

Challenges and Opportunities in Developing Sustainable Tourism in Nusa Penida, Indonesia: A Narrative Review of Direct Community Behavior

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ABSTRACT

This narrative review aims to evaluate the current situation and challenges of developing sustainable tourism in Nusa Penida, Indonesia, with a focus on direct community behavior. Nusa Penida is a small island located southeast of Bali and is known for its natural beauty and biodiversity. The tourism industry has been growing rapidly in recent years, but it has also brought negative impacts on the environment and the local community. This review examines various studies and reports on the development of sustainable tourism in Nusa Penida and the factors that affect the behavior of local communities, tourists, and tourism stakeholders. The review identifies several challenges to developing sustainable tourism in Nusa Penida, including inadequate infrastructure, limited financial resources, and a lack of effective policies and regulations. The review also highlights the importance of community involvement and empowerment in the sustainable tourism development process. The review suggests that sustainable tourism development in Nusa Penida requires a holistic approach that considers the economic, social, and environmental aspects of tourism. The review further discusses the role of education and awareness-raising in promoting sustainable tourism behavior among local communities, tourists, and tourism stakeholders.

Keywords: sustainable tourism; community behavior; Nusa Penida; small island destinations



INTRODUCTION

The opportunities for the development of Indonesian tourism are very high because Indonesia is the largest archipelagic country in the world, is rich in biodiversity, has a coastline of more than 81,000 km, and has 17,504 islands, of which 10,000 islands are small, even very small islands (Poernomo & Kuswardani, 2019). Therefore, small islands have the potential to be used for tourism activities. Various efforts have been made to restore the proper function of tourism, especially those in line with the sustainable tourism movement. The concept of sustainability has now been utilized in several development sectors, including tourism. Sustainable tourism is defined by the U.N. Environment Program and U.N. World Tourism Organization as “tourism that takes full account of its current and future

economic, social and environmental implications, satisfying the requirements of visitors, the industry, the environment, and host communities” (Burgoyne & Mearns, 2020). Sustainable tourism products are expected to harmonize with the local environment, society, and culture (Medina, 2005). The regulations that guide sustainable tourism development focus on efficiently using both natural and human resources over multiple years. Communities or communities in sustainable tourism play a vital role, and because they participate in implementing the concept of sustainability, they must be employed as development subjects. This is because they must be used as subjects for development. Marine Protected Areas (MPAs) are emerging as a popular instrument for marine conservation and fisheries management

(Grip & Blomqvist, 2020; Laffoley et al., 2019). MPA is an area of tidal waters, which may include coastal areas and small islands, as well as the plants and animals that live within them, as well as evidence of historical heritage and the sociocultural aspects lie beneath it. This area is protected by law or other effective means, and it may preserve all or just a portion of it. It is generally recognized that conservation areas effectively increase the species richness of standing fish stocks. Still, migratory pelagic fish species are not protected enough from conservation areas, especially since their size, number, and location are much narrower than the fishing area.

Human activities have contributed mainly to destroying coastal ecosystems, which are critical to human well-being. Protecting fish populations by establishing marine protected areas can cause conflicts between fishing and tourism (Lopes et al., 2015). They are different in size, how they focus on conservation, and how much they protect, but a common goal is to keep people from taking too many marine resources. But putting in place, MPAs could make it more likely for poor people to lose their jobs. So, it's essential to come up with other ways for people to make a living besides fishing so that they don't have to depend on the fishing industry and the coastal communities don't lose their way of life (Pham, 2020).

Human behavior significantly impacts the success of MPAs. For example, the destruction of coastal ecosystems, critical to human well-being, is mainly caused by human activities such as overfishing, pollution, and coastal development (Fleming et al., 2019; Nie et al., 2023). The establishment of MPAs aims to protect fish populations and other marine resources by limiting human activities such as fishing, boating, and diving (Sutrisno et al., 2023). However, conflicts between fishing and tourism can arise, and MPAs could make it more likely for poor people to lose their jobs. Therefore, it is essential to understand human behavior, including the economic and social factors that influence it, to develop effective management strategies for MPAs that balance conservation goals with the needs of local communities. This understanding can help to develop alternative livelihoods for fishing communities and engage local stakeholders in the MPA decision-making process, leading to more successful and sustainable MPAs.

This study evaluates the current situation and challenges to developing sustainable tourism in Nusa Penida with direct community behavior. The evaluation of the current situation and challenges

to developing sustainable tourism in Nusa Penida with direct community involvement is essential because it provides insight into the region's potential for sustainable tourism. The archipelagic nation of Indonesia possesses a significant amount of untapped tourism potential. Still, environmental deterioration brought on by human activity, such as in the Nusa Penida region, can potentially lessen the value of this capital. Additionally, protecting fish populations by establishing marine protected areas can cause conflicts between fishing and tourism. Therefore, understanding the challenges and opportunities for sustainable tourism in Nusa Penida can help to identify strategies that balance economic development with environmental conservation and social welfare. Direct community involvement is significant because it promotes the inclusion of local stakeholders in decision-making processes and helps ensure that sustainable tourism's benefits are distributed equitably. By involving the community in the planning and implementation of sustainable tourism initiatives, it is possible to build partnerships, promote social capital, and foster a sense of ownership and stewardship over the natural and cultural resources of the region. This can lead to more responsible and sustainable practices and a greater sense of resilience in the face of climate change and economic fluctuations.

