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Coordinator: Kim Des Rochers, English Editor, SPC, B.P. D5, 98848 Noumea Cedex, New Caledonia. [Phone: +687 262000; Fax: +687 263818; Email: KimD@spc.int]. **Production:** Information Section, Marine Resources Division, SPC [Fax: +687 263818; Email: cfpinfo@spc.int]. **Printed with financial assistance from Australia and New Zealand.**

Introduction

Welcome to the 12th issue of the Women in Fisheries bulletin.

A common thread running through several articles in this issue is food security. Across the Pacific, and in many other parts of the world, women's fishing and reef gleaning activities are vital in providing a source of protein and income for coastal communities. This is especially true during times when inclement weather makes it either difficult or dangerous for men to fish beyond the reef. But a combination of factors — including overharvesting and habitat destruction — threaten women's ability to provide for their families. Some areas are experiencing localised declines in shellfish abundance, yet little scientific research has been done on many of these shellfish species and their sustainable yield. As *Vunisea* notes (see p. 17), in some areas of Fiji there is growing concern that the overcollection of coral for the marine aquarium trade could adversely impact long-standing subsistence fishing activities. The coral trade, however, is providing some communities with an opportunity to earn much needed cash, with very little training and investment needed. Fisheries officers, NGOs and others need to determine how the need for cash can be balanced with conservation of reef ecosystems so that they may continue to provide communities with subsistence livelihoods.

In Papua New Guinea, studies have shown that women contribute anywhere between 20 and 50 per cent of total fish catches annually. Women in Milne Bay Province, PNG, harvest marine invertebrates in particular. Recently, women's fishing activities have expanded into small-scale commercial harvesting activities (e.g. beche-de-mer). Women therefore contribute both to the daily subsistence fish catch — and so to their families' food security — and to their households' income earnings. As *Kinch* notes (see p. 32), however, women in PNG are still under-represented in national fisheries agen-

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Women's fishing

Women in fisheries in Milne Bay Province, Papua New Guinea: Past initiatives, present situation and future possibilities
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cies, fisheries training courses, and fisheries development and planning processes. Kinch suggests that more information is needed on subsistence fisheries production, consumption and environmental impacts.

In the Philippines, food security and decreased fish catches were named as the most urgent issues of personal concern in a survey of 700 small-scale fishermen (see p. 15). This baseline survey was the first attempt to measure the level of people's understanding about coastal issues and to gauge their attitudes and practices with regards to fishing and coastal resource management.

In the Solomon Islands, Aswani and Weiant (see p. 3) report that the harvest of marine invertebrates, particularly shellfish, is a woman's activity, and a decline in shellfish resources could affect a woman's position within her household and community, and result in declines in a household's level of food security. Like Kinch, the authors report that women are frequently ignored by fisheries developments and conservation projects, and that until recently, very little attention has been paid to the need to manage resources that are vital to women. Aswani and Weiant's article, however, presents the positive outcomes of a women's community-based marine protected area project they have been involved with; a project that is effective both in sustaining invertebrate resources, and in generating community support.

As always, I hope you will find the articles in this issue of Women in Fisheries both thought-provoking and interesting. I welcome any feedback on them and encourage you to submit articles about women and community fishing issues from your country.

Kim Des Rochers

PS: Please note that articles from Micronesia and the USA retain American spelling.

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Processing clams in the Milne Bay Province, Papua New Guinea. Photo: Jeff Kinch

Community-based management and conservation

Shellfish monitoring and women's participatory management in Roviana, Solomon Islands

Shankar Aswani¹ and Pam Weiant²

Abstract

This paper summarizes the results of a women's community-based marine protected area that has been successful in sustaining invertebrate biological resources and in promoting strong community support. In 1999, the women of Baraulu and Bulelavata villages in Roviana Lagoon, Solomon Islands, created a spatio-temporal marine closure to sustain marine resources that are valuable for nutritional and income-generating purposes. The aim of this paper is three-fold: 1) to outline the project and the associated biological results; 2) to describe the process involved in attaining a committed level of community participation; and 3) to review additional lessons that have been learned during the project. We find that a high level of community involvement is achieved when positive scientific results generated by the monitoring protocol are returned to the community. This educational process, which cross-fertilizes indigenous and Western knowledge, has increased women's interest in the project and their direct participation in monitoring and enforcement. Also, the initiative's perceived success has encouraged several nearby villages, which otherwise would have no marine protection strategies, to launch other conservation initiatives. We hope that the project's findings can be generalized to other regions of the world and help to increase the effectiveness of establishing community-based marine protected areas (CBMPAs) across the Pacific region.

Introduction

This paper summarizes the results of a women's community-based marine protected area project in the Solomon Islands that has been successful in sustaining invertebrate biological resources and in promoting strong community support. Marine protected areas are emerging as a critical means to protect marine biodiversity in coastal zones around the world. In the insular Pacific, most marine protected areas and other conservation initiatives have targeted resources traditionally harvested by men (e.g. Bidesi 1994). Yet, the fishing activities of Pacific Island women, particularly the harvesting of diverse marine invertebrates, are vital in providing a source of protein and income to coastal communities. Despite their significant role, women are rarely included in community fisheries management because governments, industry, and banks hardly recognize the significance of

women's artisanal and small-scale commercial activities (e.g. Chapman 1987; Mathews 2002). Since the harvest of marine invertebrates, particularly shellfish, is predominantly a female activity, the decline in these resources may have the dual effect of altering their position within their households and communities, and causing declines in households' levels of food security and operating income. In the Solomon Islands, women are frequently ignored by fisheries development and conservation projects, and until recently, scant attention has been paid to the need to manage resources that are vital to women locally. Among the two most important bivalve species harvested by Solomon Island women are the mangrove *Anadara granosa* or blood cockle, and the *Polymesoda (Geloina)* spp. or mud clam. These organisms are vital subsistence resources for coastal communities across the country as well as in other Indo-Pacific island nations (e.g. Fay-Sauni and Robinson 1999).

1. Assistant Professor, Department of Anthropology/Interdepartmental Graduate Program in Marine Science, University of California, Santa Barbara, CA 93106, USA. tel.: +1 (805) 893-5285; fax: +1 (805) 893-8707; email: aswani@anth.ucsb.edu
2. Interdepartmental Graduate Program in Marine Science, University of California, Santa Barbara, CA 93106, USA



Figure 1. The Western Solomon Islands.

In the Roviana Lagoon, Western Solomons (Fig. 1), these bivalves are harvested for subsistence and for cash, and their importance stems from their historic abundance, large size and accessibility.

Scant scientific research on these species has been conducted and little is known about the environmental requirements, biology, population status, and tolerances of most of these bivalves (Thu and Hung 1999). The causes for localized declines in shellfish abundance, for instance, are unknown, and there is little understanding of the effects of overfishing or modification of water quality due to land-based activities such as timber harvesting, which is prevalent in the region. The most complete studies on the biological aspects of *Anadara* spp. are by Broom (1982, 1985) and Narasimham (1969, 1988), but these studies are limited to the Philippines, Malaysia, Thailand, South Korea and Indonesia. We believe that drawing from indigenous ecological knowledge is of key importance in designing scientific research and in building a comprehensive image of marine species that are poorly understood by marine scientists. By studying different aspects of indigenous ecological knowledge, we have been able to formulate a number of working hypotheses regarding the distribution and abundance of various marine invertebrates, and we have tested these using current marine science methods (Aswani and Weiant n.d.). This information has been crucial for establishing and improving ongoing resource management plans. In this paper, we argue that the long-term environmental and social success of the project depends on a continued incentive that hinges upon a positive feed-

back loop between a strong level of community involvement and scientific research results that are disseminated through educational campaigns, and which are understood by all stakeholders.

The resource management project

The Baraulu/Bulelavata Women's Shellfish Project (aka The Baraulu/Bulelavata Women's Sewing Project) was established in 1999 to encourage the management of two bivalve mollusks, *Anadara granosa* (locally referred to as *riki*) and *Polymesoda* spp. (locally referred to as *deo*) with outside support from Dr Aswani. This project forms part of two larger multidisciplinary initiatives funded by the MacArthur and Packard Foundations entitled the "Roviana and Vonavona Lagoons Marine Resource Management Project" (2000–2003) and "Establishing Marine Protected Areas and Spatio-temporal Refugia in Roviana and Vonavona Lagoons, Solomon Islands" (2002–2004). These projects seek to investigate a spectrum of issues concerning human dimensions of marine resource utilization. The applied aims are to economically and educationally empower rural communities through rural development and capacity building programs (see Aswani 2000), while simultaneously promoting resource management and conservation. For instance, a small-scale sewing project has been designed to provide local women with a measure of financial independence to support local enterprises such as the construction of a permanent facility for women's activities. This incentive, which is presented as an integral component of the project and not as a trade-off, has facilitated the

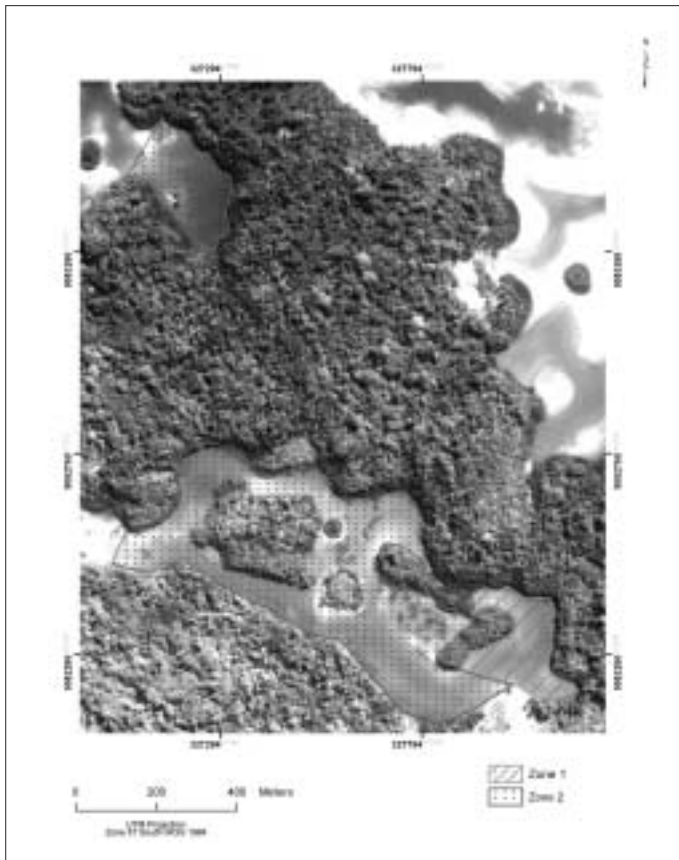


Figure 2. The Rereghana and Duduli spatio-temporal marine invertebrate refugia.

establishment of permanent marine protected areas and spatio-temporal refugia by providing women with an economic venue to offset the income they lose by not selling shells. In addition, we are assisting several communities in building clinics, schools, and water supply systems. The overarching conservation goal of the projects is to create a network of marine protected areas in southwestern New Georgia.

In the late 1990s, community leaders in eastern Roviana began discussing the possibility of developing and implementing a resource management regime to arrest the continued decline of marine invertebrates. The Baraulu and Bulelavata communities joined together to address the issue of resource loss and discuss the various available avenues that could be taken to curb the overexploitation of marine invertebrates. Members of both communities agreed to the closure of two large mangrove and associated habitat areas — locally referred to Duduli and Rereghana (Fig. 2) — to shellfish gathering during the *odu rane* (daytime high-tide) season from September through May. The area was selected due to the anecdotal decrease in shell size and abundance, and high fishing pres-

sure due to site preferences and village proximities. The spatio-temporal closure mimics the community's traditional use of the resources: 1) the shellfish areas within Duduli and Rereghana are typically harvested less during the *odu rane* season, and 2) specific shellfish areas within these areas have been previously closed for extended periods in preparation for special community and religious events at which times ample supplies of food would be needed (although for much shorter periods). Since 1999 these two areas have been consecutively closed during the *odu rane* season. This form of preventive management (Johannes 1998) is a less intrusive regime that allows women continuing access during the most accessible times of the year. Note that other mangrove areas in which the same resources can be harvested remain open throughout the year. To evaluate the appropriateness of this management strategy in terms of its biological objectives and potential effects, we set out to design a participatory monitoring protocol. The objective of the monitoring research was two-fold: 1) to assess the effect of the temporal refugia on the two over-exploited mangrove-associated bivalve populations (*riki* and *deo*) by compar-

ing trends in abundance and size over time and between control and experiment sites, and 2) to foster community involvement in the project, especially by women and children. This has been accomplished through education on the monitoring methodology, direct participation in the monitoring, and participatory workshops. The ultimate goal is for the community to conduct their own monitoring.

Shellfish monitoring and associated biological results

The shellfish monitoring was conducted following two strategies: *in situ* (in the field) and *ex situ* (household surveys). Despite the difference in monitoring approaches, the data collected from these efforts is highly integrated and depends heavily upon community involvement. *In situ* monitoring was carried out in September 2000 (pre-closure), May (post-closure) and August (pre-closure) 2001, and May 2002 (post-closure). No baseline data was collected when the closure was put into effect in 1999, and the number of monitored sites fluctuated over time due to financial and community constraint. In September 2000,

eight sites were sampled (three experiment and one control site for *riki* and *deo*, respectively). In 2001, the number of sampled sites was increased to sixteen sites (four experiments and four control sites for *riki* and *deo*, respectively) in an attempt to yield more accurate scientific results. In 2002, however, only 14 of the 16 sites were monitored due to a local management decision (e.g. Koqu Piu was selected as a permanent closure and Koreke was closed in preparation for a religious festival, thus could no longer be used as a control site) (Table 1). The selections of experiment and control sites were based on women's knowledge of principal shellfish harvesting locations. Employing indigenous ecological knowledge, therefore, was crucial for selecting the sites in which to conduct our scientific monitoring.

Data collection

A rotating team of six to ten Roviana women, and on occasion men and school children, conducted the *in situ* monitoring. At each site, the range of suitable shellfish habitat was monitored, with the starting point selected at random. Transects for *riki* were run every 20 feet in the water at the mangrove-estuarine interface and samples were collected every 10 feet using a 0.25 m² quadrant (Fig. 3). Women customarily collect *riki* by wading in the water and digging their feet and hands into the muddy substrate. This method was used to collect the shells during sampling. Transects for *deo* were laid every 40 feet and samples were taken every 20 feet using a 1 m² quadrant. Women collect *deo* on land in the mangrove forests adjacent to the lagoon water and *deo* is gleaned by spotting the shell in the mud and then removed by digging (Fig. 4). This method was also used to sample *deo*. All shells were counted and sorted by size class (Fig. 5). Size was measured using a standard based on the size range of shells harvested in the lagoon and on other research regarding size correlation to reproductive maturity and fecundity (e.g. Broom 1985) (Table 2). The total number of shells and their per-site number per m² quadrant was tallied and entered into Excel spreadsheets.

Ex situ monitoring of household harvest yields was conducted at a time when Duduli and Rereghana were open to harvest. Five women were trained to instruct all village households in how to record catch data onto a standardized form during May 2001. The following were recorded: harvest sites, number of shells gathered sorted by species and

Table 1. Monitored sites in the experiment and control areas.

