

Coral Restoration and Conservation in Serangan Island, Denpasar City, Bali, Indonesia: Turning Coral Miners into Conservation Advocates

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Key Message

- A strong motivation to effect change can come from any segment of the community, in this case, the youth.
- Local champions are crucial for raising community awareness and providing the leadership for community empowerment. The ICM system can capitalize on such willingness and facilitate support from all levels of government, nongovernment organizations, private sector, and the community by developing a network that harmonizes the needs of all stakeholders in an integrated manner.
- Community empowerment for sustainable environmental management can be achieved by the development of sustainable business opportunities in line with environmental conservation objectives.

Abstract

Bali's Serangan Island increased in size almost five times by land reclamation in the mid-1990s. Meant to support tourism development, which was later abandoned, the reclamation destroyed much of the marine habitats and valuable fishing grounds. The declining marine stocks forced many of the fishers to engage in destructive fishing and coral mining, earning them the reputation of reef "destroyers". In 2003, a group of young coral miners, highly motivated to protect coral reefs after learning of reef conservation from environmental campaigns, organized themselves into the "Coastal Fishers Group of Karya Segara". However, their expertise, capacity, or facilities to effect change were inadequate.

The Bali ICM Program selected Serangan Island as a site to demonstrate ICM approaches for addressing priority local issues and needs and to empower the community.



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The ICM program facilitated the development of the fishers group by building a network of partners to sustain their conservation effort and develop ecotourism services in collaboration with tourism agencies. This complete turnaround saw the transformation of some community fishers from being reef destroyers to active conservation advocates. Their strong conviction on environmental conservation and leadership earned them the respect of the community and in 2011, recognition from the country when they received Indonesia's highest award for environmental management programs.

Background

Serangan Island is a small island in Bali's Benoa Bay, close to three famous tourist destinations – Sanur, Kuta, and Nusa Dua.

The diverse marine habitats included mangroves, seagrass, coral reefs, seaweed beds, and tidal flats that provided abundant resources on which the community of mainly fishers depended. Seaweed (*Hypnea* spp. and *Gracillaria* spp.) and rabbit fish (*Siganus* spp.) were abundant in the seagrass habitat. Shellfish including shrimps and crabs were

readily available from the mangroves and wide tidal flats, while the coral reefs provided a diversity of high value target and ornamental fishes. The natural habitats and rich marine life attracted tourists from Sanur using traditional boats.

A reclamation project from 1994 to 1997 increased the island's size from 101 ha to 481 ha and connected the island to the mainland with a 110 m bridge (Figure 1). Intended for tourism development, which failed to materialize, the reclamation instead destroyed much of the island's natural marine habitats including natural nesting sites of the green turtle. The island is also commonly referred to as "Turtle Island".

Environmental conditions changed after the reclamation. Marine excavation and dredging destroyed the marine life and habitats, causing more than 75% of the seagrass beds and 50% of mangroves to disappear. Coral reef communities of adjacent areas that were not directly dredged were also affected because of their sensitivity to both suspended and settled sediment spreading from the reclaimed sites. The effects were long lasting. In 2002, a monitoring survey of the state of the coral reefs showed that mortality rate of Serangan's coral reefs was at 37.9% (Environmental Management Agency of Denpasar Municipality, 2002).

Figure 1. Serangan Island before (left) and after reclamation (right). The reclamation increased the size of the island by almost five times.



Before the reclamation, the majority of Serangan's population were fishers. The island was known as a fisherman's village in the Denpasar Municipality. Maritime tradition in the community was strong, brought about by the interaction with the Bugis ethnic population who came from South Sulawesi.

The local economy in the community was highly dependent on the coastal resources such that the level of welfare was determined by the reserves and the quality of the resources available, which can be accessed and utilized by the community. The increasing depletion of fishery resources in the coastal waters after the reclamation brought changes to the sources of livelihood in the island.

Habitat degradation posed a challenge to the fishing community as it did not have the knowledge or skill to fish in deeper waters of the open sea. The island's shallow coastal waters provided adequate resources for generations, but with the loss of habitat, the fishers lost their fishing grounds. The decline of living coastal resources forced some of the already poor fishers to engage in cyanide fishing and coral mining. Beautiful live coral colonies were harvested from the reefs and sold as ornaments for aquariums. Stony corals including large coral boulders were excavated and used as building materials. The income derived from these illegal and harmful activities was not huge but there were limited alternatives for the fishers.

