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Synergizing Sustainable Economy and Wildlife Conservation: An Analysis of Seashell Crafting and Sea Turtle Protection in Bali

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Abstract.
The province of Bali faces a dual challenge in managing its coastal resources: promoting micro-economic growth through community empowerment while preserving endangered marine wildlife. This qualitative study aims to analyze the synergy between sustainable economic practices in the local seashell crafting industry ("Ayu & Bagus Collection") and community-based wildlife protection at the Turtle Conservation and Education Center (TCEC) in Serangan, Bali. Using direct observation and in-depth interviews, the findings reveal that the seashell crafting industry achieves resource efficiency through an order-by-order business model and strict compliance with export legalities. Furthermore, TCEC demonstrates that a drastic reduction in illegal sea turtle trade has been achieved through legal collaboration with the government, public education to disrupt the supply chain, and medical awareness regarding the dangers of heavy metal accumulation in sea turtle meat. In conclusion, ideal coastal management requires a balance between the wise utilization of unprotected marine commodities and the strict protection of conservation-status wildlife, deeply rooted in community participation.
Keywords: *Community empowerment; Environmental education; Sea turtle conservation; Seashell crafting; Sustainable economy.*

I. INTRODUCTION

The coastal areas of Bali possess tremendous marine resource potential, which for decades has served as the economic backbone for local communities (Wahyudin, 2020). However, uncontrolled exploitation of marine resources often conflicts with global environmental conservation agendas, which demand integration between economic development and ecological sustainability (Berkes, 2021). Addressing this issue requires active community participation to ensure that local economic activities do not degrade the environment, aligning with the Sustainable Development Goals (SDGs) for life below water and decent work. Two prominent issues currently emerging in Bali's coastal areas are the utilization of marine products for creative industries, such as seashell crafting, and the threat to protected marine animals, particularly sea turtles, driven by illegal trade and traditional consumption (Mancini et al., 2021).

On one hand, Micro, Small, and Medium Enterprises (MSMEs) specializing in seashell crafts are required to compete in the global market without damaging the coral reef ecosystems that serve as habitats for marine species (Tambunan, 2021). On the other hand, the sea turtle population in Bali's waters continues to face threats from poaching, driven by high demand for turtle meat for consumption and specific traditional ceremonies, particularly in the southern part of Bali. To address these actual community challenges, there is an urgent need for an empowerment program that educates the community while providing sustainable economic alternatives.



Therefore, this study aims to deeply examine how the synergy between sustainable economic practices and wildlife conservation can be implemented in the field through community engagement. The study focuses on two main entities: "Ayu & Bagus Collection" (King Saguna Jaya) as a representation of the creative seashell crafting industry, and the Turtle Conservation and Education Center (TCEC) on Serangan Island, which actively operates as a fortress for sea turtle protection and community environmental education in Bali (BKSDA Bali, 2022).

II. METHODS

This study utilized a qualitative descriptive approach to explore social and ecological phenomena deeply within their original context. The activities and data collection were conducted at two specific locations: the seashell crafting production facility ("Ayu & Bagus Collection") and the TCEC conservation center in Serangan, Bali, over a period of [Insert Duration, e.g., three months, from March to May 2023]. The initial condition prior to these empowerment activities was characterized by a lack of awareness regarding export legality among local artisans and a historical precedent of massive illegal sea turtle trading involving local community members.

Primary data collection techniques included direct observation of the empowerment activities and in-depth interviews with key informants, which comprised local artisans, conservation managers, and expert sources. The validity of the data was ensured through source triangulation (Denzin, 1978). Data analysis was conducted interactively by reducing the observation data, presenting it in a thematic narrative, and drawing conclusions based on the principles of sustainable

economics and wildlife conservation (Miles & Huberman, 1994). The anticipated outcome of this study is a comprehensive model of community participation that balances economic needs with ecological preservation.

