

Community-based management and conservation

Community-based marine resource management in Fiji: The challenges

By Aliti Vunisea, SPC Community Fisheries Officer

Community-based marine resource management — argued by researchers, writers and community workers as the best approach to modern fisheries management practices — is a more regularised and organised version of traditional management practices that have been widely used in Fiji and other Pacific Island countries for generations.

Community-based management promotes maximum community participation, and the inclusion of all sectors of a community (including both men and women). This approach faces the challenge of relying on community cooperation (or existence) within a semi-capitalistic, primarily individualistic, lifestyle. Community management work in Fiji over the last six to seven years has enjoyed varying degrees of successes depending on the location, implementing agencies, and the initial contact made at the community level. Recently, a network of people involved in community-based fisheries management has managed to establish contacts and networks with government departments, NGOs, conservation agencies and individuals. The FLMMA (Fiji Locally Managed Marine Areas) have firmly established their initiatives, forming partnerships with communities and other organisations. FLMMA is also using pilot management areas and those involved in these projects to facilitate continuing community management work. The Fiji Fisheries Division, with assistance from SPC's Community Fisheries Section, has also established their own programme, which will make community-based fisheries management a government initiative. The vulnerability of coastal resources and the need for awareness-raising and management proposals has prompted this initiative. Like other established initiatives, the fundamental concept is to mobilise resource owners or communities to take over resource management responsibilities.

Traditional community-based controls and check systems on resource use may not have been intentional management measures, but they served to either directly or indirectly manage resource use. These controls included periodic closures due to the death of those of chiefly birth, seasonal closures on fishing grounds or on certain species, taboos on eating totem fishes, declared sacred fishing areas, ritualised fishing and associated activities, which

on numerous occasions, eased pressure on fishing for certain periods of time. There are also legends of turtle and eel calling in certain areas of Fiji. Such management practices were similar to those known and practised in most other Pacific Island countries, varying only in form and implementation. In most instances, these control systems were not direct fisheries management practices but were part of a wider community mechanism on the use of a diverse range of resources. In most cases there was no exact distinction between the land and the sea, as these were seen as integral parts of each other; thus, regulated use applied to all resources that were encompassed under the word '*vanua*' (which means the land, the sea, and all the resources and people).

These traditional practices have, over time, gradually been affected by modern thinking, Christian beliefs and other such factors, but the 'institution' and its associated leadership structures, protocol, respect and beliefs still exist. Community mobilisation is, in most cases, already built into people's daily work schedule and routine. Traditional roles and resource use systems within these communities are still well defined, but like any other system, these roles are undergoing change and their usefulness and relevance are being questioned.

The modern approach to community-based management, which people will need to adapt to, is working with outside 'intervention' and adapting to new leadership and learning modes. Village leaders must deal with distributing money, working out monetary compensation and organising people's time to balance both traditional lifestyle needs and modern demands and requirements.

Complicating all this, is the gradual change in leadership structures and community dynamics, a result of rural-urban migration, urbanisation, western oriented education and global networking and telecommunications. Therefore, common at the community level are changing eating preferences, the exploitation of new fisheries and arrangements for such ventures infiltrating traditional village settings, and employment both by men and women outside the village, and many other such new challenges.

People in rural areas and villages still perform specific traditional functions within their community, but many of these have been adapted to modern lifestyles and new forms of socialisation.

The current community-based resource management approach primarily utilises participatory learning activities (PLA). These tools are well known and widely used around the world for information gathering and for mobilizing people to participate in development and management initiatives. Non-governmental organisations (NGOs), ministries and conservation agencies involved in community-based work in Fiji utilise a wide range of PLA tools. The success of community-based initiatives are due in part to these PLA activities as these allow for a wider interaction with communities, the participation of all sectors of the community, and provides forums for discussions, debates and questioning without any social or traditional restrictions.

Discussions on gender, ethnic and culturally sensitive issues that may have not been possible in the past are easier dealt with through current community participatory learning processes. In spite of these, there remain major areas that need to be addressed before meaningful participation can happen.

The following are questions that remain unanswered, or areas that remain to be explored further:

- The dual mode of ownership and understanding of resource use or access has been an accepted operational fact. Will change in ownership of the *I qoliqoli* systems upset the current equilibrium?
- Changing administrative and leadership structures. How will the re-structuring of the Fijian Affairs Board affect the modern needs and aspirations of the Fijian people?
- Should women be considered participants or partners in fisheries management?
- More networking among the various sectors involved in community-based management work.
- Continuity of projects.
- Indicators of success.

