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Oceans and Marine Resource Management: Ecosystem-based Management and Sustainable Development

Chapter 4

Oceans, seas, islands and coastal areas form an integral and essential component of the Earth's ecosystem and are critical for global food security and for sustaining economic prosperity and the wellbeing of many national economies, particularly developing countries.

UN, para. 20, World Summit on Sustainable Development (WSSD),
Johannesburg Plan of Implementation, 2002

Introduction

Strategic development and management of the Pacific ocean and marine resources at national and regional levels are critical to Pacific islanders' ability to meet their changing needs and aspirations and to maintain their unique lifestyle.

The Pacific region is associated with the geographical beauty of its oceans and islands, and the colourful cultures of its people. The Pacific community prides itself on the 'Pacific Way' lifestyle where communal living and reciprocal social relationships are emphasised, often at odds with the pressures of individualism encouraged by market forces. The region is going through rapid changes, mostly due to high population growth rates and the changing needs and aspirations of its population, including increasing consumerism. The Pacific people, while living in a globalised world, have strong traditional ties and are influenced by their cultural customs. However, traditional systems are gradually weakening under the forces of globalisation and market economy.

The coastal and marine environment, a source of subsistence as well as commercial activities, is an integral part of the Pacific lifestyle. The Pacific islands have ecologically diverse environments and landscapes, high biodiversity values and high endemism. In some cases, such as for coral reefs, the Pacific has the highest known diversity in the world. These qualities serve as a magnet for tourists from as far away as Europe and North America as well as the more traditional markets from Australia and New Zealand. Most countries rely on their coastal resources for tourism dollars, which in 2003 contributed about US$1 billion, or about 5 per cent of the region's GDP.

With a large exclusive economic zone (EEZ), very high sea to land ratio and relatively undeveloped natural environments, most Pacific island countries (PICs) are reliant on coastal and offshore fisheries and tourism as the main source, perhaps the only source, of gross domestic product and export earnings (Table 4.1). Pelagic tuna-based offshore fisheries contribute about 11 per cent of the gross domestic product of all PICs (Gillet et al., 2001) and account for around 50 per cent of total exports from the region. On the other hand, coastal resources are the cornerstone of subsistence and domestic economic activities, contributing about 15 per cent of the region's GDP.

Table 4.1 Land to sea area relationship in the islands of the Pacific Islands Forum

Country	*Land mass (km²)*	*EEZ (million km²)*	*Sea: land ratio*
Cook Islands	237	1.8	7,595
Fiji Islands	18,272	1.3	71
FSM	700	2.9	4,143
Kiribati	810	3.6	4,444
Marshall islands	181	2.1	11,602
Nauru	21	0.3	14,286
PNG	462,000	3.1	7
Samoa	2,820	0.1	35
Solomon Islands	28,370	1.3	46
Tonga	747	0.7	937
Tuvalu	—	—	—
Vanuatu	12,189	0.7	57

Source: http://www.faopacific.ws/Members/tabid/4723/language/en-US/Default.aspx#m2 [accessed February 2011]

Management challenges

Specific challenges in the marine sector have their origins in international as well as domestic development pressures. PICs' dependence on limited marine and other resource-based export commodities make them highly vulnerable to global forces, such as fish prices, the effects of international trade liberalisation and increasing fossil fuel prices. Many PICs are also highly prone to natural disasters, such as cyclones, earthquakes and volcanic eruptions. They need to cope with the emerging challenge of vulnerability to increased frequency and extreme climate events coupled with sea level rise resulting from global climate change. Such challenges are further exacerbated by their geographical isolation within the region, as well as from their main export markets. The small island states have many islands scattered across a large area under their national jurisdiction, with poor domestic transport infrastructure and communication adding to their challenges. Growing population in most countries and increasing emphasis on consumerism has encouraged a focus on economic development goals, with often cursory regard for their impact on the environment or on social equity.

Pacific islands are under international pressure to preserve their biodiversity and their natural ecosystems for the global good, since the Pacific is generally regarded as one of the last remaining unspoilt natural environments. The international call for the protection of key species and their habitats is often at odds with the economic development desired by the people to support their needs and aspirations and encouraged by governments. The Pacific leaders have recognised the need to balance conservation for international good and economic development for the benefit of their citizens.

Offshore tuna fisheries

One of the ongoing concerns in the region is sustainability of the tuna resources, particularly since for many countries tuna is an important source of GDP, foreign exchange and employment. The value of the catch increased from US$375 million in 1982 to US$1.9 billion in 1998 (Gillet et al., 2001). The Pacific Islands Forum Fisheries agency reports that the value of tuna caught in national waters of the Pacific region during 2009 amounted to US$2.8 billion. This can be attributed both

to an increase in the volume of catches and the price of tuna. The volume of tuna caught increased from 1.5 million metric tonnes in 1998 to 1.9 million metric tonnes in 2009. The price per tonne of tuna also increased significantly over this period. Skipjack tuna stocks are considered to be healthy, with some potential for an increase in harvest. However, the larger tunas, including yellowfin, albacore and blue-eyed tuna are considered to be fully exploited, and bigeye overexploited. Adding to the concern about declining stock is that of the effects of climate change on recruitment of some tuna species, due to El Nino and La Nina southern oscillation affecting sea temperatures. Large fluctuations in fish stock, as well as any decline in tuna catches, can have a large impact on small economies extensively reliant on fish for export earnings and their GDP.

Other issues of concern, particularly for the Pacific countries that have had a special trading relationship with the European Union (members of the African, Caribbean and Pacific [ACP] countries) include potential impact of globalisation and trade liberalisation.

