



PACIFIC ENVIRONMENT OUTLOOK

Special Edition for the Mauritius International Meeting for the 10-year Review of the Barbados Programme of Action for the Sustainable Development of Small Island Developing States



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FOREWORD



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In 1995, the United Nations Environment Programme (UNEP) launched the Global Environment Outlook (GEO) process for integrated environmental assessment and reporting at global and regional levels. GEO is based on cross-sectoral and participatory environmental assessment, facilitating dialogue between policy-makers and the scientific community.

Under the GEO framework, the first environment outlook report for the Pacific was published in 1999. The current *Pacific Environment Outlook* builds upon this work, strengthening environmental assessment, reporting and monitoring in the Pacific Islands. The South Pacific Regional Environment Programme (SPREP) has been a key partner in both processes.

Small Island Developing States (SIDS) have been recognized as a special category of countries, with particularly vulnerable and delicate ecosystems due to their small size and other characteristics. The United Nations recognizes the unique situation of SIDS and actively supported the process of giving them an international political identity with the establishment in 1991 of the Alliance of Small Island States (AOSIS), which would provide a forum for small island states to have a collective voice in addressing their common problems. This recognition was reaffirmed by the United Nations Global Conference on the Sustainable Development of Small Island Developing States held in Barbados in 1994, and the resulting Barbados Programme of Action for the Sustainable Development of Small Island Developing States (BPOA).

In 2003, UNEP initiated the preparation of environment outlook reports for the Caribbean, Pacific and the Atlantic and Indian Oceans SIDS, as a contribution to the Mauritius International Meeting for the 10-year Review of the BPOA (Barbados +10) in 2005. The major objectives of these reports are to:

- Highlight the state of the environment in the SIDS showing the trends of national, regional and global significance;
- Provide policy guidance and early warning information on environmental threats;
- Provide a basis for regional consultations and for identifying the environmental issues and priorities in preparation for Barbados +10;
- Help to catalyse and promote international cooperation and action based on the best scientific and technical capabilities available; and
- Contribute to the development of a common strategy for sustainable development in SIDS.

The *Pacific Environment Outlook* was prepared simultaneously with the Pacific Regional Assessment on Sustainable Development to feed into the Barbados +10 process and ensure consistency of much of reporting. Much of the information has been drawn from national and regional reporting to the World Summit on Sustainable Development (WSSD), preparations for the Barbados +10, and from key reports for international and regional multilateral environmental agreements.

The *Pacific Environment Outlook* presents environmental trends by assimilating the drivers that directly and indirectly affect the state of the environment. It examines the linkages between social and economic activities and the environment in the Pacific SIDS, highlighting their social, economic and environmental vulnerability. The use of national assessment reports for the Barbados +10 has enabled the portrayal of national and regional priorities in terms of thematic environmental issues and cross-cutting institutional capacity needs. This should place Pacific Island Countries and Territories in a better position to ensure that initiatives to address the human impacts on the environment incorporate means to reduce socio-economic pressures.

It is my sincere hope that this report — *Pacific Environment Outlook* — will be a useful resource during deliberations at the Barbados +10 Conference.

EXECUTIVE SUMMARY

The Pacific Island Countries and Territories (PICTs) share some common characteristics with other Small Island Developing States (SIDS), including small physical size and geographical remoteness, fragile biodiversity, exposure to natural hazards, high population growth, a limited natural resource base, remoteness from world markets, and small economies of scale. However, some of these features are even more pronounced in PICTs, making them unique among SIDS. For example, PICTs are more geographically remote and have higher population densities than other SIDS. These characteristics make the environment and economies of SIDS particularly vulnerable to external pressures, as recognized in the Barbados Programme of Action for the Sustainable Development of SIDS (BPOA) and other international frameworks such as Agenda 21 and the Johannesburg Plan of Implementation (JPOI).

Social and economic development is closely linked with the environment in PICTs. Agriculture and fisheries are the mainstay of the economies of most of the independent countries, and support both subsistence livelihoods and commercial production. Logging and mining are significant in countries such as Fiji, Nauru, New Caledonia, Papua New Guinea (PNG) and the Solomon Islands. Tourism is also an important economic sector and is growing in importance. The environment, however, is experiencing significant pressures arising from socio-economic driving forces such as high population, poverty and poorly planned economic development. This has

significant implications for sustainable development in PICTs. Addressing these pressures and their impacts is constrained by several factors including limited human and institutional capacity, financial resources, inadequate data and information, poor governance, weak regulatory frameworks, and displacement of traditional natural resource governance systems. A major constraint is the slow pace of mainstreaming the environment into development planning and processes.

The population of 8.6 million in PICTs is expected to double in the next 30 years, and will exacerbate the already high population densities on some islands. As a result of poor economic performance and growing inequalities, poverty is a growing problem in some countries. The Human Poverty Index shows PNG to have the highest poverty level and Tonga the lowest among PICTs. The level of human development varies widely among PICTs, as reflected by the Human Development Index, which ranges from 0.861 for Palau to 0.314 for PNG. Hawaii and the US and French territories are the most developed and industrialized countries in the region. Economic performance over the last decade has generally been poor with per capita incomes stagnant in many countries. The majority of PICTs have relatively limited opportunities for development and are highly dependent on overseas development assistance and remittances.

TRENDS AND STATE OF THE ENVIRONMENT

CLIMATE CHANGE

Climate change and variability and sea-level rise represent the most serious emerging environmental threats to PICTs. Effects of climate change and sea-level rise include extreme climate events and increased natural disasters, habitat destruction, possible saltwater intrusion into groundwater systems in low-lying atolls, adverse effects

on crops and fisheries, and increase in vector-borne diseases. PICTs have taken steps at the global, regional and national levels to address climate change. For example, the United Nations Framework Convention on Climate Change (UNFCCC) has been ratified by 12 PICTs, and activities have been launched under regional initiatives

such as the South Pacific Sea Level and Climate Monitoring Project and the Pacific Islands Framework for Action on Climate Change, Climate Variability and Sea-level Rise for 2000–2004.

NATURAL AND ENVIRONMENTAL DISASTERS

Natural and environmental disasters continue to pose an enormous threat to sustainable development in the region. From 1990 to 1999, the Pacific led the entire world in rates of disaster-related mortality, percentage of population affected, and damage costs per capita gross national product. On a smaller, but equally important, scale are the threats of disasters from the poor management of hazardous chemicals and waste. The draft Pacific Regional Action Plan for Disaster Risk Reduction has enabled the region to make some progress in strengthening technical and scientific capacity related to climate change and disasters. The South Pacific Applied Geosciences Commission (SOPAC) coordinates a number of disaster management programmes in the region.

