

The Strategy of POKMASWAS in Developing Mangrove Forests in Pelambung Village

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Abstract. This study aims to analyze the management of mangrove forests in Pelambung Village, Tanjung Balai Karimun, Riau Islands, and its impact on the local community. Mangrove forests play a crucial role in maintaining ecosystem balance and protecting coastal areas from natural disasters. Through the active participation of the community in the Kelompok Masyarakat Pengawas (POKMASWAS), mangrove management activities include seedling cultivation, planting, maintenance, and monitoring. The results show that mangrove management not only focuses on environmental preservation but also provides economic benefits through the development of ecotourism and the improvement of community income. Although challenges remain in integrating reforestation programs with regional development plans, ongoing mangrove rehabilitation efforts are expected to enhance community welfare and sustain ecosystem balance. This study offers valuable insights for developing community empowerment strategies in mangrove conservation across Indonesia.

Keywords: Mangrove Forests, Community Empowerment, POKMASWAS, Ecotourism, Sustainability

1. Introduction

Indonesia is an archipelagic country with more than 17,500 islands, where approximately 70% of its territory consists of oceans. These coastal and marine areas hold vast economic potential, one of which lies in mangrove forests. Mangroves thrive in tidal zones and play a vital role in protecting coastlines from erosion, supporting biodiversity, and serving as natural carbon sinks [1].

Despite being home to the world's largest mangrove area—covering about 2.5 million hectares—Indonesia has experienced significant degradation. Between 1982 and 1993, mangrove cover decreased by nearly 48%, largely due to industrial development, aquaculture, and urban expansion [2]. In Riau Islands Province, mangrove conservation has become an urgent priority, especially in regions like Tanjung Balai Karimun, where coastal communities rely heavily on mangrove ecosystems for both environmental and economic stability.

In Pelambung Village, the Kelompok Masyarakat Pengawas (POKMASWAS) was established in 2023 to strengthen local participation in mangrove conservation. The group began with the planting of 5,000 mangrove seedlings as part of a broader community-based conservation initiative. POKMASWAS aims to restore damaged mangrove ecosystems through sustainable practices that integrate ecological preservation with local economic development.

This research seeks to: Assess the ecological condition of mangrove forests in Pelambung Village. Identify the programs and activities carried out by POKMASWAS. Formulate empowerment strategies for the sustainable management of mangrove ecosystems. The study contributes to understanding how community-based environmental management enhances both ecosystem health and social well-being.

2. Methodology

This study employs a qualitative descriptive method, which is used to obtain an in-depth understanding of social phenomena and to describe systematically the forms of community participation in mangrove forest management. The qualitative method emphasizes natural settings and seeks to interpret meanings, experiences, and community behaviors related to environmental conservation[3].

Data collection was carried out through observation, in-depth interviews, and documentation. The research was conducted in Pelambung Village, Tanjung Balai Karimun, Riau Islands, from July 15 to August 15, 2024. The selection of this location was based on the active role of the Kelompok Masyarakat Pengawas (POKMASWAS) in implementing community-based mangrove conservation and rehabilitation programs.

Primary data were obtained from interviews with local residents, traditional leaders, and POKMASWAS members who are directly involved in mangrove management. Meanwhile, secondary data were collected from books, government reports, journals, and statistical documents relevant to mangrove management and community empowerment.

The data analysis followed three main stages as proposed by Sugiyono (2019): Data Reduction – simplifying, categorizing, and focusing data based on the research objectives; Data Presentation – organizing the information in a structured, narrative form to facilitate interpretation; and Conclusion Drawing – identifying essential patterns and relationships that explain how community-based mangrove management is practiced in Pelambung Village[3], [4]. Through this process, researchers were able to identify the dynamics, challenges, and strategies of local communities in implementing sustainable mangrove management.

3. Results and Discussion

A. Patterns of Mangrove Management in Pelambung Village

The results of the field study reveal that mangrove forest management in Pelambung Village operates under a community-based participatory model led by the *Kelompok Masyarakat Pengawas* (POKMASWAS). The group functions not only as an environmental watchdog but also as an agent of empowerment that integrates ecological preservation with socioeconomic development[5].

Mangrove management activities in Pelambung Village can be divided into two key approaches: ecosystem development and ecosystem rehabilitation.

1) Ecosystem Development.

This approach focuses on the sustainable use of mangrove resources while maintaining ecological balance. POKMASWAS collaborates with local government and academic institutions to conduct environmental education programs, awareness campaigns, and eco-friendly livelihood training. Mangrove forests have also been developed as an ecotourism attraction, allowing visitors to experience the biodiversity of coastal ecosystems while generating alternative income for local households. Products such as mangrove coffee, handicrafts, and eco-tourism services have created new microeconomic opportunities, especially for women and youth groups in the community[6].

2) Ecosystem Rehabilitation.

