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**VILLAGE BY VILLAGE
Recovering Fiji's Coastal Fisheries**

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by

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VILLAGE BY VILLAGE

Recovering Fiji's Coastal Fisheries

IN THE EARLY 1990s, RESIDENTS OF UCUNIVANUA VILLAGE, ON THE EASTERN COAST OF

Fiji's largest island, realized that the marine resources they depended on were becoming scarce. Village elders remembered when a woman could collect several bags of large *kaikoso* clams—a food staple and important source of income—in just a few hours. By the 1990s, however, a woman could spend all day on the mudflats and come home with only half a bag of small clams. The decline of Ucuivanua's marine heritage reflects a larger pattern of depletion repeated throughout the Fiji islands. A combination of greater

commercial fishing and larger local subsistence harvests have left most of Fiji's coastal waters overfished, sometimes heavily so. Rural Fijians, who constitute half of Fiji's population of nearly 900,000, have been hurt. Most of these villagers still lead a traditional subsistence-based livelihood, communally drawing on local marine resources for at least part of their daily protein and income. In the past, the abundance of the marine catch meant a moderate level of affluence and food security. With that abundance gone, the pressure on village economies has mounted, leaving 30-35 percent of rural households in Fiji below the official poverty line.

But Fijians are fighting back, village by village, linked by a network of communities that carefully regulate the use of their coastal waters, slowly restoring their productivity. Although these *locally managed marine areas* (LMMAs) are an innovation of the last decade, they call on a rich tradition of village management of ocean resources. In this new incarnation, traditional local conservation practices are blended with modern methods of monitoring and energized by the full participation of members of the community, who design and implement the marine management plans. The goal is to bolster local incomes and traditions by replenishing local waters—a grassroots approach to rural development.

Ucuivanua was the site of the first locally managed marine area in Fiji, and its results have been dramatic. Since local management began seven years ago, the *kaikoso* clam has once again become abundant, and village incomes have risen significantly. The Ucuivanua project set aside the usual mind-set that only experts know best and that development occurs only when planned by governments. Instead, it let the ultimate choices—the decisions that determine a project's success or failure—rest with the people most dependent on the resources for their livelihoods. The success in Ucuivanua has led to the adoption of LMMAs throughout Fiji, Asia, and the Pacific region (Aalbersberg 2003; Aalbersberg and Tawake 2005; Gell and Tawake 2002; Tawake and Aalbersberg 2002; Tawake et al. 2001).

Locally Managed Marine Areas (LMMAs)

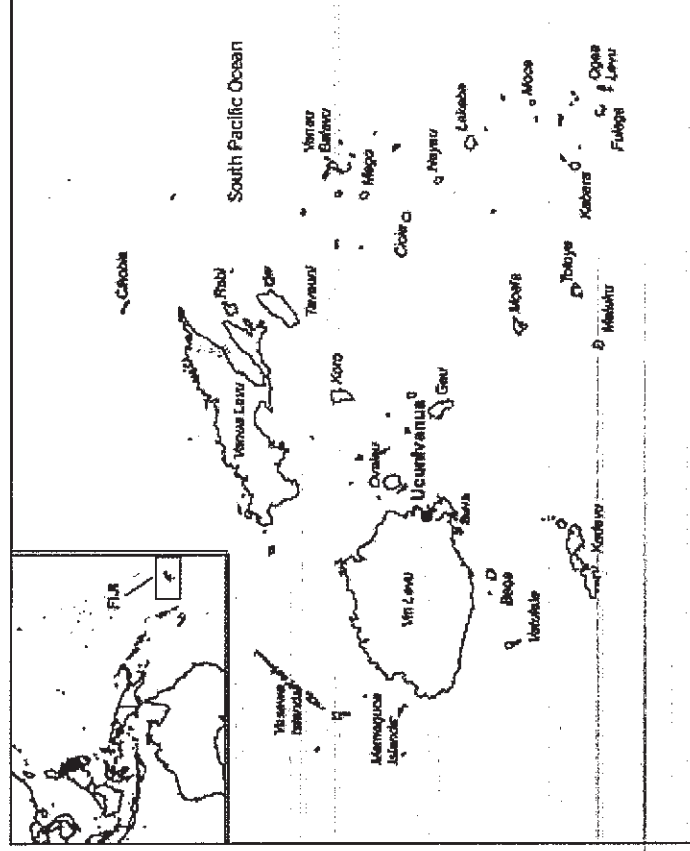
Pacific island communities have long practiced traditional methods of preserving their valuable food sources, such as imposing seasonal bans and temporary no-take areas. These methods have been based on a system of community marine tenure—the right to own or control an inshore area—that has been informally recognized by villagers and local chiefs. Fiji's