WASTE AND POLLUTION

Growing industrialization, urbanization and populations, the increasing imports of non-biodegradable material and industrial and agricultural chemicals, and changes in consumption patterns have all led to problems of waste and hazardous material in PICTs. Solid waste is of particular concern. Industrial and domestic solid and liquid wastes, including sewage, and disposal of toxic chemicals contribute to pollution of surface and groundwaters in PICTs. The period from the 1950s to 1990s saw widespread radioactive and chemical contamination of land. The region lacks the capacity for adequate waste and hazardous material management and also lacks suitable land for waste disposal. Regional efforts to address waste management and pollution in PICTs include the South Pacific Regional Environment Programme (SPREP) Pollution Prevention and Waste Management Programme. PICTs are also participants in the Global Programme of Action for the Protection of the Marine Environment from

Land-Based Activities. Waste management is covered by several multilateral environmental agreements (MEAs), such as the International Convention for Prevention of Pollution from Ships (MARPOL) and the Basel and London Dumping Conventions. The majority of PICTs have signed the Waigani Convention.

COASTAL AND MARINE RESOURCES

Coastal and marine resources are the basis for sustainable social and economic development of the Pacific Islands. The coastal environment and its resources are threatened by unsustainable harvesting practices and habitat damage from shoreline development, uncontrolled sand mining, tourism, land- and marine-based pollution, global climate change and introduction of alien species. In many PICTs, inshore fisheries are declining from overexploitation and degradation of coral reefs. About 30 per cent of Pacific reefs are at medium risk and 10 per cent at high risk of further degradation. The oceanic, predominantly tuna, fishery has significant potential for further development by PICTs. Several PICTs have ratified the United Nations Convention on the Law of the Sea (UNCLOS), and subsequent agreements such as the 1995 Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Species. Many PICTs have begun to pass legislation to control marine pollution and manage their fisheries, including through traditional practices.

WATER

Water supply and quality continue to be a major problem in PICTs, particularly in view of the increasing demand for water by urban areas, growing population, industries and commercial agriculture. Water shortages in PICTs are associated with factors such as variable rainfall patterns, pollution of existing supplies and inefficient use and leakage. Pollution of freshwater resources by chemicals and pathogens as well as saline intrusion from over-pumping of aquifers occurs to varying degrees throughout the region. In some atoll communities the use of polluted groundwater has led to disease outbreaks. The

Pacific Regional Action Plan on Sustainable Water Management identifies priority actions to promote the sustainable management of water resources in the Pacific. Improvement in water resource management will require a coordinated effort across many sectors including improvements in watershed management and reduction in deforestation; raising public awareness of wise water use and management; controls over agricultural activities; and improvements in the treatment and disposal of waste.

LAND

Land degradation is one of the primary environmental concerns of PICTs. Land resources are being affected principally by high population growth rates and density, displacement of traditional land and resource management systems, land tenure conflicts, mining, deforestation and poor development practices. Climate change could exacerbate land degradation with the possibility of more frequent droughts in some PICTs. Commercial agriculture has resulted in extensive land clearing, intensification of land use, increased mechanization and reliance on chemical fertilizers. Economic reforms and globalization, specifically trade liberalization, will continue to influence land use and intensity in PICTs. Land degradation has also affected coastal habitats in some PICTs, where increased erosion of degraded land and the resulting sedimentation has killed coral colonies on fringing reefs. Since 1999, 14 PICTs have become members of the UN Convention to Combat Desertification (UNCCD). Other responses to land degradation by PICTs include some limited scientific research and agricultural extension projects.

ENERGY

PICTs import fossil fuel at high costs. There is significant potential in the region for renewable energy development. However, while funding is available from the international community to support renewable energy and energy efficiency projects, some initiatives are often not suited to the needs of SIDS. Nevertheless, some

advances have been made, such as the inclusion of the Pacific Islands Greenhouse Gas Abatement through Renewable Energy Programme (PIGGAREP) in the International Action Programme. The implementation of the Pacific Islands Energy Policies and Strategic Action Planning (PIEPSAP) project — through the United Nations Development Programme (UNDP) with the Government of Denmark, under the European Union Type II Initiative — has commenced.

TOURISM

The natural environment of PICTs is the foundation for successful tourism development. Unregulated tourism practices could have severe adverse consequences for the environment and, in turn, the tourism industry itself. Ecotourism operators and agencies should work closely with nature conservation agencies in promoting awareness and management of the tourism assets of natural areas.

FORESTS

Forests have diminished in PICTs from a combination of population pressures, loss of traditional controls, commercial logging and cash cropping and shifting cultivation, pasture development, mining and fire. Deforestation and forest degradation on most islands has accelerated rapidly over the last 30 years. Although there have been attempts at reforestation, this is inadequate and, furthermore, has been done with exotic species that have limited ecological value and in some cases have become invasive. Since the mid-1990s, the development of non-wood forest products has been encouraged through a number of non-governmental organizations (NGOs). The Code of Conduct for Logging of Indigenous Forests in Selected South Pacific Countries was endorsed by the South Pacific Forum in 1995. National codes of logging practice have been established in Fiji, PNG, Vanuatu, Niue and the Solomon Islands and are at various stages of implementation.

BIODIVERSITY

The evolution of island biogeography has led to unique biodiversity and ecosystems in PICTs. Biodiversity is critical for social and economic development as well as for the maintenance of essential ecosystem functions. The threats to biodiversity in PICTs include large-scale forest logging, commercial agriculture, associated land clearing and fires, habitat alteration and loss, pollution, exploitation of natural resources, bio-prospecting, urbanization, natural phenomena and invasive species. There are also concerns about biosafety in PICTs. The extreme vulnerability of island biodiversity has resulted in the flora and fauna of

the Pacific being among the most endangered in the world. In 1991, 75 per cent of PICTs reported biodiversity loss as a serious problem. Twelve PICTs have ratified the Convention on Biological Diversity (CBD) and many are working on obligations such as the preparation of National Biodiversity Strategies and Action Plans. PICTs are developing conservation tools such as community-based conservation areas, conservation enterprises, and the use of traditional resource management methods. They have also established several marine protected areas. The regional Action Strategy for Nature Conservation (2002–2007) is implemented by the Round Table for Nature Conservation with support from SPREP.

POLICY ANALYSIS

NATIONAL AND REGIONAL INSTITUTIONAL FRAMEWORKS

In many PICTs many of the environmental planning and management functions are conducted by a range of government departments or environmental units which have been strengthened in many countries throughout the 1990s. Nevertheless, throughout the Pacific most environment departments are constrained by limited human and financial resources and institutional capacity. A growing number of regional agencies, including intergovernmental organizations (IGOs), are active in the Pacific. SPREP is one of the major IGOs in the region and deals with environmental protection and sustainable development. SOPAC primarily focuses on the sustainable development of non-living resources, ocean management, hazard assessment and geosciences. Coordination among the regional agencies is facilitated by the Council of the Regional Organizations of the Pacific (CROP). A growing number of international, regional and national non-governmental organizations are active in the region.

