

Empowering Coastal Communities Through Ecotourism: Enhancing Economic Livelihoods And Turtle Conservation Efforts

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Abstract.

This community engagement project aimed to empower coastal communities through ecotourism while enhancing sea turtle conservation in Nipah, North Lombok, Indonesia. Conducted in collaboration between Mataram University and Universiti Utara Malaysia, the program combined educational sessions, interactive discussions, and symbolic hatchling releases to foster environmental awareness and sustainable livelihoods. Participants gained valuable insights into sea turtle life cycles, threats, and the importance of community-driven conservation. The event successfully strengthened public commitment to biodiversity protection and promoted Nipah as a model for ecotourism development. Moreover, the initiative demonstrated how integrated conservation and tourism strategies can contribute to marine ecosystem restoration and socio-economic resilience in coastal areas.

Keywords: *Sea turtle conservation; Ecotourism; Community empowerment; Sustainable tourism; Coastal livelihoods; Environmental education; Lombok.*

I. INTRODUCTION

Sea turtles (*Cheloniidae* and *Dermochelyidae*) are long-lived marine reptiles that have existed for over 100 million years and are considered crucial for maintaining healthy marine ecosystems (Wallace et al., 2011). As keystone species, they regulate the dynamics of seagrass beds, coral reefs, and marine food webs. For instance, green turtles (*Chelonia mydas*) graze on seagrass meadows, which enhances nutrient cycling and productivity of the coastal ecosystem (Coral Reef Alliance, 2023). Similarly, hawksbill turtles (*Eretmochelys imbricata*) play a crucial role in maintaining coral reef health by preying on sponges, which can otherwise outcompete corals for space, thereby promoting coral diversity and resilience (Mortimer et al., 2021). Despite their ecological significance, sea turtle populations worldwide have experienced precipitous declines, primarily due to anthropogenic pressures. Key threats include illegal exploitation for meat, eggs, and carapaces; incidental capture in fisheries; ingestion of and entanglement in marine debris, particularly plastics; habitat degradation caused by coastal urbanization; and disturbance of nesting sites by artificial lighting and human activity (Nelms et al., 2016; Rees et al., 2022). Additionally, climate change introduces further stressors, such as rising sand temperatures, and increased coastal erosion from extreme weather events, which jeopardize nesting success (Fuentes et al., 2020). The International Union for Conservation of Nature (IUCN) has recognized the precarious status of these species by listing six of the seven extant sea turtle species as threatened on the IUCN Red List of Threatened Species.

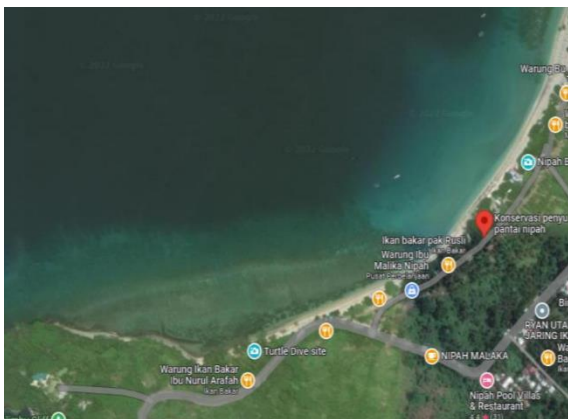
Notably, the hawksbill turtle (*Eretmochelys imbricata*) and Kemp's ridley turtle (*Lepidochelys kempii*) are categorized as Critically Endangered, facing extremely high risks of extinction in the wild due to their limited population sizes, narrow reproductive windows, and high vulnerability to cumulative anthropogenic impacts (IUCN, 2023). Although some regional conservation efforts have yielded positive outcomes, such as increased nest counts in certain areas, global population recovery remains hindered without cohesive international collaboration, long-term habitat protection, and mitigation of systemic drivers of decline (Wallace et al., 2011; Rees et al., 2022). Indonesia, home to six of the world's seven sea turtle species plays a critical role in global sea turtle conservation efforts (Hamann et al., 2022). However, the

country faces particularly complex and multifaceted conservation challenges due to its extensive coastline, decentralized governance, and varying socio-economic pressures across regions (Adnyana et al., 2023; Setyawan et al., 2022). These activities not only reduce hatching success but also discourage nesting females from returning to traditional sites. Government protection through national regulations, such as Government Regulation No. 7 of 1999 and the Ministerial Regulation No. 106 of 2018, provides a legal framework, but community-based initiatives remain key to achieving effective protection.

