

# Chapter 3

## Managing the Use of the Ocean

Managing the use of the immense Pacific Ocean will be a key challenge for Pacific Island countries in the twenty-first century, requiring stronger collaboration among communities, governments, and organizations throughout the region.

This chapter examines how Pacific Island countries could best address this challenge in face of current trends. The chapter is divided into five sections, addressing the most pressing issues in ocean management. Section A describes the nature of the challenges and opportunities the ocean presents. Section B outlines a strategy for managing coastal areas in the Pacific. Section C focuses on the management of shared tuna fisheries and on ways Pacific Island countries could optimize their benefits under a new regional management regime. Section D analyzes the policy and regulatory environment for offshore mining. Section E summarizes key findings and recommendations. Further analysis of ocean management and a statistical annex are included in Volume III of this report.

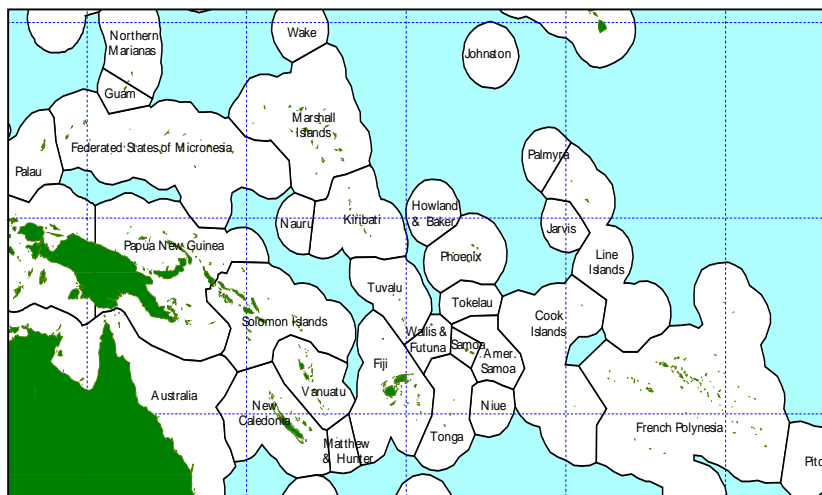
### A. The Nature of the Challenges

The Pacific Ocean occupies 180 million square kilometers—half of the earth’s sea surface and more than a third of the earth’s surface. Scattered in the western half of this immense area are 200 high islands and 2,500 low islands or atolls, which together make up the 22 countries and territories of the Pacific Islands (figure 3.1).

In this “sea of islands”<sup>3</sup>—where the ocean exceeds land masses by an average factor of 300 to 1—the people of the Pacific have developed a

<sup>3</sup> Hau’ofa 1993.

Fig. 3.1. The Exclusive Economic Zone of Pacific Islands



*Courtesy of Secretariat of Pacific Community*

unique relation with the ocean that has helped define the ways communities communicate and are governed, and continues to be a source of cultural significance and inspiration.

The relation that Pacific Island people have with the ocean is dualistic. The vast offshore areas—the deep ocean—represent the frontier, a region of underexploited resources of high economic and strategic value. But for most Pacific Islanders, it is the coastal areas surrounding their islands that provide the food, income, culture, and recreation that are so important to the Pacific way of life.

Yet coastal areas are increasingly threatened. Overexploitation, pollution, mining, and poor coastal planning are leading to depletion of fisheries and to coastal degradation, undermining the livelihood of coastal communities.

The deep ocean presents challenges and opportunities of a different kind. Chief among them is the management of the migratory tuna fisheries of the Central and Western Pacific, the most important tuna fishing ground in the world. Pacific Island countries and distant water fishing

nations are at the verge of undertaking key decisions that will affect the benefits they derive from tuna resources for years to come.

Another emerging challenge in offshore areas is seabed mining. The recent resurgence of investors' interest in exploratory licenses makes it urgent for Pacific Island countries to adopt suitable offshore mining policies, and to extend potential national claims to the limits of the continental margin.

The three key challenges mentioned above — management of coastal areas, management of tuna resources, and regulation of offshore mining — are the most urgent issues that Pacific Island countries currently face in ocean management. Many other challenges and opportunities could emerge in the future. The Pacific Ocean has long been an area of strategic importance for national and external interests, and these are expected to continue to be a major shaping force in the future.

## B. Managing Coastal Areas

Much of the daily life of Pacific Islanders is spent near the coast. For them, coastal areas are vital sources of food, income, tourism, building materials, and protection against storms.

Pacific Islanders depend heavily on subsistence fisheries for their food security. Seafood comprises 28 and 67 percent of the animal protein consumed in Fiji and Kiribati -- substantially higher than the world average of 17 percent. The value of subsistence fisheries for food security can be gauged by how much Pacific Island countries would have to pay for imported substitutes if these fisheries ceased to exist. Fiji, Samoa, the Solomon Islands, and Vanuatu would each have to spend an additional US\$7–\$15 million a year for substitutes with similar protein content. Kiribati would require US\$18 million in alternative protein sources — equivalent to 38 percent of its GDP (table 3.1).

Many Pacific households supplement their income through the occasional sales of coastal products. While only about 20,000 Pacific

**Table 3.1. Value of Seafood to Food Security**

Country	Seafood available for consumption (kilograms per capita)	Seafood as percent of animal protein	Value of subsistence fisheries to food security (US\$ million) <sup>a</sup>	
			In protein equivalent	In calories equivalent
Fiji	51	28	6.7	3.9
Kiribati	150	67	18.0	7.0
Samoa	46	—	13.9	5.3
Solomon Is.	33	77	13.3	11.6
Vanuatu	21	33	14.7	8.9
World Average	16	17	—	—

— Not available.

Notes: For valuation methodology, see Volume III, Annex B.

a. Cost of importing equivalent amounts of protein, or of purchasing substitutes with equivalent caloric content.

Sources: Seafood consumption: 1995 per capita supply from national statistics. Seafood as percent of animal protein and world averages: 1997 data from FAO (2000). Others: World Bank estimates and Preston (2000).

Islanders were officially employed in coastal fisheries in the mid-1990s, an estimated 88 percent of households in Kiribati, 50 percent of rural households in Fiji, and 35-40 percent of households in Samoa fish on a part-time basis (KDOF 1999; SFD 1998; FFD 1997). Coastal products such as trochus shells, beche-de-mer (dried sea cucumber), giant clams, and pearls are significant contributors to national exports. Trochus shells, used in the manufacture of high quality buttons, are exported at volumes of 2,300 metric tons a year — 59 percent of the world supply. Pearl exports, primarily from French Polynesia and the Cook Islands, generate some US\$100 million in annual revenues (Icecon 1997; Dalzell and Adams 1994).

Tourism — a US\$1 billion a year industry in the region — is highly dependent on the quality of the coastal environment. And in many Pacific Island countries, sand, coral and coastal gravel remain the only source of construction materials.

Coral reefs, mangrove forests, and other coastal habitats also play essential roles in protecting the coast against storms and inundation. In Fiji, the annual value of this coastal protection function is estimated at US\$550 million for reefs and US\$60 million for mangroves (Sistro 1997).

