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Research Article

The Implementation of Community - Based Turtle Conservation in Serangan Traditional Village Denpasar Bali Indonesia Assisted by Pertamina Patra Niaga Fuel Terminal Sanggaran

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Abstract: One of PT Pertamina Patra Niaga Fuel Terminal Sanggaran's Corporate Social Responsibility (CSR) initiatives is the community-based Turtle Conservation and Education Center Serangan (TCEC), which focuses on biodiversity preservation and community empowerment. The program aims to protect endangered turtles in Serangan Village—an area within the company's operational region and a priority for biodiversity and social empowerment efforts. TCEC's main activities include hatching and caring for turtles, feeding hatchlings, conducting health examinations, monitoring, providing education and training on turtle health, and rescuing stranded turtles from South Bali's beaches. Through these initiatives, the program contributes to achieving several Sustainable Development Goals (SDGs), including Goal 4 (Quality Education), Goal 8 (Decent Work and Economic Growth), and Goal 15 (Life on Land). The program employs 19 local workers and generates approximately $200 million annually. The center's management structure consists of leaders from Serangan's traditional village, reflecting strong community participation. Established through collaboration among local communities, WWF, the Nature Conservation Agency (BKSDA), and Udayana University Bali, TCEC has released nearly 20,000 baby turtles as part of its conservation efforts. The center's success has drawn international recognition, including visits from G20 Summit delegates and prestigious awards such as the Kalpataru, Indonesia's highest environmental honor. This program demonstrates the integration of corporate social responsibility, local empowerment, and sustainable environmental stewardship.

Keywords: Biodiversity; Community empowerment; Corporate social responsibility; Sustainable Development Goals; Turtle conservation.

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1. INTRODUCTION

Conditions for Turtle Development on the Island of the Gods

Due to the fact that their populations are declining, turtles are protected marine reptiles (Ario et al., 2016). Seven turtle species are listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) as being threatened, protected, and exempt from any form of exploitation (Dermawan and Adnyana, 2003). Turtles are also on the Red List of the International Union for Conservation of Nature (IUCN). Due to overexploitation, turtle populations in Indonesia have been declining over the past 20 years. According to the study's findings, the population has decreased by 72% on average over the previous 15 years compared to the entire population. This is mostly obvious. The primary spawning grounds in East Kalimantan, Southeast Aru, and the Java Sea are proof of this (Marine and Fisheries Research and Development Agency, 2011). The Maritime Affairs and Fisheries Research and Development Agency (2011) lists three main causes of the fall in turtle populations: fishing operations, the mass killing of adult turtles, and the lack of management practitioners due to a lack of funding and competence to control populations. According to Patadungan (2013), there is an imbalance between the degree of utilization and the pace of population growth since up to this point, turtle resources have not been used in a

good and correct manner. Despite efforts to conserve them, excessive turtle exploitation will negatively impact the state of populations in the wild. Measures must be made to conserve their numbers through conservation since excessive turtle exploitation, despite of conservation efforts, would increase the threat of extinction for species that are already scarce in nature. Turtles have been employed in Bali since the 1970s (Firliansyah et al., 2017). People exploited turtles for food, souvenirs, trade, medicine, and religious rituals until laws restricting turtle catching were passed. Numerous global environmental organizations, notably Greenpeace, which initiated a vigorous campaign to end the turtle trade, harshly criticized this, especially its usage for religious purposes (Greenpeace, 1991). In order to protect turtle habitat in Indonesia from extinction, conservation is one of the activities that is anticipated to prevent the extinction of turtle habitat, prevent the use of turtles for commercial purposes such as the sale of eggs, meat, or shells, and can be a means of knowledge sharing or public education (Ario et al., 2016).

2. METHOD

This study employed a qualitative descriptive research design to examine the implementation of the Turtle Conservation and Education Center (TCEC) Serangan as a community-based conservation program supported by PT Pertamina Patra Niaga Fuel Terminal Sanggaran. The qualitative approach was selected to gain an in-depth understanding of the social, environmental, and managerial processes that occur during the implementation of the TCEC program. According to Moleong (2017), qualitative research aims to interpret social phenomena through the perspectives of the participants, making it suitable for understanding the dynamics of community participation in conservation.

2.1 Research Approach

The descriptive qualitative method was used to provide a comprehensive description of how the TCEC program is planned, implemented, and evaluated within the local socio-cultural context of Serangan Traditional Village. This approach emphasizes naturalistic inquiry, where the researcher becomes the main instrument in observing, collecting, and interpreting data from the field (Sugiyono, 2019).

