

Strengthening Sea Turtle Conservation Awareness and Literacy Through The Sustainable International Community Service Program At The Turtle Conservation and Education Center, Serangan Village, Bali

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Abstract.

This study aims to examine the sea turtle conservation efforts carried out at the Turtle Conservation and Education Center (TCEC) in Serangan Village, Denpasar, Bali, as experienced by students of the Faculty of Economics and Business, Universitas PGRI Semarang, through the Sustainable International Community Service (SICS) program. This international community service activity was conducted on Tuesday, June 30, 2026, under the theme "Sea Turtle Conservation in Serangan Village." A descriptive qualitative case study approach was employed by combining direct field observation, participatory involvement in conservation activities, and in-depth interviews with a TCEC educator as the key informant, followed by descriptive-thematic analysis of the collected data. The results showed that TCEC manages sea turtle conservation through four integrated stages: egg rescue and relocation, semi-natural incubation, rehabilitation of injured or illegally traded sea turtles, and community participation through hatchling adoption and release programs, which also generate donation-based funding for its operations. The field findings further revealed that incubation temperature greatly influences the sex ratio of hatchlings, that a female sea turtle can mate with several male sea turtles to maintain genetic diversity, and that TCEC has developed nine partner conservation sites throughout Bali. Before the program was implemented, the students had only limited theoretical knowledge regarding sea turtle biology and the threats to their conservation; after the program, the students demonstrated a significant improvement in their understanding of sea turtle ecology, conservation techniques, and the socio-economic dimensions of community-based ecotourism. The program is concluded to have effectively strengthened the students' ecological awareness while supporting the sustainability of TCEC through education-based tourism.

Keywords: *Community-based conservation; Ecotourism; Incubation temperature; International community service; Sea turtles*

I. INTRODUCTION

Sea turtles play an important role in maintaining the balance of coastal ecosystems; however, they are currently facing the threat of extinction due to both anthropogenic and natural factors, such as the harvesting of eggs, meat, and shells, degradation of nesting habitats, and the illegal trade of

protected wildlife (Pheasey et al., 2021; Setyorini et al., 2025). In Bali, these threats were once widespread, particularly on Serangan Island and Tanjung Benoa, because sea turtles were closely associated with the religious ritual needs of the Balinese Hindu community as one of the offerings used in certain ceremonial practices.

In response to these conditions, sea turtle conservation efforts in Serangan Village were initiated in the late 1980s, experienced a period of decline, and were seriously revitalized in 2003–2004 through the establishment of the Turtle Conservation and Education Center (TCEC). Institution-based conservation management, such as that implemented by TCEC, has proven effective in reducing the rate of sea turtle extinction in Bali (Zeno et al., 2021), while also creating opportunities for educational ecotourism that supports the sustainability of operational funding for the conservation area (Arianti & Farid, 2023; Rosalina & Prihajatno, 2022). Its success is largely determined by the active participation of local communities, academics, and other stakeholders through collaborative management or co-management schemes (I Wayan Koko Suryawan, 2023; Nurfitriani et al., 2024).

As a contribution to environmental conservation, students of the Faculty of Economics and Business, Universitas PGRI Semarang (UPGRIS), participating in the Sustainable International Community Service (SICS) program, conducted an International Community Service program at TCEC, Serangan Village, Denpasar, Bali, on Tuesday, June 30, 2026, under the theme “Sea Turtle Conservation in Serangan Village.” This activity aimed to provide students with direct learning experiences in sea turtle conservation while enhancing their awareness of marine ecosystem preservation, in line with the principles of community-based ecotourism, which emphasize the direct involvement of visitors in conservation activities (Fadliyanti et al., 2024; Putu Sri Murtini & Pujaastawa, 2023).