Areas monitored within closed area (experiment sites)		Areas monitored within open area (control sites)	
<i>riki</i>	<i>deo</i>	<i>riki</i>	<i>deo</i>
Koqu Piu	Koqu Piu	Miho Rereke	Miho Rereke
Duvulani	Duvulani	Kopo I	Kopo I
Koqu Kanada	Koqu Kanada	Kopo II	Kopo II
Duduli	Duduli	Koreke	Koreke



Figure 3. Baraulu women monitoring *riki*.



Figure 4. Baraulu women monitoring *deo*.



Figure 5. Baraulu women measuring shells using size classes.

Table 2. Size class measurements for *deo* and *riki* in centimeters.

	Size class			
	1	2	3	4
<i>riki</i>	0–2.9	3.0–4.4	4.5–5.9	≥ 6.0
<i>deo</i>	0–5.9	6.0–7.9	8.0–9.9	≥ 10.0

size, number of gleaners per trip, and number of hours spent foraging. The data was entered into Excel spreadsheets, and the average household harvest catch per bout were calculated. The purpose was to quantify daily household harvests and to document variation in catches during the open season, as well as to better understand the fishing behavior of women (i.e. the choice locations, hours employed per trip, and the trip’s purpose). Simultaneously, specialized indigenous ecological knowledge regarding the ecology of *riki* and *deo* were documented.

Biological results

Shellfish abundance was compared by time (pre-closure 2000 through post-closure 2002) and treatment (experiment and control) using the statistical package JUMP. Post-test comparisons were performed using a least square means difference Tukey’s honestly significant difference (HSD) test, which compares all possible pairs of means to predict where the significant differences occur. Two significant results are that: 1) there is a statistical difference in abundance of *riki* and *deo* in the experiment sites over time, with no statistical difference at the control sites; and 2) there is a statistical difference in abundance of *riki* and *deo* between treatments, most notably during post-closure 2002 for both species, and post-closure 2001 for *riki* (Figs. 6 and 7). A less significant difference between experiment and control sites prior to the 2002 open season for *deo* (Fig. 7) could have resulted from poaching. Readers interested in complete results and a full discussion of the biological findings

may refer to Aswani and Weiant (n.d.). Results from the *ex situ* monitoring reveal that the mean number of *riki* and *deo* harvested per household in one fishing event during the first month of the open period were similar, with slightly more shells harvested in 2001 (Table 3). In both years, size class 2 contributed most signifi-

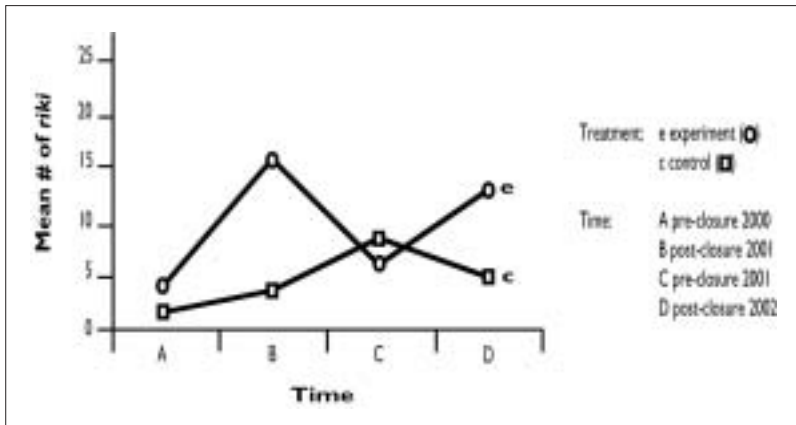


Figure 6. Abundance of *riki* per m² quadrant by treatment and time.

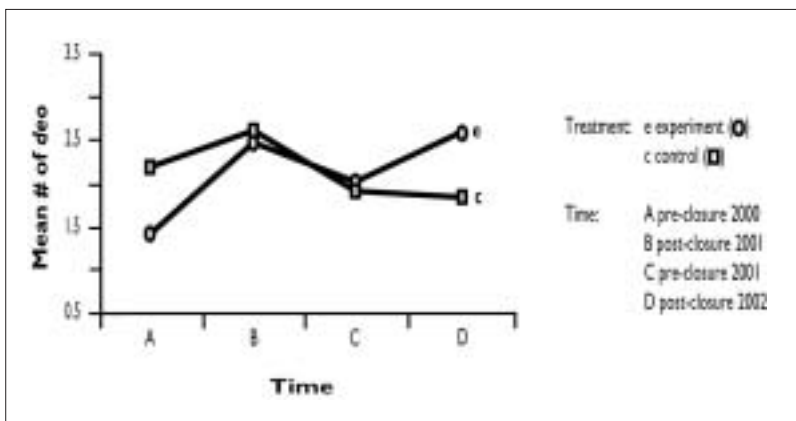


Figure 7. Abundance of *deo* per m² quadrant by treatment and time.

Table 3. Average number of *riki* and *deo* harvested per harvesting event per household during the first month of the “open” season in 2001 and 2002.

Species	Year	No. of divers	Hours per bout	Size class 1	Size class 2	Size class 3	Size class 4	Total # of shell
<i>riki</i>	2001	1	2.4	15	155	104	6	281
	2002	2	2.6	54	95	61	14	225
<i>deo</i>	2001	1	2.6	39	89	36	7	171
	2002	1	1.9	45	66	46	9	167

cantly to the catch, followed by size class 3. In 2002, the contribution to total catch from size classes 1 and 4 increased, suggesting time to grow to the next size class (with the largest size class being the most fecund) (Broom 1985).

Project structure and community participation

The increase in abundance of shellfish stocks is a significant finding, but this project's most important contributions come from its investigations of the economic and social needs of women rather than just men. The women are actively engaged in both designing and monitoring the conservation strategy. We find that this high level of their participation is having a positive impact on management decisions, and is encouraging the women to adopt sustainable harvesting practices. The women have assumed an active role, and have created an appropriate, effective, and equitable reserve design for the conservation of marine resources. This cooperation has been triggered by the growing perception among local people that shell beds have recovered rapidly, and scientific evaluation has helped to reinforce this belief.

The women have been willing to accept restriction rarely implemented in other marine conservation projects. Local communities often opt for closing fishing areas that are either less productive or more difficult to access. Baraulu and Bulelevata women, by contrast, have chosen to close areas that are of primary importance for shellfish collection. Moreover, the women have decided to permanently close a key area for harvesting *riki* within the Duduli/Rereghana closure as a result of the preliminary positive assessment of the closures. This area, called Koqu Piu, is commonly referred to as the *riki* "hospital" by the community because it is locally considered to be a source population. In September of 2002, this permanent "no-take" zone was extended to cover a larger area (see Zone 1 in Fig. 2).

Although the current trend in marine protected areas is to ensure community involvement during all the critical phases of the reserve design process (e.g. planning, establishing and enforcement) (e.g. Salm and Clark 2000; Bunce et al. 2000), few case studies demonstrate how to achieve this goal, and even fewer acknowledge the obstacles encountered that may hinder success. Here we focus on three interrelated factors that have contributed to the community's support and the project's initial success: 1) the project's time-frame; 2) the participatory design of the conservation strategy; and 3)

the direct involvement by the women in the monitoring strategy.

Project's time frame

Two aspects of time contribute to the success of the conservation strategy: the amount of time the project leader has spent in the region and the long-term duration of the project. The project leader (Aswani) has over 11 years of experience working with this community and continues to reside in the area several months per year. Due to his long-term presence, the community trusts that the project is not a fly-by-night operation. Further, the project leader understands the community's social mores, customs, ways of living, resource concerns, and needs, and thus is able to present management options that are locally appropriate. In addition, the field research assistant leading the monitoring component of the project (Pam Weiant) has spent two full field seasons working with the community to ensure that women were sufficiently trained in the monitoring protocol. Since time constraints are an issue for almost any project that entails monitoring and community assistance, a substantial amount of time during the first field season was dedicated to properly training the community by holding workshops and preparing an efficient and workable monitoring schedule. In the future, the community is expected to monitor the shellfish beds on their own, although the project leader will continue to assist the community if needed. We realize that most projects are constrained by time and financial restraints. The value of time, however, should not be trivialized, as long-term projects are more likely to assure a community's commitment and, therefore, to succeed.

Design of the conservation strategy

The conservation strategy, which includes spatio-temporal and permanent closures, corresponds with the women's traditional use and management of the marine resources in this area. It also integrates an adaptable sea tenure regime with a resource management and development plan (see Aswani 1999, 2000, 2002). Despite a tangential association during the early planning of the project, an expatriate consultant hired by WWF-Solomon Islands, criticized the closure schedule and argued that the project was subsidizing women with a financial incentive (i.e. a sewing project) for continuing a practice that they have traditionally done for centuries, the periodic closing of shellfish beds (Foale 2001).³ However, we do not perceive the project's harnessing of local forms of

3. In fact, Foale's criticism is based on a single two-day field trip to the area during the project's initial stages.

sea tenure and management to be a weakness, but a tremendous strength, and the management regime's foundation. The plan builds upon a practice that the community is familiar with, and therefore, they can better grasp its biological value and understand the use restrictions it requires. The strategy is also practical in that it fits the geographical seascape. For example, policing restrictions on catch size and shell size is a problem due to the extent of the lagoon area, but spotting poachers entering and exiting the closures is not difficult. The project also reinvigorates a management strategy that had previously been implemented on an ad-hoc basis. Because this is a community driven project, we believe that this strategy will result in the long-term management of the area with long-lasting positive conservation results. In sum, the project's preliminary success in terms of improved shellfish biomass, enhanced local environmental awareness, and the reinvigoration of cultural management practices has resulted from a realistic management strategy — one that invokes strong community support and adherence, and has paved the way for the establishment of more strict conservation tools (i.e. no take areas).

Women's direct involvement in monitoring

The monitoring protocol was established to enable all women to participate in the field monitoring, the household harvest recording, the expert workshops, and in field logistics. Village women who were physically able to gather shellfish (which excludes women with small children, those pregnant or nursing, and the elderly) were divided into four groups of approximately 30 women. Each group was assigned to one day each week on which a minimum of six and a maximum of 10 women were asked to volunteer for the monitoring, and two women were asked to prepare lunch for the team. A leader and an alternate leader were nominated within each group to organize and oversee the monitoring procedure. We attempted, as best as possible, to coordinate the monitoring effort with the women's other domestic and community duties in mind. For instance, we did not monitor on Fridays (women's local market day), Saturdays (fishing day), and Sundays (church day). Given the size of each group, the women could select a week to monitor that best fitted their household responsibilities and community commitments. To bolster enthusiasm, various foodstuffs were provided to women during the monitoring, and a meal was shared upon return to the village. The women repeatedly voiced satisfaction with their participation in the monitoring, and also enjoyed the camaraderie. As is common in so many areas of the Pacific, their enthusiasm was given its most public voice during village feasts.

From the onset, women were aware of the declining shellfish stock and recognized to some degree the potential impact the project would have for their community, especially for their children. After the first year of the closure, however, the willingness of the women to engage in the project was enhanced due to: 1) their involvement in the monitoring, 2) the circulation of scientific results showing the closure's benefits, and 3) their perception that the shellfish were once again easier to find after the area was re-opened. Despite these achievements, we have encountered a number of obstacles, and our management strategy has had to be adaptive enough to work necessary modifications into the management prescription. When an issue arises, expert workshops and group consultations are arranged to discuss possible solutions, such as how to increase adherence to the fishing restriction and prevent poaching, or how to increase the effectiveness of the temporal closure. In what follows we summarize some of the problems encountered.

First, despite the long field seasons and the women's dedication, our team was often limited by the short amount of time available for monitoring. Solomon Islanders have multiple social obligations that sometime preclude them from full dedication to a particular activity. For instance, the group leaders often had difficulty in assembling their groups, which delayed departure and prevented completion of the monitoring planned for that day. This of course increased the number of days required to complete the job. Such relatively minor setbacks in the monitoring schedule were compounded with other delays caused by heavy rains and community obligations (in particular, a death in the village means all work is suspended for four to five days). We also found that community involvement and enthusiasm wanes and waxes over time, with a significant slowing of momentum following unplanned pauses in the monitoring schedule. The point is that a project leader must be cognizant of these types of logistical problems when designing a project that entails a high level of community involvement, and must structure deadlines appropriately.

A second problem, from the start of the project, has been the trade-off between a temporal closure versus other management strategies (such as a "no-take" zones and size and catch restrictions) was recognized. The advantage of the temporal closure, as discussed above, is that the design formalizes an aspect of traditional fishing practices, and thus the community already understands the strategy, the guidelines, and the restrictions. During the "open" harvest season, however, there are no limits on the take and this results in a free-for-all use of

resources. The lack of harvest restrictions may hinder the long-term effectiveness of the closure by potentially offsetting any increase in shellfish abundance that occurs when the area is closed. If we compare time-period B (monitoring that occurred after the eight month of closure) and time-period C (monitoring that occurred after the four months of harvest) in Figures 6 and 7, we see that there is a decline in shellfish abundance. The effect of the open-access regime during the open season has been recognized by the community, and we are discussing the possibility of setting size and bag limits, although this has not yet gone into effect.

A third problem is poaching. During the closed period of 2002 a small group of women poached in some areas where *deo* is found. The preference to poach for *deo* rather than *riki* is linked directly to the market — *deo* is easier to poach (women can stay dry and can hide from passing boats within the mangroves) and the shells are larger, hence fewer are needed to fill a palm basket to sell at the market. In August of 2002, by-laws were written by the Baraulu Resource Management Committee (RMC), which detail the repercussions of failing to adhere to the seasonal closure guidelines. This informal step also has been sanctioned by the leader of the local Christian Fellowship Church (the “spiritual authority”), which gives the project tremendous legitimacy. Long-term legislative enforcement of management initiatives to manage *riki* and *deo*, and other species, will be achieved through the Western Province “Customary Land Resource Management Orders” statute. We have begun the formal process of codifying this and other management initiatives that are being designed to protect important habitats and species (see Aswani and Hamilton, in press).

Last, although we would like to expand the number of sites currently being monitored, it seems improbable given the time and financial constraints involved. The monitoring of the 16 existing sites already takes approximately a month (due to non-working days and weather conditions), two times a year (pre- and post-closure). We do not think that we could ask the women to spend more time monitoring, and when the monitoring drags on for too long community involvement tends to diminish. The bottom line is that, realistically, monitoring can only be conducted for several weeks once a year or every few years.

The community has established other areas as permanent closures, such as Koqu Piu (and extension to cover neighboring waters), and we believe these are good decisions. Preliminary findings reveal that after 18 months of being closed, the abundance of *riki* at Koqu Piu had increased significantly. While the adjacent mangrove is also closed for

gleaning *deo*, the area is not considered prime *deo* habitat. Thus, the community is considering if it should establish a permanently closed area for *deo* as well. While ideally they would select no-take areas that encompass source and sink populations, no scientific evidence is available to indicate where these areas are, or even to test the local wisdom regarding where they are. To make management decisions, therefore, we have had to rely on a preventive-management strategy that integrates indigenous and marine science knowledge.

