

Asia-Pacific: Fiji

Bioprospecting and Live Rock Harvesting for Coral Conservation in Fiji

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Abstract

A Locally Managed Marine Area (LMMA) is an area of nearshore waters actively being managed by local communities or resource-owning groups, or being collaboratively managed by resident communities with local government and/or partner organizations. An LMMA strategy offers an alternate and complementary approach to the centrally-managed system where a body (such as a national government agency) largely uses “command-and-control” to manage a marine area, often from a remote location. As of 2007, 200 LMMAs involving more than 300 communities had been declared in Fiji, covering about 30% of the country’s inshore fishery. The LMMAs in Fiji protect reefs, sea grasses, and mangroves. Management plans associated with LMMAs include income-generating activities. Under this guise, contractual arrangements between private companies and communities have been entered into for bioprospecting and artificial live rock harvesting. This case study explores these arrangements as a means to augment local incomes and create tangible value in protecting the marine environment through LMMAs.^{1, 2}

Project Overview

Context

Since 1995 the University of the South Pacific (USP) has worked with Fiji communities to develop management plans and monitor their inshore coral reef ecosystems. About 180 sites are now involved. At almost all sites a lack of monetary resources (tied to rising material aspirations) is identified as a root cause of many of the direct threats and so active plans call for income generating initiatives.

Agreement Mechanisms

A number of income generating initiatives directly related to access to Locally Managed Marine Areas (LMMA) and their tabu (no take) zones have been established. Given the well-developed tourism sector in Fiji, snorkeling in no-take areas (where fish are plentiful and docile) by fee-paying tourists is a common income-generating effort. This case study focuses on two less prosaic initiatives, the commercial search for drugs from marine invertebrates and microorganisms (bioprospecting) and the rental of reef area for live rock culture (planting artificial bare substrate of cemented pumice to allow coralline algae to cover it).

Bioprospecting

For bioprospecting, different kinds of agreements have been used. The policy framework is that the Fiji government plays a regulatory role and benefits are channeled to the traditional marine resource owners. In all cases the University of the South Pacific has played a central role, signing agreements with overseas entities such as universities or pharmaceutical companies and in turn getting approval from Fijian communities for collection to take place.

Two fee-paying initiatives have been established:

¹ Locally Managed Marine Areas. Accessed online, April 3, 2008, at: http://www.lmmanetwork.org/Site_Page.cfm?PageID=15.

² Aalbersberg, B, A. Tawake, and T. Parras. 2005. Village by Village: Recovering Fiji’s Coastal Fisheries. World Resources. pp 144-151.

- An agreement between the Strathclyde Institute for Drug Research (Scotland) and the Verata district, signed in 1997 (the Strathclyde Institute mainly acts as a broker for Japanese companies); and
- A contract with the PharmaMar Company (Spain) and several provinces, signed in 2007.

In the Verata case a fee of \$100 USD per sample was paid for about 350 samples. Proceeds go to a district conservation and education trust fund. With PharmaMar, 40,000 Euros was split 50/50 between the USP laboratory and a trust fund established to support LMMA work in the collection areas. Many other marine collections have been made but as part of programs without immediate commercial potential (after 1995, drug discovery models have disfavored the use of natural products by drug companies). All agreements call for milestone payments for collection and sharing benefits from licensing fees or royalties.

Live Rock Harvesting

The live rock initiative is an attempt to replace the removal of naturally-occurring reef base with artificially cultured reefs for aquarium traders. After about a year the cultured material attains the desired characteristics of natural live rock. In essence reef space is “rented”. The main company is Walt Smith International which signs contracts with individual villages. Villages pay US\$0.25 per kilogram of bare rock and receive US\$0.50 per kg (there is also a 20% weight increase as organisms cover the substrate). To facilitate community involvement in pilot sites, USP, under an International Cooperative Biodiversity Group (ICBG) grant, underwrites the purchase of up to 5,000 kg of material per village, with the proviso that at least 60% of proceeds are used to replant an increasing amount of live rock each year.

Process and Issues

Decision-making and Implementation Processes

Both processes began as part of a larger marine conservation initiative in which a healthy reef system is linked to the enterprise (through more samples being made available for bioprospecting and the availability of coralline algae to inhabit the cultured live rock). Extensive discussions were held with community leaders and government officials about the projects. For bioprospecting, the idea of providing new drugs to help people was attractive to Fijians and the extensive negotiations to maximize community benefits were mainly done on their behalf, although key issues were discussed with the community and a lawyer of community choice reviewed the agreement.

In the case of live rock, a regional integrated coastal management project planning meeting had listed live rock harvest as a major threat. A multi-stakeholder meeting (government, industry, NGOs, community and marine biologists) agreed that, among other initiatives, cultured live rock should replace removal of naturally-occurring reef rock over time.