Community-led hatchery programs and ecotourism have shown promise in several parts of Indonesia, offering economic incentives while reducing poaching pressures (Putra et al., 2020). Nipah, located on the coast of West Nusa Tenggara, Indonesia, is a biodiversity hotspot that supports nesting grounds for green turtles, hawksbill turtles, and olive ridley turtles. However, the region faces threats from illegal hunting and blast fishing practices, which have damaged critical marine habitats. In response, local communities began a self-initiated conservation program, starting with one turtle hatchery pond and eventually expanding to multiple facilities with support from NGOs such as Pertamina. As of today, the initiative has successfully saved 25 sea turtle eggs and released approximately 18,000 hatchlings (*tukik*) back into the wild. Turtle-based eco-tourism has proven to deliver both environmental and socio-economic benefits. Activities like hatchling releases and nest patrols attract tourists, generate income for local communities, and promote conservation education (Sustainable Travel International, 2022). These initiatives align with the goals of sustainable development and biodiversity protection. In addition to hatchery operations, local efforts also include coral reef conservation and plastic waste reduction along coastal zones. These activities aim to restore a healthier environment not only for turtles but for the broader marine ecosystem. The main objective of this international community engagement project is to restore and conserve the sea turtle population in Nipah through community-based conservation, environmental education, and the development of sustainable eco-tourism.

II. METHODS

This community service program is an international collaboration between the Development Economics Study Program, Mataram University and Universiti Utara Malaysia (UUM), titled Empowering Coastal Communities Through Ecotourism: Enhancing Economic Livelihoods and Turtle Conservation Efforts. The primary objective of this program is to restore and preserve the turtle population in the Nipah region. Through conservation efforts in this Lombok tourism area, it is expected to contribute to environmental preservation, maintain the island's attractiveness as a tourist destination, and increase employment opportunities in the tourism sector. Furthermore, this initiative supports the Sustainable Development Goals (SDGs), particularly through the sustainable management and conservation of marine resources.



This international community empowerment activity was conducted in the Essential Ecosystem Area (Kawasan Ekosistem Esensial/KEE) of Nipah, located in Malaka Village, North Lombok, West Nusa Tenggara (NTB), at Latitude: -8.4400336 and Longitude: 116.03921008319 (Figure 1), in collaboration with the Nipah Turtle Conservation Center (TCC), on Thursday, October 10, 2024. The community empowerment activities were carried out through several phases: preparation, implementation, and joint evaluation.

Preparations included obtaining permits from relevant authorities such as the local Natural Resources Conservation Agency (Balai Konservasi Sumber Daya Alam/BKSDA), Nipah turtle conservation area managers, and village authorities or local communities. This step was crucial to ensure that the program complied with existing regulations and did not interfere with ongoing conservation efforts. Once the necessary permits were secured, the organizing team began logistical and technical preparations, including coordination with speakers, formation of the implementation committee, and preparation of educational materials. Additionally, logistical arrangements such as presentation tools, documentation equipment, and supplies for the turtle release were made. Coordination with various stakeholders was a key phase to ensure the program's success. Therefore, after permits were obtained and speakers were confirmed, coordination with Universiti Utara Malaysia was also prioritized to ensure alignment with the shared objectives. The main program activities began with a sharing session held on Thursday, October 10, 2024, at 2:00 PM, in a designated area provided by the Nipah turtle conservation management team. The educational session commenced with opening remarks from the organizing committee and speakers, followed by the presentation of materials on turtles, their life cycles, the threats they face, and the importance of conservation for the sustainability of this species.



Fig 2. Implementation of the Sharing Session Activity

Following the presentation of information on turtle conservation, the main activity was carried out by participants from both the University of Mataram and Universiti Utara Malaysia, guided by the TCC team. This process was conducted with great care, involving participants directly in the experience of releasing hatchlings into their natural habitat. Prior to release, the hatchlings were carefully selected and prepared to ensure they were in healthy condition and ready to be returned to the sea. Participants received a briefing on the safe release procedures to avoid disrupting the hatchlings' natural behavioral patterns. Each participant was given the opportunity to hold and release a hatchling into the ocean, offering a hands-on and memorable experience that fostered a deeper sense of responsibility for turtle conservation. The hatchling release activity also aimed to raise awareness among participants about the challenges faced by hatchlings in the wild, as well as the importance of ongoing conservation efforts to ensure their survival.