Lessons learned

- While the strategy negotiated with the women of Baraulu has increased the level of participation and dedication to the project, the community still seeks financial assistance to motivate and manage the monitoring, as well as direction in modifying the management strategy. It is unrealistic to expect a CBMPA to succeed with only short-term expert guidance and financial support. Nevertheless, continued environmental educational campaigns are of key importance if we are to move beyond the economic dependency created by financial incentives as a central component of conservation projects.
- Many projects are criticized for their dependence on outside assistance. However, outside help is important for two reasons. First, communities may have good intentions to establish a conservation project, but generally lack the finances and expertise to do so. A project can be expensive and it is naïve to think that a community can support it. Second, national and provincial governments have had little interest in assisting rural communities to manage their marine resources. Marine resources that villages depend upon for subsistence are declining due to population growth and fishery commercialization. The long-term implications of this project are already visible, as other nearby communities are seeking to launch similar conservation efforts in their tenured seas. Without these small-scale CBMPAs, there would be no effective marine-protection strategies in this region.
- The ultimate long-term success of the project depends upon a positive feedback loop between a strong level of community involvement and positive scientific results. In the Roviana case, positive scientific findings have facilitated and secured community support for the project. The project leader’s long-term commitment to the region will assure continued monitoring and assistance after the project is considered “complete”.
- Children must be involved in the conservation strategy. In our project, children were able to accompany women during monitoring and

assist with the *ex situ* counting the household harvests (when they are most enthusiastic about sorting and counting the shells). Through conversations with the researchers, children learn about the purpose of the project, about how their marine resource fit into the larger global picture of marine conservation, and about the value of their resources.

A number of environmental and socioeconomic challenges remain to be addressed before the future of this conservation and development project can be assured. We believe that it is important to assess the early effects of the Duduli/Rereghana closure on the abundance of *riki* and *deo* to determine if the project is a success from a biological perspective, but the results from monitoring need to be widely disseminated to increase community support for the project and to provide the community with the information to formulate additional management policies. This integrated approach should contribute to the project's long-term success.

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Caribbean students team with Fiji to protect reef

Source: Pacific Islands Report, 31 January 2003

A group from Seacology and Grand Cayman High School in the Caribbean has pledged to establish a kindergarten in Fiji in exchange for approval to establish a 17 square mile marine reserve.

Seacology, a nonprofit organization set up to preserve the environment, says the special partnership between the Caribbean and the South Pacific is a milestone.

Seacology promotes projects where islanders receive a critically needed benefit they request in return for making an important sacrifice on behalf of the environment.

The remote Fijian village of Naikorokoro, on the historic island of Ovalau, has been selected as the recipient. In exchange, the village has agreed to establish a no-fishing reserve on a 17 square mile portion of their ancestral fishing area, enabling the coral reefs and marine life to be replenished.

Based on the nature of this innovative project, John Gray Recyclers, an environmental club based at John Gray High School on Grand Cayman Island, volunteered to raise funds for the project.

The students have dedicated themselves to promoting recycling in the Cayman Islands and helping to keep the islands beautiful.

The club has worked to help protect the Cayman Islands' coral reefs, considered to be among the most pristine in the Caribbean, as well as the islands' beaches and wildlife. The club has announced a donation of USD 1600.

Seacology Executive Director Duane Silverstein says he is thrilled to have John Gray Recyclers support Seacology efforts to build a kindergarten in the remote village of Naikorokoro.

"The fact that young people in the Cayman Islands, which are known far and wide for their beautiful and threatened coral reefs, are raising funds to preserve the coral reefs of a village halfway around the world is remarkable," said Silverstein.

Christine Whitehead, faculty coordinator of John Gray Recyclers, says, this is a unique project that covers all areas of the curriculum and will also enrich the lives of the club's members.

"The John Gray Recyclers are planning to make a visit to Naikorokoro Village for the opening of the kindergarten. It will be an unforgettable experience and we would like to thank Seacology for their insight and understanding in involving us with this project," said Whitehead.

Jeremy Forbes, the 18-year-old president of John Gray Recyclers, says the club decided to donate the money they won from the Commonwealth Youth Services Award to Seacology's Fiji program.

"Because we thought that in this way we could reach out and help people who would not normally have the means to protect their coral reefs.

We can hardly believe that we are now making an active international contribution to coral reef protection," said Forbes.

Tiny Mejatto first in Marshalls with fisheries plan

Source: Pacific Islands Report, 14 January 2003

In the face of depleted marine resources and increased pollution, the Marshall Islands Marine Resources Authority is pushing for local management and enforcement of fisheries throughout this central Pacific nation.

Earlier this month, the remote outer island community of Rongelap Islanders, living on tiny Mejatto Island on Kwajalein Atoll, became the first to adopt a community-based fisheries management plan, and fisheries official Terry Keju says

that four more atolls will follow shortly with their own plans.

Over the past year, Marshall Islands Marine Resources Authority staff have worked with traditional, elected and community leaders, as well as meeting with men's, women's and youth groups on Mejatto Island to hammer out a plan of action to protect fisheries resources on this distant island. A Fisheries Management Advisory Committee was created that includes elected leaders, men, women

and youth to oversee enforcement of the new plan. This group helped to design the plan and is set up to enforce it, said Keju, who is heading the national government's effort to get local communities deciding their own fisheries' plans.

The Mejatto community's fisheries assessment said that:

- there's too much rubbish on the beach and in the lagoon, which makes the area ugly and pollutes marine habitats;
- unregulated fishing by local fishermen of small fish and shellfish is wiping out supplies;
- the use of chemicals, including Clorox, to catch fish destroys corals and kills many small fish.

The Mejatto community agreed to establish marine protected areas around the island, using customary conservation practices, and has asked the govern-

ment's fisheries program to restock the lagoon with important shellfish.

Keju said now that Mejatto is done, the atolls of Likiep, Arno, Majuro and Jaluit will develop similar community-based fisheries plans. The fisheries office is initialling targeting atolls that have Japanese-funded fish bases for management plans, Keju said.

While the fisheries office's community-based program follows the same format, "each community has different needs and problems," Keju said. "The plan depends on the particular issues in each community."

Keju said there are four Majuro-based agencies whose cooperation is key to successfully implementing community-based fisheries programs.

Clams make a comeback through community-based management

Source: World Resources Institute (http://ideas.wri.org/success_stories.cfm?ContentID=20)

For the Verata people of rural Viti Levu Island in Fiji, the *Anadara antiquata* clam is a symbol of cultural identity. But in recent years, the *Anadara* clam has experienced a precipitous decline in population due to overfishing, coastal development, and urban runoff.

In collaboration with partners at the University of the South Pacific, World Resource's Institute's Global Marine Strategy team is working with the Verata people to study the effects of a temporary ban on fishing and harvesting of the clam and other marine resources.

This provisional marine protected area, declared through traditional practices, has experienced remarkable success. Using newly gained skills in scientific measurement and data collection, community members reported an 800 per cent increase in clam population. Such encouraging results demonstrate that, with minimal outside support, local communities can employ temporary marine reserves to improve their resource base, even in conjunction with formal protected area initiatives.

Mussel muscle

M. Muralikrishna and Yumi Onishi

Source: Samudra, November 2002

Beyond the palm trees and shining waters of the enchantingly beautiful backwaters of Kerala, India, some community initiatives towards estuarine resource management are taking place that deserve attention. A specific example is located in the Ashtamudi estuary in Kollam district, the second largest estuarine system in the state.

Historically, the town of Kollam flourished as a centre of trade with China, and later with the Dutch and the Portuguese. The renowned traveller Marco Polo set foot on Kollam during his journeys, when black pepper was one of the most sought-after merchandise there.

The landscape surrounding Ashtamudi has changed little since the time of Marco Polo. Everywhere one looks, deep green palm trees stand still. On the edge of the estuary, palm trees hang over, as if watching their reflections on the calm water.

The region's prosperity derives from trade-related activities, and the most prominent economic activities in and around Ashtamudi estuary today are fishing and coir manufacturing. Although fishing has been the traditional occupation of the inhabitants of the region from time immemorial, Ashtamudi's vibrant fishing practice entered the estuary in the 1950s and early 1960s, when fishing turned into a localized industry of artisanal fishermen using traditional craft and gear. By the late 1960s, the international demand for prawns opened up a possibility for commercial fishing in the region. The construction of the Neendakara fishing harbour led to the flourishing of commercial fishing activities in the region. Norwegian aid not only contributed to the development of fishing craft, but also to the mechanization of fishing craft, which created an apparent economic class difference among the communities.

The inland fisheries in Ashtamudi estuary include both capture and culture fisheries. For capture fishing practices, stake net (locally called *kutivala*), Chinese net (*cheena vala*), gill net (*vysali vala*), cast net (*veesu vala*), drift net (*ozhukku vala*) and trawl net (*koru vala*) are used. Although the fishing industry supports the livelihood of the majority of people in this region, the inland fisheries remain at the subsistence level. The decrease in per capita catch is also evident partly due to the increasing number of fisherfolk in the region. Consequently, the fishing industry in Ashtamudi estuary is no longer on the rise. Rather, it is on the decline due to inadequate management of the estuary. Moreover, despite the fact that the estuary supports a lucrative fishery, no effort has been made so far to assess the exploited fishery resources.

In this market-driven resource milieu, Ashtamudi estuary has a few examples of community initiatives in managing inland fisheries resource. Though often overlooked, the initiatives are certainly worth studying for their distinctive practices.

People's plan

Nurturing fish by marking off a protected area within the estuary is a community initiative, a first of its kind in inland fisheries in Kerala. Fisherfolk have recognized the importance of allowing fish to grow and, thus, have set aside a "fishing prohibited" zone in the estuary. Motivated by the Kerala

State's Peoples' Planning Campaign, one hectare of estuary was fenced off and declared as a no-fishing area, with the financial support of INR 100,000 from the Chavara block *panchayat* (local governing body) and the technical support of the Brackish Water Fish Farmers Development Agency. (As part of the decentralizing Peoples Planning Campaign, a three-tier administrative structure exists in the State, comprising district *panchayats*, block *panchayats* and *grama panchayats*.)

They created artificial reefs with tree branches and concrete slabs. The fisherfolk of four *grama panchayats* — Chavara, Thekkumbhagam, Thevelakara and Neendakara — are benefiting from this bioreserve. The catch has tremendously increased, especially of pearl spot (*Etroplus suratensis*), locally known as *karimeen*, a delicacy in Kerala cuisine.

Collection of mussels for their meat is recent, compared with other inland fishing activities in Ashtamudi estuary, and is only a generation old, though shell collection for lime is an ancient practice. The shell collectors used to consume the mussel flesh sometimes, if the mussels were caught live, but only marginally. However, with the increased demand in the export market for mussel meat, a small group started collecting the live shells, which are abundant in some selected pockets in the estuary. The participation of family and community in the mussel collection makes the practice unique and noteworthy.

There are about 1000 families at Dalawapuram village in Thekkumbhagam involved in harvesting the rich mussel bed of the region. The nature of the resource necessitates a proper regulation of who catches where. This has been well observed by the community, even though there is pressure from the market for more mussels.

Each household has demarcated its fishing ground in the estuary by placing tree branches in the water about 20 to 50 m away from the land border of their houses. The males in the family collect shells manually, standing chest-deep in the water, and using a small handnet. Shells are collected in the morning, when there is an ebb tide and the water column is low. By noon, the collected shells are taken home, adjacent to the fishing ground. The female members and the children of the family sort the shells, returning the young mussels to the estuary to grow. In other parts of the estuary, some people exploit the mussels for cattle and duck feed, irrespective of their maturity.

The fishermen receive an average of 150–200 rupee each day; however, the catch is available only for a third of the year. During the breeding period, the

community has to frequently cope with the death of mussels due to the high nitrate content in the water. The community claims that this is caused by the runoff of fertilizers and pesticides heavily used in the upland regions.

There is no organized society in the mussel collecting community that facilitates the collection of the meat for the export market, and so, a few agents who act as middlemen reap the profits. They collect the mussel meat from each household and transport them to the export businesses, based mostly near the Neendakara fishing harbour, 6 km from the village.

Scientific studies have indicated that the breeding period of the mussels is during November to February, and the state government has imposed a ban on shell collection during that period. In reality, the actual breeding period is never fixed, but depends on tide character and weather variables, and may sometimes prolong for another month or so. The community is very aware of this, and observes a consensus not to collect shells during that time, in addition to observing the government restriction.

Nonetheless, such community initiatives are not free of the profit motive. In the case of the inland fishery, influential fishermen in the area have piled up tree branches close to the fenced-off area. Fish aggregating devices prevent fish from moving to other parts of the estuary. As a result, they make a large catch, while denying other fishermen their catch. To an extent, it can be said that these fishermen have privatized the fishing ground, while other marginalized fishermen suffer from low catches. Moreover, those fishermen who use fish aggregating devices outside the fenced-off area also catch juvenile fish, which affects future catches.

A collective community-level effort of this kind is important in managing resources for sustainable fisheries. Given the scenario of dwindling mangrove vegetation, which traditionally functioned as natural bioreserves, more initiatives are needed to develop bioreserves in the estuaries and backwaters of Kerala.

Community initiatives of this kind lend hope for the sustainable management of inland fishery resources.

Small fishers' views on coastal management and what they mean to national policy

Source: Over Seas, August 2002

In 2000, the Coastal Resource Management Project of the Department of Environment and Natural Resources funded by the United States Agency for International Development, contracted a private research firm, Trends MBL, Inc. to conduct a quantitative knowledge, attitude, and practices (KAP) survey to benchmark current levels of knowledge and concerns of small fishers in the Philippines regarding coastal issues, attitudes and practices. The survey is significant in that it is the first ever attempt to measure, using accepted survey methodologies, the current level of public knowledge on coastal issues, and gauge people's attitudes and practices as they relate to coastal resource management. This article provides a summary of the survey results, and identifies some important issues for government policy to consider in addressing the concerns of small-scale fishers.

Profile of respondents

Respondents were 700 males, all regarded as heads of households, whose primary livelihood is small-

scale fishing. The survey was conducted in 16 provinces: Bohol, Cebu (Olango Island), Negros Oriental, Palawan, Davao del Sur, Sarangani, Quezon, Albay, Aklan, Negros Oriental, Leyte, Misamis Oriental, Davao del Norte, Davao Oriental, Lanao del Norte, and Zamboanga del Sur. Eighty-nine per cent of respondents were married and had been residing in their locality for more than 10 years; about 46%, however, were not born in their present town of residence.

All respondents were at least 20 years old, with more than half (58%) belonging to the 20–44 age bracket. Eighty-nine per cent have not completed high school and 47% have either no schooling or finished only some elementary education. The average household size is 5.5 persons. Sixty-seven per cent do not own or rent a residential lot, but 95% own the house they live in. Their houses are typically one-room, poorly constructed structures made of light and cheap materials. Sixty-three per cent of respondents use non-motorized boats. The top three family expenditures are food (93%), fish-

ing-related supplies and goods (60%), and housing (42%).

Summary of survey results

Food security, poverty are the primary issues

In general, the respondents' views reflected their difficult economic situation. When asked to name their three most urgent personal concerns, 74% of respondents answered "having enough to eat everyday", 64% said "health of family members", and 62% "to provide schooling for my children". Expectedly, "decrease in fish catch" and poverty — cited by 67% and 55% of respondents, respectively — were seen as the top two most pressing problems in the community.