For many countries, the relatively low value of returns from their tuna resources is a growing concern. Countries receive only about 5 per cent of the value of tuna harvested from the Pacific EEZ by distant water fishing fleets. The low direct benefits to the island states have meant that the domestication of tuna fisheries has been an ongoing interest. Many have considered going into joint ventures and/or encouraging domestic industry. However, the Pacific nations have so far found it difficult to realise this dream of having a local tuna fishing industry (Gillet, 2003), largely because of the financial capital and technical knowledge necessary to make it viable.

Coastal resources

Coastal resources throughout the region face serious challenges. As human population increases and national economies grow, the pressure on fisheries has gradually increased and is expected to further increase in the future, particularly around major settlements. Overfishing of target finfish and non-fish species within the range of small motor-powered boats are expected to become more common (box 4.1).

Box 4.1 Overfishing of trochus and green snail in Vanuatu

Trochus and green snails, two of the main export products from Vanuatu, are in danger of becoming overharvested. Commercial exploitation of trochus and green snail fishing began in the 1920s with the demand for raw material for buttons, jewellery, ornaments and inlay work for furniture and handicraft. The industry has grown and the processed shells are exported to Asia, which together with the smoked and dried *bêche-de-mer* (sea cucumber) fetched about US$3.7 million in the last ten years.

These marine species provide an important source of livelihood for rural isolated islands, which lack transportation, refrigeration facilities and fresh fish or agricultural markets.

However, trochus and green snails are becoming scarce on many islands and are difficult to find. A recent survey of trochus fishing suggests that the industry has almost collapsed; the only surviving shell company has reported that it cannot find enough raw material to remain viable. The few viable stocks in remote areas are also seriously endangered. Overharvesting combined with the slow growth rate of the green snail make it particularly vulnerable to extinction.

The government has placed a ban on green snail exports and enforced it, but the population of snails is not showing signs of recovery. Efforts to transplant brood stocks of green snails have not been successful. Similarly, mariculture of trochus and the release of larvae on outer reefs have been attempted but as yet population increase has not been observed.

Source: Lovell et al., 2004: p. 350

The pressure on coastal resources is expected to increase with changing international demands for key fisheries products from the Pacific (box 4.2).

Box 4.2 Impact of rising prices and overfishing of bêche-de-mer in Marovo Lagoon, Solomon Islands

In Solomon Islands, the harvesting of bêche-de-mer is a multi-million dollar industry, second only to tuna as the country's most valuable marine resource. The ease of gathering and processing bêche-de-mer has resulted in it becoming one of the largest sources of cash in many coastal communities throughout Solomon Islands. Bêche-de-mer, is highly regarded in Asia as a delicacy with powerful qualities as a traditional medicine and aphrodisiac. In addition, it is an important source of protein for Solomon Islanders, who have one of the highest per capita seafood consumption rates in the world with over 80 per cent of the population deriving their protein from marine resources. Bêche-de-mer is an important source of livelihood for coastal villagers; during the recent political crisis, it was one of the few stable sources of income.

Increased demand for bêche-de-mer, resulting in higher prices, has in recent years led to overharvesting and a decline in stock of some species. In 1991 one species, the white teatfish, was valued at 30 Solomon Islands dollars (SI$) a kilo but by 2004 this had gone up to about SI$220–270 a kilo. With this increase in price, the teatfish has been overharvested to the extent that its catch has recently decreased. In 1999, more than 50 per cent of the total bêche-de-mer catch was white teatfish but by 2002 this species accounted for only 2 per cent. Catches and exports have fallen from 715 tonnes in 1992 to less than half this figure in 2005.

Rising prices have also led to an increase in dangerous fishing practices. 'Ten years ago people were happy to free dive or simply collect the sea cucumbers at low tide. Now people are night diving with torches, using weighted "bombs" with steel barbs, and even using dredges to harvest from deeper waters' (Ramofafia, a bêche-de-mer specialist from Marovo Lagoon, quoted in Menzies 2005). The growing use of 'hookah', or diving using air compressors and long hoses, has been noted to have contributed to a growing number of deaths in the Western Province.

Source: Adapted from Steve Menzies, IWP Project Media release 7 July 2005. Available at: www.sprep.org; [last accessed 29 October 2005]

One of the net effects of overfishing of key species is the shift in the dynamics of coral reefs and natural ecosystems. The reefs have become more susceptible to overgrowths by macro-algae and plagues of coral predators, such as crown of thorn. Other pressures include the impact of land-based activities; sediments from poor land use, deforestation and dredging smother coral reefs and reclamation of mangroves and other habitat affecting coastal productivity and species composition. Nutrient and chemical pollution from untreated and poorly-managed human sewage and animal wastes, contaminants from agriculture as well as in limited cases industrial pollutants all have a negative impact on coastal ecosystems. Such effects are often localised and their cumulative effects can vary from low to very high within a country (table 4.2).

Table 4.2 Perceived local threats and severity of those threats to some selected coral reefs of Fiji

Reef area	*Coastal development*	*Pollution*	*Sedimentation*	*Overfishing*	*Destructive fishing*	*Overall*
Tavueni/Somosomo	None/low	Medium	Low	Low	None	?
Suva	Medium	High	High	High	Medium	Very High
Beqa	Medium	None/low	Low	High	Low	Medium
Coral Coast	Medium	None/low	High	High	High	High
Mamanucas	Medium	Low	Medium	High	Low	Medium
Lautoka	Medium	High	High	High	Medium	Medium

Source: Lovell, Sykes et al., 2004: p. 341

Countries differ in the degree of risks local habitats may be exposed to (table 4.3).