1. Change in ownership of the *I qoliqoli* systems

Marine tenure in Fiji is, in the majority of cases, well defined and registered. Customary understandings on marine resource use allow for access to and ownership of fishing grounds and rights to all foreshore and shore areas up to the outer reef (*kanakana* and *I qoliqoli*). *Kanakana* is the subsistence fishing area, which usually refers to the immediate shore area adjacent to a village and includes all mangroves, mudflats, sandflats, lagoons and reefs. *I qoliqoli* refers to the total fishing area, including the areas beyond the *kanakana*.

Legal access allows customary owners proprietary fishing rights over their *I qoliqoli* while the state has ownership rights of waters up to the high-water mark. Thus, there exists dual ownership and understanding of resource use. Customary owners in both instances still have significant rights over their coastal areas, so that any marine resource management initiative must involve the community. This dual ownership is at times a source of conflict and concern for customary owners. There are 410 *I qoliqoli* areas in Fiji, more than 200 of which have been surveyed and registered by the Native Lands and Fisheries Commission. Most of those that have not been registered are rivers and creeks.

Ownership or user rights of *I qoliqoli* areas are at a higher level than the *yavusa* or *vanua* (land). Therefore the *liuliu ni yavusa*, or chief of a *yavusa* has ownership rights. Unlike land tenure in Fiji, which is *mataqali* or clan owned, demarcation of specific *I qoliqoli* areas has always been disputed. In many cases the communal ownership of the *I qoliqoli* is complex. Sometimes the paramount chief who has the *I qoliqoli* ownership can sign fishing licenses or make agreements with coral harvesters or other outside investors, for example, without the knowledge of the several villages and districts under his or her jurisdiction.

The current government has stated in its blueprint the need to return full ownership rights to customary owners of the *I qoliqoli*. This, however, prompts several questions:

- How will this be specifically drawn if the argument in traditional ownership is where land ownership extends to foreshore areas? Will ownership be along *mataqali*, or clan lines, as in land ownership?
- If this is adopted, will this effectively leave people without any land adjacent to bodies of water or foreshores?
- What will be the future of the *I kanakana* and *I qoliqoli* arrangements for subsistence fishing areas, if these are demarcated and specifically owned? Where will communal ownership fall?
- How will these changes in ownership affect community-based management initiatives, where consent may depend on one clan as opposed to the *yavusa* as is the case now?
- If ownership remains with the *yavusa*, and *liuliu ni yavusa* as is the case now, does ownership mean the right to negotiate for and deal with investors for all members or sub-groups of such a large amalgamation of clans or villages?

Ownership can also mean total control over development in coastal areas, which may be an advantage for management and detrimental if development becomes the focus of the *yavusa* with ownership rights. It will also mean more responsibility on

the part of *I qoliqoli* owners to look after their resources. The question of ownership and access by all community members as highlighted above can only be solved at the initial stages of the attempt to revert ownership to traditional owners and this will need the goodwill and support of all the parties concerned before any finalisation of demarcated grounds and ownership status.

2. Changing administrative and leadership structures

In addition to the complexity surrounding ownership and user rights, there is also a dual administrative or control system for the people. The government administrative system and the traditional system both come into play when working with people in communities. This is important because any work in communities still uses both systems. In the village for example there is a village headman who is the administrative head or village headman.

The headman may have no high traditional positions. The village traditional head or *liulu ni yavusa* is different from the village headman or *turaga ni koro*. The village headman then liaises or works with the traditional leaders in projects. Their roles are mostly administrative and they are contact persons for government or other external contacts or developments.

A review of the Fijian Affairs Board is currently being undertaken. The question is whether the restructure will take into account the aspirations of all Fijians, including urban-based Fijians. This is important for many resource owners with decision-making powers now reside away from their communities. Thus, there remains a sort of remote control over resources and the people using them. People living away from home may also have very different views of how resources should be used, developed or managed as they have different lifestyles and aspirations. The models above depict a simple process that people should be able to work with, but in some situations, elders or leaders in communities have migrated to urban areas and there is a new leadership at the community level. The challenge, therefore, is how the restructuring of the Fijian Affairs Board will take into account these changes, and how best they plan communities' future direction and linkages to the modern administration.

3. Should women be considered as participants or partners in fisheries management?

Women play a major role in most community-based work in Fiji, and every attempt has been made by NGOs, ministries and conservation agencies to include women. Yet women are still expected to pre-

pare and cater food for the very workshops and training activities they are attending. So, women must both attend meetings and workshops, and cater these affairs. The challenge then is for women to be *partners*, not just participants, in the decision-making, planning, monitoring and evaluation process. Some NGOs, such as the Women in Fisheries Network, specifically target women. The question, however, is whether these activities should continue to target only women or, should women's development come under a community approach to fisheries management? To do so would require that all hindrances and social restrictions that may deter full partnership in such activities be identified and addressed.