2.2 Data Collection Techniques

The data were collected through triangulation of methods—namely observation, interviews, and documentation—to ensure the validity and reliability of findings (Miles, Huberman & Saldaña, 2014).

- Observation
  Direct observations were carried out at the TCEC Serangan site to record daily conservation practices such as turtle rescue, hatchery management, hatchling releases, and educational tourism activities. This technique allowed researchers to observe community engagement and conservation practices in their natural setting (Spradley, 1980).
- Interviews
  Semi-structured interviews were conducted with key informants, including TCEC managers, local community members, traditional village officials, and CSR representatives from PT Pertamina Patra Niaga. Interviews focused on understanding the collaboration mechanisms, challenges, and perceived program impacts on local livelihoods and biodiversity (Creswell, 2018).
- Documentation
  Secondary data were gathered from CSR annual reports, official publications from TCEC, Denpasar City environmental offices, and previous academic studies related to turtle conservation and community-based natural resource management. This method supported the triangulation process and provided a historical perspective on the evolution of the TCEC program (Ario et al., 2016; Suarta, 2023).

2.3 Data Analysis

Data were analyzed using the interactive analysis model of Miles, Huberman, and Saldaña (2014), which includes three main components:

a) Data reduction, involving the selection and simplification of relevant information;
b) Data display, by organizing the results into tables, matrices, and narrative descriptions; and
c) Conclusion drawing and verification, in which emerging patterns are identified, interpreted, and verified through source triangulation and respondent validation.

This process allowed the researcher to identify critical themes such as program planning, stakeholder collaboration, community empowerment, and sustainability outcomes.

2.4 Research Focus

The study focused on five primary dimensions of program implementation:

a. Planning and institutional coordination between the company and the traditional village;
b. Execution and operational management of conservation activities;
c. Community participation and empowerment in biodiversity protection;
d. Social, economic, and environmental outcomes of the TCEC program; and
e. Program sustainability and alignment with the Sustainable Development Goals (SDGs) 4 (Quality Education), 8 (Decent Work and Economic Growth), and 15 (Life on Land).

These analytical dimensions were formulated based on the logic of program implementation as described by Edwards III (1980) and the CSR framework by Carroll (1991), both emphasizing the importance of institutional commitment, community engagement, and accountability.

2.5 Research Location and Duration

The research was conducted at the Turtle Conservation and Education Center (TCEC), located in Serangan Traditional Village, Denpasar, Bali, Indonesia. Field data collection was carried out from March to August 2025, involving multiple site visits and direct interaction with stakeholders. The Serangan area was chosen purposively because it represents a successful model of community-based marine biodiversity conservation supported by corporate social responsibility initiatives (Sudiana, 2010; Wijaya et al., 2019).

3. RESULT AND DISCUSSION

The role of Sanggar Fuel Terminal-assisted community-based turtle conservation, also known as Turtle Conservation and Education Center Serangan (TCEC)

The Turtle Conservation and Education Center Serangan (TCEC), a community-based turtle conservation program, is a biodiversity-related CSR initiative of PT Pertamina Patra Niaga Fuel Terminal Sanggar. With the help of this program, turtles in Serangan Village that are in danger of going extinct will continue to exist. The company's operational area includes Serangan Village in ring I, which is given top emphasis when executing CSR initiatives in the area of biodiversity. The program's main objective is to raise and care for turtles at TCEC, including feeding hatchlings and turtles, examining turtles' health, monitoring, and saving turtles from South Bali's beaches. Planning, implementation, evaluation, monitoring, evaluating, reporting are the six main steps that make up the stages of executing the TCEC Program.