Table 4.3 Variation in risk level of coral reefs in selected countries

	Reef Area (sq km) by degree of risk				*Percentage under risk*			*Marine protected area*	
	Total (km²)	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*	*No.*	*Area (km²)*
Fiji*	10,000	3,360	4,800	1,900	34%	48%	19%	1	1
French Polynesia	6,000	4,900	1,100	0	82%	18%	0%	1	124
Marshall Islands*	6,000	4,900	1,100	0	82%	18%	0%	2	163
New Caledonia	6,000	5,800	200	0	97%	3%	0%	5	530
PNG	12,000	6,000	4,500	1,500	50%	38%	12%	8	2149
Solomon Islands	6,000	3,000	2,500	500	50%	42%	8%	—	—

Source: Bryant et al., 1998, p. 34; http://pdf.wri.org/reefs.pdf [accessed 31 January 2011]

In addition to human activities within their own borders having major effects on ecosystems, global activities have far reaching impacts on the Pacific people. Coastal ecosystems and coral reef-based activities are particularly under threat from the effects of climate change. Global climate change effects not only include more frequent switches in El Nino and La Nina events, but also an increase in the frequency and intensity of tropical storms. Furthermore, climate change is expected to result in increases in dissolved carbon dioxide in water, which is believed to cause coral bleaching and coral mortality. Major bleaching was reported in 1998, 2000 and 2002. The 1998 global coral bleaching alone led to a loss of 16 per cent of the worlds' coral reefs, including some of those in the Pacific. Fiji reported serious coral bleaching in 2000 and 2002, with 40–80 per cent of coral mortality on many reefs. Although some recovery has been reported, it is slow in some damaged areas, such as Beqa Barrier Reef and the western Astralobe reefs. Overall only about 10 per cent of the coral reefs affected by bleaching in the SW Pacific during 2000–2002 have recovered to their pre-bleaching levels (Lovell, Sykes et al., 2004).

Coral reefs and other habitats are under constant threat from wave and wind actions caused by extreme weather events, as has recently been experienced by countries such as Samoa, Nauru and Niue. Cyclone Heta in 2000, for example, caused damage to some 13 per cent of coral reefs in Samoa. In 2003, Nauru experienced major coral bleaching and mass fish kills, due possibly to elevated sea level temperatures.

Such changes in the coastal ecosystems can have far reaching effects beyond the decrease in the availability of fish. They can undermine the tourist industry, which relies on the diverse vibrant and healthy corals supporting a large variety and abundance of colourful coral and fish species and the presence of megafauna, such as sharks, manta rays and turtles. For countries such as Cook Islands where tourism is the backbone of the local economy, such changes can have a drastic impact on people's livelihoods. To address such pressures on oceanic and marine resources, including coral reef and other coastal ecosystems, a more stringent and strategic management based on an ecosystems approach underpinned by robust information is important. This will become more acute over time as population increases and global attention shifts towards the last remaining relatively healthy tuna stocks and more dynamic coastal ecosystems.

Management responses

For Pacific islands, management of their domestic oceanic and marine resources, national and regional approaches have been adopted. Meeting the ever-increasing pressure from distant water

fishing nations for increased access to pelagic resources, the PICs have generally taken a regional approach without necessarily compromising their sovereign rights and interests. Much of the research and policy discussions have been supported by the activities of two particular regional agencies, Forum Fisheries Agency (FFA) and the Secretariat to the Pacific Community guided by their governing councils. These agencies hold annual scientific as well as policy meetings to guide member countries in their deliberation and negotiations with distant water fishing nations. Since 2006, this has also been carried out in the context of the Western and Central Pacific Tuna Commission, which includes distant water fishing nation representatives as members.

National programmes and policies to address such challenges vary across the region. Management of coastal and ocean resources has predominantly been sectoral in nature. Generally, environmental aspects of the coastal and marine sector are managed independently of the fisheries sector. Not only is the fisheries management addressed independently of environmental issues, agencies managing different aspects of the marine sectors are separate and operate under the different legislations, with little or no co-ordination. Thus, for example, fisheries harvest in Fiji is managed by the Fisheries Department under the Fisheries Act, while the coastal mangrove resources, which are important nursery grounds for fish, are managed by the Forestry Department under the Forestry Act. Pollution of coastal waters is either addressed under the Public Health Act, or by the municipal council under the Town and Country legislation. There has also been some effort made to use other instruments such as Environment Impact Assessment (EIAs) to screen projects. These EIAs, however, have usually been applied by the department of environment to very large projects, if at all.

The activities of these different organisations are often not co-ordinated, largely because each department operates within its narrow legislative mandate and there are no cross-cutting institutional mechanisms for co-ordination of management response. In most cases, management relies on a 'top-down' regulatory approach, using command and control strategies. In the case of coastal fisheries, instruments such as licences, size limits, bans on the harvest of certain species, restrictions on gill net mesh sizes or restrictions on equipment are commonly used. These have generally been found to be ineffective, largely because government fisheries departments often do not have adequate resources for monitoring and enforcement, and penalties are inadequate to act as a deterrent (box 4.3).

Box 4.3 Management of bêche-de-mer in Solomon Islands

'Economically, bêche-de-mer is a very important resource for Solomon Islands, but the government's "top-down" approach to management has not worked. The government does not have the capacity or resources to enforce regulations such as size limits, bag limits, equipment restrictions and seasonal closures. There are no national regulations or guidelines to safeguard the industry, except for a 1998 ban on fishing for sandfish, which was repealed in 2000'. At the same time, the resources are owned communally under the traditional system of tenure, but coastal communities do not have much say in the management of those resources.

It is generally acknowledged that the only way 'to protect these resources is to actively involve fishing communities and resource owners in developing and implementing their own management strategies'. Some have argued that the management of these resources should be transferred to communities and that they should be responsible for enforcing regulations. 'These regulations should be implemented in accordance with the local system of customary marine tenure and the national government should develop policy and regulatory frameworks that help to support this community-based management'.