As the economic situation of the people and the environmental conditions of the habitats worsened many fishers were forced to engage in destructive fishing. They gained the reputation of coral reef "destroyers" and were consequently barred from fishing in the neighboring areas of Sanur and Nusa Dua. The community as a whole had to bear the shame of being ostracized.

Approach and Methodology

A group of 42 young coral miners representing the youth of Serangan decided to turn things around, motivated by a desire to change the bad image of the island and its people.

Their awareness on the importance of preserving the environment was a result of their interaction with external parties and campaigns on the conservation of coral reefs in Bali. They learned that there were ways to utilize environmental resources in accordance with the principles of conservation that would provide alternative sources of income over the long term.

They launched the Coastal Fishermen Group of Karya Segara (CFGKS) in 2003 and pledged to restore the coral reefs and instill mindfulness towards the environment. They had the conviction, but their knowledge, capacity, and facilities to effect change were inadequate.

It was timely that their community initiatives in preserving coral reefs were welcomed by the Environment Agency of Bali. In 2004, through the Bali ICM Demonstration Site Project, a joint program with PEMSEA, Serangan Island was selected as a pilot project in the application of the ICM approach. The objective of the program was to increase awareness of the broader community on the importance of conserving coral reefs and developing alternative livelihoods. Capacity building activities and development of skills, along with training on restoration and conservation of coral reefs, were implemented by the program. To strengthen the program, the community group mobilized support from other parties, including the Ministry of Marine Affairs and Fisheries (MOMAF), the Government of Denpasar Municipality, the private sector, and nongovernment organizations (NGO). All of these were facilitated by the ICM approach.



Figure 2. Coral restoration and protection in Serangan Island. Clockwise from top left: coral cuttings attached to concrete substrate; coral cuttings ready for transplantation; corals transplanted in artificial reefs; and growth of transplanted corals.

Coral reefs take a long time to recolonize naturally but recovery can be accelerated through coral transplantation techniques (Figure 2). All coral species can be transplanted similar to assisted vegetative propagation. Under intensive maintenance, transplantation of corals can effectively restore and rehabilitate reefs. Restoration and rehabilitation efforts, however, cannot succeed without the active participation of people. Thus, restoration activities in the Serangan Island were complemented with conservation efforts. CFGKS became a motivating force in the practice of conservation in the island. Apart from stopping destructive activities, the group restored coral reefs in two hectares of the dredged area.

Starting in 2008, the restoration of coral reefs was used to engage tourists in a coral adoption program. Tourists participated in transplanting corals, an activity that became an attraction in the island along with other recreational activities such as swimming or snorkeling. Each tourist was charged a fee for each cutting of coral that she/he transplants, with the fee going to the host community. Experience showed that by participating in the program, tourists were able to identify themselves as part of the community; were proud to be counted as reef protectors and

conservationists; and enjoyed benefits derived from the unique and valuable experience of their visit to the island. In 2011, the group began to work with travel agents to bring more tourists to the island, thus contributing to the increasing revenues generated by ecotourism (Figure 3).

By 2008, the CFGKS achieved economic independence through activities and programs for restoration and conservation of coral reefs by developing ecotourism and by providing services in setting up and running projects in other regions in Indonesia. Some members of the group were able to get benefits from improved employment on account of the skills they learned from the Bali ICM project.

Serangan Island became a place of learning for many local governments, NGO, community groups, and students from universities within and outside Indonesia (Figure 4).

The CFGKS generated income by providing food, lodging, and services to visiting organizations and individuals. The Bali ICM program helped the group by promoting the island as a place to learn the methodology and practice of ICM.



Figure 3. A pontoon built with the support of private sector partners and operated by the Coastal Fishers Group of Karya Segara where tourists learn about marine conservation, at the same time choose tour packages that include transplanting corals, releasing seahorses, diving, and snorkeling. The seahorses come from the culture farm of the community group.



Figure 4. Mr. Wayan Patut (extreme left), Head of the Coastal Fishers Group of Karya Segara explaining the coral restoration method to visitors from Timor-Leste (August 2015).

In recognition of the efforts and achievements of CFGKS in conserving and saving coral reefs, then President Susilo Bambang Yudoyono of the Republic of Indonesia awarded the “Kalpataru” to the group in 2011, the highest award for environmental management programs. The award boosted the spirit of the group members and the community of Serangan Island to further push forward coral reef conservation.