4. More networking among the various sectors involved in community-based management work

In spite of all the progress made in community-based management in Fiji, there remains considerable room for linking different ministries, and NGOs and other sectors. Coastal resource management involves not only the shoreline, but all activities within watershed areas, the upper reaches of rivers and farming areas. Factors affecting coastal fisheries are varied and inter-linked, and attempts to address them should likewise be inter-connected. These activities directly or indirectly affect any resource management work. Management initiatives should include the departments of forestry and agriculture, tourism and health, and take into account the Agriculture, Land and Tenant Agreement. Such connections will help keep various interested groups informed of each others' activities, and enable collaboration on community-based work. Increased networking among the various sectors will enhance the fisheries management work that has already started.

5. Continuity of community-based projects

A question that has haunted developers and managers in the past has been how projects can continue and be maintained long after the initiators, donors, specialists or experts leave. Monitoring and evaluation are essential for the success of a project. What happens three years after the 'outside' partner of a management project pulls out? Does the partner need to periodically visit the project throughout the following years to check the progress? This might be possible if only 20 marine reserves or taboo areas are considered. If, however, there are 200 or more *I qoliqoli* areas, then there must be a huge financial and human resource back-up system to continue the project. NGOs can play a crucial role in keeping the necessary groups informed and in touch with one another. The government could also consider building these management systems into the current restructuring of the Fijian Affairs Board, as this can

provide for a permanent mechanism of continuity for the people.

6. Indicators of success

There are numerous examples of success in Fiji Islands and most of these have been on biological measures, with little socioeconomic indicators. Complementary social indicators of success should also be drawn up where those people specifically identified as being dependent solely on marine resources within their *I qoliqoli* areas for the economic and social livelihoods, can be continuously surveyed over certain periods of time to ascertain change in lifestyle, social attainment, educational attainment and other such social and economic indicators. This should be divorced from other collective factors that can contribute to general social improvement at the village level. This will involve rigorous research, study and data collection but should be instrumental in establishing needed factors to gauge success of projects. Most importantly, this should involve communities doing their own research or being part of the assessment process.

Fiji Islands has come a long way with regards to community-based marine resource management, but it has a long way still to go. The above stated challenges reflect questions that continuously plague people at all levels about the relevance and success of these initiatives. FLMMA continue their work with vigour and enthusiasm after the success in the pilot areas of study, the Fiji Fisheries Division's recently introduced community-based fisheries management project will also be pursued with enthusiasm. These challenges remain and need to be answered and addressed in the near future.



Community valued in Pacific conservation

By Scott Radway, *Pacific Islands Report*, 28 June 2002

Simpson Abraham remembers bringing a new land-use plan to the people of Kosrae at a community meeting, and how his own uncle told him the plan was no good.

'My uncle stood up in the back and said, "To hell with that report. I will never, never support it," said Abraham, Director of the Kosrae Resource Management Program. 'He thought we were taking over rights to his land.'

Abraham told that story yesterday at a workshop at the annual Pacific Islands Environmental Conference.

The people of Kosrae — an island state in the Federated States of Micronesia — rejected the land-use plan because no one had consulted them, he said. Officials just showed up one day with the finished copy of the plan, he said.

Abraham was part of a panel of regional leaders who discussed the need to engage the community if any environmental program is going to work.

Pacific Islanders, especially in more traditional areas, do not respond to outsiders dictating what should be done with their land and reefs. There is a great strength in working through traditional leaders and employing traditional practices that have successfully maintained the environment for

thousands of years, said Noah Idechong, a Palauan delegate.

Idechong said many Palauans were dispirited in the 1980s because fish stocks were being severely harmed by poor fishing practices. Idechong turned to grass-roots leaders and worked with village chiefs to temporarily ban fishing in certain areas, as was often done long ago to preserve resources.

That action later led states to establish official marine protection areas and Idechong is now working at a national level to establish a united system of preserves. Idechong, who has won several prestigious national awards for his work, said that by building from the village up, the effort was successful.

If the national government had decreed marine preserves from the beginning, villagers would never have enforced them.

Alan Freidlander, from the Oceanic Institute in Hawai'i, said the state has had greater success protecting coral reefs and fish stocks in areas where traditional culture survived. Traditionally, people have had a stronger connection with the land and sea. Freidlander cited the deterioration of culture in Hawai'i as a reason for reef degradation.

Guam officials, too, said fighting coral reef degradation has been harder because of a dilution of tra-

ditions there and the loss of a strong connection to the environment.

But Willy Kostka, executive director of the Conservation Society of Pohnpei in FSM, said that while traditional culture is a great strength, balancing village input with government designs is a great challenge.