The problems are recognized, but not adequately understood

Respondents demonstrated a fairly high level of knowledge of the coastal ecosystem, although many had some misconceptions about fisheries and coral biology. For example, 89% correctly stated that grouper live in crevices of coral reefs, but only a few (10%) correctly agreed that these fish mature slowly and must reach a body weight of more than 1 kg before they can breed. Eighty-three per cent recognized the importance of mangrove detritus in the food web of invertebrates and fish, but only 42% believed mangroves help prevent land erosion. And 70% said corals are rocks, with only 6% correctly describing corals as animals.

Moreover, while more than 90% of respondents agreed that throwing waste in rivers and the sea, cutting trees in the forests, and industrial pollution pose very great or great danger to coastal resources, just over 50% considered overfishing as a very great or great danger to coastal resources.

Problems can be solved, and fishers accept the solutions

Answers to questions related to coastal management issues and solutions are encouraging, with respondents demonstrating a high level of awareness of the problems and what needs to be done to address them — between 64% and 97% said they strongly agree or agree with knowledge statements on different aspects of coastal resource management. More reassuringly, respondents expressed strong support for local government initiatives in coastal resource management. More than 70% said they would support or strongly support totally banning the use of compressors for fishing, banning commercial fishing in municipal waters, imposing heavier penalties for illegal fishers, and establishing

marine sanctuaries to rehabilitate fisheries and coral reefs. Moreover, some 50% said they would support limits to the amount of fish they could catch.

To the small fisher, government means the local government unit

Among possible sources of assistance for specific coastal resource management concerns, the *barangay captain* (village chief) and the mayor, in that order, appear to be the most accessible to respondents. Respondents said the *barangay captain*, in particular, is the person they are most likely to approach about various coastal resource management concerns ranging from illegal fishing to training in coastal management. However, the majority (63%) regarded the mayor as the most influential person in their municipality.

National policy considerations to address fisherfolk concerns

- Food security, as the number one most urgent personal concern identified by small fishers, can only be addressed by strict implementation of national and local laws, adopting sustainable methods of fishing, restricting access to fishery resources, restricting use of fishing gear and practices, such as *payaos* (fish-aggregating devices), bottom-setting gill nets, and other methods that promote overexploitation of fisheries resources, protecting coastal habitats, and adopting strategies to rehabilitate coastal habitats and fisheries.
- Overfishing is widespread and the impacts clearly articulated by small fishers as increased effort required to catch fish, smaller fish caught, and poorer quality of fish and must be viewed by national government as a crisis with non-nonsense policies to alleviate overexploitation of fishery resources while protecting the rights of sustenance and marginal fisherman.
- Most small fishers prefer or insist on fishing as their primary livelihood, therefore, national government programs should carefully identify the smaller percentage of individuals interested in or accepting of alternative livelihood programs.
- Small fishers support local government initiatives in coastal resource management in contrast to commonly held perceptions of Local Chief Executives that coastal resource management is politically unpopular.
- Local government, in particular, municipalities, is the most important level of government with which to address small fishers' concerns and must continue to be the focus of national policies and plans that are designed to assist coastal municipalities deliver coastal resource management as a basic service.

- Mayors and *barangay captains*, in particular, and other local government staff members must be targeted for continued capacity-building programs as they serve as the community's primary support system for all coastal resource management concerns.
- Awareness of coastal resource management issues among fisherfolk is fairly high. However, formal education in elementary and high

schools and local colleges and non-formal education in the coastal and marine environment are needed to expand community understanding of the basic concepts of fisheries biology, marine ecology, the relationship between environmental quality and fish catch, and root causes of coastal resource decline, in particular the role of population growth, habitat destruction, and overfishing.

Socioeconomics status of fishing communities

Coral harvesting and its impact on local fisheries in Fiji

Aliti Vunisea¹

Coral harvesting for the aquarium trade has become one of the major economic activities for many coastal villages on Viti Levu, Fiji. Rising village unemployment and increasing demand for cash have encouraged community participation in this activity, which is easily entered by villages, and offers potentially lucrative incomes. Villages have been involved in the trade for between two and nine years. The major challenge currently facing the Fijian government and fisheries officers and managers is the need to establish management and monitoring strategies that ensure the collection of and trade in coral is sustainable and does not adversely impact long-standing subsistence activities.

Communities, industry developers and resource managers all face a difficult task in balancing the need for access to new income opportunities while at the same time ensuring that the non-monetary values of natural resources that provide for subsistence livelihoods are also recognized. Given communities' limited access to other means of earning money, the coral trade provides them with an exceptional opportunity. Community involvement in the trade has allowed coastal communities to earn needed income and build basic amenities, and has provided some villages with much needed economic development. But in addition to the potential cash income from the coral trade, coral reefs also form the mainstay of subsistence livelihoods in most rural coastal communities. Many people

are concerned that extended periods of coral collection will result in the loss of and changes to reef ecosystems, habitats, and species, and in a lessening of villagers' knowledge and skills about reefs and reef organisms. The net result may be a reduction in long-term food security.

Over generations, coastal peoples have fine-tuned their fishing skills and knowledge relating to reefs and marine species within their fishing grounds. Women — who are regular fishers of the nearshore coastal area and reef flats — have a wealth of knowledge, fishing skills and lore that assists them in their fishing activities. In contrast to the specialized knowledge and techniques that reef fishing and gleaning requires, coral harvesting involves modern collection methods that require no special skills.

Any changes in either the condition or use of reef ecosystems will greatly impact on women, whose fishing activities are predominantly within the nearshore reef area. Women fish primarily for home consumption, therefore, food security at the household level largely depends on them. Threats to their fishing areas can affect basic food security and may result in the loss of what has, until now, remained a fallback option for rural coastal populations.

Currently, there are 10 companies involved in the aquarium industry in Fiji. Two of the companies,

1. Coastal Fisheries Management Officer, Secretariat of the Pacific Community, BP D5, 98848 Nouméa Cedex, New Caledonia. Email: AlitiV@spc.int

Seaking Trading and Aquarium Fish (Fiji Limited), have been operating since the start of the industry 15 years ago, while others have been operating for periods ranging from between two and nine years. These coral harvesting and aquarium fish collecting activities have concentrated in certain areas of Fiji, and there is concern about the impact of long-term extensive coral collecting within these fishing areas.²

Methods used to collect coral include the use of large iron bars to pry or break off coral pieces. Fish fences, scoop nets and an assortment of rods and chisels are used to catch fish and other marine organisms. Many local people harvesting these resources lack a basic biological understanding of coral reefs, or of the impact of their collecting and associated activities on the reefs, which include trampling over non-collecting areas, and dragging bamboo rafts to the dry shore areas.

Collecting and packing usually involves 20 to 30 men from each village. Money paid out to packers and collectors ranges from FJD 90 per week for packers to FJD 228 per collector per week in some areas. Approximate goodwill payments to fisheries custodians ranges from FJD 3000 per year for one company to FJD 28,000, for another, depending on the regularity and extent of collecting activities. Export earnings from the six companies involved in the trade has been estimated to be between FJD 250,000 per year and FJD 6,000,000 per year. Live coral, live fish and other marine products are primarily exported to North America (US and Canada), Europe (Germany, England, France, Belgium, and Denmark) and Asia (Hong Kong, Taiwan/ROC, and Singapore).

In 2002, the International Marine Alliance (IMA), an international NGO with an office in Fiji, was contracted by the Fiji government to conduct a study on the coral harvesting/aquarium fish collecting industry. The purpose of the study was to establish the importance of the industry to local communities and to determine implementing, monitoring and management strategies. The study was commissioned as a result of concerns raised by the government, NGOs, and various institutions and individuals regarding the long-term impact of the industry on coastal people's livelihoods. Some of the discussions and observations included below are initial responses to rapid village visits and interviews with village leaders, which the author conducted as part of the IMA visits to vil-

lages in Nadroga District (currently a major coral harvesting area).

During some village visits the general perception was "this was a unique opportunity to earn income". Among the factors that encouraged involvement in the trade were: fish scarcity; the lack of a market to sell seafood; lack of access to good agricultural land; lack of formal and informal employment opportunities; and transportation and other associated problems that complicated marketing of local products. During discussions, some young men stated that coral harvesting (which involves instant payment of money by the company for coral collected) was more profitable than sitting at the local market all day trying to sell coconuts (previously one of the major economic activities pursued).

Companies offer short training stints in coral harvesting, instructing collectors in the identification of desirable species and in good collection practices and methods, which ensure minimal damage. During harvesting men divide themselves into three groups, so at any one time there are three teams at a harvest site. Coral harvesting works as follows: harvesters (*tuki*) identify and break off coral. The next team comes along and places the coral pieces onto bamboo rafts. This is usually done at the turn of the tide. The third team cleans the coral and separates out the undesirable pieces. The coral pieces are then stacked in large buckets, which are later collected by the company for immediate transportation to the factory, where the coral is weighed and paid for. For coastal people who have been fishers all their lives, these are easy tasks, requiring at most a half-day of work several days a week to earn a substantial amount of money. Harvesting depends on demand from the buyers, however.

Both harvesting and the distribution of money are community-organised in nearly all instances. Companies have a contact person in the village who liaises between the village and the company. This is usually a village elder or one of the *qoliqoli* owners (fishing rights owners). The companies approach the *qoliqoli* owners directly and negotiate with them. In some of the villages visited, the decision to allow coral harvest in their *qoliqoli* was based on communal financial demands, and the lack of employment and alternative ways for people to earn money.

2. Most of the activities of Seaking Trading and Aquarium Fish have been in the Beqa reef area and Ra Province. Ocean 2000, Acropora International Limited and Waterlife Exporters have operated for at least seven years with most of their activities concentrated in the provinces of Tailevu and Rewa. Ocean 2000 has also operated within Nadroga Province. Walt Smith International, which has been operating for four years, has worked mainly with communities in Nadroga Province.

Traditional and religious obligations place heavy demands on rural people. Fijians' traditional obligations and customary rituals at times require substantial amounts of money from individuals. The Methodist church (which is the dominant church in most of these areas) has special levies on communities, which amount to thousands of dollars a year. The levy depends on the village population; for Sanasana, in Nadroga, for example (which has a large population), the annual levy is more than FJD 10,000.00. This financial demand on the community, plus the need for village development, encourages rural coastal communities to engage in trades or fishing activities that promise quick monetary returns. Immediate and clearly evident financial benefits can influence the willingness of a community to participate in the industry.

Once the coral has been delivered and paid for there is a meeting for the distribution of money within the village. In most cases an agreed distribution criterion is used. In Sanasana village, for example, the liaison man (who owns the harvesting license that is being used by the community and is responsible for all outside dealings relating to the village's coral harvesting activities) receives 25 per cent of all earnings. Ten per cent of the money is allocated for *vanua* or communal obligations, while another 10 per cent is allocated for religious obligations. The rest is then shared amongst the working team, with the team identifying and breaking coral getting a slightly larger share than the other two teams. The distribution method is well known and accepted by those involved.

There have been instances of dissatisfaction in which people were not happy with their allocation. In one of the villages along the Nadroga coast the conflict affected the entire community, and involvement in the trade was temporarily halted as a result. In this instance the chief or owner of the *qoliqoli* was receiving a very large portion of the money earned and collectors were not receiving sufficient reward for their efforts. In such cases, communities typically solve their differences through village meetings, or otherwise come to a consensus.

Also obvious through discussions with people at the community-level was their very limited understanding of the biology of coastal ecosystems, and of the impact that removing coral has. People did not see any reason for concern regarding the abundance or distribution of marine resources within these areas. Villagers' perceptions and attitudes included the following:

- Collectors maintained that regrowth of coral to a former state occurred within a period of three

months, and that coral reefs were in better condition following harvesting activities.

- When they were questioned about resource sustainability, community members commonly suggested declaring reef "no take zones" as a measure to regenerate reefs after harvesting. Feasibility studies on the appropriateness of areas declared "no take zones" was almost nil; instead, communities simply put such zones into place themselves. There was thus a sense of self-assurance that even though coral harvesting took place at a significant rate, communities were taking effective action by putting some areas aside for regeneration. The willingness to declare "no take zones" could be exploited for management purposes.
- In some instances people believed that harvesting conducted "far away from the village" would not impact village fisheries; they did not appear to consider interdependence of different reef areas, or migratory movements of fish.

Communities supported the activities of companies involved in the coral trade, and appeared more willing to work with them than with the Fisheries Department or with "outsiders". This is thought to have come as a result of the frequency of visits by company personnel, and the immediate benefits that derived to communities from involvement in the trade.

Exporters have argued that coral harvesting and collecting is not the only contributor to loss of coral reefs in Fiji. Other contributing factors to loss of reefs include: expansion in the tourism industry; landscaping and coastal development; poor land use practices in catchment areas; and logging activities. Impacts from these activities are exacerbated by frequent storms, cyclones and subsequent flooding.

Companies have tried to put in place precautionary measures to ensure that only targeted species are collected, and that proper certification of products under a Marine Aquarium Council agreement is carried out. Unfortunately, collecting activities are conducted by community members without supervision or monitoring, by either government or industry. Large amounts of waste coral were evident in nearly all the villages visited.

Extensive coral harvesting activities can constitute a threat to reefs and the livelihood of coastal populations. The attraction of quick monetary return can override traditional management systems and result in degradation of resources. In some villages (e.g. Sanasana) coral harvesting was introduced to ensure that traditional (and especially religious) obligations are met. Thus, ironically, a traditional

source of food security is threatened by a combination of the cash demands of modern society and traditionally defined obligations.

Social benefits and disadvantages of involvement in the coral trade are many and varied at this stage. Most villages began their participation at different times and are therefore at different stages. Communities that have been involved in the industry for more than six years stated that they had benefited immensely from the activity, citing the funding of children's education and building of better homes as some of the benefits.

In Vatukarasa village, discussions with people living away from the village revealed concerns about rising alcohol abuse and the lack of any planned use for money earned. Discussions within the village, on the other hand, revealed direct benefits to both the community and individual households.

Most people interviewed defended the activity, which may be expected from people who have lived on very meagre incomes, and suddenly have access to significant amounts of money.

In Nadroga District there is no vocational or tertiary institution where young school dropouts can take up studies or pursue a career. These youth enter the coral trade due to a lack of alternatives. Efforts to develop alternative employment activities must offer comparable wages. Rigorous campaigns need to be conducted to create awareness and educate the people to make informed decisions about their coral reefs. The initiative began by the government and currently conducted by the International Marine Alliance needs to be supported. Findings and strategies identified need to be considered and implemented to ensure proper monitoring and management of the trade.

The socioeconomics of reef fisheries in the South Pacific: A methodological approach

Mecki Kronen¹

Introduction

Two projects emerged from continuous discussions between representatives of the Secretariat of the Pacific Community and the World Bank on how best and most effectively to address the assessment of the status of the Pacific Island reef fisheries. The World Bank funded "voices from the village", the first project to be designed and implemented. A participatory approach was used to investigate factors contributing to the successful management of coastal resources in the Pacific Island region, from the perspective of coastal communities (World Bank 1999).

The second project, "DemEcoFish", is funded by the MacArthur Foundation and implemented by the Secretariat of the Pacific Community (SPC). DemEcoFish is the first attempt to link quantitative and qualitative resource and user surveys to assess the status of reef and lagoon fisheries. The project uses an interdisciplinary approach involving ecology, fisheries and socioeconomics. This paper focuses on the socioeconomic component of the DemEcoFish project, and aims to 1) provide an overview of the methodological approach devel-

oped, and to 2) discuss its advantages and disadvantages based on experience during the implementation phase.

