

Protection and Preservation of the Marine Environment Through a Marine Ecotourism Scheme in Nusa Penida Bali

Sabri Banna ^{a✉}, Tarmizi Taher ^b, Aditya Bagus Pradana ^b

^a Semarang Local Water Company, Semarang,
Indonesia

^b Water and Marine Justice Forum, Jakarta,
Indonesia

✉ Corresponding email: sabribanna@gmail.com

Abstract

This study examines the potential of a marine ecotourism scheme as a strategy for the protection and preservation of the marine environment in Nusa Penida, Bali. With the rapid growth of tourism in the region, there is an urgent need to balance economic development with environmental conservation efforts. Through qualitative research methods, including interviews, surveys, and site observations, this research explores the current state of the marine environment in Nusa Penida and assesses the feasibility and effectiveness of implementing a marine ecotourism scheme as a means of sustainable development. The findings reveal significant threats to the marine environment in Nusa Penida, including coral reef degradation, marine pollution, and habitat destruction. However, the study also identifies opportunities for conservation and sustainable management



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through the promotion of marine ecotourism initiatives. By engaging local communities, businesses, and government agencies in collaborative conservation efforts, a marine ecotourism scheme has the potential to generate economic benefits while simultaneously safeguarding marine biodiversity and ecosystem health. This research contributes to the growing body of knowledge on sustainable tourism development and provides practical recommendations for policymakers, stakeholders, and practitioners seeking to promote the protection and preservation of marine environments in coastal regions like Nusa Penida, Bali.

KEYWORDS *Marine Protection, Eco-tourism, Environmental Protection*

Introduction

The marine environment of Nusa Penida, Bali, stands as a critical yet fragile ecosystem facing escalating pressures due to rapid tourism development. As one of Indonesia's most popular tourist destinations, Nusa Penida's pristine marine habitats attract visitors from around the globe, generating substantial economic benefits for the local communities.¹ However, this influx of tourism has also brought about significant environmental challenges, including coral reef degradation, marine pollution, and habitat destruction. In response to these threats, there is a growing recognition of the urgent need for sustainable management practices to ensure the long-term health and resilience of Nusa Penida's marine ecosystems.²

¹ Susiloningtyas, Dewi, T. Handayani, and A. N. Amalia. "The impact of coral reefs destruction and climate change in Nusa Dua and Nusa Penida, Bali, Indonesia." *IOP Conference Series: Earth and Environmental Science*. Vol. 145. No. 1. IOP Publishing, 2018; Yunitawati, Dinah, and Julian Clifton. "Governance in the early stages of marine protected area development: A case study of Nusa Penida District Marine Conservation Area, Indonesia." *Marine Policy* 127 (2021): 103653.

² Sudipa, Nyoman, et al. "Daya Dukung Air di Kawasan Pariwisata Nusa Penida, Bali." *Jurnal Sumberdaya Alam dan Lingkungan* 7.3 (2020): 117-123; Damayanti, Ida Ayu Kade Werdika, I. Nengah Wijaya, and I. Nyoman Kanca Kanca. "Strategi pengembangan Pulau Nusa Penida sebagai kawasan pariwisata yang

In addition, the term ecotourism can be interpreted as a trip by a tourist to a remote area with the aim of enjoying and learning about nature, history and culture in an area, where the tourism pattern helps the economy of the local community and supports nature conservation. Actors and experts in the field of ecotourism agreed to emphasize that ecotourism patterns should minimize negative impacts on the local environment and culture and be able to increase economic income for local communities and conservation values.³

Natural resource management that leads to ecotourism activities is a concept that combines the interests of the tourism industry with environmentalists. Environmentalists state that environmental protection and preservation can only be achieved by involving people who live and depend on the area to be developed into a tourist area and making them *partners* in the tourism development efforts. This method was introduced by the President of the *World Wild Fund* (WWF) at the 40th annual conference of the Asia Pacific Travel Association (PATA).⁴

Ecotourism includes ecology, and socio-economics. The ecological aspect means that ecotourism contributes positively to nature conservation. The socio-economic aspect means that it is a tool for a sustainable economy. Community opinion requires ecotourism to empower communities, in the economic sense of providing a role in ecotourism for locals, and by increasing their participation in conservation.⁵

berkelanjutan." *Soshum: Jurnal Sosial dan Humaniora* 5.2 (2017): 136; Sudipa, Nyoman, et al. "Status Kualitas Air di Kawasan Pariwisata Nusa Penida." *Ecotrophic* 14.2 (2020): 181-189.

³ Wearing, Stephen, and John Neil. *Ecotourism*. Routledge, 2009; Stronza, Amanda L., Carter A. Hunt, and Lee A. Fitzgerald. "Ecotourism for conservation?." *Annual Review of Environment and Resources* 44 (2019): 229-253; Fennell, David. "Ecotourism." *The Routledge handbook of tourism and the environment*. Routledge, 2012, pp. 323-333.

⁴ Rhama, Bhayu. "Peluang Ekowisata Dalam Industri 4.0 di Indonesia." *Journal Ilmu Sosial, Politik dan Pemerintahan* 8.2 (2019): 1-13; Nafi, Mochammad, Bambang Supriyadi, and Nanny Roedjinandari. "Pengembangan Ekowisata Daerah." *Buku Bunga Rampai* 1.33 (2017): 38-45.