The research aims to understand how the MPA's zonation management, community participation, and organizational capacity building contribute to the conservation of marine biodiversity and the sustainable development of the local economy. The research questions that seem to be addressed in this study are:

1. How does the zonation management within the Nusa Penida MPA contribute to the effective conservation of marine resources and the sustainable use of these resources for tourism and local livelihoods?
2. What role does community participation play in the management of the Nusa Penida MPA, and how does it impact the success of sustainable tourism and conservation efforts?
3. How do organizational structures and capacity building within the Nusa Penida MPA influence the implementation and effectiveness of conservation strategies, sustainable tourism, and waste management practices?

These research questions aim to explore the intricate balance between marine conservation, sustainable tourism, and local community engagement in the context of the Nusa Penida

MPA. The study delves into how different aspects of MPA management, including zoning, community involvement, and organizational capacity, interact to create a sustainable model that benefits both the environment and the local population.

RESEARCH METHODS

Location and Time of Research

The research was conducted in Nusa Penida, a small island located southeast of Bali, Indonesia. Nusa Penida is known for its natural beauty, rich biodiversity, and rapidly growing tourism industry. The island's geographic coordinates are approximately 8°44'0"S 115°32'0"E. The study took place over a twelve months period, from January 2022 to December 2022. This timeframe allowed for a comprehensive review of literature and the collection of seasonal data, capturing variations in tourism patterns, community behavior, and environmental conditions.

To enhance the contextual understanding of the research environment, photographs of Nusa Penida are included. These images illustrate the island's landscapes, tourist attractions, and community activities, providing visual support for the findings discussed in the literature review. The photographs were sourced from field visits and documented studies, ensuring they accurately represent the current state of Nusa Penida. By conducting the research over an entire year and including visual documentation, this study aims to provide a thorough and detailed examination of the challenges and opportunities in developing sustainable tourism on Nusa Penida. The inclusion of pictures from the research location and literature enriches the narrative review, offering a clearer perspective on the local context.

Types and Methods of Data Collection

The study employs a narrative review method. The semi-systematic or narrative review method is suitable for topics that have been explored in various ways by different researchers across multiple fields, making a full systematic review impractical. This method allows for a comprehensive examination of the literature, integrating findings from diverse disciplines to provide a holistic understanding of the research topic. The data used in this research are primarily and secondary data. These include academic journal articles and books on sustainable tourism, environmental conservation, and community behavior. These sources provide theoretical frameworks and empirical findings from

previous studies, contributing to the understanding of the broader context of sustainable tourism development. Reports from governmental and non-governmental organizations on tourism and conservation in Nusa Penida were also reviewed, offering official perspectives and statistical data on tourism trends, environmental impacts, and policy measures. Additionally, statistical data from local tourism boards and environmental agencies were analyzed to understand the quantitative aspects of tourism growth, visitor demographics, and environmental indicators. By focusing on secondary data, this research aims to construct a detailed and nuanced picture of the challenges and opportunities in developing sustainable tourism in Nusa Penida. The integration of diverse data sources enhances the reliability and depth of the analysis, supporting the comprehensive nature of the narrative review method.

Analysis Method

The narrative review method employed in this study allows for a comprehensive and nuanced examination of the multifaceted nature of human behavior, a crucial aspect of our research. Human behavior is complex, intersecting with various theories, perspectives, and methods from disciplines such as psychology, sociology, anthropology, and environmental sciences. A systematic review, with its structured approach to searching, screening, and synthesizing research literature, might not capture the breadth and depth required for a study of this nature. In contrast, the narrative review method facilitates the analysis of a broad range of literature on specific topics, enabling the identification of patterns, trends, and inconsistencies across studies. This approach provides an in-depth and holistic understanding of human behavior in the context of Marine Protected Area (MPA) management by integrating findings from diverse disciplines and research traditions. It also offers the flexibility to explore research questions creatively and generate new hypotheses. Narrative review will cover several key areas:

1. Zonation Management in MPAs: The narrative review will explore literature across environmental sciences and policy studies to understand how zonation management impacts conservation and sustainable tourism. This will involve analyzing studies that discuss the effectiveness of different zoning strategies in MPAs and their implications on marine biodiversity and local livelihoods.
2. Community Participation in MPA

Management: The review will include literature from sociology and anthropology to understand community dynamics and participation in conservation efforts. It will examine how community involvement in MPAs influences the effectiveness of conservation strategies and sustainable tourism practices.

3. Organizational Structure and Capacity Building: The review will integrate findings from organizational and management studies to assess the role of organizational structures and capacity building in the effectiveness of MPA management. This includes exploring how different management models and capacity-building efforts contribute to sustainable practices and effective conservation.