long-established system of local marine tenure consists of *qoliqolis*, or traditional fishing grounds that are under the control of the communities adjacent to them. *Qoliqolis* have some legal recognition and are officially referred to as "customary fishing rights areas." They are accurately mapped, delineated, and bound by survey lines, with records maintained by the Native Fisheries Commission. There are 385 marine and 25 freshwater *qoliqolis* in Fiji. The resources from these provide livelihoods for approximately 300,000 people living in coastal villages.

Traditionally, management of *qoliqolis* included temporary closures of these fishing zones, limitations on the number of fishers or the amount of fish they could harvest, restrictions on using certain fishing practices, and the imposition of a *tabu*, or prohibition, on fishing for certain species. In addition, sacred fishing grounds were recognized by communities, and temporary moratoria on fishing were sometimes imposed as part of traditional ceremonies. For example, a 100-day *tabu* on using certain fishing areas was often declared as a token of respect when a high chief died. When the *tabu* ended, villagers harvested fish again and held a large feast to end the mourning period.

Today, many communities maintain such customary practices, with varying levels of compliance. Chiefs are applying this customary *tabu* concept to more practical ends—to protect spawning or overexploited areas and to increase fish stocks—with mounting interest and success. They are linking their traditional practices with modern techniques—assessing fish stocks, measuring potential no-take zones, monitoring the *tabu* area—to establish locally managed marine areas.

Communities set aside at least part of an LMMA as a restricted area, typically 10-15 percent of the village's fishing waters, in order to allow habitat and resources to recover from fishing pressure. The location and size of the *tabu* area is determined by members of the community, depending on how much they feel they can close and still meet their needs. The community may also choose a spot that is easy to police, and not necessarily a rich fishing area. Technical experts may offer their advice to the community on optimal placement of the *tabu* area, but ultimately the community itself has the final say about location. Thus an LMMA is significantly different from a marine reserve or *marine protected area*. In a marine protected area, a central body, often a national government, makes all decisions, often from afar and with little or no local input.



Ucuivanua: One Village's Experiment

The *kaitoso* (*Anadara antiquate*) a clam found in shallow mudflats and seagrass beds, is the clan totem of the people of Ucuivanua—the community's symbolic animal. It is also a food staple and primary source of income, along with agricultural crops and other marine resources such as octopus. To preserve the *kaitoso*, residents of Ucuivanua began working in the 1990s with the University of the South Pacific (USP) in Suva, Fiji (Tawake et al. 2001). This collaboration began when the son of the high chief of Verata, the district in which Ucuivanua is located, studied land management at USP and asked his teachers there to help address some of the problems in his village.

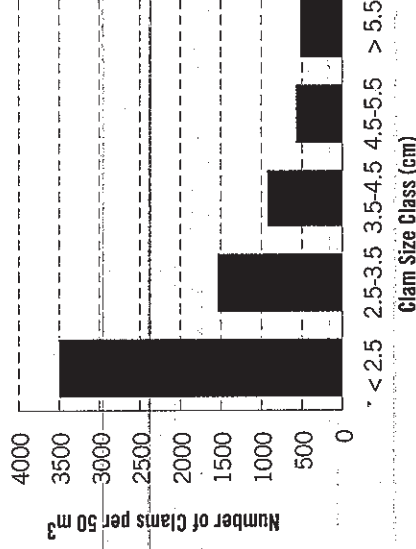
At the end of two years of workshops and training in environmental education and community planning, the community decided to set up a 24-hectare *tabu* area on the mudflat and seagrass bed directly in front of the Ucuivanua village as an experiment. The hope was that as the clam population recovered in the *tabu* area, more clam larvae would settle in adjacent fishing areas as well, eventually leading to increased clam harvests in these areas—something called a seeding effect.

