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持続可能な開発目標と太平洋島嶼国フィジーの沿岸漁業

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Abstract

The world is witnessing critical environmental problems. Since these problems are complex and linked to multiple factors, finding an immediate solution is difficult. Therefore, aiming for a reliable solution while taking all the measures and precautions to ensure sustainable development is necessary. To achieve sustainable development, the concept of Sustainable Development Goals (SDGs) was proposed by the United Nations in 2015. This study, focused on one of the most economically important bivalves in Fiji's coastal fisheries, outlined its features and current conditions and then assessed its relationship with the SDGs.

Keywords: *Anadara*, Bivalves, Coastal Fisheries, Fiji, Pacific Islands, Resource Use, SDGs

1. Introduction

Presently, the world is witnessing critical environmental problems, such as global warming, hygiene and health problems represented by the novel coronavirus infection, and poverty problems due to the disparity between the northern and southern hemispheres, which require urgent attention. However, since these problems are complex and linked to multiple factors, finding immediate solution is difficult. Therefore, aiming for a reliable solution that ensures sustainable development is necessary. To achieve sustainable development, the concept of "Sustainable Development Goals" (SDGs) was proposed by the United Nations in 2015 (UN 2015). Under this initiative, 17 SDGs and 169 targets were proposed for the attainment of a sustainable and better world by 2030.

While the SDGs comprehensively summarize the global economic, social, and environmental goals, the progress in the attainment of sustainable development is still disappointingly slow. According to the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the current "progress is being made in some areas of the Asia-Pacific region, but change must be accelerated. And it is retreating in some areas, so we have to reverse this" (ESCAP 2017a). In response, the ESCAP adopted the Asia-Pacific Roadmap at the 2017 ESCAP 73rd General Assembly (ESCAP 2017b). One of the main agendas was "to integrate the three pillars of society, economy, and environment in a well-balanced manner, and to put gender equality and women empowerment development at the center of policy issues in the region."

Most Pacific Island Countries (PICs) are comprised of small islands, characterized by limited development options, small population, and geographical isolation. The PICs have adapted to various social transformations such as Fiji. Comprised of more than 300 islands, this country is an attractive tourist destination in the South Pacific, making it the primary source of income, that also exhibits primary industry such as sugar cane, dalo, pineapple, cassava, and gingers. The land in the coastal villages is predominantly owned by indigenous extended family groups (Nishimura 2006) or land-owning units called “mataqali”. Further, many villages are economically self-sufficient due to their reliance on the environmental resources such the ocean, coastal fisheries. The application of traditional knowledge and the role of customary and religious leaders has promoted sustainable resource use (Veitayaki 2002; Fache & Pauwels 2020). Women play a key role such as culture, marketing, and society in the coastal fisheries (Tawake et al. 2007; Vunisea 2016; Kleiber et al. 2019; Thomas et al. 2020; Vitukawalu et al. 2020). Along with other household chores, women collect invertebrates such as shellfish, octopuses, and fish, from nearby mangrove forests, tidal flats, seagrass beds and coral reefs for local consumption or to generate income by selling them commercially. Recent social transformations, such as global warming, globalization, and environmental pollution have affected the lives of those in these coastal communities and their fisheries; that demands that sustainable development must be pursued to safeguard their future.

To achieve sustainable development in coastal villages, understanding the relationship between coastal fisheries and the SDGs is important. In this study, we focused on one of the most economically important bivalves in Fiji’s coastal fisheries, summarized its features based on known scientific research, socio-economic surveys and observations then assessed its relationship with the SDGs. Finally, concluding with some reflection on the way forward.

2. Bivalve Fishing

The bivalve of interest *Anadara* spp., which is a major catch of the Fiji coastal fisheries industry, is mainly fished by women and children, and rarely by men other than older ones. Fishing is conducted throughout the year at low tide by wading into ankle deep water and at high tide by boat. It takes several hours before the lowest tide in the day, and ends during high tide.

Anadara spp. is buried in shallow tidal flats and sandy mud bottoms, it consumes organic matter and filters oxygen from seawater. This bivalve connects the mantle rim, which is a part of the body

tissue, to form a water pipe-like hole to suck seawater. Even during low tides, the water pipe-like holes are created from the bottom of the sand and mud in the seawater with gaps between the sand and mud to feed and breathe. Women use their toes to feel the bivalves and visually locate the water pipe-like holes emerging from the bottom of the sand and mud, and then collect them with their bare hands. The average catch was approximately 2 kg of bivalves per fisherwoman per day (Mangubhai 2020).

Since locating small individuals is difficult through this fishing method, they are not collected by the fisherwomen in eastern Viti Levu Island, Fiji (Kawai et al. 2008). First mature size of *Anadara* spp. has studied for the fisheries in the Pacific area (SPC 2012; Saputra et al. 2019: Panta-Vélez et al. 2020). Thereby ensuring sustainable resource use. In addition, other than visual inspection, shellfish are collected through skin diving using underwater glasses at locations that exhibit sufficient quantities of water even during low tides. However, most women avoid fishing or fish only near their village during bad weather.