⁵ Prihanta, Wahyu, et al. "Pantai Taman-Pacitan ecotourism development: Conservation and community empowerment orientation." *Journal of Community*

Ecotourism is said to have an important value for conservation because there are several things, including: providing economic value for areas that have the purpose of conservation activities in protected areas, providing economic value that can be used for conservation programs in protected areas, generating additional income directly and indirectly to the community around the ecotourism site, can develop constituents that support conservation at the local level, nationally and internationally, encourage the sustainable use of natural resources, and reduce threats to biodiversity.⁶

Law Number 5 of 1990 concerning the Conservation of Natural Resources and their Ecosystems, provides a definition related to conservation, namely the management of biological natural resources whose use is carried out wisely to ensure the sustainability of their supplies while maintaining and improving the quality of diversity and value.⁷

The conservation area has an attraction for tourists to visit. This area consists of *natural amenities* (climate, forests, flora and fauna) in the form of human creations (historical, cultural and religious objects) and human way of life. Tourist attractions are managed through technological and scientific capabilities mastered by humans. Nature and attraction form by itself, but there are times when it can be stimulated by humans, but if not calculated properly, it can cause considerable negative impacts such as environmental damage due to the construction and development of the tourism object.⁸

Marine protected areas (MPAs) individually and globally are the main tools in protecting marine biodiversity. Although knowledge about

Service and Empowerment 1.1 (2020): 1-16; Wijayanti, Ajeng, and Ramlah Ramlah. "Pengaruh Concept Blue Economy Dan Green Economy Terhadap Perekonomian Masyarakat Kepulauan Seribu." *Owner: Riset dan Jurnal Akuntansi* 6.3 (2022): 2875-2886.

⁶ Singh, Ravishankar Kumar, ed. *Eco-tourism and sustainable development*. Abhijeet, 2003.

⁷ Salman, Ahmad, Mastura Jaafar, and Diana Mohamad. "A comprehensive review of the role of Ecotourism in sustainable tourism development." *E-Review of Tourism Research* 18.2 (2020): 215-233.

⁸ Dolnicar, Sara, Geoffrey I. Crouch, and Patrick Long. "Environment-friendly tourists: What do we really know about them?." *Journal of Sustainable Tourism* 16.2 (2008): 197-210.

MPAs is constantly changing or increasing, the application of the theories to a large area is almost non-existent. Some theories recommend that the core zone within MPAs should protect more than 20%. However, agreement on how much habitat should be protected by marine biodiversity to ensure ecological connectivity does not yet exist.⁹

Bali is the name of one of the provinces in Indonesia and is also the name of the largest island that is part of the province. Besides consisting of the island of Bali, the territory of Bali Province also consists of smaller islands around it, namely Nusa Penida Island, Nusa Lembongan Island, Nusa Ceningan Island and Serangan Island. Geographically, Bali is located between the Islands Javanese and Island Chili. The majority of Bali's population are religious believers Hindu. In the world, Bali is famous as a tourism destination with the uniqueness of various art-cultural results, especially for tourists Japanese and Australia. Bali is also known by its nickname *Pulau Dewata* and *Thousand Temple Island*.¹⁰

The exotic Bali in tourism makes Bali the center of tourist destinations for local people and foreign communities. Bali even received an award from The World's Best Destination in the TripAdvisor Travellers' Choice Award 2017. This event is a form of appreciation from TripAdvisor to tourism actors, activists, and *stakeholders* around the world. Winners are selected based on millions of reviews and opinions made by travellers around the world over a 12-month period. Winners are selected using an algorithm that takes into account the quality and quantity of reviews and ratings as well as objective ratings in each award category. In fact, TripAdvisor has received 500 million reviews and opinions with 290 pieces of content per minute involving trip planning, booking sites and mobile apps. When it comes to TripAdvisor reviews of Bali, we see growth

⁹ Soemarmi, Amiek, et al. "Konsep negara kepulauan dalam upaya perlindungan wilayah pengelolaan perikanan Indonesia." *Masalah-Masalah Hukum* 48.3 (2019): 241-248; Mora, Camilo, et al. "Management effectiveness of the world's marine fisheries." *PLoS biology* 7.6 (2009): e1000131.

¹⁰ Umiyati, Mirsa, and Aron Meko Mbete. "Ecotext of Environmental Treatment and Preservation of Springs-Upstream River in Tenganan Pegringsinan Village." *WARDS 2019: Proceedings of the 2nd Warmadewa Research and Development Seminar (WARDS)*, 27 June 2019, Denpasar-Bali, Indonesia. European Alliance for Innovation, 2020.

in 2016 compared to 2015 across three main categories. Among them are growth in the accommodation aspect by 25%, attractiveness by 38%, and restaurants by 38%.¹¹

As the center of tourist destinations in Indonesia, it is fitting that Bali implements conservation through tourism methods or better known as ecotourism. One of the ecotourism destinations that become a reference is Nusa Penida. Nusa Penida is one of the marine attractions in Bali that is often visited by tourists who come. Nusa Penida is considered a marine protected area in Indonesia and has been reserved through the Regulation of the Regent of Klungkung Regency (Perbup) No. 12 of 2010 with the status of the area is a Water Tourism Park. One of the reasons for the reservation of conservation areas in Nusa Penida is because Nusa Penida has specific or endemic organisms that attract tourists, namely sunfish (*sunfish*), manta rays, turtles, and dolphins so that in its sustainability it really needs to be conserved.¹²