The village chose a group of 20 men and women to be on the *tabu* area management team. From the outset of the planning process, advisors from USP had requested that the team include equal numbers of adult men, women, and youth—an unusual step in traditional Fijian culture. The *tabu* area management team staked out the boundaries of the proposed protected area. The team then worked with the paramount chief and elders of the village to hold a traditional ceremony declaring the area *tabu* for three years.

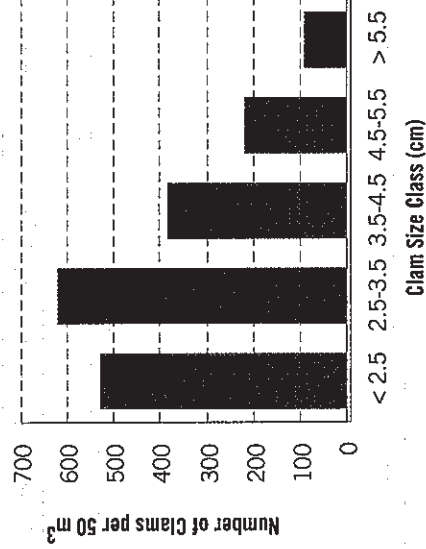
FIGURE 1 TRENDS IN CLAM SIZE AND ABUNDANCE, UCUNIVANUA, FIJI

Size Class (cm)	NUMBER OF CLAMS (PER 50 M ²)			
	Tabu Area		Adjacent Harvest Site	
	1997	2004	1997	2004
< 2.5	0	3502	1	532
2.5-3.5	5	1546	7	622
3.5-4.5	12	935	14	385
4.5-5.5	13	570	9	221
> 5.5	8	530	1	91

Tabu Area, 2004



Adjacent-Harvest Site, 2004



Source: Aalbersberg and Tawake 2005

Here is where modern technique fused with traditional village values. The scientific experts from USP taught team members the skills of monitoring and the basic ideas of sampling and statistics. The team learned how to lay line transects and to sample the clam population at 10-meter inter-

vals along the 500-meter transect line, then record their results and analyze them with simple statistics. Using these skills, the team established a baseline of clam populations in the *tabu* area and in adjacent sites down current. Those baseline calculations were then used for comparison with the results of the annual monitoring to follow. In effect, the community learned how to conduct a scientific experiment to see if a locally managed marine area strategy would lead to increased resource yields and better conservation.

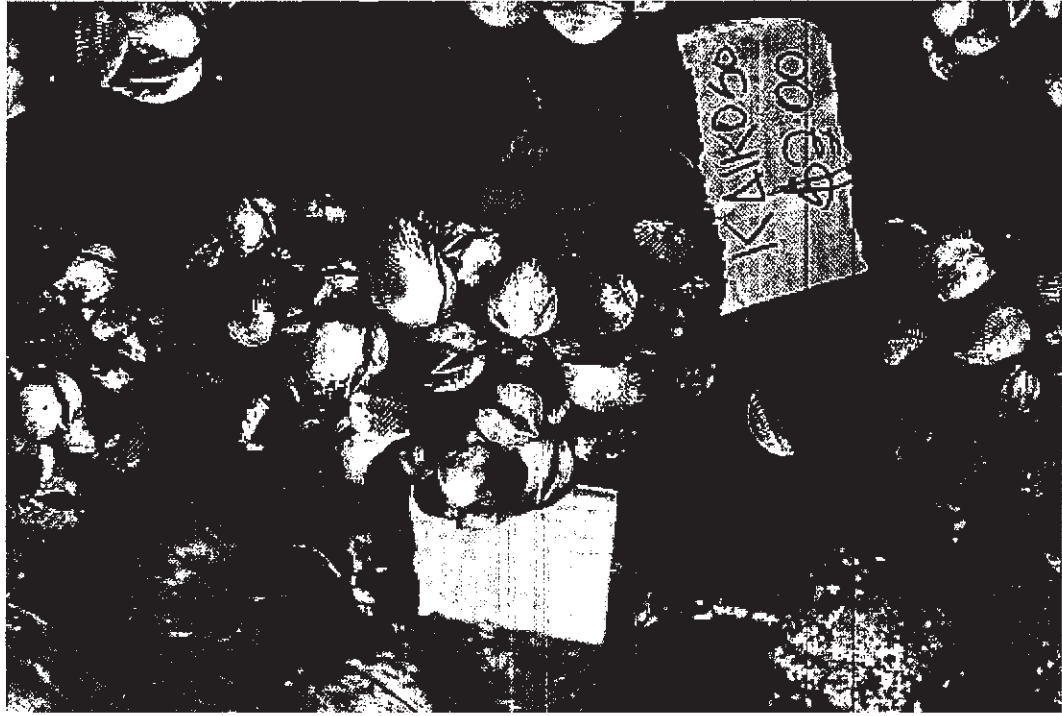
Monitoring data gathered by the team in 1997 and 2004 indicate the dimensions of the experiment's success. The number of clams increased dramatically in both the *tabu* and adjacent harvest areas. (See Figure 1.) At the start of the project, it was extremely rare to find a clam bigger than 5 cm in diameter. Today, the Ucuivanua community routinely finds clams in the *tabu* area that are over 8 cm in size. Because of its success, the Ucuivanua *tabu* area, which was initially intended to be closed to fishing and collection for just three years, has been extended indefinitely (Tawake and Aalbersberg 2003).