## Current Trends

A 1998 World Bank-sponsored coastal survey of 31 coastal communities in the Pacific<sup>4</sup> revealed a widespread perception that coastal resources were declining. Only 10 percent of the 399 responses perceived that fishing catch per unit of effort had improved over the past decade. The main reasons cited for the perceived decline included overfishing; destructive practices such as the use of traditional poisons; more effective fishing technology; pollution; construction of causeways; siltation; and habitat degradation. Coastal resources were perceived to be declining even in isolated sites where population densities remained low.

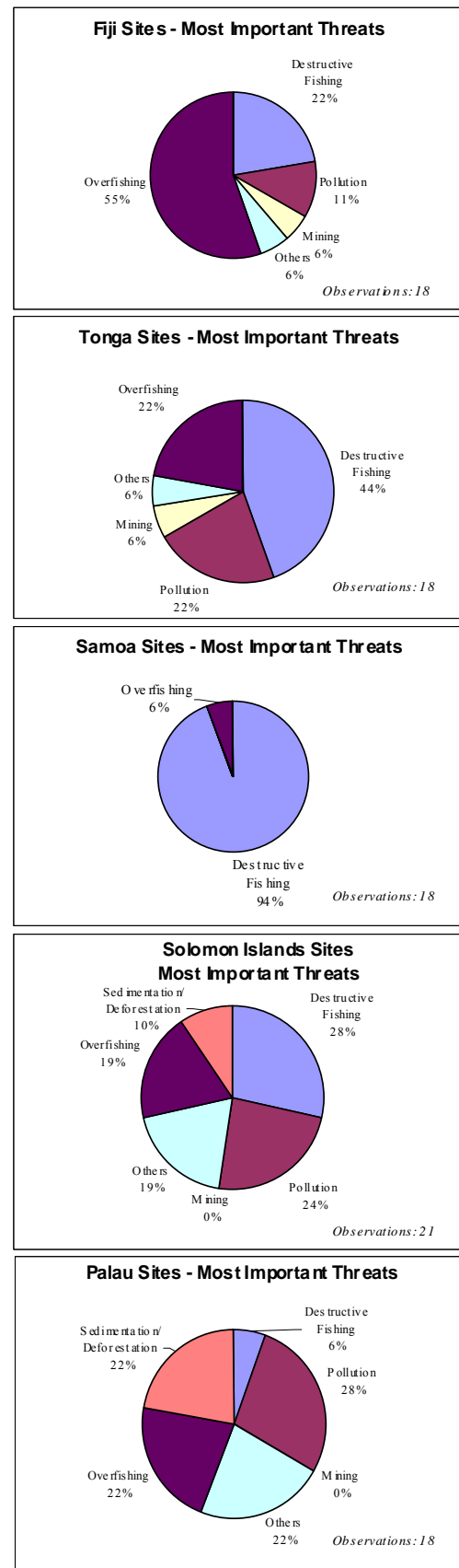
About half of the survey responses also perceived coastal habitats to be declining -- particularly coral reefs, coastal lagoons, and intertidal areas. In Fiji, 19 percent of the coral reefs are now believed to be under high stress (WRI 1999). Water pollution, commonly viewed as an urban problem, also appears to be increasing in the sites surveyed in Palau, the Solomon Islands, and Tonga (figure 3.2). Overall, the communities surveyed by the coastal study perceived pollution as the fastest rising threat to their coastal resources.

Damage to coastal areas is imposing substantial economic costs on Pacific Island countries. In Fiji the loss of coral reefs that are now under high stress could cause economic impacts on the order of US\$38 million a year. In the island of Upolu, Samoa, the losses in productivity of degraded coral reefs resulting from urban pollution have been estimated at nearly US\$170 per hectare of reef per year (World Bank 1995b). Coastal degradation is also resulting in land erosion, a higher incidence of ciguatera poisoning, and a rising exposure to storms and floods.

Pacific Island governments can no longer afford a policy of inaction. Halting the degradation of coastal areas is desirable on ecological grounds, but it is first and foremost a sound economic

<sup>4</sup> The survey was carried out in 31 sites in Fiji, Palau, Samoa, Solomon Islands, and Tonga (World Bank 2000a). This section draws on the results of this survey, as well as on contributions by John Virdin (Virdin 1999) and by Garry Preston (2000).

**Figure 3.2. Community Perceptions of Most Important Threats to Coastal Resources**



Source: World Bank (2000a).

decision: as the analysis of climate change will indicate (chapter 4), improved coastal management is one of the most cost-effective ways to reduce the islands' vulnerability to climate events, and to protect the resources on which so many coastal communities depend.

## **Key Challenges**

### ***Helping Communities Manage the Coast***

In a region with nearly 3,000 islands, managing coastal areas is a daunting task<sup>5</sup>. Pacific Island governments have wisely recognized that, for the most part, they lack the staff or budget to manage these vast areas, and will need to rely on local communities for much of the management interventions.

But communities also need urgent help. Findings from the coastal survey indicate that community-based management is insufficient to address the current threats to coastal areas. Help was felt to be most needed in:

- Raising the communities' awareness of the need to restrict their own fishing effort.
- Addressing threats that cannot be handled locally (such as pollution, poaching, and the impacts of major coastal infrastructure).
- Facilitating the application of customary laws (by incorporating them into by-laws, for example).
- Providing advice on technical aspects of resource management.
- Preventing abuses of power by local leaders.

### ***Improving the Response of Government to Local Needs***

Pacific Island Governments in general do not view coastal management as a high priority. Findings from the coastal study indicate that on average less than 25 percent of staff time at

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<sup>5</sup> Coastal management consists of measures such as closing reefs or mangrove areas to allow for natural regeneration, minimizing waste disposal, prohibiting destructive practices, and building infrastructure in ways that minimize impacts.

national fisheries agencies is spent on coastal management. Among the 31 sites surveyed, 48 percent had never been visited by a government official to discuss coastal management issues. Distances alone could not explain this finding, as three of the sites were located within short distances from the fisheries agencies' headquarters.

Some of the key impediments are institutional. While traditional Pacific societies were holistic, modern governance systems are commonly modeled on those of the former colonial powers, with weak central planning and well-defined sectoral agencies. These systems are ill suited to the integrated nature of the challenges facing the small islands.

Government staff also have few incentives to assist communities in coastal management. First, in contrast to infrastructure projects, the results of which are visible and easy to report, management assistance is typically process oriented and the results are less concrete. Second, extension workers involved in coastal management are mostly junior-level staff who tend to be promoted to "more quantifiable" activities as soon as they acquire the knowledge that would have made them more effective at the community level. Third, finance ministries in some Pacific Island countries expect sectoral agencies to contribute to public revenues. For fisheries agencies, this encourages a focus on license fee collection and tuna fisheries development at the expense of much needed coastal management support. Redeployment of license fee revenue to development activities in other sectors also plays a role in the weak attention generally paid to coastal management.