Site selection

Two Pacific Island countries, Tonga and Fiji, were selected to represent a Polynesian and Melanesian culture. Within each country three major regions were chosen, and in each region, two coastal communities were identified and surveyed.

The site selection criteria applied ecological and socioeconomic parameters. At the regional selection level, only those islands that had reef and lagoon systems were considered. In Tonga, the island groups of Ha'apai and Vava'u, as well as the main island of Tongatapu were selected; in Fiji, the Lau group, Vanua Levu and the main island of Viti Levu were selected (Fig. 1).

At the community selection level, four criteria were applied:

- a) Methodological comparison between the World Bank and MacArthur Foundation project

1. Community Fisheries Scientist, Secretariat of the Pacific Community, BP D5, 98848 Nouméa Cedex, New Caledonia. Email: meckik@spc.int

approaches. DemEcoFish targeted two communities in each country that had been included in the World Bank survey.

- b) Comparison of communities with a varying degree of urban influence in each region. Geographical isolation (i.e. small island location, and distance from the next centre) was used as a proxy.
- c) Interest of local authorities and their demand for information on specific communities that could be accommodated in DemEcoFish's field research; and
- d) Logistical viability to ensure successful implementation of socioeconomic and ecological surveys.

Survey development, design and implementation

Approach

A comparative snapshot approach was used for the DemEcoFish project. Sites or communities were visited only once, regardless of the time of the year. However, major festive occasions, when village activities diverted from normal routines, were avoided. The snapshot approach taken excluded replications, thus there is only one dataset for each surveyed site or community.

The socioeconomic survey rendered information on the location and popularity of fishing grounds harvested by fishers from the surveyed communities. Information gathered about fishing grounds provided the basis for planning and lay-out of underwater resource surveys.

Preparation

All relevant data for each country and, in particular, selected sites (i.e. communities), were collected and reviewed prior to final planning and implementation of field surveys. Such data included demographic information, aerial photographs, and topographic and nautical charts. Technical and scientific reports, if available, were also used. These all gave insight to fisheries, fishery systems, vernacular names, localities and habitats of marine species and rural development projects associated with any of the sites envisaged for survey.

Local, national counterpart authorities were contacted to assist in the preparation of field surveys. Usually, the two communities in each region were surveyed within one field trip. Local preparations required appointing socioeconomic survey team members and talking with the respective regional fisheries officer (RFO) in charge. The RFO was responsible for informing selected communities

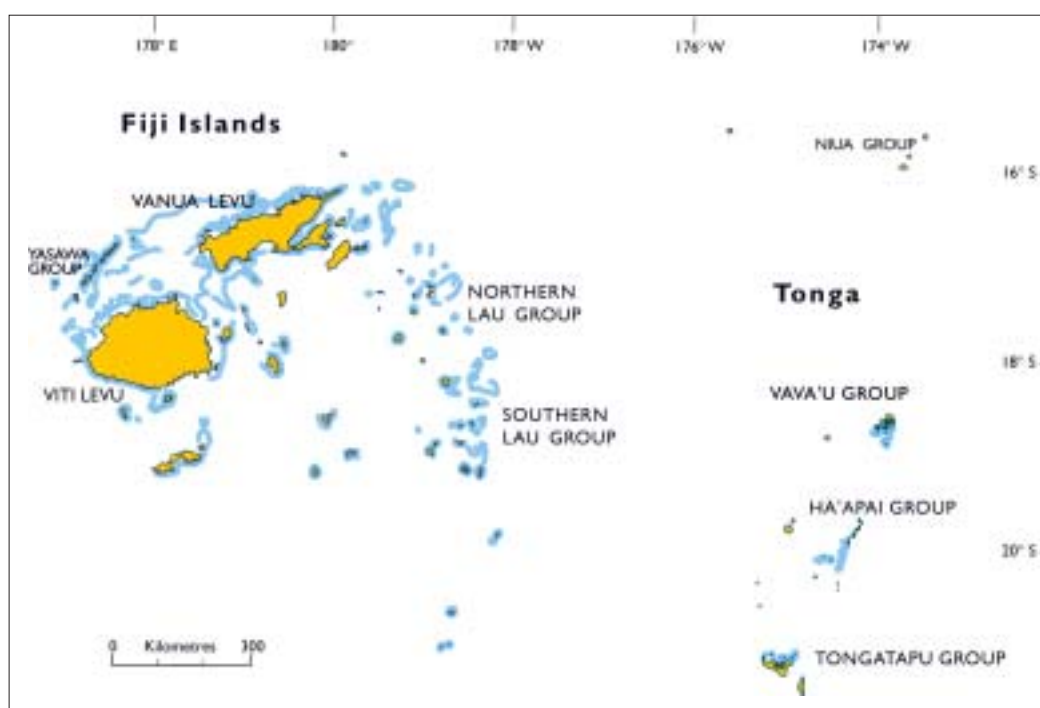


Figure 1. Fiji Islands and Tonga

about the objective and purpose of the survey, and for arranging a suitable time for its implementation. The RFO was also in charge of ensuring that all necessary traditional protocols were followed.

According to basic demographic data (i.e. approximate number of households and total population), the necessary survey material was prepared. Information provided by the RFO, in particular on traditional protocols to be followed and on survey team members appointed, assisted in the preparation of budgets for socioeconomic surveys.

Major components determining and/or closely associated with “fishing pressure” are depicted in Figure 2. Accordingly, the survey design aimed to elicit answers to the following:

- what fish/seafood is caught where? (habitat-fishing ground)
- when?
- how? (technique, means of transport)
- by whom? (fisher, gender)
- for what reason? (autoconsumption, sale, gift).

Answers were derived from households, individuals, fishers, boat owners, marketing agents, and students.

Survey design

Overall, the socioeconomic survey followed four distinct levels (see Fig. 3). Level 1 is the first contact

between the survey team and the target community. This initial contact usually occurred through a community meeting, where men and women of all age groups were encouraged to attend; participation at these meetings was voluntary. These community meetings served to introduce team members, and to present the objective, purpose and actions to be taken, as well as the expected cooperation expected from community members throughout the survey. During these community meetings, fishing grounds were identified on charts. The popularity of these areas were determined using participatory scoring and ranking for fishers and individual groups.

Provided that participating community members reached approximately 20 people, participatory scoring and ranking was done for gender age groups, old and young men and all women. Each group was asked the same questions, which aimed at gaining an overview of the main preferences and consumption of fish and invertebrates, fisheries characteristics and overall food preferences within the community.

Community meetings were also used to identify key persons who were later addressed with open-ended questionnaires in order to learn about the management of marine resources, general problems, and perceptions of local fisheries.

At level 2, a closed questionnaire type of surveying was adopted, which mainly focussed on the

Level	Subject	Methodological approach	Target group	Output
1	community meeting village authorities	PRA open-ended questionnaire	village population village elders key persons	overview on fishing and seafood consumption general information on management name of boat owners, serious fishers, etc.
2	household census household consumption	closed questionnaire closed questionnaire	all individual households all individual households	demography, socioeconomics household consumption on finfish and other seafood
3	fishing and marketing consumption and fishing fishing boat survey marketing survey	closed questionnaire closed questionnaire closed and open ended questionnaires	all serious fishers >30% of adults >15 years all boat owners agents, middlemen, shop owners, etc.	fishing systems, marketing consumption and general fishing activities quantitative and qualitative information on fishing vessels marketing and price systems
4	children's survey	PRA	primary school students (≈12 years)	children's participation in village fisheries

Figure 3. Overview of DemEcoFish project methodological design

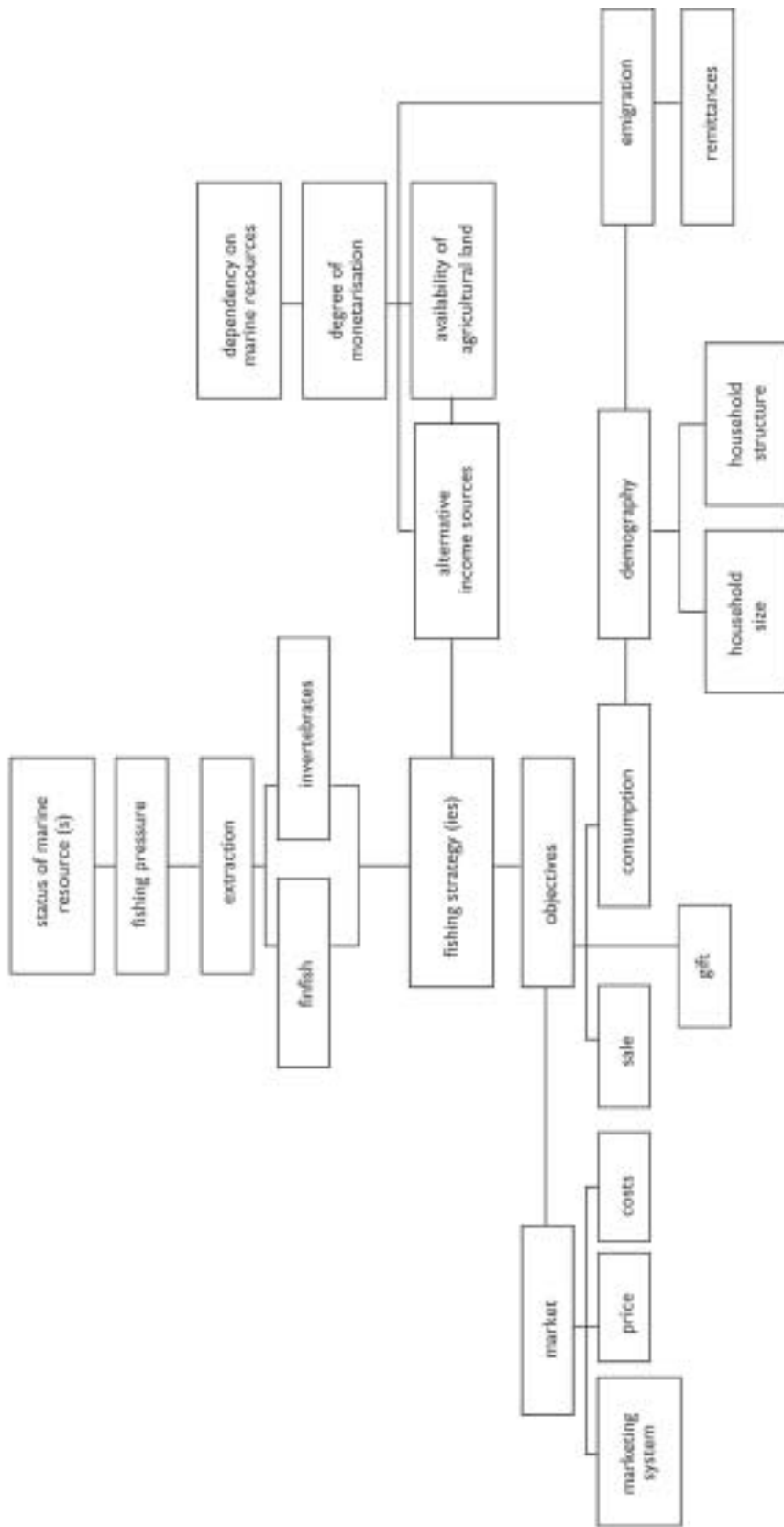


Figure 2. Flow-chart model of DemEcoFish project approach

collection of quantitative and complementary qualitative data. All active households in each community were numbered and consequently surveyed about demographics, basic economics, and household seafood consumption patterns. The target group responding to both questionnaires were heads of households for demographic and economic data, and women responsible for preparing the family meals for seafood consumption patterns.

At level 3, various groups within each community were asked questions that would provide the necessary information for understanding, quantifying and characterising fisheries in each surveyed village. Thus, all boat owners and so-called “serious” fishers were identified. Closed questionnaires were either filled in on a strictly individual basis or, as in the case of Tonga field surveys, by individuals but in a group setting. Boat owners include all members of the community that own a motorised or non-motorised boat. “Serious fishers” are persons who fish more frequently, more successfully and more for selling purposes than the average community member. The status of a “serious fisher” is either based on social community recognition only, and/or on individual perception. Very often, the status of a serious fisher coincides with ownership of motorised boats or regular use of motorised boats.

In addition, usually more than 30–35% of all women and men over 15 years of age were interviewed on the basis of a closed questionnaire in each community to learn about individual preferences and seafood consumption patterns as well as fishing (finfish and invertebrate collection) and marketing.

Complementary data on seafood marketing and pricing were obtained by interviewing agents, middlemen, shop owners and cooperative managers where applicable.

At level 4, an additional and experimental part of the socioeconomic survey targeted older primary school students. Children’s fishing activities are not included in any official statistics because they are not considered a significant factor of fish harvesting and, thus, fishing pressure. The socioeconomic part of the DemEcoFish project attempted to estimate the amount of children’s fishing contribution to family fish harvesting rather than obtaining comparative quantitative data as in case of the individual adult surveys.

Survey implementation

In Tonga, villages were visited on a daily basis, whereas the survey team stayed in the village during Fiji survey implementation. Community meetings were held in places proposed by village elders, at a pre-arranged time. In both countries, the survey team participated in traditional kava² ceremonies upon their arrival and departure.

Total length of stay in each village community was kept to a minimum so as to not unnecessarily disturb normal life and routines. Village elders were contacted first to obtain all necessary permission, useful advice and names of people falling in one of the specialised target groups (serious fisher, boat owners, etc.).

Local counterparts were used to communicate with villagers in their native language, and to conduct the surveys; they were trained and guided by the expatriate socioeconomic team leader. Local customs were adopted in approaching households and individuals. The headmaster of various primary schools was contacted to approve and organise the participatory primary school student survey.

Any agent, middleman or shop owner living outside of the surveyed community was contacted and interviewed, accordingly.

Data analysis

All survey data were entered into Excel worksheets, and a database for each surveyed community was created. Credibility and reliability of data were tested by filtering out extreme values. Also, the design of the survey questionnaires included a comparison of various approaches. For seafood consumption data, total household figures can be compared with information provided in individual questionnaires. Likewise, for examining fishing pressure, data derived from “serious” fishers and by general fishers, is regarded complementary. Boat owners can be cross-checked with information on boat ownership included in the household and individual surveys.

Finally, research hypotheses were formulated and data sources for statistical analysis were identified (Table 1).

Statistical analysis includes descriptive to non-parametric multivariate analysis depending on the

2. Guests offer kava, the bare and dried roots of a pepper bush/tree to the chief or head of a village. During the kava (or *yaqona* in Fiji) ceremony, the chief or head of the ceremony mixes the powdered root with fresh water in a large hardwood bowl (*tanoa* in Fiji), then strains the root powder with a cloth and offers each participant at the ceremony a small cup, usually made of half a coconut shell, (*bilo* in Fiji) of the liquid.

degree of complexity of each hypothesis to be tested. Various statistical packages such as Microsoft Excel, SAS and Statistica will be used to perform the analysis.

Discussion

All socioeconomic field surveys from the DemEcoFish project have been completed. Due to the fact that data analysis is currently underway, results presented and discussed here only focus on the methodology and field survey components.