Expanding the LMMA Benefit

The district chief early on in the process had asked that the project include the entire district and not just Ucuivanua. After only one year of local monitoring and reporting at district meetings, the clear benefits of the LMMA strategy at Ucuivanua became apparent to other villages in the Verata district, and they began setting up *tabu* areas. Sawa villagers, for example, imposed a *tabu* on a mangrove island. By counting the "active" holes in the mangroves, they found that the numbers of the mangrove lobster *Thalassina anomala* increased by roughly 250 percent annually, with a spillover effect of roughly 120 percent outside the *tabu* area.

As these results were reported in the local media, villages throughout Fiji facing declines in their inshore fishery approached USP for help in setting up locally managed marine areas in their *qoliqoli*. In Nacamaki village on the island of Gau, one year after creating a *tabu* area the community harvested approximately eight tons of their food totem, the rabbitfish, in one week. This bounty was enough to provide a feast for the entire island—20 villages in three districts, totaling roughly 6,000 people.

While this catch coincided with the high season for rabbitfish, Nacamaki had not seen such abundance in a long time. A 68-year old woman recalled that the last time she saw so many rabbitfish was when she gave birth to her second son 47 years earlier. A testimonial from the Nacamaki village chief illustrates the enthusiasm for LMMA work that has spread throughout Fiji: "The LMMA work that these young guys from USP are doing has changed the attitude of my people to conserve and sustainably manage our resources for our kids. In recognizing this change, our ancestors have released the blessing to us by reviving this tradition."



VILLAGE BY VILLAGE



National and International Collaboration

A concurrent step for advocates of LMMAAs—both the technical experts and traditional practitioners—was to work together, first within Fiji and then across Asia and the Pacific, to spread the principles and techniques of locally managed conservation of marine resources.

The Fiji LMMA Network (FLMMA)

The residents and researchers in Ucuivanua were not the only ones in Fiji exploring local solutions to diminishing marine resources in the 1990s. In Cuvu district on the Coral Coast, along a southern stretch of Viti Levu (Fiji's largest island), community members were working with the Foundation for the Peoples of the South Pacific (now Partners in Community Development Fiji) on techniques for setting aside and restoring degraded coral reefs. And in Ono, in the island group of Kadavu, villagers were working with the World Wildlife Fund's South Pacific Programme to find ways to protect and manage blue holes (large deep holes in the middle of a reef). Each of these projects was testing variations of the basic LMMA strategy to see if it could contribute to conservation and local livelihoods under differing conditions.

Team members from these three projects—Ucuivanua, Cuvu, and Ono—joined in 2001 to form the Fiji LMMA

Network (FLMMA), to serve as a forum in which communities with LMMA projects could share methods and results. With the help of the respective project teams, the community members in the network presented the results of their monitoring to fishery policy makers of the Fijian government. While surprised at first to be given scientific findings by villagers, the government representatives grew excited about the idea of adopting Fijian customs to the management of marine resources. The national government has formally adopted the LMMA approach and has designated a division of the Fisheries Department to promote inshore conservation and to work with FLMMA. With FLMMA's assistance, the Fisheries Department has been tasked to conduct resource assessments of all of Fiji's *qoliqolits* and to help develop management plans.