'If you deal with the community too much, the government gets jealous. And if you deal with the government too much, the community gets jealous,' Kostka said. 'It's a balancing act.' Kostka said he tells his staff never to forget that if each side doesn't support a goal, the plan will fail. Political will is as important as community support, he said. 'It has to be the dream of everyone,' Kostka said.

Pacific Community Reef Restoration Project lauded In Washington, D.C.

News Release, Pacific Islands Report, 16 April 2002

Community leaders from the Pacific were in Washington, D.C. recently to share the successes of a unique coral reef restoration initiative, which rehabilitates reefs while sustaining rural livelihoods. The Coral Gardens initiative of Counterpart International also aims to enhance the cultural heritage of coastal regions.

Environmental leaders, representatives from multi-lateral agencies and private foundations lauded the success of the Coral Gardens programme in restoring reefs that in turn rejuvenate fisheries, and the local communities that feed off them. Coral Gardens sites are in the Melanesian archipelagos of Fiji and Solomon Islands.

Through a community-based initiative developed by Counterpart International and its Pacific partner, the Foundation for the Peoples of the South Pacific, Fiji (FSP), Coral Gardens methodologies provide the tools for conservation, fisheries restoration, and sustainable income generation.

Developed by acclaimed biologist Austin Bowden-Kerby, Coral Gardens leaves to communities, the acceleration of natural coral reef formation and recovery, the development of no-fishing marine protected areas, and the stewardship of reefs by the local communities that own them.

Luxury resorts such as the Shangri-La in Fiji Islands are helping to conserve and highlight the aquatic splendor by hiring local 'reef guides' trained by the programme to share the reef's beauty with the 400,000 guests that visit Fiji annually.

Small aquaculture enterprises owned by women are providing alternative livelihoods and technical training is helping to develop ecotourism enterprises to boost the Fijian economy.

Counterpart and partners hope to establish a regional training center and environmental trust fund through Coral Gardens, ensuring adequate resources for long-term conservation of the region's reefs.

'We have these resources on loan, and are the stewards that must carry them to future generations,' said Alisi Daurewa, Executive Director of FSP.

Counterpart International, born as The Foundation for the Peoples of the South Pacific, has worked with Pacific Island communities since 1965, helping them to solve their own self-defined needs.

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Population and gender dynamics in coastal conservation in East Africa

By Bronwen Golder, Senior Research Fellow, and Mia MacDonald, Population and Environment Consultant, Conservation Strategies Unit, World Wildlife Fund

Source: InterCoast, Winter 2002

Along the east coast of Africa lies one of the richest marine ecosystems in the world, spanning over 300,000 square miles from Somalia in the north to Mozambique in the south. The World Wildlife Fund (WWF) defines this area as the East Africa Marine Ecoregion (EAME) (Ecoregions are large units of land or water that contain geographically distinct assemblages of species, communities, dynamics, and environmental conditions.)

With its diversity of fish, corals and mangrove forests, the EAME is among the ecologically richest, rarest and most endangered marine ecoregions on earth.

Today, extensive fishing, destruction of coral reefs, and the clearing of mangroves are increasingly threatening this unique marine system. To address these threats, WWF has initiated conservation plan-

ning and action across the ecoregion. Effective conservation action at such a large scale requires an understanding of, and response to, far more complex biological and socioeconomic interactions and trends than site-level work demands. Population is one of the key socioeconomic factors at work across the ecoregion scale, often shaped by gender dynamics. Along with factors such as fertility rates and migration patterns, gender dynamics play an important role in determining the amount of pressure that is likely to be placed on human and natural resources.

In late 2000, WWF undertook an analysis of population and gender dynamics in a number of coastal communities within the EAME, specifically in Tanzania and Mozambique. This article describes the study's findings, what they suggest about the links between gender and population, and ways of addressing these links to advance conservation goals in coastal ecosystems.

Findings: Gender and population links

Population dynamics provided important information about current and anticipated pressures on the resources of the EAME, and, as anticipated, gender emerged as a key element determining men's and women's access to and use of resources in the ecoregion.

