lumnitzera littorea | Mangrove with oval-shaped leaves and flowers that grow in clusters at the ends of twigs. |
| 9. | Xylocarpusgranatum | Large mangrove trees with spherical fruits and towering aerial roots. |
| 10. | Nypa fruticans | Mangrove palm that grows in swamps and has broad leaves and flowers in bunches. |

## Coastal Abrasion

Scientific studies show significant changes in the coastline due to abrasion processes in the Pasar Banggi area in 1962. There was a 353-meter setback from the shoreline, as clearly illustrated in Figure 1. The impact caused by abrasion was the main driver for the emergence of efforts to manage and develop mangrove forest conservation in the Pasar Banggi area.

The dramatic decline of the coastline highlights the urgency of protecting and conserving the surrounding mangrove forest ecosystem. Mangroves not only serve as a natural protection against coastal abrasion, but also have an important role in maintaining marine biodiversity and as a refuge for various animal species. With the increasing awareness of the importance of environmental conservation, efforts to manage and develop mangrove forest conservation in Pasar Banggi are becoming increasingly urgent in order to preserve the coastline and marine ecosystems that are vulnerable to abrasion and degradation.

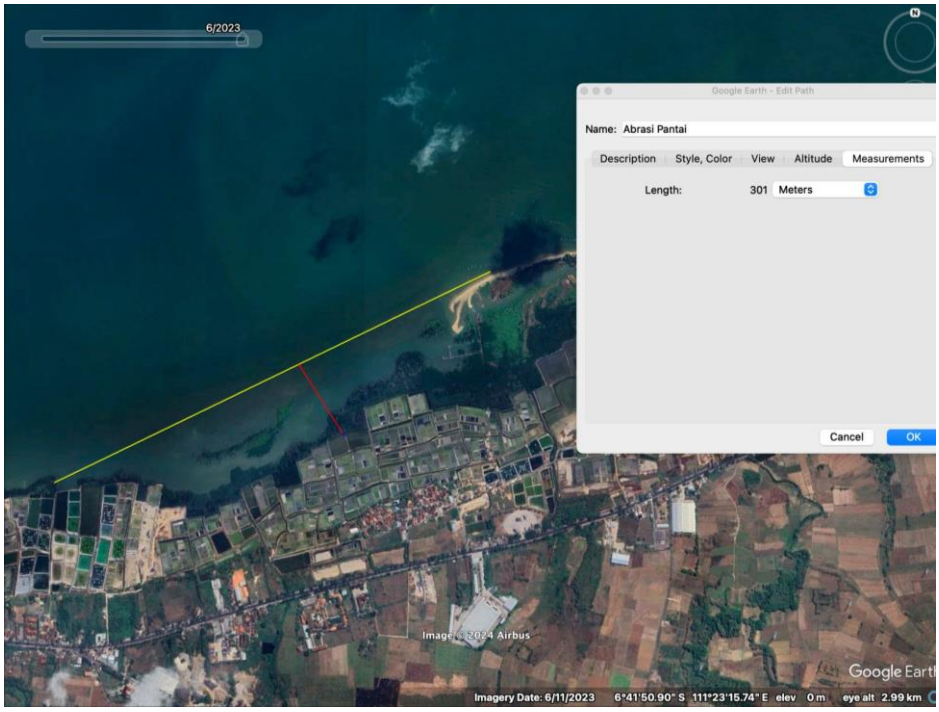


**Figure 1.** Changes in the coastline of Pasar Banggi Village viewed through Google Earth (2023)

The utilization of mangrove forest areas in Pasar Banggi Village is not only a step to prevent abrasion disasters, but also as an effort to develop sustainable ecotourism. Based on Regional Regulation No. 14/2011 on the Regional Spatial Plan of Rembang Regency 2011-2031, the mangrove area in Pasar Banggi Village is recognized as one of the regency's strategic areas based on its strong environmental potential, thus requiring sustainable restoration. In the regulation, it is explained that this area will be designated as an ecotourism area and mangrove center, as illustrated in Figure 2.

Developing the ecotourism area is a proactive measure to sustainably utilize natural resources while promoting awareness of biodiversity and the importance of environmental conservation. The ecotourism area will provide opportunities for visitors to enjoy the beauty of nature, learn about mangrove ecology, and engage in environmental conservation activities such as mangrove planting, beach cleaning, and wildlife observation.

Thus, the development of an ecotourism area and mangrove center in Pasar Banggi Village is not only beneficial in terms of tourism, but also a strategic step in efforts to preserve the environment and create long-term benefits for the local community and future generations.