Through this method, the study aims to explore the intricacies of zonation management in MPAs, the role of community participation in conservation and sustainable tourism, and the impact of organizational structures and capacity building on the effectiveness of MPA management. By synthesizing information from various fields and examining the interconnectedness of these aspects, the narrative review will provide comprehensive insights into the effective management and sustainable development of the Nusa Penida MPA. This approach is expected to yield a nuanced understanding that aligns with the complex realities of environmental conservation, community involvement, and sustainable tourism practices.

RESULTS AND DISCUSSION

The Nusa Penida Islands, located within the Nusa Penida District, are composed of 16 administrative service villages and 48 traditional villages. This region is recognized for its considerable environmental and cultural value, which is reflected in the designation of the Nusa Penida Marine Protected Area (MPA). According to the IUCN classification highlighted in Table 1, MPAs are categorized based on their primary management objectives and the level of human intervention allowed.

Nusa Penida MPA falls under Category VI, a designation that permits sustainable use of its natural resources. This classification implies that while the MPA's primary objective is the preservation of ecosystems, habitats, cultural values, and traditional natural resource management practices, it also allows for a certain degree of sustainable economic and recreational activities. The management strategy for Category VI areas typically involves maintaining large swathes of the region in their natural state,

while also designating zones where sustainable resource management practices are implemented. This ensures that the use of the area's resources, which is non-industrial and low in intensity, aligns with the overarching goals of nature conservation. The establishment of the Nusa Penida MPA under this category supports the long-term preservation of its biodiversity and cultural heritage, while also allowing for the community and stakeholders to make a sustainable living from the land and sea. (Gardner et al., 2018).

Table 1. Characteristics of Nusa Penida Aquatic Park (Protected Planet, 2018),

Parameters	Information
Original Name	Taman Wisata Perairan Nusa Penida
English	Designation of Marine Recreation Park
IUCN Status	Management Category VI Designated
Type of Designation	National
Status Year	2010
Sublocation	ID-BA
Governance Type	Sub-national ministry or agency
Management Authority	District/Local Government assisted by Ministry of Marine Affairs & Fisheries (MMAF)

The three islands of Nusa Penida, Bali, Indonesia, which are in the center of the Coral Triangle and have a lot of ecological value, are being used to make an MPA learning site (Welly, 2022). It deals with the fact that natural resource management isn't formalized and marine biodiversity isn't well protected. The leading institutional strategies are meant to create platforms for learning and sharing knowledge and skills about tropical marine conservation on the ground (Welly, 2022). Effects of things like fishing without a license, sewage and pollution, coral mining, and climate change 45,000 people live on Nusa Penida, and they depend on fish and seaweed for food (Welly, 2022). Also, about 200,000 tourists come to the islands every year. The solution deals with fishing without a license, sewage and pollution, coral mining, and the effects of climate change, such as rising seawater temperature, rising seawater level, and changes in the fishing season, which threaten biodiversity, ecosystems, and people's way of life.

The administrative status of the Nusa Penida Islands is crucial for identifying the jurisdiction and local government responsible for managing and safeguarding the area. This information is



Figure 1. Nusa Penida Area (Joseagush, 2020)

key to understanding the area's conservation policies and regulations and their implications for marine conservation efforts. Furthermore, the socio-economic and cultural context of the local communities, informed by the administrative status, is essential for devising and executing effective conservation strategies that align with local needs and perspectives. Protected areas remain a pivotal component of most national and international conservation strategies, endorsed by governments and international entities. These areas are intended to serve as adaptable building blocks to guide and enhance management practices within the sector, tailored to local conditions, practices, and cultural norms (Appleto, 2016). Guidance is provided on using competencies to establish staffing structures, define job roles, identify performance indicators, conduct various assessments, and develop educational programs (Appleto, 2016).

The six building blocks are part of a step-by-step process that works from the bottom up to get to the solution. First, collecting baseline data (Building Block 1) is necessary for the MPA zoning and management plan to be developed with the help of all stakeholders (Building Block 2) (Welly, 2022). So, the collaborative management process can begin, which involves and brings all the stakeholders (Building Block 4). During the development of the zoning and management plan (Building Block 2), which is done with public input, options for the sustainable financing mechanism (Building Block 3) and ecological

restoration (Building Block 5) are chosen (Welly, 2022). They are made better when management and all stakeholders work together (Building Block 4). Finally, the process and success of working together to manage the MPA, use its ecosystem services, and make money for the community through marine ecotourism are shared to help other sites (Building Block 6). The government, the private sector, and non-governmental organizations (CTCs) have been helping to set up a Marine Protected Area Learning Site for the Coral Triangle from the beginning (Welly, 2022).



Figure 2. Building Blocks at MAP Nusa Penida (Welly, 2022).