Rehabilitation efforts aim to restore previously degraded mangrove areas due to logging, land conversion, and coastal abrasion. POKMASWAS conducts regular replanting activities, with approximately 5,000 mangrove seedlings planted since 2023. Community members participate in every stage of the process—from seedling cultivation and maintenance to monitoring growth—ensuring collective ownership and accountability. The rehabilitation program also includes constructing bamboo barriers (*avicenna fences*) to protect newly planted seedlings from wave erosion, a practice supported by the Riau Islands Provincial Environment Office[7].

These two approaches demonstrate that conservation and community welfare can go hand in hand when environmental initiatives are rooted in participatory governance and local wisdom[8].

B. Socioeconomic and Ecological Impacts

The development of mangrove forests in Pelambung Village has produced multiple impacts—economic, ecological, and social—that are interrelated and mutually reinforcing.

1) Economic Impacts.

Field observations and interviews indicate that mangrove-based management has directly improved the economic resilience of the community. Residents have diversified their livelihoods beyond traditional fishing, engaging in activities such as mangrove seedling nurseries, eco-tourism services, and mangrove-derived product sales (e.g., mangrove syrup, chips, and processed foods). The empowerment model introduced by POKMASWAS has particularly benefited

women, who now participate actively in small-scale entrepreneurship[6]. This has created a circular local economy that supports both household income and conservation funding.

2) Ecological Impacts.

The ecological benefits of mangrove restoration are evident in the increased biodiversity observed around the Pelambung coastline. Mangroves function as a natural barrier against tidal surges, reduce coastal erosion, and stabilize sedimentation processes. The area now supports greater populations of fish, shrimp, and crab species, creating a sustainable source of protein and income for local fishers. Additionally, the restored mangrove ecosystem contributes to climate change mitigation through enhanced carbon sequestration and reduced greenhouse gas emissions. These findings are consistent with prior studies highlighting mangroves' capacity to store up to 1,000 tons of carbon per hectare[2].

3) Social and Cultural Impacts.

Beyond economic and ecological outcomes, mangrove management in Pelambung has fostered a renewed sense of community solidarity. Conservation activities are carried out collectively, strengthening cooperation among villagers and reviving local cultural practices associated with environmental stewardship[9]. Religious gatherings and traditional events are sometimes held near the mangrove area to symbolize gratitude and respect for nature. Such practices reflect the integration of ecological ethics into local belief systems—an essential aspect of sustainable conservation[10].

C. Empowerment Strategy: SWOT Analysis

The success of community-based mangrove management in Pelambung Village can be analyzed through the SWOT framework—identifying Strengths, Weaknesses, Opportunities, and Threats that influence sustainability[5]. The SWOT analysis indicates that while Pelambung Village has significant strengths in community organization and environmental potential, long-term sustainability requires stronger institutional support, particularly in funding and policy consistency.

D. The Role of POKMASWAS as a Catalyst for Sustainable Development

POKMASWAS plays a pivotal role as both a guardian of natural resources and a driver of local empowerment[8]. Its members—comprising fishermen, local leaders, and youth—act as environmental monitors, ensuring that mangrove areas are protected from illegal logging, land encroachment, and destructive practices.

Beyond surveillance, POKMASWAS promotes environmental education, collaborating with schools and local NGOs to raise awareness among students about the importance of mangrove ecosystems. The group also participates in policy dialogues with village authorities, contributing to the integration of conservation objectives into the Rencana Pembangunan Jangka Menengah Desa (RPJMD) or village mid-term development plan[7].

The participatory governance model established by POKMASWAS illustrates that

environmental sustainability can only be achieved when local communities are empowered as decision-makers rather than passive beneficiaries[5].

E. Challenges and Future Prospects

Despite notable achievements, several challenges persist in the sustainable management of mangroves in Pelambung Village:

- **Institutional Fragmentation:** Overlapping authorities between environmental, forestry, and maritime sectors often delay program coordination.
- **Funding Constraints:** POKMASWAS activities largely rely on short-term grants; sustainable financial mechanisms are still underdeveloped.
- **Knowledge Gaps:** Some community members lack adequate technical understanding of mangrove ecology, making maintenance inconsistent[1].

Nevertheless, the growing collaboration between local government, NGOs, and universities presents significant opportunities for improvement. The integration of mangrove education into school curricula, the introduction of eco-labeling for mangrove products, and the promotion of green tourism initiatives could further enhance the sustainability of Pelambung's mangrove ecosystem[9].

In the long term, strengthening local institutional capacity and ensuring community-based environmental governance will be essential for protecting mangroves as a living heritage of both ecological and cultural importance[10].

4. Conclusion

This study concludes that mangrove management in Pelambung Village, Tanjung Balai Karimun, Riau Islands, is effectively implemented through preservation and rehabilitation programs led by the community-based monitoring group, POKMASWAS. These efforts integrate environmental conservation with local economic empowerment through ecotourism and sustainable resource use.

Although challenges remain in integrating mangrove programs with regional development plans, the collaborative model demonstrated by POKMASWAS provides a strong foundation for long-term sustainability. Ongoing evaluation and coordination are essential to ensure the success of conservation initiatives and to maintain the balance between ecological preservation and community welfare.

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