Finally, many Pacific Island countries lack the capacity to respond rapidly to the requests of coastal communities. Donor-driven priorities, weak communication links, and strict sectoral mandates are often to blame, but governments also continue to support programs that may be of debatable value to coastal communities. Aquaculture, tuna fisheries and deep slope fisheries, for example, are commonly promoted as income-generating alternatives to coastal fisheries, yet feedback from the communities surveyed by the coastal study indicated that they have not been effective in relieving pressure on coastal resources (World Bank 2000a).

## A Strategy for Coastal Areas: the Co-Management Approach

As seen, coastal areas in the Pacific are facing urgent challenges that neither governments nor communities can manage on their own. A collaborative partnership between coastal communities, governments and other external organizations – a “co-management” approach – offers the greatest prospects for Pacific Island countries to effectively manage their coastal areas (figure 3.3).

In many rural areas of the Pacific, there are strong traditional decision-making processes that can play a vital role in this process. Co-management requires working with these traditional institutions, increasing the effectiveness of local governments in meeting local needs, and involving national agencies where necessary. Such a decentralized process has the best chance of being responsive to the conditions and needs of coastal communities.

An effective co-management strategy should therefore:

- ❑ Identify clear institutional roles for each partner which build upon their comparative strengths;
- ❑ Ensure effective two-way communication between coastal communities and their external partners; and
- ❑ Establish intersectoral planning and coordination among government agencies responsible for coastal areas.

### ***Drawing on the Strengths of Each Partner***

Communities and their external partners should have clearly defined roles that maximize their comparative strengths. Monitoring compliance with management rules, for example, is best done by communities, while urban pollution is best handled by the government. A clear division of responsibilities helps achieve results and minimize the costs of management.

The results of the coastal survey suggest the following roles for the key institutions involved in coastal management:

**Figure 3.3. A Co-Managed Fish Sanctuary in Samoa**



***The Role of Communities.*** Local communities, and particularly traditional leaders, should be given the major responsibilities for managing coastal areas outside towns. Their responsibilities might include:

- Adopting and enforcing local management rules (such as prohibiting sand removal).
- Managing threats to coastal areas that are within their control (such as local garbage).
- Restricting their own harvesting effort to allow resources to recover.
- Controlling poaching by people from outside the community (in collaboration with the government).
- Mobilizing the community for joint action (such as clean-up efforts).

***The Role of Governments.*** Government agencies such as Fisheries and Environmental Divisions have a critical role to play in providing an enabling environment for community-based management and handle threats beyond communities’ control. They should be responsible for:

- Providing a legal framework that supports community user rights over coastal areas (preferably exclusive user rights) and recognizes community management rules as by-laws.

- Reducing the harvesting of coastal resources through export or point-of-collection restrictions and limits on commercial harvesting licenses.
- Requiring environmental impact assessments for all new projects likely to affect the coast.
- Improving waste management in and around towns.
- Carrying out awareness activities aimed particularly at community leaders.
- Ensuring accountability and transparency in the issuance of fishing licenses.
- Supporting collaborative enforcement with communities, particularly to address threats external to their sites.
- Facilitating consensus building and conflict resolution between communities for the management of larger areas of the coast.
- Ensuring adequate incentives and technical back-up for extension staff working at the community level.
- Using alternative income-generating programs cautiously. While their objective may be laudable, extension staff and scientists are often not well positioned to provide communities with the sound business advice they need to make the enterprises succeed. Linking communities with private sector investors may be a more effective way to increase local incomes.

Depending on the location and culture, co-management can be largely community based or more reliant on the government (in town areas, for example). Other partners such as non-governmental organizations, high-level policy makers, and donors can also play vital roles in facilitating co-management (box 3.1).

### **Box 3.1. Role of Other External Partners in Co-Management**

#### **Roles of Nongovernmental Organizations**

NGOs can play a pivotal role in catalyzing community action. According to the coastal survey, the partners most appreciated by coastal communities were those that maintained a long-term commitment to the partnership, provided assistance when so asked by the communities, relied on local institutions and processes, and promoted solutions that were technically and financially sound.

#### **Roles of High-Level Policymakers**

High-level policymakers in Financial and Economic Ministries can play key roles improving the macroeconomic incentives in support of coastal management. This includes recognizing coastal management as a national priority in development plans, supporting intersectoral planning, re-orienting development aid towards long-term support to coastal management, and removing the incentives that lead fisheries agencies to favor offshore fisheries development over coastal management – either by separating licensing and management functions or by allowing the agencies to retain license revenues to support coastal management.

#### **Roles of Donors**

Donors should provide long-term assistance to flexible, intersectoral programs that support community-based planning and encourage Pacific Island countries to develop their own solutions to coastal management. Donor-supported research should have immediate application at the local level, and training programs should be conducted in-country to prevent the draining of capacity caused by frequent attendance at regional meetings.

### ***Ensuring Effective Communication***

An effective two-way communication between communities and external partners is critical to the success of co-management. With government agencies often located far from coastal villages, it is essential that communication links be kept active. Only by institutionalizing the means by which communities convey requests for and receive assistance can the government response become more demand based and effective.

Several lessons can be drawn from the coastal study survey. First, it takes a long time for communities to absorb and process information provided by external partners. The assistance needs to be provided on a long-term basis and the information conveyed in as many ways as possible. Second, external partners need to be

able to respond rapidly to requests for assistance by communities -- requiring both reliable communication channels and access to information. Third, the assistance needs to be able to adapt to the changing nature of the threats affecting coastal areas.

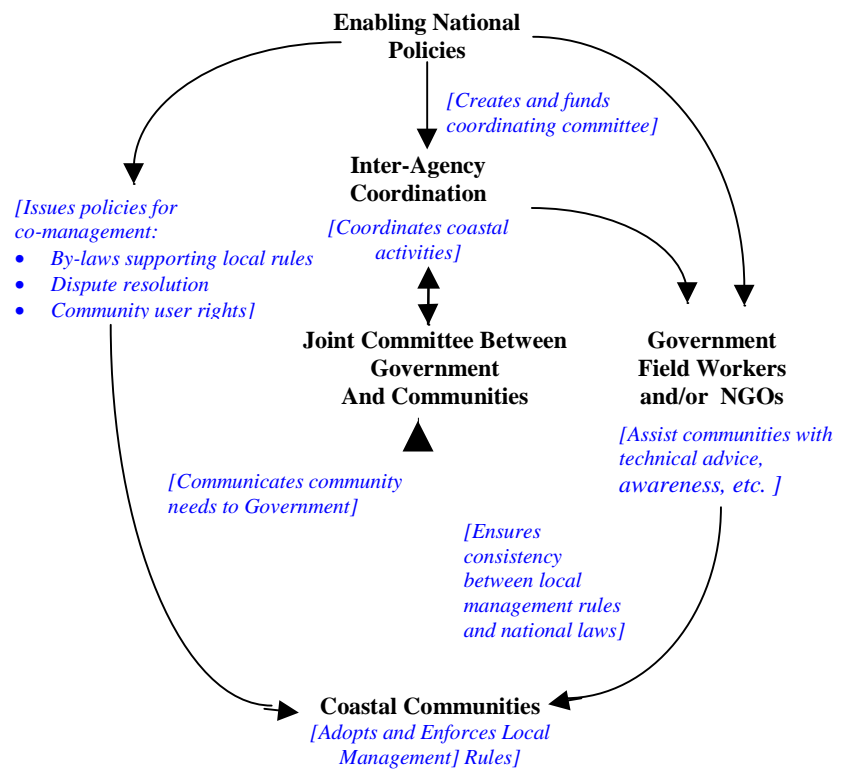
How can Pacific Island countries best address these challenges? Several recent initiatives suggest three possible solutions:

**Find strength in numbers.** Joint programs by different government agencies or between governments and NGOs increase the number of field staff assisting the communities, and help ensure that the assistance is multisectoral. The Samoa Visitors Bureau, for example, conducts periodic “road shows” from village to village, at which staff from various agencies — tourism, environment, health, and agriculture — offer advice to communities. Kiribati has also started sending multisectoral teams to the outer islands.