Gendered use of resources

The following were the main findings regarding gender and resource use:

- As the main household breadwinners, men control access to almost all resources and are primarily responsible for much of the destruction in the marine environment. Men's primary activity is fishing in open waters, often using dynamite and poison to secure their catch. Men also cut mangroves for boat and home construction. In the Tanzanian communities studied, palm leaves used for handicrafts are the only resource women alone control. And in most villages in coastal Mozambique, women are not allowed to fish, although they do process and market the men's catch.
- Women, as household managers and increasingly to earn extra income, use primarily those marine resources that are close to land. This is largely the result of prevailing cultural mores. Women use mangroves for fuelwood and make charcoal for household consumption or sale in markets. They also collect small marine life such as seaweed, crustaceans, oysters, and turtle eggs, often damaging coral reefs and disrupting turtle breeding in the process. Women are increasingly processing these marine resources and selling them, often to tourists.
- Women, although they are generally the main producers of food through subsistence agriculture, tend not to own or control land. In addition, they rarely have access to technology that would enable more sustainable use of resources. In many cases, men also lack such access, but conservation programs more often target men with programs that provide new sustainable technologies.
- Poverty plays an important role in gendered use of resources. In general, and especially in Tanzania, women in wealthier households do not traditionally or by necessity earn money, so they rarely use marine resources directly. But most people in these coastal communities are poor and so are heavily reliant on local marine resources. Widespread and, in some cases, growing poverty are putting new pressures on women to contribute to household income.

Population and gender

Population dynamics in the two countries have strong links to gender. Fertility, though falling, is still high, with an average of five children born to each woman in Tanzania, and nearly six to every woman in Mozambique. In rural areas such as the coastal villages studied, fertility is even higher. Women in these communities have limited access to family planning and reproductive health care, and overall rates of contraceptive use remain very low. The 2001 report by the New York United Nations Population Fund, *State of World Population 2001*, states that only 16 per cent of women in Tanzania and 5 per cent in Mozambique use a modern contraceptive method, with even smaller percentages the norm in rural communities. Women's status is also low, with only a small proportion of girls completing school. Because secondary schooling is a strong predictor of lowered fertility, lower education levels for women often lead to higher levels of population growth. Another outcome is that large numbers of women are illiterate. Estimates from the *State of World Population 2001* suggest rates at the national level of 31 percent in Tanzania and 70 percent in Mozambique. As a result, women's power to determine family size is limited.

Dynamism of the situation

The state of both gender and population are dynamic in the EAME. In most of the coastal communities studied, poverty and population are rising, in some cases very quickly, suggesting even greater future demands on resources. Ironically, some communities view the growing population as positive since it provides a larger market for their wares, including processed marine life. At the same time, out-migration is increasingly common

and also has a link to gender. Men usually migrate in search of waged work in cities, leaving women in charge of households and in need of money, which is largely secured through increased use of forest and marine resources.

Indeed, throughout coastal Tanzania and Mozambique, growing numbers of women are undertaking economic activities, the result of household food security needs, male out-migration, a desire or need for more household income (often to pay for health care or schooling for children), and changing social mores. In some communities in Tanzania, women have been driven by these changing circumstances to begin fishing, breaking long-standing gender norms. Structural factors are also playing both planned and unplanned roles in this change; among these are the increasing marketization of local economics, government commitments to gender equity in employment and education, and donor-funded conservation programs that emphasize women's role as resource managers.

Interpreting the findings and moving forward

The results of the analysis suggest that conservation objectives will not be met in the EAME or many other coastal ecosystems if gender and population realities are not addressed. The following are some of the realities revealed by the analysis that should be applied to the EAME and other coastal areas:

- Women are important resource users and managers who, along with men, need education, training, and inputs that will enable them to use coastal resources more sustainably. The analysis revealed that women resource users were generally more open than their male counterparts to shifting harmful economic activities such as the collection of turtle eggs to less environmentally destructive, income-earning pursuits such as basket weaving or sustainable mariculture. But, although the law in Mozambique guarantees women and men equal access, women still have limited control over assets and resources. This suggests the need to encourage involvement of both men and women in community discussions and actions rather than engaging only those who can claim principal use or ownership of resources (which in most cases are men).
- Greater awareness of gender-based resource management can play an important role in policy development and action. At national levels, both Tanzania and Mozambique have policies that are gender-sensitive in writing, but government agencies lack the necessary capacity in gender analysis and programming to imple-

ment them. Support for gender training of key stakeholders and government coastal resource administrators could be an effective response.

- There is a strong link between high fertility and the low status of women in coastal communities. Limited family planning, reproductive health services, and educational opportunities reinforce these links. Health and education infrastructure in coastal areas and governmental actors that can prioritise its delivery are critical. Also important is long-term monitoring of population trends, joined with planning to address their potential impacts on coastal resource use.

This could be accomplished through support for NGOs that deliver reproductive health care in underserved communities, and partnerships with government agencies or NGOs to improve health or school facilities. Government agencies or conservation managers might also undertake or support studies of migration patterns and their impacts on gender.