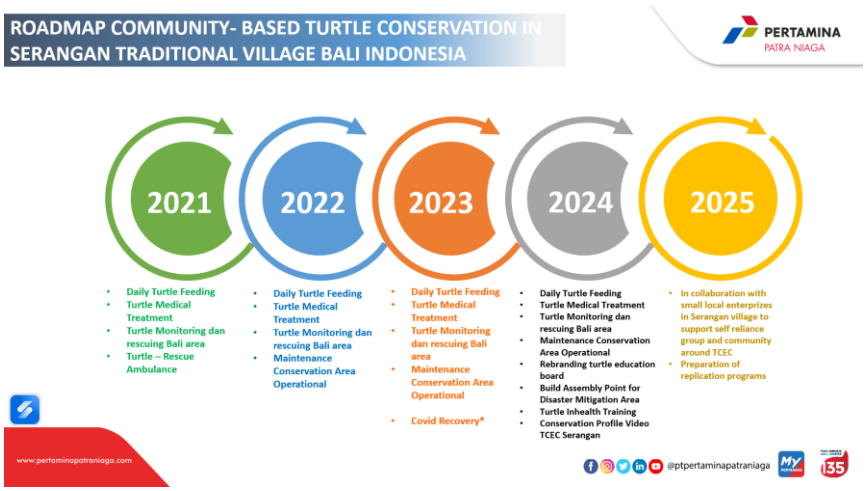

Image 1. The Roadmap of TCEC Program Assisted By Pertamina

The Turtle Conservation and Education Center (TCEC) has been a supported group for CSR Fuel Terminal Sanggar since 2016. To date, it has almost distributed cash for turtle conservation totaling up to 600 million rupiah. Along with supporting efforts to protect and care for turtles, the Serangan turtle conservation group also supports the expansion of TCEC facilities, such as by purchasing motorbikes to take trash to ambulances for turtle monitoring. Turtle monitoring organizations at the local, national, and worldwide levels greatly value the group's strong commitment to implementing turtle protection. The activities carried out at TCEC include:

1. Turtle rescue and nest relocation
2. Turtle medical treatment
3. Turtle rehabilitation
4. Hatchling Release
5. Turtle education and socialization for the community and tourist
6. Sales of unique turtle imitation souvenirs.

Image 2. Activity in TCEC Serangan

On January 20, 2006, the Governor of Bali, Dewa Barata, officially launched the Turtle Conservation and Education Center (TCEC) on Serangan Island. The Bali Provincial BKSDA, the Mayor of Denpasar, WWF, the Governor of Bali, and members of the local community all endorsed the TCEC decision. A comprehensive plan was developed to end the illegal turtle trade on Serangan Island, and as part of that plan, the Turtle Conservation and Education Center (TCEC) was founded. TCEC, which occupies a 2.4-hectare area, aims to assist the Serangan community in finding sources of income other than the turtle trade. In order to create new opportunities for the critically endangered sea turtles on Serangan Island, the center fully utilizes its potential for education, tourism, conservation, and research.

The major illegal market for turtle flesh and other goods has long been known to be located on Serangan Island and in the nearby community of Tanjung Benoa. Hundreds of turtle-fishing vessels dock in Serangan on their way to Derawan, East Kalimantan, and the Papaa bird's head region. In addition to decimating sea turtle populations in Bali, this widespread trade and poaching has an adverse effect on the environment in a number of Indonesian regions. The island of Java is included in TCEC's conservation efforts in order to save beaches where panyu lay their eggs, which are frequently stolen by turtle egg traders. At TCEC, some eggs from Java gave birth. When they reach 40 cm in length, some are released, while others are raised for customary rituals. The course of Serangan is strongly tied to the fate of sea turtles under various circumstances. Something positive for turtle conservation can start from here, aside from the state of the tourism business, which is in trouble, and the enthusiasm of the Serangan people, who are growing more concerned. Up to the year 2000, the enterprise caught and transported to the island about 30,000 sea turtles annually. Over the past few years, WWF and local authorities have implemented a combination of adaptive strategies, consistent advocacy, and practical community strengthening programs. These efforts have the potential to both reduce the amount of turtles traded and to mobilize local support, which will eventually lead to the gradual eradication of the major turtle traders

Image 3. Maps Location of TCEC Serangan

The objective of the Turtle Conservation and Education Center includes economics, socioculture, and education. TCEC works in the conservation sector to save sick turtles, preserve turtle eggs found on beaches, and care for turtles found in semi-natural rescues and hatcheries. Through tourists who come to this location, it can increase economic income, tourists who travel internationally as well as domestically. If numerous tourists visit, the communities near Serangan Island that have stores, eateries, and homestays may benefit. Another potential source of income is the sale of handcrafted turtle souvenirs manufactured by the local community and offered for sale at TCEC. Naturally in accordance with the terms and conditions in Government Regulations, TCEC has a turtle growing pond for traditional ceremonies in Bali. Regarding the significance of turtle conservation, TCEC serves as an instructional facility or tour. Every visitor will receive education on turtle preservation, the turtle life cycle, different kinds of turtle food, etc. Visitors can adopt hatchlings at TCEC and then release them directly onto the beach as part of one of the educational events offered there. For students who desire to work as internship or conduct research, TCEC also provides opportunities.