Source: Adapted from Steve Menzies, IWP Project Media release 7 July 2005. Available at: www.sprep.org [last accessed 29 October 2005]

Recently, countries such as Samoa, Tonga and Cook Islands have adopted integrated coastal zone management strategies and plans, although their implementation has generally suffered from lack of resources and co-ordination between government agencies.

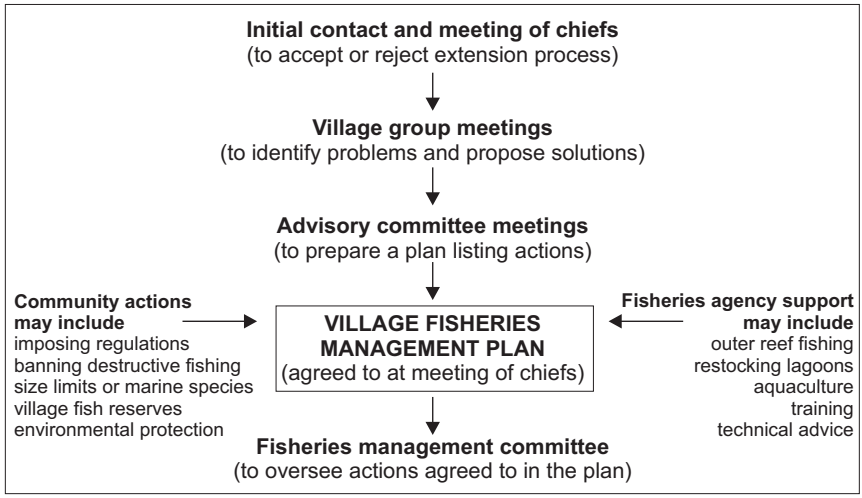
Some effort has recently been made to encourage greater community participation in coastal fisheries development and management, particularly with the assistance of development partners. Projects such as the AusAID-funded Samoan Fisheries Development Project (box 4.4), Fiji Local Level Management Areas (FLLMA), and conservation area projects in Vanuatu under the Global Environment Facility (GEF)-funded South Pacific Biodiversity Conservation Projects are examples. In places like Fiji, local community members are trained and hired as fisheries wardens to increase effectiveness of the regulations. Such efforts have taken sectoral approaches, with little co-ordination between different initiatives. In many instances, the link between coastal zone management initiatives, national development planning and budgetary processes is limited at best, non-existent in most cases.

Box 4.4 Community-based fisheries development and management in Samoa

In Samoa, community-based fisheries development and management has been developed with the assistance of the South Pacific Commission (SPC) and AusAID. The project strategy was based on the following four principles:

- Maximum community participation
- Motivation not education
- Demand-based assistance with extension services
- Development of alternative sources of seafood where stock is under threat of depletion

In such a process, scientists and government officials provide technical backstopping and play a facilitation role where necessary. They also help link the community efforts, rules and regulation with the national level 'formal' process, thereby giving the legislative basis for the local level management. The process follows is summarised in the diagram below:



Source: King and Faaisili, 1999

Regional response

The Pacific region has several regional intergovernmental organisations that provide technical advice to assist independent island nations and territories to manage their coastal and marine resources and offshore tuna fisheries. However, countries face major challenges in making the most effective use of regional support. Nor do the regional programmes necessarily address the country-specific priority issues, with regional projects often depending on the availability of development partner support, which in many instances is for programmes that reflect international or regional interests.

Regional marine resource and environment-related projects are primarily implemented by the South Pacific Regional Environment Programme (SPREP), Pacific Islands Applied Geoscience Commission (SOPAC), FFA and SPC, with the Pacific Island Forum Secretariat (PIFS) co-ordinating and providing policy advice to the leaders. These agencies tend to focus on areas of immediate interest, as mandated by their governing councils. SPC, the primary regional organisation responsible for marine living resources, has until recently focused on coastal and offshore fisheries development and capacity building activities. FFA, on the other hand, has focused on helping countries with primarily offshore tuna fisheries management, including access negotiation, and technical backstopping in relation to monitoring and stock assessment (in collaboration with SPC). SOPAC deals mainly with non-living aspects of the EEZ, including mapping mineral resources and defining maritime boundaries. SPREP addresses environmental aspects of the oceanic and marine resources, including climate change effects and protection of key species such as whales and turtles.

With limited member contributions, each of the regional organisations largely relies on support available from development partners and UN agencies under various multilateral environment agreements. As a result, their activities have tended to be stand-alone projects supported by development partners under different international instruments, particularly the GEF established after the Convention on Biological Diversity (CBD) 1992.

Many of the regional activities have focused on research, capacity development or developing regional strategies for action. These projects have included the UNDP GEF-funded National Environmental Management Strategies (NEMS) project, national biodiversity strategic action plans (NBSAPs), South Pacific Biodiversity Conservation Programme (SPBCP), National Adaptation Programme of Action (NAPAs), Comprehensive Hazard and Risk Management (CHARM) and the Pacific Islands Climate Change Assistance Programme (PICCAP).

To a large extent, the Council of Regional Organisations in the Pacific (CROP) agencies developed projects on themes that were of particular interest to development partners and funding opportunities. In this regard, one may categorise them as supply-driven. Projects did broadly reflect regional concerns, although this is slowly changing. In some cases, specific activities were carried out in response to national requests.