The diversity of marine biological resources owned by Nusa Penida is indeed very high, this can be seen by the discovery of various types of corals, reef fish and ornamental fish, sharks, manta rays, turtles, dugongs, dolphins and whales. These types are typical biota for the Nusa Penida Area. In July-September every year, Nusa Penida is filled with tourists with the appearance of sunfish which become a tourist icon. In addition, in the Nusa Penida area there are also 230.07 hectares of mangroves found in Nusa Lembongan and Nusa Ceningan and based on the results of a survey conducted by the TNC *Marine Program* and the Mangrove Forest Management Center, 13 species of mangroves and 7 species of associated plants were found and there were 5 species of water birds and 25 species of land birds around the mangroves. All types of mangroves as well as

¹¹ Prideaux, Bruce. "The resort development spectrum—a new approach to modeling resort development." *Tourism Management* 21.3 (2000): 225-240.

¹² Stratoudakis, Yorgos, Helena Farrall, and Lia Vasconcelos. "Collaborative lessons towards marine sustainability: a long-term collective engagement." *Sustainability Science* 14.4 (2019): 1147-1160; Putra, I. Nyoman Darma. "Bali: between cultural and marine tourism." *Jurnal Kajian Bali* 4.1 (2014): 15-30.

associated plants and bird species are found in Nusa Lembongan and Nusa Ceningan.¹³

This study focuses on the potential of implementing a marine ecotourism scheme as a multifaceted strategy for the protection and preservation of the marine environment in Nusa Penida, Bali. By leveraging the inherent value of the marine ecosystem for tourism purposes while promoting responsible and sustainable practices, marine ecotourism has emerged as a promising avenue for reconciling the economic interests of tourism with the imperative of environmental conservation. Through an interdisciplinary approach that combines ecological insights with socio-economic considerations, this research aims to assess the feasibility and effectiveness of marine ecotourism as a means of achieving conservation goals while supporting local livelihoods and promoting community empowerment. By investigating the current state of the marine environment in Nusa Penida, identifying key challenges and opportunities, and proposing practical strategies for sustainable development, this study seeks to contribute to the growing discourse on marine conservation and sustainable tourism in coastal regions.

Potential in Marine Ecotourism in Nusa Penida, Bali

Bali Island is part of the Lesser Sunda Islands along 153 km and 112 km wide about 3.2 km from Java Island. Astronomically, Bali is located at 8°25'23" South Latitude and 115°14'55" East Latitude which makes it tropical like the rest of Indonesia. Mount Agung is the highest point in Bali at 3,148 m. The volcano last erupted in March 1963. Mount Batur is also one of the mountains in Bali. About 30,000 years ago, Mount Batur erupted and produced a catastrophic disaster on earth. Unlike in the north, the southern part of Bali is a lowland fed by rivers.

¹³ Zamzami, Lucky, and Muhammad Aliman. "The effect of ecotourism development on marine conservation area in west Sumatera, Indonesia." *Geo Journal of Tourism and Geosites* 38.4 (2021): 1166-1174. See also Masud, Muhammad Mehedi, et al. "Community-based ecotourism management for sustainable development of marine protected areas in Malaysia." *Ocean & Coastal Management* 136 (2017): 104-112.

The capital city of Bali is Denpasar. Other important places are Ubud as an art center located in Gianyar Regency; while Kuta, Sanur, Seminyak, Jimbaran and Nusa Dua are some places that become tourism destinations, both beach tourism and resting places. The population of Bali is approximately 4 million people, with the majority of 92.3% adhering to Hinduism. Other religions are Islam, Protestantism, Catholicism, and Buddhism. Apart from the tourism sector, Balinese people also live from agriculture and fisheries. Some also choose to become artists. The languages spoken in Bali are Indonesian, Balinese, and English, especially for those who work in the tourism sector.

Balinese and Indonesian are the most widely spoken languages in Bali, and like the rest of Indonesia, most Balinese are bilingual or even trilingual. Although there are several dialects in Balinese, generally Balinese people use a form of Balinese association as an option in communicating. Traditionally, the use of various dialects of Balinese is determined based on the color chess system in Hindu Dharma; Although the implementation of such traditions tends to decrease. English is the third language (and the main foreign language) for many Balinese people, influenced by the great needs of the tourism industry. Employees who work at tourist information centers in Bali, often also understand several foreign languages with sufficient competence.¹⁴

Nusa Penida is one of the marine protected areas in Indonesia and has been reserved through the Regulation of the Regent of Klungkung Regency (Perbup) No. 12 of 2010 with the status of the area is a Water Tourism Park. One of the reasons for the reserve of conservation areas in Nusa Penida is because Nusa Penida has specific or endemic organisms that attract tourists, namely sunfish, manta rays, turtles, and dolphins so that its sustainability really needs to be conserved. The reserve of marine protected areas, especially in Nusa Penida, certainly has an impact on the community and the marine environment (ecology) in the Nusa Penida area because this area is considered a tourist area that has developed and has been managed for almost 5 (five) years. The impact that can be caused

¹⁴ Sutawa, Gusti Kade. "Issues on Bali tourism development and community empowerment to support sustainable tourism development." *Procedia economics and finance* 4 (2012): 413-422.