Unlike previous studies that have primarily focused on the biological and ecological aspects of sea turtles (Elfidasari et al., 2022), this article is original in presenting the perspective of Management Study Program students who examined sea turtle conservation from the viewpoints of program management, community education, and the economic sustainability of ecotourism. The purpose of this article is to describe the implementation and learning outcomes of students in sea turtle conservation efforts in Serangan Village, Bali, through the SICS program, as well as to analyze the students' participation and interaction with the conservation management community.

II. METHODS

This study employed a descriptive qualitative approach with a case study design, a method that provides an in-depth description of a phenomenon within its real-life context (Setyorini et al., 2025). The activity was conducted on Tuesday, June 30, 2026, at the Turtle Conservation and Education Center (TCEC), Serangan Village, South Denpasar, Bali, during one day of intensive field activities as part of the SICS International Community Service program.

The participants included four students from the Management Study Program of Universitas PGRI Semarang (UPGRIS), as well as the managers and educators of TCEC. Data were collected through:

(1) direct observation of the conservation facilities and activities, including the semi-natural hatchery area, the adult sea turtle exhibition ponds, and the hatchling rearing ponds; (2) the active participation of the students in conservation activities, including observing egg care and hatchling

release; and (3) in-depth interviews with the TCEC educator, Wayan Sudarma, as the key informant regarding the sea turtle life cycle, the influence of incubation temperature, and conservation management strategies. Data validity was ensured through source triangulation by comparing interview results, observations, and activity documentation.

The data were analyzed descriptively and qualitatively through data reduction, data presentation, and conclusion drawing. Before the program, the students had only limited theoretical knowledge regarding sea turtle biology and the threats to their extinction without any field observation experience. This program was designed to produce outcomes in the form of improved student understanding of sea turtle conservation in practice and increased awareness of the importance of youth involvement in community-based ecotourism (Fadliyanti et al., 2024; Putu Sri Murtini & Pujaastawa, 2023).

III. RESULTS AND DISCUSSION

This section presents the field findings regarding the TCEC conservation management model and the students' learning outcomes during their participation in the SICS program in Serangan Village, Bali.

3.1 Profile and Conservation Management Model of TCEC

TCEC serves as a transit area and reproduction center for sea turtles in Bali. Together with its partner fishermen, TCEC collects sea turtle eggs from the beaches during the nesting season (July–August) and relocates them to a semi-natural hatchery area measuring approximately 2×2 meters to protect them from natural predators and theft. After hatching, the hatchlings are raised in ponds measuring 2.5×2.5 meters for approximately 3–5 months before being released into the sea. This phased model is consistent with the findings of (Setyorini et al., 2025) at Samas Beach, Bantul, which also demonstrated the effectiveness of a sequence consisting of egg collection, semi-natural incubation, hatchling release, and the rescue of injured sea turtles.

TCEC also functions as a rehabilitation center for sick, injured, or illegally traded sea turtles before they are released back into their natural habitat. This role is important considering the continued prevalence of illegal sea turtle exploitation in various parts of the world (Pheasey et al., 2021). At present, TCEC supervises nine hatchery sites across Bali, including Perancak (Jembrana), Pengambangan, Saba Beach, Kuta Beach, and Serangan as the main center.



Figure 1. Students receiving a presentation on sea turtle conservation from a TCEC educator during the SICS International Community Service program, Serangan Village, Bali

3.2 The Influence of Incubation Temperature on Hatchling Sex Ratio

According to the TCEC educator, Wayan Sudarma, incubation temperature has a significant influence on the development of sea turtle eggs, particularly on the sex of the hatchlings produced: higher temperatures tend to produce more female hatchlings, whereas lower temperatures produce more male hatchlings. This finding is consistent with the phenomenon of temperature-dependent sex determination (TSD), which has been internationally documented. (Barraza et al., 2023) confirmed that sand temperature during the sex-determining period directly affects the sex ratio of hatchlings, and that increasing temperatures caused by climate change have the potential to create a long-term female-biased population. Therefore, nest temperature management has become a crucial variable in the conservation strategy implemented by TCEC (Jannah et al., 2022).