**Develop a network of experts.** Some of the advice that coastal communities request is highly technical. Field workers need access to a network of specialists who can provide quick responses to these requests and keep them informed of the latest developments. The Secretariat of the Pacific Community could play a major role in managing such a network by connecting field workers with regional experts through electronic mail.

**Strengthen local committees.** To the extent possible, there should be a single point of entry for communities seeking external assistance in coastal management. Some examples are starting to emerge in the region. In the Marshall Islands, the Environmental Protection Agency is working with island governments—where traditional leaders are represented—to develop coastal management plans. In the Federated States of Micronesia, joint committees made up of community representatives and state governments are starting to address the management of coastal resources. And in Samoa, fisheries extension staff conduct regular

**Figure 3.4. The Institutional Setting for Co-Management**



meetings with the village fisheries advisory committees established under a village fisheries extension program (King, Fa’asili and Taua 1998).

**Establishing Intersectoral Planning and Coordination**

As seen in Chapter 2, poor coordination and overlapping mandates are chronic problems for many Pacific Island governments. Sand mining licenses are issued with little consultation with environmental agencies, and coastal infrastructure is often built without assessing its environmental impact. For co-management to be successful, intersectoral coordination among government agencies responsible for coastal areas must be improved. Coordination can take place through an interagency coordination committee, or through the same forum where communities, government and NGOs interact (the “Joint Committees” shown on figure 3.4).

Several Pacific Island countries have taken steps to improve intersectoral coordination. In Palau, a task force was created to draft the national tuna

management plan. The task force included representatives from the environment, marine resources, foreign affairs, tourism and labor departments, the Attorney General's office, NGOs, and the Association of Governors. In Samoa, the Director of Environment plans to create an interagency committee to address environmental management. One of the ideas proposed is that staff from non-environmental agencies represent Samoa at regional environmental meetings, to help broaden national support for environmental management.

Many of these efforts have been spurred by two recent initiatives: the Biodiversity Strategy Action Plans (coordinated by the South Pacific Regional Environmental Programme) and the Tuna Management Plans promoted by the Forum Fisheries Agency. The initial funds for these committees provided the impetus for their operation, and allowed them to start addressing coordination issues outside of the original mandate for which they were created.

### ***Funding Co-Management***

The reliance of these emerging initiatives on external funding is a major concern for the future of co-management in the Pacific Island region. As funding runs out, some committees may cease to operate. It is essential that Pacific Island governments recognize the importance of these committees and provide funding for their continued operation.

Co-management does not require a large allocation of public expenditures. The Samoa fisheries extension program, for example, operates with an annual budget of only about US\$81,000 for on-going support to about 60 villages and extension of the program to 10 new communities per year (Legislative Assembly of Samoa 1999; Kallie 1999). In the Marshall Islands, the cost of the UNDP-funded coastal management plan for the Majuro atoll totaled US\$367,000 for four years of operation (UNDP 1996). Compared with the potential costs of coastal erosion or the loss of traditional fisheries, these expenditures are well justified.

## **C. Managing Tuna Fisheries<sup>6</sup>**

The ocean surrounding the Pacific Islands is the most important tuna fishing ground in the world. It provides a third of the world's tuna catch and 40–50 percent of the total supply to tuna canneries. Annual production during the 1990s averaged nearly 1 million metric tons, with a landed value close to US\$2 billion at current times (SPC 2000; FFA 2000).

Despite this value, the share captured by Pacific Island vessels remains modest. Most of the region's tuna is caught by distant water fishing nations, with Japan, the Republic of Korea, Taiwan (China), and the United States as the most important players. Catches by Pacific Island country fleets represented only about 11 percent of the total landed value in 1998 (figure 3.5).

Distant water fishing nations pay license fees to Pacific Island countries for the right to fish in their Exclusive Economic Zones (EEZs). In 1997/98, these fees amounted to over US\$54 million, with Kiribati, the Federal States of Micronesia, Papua New Guinea, the Marshall Islands, and the Solomon Islands as the top beneficiaries.

Pacific Island countries have long sought to increase their benefits from tuna resources – with some success. Starting with the creation of the Forum Fisheries Agency (FFA) in 1979, the coastal states have collaborated closely in the management of their shared tuna resources. This collaboration has paid off: regional operations such as the vessel monitoring system, the regional register system, and joint research, which cost US\$3.5 million a year, would have cost close to US\$21 million if they had been developed by individual countries.

Regional collaboration has also strengthened the Pacific Island countries' leverage with distant water fishing nations. The regional register, for example, prevents vessels with unpaid fines or outstanding offences – vessels who lack “good standing” – from operating in the waters of any of the 16 members of the Forum Fisheries Agency. Foreign vessels have been known to

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<sup>6</sup> This section is based on background studies by van Santen and Müller (2000), and Preston (2000).

pay fines of US\$1 million rather than lose their good standing in the region (Moore 1987).

Despite these successes, many Pacific Island countries have suffered crippling financial losses on their public investments in tuna fisheries. Early promises of high employment and export value failed to materialize as public ventures suffered from poor management, declining tuna prices, and competition from countries with lower operating costs. Overall, an estimated US\$200–\$300 million in past investments has failed to yield minimum economic returns. This means that for the region as a whole, the revenues from access fees have largely been lost through failed local investments.

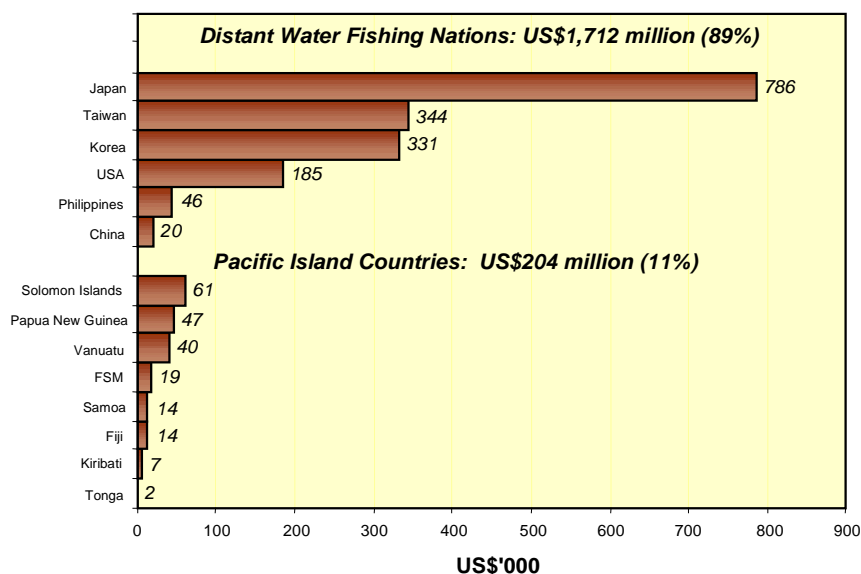
In 1987, Pacific Island countries collaborated in negotiating the U.S. Multilateral Treaty, allowing access by U.S. purse seiners to waters of FFA member countries. The treaty, renewed in 1997, provides for a fixed annual fee of about US\$18 million, a relatively high return when compared with bilateral agreements. Up to 50 percent of this value is paid through aid (Duncan and others 1999).