Fig 3. Hatchling Release Activity in Nipah Island



The final session of the activity included documentation, evaluation, and the formulation of follow-up plans. The organizing team ensured that all series of events were thoroughly documented through photographs and videos. This documentation serves both as material for the official activity report and as promotional content to support future conservation initiatives. Upon the completion of the activity, an evaluation was conducted to assess the extent to which the objectives were achieved. This evaluation involved participants, resource persons, and the organizing committee, who provided constructive feedback and suggestions for improving similar activities in the future. Additionally, the evaluation results were used to identify both the successes and challenges encountered during the event, forming the basis for planning subsequent steps in turtle conservation efforts. As a follow-up, participants will be encouraged to engage in more advanced turtle conservation programs. These may include monitoring turtle nesting sites, participating in marine anti-pollution campaigns, or joining regular hatchling release activities that involve broader community participation. The aim is to ensure that the awareness built through the educational sessions and hatchling release experience is translated into continued, concrete, and sustainable conservation actions.

III. RESULT AND DISCUSSION

The Sharing Session on Sea Turtle Conservation and Hatchling Release held on Thursday, October 10th at the Nipah Turtle Conservation Area, North Lombok, effectively achieved its primary objectives. These included enhancing public awareness of the importance of sea turtle conservation and encouraging direct involvement in marine biodiversity preservation efforts. The program was well received by various stakeholders, including local communities, academics, and environmental activists. Most participants reported gaining valuable new insights regarding the life cycles of sea turtles, the threats they face such as habitat degradation, marine pollution, and illegal poaching and the critical role of community participation in ensuring the sustainability of sea turtle populations. Educational materials delivered by conservation experts helped participants understand specific actions they could take, such as reporting illegal poaching and protecting nesting grounds. The interactive discussion session proved highly engaging, with participants actively posing questions and sharing their local experiences with sea turtle conservation. Key discussion topics included turtle migration patterns, methods for identifying nesting sites, and practical strategies for mitigating threats, such as reducing plastic waste in the ocean. This exchange of knowledge underscored the growing environmental consciousness among participants and their willingness to contribute to conservation efforts.

One of the most anticipated segments was the symbolic release of 100 healthy hatchlings into the sea. This activity allowed participants to physically engage in the conservation process, which studies by Nurhayati et al. (2020), Ario et al. (2016), and Ayu et al. (2024) suggest can significantly enhance environmental empathy and support for marine ecosystem protection. The experience emphasized the need to give future generations of turtles a chance at survival while also highlighting the environmental challenges they face, such as natural predators, pollution, and climate change. The low survival rate of hatchlings further reinforced the necessity of continuous and sustainable conservation programs. Importantly, this initiative also demonstrated the effectiveness of collaborative engagement between local communities, academics, and the Nipah Turtle Conservation Area management team (Anan & Rahmah, 2024; Jannah et al., 2022). These partnerships have proven instrumental in strengthening educational outcomes and building trust among stakeholders. In addition to its environmental objectives, the program has broader socio-economic implications. By conserving marine biodiversity and promoting eco-friendly tourism practices, the initiative contributes to enhancing the appeal of Lombok as a sustainable tourist destination. The natural charm and ecological richness preserved through such activities are likely to attract more visitors, particularly those interested in eco-tourism. Increased tourist arrivals, in turn, create new opportunities for employment in the local tourism and hospitality sectors.

Thus, sea turtle conservation not only supports environmental sustainability but also acts as a strategic lever for inclusive economic development and job creation in coastal communities. Despite its overall success, the program faced minor challenges, such as unfavorable weather conditions prior to the event and limited public awareness of the broader impacts of turtle conservation. However, the feedback

collected indicates a positive shift in participant attitudes and a strong desire to remain engaged in future conservation initiatives. These results highlight the need for continued follow-up activities, such as community-based monitoring of nesting sites, anti-marine pollution campaigns, and regular hatchling release events with broader public involvement. Such actions are essential to ensure that the awareness built through this program translates into long-term, sustainable conservation efforts that benefit both the environment and the socio-economic well-being of the region.

IV. CONCLUSION

The Turtle Conservation Education Sharing Session and Hatchling Release at the Nipah Turtle Conservation Area in North Lombok successfully increased public understanding of the importance of sea turtle preservation. The interactive discussions and hands-on hatchling release offered meaningful experiences to participants, reinforcing the critical role of community involvement in conservation efforts. Furthermore, the activity served as a model of integrated environmental education and sustainable tourism promotion. Beyond ecological benefits, the conservation initiative also has important socio-economic implications. By preserving marine biodiversity and promoting eco-friendly practices, such programs enhance the attractiveness of Lombok as a sustainable tourism destination. In the long term, this can contribute to increasing tourist visits, which in turn may generate employment opportunities for local communities, particularly in the tourism and service sectors. The collaboration between local communities, academics, and conservation authorities not only strengthens conservation outcomes but also supports the broader agenda of environmentally responsible tourism development and inclusive economic growth in the region.

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