Each building block addresses a specific aspect of MPA development and management, such as collecting baseline data, involving stakeholders, selecting sustainable financing mechanisms, and

implementing ecological restoration. Human behavior plays a critical role in the success of each building block. For example, involving stakeholders (Building Block 4) requires effective communication and collaboration skills to engage with the community and address their concerns and needs. Selecting sustainable financing mechanisms (Building Block 3) requires an understanding of the local economic and social contexts and the ability to persuade stakeholders to invest in conservation efforts. Finally, implementing ecological restoration (Building Block 5) requires knowledge and skills in restoration techniques and working with local communities to implement restoration activities. Successfully implementing each building block requires understanding human behavior, including communication, collaboration, persuasion, and knowledge transfer. By recognizing the importance of human behavior in MPA development and management, conservation practitioners can improve the effectiveness of their conservation efforts and promote sustainable behavior change within local communities.

Conservation practitioners should improve the effectiveness of their conservation efforts and promote sustainable behavior change within local communities for several reasons. Firstly, conservation efforts that are not effective can lead to a waste of resources and time, resulting in little to no positive impact on the environment. This can be discouraging for stakeholders, who may not see the value in continuing to support conservation initiatives. Secondly, local communities play a vital role in conservation efforts, as they are often directly impacted by environmental degradation and are key stakeholders in managing natural resources. Finally, promoting sustainable behavior change within these communities can lead to long-term, sustainable conservation outcomes. Thirdly, addressing human behavior is crucial for successful conservation outcomes. Economic and social factors often drive unsustainable behaviors, such as overfishing or deforestation. By promoting sustainable behavior change and providing economic alternatives, conservation practitioners can address the root causes of environmental degradation and ensure that communities are invested in conservation efforts.

Zonation Management

Zonation Management is crucial in the Nusa Penida Marine Protected Area (MPA) because it helps to ensure the effective conservation and sustainable use of marine resources. Implementing

zonation ensures that different areas within the MPA are designated for specific activities such as no-take zones, fishing zones, and tourism zones. This allows for a more targeted approach to resource management, ensuring that sensitive areas are protected while still allowing for sustainable use of the area's resources. Zonation Management can also help to prevent conflicts between different users of the marine environment, such as fishers and tourism operators. In addition, designating specific zones for different activities can help reduce competition and promote stakeholder cooperation. Additionally, zoning can help ensure that the MPA's economic benefits are distributed fairly among local communities. By designating areas for seaweed cultivation, for example, the MPA can provide opportunities for income generation and livelihoods for local communities while still ensuring the conservation of the marine environment.

The Nusa Penida MPA is set to have four zones, each with different limitations on activities that can be carried out within them: a no-take zone, a marine tourism limited use zone, a seaweed cultivation limited use zone, and a fishery limited use zone. A regional regulation specific to Nusa Penida needs to be developed to ensure that the regulations are followed and to strengthen the rules in each zone. In addition to survey results, public consultations will be conducted with marine tourism entrepreneurs, fishers, and seaweed farmers to obtain their input and agreement on the zoning design. This ensures that the management plan is developed with the participation of all stakeholders and that it aligns with their needs and concerns. This approach has been shown to increase the effectiveness of conservation efforts and promote sustainable behavior change within local communities. By involving local communities in the process, there is a greater likelihood of compliance with regulations and the adoption of sustainable practices, which can ultimately lead to better conservation outcomes (Berdej & Armitage, 2016).

Community participation in managing tourism zone is a guide to the protect environment (Ginantra et al., 2018). The problem is the unavailability of detailed data on mangrove diversity in the form of a handbook that can guide tourists on mangrove tour activities (Ginantra et al., 2018). Mangrove tour activities in mangrove areas generally travel to explore mangrove forests. Still they have not been directed to introduce plant species with distinctive characteristics, habitat peculiarities, and fauna diversity associated with mangrove forests, how to zoning mangrove plants from the sea to the mainland (Ginantra et al., 2018). From 4 pm to 9

am, it is permitted to use fishing activities directly from nature with or without the use of tools, such as fishing both bottom fishing line, trolling line, gill net, stationary bottom net, surface net, both stationary and pulled, good diving with or without tools, as well as spears or fish arrows (KKP Nusa Penida, 2017). In addition, from 9 am to 4 pm, tourism activities are permitted, such as diving tours with or without equipment, swimming, snorkeling, dolphin or whale watching, bird watching, fishing, cultural tours, and cruises (KKP Nusa Penida, 2017).

This issue is made worse by the disposal of rubbish from local communities as well as fuel spills from tour boats, and the impact of solid waste, particularly plastics, from population centers on Bali is a large and expanding problem (Sari et al., 2022; Suryawan & Lee, 2024; Yunitawati & Clifton, 2021). In addition, landfill management in Nusa Penida (Jatmoko et al., 2021; Widyarsana et al., 2019; Widyarsana & Agustina, 2020) must also be considered managed to prevent the decline in tourist attractions.

The community rents or provides water transportation services in the form of boats and boats that are used to serve tourists in various activities such as snorkeling and diving or other water sports games that harm the survival of seaweed vegetation (Anshori et al., 2017). This impacts the economy of the people of Nusa Penida, where the welfare of the people is better than before, and the circulation of money occurs so fast (Anshori et al., 2017). Besides, this activity can harm coral reefs and impact the activities of seaweed farmers.