INTERNATIONAL AND REGIONAL AGREEMENTS

PICTs have ratified most global MEAs and are working on fulfilling their obligations under these MEAs and incorporating their objectives and principles into national policies. Two regional MEAs form a particularly strong legal foundation on which regional cooperation on environmental matters continues to be built: the Convention on the Conservation of Nature in the South Pacific (the Apia Convention), which provides the basic structure for regional cooperation on biological conservation and the use of protection areas; and the Convention for the Protection of the Natural Resources and Environment of the South Pacific Region, which deals with pollution and the protection of marine resources.

Implementation of MEAs is constrained by weakness of national policies, unsuitable legal and institutional arrangements, limited human resources and capability, and inadequate financial resources. Poor information and means to share it are constraints to MEA implementation. Action at the national level for integration of MEA objectives into existing legislative platforms suffers due to relic colonial laws and the plethora of statutes dealing

with environment, natural resources and development. The National Capacity Self Assessment (NCSA), initiated by the Global Environment Facility (GEF) and coordinated through SPREP and UNDP, will enable countries to assess the progress and barriers to the national implementation of the CBD, UNFCCC and the UNCCD.

NON-BINDING AGREEMENTS AND FRAMEWORKS

The non-binding agreements and frameworks that are of particular importance to the Pacific are the UN Conference on Environment and Development (UNCED) and Agenda 21, the BPOA, the Millennium Development Declaration and Goals, and the JPOI. Although some resources have been leveraged for specific actions from the GEF, most of the implementation of the BPOA has been fully funded by PICTs. The ten-year review of the BPOA in 2005 will assess progress in its implementation and make recommendations for further efforts to pursue increased international recognition and financing.

NETWORKS AND PARTNERSHIPS

Pacific leaders released a suite of Pacific Type II Partnerships Initiatives at the WSSD in 2002. The 14 Pacific Umbrella Initiatives provide the impetus for new partners and resources for sustainable development and environmental management within the Pacific.

REGIONAL AND NATIONAL ACTION STRATEGIES, PLANS AND FRAMEWORKS

The preparation of the Pacific Regional Sustainable Development Strategy for BPOA +10 is being undertaken by the CROP Sustainable Development Working Group. A key area of the SPREP Action Plan for Managing the Environment in the Pacific Islands Region focuses on sustainable economic development. A number of regional strategies and plans have been developed or strengthened. At a national level, most PICTs began the preparation of National Environmental Management

Strategies in the early 1990s. Completion of policies, plans and strategies for thematic areas is a significant achievement.

ENVIRONMENTAL LEGISLATION

Environmental legislation has been drafted in many PICTs over the last decade, but enactment for many has been slow. Engagement in MEAs has inspired new environmental laws. Many PICTs, however, still lack legal frameworks that integrate environmental management and development processes. Resources and capacity for implementation and enforcement are limited. Poor implementation of environmental legislation often stems from conflicts between local customary authority and Western-style legal frameworks often ill-suited to the circumstances of PICTs.

SCIENCE AND TECHNOLOGY

PICTs have limited capacity to access and utilize developments in science and technology. Adoption of technology for improved market-based energy management has been greater than any other sector.

FINANCING THE ENVIRONMENT

Significant funding has come from countries, the European Union, and also from the GEF. The Pacific needs to take better advantage of available funds from the GEF and other significant sources.

CAPACITY BUILDING

Human resource capacity development needs to be a feature of all national and regional projects, and to be adequately funded. The region has responded to national demands through the development of a Type II Initiative, 'Regional Capacity Building Framework for Research and Training'.

GENDER EQUALITY AND EMPOWERMENT OF WOMEN

Over the past decade there has been considerable progress towards gender equality in PICTs, with increasing recognition of the need for integration of gender considerations into key environmental policy and planning processes. Many regional, national and local environmental initiatives target the capacity development of women.

AWARENESS AND COMMUNICATIONS

Poor environmental awareness is a major constraint to dealing with environmental problems at the regional and national levels. Over the last decade, PICTs, with support from CROP, have run successful environmental awareness campaigns, though coverage has been limited by inconsistent funding. Awareness and communications in PICTs will need to focus on the wider sustainable development framework.

CROSS-CUTTING ISSUES AND CHALLENGES

There are a number of cross-cutting issues that affect the environment and sustainable development in PICTs. Attention to these issues as part of sustainable development strategies would help to reduce environmental degradation and human vulnerability in PICTs. Cross-cutting issues include:

- **Population.** It is expected that population growth will continue for at least the next three decades in most PICTs. The issue of population growth needs to receive particular attention in its own right;
- **Poverty.** Material poverty as well as poverty of opportunity is growing in PICTs. Much more needs to be done to ensure that natural environmental capital makes a significant contribution to poverty alleviation. Strategic economic and physical development strategies should include the equitable distribution of economic development opportunity;
- **Health.** Although the overall health of the people of PICTs has improved, they are faced with rising threats from diseases such as HIV/AIDS and a resurgence of infectious and vector-borne diseases. Fundamental environmental health requirements such as the provision of safe drinking water, food safety, hygiene and sanitation have been overlooked in national economic planning;
- **Urbanization.** Rapidly expanding urban populations place large demands on PICTs for utility and infrastructure services, especially water supply and sanitation. Many of these problems can be addressed in part through strategic physical and environmental planning and management. However, the socio-economic drivers for urbanization are often nationally oriented and cannot be solved by geographically based solutions alone;
- **Deterioration of traditional systems.** Deterioration of traditional land and sea tenure systems and loss of traditional knowledge have been detrimental to natural resources and human welfare in PICTs. Cash economies are replacing the traditional subsistence economies of PICTs, contributing to overharvesting of natural resources and ecosystem modification and degradation;
- **Poor environmental awareness.** This is a major constraint to dealing with environmental problems at the regional and national level. Much more emphasis needs to be placed on raising awareness and improving the knowledge base for economic growth and sound environmental management;
- **Trade and investment.** The trade and investment situation of PICTs is changing rapidly, with the signing of regional trade agreements, accession to the WTO, and the interest of large economies. PICTs

need to effectively manage the environmental risks associated with increased liberalization of trade and investment regimes at the global and regional level;

- **Vulnerability.** Vulnerability and resilience and response mechanisms, including adaptation measures for climate change and sea-level rise, need to be incorporated into development planning systems at the national and sub-national level in PICTs.

THE WAY FORWARD

OPPORTUNITIES

Community development frameworks, traditional information and practices, and partnerships present opportunities for addressing a variety of environmental and cross-cutting issues, as well as issues of governance and human resource development. There is considerable momentum at the regional and national level for 'mainstreaming the environment' in development planning. The Type II Initiative, 'Planning for Sustainable Community Lifestyles', aims to provide a platform for PICTs to take advantage of this momentum to achieve full integration of the environment and development.

that civil society views are considered in programme development and implementation.

- **National Sustainable Development Strategies (NSDS).** Support for NSDS production is necessary to ensure that effective strategies incorporating some essential elements are generated.
- **Essential investment.** Investment in areas such as strategic programmes, building capacity in basic skills, community development frameworks, monitoring and performance measures and reporting is required.