can be positive and can also be negative. It has a positive impact if the management has so far prospered the community and protected the marine environment (ecology), in this case coral reefs which are one of the largest tourist attractions and other organisms associated with it and have an attraction for tourists. And vice versa it will have a negative impact if there is no improvement in the marine environment (ecology) and improvement of community welfare. These two things are an inseparable whole, so in the management of coastal areas, especially in marine protected areas, it is necessary to pay attention to the balance of these two aspects.¹⁵

The diversity of marine biological resources owned by Nusa Penida is indeed very high, this can be seen by the discovery of various types of corals, reef fish and ornamental fish, sharks, manta rays, turtles, dugongs, dolphins and whales. These types are typical biota for the Nusa Penida Area. In July-September every year, Nusa Penida is filled with tourists with the appearance of sunfish which become a tourist icon. In addition, in the Nusa Penida area there are also 230.07 hectares of mangroves found in Nusa Lembongan and Nusa Ceningan and based on the results of a survey conducted by the TNC Marine Program and the Mangrove Forest Management Center, 13 species of mangroves and 7 species of associated plants were found and there were 5 species of water birds and 25 species of land birds around the mangroves. All types of mangroves as well as associated plants and bird species are found in Nusa Lembongan and Nusa Ceningan. Coral reef ecosystem conditions Coral reefs in Nusa Penida Conservation Area are categorized as good or in good condition. This can be proven by the level of coral health which is assessed from the percent of coral community cover and the abundance of reef fish. The percent of coral community cover in the Nusa Penida conservation area is done by

¹⁵ Christie, Patrick, and Alan T. White. "Trends in development of coastal area management in tropical countries: From central to community orientation." *Coastal Management* 25.2 (1997): 155-181; Cendrero, Antonio, and David W. Fischer. "A procedure for assessing the environmental quality of coastal areas for planning and management." *Journal of Coastal Research* (1997): 732-744.

observing corals at two depths, namely at a depth of 3 meters and 10 meters, as seen in the Figure 1.¹⁶

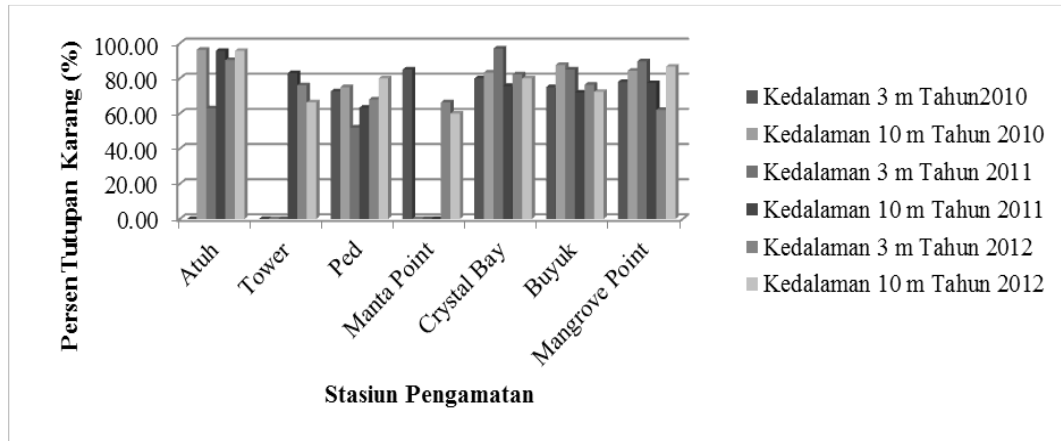


FIGURE 1. Coral Cover Percentage

Figure 1 shows that the percentage of coral community cover in the Nusa Penida conservation area from 2010-2011. The category of coral community cover ranges from good to very good. In 2010 the range of coral community cover was between 72.00% - 95.67%, in 2011 it ranged from 62.00% - 96.33%, while in 2012 it ranged from 52.00% - 97.00%. This percent of coral community cover is calculated by summing the percent of hard coral cover, soft coral cover and cover of other living organisms (*living others*) that coexist with coral reef ecosystems that are sedentary in nature and form one community. The organisms classified as other living organisms are algae, crinoids, linkia, tridacna, anemone and other organisms that live together with coral reef ecosystems in one community. Coral mortality index (coral mortality rate) The value of coral

¹⁶ See Putra, I. Made Raditya, I. G. N. P. Dirgayusa, and Elok Faiqoh. "Keanekaragaman dan biomassa ikan karang serta keterkaitannya dengan tutupan karang hidup di Perairan Manggis, Kabupaten Karangasem, Bali." *Bali. Journal of Marine and Aquatic Sciences* 5.2 (2019): 164-176; Dewantama, Made Iwan, N. K. Mardani, and I. B. Windia Adnyana. "Studi efektivitas pengelolaan kolaboratif kawasan perairan Taman Nasional Bali Barat terhadap tutupan karang hidup dan sosial ekonomi masyarakat lokal." *Ecotrophic* 2.2 (2007): 381856; Jubaedah, Iis, and Pigoselpi Anas. "Dampak pariwisata bahari terhadap ekosistem terumbu karang di perairan Nusa Penida, Bali." *Jurnal Penyuluhan Perikanan dan Kelautan* 13.1 (2019): 59-75.