The existence of seaweed farmers in tourism development is not synergistic in utilizing the Nusa Penida coastal areas, increasing professional transfer from farmers to tourism actors. However, seaweed can be part of Nusa Penida's tourism practices. If developed and managed optimally in the future, processed products from seaweed products can be sold in tourism practice activities such as packaging seaweed cultivation activities as alternative tourism packages, serving processed foods from seaweed, and souvenirs that characterize the identity of a typical product.

Community Participation

Community participation is a cornerstone of environmental protection efforts (Nguyen et al., 2022; Suryawan & Lee, 2023b, 2023a), as it is closely tied to the preservation of ecosystems and the integrity of diverse geographical and climatic regions (Ocampo et al., 2018; Sriarkarin & Lee, 2018). Providing ecotourism activities educates

tourists, locals, and other interested parties about the need to protect natural resources (Ocampo et al., 2018). The viability of ecotourism depends on community involvement; rural communities must assume environmental and natural resource management responsibilities. The results of environmental management and development can be directly affected by the participation of local people (Masud et al., 2017). Community participation is necessary for successful ecotourism because communities must lead environmental and natural resource management. Local communities are essential stakeholders who may directly drive ecological management and development outcomes (Rawlins & Westby, 2013). Community involvement in ecotourism promotes long-term natural resource sustainability and reduces human-caused environmental damage. Local populations' feelings and experiences may produce unforeseen effects and uncertain tourism settings (Cobbinah et al., 2017; Tseng et al., 2019).

In Nusa Penida, there is a special zone which is Holy Zone. In this holy zone, fishing activities are not allowed. Only rehabilitation activities, taking pictures, and patrols are permitted in this area (KKP Nusa Penida, 2017). The development of marine potential and the development of the tourism sector in the Nusa Penida Island area have the concept of Tri Hita Kirana an environmentally sound effect. Nyepi Segara (Silent Day) on Nusa Penida Island has become the philosophical, juridical, and sociological basis for preserving the marine environment (Sari Adnyani, 2014) in Nusa Penida. Nyepi Segara is a marine conservation ritual carried out by stopping all activities at sea for 24 hours and respecting the environment (Weeks et al., 2014). Woven cloth is one of the handicrafts that have developed due to tourism or can support cultural tourism (Arismayanti et al., 2019). Woven fabrics in Nusa Penida have various types with the function of their use in the daily lives of the people on the island and traditional events (Dwijendra, 2020). By harnessing the potential of such indigenous products and integrating local wisdom, Nusa Penida can develop strategic programs to further cultivate its unique cultural tourism offerings.

Community participation in Nusa Penida serves as a model for how local involvement can lead to the successful management of natural resources, support cultural preservation, and foster sustainable tourism practices. It demonstrates the importance of engaging local communities in conservation efforts, ensuring that their experiences and knowledge contribute to the stewardship of their environment.

Organization and Capacity Building

Organizing is the process of developing a structured framework to define the roles and responsibilities of each party involved in a particular initiative. In the case of Nusa Penida MPA, the marine area has been designated as an Aquatic Conservation Area and Aquatic Tourism Park through the Decree of the Minister of Maritime Affairs and Fisheries. The Technical Implementation Unit of the Marine Conservation Area (UPT KKP) of Nusa Penida, Bali Province has been appointed as the primary manager responsible for managing the marine life in Nusa Penida. One of the critical aspects of managing Nusa Penida MPA is funding. Outreach activities, training, and supervision must be considered, and adequate funding must be available for these activities (Yunitawati & Clifton, 2021). To ensure sustainability, the income generated from the entrance fee can be utilized to support the conservation and management efforts of the area. By effectively managing the environment and economy, the Nusa Penida MPA can ensure the long-term well-being of the local communities and preserve natural resources for future generations.

The problem of waste in water areas, especially during the rainy season, can be a significant issue for marine ecosystems, tourism activities, and the livelihoods of local communities. However, this issue can be addressed effectively by promoting cooperation between the parties involved in the marine area. One example of such cooperation is when tourism service providers work together to maintain the cleanliness of the area where they operate. They can carry out cleaning activities in the area before the start of marine tourism activities with tourists who use their services. This can help prevent waste from accumulating in the water and damaging marine ecosystems, as well as improve the experience of tourists and the reputation of the area as a sustainable tourism destination. Such efforts to address the waste problem can involve other parties, such as local government, waste management organizations, and community groups. One strategy to support these conservation efforts is to channel a portion of the revenue generated from entrance fees back into the management of the MPA. Such a model helps balance environmental management with economic considerations, contributing to the well-being of local communities and the preservation of natural resources for future generations.

Addressing waste management, especially during the rainy season, is a significant challenge affecting marine ecosystems, tourism, and the livelihoods of the local communities. Effective

cooperation among stakeholders, including tourism service providers, local government, waste management organizations, and community groups, is key to mitigating this issue (Phan et al., 2023; Suryawan & Lee, 2023a, 2023b). Collaborative efforts, such as organizing collective clean-up activities, can significantly reduce the accumulation of waste in marine areas, safeguarding the health of the ecosystems and enhancing the tourism experience. By promoting and implementing sound waste management practices, it is possible to foster an environment conducive to sustainable tourism and community well-being, ensuring the integrity and attractiveness of Nusa Penida as a sustainable tourism destination.