The importance of collaboration

Collaboration will be a critical factor in the success of coastal conservation. As success increasingly depends on existing and shifting socioeconomic realities, coastal resource managers' traditional areas of expertise may not be sufficient to implement a broad-based conservation strategy. Such a strategy may require attention to issues of reproductive health, migration, and women's status. It is neither efficient nor desirable, however, for coastal resource managers to become experts in such areas. Rather, collaboration with governmental, non-governmental, and community groups will most effectively address critical gender and population dynamics. Throughout most areas of the world, and even in the most remote communities, organisations exist that can take responsibility for promoting or providing reproductive health care, education, or support in sustainable resource management. The challenge for conservation organizations is to build a dialogue and shared understanding with those groups so that issues of common interest can be addressed constructively.

Lessons for future action

The EAME gender analysis makes a strong case that successful conservation action in the EAME will be impossible without recognizing the links between gender and population and strategically responding to the different roles of men and women in resource management. High rates of fertility and poverty are unlikely to change unless women have more access to reproductive health care and education. And, as resource users, women

also need to be involved in community decision-making about the use or protection of resources.

Finally, because the analysis revealed that migration patterns are gender-related and have a direct impact on resource use, conservation planners should understand and address both the drivers and impacts of migration.

Integrating women's subsistence fishing into Pacific fisheries and conservation programmes

By Elizabeth Matthews, Marine Affairs Department, University of Rhode Island, Kingston, Rhode Island, USA

Source: InterCoast, Winter 2001

Fishing is generally thought of as what fishers do — catch fish. A sentiment among some Pacific Island fisheries departments is that 'women don't fish, they just collect shells'. The extent or affect of that shell collecting is often minimized or overlooked completely. This has helped to isolate women's concerns from mainstream fisheries programmes. For instance, the Secretariat of the Pacific Community (SPC) began a Women in Fisheries programme within its Coastal Fisheries section. Although women's needs and collection activities are increasingly acknowledged and studied, they are usually the focus of a separate and special office, not integrated into the fisheries development programme as a whole. In addition, regional organisations and governments rarely integrate the impacts and needs of these collection activities into broader fisheries conservation and management programmes. Many women in the Pacific Islands ensure a daily supply of fresh seafood for their families by gathering invertebrates from nearshore areas. This aspect of the traditional food production pattern has remained prominent even as imported and processed foodstuffs have gained wide local acceptance. Various fresh and saltwater molluscs, crustaceans, sea cucumbers, urchins, and prawns are eaten on a daily basis throughout the region. These invertebrate species are collected from the reef flats at low tide, or from mangroves, rivers, and streams in both rural and urban areas. Often the invertebrates are collected in rural locations, transported, and then sold in urban areas where adults are more likely to work in offices than in traditional gardens and lagoons.

Although lifestyles have changed, the taste for traditional foods remains. Some invertebrates are exported, most notably trochus, dried and smoked sea cucumbers, and in some areas both live and dead corals. After centuries of continued exploitation, some invertebrate species are showing localized signs of depletion. Stocks that could once support daily harvest are feeling the effects of overexploitation and pollution. The combina-

As pressures on the EAME and other coastal ecosystems around the world increase, the resources that support millions of people are threatened. Protecting the biodiversity of these rich systems will require strategic action that is sensitive to the critical role that gender dynamics play in the use of coastal resources.

tion of overexploitation from a growing population and from increasing commercial enterprises, habitat degradation (especially mangrove destruction, erosion due to land-based construction and development, destructive fishing, collecting practices, and pollution), and the lack of conservation programs for invertebrate species have contributed to this decline.

Women's activities and impacts

Women generally engage in reef gleaning by walking along the reef flats at low tide, collecting invertebrates, small fish, and seaweeds. They engage in other activities as well. In Fiji Islands, women collect freshwater mussels from rivers, small crabs, shells, sea cucumbers, and urchins from reef flats, and mud lobsters and crabs from mangroves. In Palau, women collect clams from mangrove areas as well as molluscs, sea cucumbers, crabs, and urchins from reef flats. In Kosrae, women use gill nets to catch a variety of fishes from shallow reef flats. A quarter of Kosrae's fish catch is caught by women in this way. Women also collect mangrove crabs, octopus, eels, anemones, seaweeds and numerous kinds of molluscs. Little quantitative data is available on the extent of these activities. However, in 1993 it was estimated that women in Vavau, Tonga, collected about 230 tons/year from the reef flats. This includes shellfish, mangrove crabs, jellyfish, sea cucumbers, and algae (especially sea grapes, *Caulerpa* sp). At one time these were purely subsistence activities; today, however, most women sell at least part of their catch in markets.

Occasionally women resort to destructive methods in order to collect some species. They break coral heads, overturn rocks, and walk on delicate corals in their search for food species. In Tonga, for example, reef gleaners often use knives, iron poles or hammers to smash corals in order to find shells. They also leave coral encrusted rocks overturned after their visits to the reef flats, which can cause the death of the exposed organisms. Women in

some areas continue to use traditional methods that utilize poisons obtained from plants and sea cucumbers to stun fish, possibly affecting other species as well. In Fiji, women may collect freshwater prawns by pouring bleach, pesticides or fertilizers into streams and rivers. Although many of these practices have not been officially documented in the region, fisheries and conservation department personnel have acknowledged them as one of the serious threats facing the reef environment.