mortality index in Nusa Penida conservation area is ranging from 0 – 0.02 at a depth of 3 meters and ranging from 0 – 0.05 at a depth of 10 meters. Based on the value of this coral mortality index, it can be concluded that the level of coral health in 2010-2012 is very good, meaning that the level of coral damage in the Nusa Penida area is very small.¹⁷

The results of a rapid marine ecology study by Allen and Erdmann (2009) found 576 species of fish in Nusa Penida waters consisting of 68 families, and 5 of them are new species / species that have no names. Of the 68 families found, there are 8 dominant families, namely Labridae (94 species), Acanthuridae (36 species), and Serranidae (32 species) which are target fish groups, Chaetodontidae (36 species) which are indicator fish, Pomacentridae (86 species), Gobiidae (24 species), Apogonidae (22 species) and Scaridae (21 species) which are major fish.¹⁸ The abundance of reef fish in the Nusa Penida area is very abundant so that it is also an attraction for tourists to visit the Nusa Penida area to carry out marine tourism activities. Most tourists who visit Nusa Penida also because this area has many types of reef fish and this is very liked by tourists. The type of fish that is excellent for the Nusa Penida area is the presence of sunfish and manta rays. This is supported by the results of research conducted by Buckley which states that most tourists who do marine activities in *National Park* Australia loves coral reef ecosystems that have diverse fish species and unique body shapes. The abundance of reef fish in the Nusa Penida area cannot be separated from the condition of corals, especially good live coral cover.¹⁹ Based on research conducted by Langga shows that there is a significant relationship between the abundance of individual fish

¹⁷ Adnyani, Sari. "Manajemen Tata Kelola Lingkungan Dengan Model Simulasi Terpadu Perlindungan Hukum Kawasan Pesisir Nusa Penida (Pelibatan Elite Desa Adat Sebagai Equilibrium)." *Jurnal Ilmu Sosial dan Humaniora* 5.2 (2016); Jubaedah, Iis, and Pigoselpi Anas. "Dampak pariwisata bahari terhadap ekosistem terumbu karang di perairan Nusa Penida, Bali." *Jurnal Penyuluhan Perikanan dan Kelautan* 13.1 (2019): 59-75.

¹⁸ Maududi, Muhammad Akhyar, and Oktiyas Muzaky Luthfi. "Tutupan makroalga pada terumbu karang di kawasan konservasi perairan (KKP) Nusa Penida, Bali." *Depik* 7.1 (2018): 69-75.

¹⁹ Maududi, et.al. *See also* Tito, C. K., and E. E. Ampou. "Coral reefs ecosystem degradation at Nusa Penida, Bali." *IOP Conference Series: Earth and Environmental Science*. Vol. 429. No. 1. IOP Publishing, 2020.

with the condition of live coral cover.²⁰ This is also supported by Carpenter's opinion that live coral cover has a positive influence on the abundance of individual reef fish.²¹

The results of the survey and suitability analysis conducted showed that the location that is very suitable for carrying out diving ecotourism activities is at the location of Jungut Batu Village (mangrove point) with a value of 85.19% while the other 3 locations/villages are included in the category according to the suitability value respectively is 74.07% for locations in Toyapakeh Village and Ped Village, 79.63% for locations in Sakti Village. These results show that all locations in the Nusa Penida area, especially the 4 villages that are research sites, are suitable to be used as dive sites because none of the locations are included in the category that is not suitable.²² Therefore, this area must be optimized for its use as a place for diving. The utilization of a location area must be adjusted to its potential so that its management is more optimal and measurable. This is in line with what Collins said that the suitability of an area is the suitability of an area for a particular use, so that its utilization can be adjusted to the conditions or potential it has.²³

Based on the results of the analysis of land suitability for ecotourism in the snorkeling category, locations that have a very suitable suitability index are locations in Jungut Batu village (*mangrove point*) with an IKW value of 85.96%. The results of the analysis conducted did not find inappropriate conformity index values but all of them were in categories according to the IKW value, respectively, Toyapakeh Village at 75.44%, Ped Village at 75.44% and Sakti Village at 80.70%. The results of this analysis are very in accordance with the existing conditions where *the*

²⁰ Maududi, et.al. See also Wicaksana, Ida Bagus Agung. "2020 Bali's Coral Conservation: from pandemic challenge to Government coral garden project." *Bali Tourism Journal* 4.2 (2020): 35-39.

²¹ Maududi, et.al.

²² Maududi, et.al.

²³ Maududi, et.al. See also Susiloningtyas, Dewi, T. Handayani, and A. N. Amalia. "The impact of coral reefs destruction and climate change in Nusa Dua and Nusa Penida, Bali, Indonesia." *IOP Conference Series: Earth and Environmental Science*. Vol. 145. No. 1. IOP Publishing, 2018.