CONCLUSIONS AND POLICY RECOMMENDATION

Conclusions

The research into the Nusa Penida Marine Protected Area (MPA) has yielded significant findings regarding the effectiveness of zonation management, community participation, and organizational structures in conserving marine resources and fostering sustainable tourism and livelihoods. Firstly, zonation management emerges as a key component in the MPA's success. By dividing the marine area into designated zones for specific activities such as conservation, fishing, and tourism, it minimizes conflicts among different users of marine resources. This approach not only supports ecological balance, crucial for preserving biodiversity, but also facilitates regulated economic activities that do not compromise conservation goals. Zonation management's structured approach is instrumental in safeguarding sensitive marine habitats and promoting tourism and fishing practices that are aligned with long-term conservation objectives.

Secondly, the role of community participation in the NPA management has been found to be fundamental to the success of conservation and sustainable tourism efforts. Incorporating local knowledge and practices into conservation strategies ensures that these efforts are culturally appropriate and ecologically attuned. Active community involvement fosters a sense of ownership and responsibility among residents, leading to improved adherence to MPA regulations and contributing to the success of sustainable tourism initiatives. Moreover, the involvement of local communities ensures equitable distribution of the economic benefits derived from tourism and resource utilization, thereby enhancing

livelihoods and securing community support for continued conservation efforts.

Lastly, the research highlights the importance of organizational structures and capacity building within the Nusa Penida MPA. Effective conservation strategies are underpinned by clear organizational roles and responsibilities, ensuring a coordinated approach to managing the MPA. Capacity building is critical in empowering local stakeholders, equipping them with the necessary skills and knowledge to actively participate in conservation, sustainable tourism, and waste management. Such organizational frameworks are vital for enhancing communication and collaboration among stakeholders, which are key to resolving issues and making informed decisions in the realms of conservation and sustainable tourism development. To further these findings, it is recommended that the management of the Nusa Penida MPA continues to refine and enforce zonation guidelines to optimize conservation outcomes and support sustainable economic activities. It is also crucial to expand opportunities for community involvement, ensuring that local stakeholders are engaged and have a vested interest in the success of the MPA. Policies should be directed towards bolstering the organizational capacity of those managing the MPA. This includes enhancing administrative structures, providing ongoing education, and ensuring that adequate resources are allocated for effective MPA management.

Policy Recommendation

Sustainable tourism development should be encouraged through policies that promote eco-friendly activities and infrastructure. This would necessitate a balance between visitor satisfaction and conservation priorities. Implementing integrated waste management strategies is essential, particularly in addressing the challenges posed by solid waste from tourism and local activities. Such strategies should incorporate community-led initiatives and educational programs to reduce pollution and protect the marine environment. Finally, fostering economic development that aligns with conservation objectives is critical. Policies should support livelihood alternatives that are not only environmentally sustainable but also economically viable, ensuring the long-term prosperity of the local community and the health of the marine ecosystem. These combined efforts can secure a sustainable future for the Nusa Penida MPA, its biodiversity, and the community that depends on it.

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AUTHORS CONTRIBUTION STATEMENT

We hereby declare that the contributions of each author to the writing of this paper are Sapta Suhardono and I Wayan Koko Suryawan as main contributor, Imelda Masni Juniaty Sianipar, Iva Yenis Septiariva, and Wisnu Prayogo as member. The authors declare that the Author Contribution Letter has been attached.

REFERENCES

- Anshori, I., Punia, I. N., & Zuryani, N. (2017). Masyarakat Pesisir Desa Kampung Toyapakeh. *Jurnal Ilmiah Sosiologi (Sorot)*, 1(1), 1–15
- Appleto, M. (2016). *A Global Register of Competences for Protected Area Practitioners* (Issue 2). www.iucn.org
- Arismayanti, N. K., Sendra, I. M., Suwena, I. K., Budiarsa, M., Bakta, I. M., & Pitana, I. G. (2019). Tourism Villages' Development in Bali, Mass or Alternative Tourism? *Journal of Tourism and Hospitality Management*, 7(2). <https://doi.org/10.15640/jthm.v7n2a11>
- Berdej, S., & Armitage, D. (2016). Bridging for Better Conservation Fit in Indonesia's Coastal-Marine Systems . In *Frontiers in Marine Science* (Vol. 3). <https://www.frontiersin.org/article/10.3389/fmars.2016.00101>
- Burgoyne, C., & Mearns, K. (2020). *Sustainable Tourism/ Ecotourism BT - Responsible Consumption and Production* (W. Leal Filho, A. M. Azul, L. Brandli, P. G. özuyar, & T. Wall (eds.); pp. 817–825). Springer International Publishing. https://doi.org/10.1007/978-3-319-95726-5_22
- Cobbinah, P. B., Amenuvor, D., Black, R., & Peprah, C. (2017). Ecotourism in the Kakum Conservation Area, Ghana: Local politics, practice and outcome. *Journal of Outdoor Recreation and Tourism*, 20, 34–44. <https://doi.org/https://doi.org/10.1016/j.jort.2017.09.003>