Results

A major achievement of the Bali ICM pilot project was behavior change among the people of Serangan Island – from being destroyers of the environment to saviors of the sea. The willingness to change sprung from the community itself, from the ranks of its youth. The change was not forced on the community from above, i.e., government or outside forces.

The Bali ICM program, in this case, took the role of providing approaches and methodologies in dealing with the problems in Serangan Island using a holistic and integrated approach. These ICM principles served as guidelines in project implementation where, for example, the environmental, social, and economic problems were viewed as integrated elements of

a whole. The capacities and resources of the community, agencies, and other stakeholders to address the problems were facilitated through a collaborative management approach.

Community empowerment was and remains the core in achieving positive change, and in Serangan Island, it was strongly supported by the motivators – the young pioneers who encouraged other youth with their initiative. They demonstrated leadership and were trusted members of the organization and the community. The role of the motivators was to guide, inspire, and mobilize the community.

The program gave priority to campaigns that raised awareness through the use of media. These were followed by educational forums supported by the local government, universities, and NGO. The content of the message in the campaigns and educational activities was adapted to the level of knowledge and sociocultural characteristics of the fisher community. The main topics of the campaigns focused on:

1. the ecological processes in an ecosystem; the implications of resource use activities on ecosystems; and the negative effects that result from harmful human activities on the coral reefs; and
2. the functions of the coral reef ecosystem (physical, ecological, and socioeconomic aspects), and the importance of conservation efforts to reduce pressure and damage in order to maintain the functions of the coral reef ecosystem and use the resources in a sustainable manner.

Several sustainable livelihood training programs were also conducted covering: (1) life skills, such as diving, salvage, and underwater construction; (2) environment-friendly fishing and ornamental fish handling; and (3) reef restoration, such as construction of artificial reefs, coral transplantation, and coral reef monitoring.

Economic empowerment for the community was also implemented. In the short term, the alternative sources of income were provided through: (1) improving market access for fish catch that used eco-friendly methods, transplanted soft corals, and artificial rocks for tropical aquariums; and (2) providing job opportunities in maritime services for individuals with skills in underwater works and construction.

The medium-term alternative sources of income were expanded by building networks with local governments in and outside of Bali, and with private sectors. The organization capitalized on the new knowledge, skills, and experiences of the members. It received many requests from local governments and the private sector to work on the rehabilitation of coral reefs in different areas in Indonesia. It established partnership with the private sector such as the PT Bali Tourism Development Center (BTDC), Nusa Dua and PT Indonesia Power, through their corporate social responsibility programs. From these efforts, the organization was able to raise funds for its coral reef restoration program.

Developing ecotourism services, which began in 2008, was the long-term alternative livelihood objective aimed at achieving self-reliance of the community. By 2013, only 50.03% of the community population relied on fishing. Others transitioned to trading (21.7%), services (10.01%), industry (5%), livestock (3.9%), transport (2.6%), and other miscellaneous activities (6.76%) (Statistics Office of Denpasar, 2014).

The community environmental management program in Serangan Island was supported at all levels of government, from village to national level. Each level performed a role complementary to others. For example, the village administration facilitated group activities, provided land for offices and workshop facilities, and gave access and management rights of the restoration area for the tourism business of the organization. The Denpasar government facilitated several social safety net assistance programs during the program implementation. The Bali provincial government coordinated the implementation of the program, while the national government, through MOMAF, conducted capacity building and provided various facilities to

the organization. Public awareness, education, and training for the community were supported by several NGOs and universities.

Lessons Learned

Local champions are crucial for raising community awareness and providing leadership for community empowerment. The desire and motivation for change in Serangan Island was driven by the youth of the community. They subsequently organized themselves, engaged other parties to support their cause, and invested in developing skills of members. The timing coincided with the adoption of the ICM program in Bali, which facilitated support from government and nongovernment agencies, the private sector, and community stakeholders.

ICM provides a framework for community participation and empowerment. The success of environmental management in Serangan Island was in accord with the principles of ICM, within the framework of the integration of the ecological, social, and economic aspects. The economic strength of the community was raised by developing alternative sources of income.

The most important element of the program was the empowerment of communities in sustainable environmental management which can be achieved successfully through the development of alternative decent livelihoods, and other business opportunities.

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