snorkeling location in Jungut Batu village is a *prima donna* location because at this location there are special attractions carried out by tourists, namely feeding reef fish with bread. And at this location there are 109 species of reef fish with 100% water brightness. However, at this location the obstacle is the rapid current which is about 0.514 m / second. The rapid flow in the Nusa Penida area is a characteristic where this area is indeed an Indonesian Cross Current (ARLINDO) area that crosses the Lombok Strait and directly faces the Indian Ocean.²⁴ Beach Tourism Nusa Penida tourist area has a beautiful beach view because it is covered by white sand. However, its management is not utilized optimally. This is because almost all beach locations are still in dirty condition and have not been managed properly. Based on the results of surveys and suitability analysis of the four beaches used as sampling, Sakti village has the highest score for the suitability of beach tourism in the recreational category with an IKW value of around 83.33%. This result is very in accordance with the conditions in the field (existing conditions) because the Sakti village known as *the Crystal Bay site* (Penida) has a beautiful beach that resembles a crystal so that the naming of this *site* is known as *Crystal Bay*. The high suitability value for the beach tourism category in this case for beach recreation in Sakti village is caused by the high value of each parameter measured such as water depth of no more than 3 meters, white sand beach type, high water brightness so that the bottom of the water can still be seen clearly with the naked eye and the width of the beach is 19.2 meters and the slope of the beach is 150.²⁵

Based on data obtained from interviews through questionnaires that we took from the Journal, it was found that community income has increased since the Nusa Penida area was proposed as a marine protected area. Before the proposal of the Nusa Penida area to become a Marine Protected Area, the average income of the community was around Rp.

²⁴ See Boakes, Zach, et al. "Coral reef conservation in Bali in light of international best practice, a literature review." *Journal for Nature Conservation* 67 (2022): 126190.

²⁵ See Eriksson, Björn, Frank Johansson, and Malgorzata Blicharska. "Socio-economic impacts of marine conservation efforts in three Indonesian fishing communities." *Marine Policy* 103 (2019): 59-67.

700,000.00 – Rp. 900,000.00 but now their income has increased by around 10 – 30%.

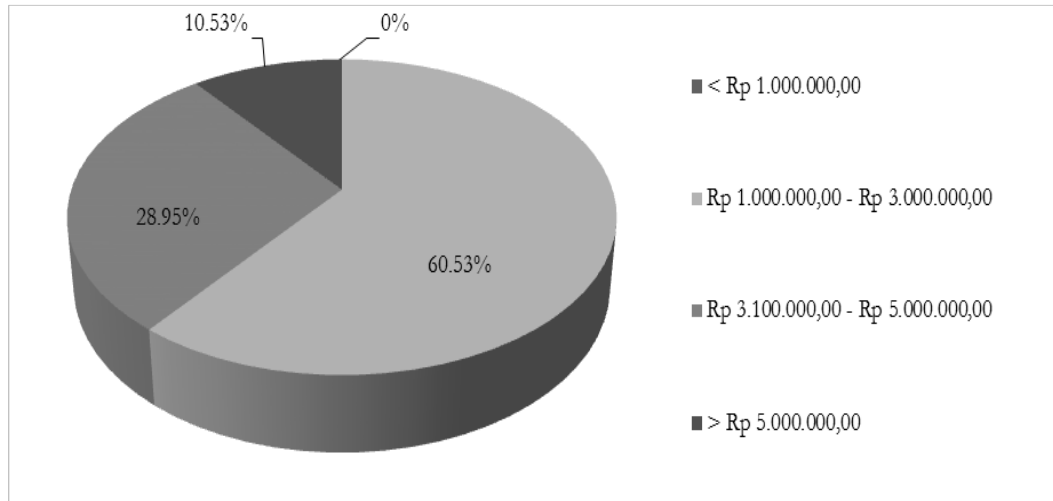


FIGURE 2. Percentage of income of people in Nusa Penida after the establishment of conservation areas in Nusa Penida

Based on the analysis conducted to measure the level of community welfare in the Nusa Penida conservation area shows that the community is at a high level of welfare and even based on the scoring analysis conducted shows that only a few of the respondents are at a moderate level of welfare and none are at a low level of welfare. Of the four villages surveyed, namely Toyapakeh Village and Jungut Batu Village, the welfare level is high with a scoring value ranging from 56-63, in Ped Village there is one family that is in a medium welfare level and the other family is at a high welfare level with a scoring value ranging from 55-63 while in Sakti Village from 10 family respondents interviewed there are 5 families who are in a medium welfare level, namely with The scoring score is between 46-50 while the other 5 families are at a high level of welfare.