- Dwijendra, N. K. A. (2020). Identity Struggle Perspective in Car-Shaped Shrine in Paluang Temple, Nusa Penida Bali, Indonesia. *International Journal of Psychosocial Rehabilitation*, 24, 5579–5591. <https://doi.org/10.37200/IJPR/V24I4/PR201653>
- Fleming, L. E., Maycock, B., White, M. P., & Depledge, M. H. (2019). Fostering human health through ocean sustainability in the 21st century. *People and Nature*, 1(3), 276–283. <https://doi.org/https://doi.org/10.1002/pan3.10038>
- Gardner, C. J., Nicoll, M. E., Birkinshaw, C., Harris, A., Lewis, R. E., Rakotomalala, D., & Ratsifandrihamanana, A. N. (2018). The rapid expansion of Madagascar's protected area system. *Biological Conservation*, 220, 29–36. <https://doi.org/https://doi.org/10.1016/j.biocon.2018.02.011>
- Ginantra, I. K., Darmadi, A. A. K., Suaskara, I. B., & Muksin, I. (2018). Keanekaragaman jenis mangrove pesisir Lembongan dalam menunjang kegiatan wisata mangrove tour. *Prosiding Seminar Nasional Pendidikan Biologi*, 249–255
- Grip, K., & Blomqvist, S. (2020). Marine nature conservation and conflicts with fisheries. *Ambio*, 49(7), 1328–1340. <https://doi.org/10.1007/s13280-019-01279-7>
- Jatmoko, M., Adinda, A. R., Siregar, F. H., Dalimunthe, R. C., Sari, M., & Pertama, I. W. K. S. (2021). *Perencanaan Proses Pengolahan Lindi di TPA Nusa Lembongan dengan Menggunakan Kolam Stabilisasi Planning for Leachate Treatment Process at TPA Nusa Lembongan by Using*. 12(2), 165–173
- Joseagush. (2020). *Indonesia Klungkung Nusa Penida district location map*. https://commons.wikimedia.org/wiki/File:Indonesia_Klungkung_Nusa_Penida_district_location_map.svg
- KKP Nusa Penida. (2017). *Rencana Pengelolaan dan Zonasi Kawasan Konservasi Perairan (KKP) Nusa Penida*. 175
- Laffoley, D., Baxter, J. M., Day, J. C., Wenzel, L., Bueno, P., & Zischka, K. (2019). *Chapter 29 - Marine Protected Areas* (C. B. T.-W. S. an E. E. (Second E. Sheppard (ed.); pp. 549–569). Academic Press. <https://doi.org/https://doi.org/10.1016/B978-0-12-805052-1.00027-9>
- Lopes, P. F. M., Pacheco, S., Clauzet, M., Silvano, R. A. M., & Begossi, A. (2015). Fisheries, tourism, and marine protected areas: Conflicting or synergistic interactions? *Ecosystem Services*, 16, 333–340. <https://doi.org/https://doi.org/10.1016/j.ecoser.2014.12.003>
- Masud, M. M., Aldakhil, A. M., Nassani, A. A., & Azam, M. N. (2017). Community-based ecotourism management for sustainable development of marine protected areas in Malaysia. *Ocean & Coastal Management*, 136, 104–112. <https://doi.org/https://doi.org/10.1016/j.ocecoaman.2016.11.023>
- Medina, L. K. (2005). Ecotourism and Certification: Confronting the Principles and Pragmatics of Socially Responsible Tourism. *Journal of Sustainable Tourism*, 13(3), 281–295. <https://doi.org/10.1080/01434630508668557>
- Nguyen, V. V., Phan, T. T. T., & Chun-Hung, L. (2022). Integrating multiple aspects of human–elephant conflict management in Dong Nai Biosphere Reserve, Vietnam. *Global Ecology and Conservation*, 39, e02285. <https://doi.org/https://doi.org/10.1016/j.gecco.2022.e02285>
- Nie, X., Su, Y., Wang, H., Lyu, C., Wu, X., Li, X., Li, F., & Gao, W. (2023). Will short-term constraints affect long-term growth? Empirical analysis from the Beibu Gulf Mangrove National Natural Reserve of China. *Ocean & Coastal Management*, 239, 106616. <https://doi.org/https://doi.org/10.1016/j.ocecoaman.2023.106616>
- Ocampo, L., Ebisa, J. A., Ombe, J., & Geen Escoto, M. (2018). Sustainable ecotourism indicators with fuzzy Delphi method – A Philippine perspective. *Ecological Indicators*, 93, 874–888. <https://doi.org/https://doi.org/10.1016/j.ecolind.2018.05.060>
- Pham, T. T. T. (2020). Tourism in marine protected areas: Can it be considered as an alternative livelihood for local communities? *Marine Policy*, 115, 103891. <https://doi.org/https://doi.org/10.1016/j.marpol.2020.103891>
- Phan, T. T. T., Nguyen, V. V., Thu Nguyen, H. T., & Lee, C.-H. (2023). Estimating citizen's adaptive behavior for sustainable plastic waste management based on a choice experiment. *Journal of Cleaner Production*, 422, 138617. <https://doi.org/https://doi.org/10.1016/j.jclepro.2023.138617>
- Poernomo, A., & Kuswardani, A. R. (2019). Ocean Policy Perspectives: The Case of Indonesia: Politics and Policy for Threatened Seas. In *Climate Change and Ocean Governance* (pp. 102–117). <https://doi.org/10.1017/9781108502238.007>
- Protected Planet. (2018). *KKP NUSA PENIDA*. <https://www.protectedplanet.net/555587241>
- Rawlins, M. A., & Westby, L. (2013). Community participation in payment for ecosystem services design and implementation: An example from Trinidad. *Ecosystem Services*, 6, 117–121. <https://doi.org/https://doi.org/10.1016/j.ecoser.2013.09.004>
- Sari Adnyani, N. K. (2014). Nyepi Segara Sebagai Kearifan Lokal Masyarakat Nusa Penida Dalam Pelestarian Lingkungan Laut. *Jurnal Ilmu Sosial Dan Humaniora*, 3(1), 300–312. <https://doi.org/10.23887/jish-undiksha.v3i1.2921>
- Sari, M. M., Inoue, T., Septiariva, I. Y., Suryawan, I. W. K., Kato, S., Harryes, R. K., Yokota, K., Notodarmojo, S., Suhardono, S., & Ramadan, B. S. (2022). Identification of Face Mask Waste Generation and Processing in Tourist Areas with Thermo-Chemical Process. *Archives of*