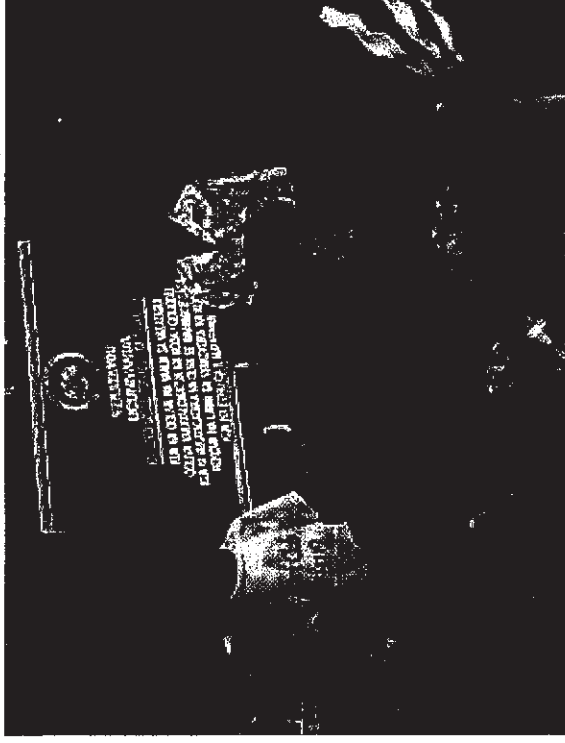
The participatory model used by FLMMA has had additional effects at a national level. The Ministry of Fijian Affairs uses FLMMA's participatory approach for its Community Capacity Building project, which identifies and develops action plans to deal with village problems. Fifteen Fisheries Department extension officers were trained in the network's participatory techniques during a community workshop in June 2002. Members of five government agencies (Fisheries, Fijian Affairs, Environment, Tourism, and the Native Land Trust Board) have formally joined the network to date. Local primary and secondary schools are encouraged to create displays related to LMMA work and even take part in monitoring exercises.

Under current law the Fijian government holds title to the *qoliqolits*, as it does all marine waters. Now, as a direct result of FLMMA's work with local communities, there has been growing pressure for the government to return legal ownership of the country's inshore fishing areas (410 *qoliqolits* in total, equaling roughly 31,000 square kilometers of coastal

waters) to their traditional owners—local chiefs. Legislation to do so is now being considered by Fiji's parliament. If the law is enacted, the high chief of an area would hold legal title on behalf of the community, but management decisions would be based on the views of community elders and the needs of the resource users.

Locally, villages have reported that their LMMA experience has given them a greater sense of cohesion and a sharpened ability to identify and address other community problems. Ucuivanua, for example, has raised funds to address two problems they had talked about for years: bringing electricity to the village and working with the central government to build a sea-wall to protect their sacred burial ground. In addition, having a successful resource-management plan enables communities to better negotiate with industry and government. For example, when a Coral Coast hotel asked permission of the *qoliqoli* owners to build a jetty, the community used the opportunity to ask the hotel, in turn, to improve its sewage treatment, since improved reef water quality was a major goal in the village's coastal management plan.

Because some parts of Fiji are days-of-boat-travel-away from the capital of Suva, efforts to decentralize operations and extend LMMA work to these remote areas were initiated in 2004. This is being done through the establishment and training of *Qoliqoli* Management Support Teams, composed of provincial government workers, overseas volunteers, and community members trained in LMMA techniques. Community workshops are conducted jointly with experienced LMMA members until the local team is able to work on its own.



This approach has worked well in Kadavu, Fiji's fourth largest island with 33 *qoliqolis*. During 2004 the Qoliqoli Management Support Team under the leadership of the Roko (governor) was able to set up LMMAs in most of the 30 *qoliqolis* that did not have one. The Fisheries Department has indicated a keen interest in formalizing this model for all provinces in Fiji, with hopes that the process will be well on its way by the end of 2005.

To date, nearly 60 LMMAs involving 125 communities with *tabu* areas have been declared in Fiji, covering about 20 percent of the country's inshore fishery. They may designate reefs only or include grass areas and mangroves as well. It is important to keep in mind that the primary reason for these closures is to recover the subsistence and artisanal value of the fishery rather than to restore marine biodiversity, although that is certainly an important side benefit. In their initial planning for an LMMA, communities invariably express the need to generate greater local income, and see a restored fishery as one of the best ways to achieve this. Government also understands that the recovery of the fishery can improve village life and perhaps reduce urban migration.