PRIORITIES FOR THE WAY FORWARD

- **Governance.** Good governance needs to encompass vertical and horizontal coordination in development planning and environmental management, and to maximize opportunities to improve quality of life.
- **Improving coordination.** There is a need for better coordination between key national policy and plans, existing regional organizational strategies and thematic strategic action plans. The alignment of these with UN programmes and activities is a major challenge. Strengthened links are also required between regional governance and NGOs to ensure

While there have been significant efforts at the national, regional and international levels, environmental degradation in PICTs has continued because of human actions, threatening sustainable development. This could be mainly attributed to the limited mainstreaming of environmental considerations into development planning and decision making. In addition, several cross-cutting issues such as poverty, urbanization, loss of traditional resource tenure systems and trade affect the environment and sustainable development in PICTs. Although PICTs share several common features with other SIDS, they also possess unique features. Therefore, approaches to environmental management and sustainable development in PICTs must be appropriate to their unique circumstances.

INTRODUCTION

In most Pacific Island Countries and Territories (PICTs) there is a high degree of economic and cultural dependence on natural resources, which are the basis for the majority of subsistence living and commercial production. The environment of PICTs, however, is experiencing significant pressures arising from high population growth rates and density, displacement of traditional natural resource management systems, introduced agricultural systems, poor catchment management, pollution, habitat destruction and unsustainable exploitation of natural resources. This places serious stress on the communities that are dependent on these resources for social well-being and, in some cases, for survival. Such trends are particularly serious on smaller islands, especially atolls with limited land and water resources and fragile ecosystems.

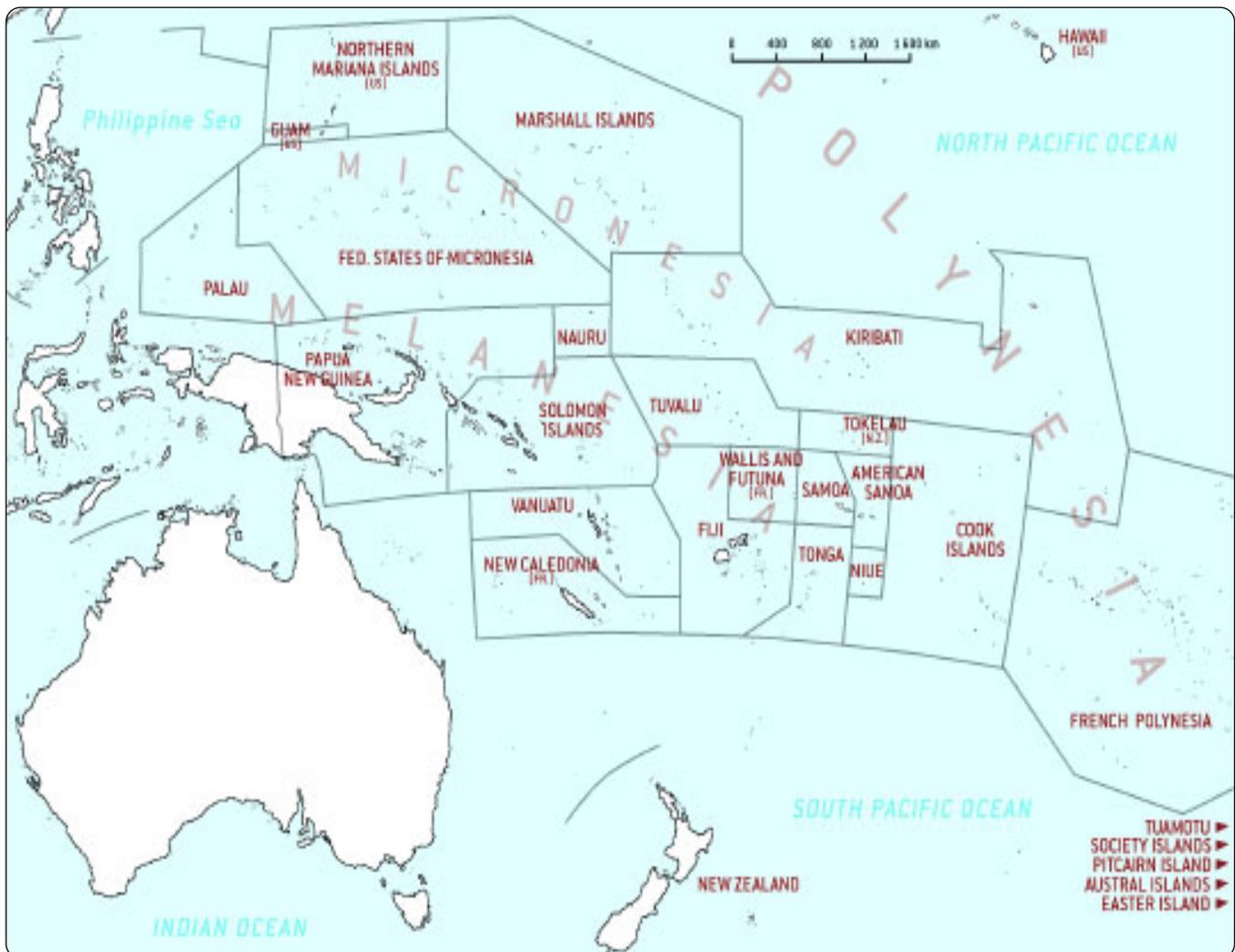
Since the early 1990s progress has been made in setting the Pacific environmental agenda and gaining recognition of the special case of the Pacific Small Island Developing States (SIDS) at the international level (Agenda 21, Barbados Programme of Action

[BPOA], World Summit on Sustainable Development and the Johannesburg Plan of Implementation [JPOI], Commission for Sustainable Development [CSD] 7, 9, 11 and 12). Initiatives have included environmental assessments and generic data aggregation for environmental issues and enabling countries to develop and implement sustainable development strategies. A feature of the early 2000s is the call for more concerted coordination across sectors, increased financial resources and tangible operational capacity development. Governments and communities are recognizing the need for capacity development in integrated environmental planning and management; better means for data aggregation and analysis across sectors; appropriate advancement of environmental law; and change in focus from environmental reporting to pragmatic actions.

The exacerbating socio-economic pressures on the environment of PICTs, however, have outstripped this progress in many countries. Population dynamics since the 1980s have been the chief driving force for environmental damage and resource overexploitation,

Table 1 PICTs included in this *Environment Outlook*

AMERICAN SAMOA	NORTHERN MARIANA ISLANDS
COOK ISLANDS	PALAU
FEDERATED STATES OF MICRONESIA (FSM)	PAPUA NEW GUINEA (PNG)
FIJI	PITCAIRN ISLAND
FRENCH POLYNESIA	SAMOA
GUAM	SOLOMON ISLANDS
KIRIBATI	TOKELAU
REPUBLIC OF MARSHALL ISLANDS	TONGA
NAURU	TUVALU
NEW CALEDONIA	VANUATU
NIUE	WALLIS AND FUTUNA



particularly where high population density accompanies intense economic activity, such as in coastal areas.