The TCEC educator also explained that a female sea turtle in its natural habitat can mate with three to five male sea turtles. This multiple mating mechanism plays an important role in maintaining the genetic diversity of sea turtle populations, making the population more resilient to environmental pressures and diseases.



Figure 2. Students observing the process of sea turtle egg care and hatchling release at TCEC, Serangan Village, Bali

3.3 Species Diversity and Visitor Participation

At TCEC, the students observed three of the six species of sea turtles found in Indonesian waters, namely the green sea turtle (*Chelonia mydas*), the hawksbill sea turtle (*Eretmochelys imbricata*), and the olive ridley sea turtle (*Lepidochelys olivacea*). The green sea turtle has a scaly but smooth-textured shell; the hawksbill sea turtle has a rougher, sharper, and layered shell; while the olive ridley sea turtle has the smoothest shell, with rounded central scutes and elongated lateral scutes. These characteristics are consistent with species descriptions reported in sea turtle conservation studies conducted at other locations, such as Samas Beach, Bantul (Setyorini et al., 2025) and Pangumbahan, Sukabumi (Elfidasari et al., 2022).

The most popular form of visitor participation is the hatchling adoption program, through which visitors can directly release hatchlings onto the beach, while the adoption funds support the operational costs of conservation. TCEC does not impose a fixed entrance fee; instead, it accepts donations from visitors interested in contributing to sea turtle conservation, a scheme that reinforces the argument that educational ecotourism can serve as an instrument for financial sustainability without compromising animal welfare (Arianti & Farid, 2023; Fadliyanti et al., 2024). To ensure animal welfare, visitors are strictly prohibited from handling adult sea turtles indiscriminately.

3.4 Comparison of Conditions Before and After the Program

Before participating in the SICS program, the students had only theoretical knowledge regarding sea turtle biology and the threats to their extinction, without ever being directly involved in conservation practices. After participating in the activities at TCEC, the students gained a much more comprehensive understanding of both the biological aspects (life cycle, reproduction, and the influence of incubation temperature) and the community-based program management aspects (funding schemes, partnerships with fishermen, and visitor education). This change indicates that experiential learning through international community service is effective in improving the ecological literacy of students from non-marine disciplines, in line with the findings of (Putu Sri Murtini & Pujaastawa, 2023) which showed that the active involvement of program participants fosters collective awareness of the importance of natural resource conservation (Amri et al., 2023; Sriati, 2022).

The success of this program was inseparable from the support of the TCEC management, partner fishermen, and participating educational institutions. (I Wayan Koko Suryawan, 2023) emphasized that the active role of the community is the key to the sustainability of sea turtle conservation through education, awareness enhancement, community empowerment, training, and sustainable ecotourism. The co-management approach involving the government, local communities, and educational institutions (Nurfitrani et al., 2024) is also relevant to the TCEC management model, particularly in strengthening the involvement of the younger generation as long-term environmental conservation agents.

IV. CONCLUSION

The SICS program carried out by students of the Faculty of Economics and Business, Universitas PGRI Semarang (UPGRIS), at TCEC, Serangan Village, Bali, successfully provided direct learning experiences in sea turtle conservation while enhancing the students' awareness of the importance of preserving marine ecosystems. TCEC has proven to play an important role as an education and conservation center by integrating egg rescue, semi-natural incubation, sea turtle

rehabilitation, and hatchling release, supported by nine partner conservation sites throughout Bali. Incubation temperature was found to determine the sex of hatchlings, while the donation and hatchling adoption schemes serve as instruments for the financial sustainability of the conservation area.

The positive impact of the program was reflected in the students' improved understanding of sea turtle biology, community-based conservation management strategies, and the importance of cross-sector collaboration. As a recommendation, similar international community service programs should continue to be developed through sustained assistance for TCEC's partner fishermen or the development of digital educational media to expand sea turtle conservation campaigns. The findings regarding the effectiveness of experiential learning may serve as a reference for the development of similar international community service models at other higher education institutions.

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