A Safe Home for Three Types of Protected Turtles: TCEC Serangan

Six of the seven turtle species that exist in the world are found in Indonesia. According to government regulations (Government Regulation No. 7 of 1999 concerning the preservation of plant and animal species, and Law No. 5 of 1990 concerning the conservation of biological resources), there are 6 different species of turtles that are protected in Indonesia. These include the following: (1) leatherback turtle (Dermochelys coriacea), (2) green turtle (Chelonia mydas), (3) hawksbill turtle (Eretmochelys imbricate), (4) loggerhead turtle (Caretta car (Samnya, 2017). The Red Data Book-IUCN classifies all varieties of sea turtles as endangered on a global scale. These turtles migrate hundreds or even thousands of kilometers away from their breeding areas and have a very wide range (Turtle Conservation Technical Guidelines, 2009).

Olive Ridley Turtle (Lepidochelys olivacea)

Of all the turtle species that exist today, the olive ridley turtle is the smallest. The carapace is more angular and narrower, and the head is bigger. Its body is the same dull green hue of a green turtle. Study on the olive ridley turtle is still in its infancy compared to research on the green turtle, therefore what is known about it is still incomplete. As a result, it is required to investigate whether the olive ridley turtle actually exists (Hardiono et al., 2012).

Image 4. Olive Ridley Turtle in TCEC Serangan

The Hawksbill Turtle (Eretmochelys Imbricata)

The hawksbill turtle is frequently referred to as the Hawksbill sea turtle because of its distinctive beak-shaped head and downward-curving upper jaw that resembles a parrot (Iskandar, 2000). The hawksbill turtle can be found all around Indonesia, however it is most prevalent on the smaller deserted islands. The Riau Islands to Belitung, Lampung, the Thousand Islands, Karimunjawa, the Sulawesi Sea (Berau), South Sulawesi (Takabonerate), Southeast Sulawesi (Wakatobi), Maluku, and Papua are where the majority of hawksbill turtles may be found (Ka, 2000).

Image 5. The Hawksbill Turtle in TCEC Serangan

Green turtle (Chelonia mydas)

The green turtle is unique in that it has an egg-shaped shell with a carapace that is either greenish-yellow or dark brown (when viewed from above). The head is blunt and quite small. The green turtle's carapace measures 97–115 cm in length and 83.5–108 cm in breadth (Krismono et al., 2010). One of the biggest turtles is the green turtle (Chelonia mydas), whose carapace measures between 71 and 153 cm. The maximum weight of a green turtle is 205 kilograms. The paddle-like appendages of the green turtle are used for swimming. The green turtle's head appears small in relation to its body size. The tail of the male turtle is longer than the shell, and he is bigger than the female turtle. Depending on where in the world the species is found, the carapace of Chelonia mydas can range from olive to brown or even black. Chelonia mydas and Chelonia mydasagassizii are two of the subspecies (Ernst et al., 1994).

Image 6. Green Turtle in TCEC Serangan

The Big Impacts and Big Hope Turtle Conservation and Education Center (TCEC) Serangan

Based on the results of the Community Satisfaction Index (IKM) analysis by the ICDC team, PT Pertamina Fuel Terminal Sanggaran's TCEC Program received a score of 85% with the category "Very Good". The analysis was conducted based on the distribution of questionnaires to a number of 11 respondents as beneficiaries in the TCEC Program. It can be concluded that the TCEC Program has been running well in terms of Program Planning, Funding, Mentoring, Program Implementation, and Sustainability. In general, the community beneficiaries of the TCEC program are satisfied with the quality performance of the TCEC program. The results of interviews with beneficiaries stated that they were proud of the presence of the TCEC program because it greatly helped the sustainability of turtle and turtle conservation. In addition, this program can also revive tourism in the Serangan Traditional Village tourist area based on education and the program can also develop and be independent and can be an example for other programs / regions.

Research conducted by a team of the Faculty of Animal Husbandry; Udayana University through a Scientific Journal entitled 'The Impact of Pertamina's CSR on Community Interest For the Conservation of Sea Turtles on Serangan Island' stated that there are two significant impacts arising from the TCEC Program, namely social and economic impacts. Based on the results and discussion above, it can be concluded that (1) the social impact of Pertamina's CSR on public interest in turtle conservation on Serangan Island, consisting of indicators of community development, community participation, and sustainability of turtle conservation and conservation programs, is in the good category with a score of 3.96; and (2) the economic impact of Pertamina's CSR on public interest in turtle conservation on Serangan Island. which consists of indicators of employment, increased income, and tourism potential is in the good category with a score of 4.02 (Suarta, 2023).