Beyond Fiji: The LMMA Network

The locally managed marine area approach spread within Fiji and other nations in the Asia-Pacific region through the creation of the LMMA Network, which now has members in Indonesia, Papua New Guinea, Solomon Islands, the Philippines, Palau, and Pohnpei. The network provides a forum for project teams from these nations to share their experiences as they try to determine the right conditions for LMMAs to work.

The network is guided by a group of country LMMA leaders who manage on behalf of local project leaders. The country leaders meet periodically and often include local project representatives. They also arrange inter-country visits,

THE FIJI LMMA NETWORK IN ACTION

Typically, a Locally Managed Marine Area evolves along a well-tested trajectory, with the following steps:

- Community discussions on goals and expectations
- Two-day action-planning workshop
- Community/district adoption of management plan
- Three-day biological monitoring workshop for projects with newly adopted management plan that can include a no-take zone or restrictions on gears and fishing methods
- Monitoring in each community within three months of management plan adoption
- Training in socioeconomic monitoring (usually once biological monitoring is well in place)
- Actual socioeconomic monitoring in sites where training has taken place
- Support visits to each site at least every six months
- Country- or region-wide meetings to discuss how project teams can work together and how adaptive management can be done at the national level

Sustainability and Costs

The estimated cost for the initial suite of community workshops is about \$3,000 per site in the first year, \$1,000 in the second year, and \$500 per year thereafter. The FLMMA has established 71 sites at a cost of approximately \$400,000 in outside funding. Many of the costs of FLMMA's work, including workshops, monitoring equipment, and buoys for marking off *tabu* areas, have been met with funding channeled through local NGOs supported by the U.S.-based Packard and MacArthur Foundations.

Most community management plans also include an income-generating aspect. As part of the conservation initiative in Verata, a bioprospecting arrangement was set up with a pharmaceutical company in which the community was paid licensing fees for samples of medicinal plants and marine invertebrates collected in their district. Efforts have been made to ensure that best practice in bioprospecting as outlined by the Convention on Biological Diversity was followed. These activities earned \$30,000, which the community put toward a trust fund to sustain their local fisheries work.

At another site, a hotel pays \$2 to a community trust fund for each scuba diver that utilizes the village's protected area. This provides an income of roughly \$1,000 per year. Another village is "planting" artificial live rock in its *tabu* area to sell to exporters for the aquarium trade after marine life has colonized it. A company makes the artificial live-rock substrate, brings it to the village, and assists in placing it on the reef. Local people need only scrape the rock clean of algae occasionally. Within a year the company harvests the rock with local help. The potential return to the community is \$4,000 a year. These sums are not large, but are sufficient to maintain LMMA work once it is established.

such as a 1999 meeting of local representatives from the West Papuan island of Biak, the Solomon Islands, and Fiji. Every three years there is a network-wide gathering that includes community members from each site.

The Process

Once a community in Fiji makes its interest in local marine management known, FLMMA and various partner organizations determine which will be the lead agency, and discussions are held with the community to ensure that the goals of all parties are clear and in harmony. Sometimes the initial planning and education process takes up to a year.

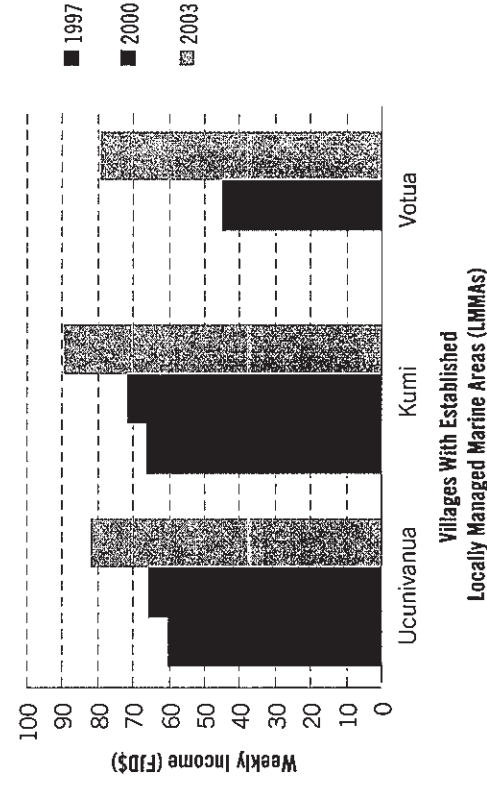
FLMMA teams then offer assistance in three types of workshops: action planning, biological monitoring, and socioeconomic monitoring. The action-planning workshops are adapted from Participatory Learning and Action (PLA) methods and include sessions on mapping the village, understanding historical trends, and analyzing who the local stakeholders are. These sessions serve the dual purpose of exploring resource-management issues and instilling community members with the confidence that they have the capacity to solve their own problems. The workshops then focus on biological and socioeconomic factors such as identification of resource use, threats to local resources, and the root causes of these threats. Finally, the community develops a community action plan, designating what will be done and by whom.