Overall, regional projects have produced some valuable information, many technical reports and have increased local awareness of specific resource and environmental management issues. However, many of these projects do not seem to have delivered on their stated objectives or produced the desired outcome. Reviews by some project teams and review teams have concluded that their projects have been ‘less than satisfactory’ considering the desired national level outcomes. For example, in the 1990s PICs developed their NEMS which incorporated strategies to strengthen environmental institutions, including those dealing with oceans and marine resources, identified supporting environmental legislation and environmental policy, and suggested means

for countries to implement global and regional agreements and to raise environmental awareness. However, 'most NEMS failed to properly address the institutional enabling environment and linkage [between sectoral governmental agencies] dealing shortfalls common to all Pacific Island Countries and Territories (PICTs), and required for holistic implementation of the separately promoted strategies' (SPREP-UNDP, 2005 para. 17). A similar outcome was observed in more recent efforts, such as the development of national biodiversity strategic action plans (NBSAPs). Regional fisheries aquaculture projects, such as for giant clam, implemented with the support of the SPC and the International Centre for Living Aquatic Resources Management (ICLARM, now WorldFish), did not produce the desired replenishment of the giant clam on coral reefs for subsistence and much-needed income. If anything, the giant clam populations continue to be depleted. Reasons for this could include a focus on technical aspects of culture, without explicitly considering the slow growth rate, marine tenure or market conditions (Lal and Keen, 2002).

Other reasons include the inappropriate project design, projects that did not adequately reflect considerations of the science–economics–policy continuum. In some cases, projects were designed on the basis of traditional management systems, disregarding the weakening of these systems, increasing individualism and erosion of traditional principles of reciprocity and redistribution (South et al., 2004).

This is expected to change with the adoption of ecosystem-based management (EBM) by the FFA and SPC. However, an operational challenge remains as to how this can be holistically and systematically applied.

In conclusion, the challenge of integrating science-focused projects into national policy process, as well as mainstreaming sectoral programmes into national level planning and budgetary process, remains a common theme in all areas of natural resource and environment management throughout the region. Successful completions of technical projects, albeit in the limited sense of scientific outputs, are noteworthy achievements supported by the CROP agencies. However, without also addressing associated policy analytical issues and institutional enabling environments, as well as social dynamics and incentive structures necessary to encourage individual behavioural change, such efforts are likely to continue to produce 'less than satisfactory' outcomes.

These issues have recently been recognised by the CROP agencies and have at least explicitly reflected their considerations in the different regional policies, frameworks for action and plans of action that have been developed in the last three years. The challenge remains in putting these regional frameworks into operation at the national level.

Regional policies and action plans

With the support of various development partners, particularly AusAID and NZAID, the CROP agencies helped member countries to develop various regional policies, frameworks and plans of actions, including Pacific Islands Regional Oceans Policy (PIROP). Regional policies and plans of action tend to reflect issues that have been emphasised in various international agreements as well as the lessons learned from past development efforts in the region (table 4.4). However, although many of these instruments have some relevance to coastal and marine resources and environment management, efforts to implement them have generally not been systematic, programmatic or holistic as agreed to in the Mauritius Strategy for the Implementation (MSI) of Barbados Programme of Action and Johannesburg Plan of Implementation (JPOI). Nor has there been much effort made to appropriately sequence the development efforts to produce synergistic impacts or achieve the desired outcome.

Table 4.4 Principles, themes, objectives and strategies of key regional policies, frameworks and plans of action

Regional policies, frameworks and plans of action	*Key principles, themes, objectives and strategies*
Pacific Islands Regional Oceans Policy	• Improve the understanding of the oceans • Sustainably developing and managing the use of ocean resources • Maintain the health of the oceans • Promote the peaceful use of the ocean • Creating partnerships and promoting co-operation *Source:* Forum Secretariat: CROP Marine Sector Working Group, 2002
Natural Disaster Risk Reduction and Disaster Management Framework, 2006–2015	• Improve governance – organisation, institutional, policy and decision-making frameworks • Improve knowledge, information, public awareness and education • Undertake analysis and evaluation of hazards, vulnerabilities and elements of risk • Adopt a holistic approach that includes planning for effective preparedness, response and recovery • Develop effective, integrated and people-oriented early warning system • Reduce underlying risk factors *Source:* SOPAC, 2005
Solid Waste Management Strategy	• Develop and implement appropriate waste management infrastructure • Develop practical sound and effective waste management policies, legislations and regulations • Implement appropriate communication strategies to support effective waste management activities • Develop mechanism that will support waste management in a financially and economically sustainable manner • Develop national capacity to assist Pacific islanders to manage their waste in an environmentally sustainable manner *Source:* SPREP, 2005
Pacific Regional Action Plan for Sustainable Water Management (Pacific RAP)	• Water resource management – water resource assessment and monitoring, rural water supply and sanitation, integrated water resource management and catchment management • Island vulnerability – disaster preparedness, dialogue on water and climate • Awareness – advocacy, political will, community participation, environmental understanding, gender • Technology – appropriate technologies, demand management and conservation, human resources • Institutional arrangements – institutional strengthening, policy, planning and legislation • Financing – costs and tariffs, alternative models, role of donor organisations and financing institutions *Source:* SOPAC & ADB, 2003

Implementation of these regional policies at the national level is the next challenge. It will be necessary to bring together appropriate government agencies, community-based stakeholders and development partners to identify and implement an interdisciplinary programme of activities to achieve the desired outcomes in a most cost effective manner.

International response

Pacific small island developing states (SIDS) have also responded to international calls and endorsed various instruments, such the Law of the Sea, MSI and JPOI. Common elements of these international fora include the need for national sustainable development strategies reflecting:

- a balanced focus on the three pillars of sustainable development – economic wellbeing, environmental conservation and social harmony,
- a programmatic 'whole-of-country' approach to development and management,
- the use of market-based financial instruments together with a command and control approach, including legislation, to address environmental problems, and
- adopting a participatory process to improve integrated decision-making processes and environmental governance at all levels.