Timing

Field experiences indicate that although the limitations imposed by applying a one-time snapshot approach are acceptable, timing is still crucial. Visiting a village community within a certain period preceding or following a major holiday and other event does not render typical/normal information on seafood consumption and fishing patterns. Also, competition of time requirements between survey and increased social activities significantly reduces village interest, participation and cooperation.

In addition, survey implementation also needs to take into account unpredictable social events that restrict or prevent the presence of the survey team and the participation of village population (e.g. funerals, major church or chiefly gatherings).

Survey design

Overall, the survey design proved to be successful in both countries. The successful organisation of a village community meeting, however, was found to be highly dependent on three major factors: preparatory steps taken, status and relationship between local counterparts and communities targeted, and the strength of social networking. Taking into account that participation at community meetings was voluntary, turn-up rates of gender and age groups at these gatherings varied considerably. There are no clear selection criteria for participatory survey design to ensure representation of the community. Also, participatory surveys involve a high risk of manipulation and the reliability of results is therefore questionable. Thus,

Table 1. Hypothesis for data analysis

Objective	Hypothesis
Indicators for fishing pressure	(a) fish consumption (b) dependency on marine resources, (c) fishing strategies, and/or (d) a combination of all are possible indicators
Consumer typology	there are different consumer groups within and between each of the two countries surveyed
Dependency on marine resources	is determined by fishing activity level
Fishing strategy	fishing strategies are distinguishable according to specific characteristics, resulting in fishing activity level
Methodological comparison between PRA and individual surveying	PRA is more likely to suffer from manipulation, hence rendering less reliable data than close questionnaire surveys

information gained from participatory scoring and ranking performed during community meetings may be misleading. Consequently, in the case of the DemEcoFish project, data gathered from participatory surveys will not be used in the final analysis. However, validation of participatory surveying will be performed by comparing data obtained from both, participatory ranking and scoring and individual surveys. This will also assist in determining how far results from the World Bank and the MacArthur-funded studies can be compared.

The reliability and accuracy of closed questionnaires are dependent on the training, effort and cooperation of the survey team members and cooperation and interest of the persons interviewed. Overall, the questionnaire should follow an easy to understand and simple to fill in design. The use of pictures for determining species and sizes (quantification of fish consumed for example) proved useful (Fig. 4).

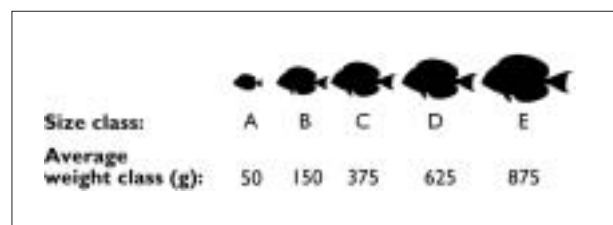


Figure 4. Fish size-weight charts

The numbering of each household in the community proved to be very useful as this number was easily used as a reference to link all different survey results to a particular household dataset.

Household census and consumption surveys served to estimate the community's total seafood consumption of the community and its economic dependency on marine resources. While in fact 100% coverage of all households was achieved in most Tongan and Fijian villages surveyed, a much smaller coverage percentage is presumably necessary to reliably estimate both parameters.

Cooperation

The success of this type of survey was highly dependent on the availability and cooperation of local counterpart staff. Experience indicated that connection and familiarity with the communities is the most crucial factor rather than technical or scientific background. The support of local extension, technical or scientific staff members can shorten the time required for preparation, and increase interest and cooperation of target communities. Also, the incorporation of young women with secondary school education from the target communities in the survey team proved to be successful. Once familiarised and trained with a particular component of the survey, they had easy access to local community members.

Fishing grounds

Identifying names and localities of finfish fishing grounds proved feasible by using enlarged hydrological — or if lacking — topographic maps. Information on names and locations was obtained from individual persons or group gatherings. The popularity of fishing grounds could be easily

established by encouraging fishers to perform scoring and ranking. However, fishing grounds used by reef gleaners and collectors of other seafood than finfish required resource mapping. The scale of hydrological and topographic charts, even if copies were enlarged, did not allow recognition of most invertebrate fishing grounds.

Fishing pressure

Complementary use of survey results from the "serious" fisher and individual groups interviewed requires avoidance of double counting (i.e. the same persons having filled in both questionnaires as well as the possibility for an a posteriori classification of fisher groups). Social status within one community does not necessarily reflect current fishing activity levels. Particularly in the case of Tonga, women's fishing activities are chronically underestimated and socially undervalued.

Experience demonstrated that the comparison and alignment of vernacular and scientific names for both, finfish and invertebrates is crucial. However, this task poses a major challenge as both systems follow different logic, and hence are not necessarily comparative at the species level.

The quantitative transformation of invertebrate units caught, marketed and consumed poses another difficulty. This part is much more diverse than finfish and requires in-depth field measurements.

School children survey

Although a complementary activity, participation and engagement of school children was extremely high. Field experiences also suggest that the role of children is an important factor in village fisheries, yet is underestimated.

Empowering Pacific Island communities

Silvia Troost

Source: Pacific Ecologist, issue no.4, summer 2002/2003

The global community's image of Pacific Islands is one of paradise — azure water, palm trees, and other tourist brochure clichés. In reality, Pacific Small Island Developing States (SIDS) face serious and unique development challenges that render them as vulnerable as the poorest nations of Africa. Pacific Islands are geographically small and isolated. They have a limited and extremely fragile natural resource base with "no room for error" in terms of management decisions.

Pacific Islands have small populations with relatively limited opportunities for advanced education. The few people who do manage to receive higher education and skills are often recruited into higher paying jobs in New Zealand and Australia, resulting in a serious "brain drain".

Economically speaking, Pacific SIDS for the most part do not benefit from globalisation in its current manifestation. They are often the dumping ground

for developed countries, receiving damaged and expired food products, toxic waste, and in some cases, weaponry (Kwajalein Atoll in the Marshall Islands is the “catcher’s mitt” for President Bush’s missile defense tests). Their language and culture — again extremely fragile due to sheer lack of numbers — are overwhelmed by global pop culture in the form of videos, television and films. Their natural resources are exploited through unfair deals with developed and larger countries, particularly their timber, mineral and marine resources.

Globalisation is usually posited either as a panacea or as the root of all evil. Certainly in its current manifestation, Pacific Islands do not benefit and are indeed exploited by the global system. However, there are opportunities for Pacific Islands to benefit from globalisation as long as they are empowered to manage it (and the change inherent in globalised communications, transport etc) on their own terms. This will require Pacific nations to maintain and strengthen their fundamental building block — villages — through a process of knowledge, education, appropriate technologies, and equitable and transparent “smart” partnerships.

Tourism, waste destroying marine biodiversity

An example of where globalisation could potentially benefit Pacific SIDS is in the area of coral reefs and marine biodiversity. Currently, globalisation — in the form of mass tourism, international fishing, logging (with associated erosion and runoff onto coral reefs), and waste generated from western styles of consumption — threaten to destroy the coral reefs of the Pacific. The impact of this cannot be over-estimated. Pacific islands depend on coral and marine resources for their very survival. In countries such as Kiribati, fish represent the bulk of the population’s diet. Coral reefs protect islands from damaging storms and waves, particularly in low-lying atoll nations such as Kiribati and Tuvalu. In countries such as Fiji, coral reefs attract tourists who bring much needed cash into the local economy. From a cultural point of view, coral reefs are part of the cultural “patrimony”, with sacred places and totem species. From an environmental point of view, Pacific coral reefs harbor some of the greatest marine biodiversity in the world.

Though the coral reefs of the Pacific remain relatively intact, particularly when compared to other SIDS (such as in the Caribbean) where coral reefs are either dead or severely degraded, the current demands on these reefs threaten to destroy them. Overfishing, destructive fishing practices, land-based sources of pollution (from erosion of steep slope areas, improper waste management from

coastal communities and tourist facilities, etc.) all threaten these reefs. It is now critical for Pacific Islands to conserve and manage these reefs before they are lost. It’s possible to do this in a way that benefits both communities and biodiversity.

This process has begun in Fiji, where villages are taking the initiative to reinstate traditional management measures, including imposition of marine protected areas (tabu areas), as well as “modern” management measures, including active coral restoration through coral planting or “coral gardening”, appropriate forms of waste management and other activities. They are “managing globalization” in support of their reefs by using the global tourism and aquarium industries as an impetus for conservation. This exciting work is taking place in a number of communities in Fiji, in partnership with the Government of Fiji and NGOs, including the Foundation of the Peoples of the South Pacific International (FSPI), Worldwide Fund for Nature South Pacific program (WWF), the University of the South Pacific, and other locally-based NGOs and organizations.

Project to restore coral reefs

Take the work of the communities of Cuvu Mina, located on Fiji’s Coral Coast. The Cuvu communities are working with an NGO, the Foundation of the Peoples of the South Pacific Fiji (FSP Fiji), to bring their coral reefs back to life. These reefs are severely degraded, largely due to the heavy impact of tourism and overfishing.

The Cuvu people have approached the major resort in the area — the Fijian Shangri-la (part of the global Shangri-la chain of hotels) — and forged a major partnership to restore their coral reefs. First and most importantly, the communities decided to declare a tabu area to restrict fishing activities. They have designated fish wardens — youths from the community — to enforce the tabu. With assistance from FSP Fiji, the communities have replanted mangroves and other coastal trees to reduce erosion and absorb nutrients (reducing the amount of pollution spilling onto the reef from the coast). They have also improved their waste management practices, moving pig pens away from the coast, and collecting and sorting rubbish.

The Fijian Shangri-la Hotel has also come to the table — an example of how globalisation (through the global tourism industry), if managed, can positively affect people’s lives in Pacific SIDS. With assistance from FSP Fiji, the Fijian Hotel has upgraded its waste management infrastructure through the development of “constructed wetlands” — artificial wetlands that absorb nutrients generated from the

hotel sewerage system. Chemical analyses are now showing a substantial reduction in pollutants emanating from the hotel onto the reef. The Resort has also initiated a campaign to involve guests in coral reef conservation, setting up snorkeling trails and educating guests on “no-impact” coral reef tourism. They have also supported training efforts, providing financial assistance to FSP Fiji to train community members in active coral restoration methods, including coral gardening (planting certain species of fast-growing corals in degraded areas to bring back the coral reef), habitat enhancement (removing deadly crown of thorn starfish from the reef, re-seeding the reef with shellfish including giant clams and trochus), and construction of “fish houses” (stone and cement structures placed strategically on the reef to recruit fish and coral). Plans are underway for the Resort to establish a community trust fund — through guest donations — for long-term conservation and sustainable management of Cuvu coral reefs.

This partnership between a local community, a national NGO and an international resort has already resulted in an improvement in the coral reef environment. Village members are reporting an increase in fish and shellfish. And they are benefiting from the tourist industry through jobs (for example, village youth are working at the Resort as “reef guides”), and increased income.

Capacity building of communities is the underlying foundation of this exciting work. By arming people with knowledge and skills, communities can forge equitable partnerships with international players in a way that they manage and control, and that ultimately benefits them.

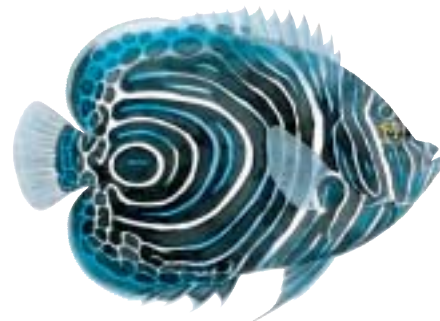
Effort to transform aquarium industry

Another potential avenue for communities to manage globalisation comes in the form of the aquarium industry. The aquarium trade is a multi-billion dollar industry that sources its products for the most part from poor countries. The Pacific, particularly Fiji, provides a significant percentage of live coral, live rock and fish for the industry, with communities currently benefiting very little (and not at all in some cases, through unsustainable extraction of aquarium products — cyanide, crow bars, etc.).

NGOs are now working with communities and consumers in developed countries to transform the aquarium industry into a sustainable trade through certification. This process is still in its infancy, but has the potential of enabling communities to take part in a global industry on its own terms, by receiving a fairer share in income generated from the industry through “value added

products” (similar to shade-grown coffee), and by protecting their marine environments through sustainable collecting and handling of aquarium products. In Fiji, FSP Fiji is working on a small component of this trade by training communities in coral aquaculture. This will enable communities to sustainably grow corals for the trade, rather than extracting corals from the wild. Again, communities benefit by earning income through production of a value-added product, while maintaining the integrity of their environments.

The examples mentioned here are presented in an effort to highlight the opportunity that economic globalisation can bring Pacific SIDS if communities are armed with training and information to manage globalisation on their own terms. The international community can contribute to this process by supporting industries and companies that do not pay mere lip-service to sustainable development, but actually incorporate this idea into their everyday *modus operandi*. The international community can also support training and skills development in Pacific SIDS through donor funding. Globalisation and all its inherent problems are here to stay. Pacific SIDS need to be smart players in this new system by demanding equitable and transparent partnerships with global players. Pacific SIDS must also have a foundation of internal good governance and rule of law so that everyone benefits from the process. The examples mentioned here — partnership with the tourism and aquarium industry — rest on the premise that communities drive the process, rather than a few corrupt government officials. It is through this process that globalisation and localisation can merge in a fashion that maintains the integrity of people and culture, while contributing to economic development.



Pomacanthus imperator
Artwork: Les Hata. © SPC

The mud crab: Victim of its own success

Jean-Luc David

Source: Les Nouvelles Calédonniennes, 8 and 9 February 2003

“Jesus Mary Joseph, that’s a beauty!” Claudia Kaudra, kneeling in the mud, has just pulled an enormous crab weighing more than a kilo from its hole using a wooden hook. Claudia, from the Oua Tom tribe in New Caledonia, has always made her living from crab fishing, like her parents and grandparents before her.

She caught her first crab at the age of seven

In the heart of the mangrove swamp, among the mangrove root labyrinth, with water up to her ankles and sometimes mid-thighs, this fisherwoman finds her way around with an astonishingly accurate sense of direction. “The crabs always come back to the same holes. The fishers who come here regularly just have to go from hole to hole whereas those who are unfamiliar with the area have to work hard to find their hiding places. And I can tell you that it is exhausting to walk for hours in this environment,” explains Claudia.

She knows this resource by heart. She caught her first crab at the age of seven. Then, when she was only 11, she fed her nine brothers and sisters after the death of her father.

At the time, she walked more than 10 km on foot from her village to the seaside before going into the mangrove area with her uncle or aunt and later her companion, Achille, looking for the green shells. Every Thursday, a travelling buyer purchased her week’s harvest.

“Sometimes we walk for hours balancing on the roots in the middle of the mosquitoes and wasps just to bring home one poor little crab. Sometimes you just have to cry and people think that 1000 francs per kilo is dear! At least in winter the temperature is a little less difficult to tolerate in the mangroves,” admits Claudia, without showing the slightest weariness.

A night out in the swamp

In 1997, this traditional fisherwoman was given some help in her activity. She obtained approval from the Southern Province for a micro-project submitted by the women of her village. The grant and a bank loan enabled her to buy an aluminium

runabout and an outboard motor. This helped Claudia extend her fishing area along the coast from La Foa township.

Two years later she is investing in traps as many other crab fishers already have. The yield from her daily fishing was immediately boosted, but this mangrove explorer is not giving in to the easy methods.