The Pacific region is physically and biophysically, as well as culturally, unique. It has maintained some of the best traditional systems of environmental conservation in the world alongside Western tenure systems. This mix sometimes stifles clear pathways to economic investment and maintenance of investment required for sustainable development.

National institutional frameworks vary greatly across the Pacific, largely reflecting the colonial histories of each PICT. Of all the countries and territories in the Pacific, only Tonga was never a colony. Some states became independent in the 1960s (Samoa and Nauru)

or 1970s (Fiji, Kiribati and Tuvalu). Former territories of the US Trust Territories of the Pacific Islands (TTPI) became freely associated independent states in the 1980s and 1990s (FSM, Palau and the Marshall Islands). The Cook Islands and Niue are self-governing in free association with New Zealand, while American Samoa, Commonwealth of the Northern Mariana Islands (CNMI), French Polynesia, Guam, New Caledonia, Pitcairn Island, Tokelau, and Wallis and Futuna are still formally attached to metropolitan countries.

VULNERABILITY AND CHALLENGES



Storm brewing over the distant highlands of Viti Levu, Fiji
 Source: James Wiseman [reprinted with permission from Jameswiseman.com]

PICTs are characterized by extreme levels of social, economic and environmental vulnerability. While PICTs are very diverse in terms of their physical and socio-economic features, they possess some common characteristics (SPREP 1992; Thistlethwaite and Votaw 1992; SPREP and ESCAP 1996):

- **Small physical size and geographical isolation.** While this has had ecological benefits, it also provides challenges such as difficulty in travelling between and within countries and in distributing resources and environmental networking;
- **Unique biodiversity.** Geographical isolation has led to the evolution of unique species and communities of plants and animals, many of which are indigenous to only one island or island group within the region. These species usually have small population sizes, making them particularly vulnerable to loss from overexploitation and habitat degradation;
- **Rapid population growth.** In the past century most PICTs have experienced rapid population growth, which is currently 2.2 per cent per annum. Table 2 provides a summary of the population characteristics. There is concern that the population has exceeded the carrying capacity of many islands. Population densities are also high. South Tarawa in Kiribati, with 2 330 persons per square kilometre, is one of the highest in the world (Government of Kiribati 2000–2001);
- **Limited land resources.** Many Pacific islands are characterized by extremely limited land resources such as soils and forests;
- **Dependence on marine resources.** There is a traditional dependence on the marine environment and its resources for food, tools, transport and waste disposal, despite new technologies and changing lifestyles (Tonga National Environment Management Strategies [NEMS] 1993).

- **Vulnerability.** The above characteristics make the environment of PICTs very vulnerable to irreversible damage. Limited financial and human resources reduce the capacity for effective response and planning to increase resilience. In addition, Pacific island economies are highly vulnerable to external economic fluctuations and changing trade policies.

This stems from a combination of factors such as remoteness from world markets, a high dependency on exports of agricultural commodities that have relatively low value on international markets, geographical dispersion of islands, vulnerability to natural disasters, small internal markets and limited natural resource bases (UNDP 1999).

Table 2 Summary of key geographical and demographic data for PICTs

	LAND AREA (km ²)	TOTAL POPULATION	ANNUAL GROWTH RATE (%)	DENSITY (people/km ²)	URBAN POPULATION (%)	GDP/CAPITA (US\$)
AMERICAN SAMOA	200	52 291	3.7	261	48	3 950
COOK ISLANDS	237	18 027	0.4	76	59	7 785
FIJI	18 333	775 077	0.8	42	46	2 353
FRENCH POLYNESIA	3 521	245 405	1.9	70	54	19 802
FSM	701	107 008	1.9	152	27	2 058
GUAM	541	154 805	2.3	286	38	16 077
KIRIBATI	811	84 494	1.4	104	37	785
MARSHALL ISLANDS	181	50 840	4.2	281	65	1 817
NAURU	21	9 919	2.9	472	100	2 500
NEW CALEDONIA	19 103	196 836	2.6	10	71	–
NIUE	259	1 788	–1.3	7	32	4 845
NORTHERN MARIANA ISLANDS	471	69 221	5.6	147	90	7 939
PALAU	488	19 129	2.4	39	71	6 157
PNG	462 243	5 190 786	2.3	11	15	838
PITCAIRN ISLAND	39	48	na	1	88	na
SAMOA	2 935	176 710	0.5	60	21	1 766
SOLOMON ISLANDS	28 370	409 042	3.4	14	13	460
TOKELAU	12	1 537	–0.9	128	0	na
TONGA	688	97 784	0.3	151	36	1 798
TUVALU	26	9 561	1.7	368	42	1 640
VANUATU	12 190	186 678	2.8	15	18	1 441
WALLIS AND FUTUNA	255	14 944	0.6	59	0	na

Source: SPC 2004 na = data not available

Box 1 Snapshot of the Pacific islands region

The Pacific islands region comprises three distinct sub-regions (Melanesia, Micronesia and Polynesia), 22 countries and territories, and a total population estimated at 8.6 million in 2004 (SPC 2003–2004). This represents a growth of 1.9 million people over the last decade. The population distribution has remained largely unchanged, with over 5 million people in Papua New Guinea and, at the other end of the scale, countries and territories such as Niue and Tokelau with populations under 2 000, and Pitcairn Island with less than 50. Each year as many as 3 million visitors to the region increase these numbers.

The region stretches some 10 000 km from east to west and 5 000 km from north to south, with a combined exclusive economic zone (EEZ) of close to 30 million km². In contrast, the total land area is just over 500 000 km², of which Papua New Guinea accounts for 83 per cent, while Nauru, Pitcairn Island, Tokelau and Tuvalu are each smaller than 30 km².

The size and ecological diversity of these states decrease from southwest to northeast, tapering from the high, forested islands of Melanesia to scores of tiny, sparsely vegetated atolls scattered across the central Pacific. The three cultural areas have quite different access to economic opportunity. In general, Melanesian countries have almost all the land and land-based mineral resources, Micronesia occupies the greatest sea areas with the largest tuna resources and Polynesia combines useful agricultural and marine resources.

Source: SOPAC 2004



Fiji Islands: Viti Levu, a village in the Samosi Highlands

Source: Juergen Kollmorgen/www.lightandpaint.com

The priority sustainable development problems identified over the last ten years include: loss of biological diversity, land- and sea-based pollution, threats to freshwater resources, degradation of coastal environments, and climate change and sea-level rise (UNEP 1999).

Recent reporting to WSSD and BPOA +10 has confirmed the following emerging cross-cutting issues as being of priority concern for sustainable development in PICTs:

- Poverty;
- Governance;
- Knowledge management;
- Health;
- Population growth and urbanization; and
- Globalization.

Chapter 1 outlines the social, political, economic and environmental characteristics of the Pacific islands that provide the context for considering sustainable development priorities in this region.