The U.S. treaty is the only multilateral access agreement in the region. All other agreements have been negotiated bilaterally between coastal states and individual distant water fishing nations. Common reasons offered by Pacific Island countries for this preference include fears of losing sovereign rights and bilateral aid, and reluctance to “subsidize” less well-endowed countries. As the analysis will show, however, multilateral agreements could be more effective than bilateral arrangements in ensuring that Pacific Island countries derive optimal benefits from tuna exploitation.

### The Future Regional Management Regime

Though tuna resources remain generally healthy, Pacific Island countries have correctly

**Figure 3.5. Value of Pacific Island Tuna Catch by Fishing Nation (1998)**



Sources: Forum Fisheries Agency (2000) ; van Santen and Müller (2000); Preston (2000)

recognized the need to strengthen their management. Since 1997, Pacific Island countries and distant water fishing nations have been negotiating a new regional convention to improve the management and conservation of tuna stocks, in accordance with the United Nations Fish Stocks Agreement.

The Multilateral High-Level Conference (MHLC) process, which has just been completed, is expected to result in a new regional convention and a commission for the management of tuna stocks in the Western and Central Pacific. In contrast with current arrangements, distant water fishing nations would also be members of the commission. Pacific Island countries, however, would retain the right to manage tuna resources in their EEZs.

Past discussions on the convention, however, have postponed resolution of two critical issues: the financial contributions by member states, and the allocation of total allowable catch, which was left to the future commission to decide. It is urgent that Pacific Island countries agree on a common position on these issues that maximizes their future benefits under the new regional management regime.

## **Working Together or Apart: A Strategy for Tuna Management**

The strategy outlined here examines how coastal states could increase the benefits from the use of their EEZs in the future. In essence, Pacific Island countries should aim to:

- ❑ Minimize their financial burden.
- ❑ Maximize benefits from the future allocation of total allowable catch.
- ❑ Negotiate effectively with distant water fishing nations for access to Pacific Island countries' EEZs.

### ***Minimizing the Financial Burden***

Historically, the costs of tuna management in the region have been borne by four key players:

- Distant water fishing nation vessel owners, through access fees and by bearing part of the costs of surveillance and on-board observers.
- Distant water fishing governments, through a share of the access fees.
- Donor agencies, through direct aid to Pacific Island countries or to regional organizations such as the Forum Fisheries Agency and the Secretariat of the Pacific Community.
- Pacific Island countries, through direct payments for some of the administration and surveillance costs, and through indirect payments (by a reduction of access fees).

The new management regime is expected to either create new arrangements for vessel monitoring, control, and surveillance, or to expand the existing regional systems. Even though Pacific Island countries would retain the right to manage tuna resources in their EEZs, as tuna migrate between the EEZs and the high seas their management would have to be standardized across the convention area, entailing additional obligations for the coastal states. New management requirements might include an effective legal system; vessel

observers; regular reporting; improved research; and the strengthening of institutional capacity.

Overall, the new regional management regime is likely to require substantial additional funding from Pacific Island countries, despite the proposed creation of a new fund based on voluntary contributions from convention members and aid agencies. The incremental costs to Pacific Island countries could be on the order of US\$2 million in additional investment costs, and of US\$3 million in annual operating costs (including those likely to be funded through aid). Distant water fishing nations would likely shoulder additional investment costs of US\$6 million and annual operational costs of US\$7 million (table 3.2).

The future costs of the convention to Pacific Island countries will depend largely on the amount of foreign aid available, and on the willingness of aid donors to maintain their support to the existing management systems. If aid donors shifted their funding from the current vessel monitoring system (controlled by the coastal states) to a new system supported by the convention, Pacific Island countries could lose the ability to independently monitor vessel operations in their EEZs.

To avoid weakening independent monitoring and help curb their future costs, Pacific Island countries should collaborate closely to:

- *Retain Existing Monitoring Systems.* Pacific Island countries should seek to keep and strengthen existing systems, such as the FFA-operated Vessel Monitoring System, the Air and Maritime Surveillance and the Regional Register. Similarly, Pacific Island countries should seek to preserve the independence of future research programs.
- *Move Toward a User-pay System.* Ideally, foreign fleets should pay for most of the costs of tuna management—as currently practiced in many fisheries around the world.
- *Avoid Voluntary Contributions to the Future Commission Fund.* Voluntary donations tend to be volatile and decline over time. Given the importance of donor support,

**Table 3.2. Estimated Present and Projected Future Costs of Regional Fisheries Management and Administration (thousands of US\$)**

Costs	Current costs of ongoing activities funded by			Estimated costs of future activities with new convention funded by		
	Distant water fishing nations	Donors (aid)	Pacific Island countries	Distant water fishing nations	Donors (aid)	Pacific Island countries
<i>Investment costs</i>						
Installation of vessel monitoring system	5,000	—	—	6,000 <sup>a</sup>	—	—
Surface surveillance investment costs	—	120,000	—	—	—	—
Preparation for MHLC	750	1,500	200	—	—	—
Finalizing MHLC and commission	750	1,500	200	—	—	—
Updating equipment	—	500	500	—	1,000	1,000
<b>Total investment costs</b>	<b>6,500</b>	<b>123,500</b>	<b>900</b>	<b>6,000<sup>b</sup></b>	<b>1,000<sup>b</sup></b>	<b>1,000<sup>b</sup></b>
<i>Operating costs</i>						
Regional monitoring, control and surveillance	1,600	8,250	4,370	5,220	8,250	4,370
Regional and national tuna research	—	1,800	500	1,700	1,800	500
Data collection	400	40	600	1,000	40	1,000
Legal review and update	—	50	—	—	300	400
Commission overhead	—	—	—	900	—	850
Fisheries administration	—	1,000	1,500	500	600	1,600
<b>Total Operating Costs</b>	<b>2,000</b>	<b>10,190</b>	<b>6,470</b>	<b>9,350</b>	<b>10,990</b>	<b>8,720</b>

— Not applicable.

Note: Future costs include requirements of new convention in the FFA and high seas areas. For detailed assumptions see Volume III, Annex B. Costs of negotiating future agreements with distant water fishing nations are not included in the table.

a. US\$8 million if a new vessel monitoring system is adopted.

b. The US\$124,400 spent on past investments is considered a sunk cost. Hence, investment costs under new regime are incremental.