In many instances, international commitments have not been translated in national legislations or actions. In the Pacific, for example, where commitments have been translated into national plans, 'traditional sector-based development plans and policy making struggle to cope with the complexity of environmental and natural resources management concerns. There is also growing appreciation of the importance of traditional practices and norms and securing an appropriate means of blending local knowledge and aspirations into development strategies'. (McIntyre and Wilson, 2004: 250; Box 4.5).

Box 4.5 Community-based and integrated resource management in Vanuatu

The Taagbe River Catchment Area near Port Vila, the capital city of Vanuatu, exemplifies the high degree of complexity involved in the development of truly integrated and community-based approaches to development planning and programming. The case study finds an urgent need for measures to deal with a wide range of resource management issues (for example, water resources protection and waste management) that confront a rapidly expanding city like Port Vila, and recommends an approach that incorporates local needs and desires and works through strengthened government planning authorities. It however notes that there are likely to be difficulties in restructuring regulatory relations between the national and local planning and environment offices, while at the same time allowing for the incorporation of community interests and traditional knowledge and practices at all stages of the decision-making process.

Source: McIntyre and Wilson, 2004
http://www.adb.org/Documents/Studies/PRES/pres-vol2.pdf [accessed February 2011]

Only in limited cases has a national action followed a specific international commitment. In such cases, the implementation of the action has not necessarily followed, as was the case in Fiji with the live coral trade (Convention on International Trade of Endangered Species [CITES], 2002; Fiji Government, 2002.) Where national legislation has been passed consistent with international commitments, these are not always implemented. If implemented, enforcement is weak, as has been the experience with the EIA requirements for development projects. National capacity in the departments of environment is often low, and the majority of time is spent either attending

international meetings or preparing reports to meet the requirements under the multilateral environmental agreements (MEAs). Little time or resources have been available for actual implementation of a work programme.

In some cases, the international communities have encouraged community-based development efforts in response the lack of success at the top-down driven development and conservation assistance. Such top-down development efforts were often driven by political interests rather than national priorities. Internationally, this led to greater emphasis on stakeholder-based development planning and implementation.

At one end of the spectrum were community-based activities, which by nature were focused on addressing local issues of importance. These projects, as seen earlier, had mixed success for several reasons, including lack of adequate considerations of equity issues in the design of the project as well as the scope for rent seeking and free rider behaviour. In some cases, the principle agent problem led to the demise of community-based projects. These projects did not include strategies for nationalising their experiences and lessons learned. Consequently their impact remained small, despite large sums having been spent. At the other end of spectrum, greater emphasis was placed on community consultation and stakeholder-based planning processes, such as for developing a national sustainable development strategy (discussed below).

The piecemeal and ad hoc approach to development assistance was identified by member countries in their report to the WSSD and the MSI. This is not unique to Pacific SIDS.

In summary, the ocean and marine resource governance challenges outlined above are multifaceted. Although the details may vary between sectors and across member countries, there is a common set of governance challenges at the national level, regardless of which issue, which sector or theme is considered. These include:

- ensuring priority funding to assessment of environmental impact of economic development on coastal and marine zones,
- linking sectoral and thematic priorities to national planning and finance, and
- integrating national- and community-based planning processes.

Regionally, the key challenges include:

- lack of co-ordination of support among different regional organisations,
- limited integrated science–economics–social analysis to underpin development and management advice, and
- lack of a programmatic approach to regional services.

Internationally, the challenges include:

- limited co-ordination of development support provided by different international agencies organisations, and
- external support seldom reflects national development goals and priorities.

Way forward

The PICs acknowledge that national sustainable development goals cannot be achieved without assistance from international developments partners and regional organisations. Learning from the past efforts – successful and otherwise – the region has recently embarked on some key initiatives that show particular promise in overcoming some of the key constraints to achieving sustainable natural

resource and environment management. These include a shift towards improving the decision-making process at all levels by developing national sustainable development strategies (NSDS). This will place greater emphasis on community-based management linked to national government efforts, utilising economic and financial instruments and making a shift towards EBM.

The endorsement of the Pacific Plan by the Pacific leaders in October 2005 could help improve co-ordination, collaboration of services to member countries among regional organisations, as well as with other development partners. Internationally, the adoption of the Paris Declaration for Aid Effectiveness, and adoption of national planning and budgetary processes linked to sectoral and cross-cutting thematic plans, and priorities based decision-making processes, show promise in countries. Through the national sustainable development strategy (NSDS), linked sectoral priorities and budgetary process, countries are more likely to effectively utilise external support to complement their own efforts to help meet the needs and aspirations of their people.

NSDS

In response to the growing awareness of key constraints to sustainable development, the PICs have endorsed the need to adopt NSDS processes to improve their national planning and budgetary process. It is hoped that the adoption of these processes will improve their decision-making at national, sectoral and community levels, reflecting the core principles of sustainable development and good governance.

As promoted in the WSSD, a sustainable development strategy is a set of co-ordinated mechanisms and processes that collectively offer a participatory approach to develop vision, goals and targets for sustainable development and to co-ordinate their implementation and review. In a national sustainable development strategy process, there is emphasis on:

- society as a whole having the responsibility for development,
- a participatory process involving all relevant stakeholders, an 'holistic', 'whole-of-country' and cross-sectoral level planning and management, and
- a shift from a focus on outputs (projects, legislations, plans) towards a focus on systems and outcomes (impacts) on people, an adaptive process that is continuously being reviewed and improved.

Countries such as Samoa, Fiji, PNG and Tuvalu have taken first steps towards this by adopting a participatory approach to developing their NSDS.