The magnitude of the commitment of the turtle conservation group TCEC Desa Adat Serangan has resonated abroad. Based on TCEC group data, as many as 19,252 foreign tourists visited the TCEC turtle conservation area. While the number of local tourists amounted to 5,901 people. Now, in the post-pandemic period, TCEC is crawling up economically. Until the end of 2022, TCEC's donation revenue reached 361 million/year. In its management, TCEC is also a business unit of Desa Adat (traditional village), namely BUMDES (village-owned enterprise) Serangan. This model can also make the exit strategy of the TCEC program by FT Sanggaran. The absorption of 13 local workers is an good achievement for this conservation program. TCEC is also often visited by several international agendas such as the G20 Summit (European Union, Tri Hita Karana and Italian delegates), the Indo Pacific Economic Framework (IPEF), as well as national agendas with the Ministry such as hatchling releases with the Ministry of Tourism and Creative Economy and The Ministry of National Development Planning Indonesia/Bappenas.

As with all long-term efforts, there is a lot for us to learn and improve from the past five years. Since poaching threats have diminished on the Serangan island, we can certainly do more to protect the eggs and hatchlings from human and natural predators in the area. We would also like to increase efficiency of our sea turtle conservation, and hope to increase staff capability to monitor and maintain the preservation. Finally, stable and well-managed organization were essential to achieving the program objectives, and we hope to be able to keep this up sustaining our environment for better future.

4. CONCLUSION AND SUGGESTION

4.1. Conclusion

The implementation of the community-based turtle conservation program at the Turtle Conservation and Education Center (TCEC) Serangan, supported by PT Pertamina Patra Niaga Fuel Terminal Sanggaran, demonstrates a strong model of collaboration between corporations, local communities, and government institutions in promoting sustainable biodiversity management. The findings show that the program has successfully integrated environmental protection with socio-economic empowerment through education, conservation, and ecotourism activities.

The TCEC program contributes significantly to achieving the Sustainable Development Goals (SDGs), particularly Goal 4 (Quality Education), Goal 8 (Decent Work and Economic Growth), and Goal 15 (Life on Land). The involvement of the traditional village (Desa Adat) in program management has strengthened institutional ownership and ensured long-term sustainability. Moreover, the program's multi-stakeholder approach—combining scientific, cultural, and local wisdom dimensions—has enhanced public awareness and behavioral change toward turtle conservation (Ario et al., 2016; Sudiana, 2010).

From an ecological perspective, the release of more than 20,000 hatchlings and the protection of three endangered turtle species (Chelonia mydas, Eretmochelys imbricata, and Lepidochelys olivacea) illustrate the tangible environmental impact of the program. From a socio-economic viewpoint, TCEC has provided employment for local residents, supported small-scale entrepreneurship, and revitalized tourism activities in Serangan Island post-pandemic. Therefore, the TCEC model represents a replicable example of corporate-community partnership in marine conservation that balances ecological sustainability with local economic development (Wijaya et al., 2019; Suarta, 2023).

4.2. Suggestions

To ensure the sustainability and scalability of the TCEC program, several strategic recommendations are proposed. First, it is essential to strengthen institutional capacity through continuous training for TCEC staff and community members to enhance their skills in turtle health monitoring, conservation techniques, and eco-education management (Hassan et al., 2017). Second, expanding collaborative networks is crucial by involving international conservation organizations, universities, and private sectors to foster innovation and secure research-based conservation funding (Tapilatu et al., 2017). Third, developing digital outreach and eco-education tools such as interactive learning platforms, online turtle adoption programs, and social media campaigns can enhance TCEC's global visibility and attract wider public engagement and funding (Haryati et al., 2016). Fourth, institutionalizing a comprehensive monitoring and evaluation framework—supported by measurable ecological and social indicators—will strengthen accountability, transparency, and adaptive management of the program (Miles, Huberman, & Saldaña, 2014). Finally, policy integration and replication of the successful elements of the TCEC Serangan program are recommended, so that it may serve as a model for national CSR biodiversity initiatives and be implemented in other coastal regions with similar socio-ecological conditions across Indonesia (Ismane et al., 2018). In conclusion, the success of the TCEC Serangan program demonstrates that effective conservation requires not only ecological interventions but also sustained socio-economic empowerment and institutional collaboration. The synergy between PT Pertamina Patra Niaga, the Serangan Traditional Village, and conservation stakeholders proves that community-based initiatives can become a cornerstone of sustainable environmental governance in Indonesia.

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