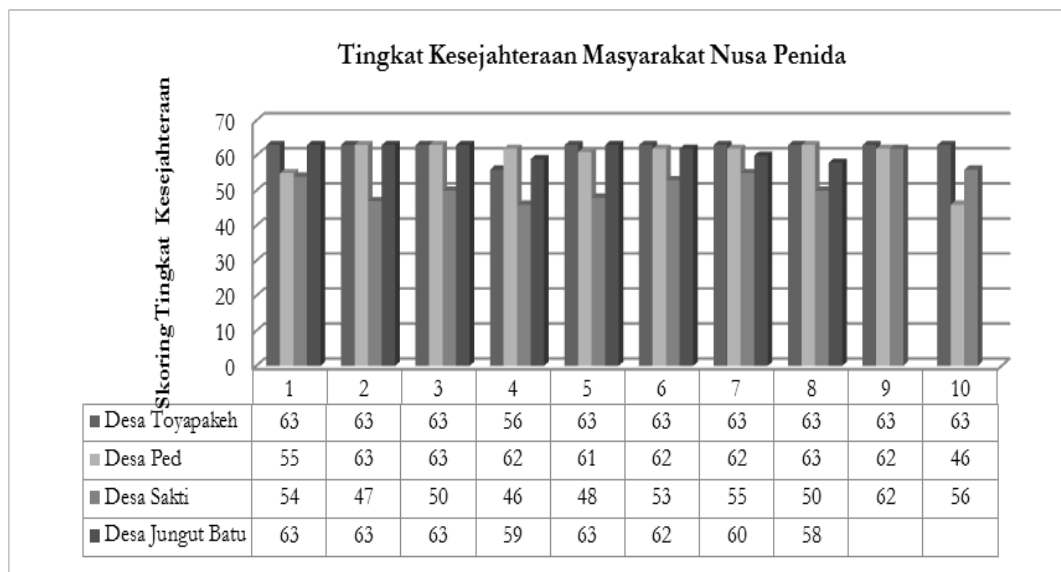


FIGURE 3. The welfare level of Nusa Penida communities in four study sites 10

This shows that the variables that greatly affect the level of community welfare in four villages namely Toyapakeh Village, Ped Village, Sakti Village and Jungut Batu Village are housing facilities, because the more prosperous a family is, the desire to have facilities in the household is higher. This shows that the higher the income / income of the family the greater the level of consumption / expenditure to meet the needs of the family and also to equip the household with better or luxurious facilities

Government Efforts in Ecotourism Management of Nusa Penida

The impact of the proposed Nusa Penida Conservation Area will not only be felt by the community, but will also be felt by the local government of Klungkung Regency, especially the government in Nusa Penida District. One of the impacts or benefits felt by local governments is through taxes, be it entrance fees in conservation areas or fee taxes from hotel services, restaurants, travel agencies, and taxes from shops that sell souvenirs. Another benefit felt by the government with the existence of conservation areas in Nusa Penida is that the community is able to manage their own area and maintain the preservation of nature available for the benefit of the welfare and sustainability of natural resources. In addition,

the benefits that can be felt by the Klungkung Regency government are through regional revenues calculated through gross regional domestic income (GRDP) of the Klungkung Regency tourism sector.²⁶

The government's efforts in managing ecotourism in Nusa Penida are still not optimal, according to the journal we quoted that there is still much to be addressed in the Nusa Penida Marine Ecotourism area, what needs to be addressed is the existing infrastructure in the Nusa Penida tourist area such as highways that connect one tourist site with another tourist location as a means of mainland transportation, because almost all roads in Nusa Penida are in poor condition (damaged), then increase the number of health facilities and infrastructure in each location that is used as a tourist attraction. This is a special request from tourists visiting Nusa Penida, then Adding the form of tourist attractions, in this case the author recommends making a tour package in the form of "Nusa Penida Tour", then setting the entrance fee to the Nusa Penida area immediately so that every business actor and also tourists get the same price, then Add facilities and infrastructure that support tourism activities specifically in the Nusa Gede tourist area because of the facilities and Very minimal infrastructure such as lodging places, restaurants, hotels and *dive operations* (rental of diving and *snorkling equipment*). The goal is that tourists are more comfortable living in the Nusa Gede area, then the sacred zone in the Nusa Penida conservation area needs to be reviewed and adjusted to the basis of the Law which is the basis for the reserve of the Nusa Penida area as a marine conservation area, then Limiting the number of visitors (tourists) entering the Nusa Penida area because based on the results of the analysis of the carrying capacity of the area conducted in this study the number of visitors has been exceeding the carrying capacity of the region. Therefore, managers and the government must limit the number of visitors (tourists), but to increase regional income, it is necessary to increase the entrance fee to the area.²⁷

²⁶ Yunitawati, Dinah, and Julian Clifton. "Governance in the early stages of marine protected area development: A case study of Nusa Penida District Marine Conservation Area, Indonesia." *Marine Policy* 127 (2021): 103653.

²⁷ RM, N. Nyoman Budiarta, and Ida Bagus Putu Adnyana. "The development of marine transportation system in supporting sustainable tourism case study: Nusa Penida Island, Bali Indonesia." *Journal of Sustainable Development* 9.4 (2016): 89.

Legal issues that exist in marine ecotourism in Nusa Penida

To ensure the implementation of safety and security at sea as referred to in article 276 paragraph (1) and article 279 paragraph (3) of Law number 17 of 2008 concerning Shipping, the function of guarding and enforcing laws and regulations and laws at sea and beaches is carried out by the *Sea and Coast Guard*.²⁸ The Sea and Coast Guard as referred to in article 277 paragraph (1) carries out the following duties:

- a. Supervise and safety and security of shipping which includes the safety and security of water transportation, ports and maritime environmental protection;
- b. Supervise the prevention and control of pollution in the sea;
- c. Supervision and control of salvage activities, underwater works and exploitation and exploration of marine resources;
- d. Supervision and control of ship activities and traffic;
- e. Security of navigational aids and support the implementation of search and rescue activities for human souls at sea.

In order to carry out its duties as referred to in article 279 paragraph (1), the Sea and Coast Guard is supported by infrastructure in the form of sea and coast guard fleet bases that operate throughout Indonesia, and can use ships and aircraft that have the status of state ships. In paragraph (3) it is stated that the implementation of guard and law enforcement at sea by the sea and coast guard as referred to in paragraph (1) above must use and show clear identity. The duties and functions of the sea and coast guard are in line with articles 73, 101, 111 and 224 of UNCLOS 1982 and the International Convention on the Safety of Life at Sea as previously amended on special measures to enhance maritime safety and security²⁹

“Territorial sea is part of the territory of the coastal State in accordance with

²⁸ Darmana, Tasdik, and Tony Koerniawan. "The Development of Energy Tourism Village in Indonesia: a Case Study in Nusa Penida." *E3S Web of Conferences*. Vol. 125. EDP Sciences, 2019.