For the marine and coastal sectoral planning process, the use of EBM approach could help address both the issue of institutional misfit between ecological connectivity and the government institutions arrangements. PICs have endorsed in principle the EBM approach to coastal and offshore fisheries management. Ecosystem management is a process that integrates biological, social and economic factors into a comprehensive strategy aimed at protecting and enhancing sustainability, diversity and productivity of our natural resources. The Ecological Society of America has identified eight key elements of EBM (box 4.6) and four key guiding principles.

Box 4.6 Core elements and guiding principles of ecosystem-based management

Core elements

Sustainability: ecosystem management does not focus primarily on deliverables, but rather regards intergenerational sustainability as a precondition.

Goals: ecosystem management establishes measurable goals that specify future processes and outcomes necessary for sustainability.

Sound ecological models and understanding: ecosystem management relies on research performed at all levels of ecological organisation.

Complex and connectedness: ecosystem management recognises that biological diversity and structural complexity strengthen ecosystems against disturbance and supply the genetic resources necessary to adapt to long-term change.

The dynamic character of ecosystems: recognising that change and evolution are inherent in ecosystem sustainability, ecosystem management avoids attempts to freeze ecosystems in a particular state of configuration.

Context and scale: ecosystem processes operate over a wide range of spatial and temporal scales. Their behaviour at any given location is greatly affected by surrounding systems. Thus, there is no single appropriate scale or timeframe for management.

Humans as ecosystem components: ecosystem management values the active role of humans in achieving sustainable management goals.

Adaptability and accountability: ecosystem management acknowledges that current knowledge and paradigms of ecosystem functions are provisional, incomplete and subject to change. Management approaches must be viewed as hypotheses to be tested by research and monitoring programmes.

Guiding principles

Partnerships and citizen participation: work together with citizens, landowners, businesses, local governments, interested organisations and other agencies to address issues, identify opportunities and find common solutions.

Science-based approach: use the best available scientific knowledge (ecological, social, and economic) as a foundation for decision-making, understanding natural resource relationships, and focuses on sustainability of ecological systems.

Long-term view: establish targets and long-term goals for desired ecosystem conditions that maintain the capacity of the land to sustain public benefits and opportunities into the future.

Comprehensive perspective: find solutions that support economic prosperity, lasting livelihoods and ecological health and sustainability.

Source: Ecological Society of America (2005) 'Principles of Ecosystem based Management' and 'Overview of Ecosystem Based Management'. Available at: http://www.michigan.gov/dnr [last accessed 30 October 2005]

The principles articulated in EBM are in many respects similar to the core guiding principles identified in the various regional policies, frameworks of action and plans already endorsed by the region. When adopting the EBM approach, for example, under the Pacific Islands Oceans Regional Policy (see below), in the management of coastal mangroves it would be necessary to address each of the elements of the three pillars and the interactions among them as well as the underlying foundational institution, such as communal resource ownership, use and management rights (as summarised in figure 4.1). It would also be necessary to identify management strategies that would include organisational co-operation as well as economic instruments complemented by formal rules and regulations, supported by appropriate legislations and bylaws.

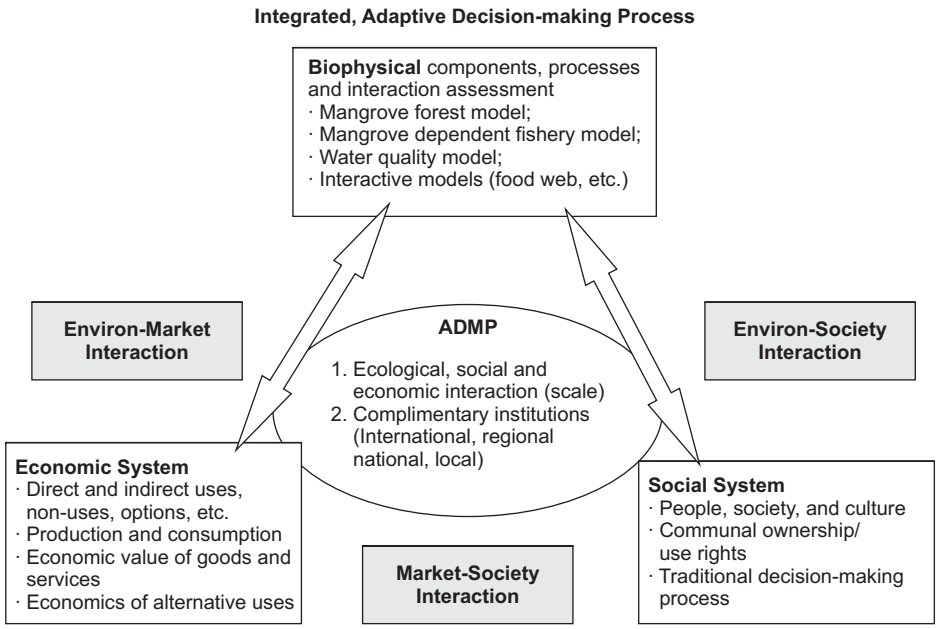


Figure 4.1 EBM framework for making integrated adaptive decisions
Source: Lal, 2003

Such an approach will help systematically identify and analyse:

- Relevant government stakeholders, community stakeholders including resource owners, and users who need to be involved in decision-making processes.
- The dynamics of and interactions between resource/environment and society, market and society, as well as market forces and environment. This is so as to identify root causes of observed resource and environment status, and to identify appropriate management strategies at national, regional and local levels.

The adoption of such an approach will help managers take into account the science–economics–policy analysis spectrum, together with the appropriate management approaches that reflect incentive-based management as well as command and control.