III. RESULT AND DISCUSSION

Results Observations at the "Ayu & Bagus Collection" (King Saguna Jaya) MSME demonstrate that micro-economic drivers can operate in harmony with environmental preservation principles. The local artisans have adopted a specific operational management system characterized by an "order-by-order" business model. Rather than engaging in mass production, crafts are produced strictly based on client requests. Furthermore, the artisans must ensure that the shells used are not CITES-listed or state-protected endemic species. To penetrate the export market, their products are subjected to rigorous cleaning to eliminate biological odors and impurities, subsequently earning a Phytosanitary Certificate from the Fish Quarantine, Quality Control, and Fishery Products Safety Agency (BKIPM).

In the realm of wildlife protection, TCEC Serangan was established as an institutional and community response to the historically high rates of turtle poaching. Data indicates that in the early 2000s, the black market circulation of sea turtles in Bali reached up to 3,000 turtles per month. Currently, this number has been massively reduced. TCEC operates strictly under a formal Cooperation Agreement (Perjanjian Kerja Sama/PKS) with the government.



The center's primary activity involves treating stranded turtles, a complex process given their unique anatomy, including a 6-meter-long intestine adapted for processing seaweed, making them highly susceptible to blockages from marine plastic pollution. To achieve this, TCEC collaborates with veterinary practitioners and the Indonesian Ocean Blue Initiative (IOBI). Beyond physical rehabilitation, TCEC conducts massive educational campaigns targeting early childhood education (PAUD) students, university students, and the general public, urging them to stop purchasing turtle derivatives. They also highlight the medical facts that turtles are long-lived animals prone to bioaccumulating heavy metals, making their meat hazardous for human consumption.

Discussion The implementation of the order-by-order system in the seashell crafting industry is a prime example of community adoption of sustainable innovations. This system optimizes the absorption of raw materials and significantly mitigates the risk of dead stock, which would

otherwise become organic waste (Chopra & Meindl, 2019). Before the introduction of strict export standards, artisans often faced supply chain inefficiencies. However, after the implementation of and strict adherence to BKIPM quarantine regulations, local MSMEs are empowered to reach international markets legally and safely without acting as vectors for transnational pathogens (Kementerian Kelautan dan Perikanan Republik Indonesia, 2020). This highlights a successful community empowerment model where economic viability does not compromise ecological integrity (Susilawati, 2020).

Furthermore, the dramatic decline in the illegal sea turtle trade from 3,000 individuals per month to a minimal figure demonstrates the profound impact of community engagement and education before and after the intervention. Ostrom (2015) argues that empowering civil society groups for wildlife rescue cannot be implemented unilaterally; it requires strong institutional backing, which is fulfilled by TCEC's PKS with the government.

TCEC’s strategy to shift focus from merely repressive law enforcement to demand-side reduction represents a critical transformation in community participation. By educating the community about the dangers of heavy metal bioaccumulation in turtle meat (Aguirre et al., 2006), the community itself adopts the innovation of rejecting traditional consumption habits. When the community stops buying, the economic incentive for illegal poaching collapses (Mancini et al., 2021). The resilience of TCEC in facing illegal syndicates stems directly from this social transformation; as the Balinese community becomes more legally literate and environmentally aware, they dismantle the social protection previously enjoyed by black-market actors (Berkes, 2021).

IV. CONCLUSION

There is clear evidence of synergy between sustainable micro-economic development and wildlife conservation mitigation efforts on the coast of Bali. The community empowerment model observed at "Ayu & Bagus Collection" confirms that the coastal economy can grow optimally through raw material efficiency and absolute compliance with quarantine regulations, avoiding the exploitation of protected species. Meanwhile, the community engagement strategies at TCEC Serangan underscore that wildlife preservation requires more than just legal enforcement. It must be integrated with public education to disrupt the supply-demand chain and disseminate medical literacy regarding heavy metal hazards to completely dismantle the black market.

It is recommended that future community empowerment activities focus on simplifying bureaucratic access to BKIPM certification for smaller coastal MSMEs, enabling broader participation in the legal export of marine products. Additionally, sociological studies should further map the conflict resolution strategies between conservation institutions and informal economic actors.

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