Source: van Santen and Müller (2000).

Pacific Island countries should carefully reexamine the voluntary nature of the fund and its future size. A specific contribution to the fund as a regular part of the commission's budget should be considered.

- *Involve the Private Sector and Encourage Distant Water Fishing Nations to Effectively Monitor Their Own Fleets.* To save costs, Pacific Island countries should examine which management activities could be carried out more effectively by the private sector (such as the observer program). Encouraging distant water fishing nations to monitor their own fleets would also reduce the costs of compliance with requirements such as port transshipment and EEZ entry and exit reporting.

### **Optimizing Total Allowable Catch Allocation**

The future commission is expected to determine the total allowable catch (TACs) for tuna fisheries based on the principles of biological sustainability. It is also expected to develop criteria for TAC allocation among coastal states (MHLC 1999). Since the membership of distant water fishing nations in the new commission will confer them collective power over the TAC negotiations, Pacific Island countries need to carefully review the advantages and disadvantages of the possible alternatives.

Among the many alternatives for TAC allocation, the most promising to Pacific Island countries would be if the TAC was allocated to distant water fishing nations (as a group or

individually) and to Pacific Island countries as a group. Each of the two groups would receive a negotiated share of the total TAC, possibly reflecting tuna concentrations in the EEZs and high seas. Pacific Island countries could then decide internally how to allocate their share of the TAC. This option would strengthen the coastal states' leverage in negotiating access fees, because they could opt to negotiate with distant water fishing nations individually, as a group, or by auctioning the quota to individual vessels. Ideally, agreement on this option should take place prior to the start of the new convention.

### ***Negotiating Collectively with Distant Water Fishing Fleets***

Pacific Island countries are individually in a weak position to benefit from tuna fisheries. Tuna migrate in and out of EEZs, and are caught primarily by foreign fleets. At the same time, collection of access fees offers the greatest potential for future revenues. The diversity of development objectives and resource

endowments among coastal states should not overshadow the fact that Pacific Island countries stand a better chance to benefit from their tuna resources by acting as a group than by negotiating individually (box 3.2):

- *Size counts.* Tuna resources negotiated by individual countries are much more modest than they would be if Pacific Island countries negotiated as a group. By negotiating as a group, Pacific Island countries could also reduce their individual negotiating weaknesses and prevent distant water fishing nations from negotiating only with countries offering the most favorable conditions. As a group, they would also be able to afford top negotiators to argue their case.
- *Net benefits are more important than gross benefits.* Even if the gross benefits of bilateral agreements appear higher, the costs to coastal states of monitoring bilateral agreements are likely to be higher than for a multilateral agreement where costs can be shared.

### **Box 3.2. The Benefits of Cooperation, the Costs of Going Alone**

The importance of cooperation among Pacific Island countries can be illustrated by a simple hypothetical example. Suppose there are 10 coastal states, 5 of which have extensive EEZs. Tuna aggregate seasonally in these countries but only occasionally in the other five countries. Annual catches fluctuate widely in each country. Two industrial countries want to fish in the EEZ of these coastal states. What would be the optimal negotiating strategy for both parties?

#### ***Negotiating Strategy for Industrial Countries***

The lowest-cost, lowest-risk strategy for the industrial countries is to negotiate with each individual country and offer low access fees or in-kind aid. If a country rejects the initial offer, efforts may be made to persuade individual decisionmakers in that country. If these efforts fail, the industrial country would approach the remaining four countries with large EEZs. If none accepts the initial offer, the industrial country could offer higher rewards, targeting countries with the largest EEZs and most convenient locations.

It is in the industrial country's interest that no coastal state cooperate with others and that the terms of the negotiation remain secret. To prevent collusion among coastal states, the industrial country could indicate a potential reduction in aid or trade policy restrictions. Since no country knows the position of the others and all realize the industrial country can go elsewhere, they are likely to accept the low offer. Tempting the other industrial country to make a counteroffer may not succeed, as the industrial countries may well exchange key information about each other's positions once they realize they are being "played against each other."

#### ***Negotiating Strategy for Coastal States***

The best strategy for the coastal states would be to minimize their key weakness: the possibility that the industrial countries will shop around and the fact that they offer access to a fluctuating, migrating resource. This can be achieved by cooperating and negotiating as a group. Such cooperation has other advantages as well: it allows for advance preparation of a joint negotiating strategy, and it allows for the sharing of information among coastal states. Projected net benefits to each coastal state from joint negotiation could be set higher than what could be realistically obtained through bilateral negotiations. Negotiating as a group would change the coastal states' position from that of a small seller of access to a modest, fluctuating resource to a single supplier of a large and stable resource—that is, they would move from being "price takers" to "price setters."

Coastal states may be put under pressure to reduce their cooperation, but they would have several options with which to counter that pressure. They could offer access to their entire tuna resource to third parties, use geopolitical or international considerations to their benefit, or seek public support for their cause.

*Source:* van Santen and Müller (2000).

Pacific Island countries with more abundant tuna resources may resent the fixed share that the US Multilateral Treaty provides to less endowed countries, and fear a possible reduction in bilateral aid under multilateral agreements. These arguments are valid, but perhaps not overriding. If an individual Pacific Island country lost out as a result of a multilateral agreement, other coastal states could agree to compensate it through a larger share of the access fees. The impact of aid linked to access agreements is questionable as it reduces the transparency of the agreement, and may allow distant water fishing nations to subsidize their fleets by paying part of the access costs through their aid budgets. Overall, the record suggests that aid and in-kind payments may have resulted in substantially less benefits to Pacific Island countries than their total budgets indicate.

Collective negotiations are particularly important for surface tuna (used mainly for canning), as distant water fishing nation fleets are unlikely to operate profitably without access to the Pacific Island countries' EEZs. Pacific Island countries could explore the option of reducing the total purse seine fishing effort in the Central and Western Pacific. A recent bioeconomic study (FFA 1999) indicates that this may indeed increase the profitability of the fleet, and thus strengthen the Pacific Island countries' potential to derive higher access fees in the future.

#### D. Managing the Seabeds<sup>7</sup>

Seabed mining could become a reality in the Pacific within the next 10–30 years. Exploratory cruises have discovered substantial deposits of minerals in the Pacific Islands EEZs, and investor interest is rising. Adoption of suitable legislation and environmental safeguards to regulate offshore mining is therefore a high priority for Pacific Island countries.

First discovered in the Pacific during the 1950's, seabed mineral deposits can be of three types:

- *Manganese nodules* are potential sources of copper, nickel, and cobalt (figure 3.6).

- *Cobalt-rich manganese crusts* can contain platinum, nickel, copper, and three to five times as much cobalt as manganese nodules.
- *Polymetallic sulphide* deposits are potential sources of copper, zinc, lead, silver, and gold.