Environmental degradation

Environmental degradation of inshore areas is an increasing concern as many countries in the region contend with growing populations and increasing urbanization and industrialization, under the difficult island conditions of limited resources and space. The major environmental problems affecting coastal areas in the region include land-based sources of pollution, deforestation leading to erosion and sedimentation, mangrove and other habitat destruction, unplanned and rapid coastal development, and destructive fishing methods. These are compounded by rapid urbanization, a growing population, and the low priority given to environmental concerns in many places in the region.

Invertebrate species, because they often live close to land on the lagoon or shore bottom, can be very susceptible to land-based pollutants. They can accumulate bacteria or diseased organisms from human wastes, pesticides, or heavy metals making them dangerous for human consumption. The invertebrates can also be killed outright by contaminants, suffocated by sedimentation, or eliminated due to loss of appropriate habitat.

Integrating women's needs into fisheries management

Fisheries departments throughout the Pacific region are concerned with downturns in nearshore fish stocks, due to overfishing and habitat loss. One of the most common solutions is to encourage the use of offshore resources. 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 due to oversight or isolation from mainstream fisheries programs.

In fact, even as men are moving into deeper waters to protect the inshore lagoon resources, women continue to collect small fish and invertebrates from the shallow waters. Many nearshore invertebrate species are showing signs of decline. In order to more fully protect invertebrate species and women's collection activities, a more holistic and

integrative view of fisheries management should be taken. A management strategy should:

- Include invertebrate species in fisheries management programs. Species important for subsistence and small-scale local markets should be included.
- Increase priority of environmental protection of inshore areas and their resources in the Pacific Islands region.
- Decrease the amount of mangrove and other habitat destruction.
- Develop local education and outreach programs focusing on wise collection strategies, especially the use of non-destructive methods, the need for environmentally sound local practices at the village level, and the importance of all species to the health of the lagoons and nearshore areas.
- Use locally important and depleted species (i.e. sea cucumbers, molluscs, urchins, small crabs, and seaweeds) instead of non-native-introduced species in aquaculture and mariculture trials. Small-scale village aquaculture projects could be used to rejuvenate popularly harvested species in local areas and contribute to local participation in stock management and conservation.
- Integrate conservation plans into all future women's fishing and collecting projects. There is going to be an increasing danger of overexploitation of invertebrate species as women's fishing projects become more prevalent in the region.
- Explore non-fisheries-related income generation schemes for women to take additional pressure off local resources.
- Use a holistic view of fisheries management that focuses on ecosystems and habitat rather than individual species. One means of creating holistic conservation and management strategies is through the use of linked marine and terrestrial protected areas as part of a larger management program.

Women and other reef gleaners will continue to collect these inshore invertebrates, whether or not fisheries personnel take notice. They will collect invertebrates from reef flats that may not be able to sustain a continued harvest if the environment is continually assaulted by damaging human activities. Serious efforts should be made to assess the status of these inshore invertebrate stocks and to develop sensible management strategies for their protection.

Learning about land crabs in Palau

By Elizabeth Matthews, Palau Conservation Society

Land crabs are a very popular food in Palau. Women and children collect the crabs in large numbers as they emerge from their burrows in the forest in the late afternoons. Some land crabs migrate to the sea to release their eggs around the full moon. Others stay closer to the forest. In Peleliu, an island at the edge of Palau's southern lagoon, land crabs are an important resource. Peleliu crabs are sold in markets and restaurants around Palau, and are common delicacies on plates served at local customs.

Although land crabs are a popular food item throughout the Pacific region, very few studies have been conducted on them. In Palau, they are a completely unmonitored resource. No one tracks their status, sales or export. In addition, local markets do not keep detailed records of sales for any of the species that are sold.

It is often assumed that the land crabs are an abundant and inexhaustible resource. However, there are signs that these crabs are beginning to be over-exploited. In 1994, Palauan law made it illegal to export crabs and lobster from the country.

Although land crabs are included in this export ban, it is still possible to export them as *ukaeb* (mixed with coconut and stuffed in a crab shell). No records are kept of how many land crabs are leaving the country in this form.

Some women who have traditionally collected these crabs for subsistence and commercial purposes have begun to notice declines in the numbers of crabs they collect.

In fact, in 2001, the women's group Ngaratatirou, asked staff at the Palau Conservation Society to

conduct a study of the land crabs in Peleliu because they were concerned with a diminishing harvest.