“Usually, I go out with my boat from Monday to Thursday, taking bread, water and tinned meat with me,” says Claudia. “I set my traps along the shore, but during low tide I continue to search the holes where the best crabs hide with my bag on my back. At high tide, I spear fish in the channels to use them as bait in the traps. Otherwise, I sleep under my tarpaulin and pull in the traps the next day, change the bait and put them back in a different place.”

Endangered resource

When she gets home, she listens to the messages on her answering machine to find out where the crabs are expected. She does the accounting, sets aside 5000 francs from each sale for maintenance and replacement of the outboard motor. And in the evening at home she prepares strips of rubber inner tube to tie up her catch.

Claudia would not give up this line of work for anything in the world: “My children learned how to walk on the boat in the middle of the mangrove, but the way the crab hunting is going today, I don’t know how long the resource will last.”

Some questions put to Claudia Kaudra, licensed fisherwoman in La Foa township, by Les Nouvelles Calédonniennes (LNC)

LNC: How many crab fishers are there in the La Foa community?

Claudia Kaudra: In our “commune” (municipal district), there are about 20 people who make most of their living from crab fishing. But in recent years, since the first Australian traps were imported into the Territory, many more people have begun to get involved in this activity.

LNC: How many traps do you use on a fishing trip?

CK: I have about 30 traps. I also go around to the crab holes in the mangrove swamp. But now some people set up to 180 or 200 traps without even paying for their business license. It's getting difficult along the coast and there are more and more disputes.

LNC: Does this overfishing represent a threat?

CK: Of course. Especially as some people do not respect the regulations and do not release crabs under 14 cm. They sell crab meat at 4000 francs a kilo or more. At that rate, there might not be anything left in two years' time. And if it gets difficult to catch crabs, who is going to buy them at 3000 francs a kilo?

LNC: Where do you sell your harvest?

CK: I have my customers — restaurants in the township — but also my personal customers. I also sell my crabs straight to companies which I generally visit once a month.

But sometimes people who don't need to sell crabs to make a living have gone before me, they don't need to sell crabs to make a living, they're just interested in the money.

LNC: Would you be in favour of more regulations?

CK: Well, things have been done for turtle and dugong fishing and other measures have been adopted on the nets, which should not have a mesh size of under 35 mm. So why not restrict the number of traps per fisher? And there would need to be checks. Pleasure fishermen are entitled to two traps per boat but some have 20 or more on board. Had I a mind to, I could have already reported so many of them.

LNC: And what about the well-known soft-shelled crabs?

CK: There is a total ban on catching them. You find soft-shelled crabs during the first or last crescent moon. That's when they change shells and go and shelter in their holes to avoid being eaten by predators.

On the brink

Jackie Sunde¹

Source: Yemaya, No. 11

Coastal communities in South Africa have a very long history of harvesting marine resources such as fish, shellfish and rock lobster or *kreef* for their livelihoods. It is estimated that 30,000 subsistence or artisanal fishing people depend on these resources to survive and another 30,000 are employed seasonally in the fishing industry. South Africa exports a large quantity of fish (about 40 per cent) to countries in the north and this makes fishing a highly profitable industry from a commercial perspective.

In most communities men have traditionally been the ones to go to sea whilst women have played significant roles in shore-based activities: making and repairing nets, preparing bait, and processing and selling fish. Along some areas of the coast, women collect mussels and other shellfish off the rocks. Women are the primary seasonal workers in the fish processing factories along the Cape West

Coast. Of late, they are also playing an increasing role in the administration and representation of fishing associations on the West Coast, where women chair at least three associations. Here they play critical roles in assisting fisher people to apply for permits and quotas and in lobbying the Department of Marine and Coastal Management (MCM), the government department responsible for fisheries management.

The fishing industry has been shaped considerably by the discriminatory legislation and practices during the white-dominated apartheid regime. Black people were excluded from getting quotas in their own right and had to work for white fishermen or companies. White-owned fishing companies flourished. Gradually the larger companies acquired smaller companies and extended their control. A handful of powerful white-owned companies came to dominate the industry. The influx control laws,

1. Masifundise Development Organization, South Africa. Email: jackie@tcoe.org.za.

job reservation, and Group Areas Act further excluded black communities from getting full access to the sea and its resources. After the election of South Africa's first democratic government in 1994, efforts to transform the fishing industry by introducing policies ensuring equitable access to marine resources, were initiated. This was in the face of considerable pressure from large companies fearful of losing control over the industry.

The Individual Transferable Quotas (ITQ) system was introduced. Although quotas were not new, this scheme was to enable people from previously disadvantaged communities to apply for quotas to fish. Other policies included giving incentives to companies that could show that they were transforming their employment practices to provide more opportunities for black and women workers. The new system intended to allocate quotas to companies of different sizes and, in this way, to enable a certain amount of smaller "new entrants" to establish companies.

However, despite these policies, some communities and people who have fished all their lives have been left without equitable access to fisheries resources. There appear to be several reasons for this.

Corruption

The fishing industry has a history of corruption, with influential people using their connections to ensure that their friends and families benefited from quota allocations. Allocations were also made for political purposes. Allocations were made to certain coloured communities and leaders but not to others. Later, in 2000, the government tried to introduce systems to ensure a more equitable distribution. However, a lot of mistrust remains, especially since many people who have never fished before have received quotas, while the access of many real, bona fide fishing people who have fished for years and depended on fishing for survival, has declined.

High costs

A big problem for fishing communities is the cost and complex procedures involved in applying for a quota. The criteria used to decide quota allocations are also seen as problematic.

Paper quotas

A further problem is that of "paper quotas". Because of the high value of quotas, many new entrants who were allocated quotas sold them to other fishing companies. This has enabled these fishing companies, even overseas-owned companies, to increase their power and control over the industry.

Failure to prioritize bona fide fisher people

The government has decided that, in the case of certain high-value species of fish and shellfish, quotas for these species will be allocated only to larger enterprises operating as businesses and not to small, subsistence fishing groups, thereby depriving the latter of access to these resources.

Impact of global trade

Pressures from South Africa's trading partners in the north, such as from the countries of the European Union, coupled with the government's current export-oriented economic policy, have affected decisions about quota allocations, ostensibly in order to promote investment in the industry. These policies are being implemented at the expense of the income and food security of local fishing communities.

Local fishing communities are thus facing social and economic crises as a result of the restricted access to fishing resources. Many fisher people who used to be active now sit at home. In other cases, the limited quota allocations mean that households have a greatly reduced seasonal income.

In certain cases people turn to poaching (catching fish without a license/quota) as a means of short-term survival. They are attracted to the large sums of money that are paid for protected species. In some instances, local people poach in return for payment in drugs. Powerful drug cartels use the lucrative trade in valuable marine resources as a way of obtaining finance. In communities where poaching is rife, problems, such as drugs and gangsterism, are on the increase. Linked to the high levels of poverty, gangsterism and drug abuse, is an increase in rape, sexual abuse and trafficking in women and children.

For communities that do not poach, the economic future is precarious. Given the seasonal nature of incomes, households find it difficult to pay their house rents and there is increasing food insecurity and poverty. Fishing communities are relatively excluded from economic development in their regions and have expressed their frustration at the lack of information on alternative economic initiatives, for example, on how to access the tourism market.

Women's fishing

Women in fisheries in Milne Bay Province, Papua New Guinea: Past initiatives, present situation and future possibilities

Jeff Kinch¹ and Jane Bagita²

Introduction

Milne Bay Province (MBP) lies at the far eastern tip of Papua New Guinea (PNG). The province's 600 islands, atolls and reefs lie within a maritime area of approximately 110,000 km² (Omeri 1991). The majority of the province's approximately 210,000 inhabitants live near the shore, both on the islands and the mainland. The communities are culturally similar, and are predominantly matrilineal (i.e. clan membership, territorial rights, and inheritance are determined through the female line). Inhabitants are mostly subsistence and artisanal fishers, many of whom sell marine resources to exporters and rely on fishing, trade and subsistence agriculture for their food security and livelihoods. Average annual income per household has been estimated at USD 130.00 (Kinch 2001; Mitchell et al. 2001).

Worldwide, women contribute in multiple ways to the production, processing, marketing and management of fish and other marine resources. Studies from PNG show that women's fishing supplies an estimated 20 to 50 per cent of catches annually in some regions (Haines 1979, 1982); studies elsewhere in the Pacific substantiate this productivity (Rawlinson, et al. 1995).

Across the Pacific, women concentrate their fishing activities on the collection of small fish, molluscs and invertebrates in lagoons, the inter-tidal zone and inshore areas (Chapman 1987). Women in MBP, particularly in the Trobriand Islands and the south coast of mainland Milne Bay, especially harvest invertebrates such as mud crabs. More recently, women have entered the lucrative beche-de-mer (processed sea cucumber) fishery as harvesters and as scouts for male divers (Kinch 2002). MBP

women generally reef glean by walking along reef flats at low tide, collecting invertebrates, small fish, and very occasionally seaweed (Kinch 1999, 2003; Yamelu 1984).

Status of women

Traditionally, women have enjoyed a relatively high status in MBP, and are central to land ownership and food production for the living and the dead (mortuary feasts are the most important rituals Milne Bay societies). Colonial administrative officers have noted the social standing and sailing prowess of women in MBP:

A noteworthy sociological feature of the seagoing inhabitants of the Calvados Chain, is the status of women in political, social, and economic life. They exercise considerable influence in all questions for discussion — nor is this influence confined to the bedchamber brand of politics. They have no hesitation in airing their views on all subjects in no uncertain terms. They carry out all the indigenous economic activities that the men do, and it can be said that they do them almost as well. They are often seen sailing over the lagoons of the Archipelago, manning large ocean going canoes from which they fish for trochus, turtles, shell and other forms of seafood and produce (Teague 1956:3).

Today, women still have a relatively prominent role in village affairs. Women's groups, particularly church-led women's fellowships and clubs continue to be an active part of every community.

1. Community Development and Artisanal Fisheries Specialist, Conservation International, Alotau, Papua New Guinea. Email: jkinch@conservation.org

2. Provincial Fisheries Officer, Milne Bay Fisheries Authority, Papua New Guinea

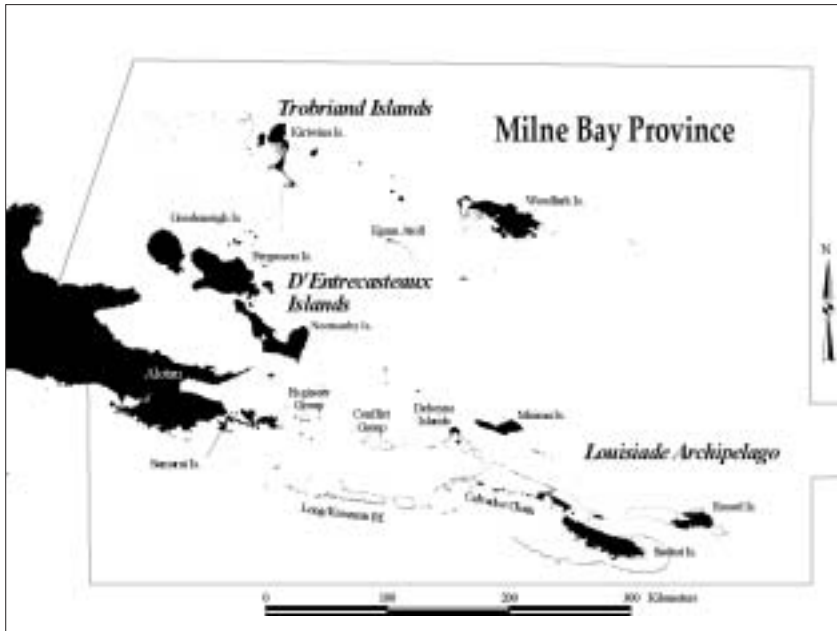


Figure 1. Milne Bay Province

Unfortunately, due to the influence of the cash economy, women's position is being usurped through changing values and a breakdown of traditional social structures. The increasing use of money in mortuary feasting has had a significant impact on women's status because women's contribution of locally grown food, particularly yams, has been overshadowed by the use of money to buy trade store food (Kinch 2001; Byford 2000a). The increase in cash from the sale of beche-de-mer has also meant the exclusion of women from decisions made about its use (Kinch et al. 2002).

Division of labour and fishing effort

As across most of Melanesia, men in MBP typically do tasks that require strength and sustained exertion, such as felling trees, building houses, cutting gardens, netting fish, sailing canoes and general maintenance. They also do all butchering of pigs and turtles. Tasks performed by women are those associated with nurture, including planting, weeding and harvesting of gardens, cooking, making mats, baskets and clay pots, raising and feeding children and livestock. Women can also be seen sailing canoes, diving and fishing. Although there is a division of labour by gender (e.g. men catch most fish, and women and children focus more on shellfish and inshore fisheries), MacIntyre (1983) noted that this is more pronounced in ideology than in actual practice.

A fishing effort study in Milne Bay coastal villages in the late 1970s reported that men spent 3.1 hours

per week fishing and that this represented 17 per cent of their productive work time (Bayliss-Smith cited in Pernetta and Hill 1980). From my own observations, I suggest this is an underestimation. In the Nuakata Fisheries survey conducted by Conservation International (CI) and the Milne Bay Provincial Fisheries Division in 2000, 76 households out of 100 were surveyed on Nuakata Island. Eleven per cent of the households surveyed said they fished daily, and 96 per cent said they had fished within the last three days (Kinch and Kelokelo 2000). On Tubetube, MacIntyre (1983) noted that people regularly fished three to four times a week

and fish was eaten on most days. Another study at East Cape in the late 1980s (part of the Commonwealth Secretariat's program, see below) showed fishing accounted for 24.1 per cent of all men's work time, compared with 9.0 per cent for women. As would be expected, given that selling is predominately a women's profession, men spent only 0.2 per cent of all work time selling fish compared with 2.1 per cent for women. Men also contributed only 9.9 per cent of all work time to domestic duties compared with 40.2 per cent for women (Hunting-Fishtech 1990).

Past initiatives

During 1989 and 1990, the Commonwealth Secretariat organized several studies on the role of women in fisheries. These were undertaken with assistance from the then called South Pacific Commission (SPC) and the Commonwealth Fund for Technical Co-operation (CFTC) (Schoeffel and Talagi 1989). These studies recommended that development programs involving women should focus on building skills and providing training in post-harvest techniques to enhance the income earning capacity of women. One study concluded that the subsistence catch was much higher than present assumptions, and that increased production was possible with an expansion of the market. It was thought that women's lack of access to markets and the lack of movement in the market were the main factors limiting women's development. Linked to this was the lack of post-harvest technology and skills transfer (Hunting-Fishtech 1990).

In 1993, the PNG Department of Fisheries and Marine Resources (DFMR) and the Department of Human Affairs and Youth (DHAY) signed an MOU for the establishment of the PNG Women in Fisheries Project. Under this agreement, DFMR was responsible for providing technical, financial and administrative support to women's groups through workshops on fish processing, marketing, distribution and small-business development. They were tasked with purchasing and distributing fish processing equipment to women's groups and providing assistance in marketing fish products. DHAY was responsible for awareness campaigns, organizing and co-coordinating training workshops for small-scale processing and marketing, and identifying promoters to start small scale processing and marketing projects. Problems arose in the delivery of this project because DFMR had trouble running what was essentially a technical fisheries project as well as a women's project. Opposition was also generated from women in the field who expected a project involving women to go through DHAY, while DHAY also believed they should control and implement the project. The project was eventually moved to DHAY, where it was later terminated due to lack of staff and resources (Lambeth et al. 2002).

