Nearshore fish aggregating devices: A means of habitat protection and food security in post-disaster Solomon Islands

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In April 2007, an earthquake measuring 8.1 on the Richter scale triggered a tsunami and caused land and reef uplift and extensive damage to fringing coral reefs in areas of Western Province, Solomon Islands. Consequently, some coastal communities suffered detrimental effects to their fishing grounds through the partial or complete loss of coastal habitats (including coral reefs, seagrass beds and mangroves).

Solomon Islands coastal communities are heavily dependent on marine resources and coastal fisheries for their livelihoods. Because the reef and coastal ecosystems impacted by the earthquake would take time to recover, there was concern that fishing pressure would impede recover, as local communities tried to meet their daily needs from a compromised coastal resource.

In the aftermath of the tsunami, in an effort to assist communities in Western Province, the World Wide Fund for Nature, Solomon Islands (WWF-SI) received funding from the David and Lucille Packard Foundation for a project on "Post-disaster fisheries and marine conservation recovery activities in the Western Province, Solomon Islands". The WorldFish Center worked in partnership with WWF-SI on this component of the project, with the goal of examining whether nearshore fish aggregating devices (FADs) could help to maintain food security, while diverting fishing effort away from recovering reefs.

FADs were deployed at three earthquake-affected coastal communities (Rarumana, Pienuna and Buri). The simple, cost-effective FADs were made primarily from locally available materials (e.g. empty fuel drums, cement anchors) and imported ropes and floats. The FAD deployment sites were in nearshore coastal areas, both near the outer part of a reef and lagoon system (40 m) and on island dropoffs (100–200 m).

The FAD raft structure was made from locally available bamboo, held together with a car tyre and rope. Maintenance visits indicated that the raft materials have a life of approximately nine months and it is envisioned that communities will be able to maintain the raft component of the FAD after the project ends.

Figure 1. Fishers remain in awe at the uplifted reef on the island of Ranongga after the 2007 earthquake.

Figure 2. Rarumana community members transport the raft component of their FAD to the sea for deployment.

Two of the communities where the FADs were deployed were able to protect and secure the FADs for more than 12 months. One of the deployed FADs was lost about six months after initial deployment (suspected sabotage), highlighting the need for better planning with the community, more widespread communication and further consideration of FAD placement.

Figure 3. Nearshore FAD deployed at Rarumana.

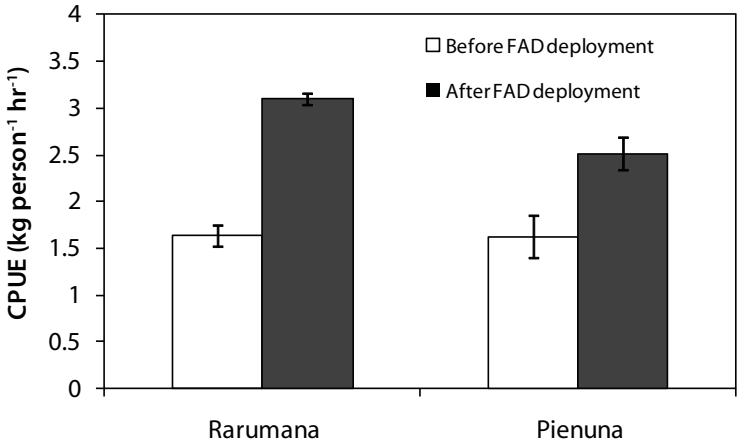

Figure 4. Average fishing catch per unit of effort (kg person^{-1} hr^{-1}) at the two study sites (Rarumana and Pienuna) before and after the FAD deployment.

Catch per unit of effort (CPUE) data (before and after FAD deployment) collected by the communities has provided an initial assessment of FAD effectiveness. The data suggest that the two FADs were successful in attracting fish within a few weeks when appropriately located. Higher CPUE was recorded after deployment of the FADs, and CPUE was markedly greater for FAD fishing compared with reef fishing (at Rarumana), suggesting that nearshore FADs can be effective in supplementing food and income for Solomon Island coastal communities.

Although there was clear anecdotal evidence that reef fish and coral communities changed as a result of the disaster, it is unclear whether reef fish standing stock also changed as there was no pre-disaster information available to gauge the effect on reef fish catch volumes and composition. Nonetheless, CPUE data provide some interesting insights into the reef and FAD fisheries that can be used to help develop a future research focus for management within these communities. Fishers were able to adapt their fishing efforts by targeting FADs to increase CPUE. In addition fishers rapidly acquired and used knowledge about fishing at the FADs to target certain fish at certain times of the day and lunar phases. In some situations, fishers used FADs not only for target species for consumption and sale, but also for catching baitfish, thereby allowing more desirable fish to be caught elsewhere (e.g. deepwater snapper), which was a previously underutilized fishery.

The results from this work indicate that FADs have the potential to divert fishing effort away from reef systems by making pelagic fish more accessible to village fishers. The notable increase in the catch and weight of fish from FADs indicates that FADs may in fact increase the quantity of fish that coastal reef dwelling communities catch and consume, thereby contributing to increased protein intake and community health.

This is the first project in Solomon Islands to examine the utility of FADs in altering fishing habits, and improving the availability of fish for local disaster-affected coastal communities. The catch data collected through this project provide a preliminary indication that FADs may act to reduce pressure on reefs following perturbations such as natural disasters and overfishing.

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