The collected shellfish are cooked for food, offered to other villagers and relatives and friends elsewhere, or transported to markets by truck or boats and sold in dozens. Normally, seaweeds, sea cucumbers, octopuses, sea urchins, and other shellfish (such as pen shells) are collected during *Anadara* fishing as well.

3. Coastal Bivalves Fisheries and SDGs

The coastal *Anadara* spp. fishery in Fiji closely relates to and demonstrate some SDGs and targets.

- *Anadara* spp. fishing enable women to earn an income by selling *Anadara* spp. commercially and provide employment opportunities, which fulfills Target 1 of SDG 1 to "Eradicate Extreme Poverty" and Target 1 of SDG 8 that emphasize the need for “Sustainable Economic Growth,”.
- *Anadara* spp. is a daily household food item that is regularly fished within the sustainable limits of the marine protected areas established by the villagers. This fulfills Target 1 of SDG 2, “Universal Access to Safe and Nutritious Food” and Target 2 of SDG 12, “Sustainable Management and Use of Natural Resources,”.
- Since women do most of the fishing and selling of *Anadara* spp., the fishery elevates the social status of women, thus, meeting Target 1 of SDG 5 to “End Discrimination against Women and Girls.”
- *Anadara* spp. purifies water in the marine ecosystem by creating a flow of water through the action of the gill cilia; as well as consumes suspended matter. This satisfies Target 6 of SDG 6 to “Protect and Restore Water-related Ecosystems.”
- *Anadara* spp., which feeds on land-derived or sea-derived organic matter transported by rivers into the sea, is fished by women in the coastal areas, transported to land, and consumed by humans. This considerably contributes to material circulation between land and sea, which fulfills Target 2 of SDG 14, “Protect and Restore Ecosystems” and Target 1 of SDG 15, “Conserve and Restore Terrestrial and Freshwater Ecosystems ".

- To conduct *Anadara* spp. fishing, adhering to the national and village regulations and laws is necessary. This ensures that villagers are aware of and abide by the law that protect the fishery. This corresponds to Target 3 of SDG 16 to "Promote the Rule of Law and Ensure Equal Access to Justice."
- Offering *Anadara* spp. to vulnerable villagers is an act of welfare (Kawai et al. 2021). Villagers live in close knit social units that look out for each other. Therefore, offering *Anadara* spp. to other villagers contributes to sustainable development in the community. This corresponds to Target 1 of SDG 2 for the need to maintain "Universal Access to Safe and Nutritious Food."
- In one village, *Anadara* spp. was being exported to the United States and Australia (Kawai et al. 2021). Effective *Anadara* spp. exports can assist in achieving Target 10 of SDG 17 to "Promote a Universal Trading System Under the WTO". If *Anadara* spp. exports increase further, building an equitable trading system at the domestic and international levels will be important for the sustainable development of not only *Anadara* spp. resources, but also the local community.
- Kawai et al. (2021) indicated that *Anadara* spp. fishing plays an important role in the sustainable development of Fiji coastal societies. However, coastal fisheries, including *Anadara* spp. fishing, have been influenced by various environmental factors and have recently been strongly influenced by social transformation worldwide. Consequently, the Fiji coastal fishery remains highly volatile and unstable to external factors. Thus, to ensure sustainable development of the coastal fisheries of Fiji in the future, countries, states, villages, universities, NGOs, etc., should coordinate to provide appropriate science based mitigative and adaptive methods and practices (Grafton et al. 2010; Lal & Holland 2010) that can respond to various impacts. This effort can fulfil Target 14 of SDG 17 to "Enhance Policy Coherence for Sustainable Development" and assist in developing the foundation for the sustainable use of *Anadara* spp. bivalves.

4. The Way Forward

In the Asia-Pacific region, efforts are still required to understand and better implement SDGs (ESCAP 2017a). ESCAP has emphasized its Asia-Pacific roadmap that "balances the three pillars of society, economy, and environment, with gender equality and women empowerment at the heart of the region's policy agenda." (ESCAP 2017b). This study has systematically demonstrated the strong association between a coastal fishery and the social, economic, and environmental factors, with women playing an instrumental role in fishing. This study on coastal *Anadara* spp. fishery has illustrated the extensive potential to achieve the SDGs and must be used as a model case for SDG research in the Pacific Island countries.

Similar studies should be done for each of the major coastal fisheries such as the trochus, beach de mer, seaweed, sea grapes, emperors, surgeon fish, parrot fish, rock cod, barracuda, turtles, and sharks to guide our resource management effort to fulfil the Asia Pacific road map. We need to know more about our target species and their role in the ecosystems and in our lives. This approach will allow us to better understand how much we have to do to ensure that our critical coastal fisheries

are sustainably used and how much we stand to lose if we fail to do what is right given the way the resources live and interact within their habitat and how we use the resources.

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