The Palau Conservation Society recruited three eighth-grade students from the Peleliu Elementary School to help conduct the study of land crabs. The research team interviewed 23 women about their land crab collection activities, and measured and weighed close to 500 land crabs found in the wild and in containers at peoples' homes. Fieldwork for this study was conducted from April to June 2002. These are the peak harvesting months for Peleliu land crabs.

The most commonly collected land crabs in Peleliu are *Cardisoma hirtipes* (*rekung el beab*) and *Cardisoma carnifex* (*rekung el daob*). *Gecarcoidea lalandii* (*kesuar*) is less commonly collected in Peleliu, since many people have allergic reactions to the crab. A fourth crab species (*cheoich*, *Eriphia sebana*) was often seen in markets along with land crabs. Although sold with land crabs, this species is not a land crab. It is found in and around mangrove areas.

Much of Peleliu's coastline contains long stretches of sandy beaches. Peleliu also contains large forested areas. The land crabs can be found among the



Students weighing and measuring land crabs being raised in a truck tire.



Rekung el beab
(*Cardisoma hirtipes*)



Rekung el daob
(*Cardisoma carnifex*)



Kesuar
(*Gecarcoidea lalandii*)

roots and brush in many sites on the island. All of the forested areas are secondary growth due to the massive destruction of vegetation that occurred on the island during World War II. Many areas appear to have been upturned from the impact of bombs exploding and then regrown with vegetation. These areas are dense and tangled messes of roots and scrubby second growth trees — a perfect site for land crabs to find protective holes.

Land crabs can be collected all year, but at certain times of the year they can be seen almost everywhere in Peleliu. In southern Palau, they are most abundant from April to May, especially around the time of a full moon. Land crab eggs need to be in salt water in order to hatch. *Cardisoma hirtipes* (*rekung el beab*) females migrate from their holes in the forest to beaches to release their eggs in the sea during the few days before or after the full moon. The land crabs are easily harvested during this migration. They are also harvested at other times of the month when they emerge from their burrows to feed in the early morning or late afternoon. Peleliu state law prohibits land crab collection the three days before and the three days after the full moon. At the beginning of this study there was little enforcement of the law; however, enforcement was increased towards the end of the study.



Female land crab heavy with eggs

In the late afternoon, groups of women and their children drive to their favourite sites. The dark crabs are quite visible on the white coral roads that cross all over southern Peleliu.

During the interviews, there was general acknowledgement that people preferred to collect female land crabs. Collecting gravid females is not illegal, but some women told the research team that they thought it was better to let the females with eggs go. However, the team did not see an overwhelming number of females, with or without eggs, in the collection bags the team randomly sampled.

Many of the women who collect land crabs bring them home and raise them in pens. The land crabs in these containers were much larger than any that the research team measured in the wild. The crabs are fed a richer diet in the pens than they regularly eat in the wild. Women feed them coconut, rice and a variety of non-toxic leaves. The crabs are usually kept in the pens for several days before the household eats them.

Half of the women interviewed sold crabs. They are sold cooked whole, or more commonly as *ukaeb* (cooked with coconut and stuffed into a crab shell). *Ukaeb* is a very sought-after food for special occasions and customs. Most of the women who sell crabs from Peleliu receive requests from people living in the main town of Koror who need 100 or more pieces of *ukaeb* for a custom. Other women sell crabs in local markets.

The research team learned about several activities that could contribute to a decline in the land crab population: collection of gravid females, preference for females in general, unmonitored export of land crabs, initially unenforced state conservation laws, more people who are collecting the crabs, use of freezers to store crabs, and use of cars to reach land crab collection sites.

Construction of roads throughout Peleliu may also be disturbing the monthly spawning migrations of crabs if the crabs can no longer travel from the forest to the sea. Finally, several women mentioned that some areas have been remarkably dry in recent years. Land crabs, which must remain wet while in their burrows, may be affected by such dry weather. It was beyond the scope of this research project to study the affects of these or other factors (such as predation by birds) on the land crab population.

Many women suggested management strategies to protect the land crabs from over harvest. They mentioned that previously women did not always collect the whole crab, but only broke one of the large front claws off. Some women recommended several sites that could be closed to all harvest for a year or more. They also suggested setting minimum sizes on both crabs collected as well as those that are sold as *ukaeb*. Many women thought it should be illegal to collect crabs with eggs. Some women were curious about the possibility of farming the crabs.

This study is the beginning step in understanding the status and uses of the land crabs in Peleliu. The Palau Conservation Society will continue to work with the people of the state to see what actions they want to take in regards to land crab collection activities. If they decide to develop a management strategy, the suggestions offered by the women in this study would be a strong starting point.