Several agencies in the region have explicitly embraced EBM, including the FFA and the World Wildlife Fund-Fiji (WWF-Fiji). The FFA, as part of its corporate plan in 2004, explicitly identified

ecosystem-based tuna fisheries management, and is working on developing specific country-focused work programmes. WWF-Fiji is currently working with one of the local communities in the north of the island to develop a community-based network of marine protected areas, adopting the EBM framework.

Although EBM is in its early days, it does show promise in bringing together a number of apparently disparate strands. These include the participatory, 'whole-of-country', interdisciplinary and inter-sectoral, and programmatic approaches that reflect the local and national social, economic and institutional context. It also brings in international commitments made by member countries.

With the adoption of the NSDS-linked sectoral plan and priority guided by the EBM approach, member countries hope to be in a strong position to systematically mainstream the three pillars of sustainable development at all levels. This could help:

- increase the effectiveness of limited national resources by directly linking national priorities to sector and community level priorities,
- increase the transparency and the accountability of the government's budgetary decisions and development efforts,
- guide a country in accessing development partner assistance that is consistent with the national priorities and that complements their own efforts, and
- minimise the transaction cost of dealing with development partner assistance, by serving as a platform for confidently negotiating with development partners, encouraging more joint, or at least co-ordinated and complementary, activities.

In effect, the use of the NSDS–EBM approach can help PICs in directly taking ownership of their own national development. Such an approach is expected to help countries better co-ordinate and complement their own development efforts with those provided by development partners towards addressing high-priority projects and programmes.

Regional co-ordination and the Pacific Plan

The Pacific island states have endorsed PIROP, prepared with the assistance of regional organisations and development partners, to 'promote the Pacific region as an ocean environment in support of sustainable development.' The policy is based on the region's collective awareness of the transboundary and dynamic nature of the Pacific ocean, the increasing number and severity of threats to its long-term integrity, and the reality that sustainable economic and social development will be dependent on wise use of the ocean and its resources. It is also based on our awareness of the potential for fragmentation of programmes and for conflicting commitments in different sectors as ocean-related activities increase. This requires more regional collaborative arrangements among communities.

Although PIROP was endorsed in 2004, its implementation at the national level has been limited to ad hoc individual projects, usually externally supported. PIROP needs to be operationalised at the national level, with countries systematically developing their own policy that reflects the guiding principles articulated in the PIROP. These national action plans for ocean and marine resources would be linked to their national development plans, NSDSs or equivalent and national budgetary processes.

Conclusion

The Pacific member countries are in a stronger position to systematically address their national development goals more effectively using their own resources and development partner support, as recognised in their vision statement. With the strengthening of their NSDS and the NSDS-linked oceans and marine sector action plan, countries would be in a strong position to address their people's needs and aspirations using their limited domestic resources, as well as co-ordinating and managing development partner assistance and improving aid effectiveness.

Sustainable development is a national responsibility, but due to limited financial and human recourses, the PICs acknowledge that they cannot achieve this without support from development partners and regional government and NGOs. In the case of ocean and marine resources, it is particularly relevant due to the area's ecological connectivity.

To realise the vision of a peaceful region, sustainable development of their natural resources and environment is central. Through sustainable development, countries in the long run can expect to achieve their national development goals of poverty alleviation, equitable distribution of economic wealth, minimising local conflict and threats to national security. In this globalised world, and with the connectivity between the environment, economy and social systems, challenges in natural resource and environment management are multidimensional, covering issues at local, national, regional and international levels.

One of the key obstacles to sustainable development in the Pacific relates to the unco-ordinated set-up of institutional and governance structures and decision-making processes at all levels. At the national level, key constraints relate to institutional issues, such as the lack of co-ordinated policies, strategies and lack of integrated planning systems that encourage mainstreaming of environmental and social considerations in economics decision-making, as well as mainstreaming economic and social issues in environmental protection decisions. The mandate for the three pillars often rests among different organisations. Organisational arrangement is fragmented, with different government agencies focused on different sectors, issues and policy aspects, a legacy of their colonial heritage.

Over the last 15 years in particular, PICs have acknowledged that social and economic development is inextricably linked with sustainability of land and marine resources and the environment. Long-term sustainability of their economic wellbeing is dependent on conservation (i.e. wise use and management) of marine- and land-based resources and environment. They also recognise that human health, particularly in atoll island states, is directly influenced by environmental pollution resulting from poor management of wastes of human and animal origin. In the long run, resilience of the local economies and communities to external natural and market forces relies on the health of the environment and the economy, and their capacity to respond to and recover from the effects of these influences.

Realising the interdependence of social and economic wellbeing and environmental health, the PICs have embraced the principles of sustainable development and good governance. The countries also acknowledge that the overarching objectives and essential requirements for sustainable development are poverty eradication, changing unsustainable patterns of production and consumption and protecting the natural resource base of economic and social development. Bringing about such changes requires a broad stakeholder consultation and participation in the decision-making process. At the regional and international level, there is a growing awareness of the need for increased co-ordination and collaboration among the donors and service providers.

A number of declarations, regional policies and frameworks and strategies have been developed to identify what needs to be done.

The time has come to focus on the 'how' aspects of operationalising sustainable development, regional policies and frameworks, as well as internationally agreed guiding principles for donor harmonisation at the national level.

To ensure countries can cost-effectively achieve their desired national development goals, a change in policy focus of decision-makers at all levels, as well as a shift towards a programmatic approach to development and the adoption of ecosystem-based adaptive management, is required. Such a shift is needed at the national level, as well as in regional and international organisations.

A beginning has been made. The PICs have taken the first few steps towards adopting a two-pronged approach to national development – participatory national sustainable development strategy-based planning and resource allocation at all levels, and participatory community-based economic development and environment conservation. These can be further built on with the assistance of regional organisations and the support of development partners under the Pacific Plan.

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