The PICTs' priority problems by environmental theme are explored in Chapter 2, which reviews progress and trends based on available information. A review of the current policy responses is provided in Chapter 3, while options for alternative frameworks and future policy for sustainable development are explored in Chapter 4 through a consideration of cross-cutting issues and challenges. Finally, Chapter 5 suggests possible ways forward to ensure that environmental issues are adequately addressed in the sustainable development of the Pacific.



CHAPTER 1
SOCIO-ECONOMIC
DEVELOPMENT

The influence of socio-economic factors in driving environmental degradation and overexploitation of natural resources is well recognized. With the maturity of understanding of economic and environment linkages, and continuing emergence of socio-economic pressures, PICTs are now calling for practical institutional and operational changes that integrate environmental considerations in economic development planning. It is important that recommended options for change in environmental management and capacity building for sustainable development be made on the basis of sound understanding of the socio-economic context in which change will happen. Keeping this in mind, this chapter gives an overview of the socio-economic status of PICTs.

POLITICAL ENVIRONMENT

Governance issues — across the dimensions of politics, economics, social cohesion and environmental management — are considered to be fundamental challenges to sustainable development in the region.

The European Union/Pacific Island Forum (EU/PIF) Regional Support Strategy (2002) summarized the political environment of the region as follows:

‘During the 1990s dramatic changes occurred within the Pacific, stimulated by long-term international and regional trends, such as globalization, deteriorating terms of trade, rising external debt and unsustainable development policies, and by more short-term developments such as the financial crisis in Asia. The security and stability of several Pacific Island countries consequently declined, marked by growing unemployment, poverty, social disintegration and widening income differentials’ (PIFS 2002).

Many countries have experienced some degree of impact from or have had to take action to contend with globalization: for example, there are the advantages of internet access to the impacts of recent developments in regional trade agreements. Security interests are now a significant part of regional governance and national actions. Security concerns and local conflicts often arise over ethnic differences, inequitable economic benefit sharing, alien dispute resolution systems and also poor access to information and knowledge.

The Pacific Islands Forum Secretariat found that the region was characterized by: weak legislatures with a prevailing weak culture of accountability and transparency and lack of clarity in the independence of

parliament; weak regulatory frameworks in which laws on the responsibility of public institutions and officers are often ambiguous or absent, with few sanctions against non-compliance; and weak judiciaries that are generally understaffed (with the possible exception of Papua New Guinea [PNG]) and where the courts often have a considerable backlog of cases (PIFS 2002).



Suva, Fiji

Source: James Wiseman (reprinted with permission from Jameswiseman.com)

SOCIAL BACKGROUND

The key demographic features of most countries in the Pacific include the high natural population growth rates and young populations (on average, around 40 per cent of the population is under 14 years old), increasing urbanization and high emigration rates.

With population growth rates ranging from -0.5 to 5.6 per cent per annum, and averaging 2.2 per cent, the population of 8.6 million is expected to double in the next 30 years (SPC 2004). This will exacerbate already very high population densities.

With the exception of Hawaii and most US and French Territories, PICTs have experienced extensive emigration over the past decade (SPC 2003), particularly to metropolitan Pacific Rim countries, such

as the US, New Zealand and Australia. However, over the last ten years some migration has been between Pacific countries, such as from Samoa to American Samoa, from Micronesian countries to Guam and from Wallis and Futuna to New Caledonia. Migration has artificially reduced the population growth in most countries and even resulted in negative net growth rates in some countries. Negative population growth is a particularly serious problem in Niue and Tokelau which are struggling to maintain viable economies and infrastructures with a diminishing labour force (Conservation International and SPREP 2004).

While the majority of Pacific islanders still live in rural areas, urban settlements are growing rapidly. This is

Table 3 Human Development indices

	HUMAN DEVELOPMENT INDEX *		
	1998	1999	2002
COOK ISLANDS	0.822	na	na
FIJI ISLANDS	0.667	0.757	0.758
FSM	0.569	na	na
KIRIBATI	0.515	na	na
MARSHALL ISLANDS	0.563	na	na
NAURU	0.663	na	na
PNG	0.314	0.534	0.542
PALAU	0.861	na	na
SAMOA	0.590	0.701	0.769
SOLOMON ISLANDS	0.371	0.603	0.624
TONGA	0.647	na	0.787
TUVALU	0.583	na	na
VANUATU	0.425	0.633	0.570

Source: UNDP 1999, 2001, 2004

* Higher values indicate higher levels of development

especially true in Micronesia, which has a higher urban growth rate and is more urbanized than Polynesia (SPC 2003). The growing population density in many townships in the Pacific, but especially on the atolls such as Majuro, Funafuti and Tarawa (Box 2) is leading to health, sanitation, housing and infrastructure problems (UNDP 1994). PICTs are currently coming to terms with urban settlement issues, as evident in submissions to the Commission for Sustainable Development (CSD) and outcomes of regional fora such as the Urban Management Workshop of December 2003. There is recognition that the problems are not just those of urban versus rural development, but that the two are intertwined and that national economic policy, as well as historic factors associated with inequitable development during colonial periods, have influenced the problems that have been emerging over the last two decades.

Unemployment and underemployment of young adults and women is a major development issue in many states, and is an indicator used to describe the social challenge facing communities and national governments (PIFS 2002; ADB 2004). Most PICTs are diversifying their economies to meet demands for semi-formal and informal employment but the problem is compounded by the general lack of vocational and technical skills among the youth.

Poor economic performance, rapid population growth, urban drift and growing inequalities have contributed to growth of poverty in some countries (ADB 2004). PICTs generally have a low level of human development; however, Table 3 shows an increase for some countries. Increasing poverty has put pressure on traditional mechanisms that have been used to support individuals and families and to maintain social cohesion.

While abject poverty is prevalent in many larger urban and informal settlements, the concept of poverty of opportunity is increasingly used to describe relative poverty in the Pacific. Approaches to poverty reduction as part of any sustainable development strategy will need to be tailored to the specific circumstances of the Pacific.

Box 2 Pacific island population characteristics

Population densities range from just over 8 persons per square kilometre for Pitcairn Island to over 500 persons per square kilometre for Nauru. If the most populous islands are considered, the figures rise to over 100 persons per square kilometre for four islands, over 200 for three islands, 421 for Koror in Palau, 757 for Funafuti in Tuvalu, 1 179 for Majuro in the Marshall Islands, and 2 190 for Tarawa in Kiribati. The estimated population for Betio Islet of Tarawa atoll was 40 000 in 2000, which gives it a population density rivalling those of Hong Kong and Singapore. If we consider Ebeye, one of some 90 islets composing Kwajalein Atoll in the Marshall Islands, to which people have been relocated by the US military to free the atoll's lagoon for intercontinental ballistic missile testing, the population density increases to over 25 000 persons per square kilometre.