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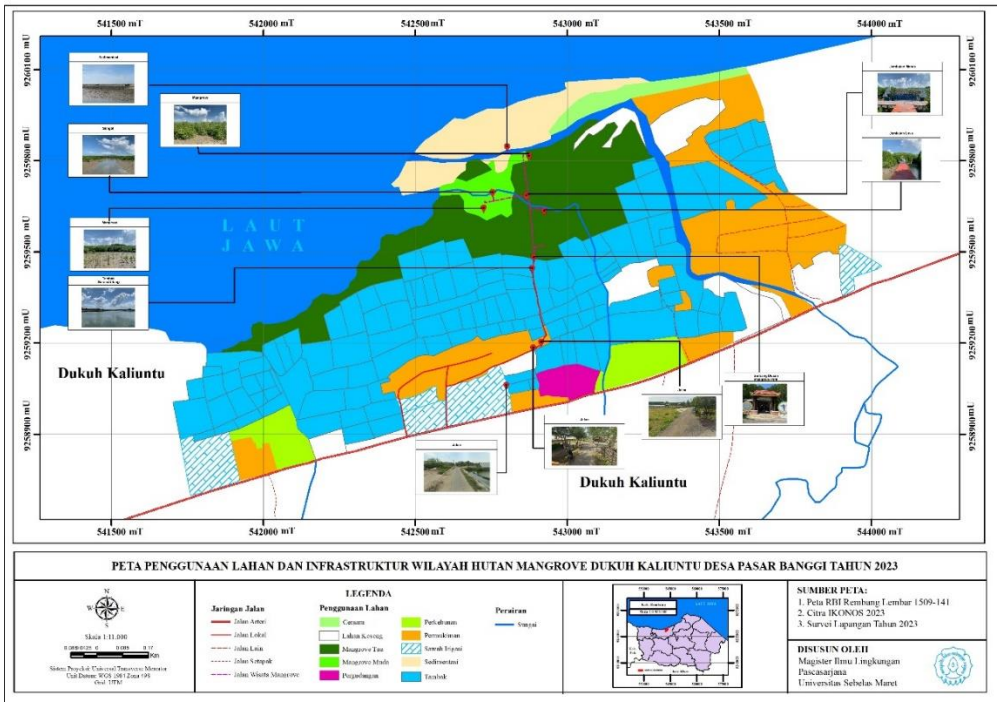


**Figure 2.** Land use and infrastructure map of Pasar Banggi Mangrove Forest area

Based on observations, the mangrove forest ecosystem in Pasar Banggi can be categorized as one of the best along the Pantura Line. Data from the IKONOS sensing image attached in Figure 3 shows the development of the mangrove ecosystem in Pasar Banggi over time. It can be seen that the condition of the mangrove ecosystem continues to improve from year to year. The first step in efforts to manage degraded coastal areas began with mangrove planting, initiated by Mr. Suyadi. This inspired the local community to participate in mangrove planting, resulting in a robust and diverse mangrove forest ecosystem. This success demonstrates the importance of the community's active role in environmental conservation. Through their participation in mangrove planting and other conservation efforts, the mangrove forest ecosystem in Pasar Banggi has become a model for the surrounding area. By maintaining the sustainability of these efforts, it is hoped that this robust ecosystem can continue to benefit the environment and local communities, as well as serve as an inspiration for other areas in nature conservation efforts.

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(a) (b)

**Figure 3.** Changes in the condition of the Pasar Banggi Mangrove Forest area; (a) 2012, (b)2022

The existence of mangrove forests in Pasar Banggi Village provides very significant benefits to the surrounding community, both in terms of ecology and economy. Ecologically, mangrove forests play an important role in maintaining coastal stability by controlling coastal erosion, maintaining sediment stability, and even assisting in the process of land expansion. In addition, mangroves also act as shoreline protection and as a natural bulwark against the adverse effects of storms and ocean waves. From an economic perspective, mangroves also make a significant contribution. Some of the economic benefits obtained from mangroves include as a provider of animal protein such as fish, shrimp, and crabs, as cultivation land, and as an ecotourism destination.

The development of the Pasar Banggi area as a mangrove ecotourism area and mangrove center is the right step in utilizing natural resources in a sustainable manner. Mangrove ecotourism areas not only provide economic benefits for the local community, but also provide environmental services without having to sacrifice the mangrove ecosystem itself.

The success of mangrove rehabilitation in Pasar Banggi has led to the development of the area into a mangrove ecotourism area. One of the keys to the successful development of mangrove ecotourism is the high knowledge of local communities about the benefits and functions of mangroves. The important role of stakeholders, especially the local government and the active participation of local communities, has been a major factor in the success of mangrove rehabilitation and conservation in Pasar Banggi Village.

One group that plays an active role in supporting mangrove conservation efforts in Pasar Banggi Village is the Sido Dadi Maju Farmer Group. This group regularly holds

meetings to discuss developments and problems in mangrove forest management. They are fully responsible for the development of mangrove forest management in Pasar Banggi and have even contributed to the development of the area.

With serious management efforts, including the development of infrastructure such as additional bridges to facilitate access to the mangrove forest area, it is expected to minimize the impact of damage to the mangrove ecosystem in Pasar Banggi Village. With the involvement of all parties, including the local government, local communities, and other stakeholders, efforts to conserve and manage mangroves in Pasar Banggi Village cancontinue to be carried out in a sustainable manner for mutual welfare and environmental sustainability.

## D. CONCLUSIONS

The conclusion of the study highlights the importance of conservation efforts and the active role of the community in addressing mangrove degradation in Pasar Banggi Mangrove Forest. The formation of the Sido Dadi Maju Farmer Group has proven that local community participation can have a significant impact in mangrove management and ecotourism development in the area.

A suggestion that can be given is the need to increase cooperation between all relevant parties, including the government, private sector, and local communities. Close cooperation between these stakeholders is essential to increase participation in mangrove ecosystem management efforts. Through stronger collaboration, various conservation programs and mangrove ecotourism development in Pasar Banggi can run more effectively and sustainably.

With good coordination between all relevant parties, it is hoped that efforts to conserve and manage mangroves in the Pasar Banggi Mangrove Forest can continue to be improved, providing greater benefits for the environment, local economy, and overall community welfare.

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