The potential for seabed mining in the Pacific Island region is significant. The Cook Islands' EEZ, for example, is believed to contain some 7.5 million metric tons of manganese nodules—a potential source of 32 million metric tons of cobalt, or 520 years of supply at current world demand (Ponia 1999; Clark 1999a). Cobalt-rich manganese crust deposits have been found in the Federated States of Micronesia and Marshall Islands. And though their volume is unknown,

**Figure 3.6. Manganese Nodules on a Seabed**



<sup>7</sup> Except where otherwise noted, this section is based on background contributions by Freestone and Müller (2000), Simpson and others (1999), and Preston (2000).

polymetallic sulphide deposits have been discovered in the Lau Basin (in Fiji and Tonga's EEZ), the North Fiji Basin, and in the Solomon Islands, in addition to the Manus and Woodlark Basins in Papua New Guinea.

Indications that the Pacific polymetallic sulphide deposits have a large gold content—with the extracted value potentially as high as US\$ 2,000 per square meter has led to a recent surge in foreign investor interest. In 1997, Papua New Guinea became the first country in the world to grant commercial licenses for exploitation of polymetallic sulphide deposits. Fiji, New Zealand, and Tonga have since been approached by Australian, Korean, and U.S. interests for similar licenses (Wanjik 1999; Clark 1999; Binns and Decker 1999).

### **The Challenges Ahead**

Seabed mining presents both an immense opportunity and an immense challenge for Pacific Island countries. Under the United Nations Convention for the Law of the Sea, coastal states have until November 2004 to extend national claims beyond their 200-mile EEZ to the limits of their continental margin, thereby laying potential claim to additional seabed mineral deposits. But the process of extending these claims involves complex technical and legal procedures that would best be carried out at the regional level.

Seabed mining would be unlike any other industry seen today. It would involve high risks (operating costs of exploration vessels run at half a million dollars per expedition); it would operate over vast areas (the Papua New Guinea license covers 5,000 square kilometers [Malnic 1999]); and it would require large and highly sophisticated machinery. Given its potential environmental impacts, seabed mining is also likely to receive intensive public scrutiny.

The economic viability of the industry remains untested, even though seabed mining has been a prospect for half a century; to a large extent it will depend on technological breakthroughs and improvements in mineral recovery rates. The technology for extraction of manganese nodules has been developed, but the great depths—

4,000–6,000 meters—and the current low world prices hinder their commercial exploitation.

Seabed mining operations would operate in unstable and small markets, facing stiff competition from mining operations on land. For example, the current global demand for cobalt is limited to 27,000 metric tons a year. A single seabed mining operation producing 10,000 tons of cobalt annually could easily flood the market and depress world prices (Exon 1989; Ponia 1999). Polymetallic sulphide mining is likely to be more profitable in the medium-term, but further analysis on global markets is needed, and the risks and uncertainties faced by the industry remain high.

Seabed mining could also have substantial adverse environmental impacts. Simulations by the Metal Mining Agency of Japan suggest that organisms living on the sea bottom may take one to two years to recover from the disturbance caused by mining collectors towed across seabed areas (Kajitani, 1999). The release of colder water in the upper water column may increase primary productivity, but the impact on fisheries and migratory species (such as turtles) is unknown. Mining operations may also lead to high levels of wastewater discharge—estimated at 9 metric tons of waste per day for a polymetallic sulphide mining operation (EDF undated)—and to sludge disposal from onshore processing facilities. Impacts on active deep water chimneys, where numerous organisms are found, have yet to be determined.

### **Managing the Future Use of the Ocean: A Strategy for Seabed Mining**

Given the emerging interest and the potential scale of seabed mining operations, it is essential that Pacific Island countries implement two urgent actions:

- ❑ Extend their maritime claims to the edge of the continental margins; and
- ❑ Develop sound national offshore mineral policies.

## Extending Seabed Claims

Pacific Island countries could claim rights over nonliving resources in six major areas of the continental margin (table 3.3). Fiji, the Solomon Islands, Tonga and Vanuatu could potentially claim new polymetallic sulphide deposits. The Cook Islands, Federated states of Micronesia, Kiribati, Marshall Islands, Nauru, Niue and Tuvalu could extend their maritime claims to deposits of manganese nodules and crusts (Simpson and others 1999; Boyes and Larue 1996).

In order to submit their claims—to the International Commission on the Limits of the Continental Shelf—Pacific Island countries would need to complete three major steps:

- *Define coastal baselines.* Countries which have declared archipelagic status (such as Fiji, the Solomon Islands, and Vanuatu) could claim archipelagic baselines and, thereby extend their offshore areas by thousands of square miles (SOPAC 1998).
- *Negotiate maritime boundaries.* Pacific Island countries would need to negotiate the boundaries of their outer shelf with adjacent coastal states.
- *Survey the outer edge of the continental margin.* Though preliminary surveys have been completed, more work is needed to meet the data requirements of the Commission.

The 2004 deadline for submission of seabed claims puts pressure on the key Pacific Island countries to complete these tasks. It would be prohibitively costly for Pacific Island countries to undertake the surveys on their own. Close regional collaboration through the South Pacific Geoscience Commission (SOPAC) could result in economies of scale in offshore surveying and facilitate the exchange of information needed to help coastal states prepare their claims.

**Table 3.3. Continental Margin Areas that Could Be Claimed By Pacific Island Countries**

<i>Location</i>	<i>Area (square kilometers)</i>	<i>Potential claimants</i>
Euripik Ridge	110,000	Federated States of Micronesia, and Papua New Guinea
Mussau Ridge	60,000	Papua New Guinea and Federated States of Micronesia
Ontong Java Plateau	60,000	Solomon Islands, Papua New Guinea
Rotuma Ridge	40,000	Fiji
Tonga-Kermadec Ridge	—	Tonga, Fiji, New Zealand
Norfolk Ridge	12,000	New Caledonia, Australia

— Not Available  
Source: SOPAC (1998)

## Developing National Offshore Mineral Policies

Following the granting of exploration licenses by PNG in 1997, Fiji and the Cook Islands started drafting national offshore mining policies. SOPAC has assisted this process by advising the countries and helping develop general guidelines on marine mineral policies, such as the Madang Guidelines, a blueprint for offshore mineral policy in the Pacific (SOPAC 1999).

Pacific Island countries have correctly recognized that seabed mining involves unique challenges that are distinct from land mining. These challenges require new policies which maximize the benefits to Pacific Island countries, safeguard the environment, provide for public participation in licensing and policy decisions, and provide a climate that is conducive for foreign investment.

### *Maximizing Benefits to Pacific Island Countries.*

Given the scale and risks of seabed mining operations, Pacific Island countries should avoid any direct public investment in mining or processing. They should also avoid agreements that reduce license fees in exchange for aid funds, promises of local employment, or investments in processing. These provisions create inconsistencies that could undermine the credibility and transparency of the licensing

system., and may result in lower benefits than originally anticipated.

Whenever possible, licenses for a given area should be split in order to increase competition. Pacific Island countries should also adopt regulations protecting their genetic property rights in the event of future biomedical or industrial discoveries linked to organisms associated with actively venting underwater chimneys (Clark 1999b; SOPAC 1999b; MRD 1999).