- Environmental Protection*, 48(2).
- Sriarkarin, S., & Lee, C.-H. (2018). Integrating multiple attributes for sustainable development in a national park. *Tourism Management Perspectives*, 28, 113–125. <https://doi.org/https://doi.org/10.1016/j.tmp.2018.08.007>
- Suryawan, I. W. K., & Lee, C.-H. (2023a). Citizens' willingness to pay for adaptive municipal solid waste management services in Jakarta, Indonesia. *Sustainable Cities and Society*, 97. <https://doi.org/https://doi.org/10.1016/j.scs.2023.104765>
- Suryawan, I. W. K., & Lee, C.-H. (2023b). Community preferences in carbon reduction: Unveiling the importance of adaptive capacity for solid waste management. *Ecological Indicators*, 157, 111226. <https://doi.org/https://doi.org/10.1016/j.ecolind.2023.111226>
- Suryawan, I. W. K., & Lee, C.-H. (2024). Importance-performance dynamics and willingness to pay in coastal areas for climate-adaptive marine debris management. *Regional Studies in Marine Science*, 103596. <https://doi.org/https://doi.org/10.1016/j.rsma.2024.103596>
- Sutrisno, A. D., Chen, Y.-J., Suryawan, I. W., & Lee, C.-H. (2023). Establishing Integrative Framework for Sustainable Reef Conservation in Karimunjawa National Park, Indonesia. In *Water* (Vol. 15, Issue 9). <https://doi.org/10.3390/w15091784>
- Tseng, M.-L., Lin, C., Remen Lin, C.-W., Wu, K.-J., & Sriphon, T. (2019). Ecotourism development in Thailand: Community participation leads to the value of attractions using linguistic preferences. *Journal of Cleaner Production*, 231, 1319–1329. <https://doi.org/https://doi.org/10.1016/j.jclepro.2019.05.305>
- Weeks, R., Aliño, P. M., Atkinson, S., Beldia, P., Binson, A., Campos, W. L., Djohani, R., Green, A. L., Hamilton, R., Horigue, V., Jumin, R., Kalim, K., Kasasiah, A., Kereseka, J., Klein, C., Laroya, L., Magupin, S., Masike, B., Mohan, C., ... White, A. T. (2014). Developing Marine Protected Area Networks in the Coral Triangle: Good Practices for Expanding the Coral Triangle Marine Protected Area System. *Coastal Management*, 42(2), 183–205. <https://doi.org/10.1080/08920753.2014.877768>
- Welly, M. (2022). *Marine protected area learning site for the Coral Triangle*. PANORAMA Solutions. <https://panorama.solutions/en/solution/marine-protected-area-learning-site-coral-triangle>
- Widyarsana, I. M. W., & Agustina, E. (2020). Waste Management Study In The Archipelago Tourism Area (Case Study: Nusa Penida District, Bali Province, Indonesia). *E3S Web of Conferences*, 148, 05002. <https://doi.org/10.1051/e3sconf/202014805002>
- Widyarsana, I. M. W., Damanhuri, E., Agustina, E., & Aulia, R. N. (2019). Risk assessment and rehabilitation potential of municipal solid waste landfills in Bali Province, Indonesia. *International Journal of GEOMATE*, 17(63), 164–171. <https://doi.org/10.21660/2019.63.39057>
- Yunitawati, D., & Clifton, J. (2021). Governance in the early stages of marine protected area development: A case study of Nusa Penida District Marine Conservation Area, Indonesia. *Marine Policy*, 127, 103653. <https://doi.org/https://doi.org/10.1016/j.marpol.2019.103653>