While the establishment of a *tabu* area is usually a central part of a LMMA, the action plan also contains ways to address other issues faced by the community, such as lack of income sources, poor awareness of environmental issues, pollution, and sometimes declining community cohesiveness. Socio-economic monitoring tests whether these broader problems are being addressed.

There is also ongoing assistance to communities to help them carry out their plans and meet new needs that might arise, such as marking protected area boundaries, publishing LMMA rules, and training fish wardens to protect against poaching.

A key element of success has been the teamwork approach that unites traditional values and modern science. Village workshops are facilitated by government representatives, NGOs, experienced outside community members, and the local university. Questions often arise regarding fisheries regulations, traditional fishing rights, marine biology, pollution, and experiences in other communities. Having a mixed team not only ensures that proper attention is given to each of these issues, but also develops trust and transfers skills among facilitators.

FIGURE 2 HOUSEHOLD INCOME FROM SALES OF MARINE PRODUCTS, FIJI



Source: Aalbersberg and Tawake 2005

LEARNING FROM FIJI'S LOCAL MARINE MANAGEMENT

Small-Scale Projects Can Influence National and International Policy. The success of the early projects at Ucuivanua, Cuvu, and Ono was persuasive. The Fijian government subsequently adopted the LMMA methodology in the national Fisheries Department, while other government departments have applied the program's participatory management techniques. Through the LMMA network, the benefits of local marine management have spread throughout the Pacific region—a demonstration of how community-based ecosystem management can be scaled up for greater poverty reduction.

Success in Marine Conservation Can Promote Broad Economic Growth. As well as conserving marine resources for village consumption, the LMMAs at Ucuivanua and other villages have generated income through commercial sales, bioprospecting, and tourism, demonstrating that ecosystem management can be the first step to broadening the sources of wealth in a rural community. In addition to gaining economic benefits, the villagers-participating in local-marine management have learned management skills that they have applied to other problems facing the village.

Traditional Management Methods Can Be Fused With Modern Expertise. At Ucuivanua, marine specialists from the University of the South Pacific worked with villagers, and within village traditions, to teach the skills needed for siting a *tabu* area, measuring it, monitoring it, and assessing its recovery. Experts provided the how-to skills, but villagers had the final word on what should be done within the framework of their goals and values.

Traditional Social Norms Can Impede Genuine Participation. For generations, Fijian culture has excluded women and young people from central roles in decision-making, which is traditionally dominated by male elders. Thus, despite a concerted effort to involve the entire village, not all community members participate equally in the Ucuivanua LMMA. A locally managed marine area may have to operate within traditional norms to gain acceptance yet promote participatory equality in ways that challenge those traditional values.

Success Can Bring New Problems. The very success of local marine management—the restoration of fish stocks—has attracted outside fishers to LMMA sites and brought new threats to village resources. The capacity to monitor and protect a *tabu* area requires new capacities from village members, who must take on enforcement duties as fish wardens, battling encroachment through both public education and legal means.

In addition, communities are able to charge more for the annual fishing licenses they sell to outsiders. One of the initial LMMA actions in Verata in 1997 was to put a moratorium on issuing such licenses, of which 60 costing \$500 each had been given the previous year. In 2003 chiefs agreed to sell a single license for \$30,000. Customary practice allows *qoliqoli* owners to permit outsiders to enter for a specific purpose such as fishing or live-rock harvest. Although issued by the Fisheries

Department, the license must be signed by the local chief (Veitayaki, Aalbersberg, and Tawake 2003).