²⁹ Yustitiantingtyas, Levina. "Pengamanan dan Penengakan Hukum di Perairan Indonesia sebagai Konsekuensi Penetapan Alur Laut Kepulauan Indonesia (ALKI)." *Pandecta Research Law Journal* 10.2 (2015): 143-152.

international law and therefore the coastal State exercises full sovereignty in this zone having the presumption of general jurisdiction as in its other land territories .”³⁰

The territorial sea is part of the territory of the coastal State in accordance with international law and therefore the State exercises full sovereignty in its coastal zone, exercising general jurisdiction as in other territories. The problems that occur in marine ecotourism in Nusa Penida are about the destruction of the marine environment by several parties for fishing purposes, such as using compressors, tiger trawls, and graffiti coral reefs. Thus, causing damage to coral reefs and other marine plants. Regarding this, it has actually been protected by rules, as mentioned above, but law enforcement is still too light, sometimes even not acted.

One of the cases that entered the court realm was a case with case register Number 785/Pid.Sus/2015/PN.Dps. in that case there were those who caught fish using compressors in the Nusa Penida marine ecotourism area whose status is a conservation area, by causing damage to crops, but the Denpasar District Court judge decided to give a sentence of 1 year and a fine of 5 million. This is too mild, with the impact caused by environmental damage.

Corals in Nusa Penida suffer from vandalism inflicted by irresponsible tourists, who scribble or scratch them with disregard for their ecological importance. Despite numerous signs and appeals urging the preservation of nature in Nusa Penida, including warnings against damaging coral reefs or catching fish, these efforts have proven insufficient. Additionally, specific signs outlining the responsibilities of tour operators, particularly diving tour operators, further emphasize the importance of sustainable tourism practices.³¹ Tourists should be aware of this, but maybe because there is no follow-up in the case, so many people dare to

³⁰ Tryfon, Korontzis. "Exceptions to the criminal jurisdiction of the coastal state on merchant and on naval vessels in the Hellenic legal order." *European Scientific Journal* (2014).

³¹ Berry, Sue, and Adele Ladkin. "Sustainable tourism: A regional perspective." *Tourism Management* 18.7 (1997): 433-440; Verbeek, Desirée, and Hans Mommaas. "Transitions to sustainable tourism mobility: The social practices approach." *Journal of Sustainable Tourism* 16.6 (2008): 629-644.

do this, so nature is sacrificed. So here needs the role of all parties, especially law enforcement, because good law enforcement will protect our nature.

In addition to the above cases, there are also other cases that damage the Nusa Penida sea area, namely the manufacture of iron and concrete handles for seawalker or underwater road water tourism that is suspected of damaging coral reefs in Nusa Penida waters. Managers are considered negligent and ignorant of the impact of damage to coral reef ecosystems in pursuit of profit alone, including weak supervision of related agencies. The monitoring results showed damage to coral reefs due to shifting concrete moorings and tourist facility materials occurred at Mangrove Point.³²

Government intervention in environmental matters is essential, given that the environment is not merely a present enjoyment but a legacy for future generations. While our regulatory framework is robust, as outlined previously, the effectiveness of these regulations is compromised by weak enforcement. As a nation governed by the rule of law, it is imperative that we strengthen legal enforcement to prevent such cases from recurring and ensure the protection of our environment for generations to come.

Conclusion

In conclusion, Bali stands as a cherished destination for both local and international tourists, with Nusa Penida showcasing its remarkable natural allure. The marine biodiversity of Nusa Penida is truly exceptional, boasting a rich array of coral reefs, reef fish, sharks, manta rays, turtles, dugongs, dolphins, and whales, making it a unique biota hub. However, despite these natural treasures, the government's efforts in managing ecotourism in Nusa Penida remain suboptimal. The infrastructure in Nusa Penida, particularly the road network, is inadequate and often in poor condition, hindering the accessibility of tourist sites and posing challenges for mainland transportation. Additionally, there is a pressing need to bolster health facilities and other essential infrastructure at tourist

³² Buncag, Mark Joseph J. "Community-based mangrove forest management sustainability: The case of some Asian countries." *International Journal of Science and Research* 10.4 (2021): 918-926.

locations to enhance visitor experience and safety. To address these issues, the implementation of a comprehensive "Nusa Penida Tour" package, coupled with standardized entrance fees, could streamline tourism operations and ensure equitable pricing for all stakeholders. Furthermore, urgent action is required to combat the environmental degradation inflicted by unsustainable fishing practices and tourism activities, such as the use of compressors, tiger trawls, and coral graffiti. While protective regulations exist, lax enforcement undermines their effectiveness, allowing continued damage to coral reef ecosystems. The construction of iron and concrete handles for seawalker or underwater road water tourism further exacerbates these environmental concerns, underscoring the need for stringent oversight and accountability among responsible parties. Only through robust enforcement of regulations and heightened awareness of the ecological impacts can Nusa Penida's marine environment be safeguarded for future generations to enjoy.

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