***Imposing Strict Environmental Safeguards.***

International concern about the potential environmental impact of seabed mining is growing. The magnitude of the operations will almost certainly guarantee high public visibility. Only by adopting strict environmental standards and communicating openly with the public will the industry and Pacific Island decision-makers avoid strong negative lobbying by environmental groups (Morgan 1999).

Pacific Island countries should put in place environmental safeguards based on several key principles. First, exploitation licenses should not be given until environmental impacts are determined in actual field conditions. Second, Pacific Island countries should consider a regional code of environmental practice, in consultation with environmental and industry experts (MRD 1999). Third, a system of independent monitoring should be adopted. Draft mining policies currently put the burden of proof on external stakeholders to prove that environmental impacts have occurred. This is a key weakness that undermines environmental regulations around the world. An independent monitoring system could rely upon on-site observers or periodic ground and air surveillance. To help defray costs, this system should operate at the regional level and be supported from a share of the mining royalties.

Pacific Island countries should also require mining operators to adopt strict contingency plans for offshore incidents, and to post environmental bonds or rehabilitation security deposits that could be refunded upon satisfactory removal of the mining infrastructure. Disincentives for repeat violators—such as

withdrawal of licenses to operate in any of the Pacific Island countries' waters—should also be adopted. For these measures to be effective, Pacific Island countries would need to adopt legislation that is consistent at the regional level.

Finally, coastal states should ban seabed mining in areas of high ecological value. Off-limit zones could include areas of other important uses—such as established shipping lanes and known areas of high tuna abundance—and areas set aside to protect threatened or endangered species (Wanjik 1999).

***Providing for Public Participation.***

Given the potential magnitude of seabed mining operations, it is important that Pacific Island countries hold public consultations during the development of their national offshore mineral policies, and conduct public hearings on all license applications. Potential stakeholders should be allowed a reasonable period of time to voice and discuss their concerns. Pacific Island governments should also consider establishing a dispute resolution forum such as the Mining Tribunal in Fiji (MRD 1999).

***Creating a Conducive Environment for Foreign Investment.***

National seabed mineral policies need to recognize the high risks faced by potential investors (Clark 1999b). However, these constraints should not be addressed by relaxing environmental safeguards but rather by offering a stable and conducive investment environment to attract investors' interest. The fiscal regime should be made as simple and transparent as possible, avoiding exemptions or conditional concessions. Reporting and data requirements should also be streamlined and simplified.

## **E. Summary of Key Findings and Recommendations**

Because of its size, the Pacific Ocean has long been considered by many to be a limitless resource. Such is not the case, however. The collapse of many world fisheries and the degradation of coastal areas in the Pacific are reminders that without careful management, the economic potential of this vast resource may no longer be sustained in the future.

## Managing Coastal Areas

Coastal areas in the Pacific are increasingly threatened and in need of urgent attention. Yet the remoteness of many sites and the multiplicity of threats make it difficult for government or community management to succeed on their own. A co-management partnership between coastal communities, governments and NGOs offers the best prospect of effectively managing coastal areas and protecting the resources upon which so many communities depend.

To succeed, co-management should meet three conditions: first, the role of communities and their external partners (governments, NGOs) needs to be clearly defined so as to take advantage of their comparative strengths. Second, coastal communities need effective communication channels with their external partners to ensure a quick response to requests for assistance. Third, intersectoral coordination among government agencies responsible for the coast must be strengthened to avoid conflicting activities (such as issuing sand mining licenses for vulnerable coastal areas).

Several initiatives are emerging to address these challenges, from the Samoa village fisheries program to the island councils in Micronesia. These co-management programs can be maintained at relatively low costs, but will need continued government support to be sustainable. Pacific Island governments and high level decisionmakers can play critical roles in supporting these efforts by:

- Recognizing coastal management as a social and economic priority.
- Earmarking a portion of fishing and mining license revenues in support of co-management.
- Strengthening local committees and/or island councils where both communities and government agencies involved in coastal activities can be represented.
- Requiring inter-agency coordination at the national level for actions affecting the coast.

- Providing legal support to community management rules through by-law systems.
- Containing threats that are beyond the control of coastal communities (such as pollution).
- Reducing overharvesting of marine resources through license and export controls.
- Linking extension workers to networks of regional expertise for technical support.
- Supporting awareness and environmental education programs, particularly aimed at local leaders.

## Optimizing Benefits from Tuna Fisheries

In the offshore areas, the issues affecting the management of the vast tuna resources are both economic and geo-political. As the region approaches the ratification of a new regional convention for tuna management, divisions among the coastal states have become more pronounced. This could have grave consequences for the Pacific Island countries' ability to maintain independent monitoring in their EEZs, curb their share of management costs, optimize their allocation of the total allowable catch, and negotiate optimal access fees with distant water fishing nations. The importance of developing a common position on these issues cannot be over-emphasized. In particular, Pacific Island countries should:

- Retain and expand upon the existing monitoring systems, rather than develop new systems under the future commission.
- Avoid voluntary contributions to the commission's management fund. Contributions should be specified as a regular part of the commission's budget.
- Insist on a pooled allocation of total allowable catch to the coastal states – preferably prior to the ratification of the convention.

- Negotiate access fees multilaterally with distant water fishing fleets.
- Consider limiting the purse seine fishing effort as a way to raise the profitability of the fleet, and expand the potential for extracting higher license revenues in the future.

### **Seabed Mining: Preparing for the Future**

With investors' interest growing, seabed mining could become a reality in the Pacific in the next few decades. Under the Law of the Sea, Pacific Island countries that qualify for the claims have until November 2004 to extend national claims to the limits of the continental margin – potentially claiming rights over new seabed mineral deposits. Close regional collaboration through SOPAC could help these coastal states meet the requirements to support their claims.

Pacific Island governments also need to urgently develop offshore mineral policies prior to the issuance of exploration licenses. The Madang Guidelines and the national marine mineral policies of Papua New Guinea and Fiji, assisted by SOPAC, provide a good basis for the formulation of these policies. Three areas, however, require further strengthening.

First, national offshore mineral policies should articulate the adoption of strict environmental safeguards. These might include:

- Requiring that environmental impacts be assessed in actual field conditions prior to issuing exploitation licenses.
- Establishing a regional system for independent monitoring of environmental impacts.

- Requiring that investors post environmental bonds and rehabilitation deposits to cover potential damages.
- Banning seabed mining in areas of high ecological value.

Second, national policies should provide a forum for public participation in policy and licensing decision. This could include:

- Public hearings for all license applications.
- An impartial dispute resolution mechanism (such as a mining tribunal).
- Identification of conflicting or traditional claims over the mining areas.

Finally, offshore mineral policies should provide a conducive climate for foreign investment, in recognition of the risks and uncertainties faced by the industry. This might include a simplified and transparent fiscal regime, streamlined reporting requirements, and incentives for long-term investment.

Though ocean management has long been viewed as a biological discipline in the Pacific, there is now a growing realization that institutional and socio-economic realities play critical roles in ocean use. Managing the ocean is, first and foremost, about managing people. By listening to the concerns and suggestions of their communities, the countries of the Pacific stand a better chance to use wisely the opportunities offered by the ocean and ensure a continuation of these benefits for years to come.