A successful LMMA is, in effect, an alternative income source. The increase in fishery resources not only improves nutrition but also raises household income from market sales. (See Figure 2.) Marine resources, on average, make up more than 50 percent of the household income for these villages, and raise these households far above the median income level of F\$4000 a year in Fiji.

FLMMA has been recognized with two international awards for its work: the United Nations 2002 Equator Initiative Award for \$30,000, and the 2004 Whitley People and Environment Award of £30,000. The funds from these awards were established as trust funds administered by FLMMA to sustain its work. Today FLMMA is a registered charitable trust in Fiji.

Challenges

As successful as many of the LMMAs in Fiji have been in increasing fishery resources, improving habitat, generating income, and promoting community cohesion, there are still problems. Ironically, one is a direct result of the LMMA success: due to higher numbers of fish and other desirable species, outside fishers are drawn to the site to harvest. In addition, non-Fijians continue to fish in the *tabu* areas, as they are either unaware of the *tabu* or do not respect it. In response, FLMMA has supported the training of community members as fish wardens, granting them legal power to apprehend offenders.

A deeper challenge involves working within the social framework in Fiji. Traditional culture does not usually allow for women to be a part of decision-making. This has proven to be a disadvantage, for in Fiji women are often the ones most involved in collecting inshore marine resources and have unique knowledge about them.

In Verata, for example, only the women knew how to locate and accurately count the *kaikoso*. Although women typically collect seafood for the community, the men make the decisions regarding the management of such activities. Continued success of the LMMA movement will require addressing this incongruity. A gender program has recently been introduced in which meetings discussing the progress of the action plan are also held with a local women's group. It is also difficult for young people to participate in decision-making under the traditional societal norms, as they may not have a say among the meeting of elders.

The Way Forward

In response to the challenge of poaching in *tabu* areas, communities are taking a variety of actions, including installing buoys and signs to mark boundaries and having fish wardens trained by the Fisheries Department. Most communities locate their *tabu* areas in plain sight of the village, but others with more distant areas need boats and trained fish wardens empowered to arrest



outsiders coming into their village waters. Usually a boat with a fish warden and other community members will simply approach an encroaching boat and tell it to leave. On occasion, they have apprehended people and confiscated boat and gear.

Another option to protect against encroachment is to gazette protected areas, legally delineating them as no-fishing zones. This would allow police to patrol the area and make arrests. To date, only two of the FLMMA-inspired *tabu* areas have chosen the gazetted route. FLMMA has had meetings with the national government to clarify the steps in the gazetted process and has written this up in the local language.

The Fiji LMMMA approach has broadened beyond just helping villages establish *tabu* areas and protect them from outsiders. Its participatory techniques and co-management methods are proving to be effective in improving local governance in general and the delivery of government services. In order to maintain the momentum of this work, FLMMA is continually identifying and addressing needs as they arise and conducting participatory workshops to help local communities to address new challenges.

As FLMMA emphasizes the need to involve all sectors of the community in a project, the inequitable representation of gender and youth needs to be further explored. Efforts are underway to find the best methods for mainstreaming women and youth into projects without violating traditional societal norms. In some communities, youths are encouraged to monitor the LMMAs or develop plays with environmental themes for presentation on special village occasions or at workshops. Women may be involved in waste management, such as composting or monitoring of the marine areas in which they

glean or fish. Holding separate women's meetings has inspired women to participate and discuss issues in a way that they would not when men are present. Having the voices of women heard at the decision-making level of coastal management, however, continues to be a challenge.

LMMMA implementation in Fiji has led to increased resources and a corresponding reduction of poverty in rural communities that depend on marine resources. Equally important, the LMMMA process has improved community solidarity as well as regional and national policy. The challenge now is to sustain the LMMMA movement and decentralize it as it spreads throughout Fiji and other parts of the Pacific.

This case study was authored by Bill Aalbersberg, Alifereti Tawake, and Toni Parras. Bill Aalbersberg is professor of chemistry at the University of the South Pacific and director of the USP Institute of Applied Science. Alifereti Tawake is an assistant project manager at the Institute of Applied Science. Toni Parras is communications specialist of the Locally-Managed Marine Area Network.