Source: South and others 2004



One of the key demographic features of most countries in the Pacific, including Fiji, is that about 40 per cent of the population is less than 14 years old

Source: Ilan Kelman (reprinted with permission from www.islandvulnerability.org)

ECONOMIC CHARACTERISTICS

The ecological dependency of Pacific economies and societies is well recognized. Agriculture and fisheries remain the mainstay of the economies of most of the independent countries and support both subsistence economies and export industries that contribute significantly to economic growth. The fisheries industry does not contribute significantly to the GDP of most PICTs (Table 4) but, given the large exclusive economic zones (EEZ) of most PICTs, offshore fisheries is one of the few industries with significant development potential. Other extractive industries such as logging and mining are or have been significant industries in Fiji, Nauru, New Caledonia, PNG and the Solomon Islands. Tourism is an important industry in some PICTs, especially Fiji, the Cook Islands, French Polynesia, the Commonwealth of the Northern Mariana Islands (CNMI) and Guam and is becoming increasingly important to many other PICTs economies.

Both the Asian Development Bank's Pacific Regional Environment Strategy (2004) and the EU/PIF Regional Support Strategy (2002) highlight the great diversity among the PICTs in terms of both their natural resource base and their 'stages of development'. Economic development in PICTs depends on natural resource endowments and socio-political affiliations with metropolitan nations. Economic growth has been very slow in recent years with per capita incomes stagnant in many countries (SPC 2003). Hawaii and the US and French territories are the wealthiest, most developed and industrialized countries in the region, while the Solomon Islands, Kiribati and Papua New Guinea are the poorest in terms of GDP per capita (Table 2). In general, the atoll states are the most economically vulnerable because of their small, dispersed land masses and limited natural resource bases, while the larger islands such as Palau, FSM, Fiji, Samoa and Tonga have greater economic diversification and potential.

Because of their small size and limited natural resources, most states have relatively limited opportunities for development and are highly

dependent on aid and remittances. Overseas development assistance from bilateral donors, particularly the Australian Agency for International Development (AusAID), the European Union, the Japanese International Cooperation Agency (JICA) and the New Zealand Agency for International Development (NZAID), and multilateral donors and banks, continues to play an important role in most Pacific island economies struggling with high debt, deficits and deteriorating terms of trade. Overall, foreign investment and development assistance to the Polynesia–Micronesia Region has increased over the past decade although the level of assistance is now stabilizing.

Overall economic performance over the past decade has been poor (ADB 1999). The public sector remains a dominant feature of the economic landscape, although its capacity is often stretched financially and in terms of human resources when dealing with vast distances between population centres and outer islands. A small private sector that finds it difficult to achieve economies of scale can also be limiting in terms of sustainable development. Weaknesses in the private sector constrain the ability of many firms to respond positively to environmental or sustainable development imperatives that may require the reorientation of production and services, staff training or the skills to generate innovative project proposals.

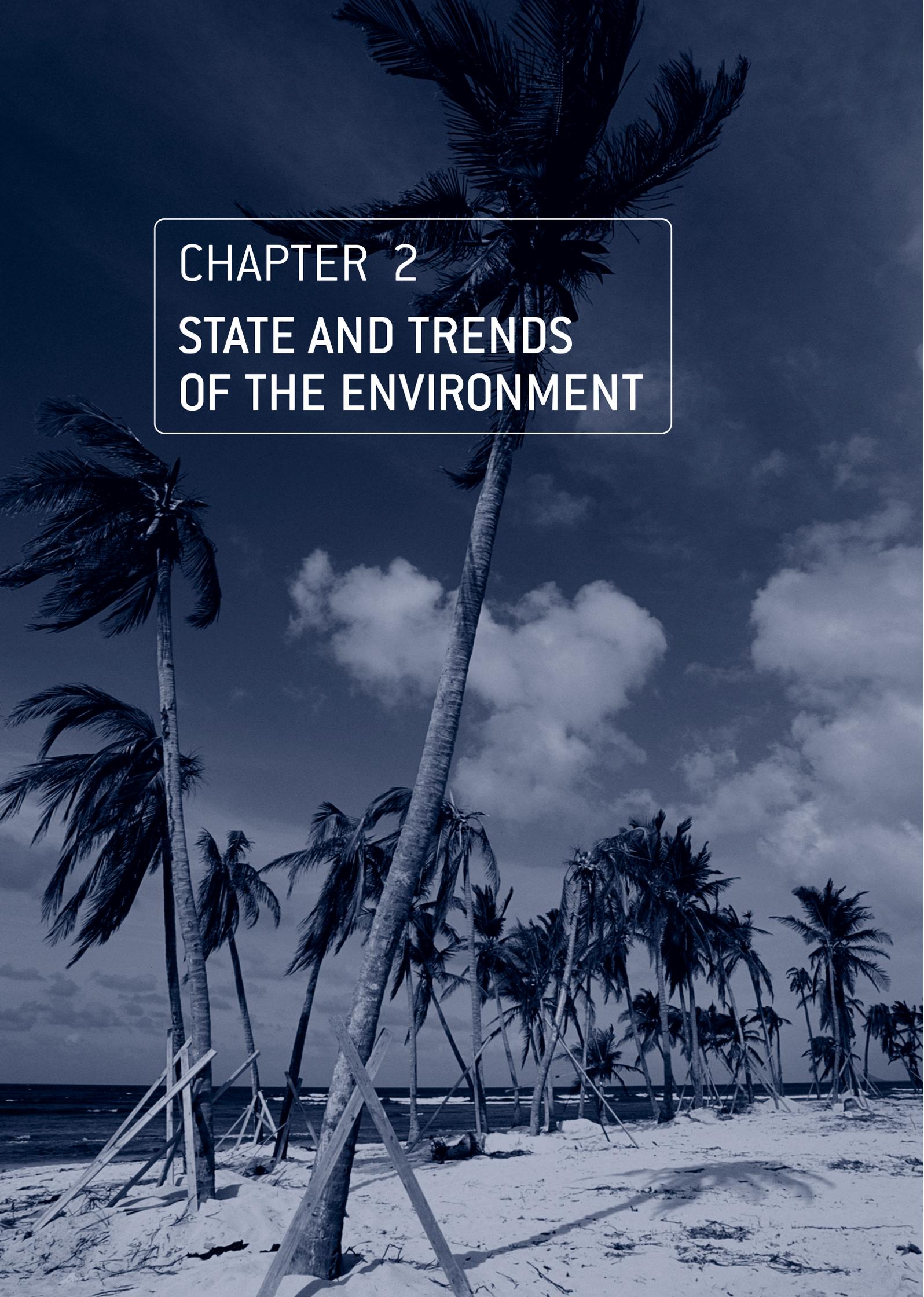
National assessment reports highlight the poor access to credit for individuals, families and customary groups to assist with development. There is a high cost and reliance on diesel fuel, which is a primary input for all development. Globalization of the food industry and targeted social and economic marketing has seen the dominance of imported food, at the expense of locally grown produce. While having an impact on the health of communities, this has also directly affected local agriculture and food service industries, diminishing economic prospects in PICTs.