Lands, Resources and Threats

The area covered by both projects is the inshore coral reef ecosystem. In Fiji these are threatened by overharvesting, pollution (especially nutrients), destructive practices (live rock harvest could arguably be classed here), siltation, and natural disasters (including coral bleaching). Fijian rural and outer island dwellers depend on fish for their protein source; 30 kg of fish are consumed per person annually and the estimated annual subsistence harvest is valued at \$25 million.

Organizational and Partner Capacity

For the bioprospecting project, the most important knowledge was that of best practices in access and benefit sharing agreements. In the absence of any Fiji government policy this was especially important. Skills in negotiations with a variety of players were also important. In both projects we were fortunate to

have helpful partnerships both with industry and with international conservation advisors. As both projects also involve communities, knowledge of protocols and local language and culture were also critical.

Legal Framework

Each initiative has a formal contract in which USP is in the center and makes agreements with both the community and the private sector. The communities in Fiji have customary tenure which gives them control over their marine resources. As such, land resources are owned by them but can be leased and marine resources can be used by others upon payment of compensation (legal ownership is with the state but this is disputed). The live rock agreements are simple and easily enforced; the bioprospecting agreements are complex and require long-term monitoring of testing results. The government does not have the monitoring capability but relies on the University's good will to do so.

Socio-economic Considerations

The main indirect threat underlying the direct threats to reefs is the need for cash (coupled with growing material aspirations). The initial main focus of our work is good stewardship; once this is agreed to/established then income generating projects are discussed. In the case of live rock, the villages had either refused large royalty offers (bribes) of about US\$20,000 to allow access to live rock harvest (Tagaqe village) or had harvested live rock and then become aware of dangers and discontinued (Namada village). Several people in a village employed as live rock harvesters can earn as much as US\$10,000 a year (a tourism job might earn a third this amount). For cultured live rock, the initial planting will only earn the entire village about \$3,000 a year but the improved reef conditions over time will hopefully compensate for this income loss. The amount of planting can also be expanded. Where communities had direct contact with the live rock trader they were suspicious of the project, especially feeling that the payment was inadequate.

Outreach

The stakeholders include the community, the government at different levels, the conservation sector and the business sector. For the live rock trade, the tourism industry was especially supportive of the cultured rock initiative and one resort offered an area in front of their resort to trial the initiative while the community discussions were taking place. The aquaria owners who ultimately buy the rock are also important as there has been a lull in the project as the original cultured rock "design" was not well-received. For bioprospecting, the general public might eventually benefit by a new drug discovery.

Funding

In both cases funding for the initiatives has come from US government projects for drug discovery and conservation.

Conclusions

Opportunities

The initial bioprospecting project, with a fee of roughly US\$100 per sample, was not replicated per se. By the end of this project the drug discovery paradigm of pharmaceutical companies had changed and most had discontinued their natural project divisions. Continued work at USP was made possible by partnership with US universities under US government funding. This developed capacity at USP but did not include sample fees. Benefits for collecting areas involve scholarships for students from the area in drug discovery or conservation. Collection areas were also prioritized for conservation planning that was

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supported by separate foundation funding. It is felt such support has greater long-term benefits for communities than sample fees.

Other collaborations with Japanese universities have offered training for a number of students. Two Fijian students who have undertaken this program have progressed through postdoctoral studies to be employed by the pharmaceutical industry. In 2007, the Spanish firm PharmaMar contributed 40,000 Euros to undertake a joint marine collection in Fiji. Half of the net proceeds were contributed to a Fiji community marine conservation trust fund. Some marine natural products obtained from Fiji sources are used in health research and a 3-5% royalty for these amounts to about \$5,000 per year to Fiji.

For the live rock trade an initial trial was made in 2005-2006 at two sites. After that the product needed to be redesigned and replanting at three sites is expected to begin in June 2008. Depending on the market penetration, earnings of up to US\$500,000 per year are possible in Fiji. Fiji supplies perhaps 50% of live rock globally. Bioprospecting sample collection continues globally although the shifting pharmaceutical scene and restrictive access conditions seem to be limiting this. The US government ICBG program funds 5-7 projects of \$3.5 million over 5 years which combine bioprospecting and conservation initiatives. Since 1994 projects have been funded in about 15 countries.

By working under existing larger project frameworks such as the Fiji integrated coastal management and the Asia-Pacific locally managed marine area network, these income-earning initiatives are a tool being used in association with other approaches to conservation and complement them.

Lessons Learned and Recommendations

Direct income to communities is a strong incentive to conserve coastal and marine areas. The commitment made by communities needs to be well understood by them as well as the consequences of non-compliance. Income-generating with minimal community requirements are more likely to be successful. It is probably simpler to work initially on a small geographic scale with reasonably homogeneous community characteristics and expand them rather than try to be too ambitious to start with. Partnerships which provide best practice advice are also critical to success.