The present situation

The main seafood processor in MBP is Nako Fisheries Limited, situated on the waterfront at Sanderson Bay in Alotau. Nako Fisheries began in 1994 in the wake of the failure of the Milne Bay Fishing Authority (MBFA) and is now the largest fishing company in MBP. In 1998 the company continued with a capital development program aimed

at upgrading standards and operating capabilities. These developments included improvements to the Nako fish processing factory and office, an extensive new slipway, and further equipment for the marine workshop. Its aim is to establish itself as a broad-based, privately owned, fishing enterprise.

Nako purchases fish and crayfish from fishers by sending out fishing boats to coastal and island communities. The fish are packed in ice, and brought back to the central fish-processing shed in Alotau where they are filleted by women who are trained processors (Anon. 2002). Previously, Nako exported giant clam adductor muscle, trawled for prawns and longlined for yellowfin tuna. Nako shares an aircraft with the courier service, DHL, and exports crayfish, crabs and prawns directly to Cairns, Australia. Ninety per cent of the filleted fish it processes is sold within PNG, mainly to a large company that provides catering services to mining companies and other large institutions.

Nako has trained several women in occupations usually reserved for men such as engineers and shipwrights, with some receiving training in Townsville, Australia. One woman was recently accepted as the first female engineer at the Maritime College in Madang (Anon. 2002).

The main option for fish marketing in MBP is through the district markets. Currently, most pub-

Women at the Alotau market selling fish, lobsters and juvenile hawksbill turtles. Photos: Jeff Kinch



lic markets in MBP are inadequate and require upgrading as there is little or no provision for the use of ice or refrigeration, for protected displays, for access to potable water, or for any training in elementary hygiene. There are current plans to construct a new market places for Alotau, which will incorporate some of these issues.

Future possibilities

Fisheries departments throughout the Pacific region are concerned with downturns in nearshore marine resources, and the subsequent effects of overharvesting and habitat loss. One of the most common solutions is to encourage the use of offshore resources where men receive gear, training, and advice on how to move their fishing activities offshore to take the strain off the heavily utilized inshore coastal resources. Women, however, receive little or none of the benefits of these programs (Matthews 2002).

Three large multi-lateral projects have been initiated in MBP: two looking at fisheries development and one assisting with sustainable fisheries. The Asian Development Bank's (ADB) Community-based Fisheries Development and Management Program and the EU's Rural Coastal Fisheries Development Program have subcomponents that allow for women's skills-training. These training programs will help women identify and respond to potential opportunities and will focus on fish quality, marketing, value-added processing and business management. Economic opportunities directed at women will be spread among a number of areas, including social infrastructure developments such as wharves, jetties and facilities that will provide secure accommodation and proper sanitation. Value-added fish processing and marketing will also enable women to respond to these opportunities. These two programs also plan to establish consultative mechanisms whereby formal associations, including women's groups, have a greater involvement in making fisheries development and management decisions.

Women who work in seafood processing plants such as Nako are usually single women because the factory working requirements are usually incompatible with the responsibilities of a woman with a family. The ADB and EU programs both recognize this and plan to conduct awareness programmes on HIV/AIDS.

Conservation International has been contracted by the United Nations Development Program to execute the Milne Bay Community-based Coastal and Marine Conservation Program (CMCP). The CMCP constitutes the first large-scale marine con-

servation and resource management initiative in PNG and is intended to be a 10-year programme assisting many coastal and island communities in village-based marine resource management and conservation activities aimed at the betterment of their livelihoods. As women are also marine exploiters, the CMCP will involve women's groups. CMCP is currently investigating alternative income streams that will focus on food production and quality, and improving the nutritional status of the family.

Finally, there are plans by the Milne Bay Provincial Administration to establish District Women's Boards and Area Associations to support the PCW and to redesign the existing women's credit scheme in consultation with Provincial Division of Commerce and Industry.

Gender equity and other issues

The overriding aim for previous policies on women in PNG has been the increased participation by women, both as beneficiaries and agents in the development process, and improvement in the quality of life for all. Turara (1995, cited in Quinn and Davis 1997) suggests that a lack of analytical, gender-specific information has worked to inhibit development opportunities for women in the fisheries sector, and this has resulted in economic planners not viewing women as stakeholders. Part of the reason for this is that much of the work done by women is not remunerated or is poorly remunerated and therefore little valued in financial terms (Williams 2002). The emphasis placed by donors and governments on commercial fisheries development, especially offshore fishing where women have virtually no involvement, has also contributed to the lack of recognition and support of women's role in fisheries (Matthews 2002).

Gender analysis highlights the different roles and behavior of men and women in production, reproduction and management. Research on women and gender in fisheries requires more rigorous methodological and analytical tools, many of which are being developed or already exist in mainstream gender analysis. This is necessary for successful program development involving women because gender-specific programs have not succeeded in PNG.

Reasons for this failure include problems over which department should take the lead. Having specific women in fisheries programs can reinforce the tendency of national fisheries agencies to separate women's issues from fisheries issues. Issues relating to women tend to get offloaded onto the

women in fisheries program, or onto women's agencies that have no experience, resources or expertise in fisheries (Lambeth et al. 2002). In the future, more attention must be given in projects to women in fisheries development activities, which can be done through approaches such as supporting the "family and development", by promoting equal opportunities for women through the fisheries sector (Williams 2002).

Conclusion

Although women's involvement in harvesting, processing and marketing are increasingly acknowledged and studied, women are still poorly represented in national fisheries agencies, fisheries training courses and fisheries meetings; and are often not included in fisheries development and management planning processes (Lambeth et al. 2002).

Because women contribute a significant portion to the overall marine resources caught, any attempt to develop long-term sustainable fisheries will require women's participation (see Bidesi 1994). Multi-lateral programs such as the ADB, EU and CI should assess gender issues at the planning, implementation and monitoring stages of projects, which will result in an increasing awareness of women's involvement in fisheries. More information on subsistence fisheries production, consumption and environmental impact is needed, with the analysis of the differing activities and contributions of men and women. This sex disaggregated data can then be used for determining the gender impact of project activities.

Impacts, both positive and negative, can be different for men and women. For example, women are more likely than men to spend their wages on children and family (Lambeth et al. 2002), while money earned by men is disproportionately spent on tobacco and alcohol, which adds to health and social problems. Already, malnutrition among women in MBP is due to an inadequate intake of energy and protein foods; it is common for women to eat after men, and to eat less (Kinch 1999, 2001; Byford 2000b). The social outcome of women becoming wage earners is not always ideal because they are often expected to maintain their traditional gender roles within the home and community. There is a need, however, to allow women access to the means for their improvement, including access to capital, equipment, technology, transport, credit, training, employment and education as full and equitable participation of women in fisheries will ultimately help improve health, nutrition and literacy standards, motivate savings, and can provide incentive for the family unit.

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News from the Coastal Fisheries Management Section

Name change

The Community Fisheries Section is now called the "Coastal Fisheries Management Section". This name change signifies the section's shift in focus to the management of coastal fisheries.

Initially the section was charged with examining issues relating to women in fisheries, and during that period, the focus was primarily on country assessments of women's participation in fisheries. Workshops and training on post-harvest activities, fishing methods and fish preparation techniques were held in several countries of the region. In recent years there has been a realisation that

women's issues cannot be targeted in isolation but must be considered within the larger framework of the communities women live in. It was also realised that it is important to assess women's fisheries development and participation in association with men's work. Thus, the current emphasis is on gender approaches to fishing, with a major emphasis on women's roles and women's general welfare. Although the section has retained most of its target areas, there has recently been more emphasis on the management of coastal fisheries by communities. Thus the name change to the Coastal Fisheries Management Section.

Review of the Marshall Islands Community-based Coastal Fisheries Management Project

A six-monthly review of the Community-based Fisheries Management Program (CBFMP) for the Marshall Islands was conducted in November 2002. As part of the review, all stakeholders who contributed to the development of the CBFMP were interviewed.

The first activity conducted by the CBFMP was training staff from the Marshall Islands Marine Resources Authority (MIMRA), the Environment Protection Authority (EPA), the Ministry of Internal Affairs (MIA), NGOs, and mayors of local governments on methods of dealing with local communities. Twenty-four participants attended the training, nine of which were local government mayors.

Mejatto Island, west of Kwajalein Atoll, is the first community to participate in the CBFMP, as a result of requests from the mayor of the Rongelap Local Government. A team of two community facilitators, a staff member from the Rongelap Local Government and SPC's Fisheries Adviser conducted community workshops aimed at establishing a

fisheries management plan for the community. All members of Mejatto's community (men, women and youth) participated in the workshop. Mejatto's plan is now ready for submission to MIMRA.

The CBFMP is now working on plans to include a second community, Likiep Atoll, following a request from the mayor of the Likiep Local Government. Community work at Likiep Atoll began in mid-January 2003.

Support for the CBFMP comes from the EPA, MFA, MIA, College of the Marshall Islands (CMI), and the mayors of Rongelap and Likiep Local Governments.

The CBFMP review found that recommendations made as a result of previous visits have been implemented, including: the recruitment of two new staff (one of them a woman), training of coastal fisheries staff, establishment of a working group, running a community workshop, project advertising, and the translation of information sheets into local languages.

Review of American Samoa's Community-based Management Project

This 12-month review was a follow up to the first six-monthly review of the programme in January 2000. The initial review identified 12 recommendations aimed at resolving the problems identified. This 12-monthly review focused on the progress in

implementing the 12 recommendations, activities undertaken by the programme, the rate at which village fisheries management plans (VFMP) are developed, and staffing.

Tuna Development and Management Plan for Kiribati

This work was carried out for the Forum Fisheries Agency as part of the Tuna Development and Management Study for the Republic of Kiribati. Although the study was too brief to fully investigate the many issues relating to gender, social issues, and development and livelihood factors, the survey does help in gauging conditions and assessing the implications of major development interventions or changes to the current tuna industry.

The key tasks identified in the study's Terms of Reference include:

- gather and review existing baseline data on the roles of men and women in the tuna industry;
- identify the key gender issues in the industry;
- consider the likely implications for both men and women of the different industry development and management options available;
- identify strategies to monitor and address any undesirable gender impacts of these industry development and management options;
- identify in particular the potential to enhance participation by women in the Kiribati tuna industry, including participation in terms of employment, management and investment; and strategies for achieving that potential.

For this study, it was necessary to gather information on gender and other social issues from other sectors of the government.

The main methods used to acquire information were a literature search, interviews and individual discussions, meetings, and two weeks of fieldwork in Kiribati. Fieldwork involved visits to factories, and meetings with different groups and personnel. A major part of the study was talking to and holding discussions with women involved in the tuna marketing business, and women involved in other areas of the industry. One of the more interesting aspects of this study was information gathering through random interviews, and discussions with women involved in the social life of the crew of major tuna boats that are usually in port in Kiribati.

Field observations and the use of local counterparts as interviewers assisted greatly. Because of time and

other social and institutional constraints, information collected so far can only provide general guidelines. Any in-depth work in specific areas may require the use of local graduates and/or professional staff to conduct on-the-ground fieldwork and information and data gathering over longer periods.

The tuna development and management study could not be conducted in isolation, especially when dealing with a small economy and closely-knit community like the Republic of Kiribati. The limited land area characterises the Republic as a total coastal entity, with the seas and EEZ providing the primary development option for the future. The limited land area means that the public sector, private enterprise, non-governmental agencies and communities physically merge into a closely-knit community, with their work overlapping in many areas. This suggests that planning and development for one sector must necessarily involve all sectors. All sectorial development or management initiatives must be planned and implemented, using a multi-stakeholder approach.

Many socioeconomic issues were involved in developing the gender component of the Tuna Development and Management Plan for Kiribati. Socioeconomic and cultural factors significantly influence interpretations of gender roles and perceptions in Kiribati. People are faced with a predicament: globalisation and associated modernisation result in significant lifestyle and preference changes, while traditional perceptions of gender roles continue to persist. On a general level it was obvious that discrimination against women in most aspects of life (including political, economic and social) continues although there are attempts to try to address this. Women's participation was notably minimal in the higher management and decision-making positions of the government.

Major long-term socioeconomic factors that have to be considered within the Tuna Development and Management Study are the rapidly rising population; the need for employment opportunities in the near future; and how the projected population increase will exert enormous pressure on resources

and finances as the country works to meet peoples' essential economic, social and infrastructure needs. Indirect effects of industry expansion also have to be taken into account. These impacts can be exacerbated by existing social conditions and impacts, including the easy availability and abuse of alcohol.

Key gender issues identified include the importance of considering traditional and customary gender expectations and norms in the entire tuna development process. For a close-knit community like Kiribati, radical changes in traditional gender expectations and orientation could be received with mixed attitudes and thus indirectly affect implementation of certain areas of development plans. There is no gender discrimination in offering employment opportunities, but traditional perceptions of gender roles may undermine this. Women are actively participating in the market economy through various means, and positive support of such involvement could result in the further advancement of their roles. Although women's participation in non-domestic activities was obvious, involvement in decision-making is still dominantly through traditional councils, which effectively leave out women.

Meaningful participation in the tuna industry requires more vigorous education and training (in both the formal and informal sectors) to prepare

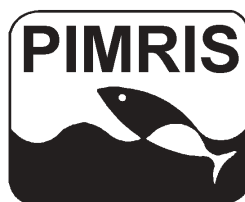
people for participation in the industry, and for associated changes in lifestyle. Meeting training needs requires a commitment from the government and the private sector. Existing maritime training institutions can expand current roles and take on training and education responsibilities for the tuna industry. Young people and community leaders can be mobilised at the village level, where more vigorous awareness work is needed.

Some of the major social concerns of the industry are not freely discussed or referred to because of cultural and social restrictions, but the problems of prostitution and sexually transmitted diseases should be addressed openly. An expansion of the industry could result in an increase in risks of such social impacts, making awareness campaigns and informal community teaching even more important. This is a major social concern, and may in time become the major gender and social concern for the country. Research, information dissemination and educational programmes need to be strengthened to ensure that people are informed and able to make decisions about their lifestyle and employment options. This means involving people through informal training and awareness campaigns, by conducting learning opportunities, and involving those already in the business; assistance should be provided in setting up support systems for alcohol abuse and other related social problems.



**Women selling fresh fish on the roadside,
Tarawa, Kiribati**

PIMRIS is a joint project of five international organisations concerned with fisheries and marine resource development in the Pacific Islands region. The project is executed by the Secretariat of the Pacific Community (SPC), the South Pacific Forum Fisheries Agency (FFA), the University of the South Pacific (USP), the South Pacific Applied Geoscience Commission (SOPAC), and the South Pacific Regional Environment Programme (SPREP). This bulletin is produced by SPC as part of its commitment to PIMRIS. The aim of PIMRIS is to improve



Pacific Islands Marine Resources
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the availability of information on marine resources to users in the region, so as to support their rational development and management. PIMRIS activities include: the active collection, cataloguing and archiving of technical documents, especially ephemera ("grey literature"); evaluation, repackaging and dissemination of information; provision of literature searches, question-and-answer services and bibliographic support; and assistance with the development of in-country reference collections and databases on marine resources.