Table 4 Fishing contribution to GDP of PICTs

	GDP IN US\$ [000s]	FISHING CONTRIBUTION US\$ [000s]	FISHING CONTRIBUTION [%]
AMERICAN SAMOA	na	na	na
COOK ISLANDS	140 340	2 336	1.66
FIJI	1 823 756	42 699	2.34
FRENCH POLYNESIA	na	na	na
FSM	220 222	10 806	4.90
GUAM	na	na	na
KIRIBATI	66 327	5 668	8.5
MARSHALL ISLANDS	92 376	7 203	7.79
NAURU	24 797	1 095	4.41
NEW CALEDONIA	na	na	na
NIUE	8 663	124	1.43
NORTHERN MARIANAS	na	na	na
PALAU	117 777	3 148	2.67
PITCAIRN ISLAND	na	na	na
PNG	4 349 878	19 177	0.44
SAMOA	312 069	18 656	5.98
SOLOMON ISLANDS	188 159	35 794	19
TOKELAU	na	na	na
TONGA	175 815	11 191	6.36
TUVALU	15 680	937	5.98
VANUATU	269 003	2 162	0.80
WALLIS AND FUTUNA	na	na	na

Sources: ADB 2002

na = data not available



CHAPTER 2
STATE AND TRENDS
OF THE ENVIRONMENT

CLIMATE CHANGE

Pacific SIDS are extremely vulnerable to climate change and variability and sea-level rise because of their low elevation, and population and infrastructure concentration in the coastal zone. There are serious threats of increased natural disasters, coral bleaching, coastal erosion, extreme weather events, storms, droughts, disruption of agricultural activities, decreasing resilience of forests, saltwater intrusion of groundwater systems in low-lying atolls, effects on crops and fisheries, and effects on and control of vector-borne diseases. Individually, these threats are daunting; combined they could have irreversible effects on the small economies, fragile environments and social systems of the Pacific SIDS.

The increasing global concentration of carbon dioxide and other greenhouse gases and the gradual

warming of the atmosphere continue to be a major concern for many PICTs. Accurate data on emissions from solid fuels and other non-fuel energy sources in PICTs are not available. This stems from the inability to reach and monitor large rural populations, most of whom lack access to electricity. Solid fuel is still a major source of energy in the Pacific but its use is increasing in some countries and declining in others (Table 5) in accordance with governments' ability to provide power. Emissions of greenhouse gases from PICTs are insignificant (Table 6), but are expected to increase with further economic development.

Sea-level rise is of considerable concern for many PICTs. While the average global surface temperature has risen by about 0.6°C in the 20th century (IPCC 2001), the Pacific is likely to warm at a slightly lower rate (Salinger

Table 5 Proportion of households using solid fuels in 1990 and 2000

	1990	2000
COOK ISLANDS	19	11
FIJI	na	48
FSM	47	54
MARSHALL ISLANDS	14	30
NAURU	1	1
NIUE	50	17
PALAU	na	1
SAMOA	72	63
SOLOMON ISLANDS	na	87
TOKELAU	18	na
TONGA	na	74
TUVALU	70	32
VANUATU	82	83

Source: SPC 2004

na = data not available

Table 6 Pacific CO₂ emissions and consumption of ozone-depleting CFCs

	EMISSIONS PER CAPITA		CONSUMPTION OF OZONE-DEPLETING CFCs (tonnes)	
	1990	2000	1990	2000
COOK ISLANDS	2.4	2.8	na	na
FIJI	1.5	1.0	38	9
KIRIBATI	0.3	0.3	1	1
MARSHALL ISLANDS	na	na	1	1
NAURU	15.5	16.2	na	na
NIUE	1.6	1.6	na	na
PALAU	na	na	2	1
PNG	0.7	0.5	28	48
SAMOA	0.8	0.8	4	6
SOLOMON ISLANDS	0.5	0.4	2	6
TONGA	0.9	1.3	2	1
VANUATU	0.9	0.4	na	na

Source: SPC 2004
na = data not available

and others 2001). Although the exact amount and rate of sea-level rise that this will cause remains uncertain, the Intergovernmental Panel on Climate Change (IPCC) estimates a global sea-level rise of between 0.09 and 0.88 m between 1990 and 2100 (IPCC 2001). The potential sea-level rise and increased frequency of extreme weather events such as cyclones, floods and droughts have already had dramatic impacts on some PICTs, particularly some of the atoll islands such as Tuvalu, Kiribati and the Republic of the Marshall Islands that are barely one metre above sea level. Islets of atolls have been lost due to rising sea levels, and many of the small atoll countries are experiencing more extreme weather events and climatic conditions. The consequences, especially associated with El Niño, have included water shortages and drought in PNG, the Marshall Islands, FSM, American Samoa, Samoa and Fiji.

Data gathered by the New Zealand National Institute of Water and Atmospheric Research (NIWA) also show a

mixed pattern of changes in climate throughout the Pacific from the mid-1970s:

- Kiribati, the northern Cook Islands, Tokelau and northern parts of French Polynesia have become wetter;
- New Caledonia, Fiji and Tonga have become warmer, sunnier and drier;
- Samoa, eastern Kiribati, Tokelau and northeast French Polynesia have become warmer and cloudier and differences between daytime and night-time temperatures have decreased;
- The southern Cook Islands and southwest French Polynesia have become warmer and sunnier; and
- Western Kiribati and Tuvalu have become sunnier.

Coastal areas will continue to experience impacts associated with El Niño/Southern Oscillation (ENSO)

variability, tropical cyclones and wave action. Tropical cyclones may become more intense which would increase storm surge height. Current risks are therefore likely to persist and probably increase at a rate determined in part by sea-level rise (Jones and others 1999). The likelihood that the frequency and intensity of weather extremes will increase with global warming jeopardizes the region's ability to develop a strong productive base for sustainable development. Other anticipated consequences of climate change that are yet to be fully studied include the disruption to agriculture due to changes in temperature, rainfall and wind patterns; and the reduced resilience of forests subject to greater pressures from changes in prevailing environmental regimes affecting the moisture and chemical compositions of soil and the atmosphere.

PICTs are calling on countries that have not done so to ratify the Kyoto Protocol, as well as urging the international community to support implementation of the Regional Framework for Climate Change, Climate Variability and Sea Level Rise. While there are insignificant emissions of greenhouse gases from PICTs, most have embarked on projects and initiatives under the United Nations Framework Convention on Climate Change (UNFCCC) for abatement. These include taking steps to increase reliance on alternative energy technologies and instituting carbon sequestering activities by increasing forested areas. Pacific leaders have also recognized the links and synergies between climate change and ozone depletion and are promoting the use of refrigerants that protect the ozone layer and mitigate climate change. To date, 14 PICTs have embarked on initiatives under the Montreal Protocol on Substances that Deplete the Ozone Layer to phase out the use of chlorofluorocarbons (CFCs) which are most damaging to the ozone layer and also have the highest global warming potentials. Such initiatives include institutional strengthening, training programmes and enforcement of national controls.

Given their vulnerability, PICTs need to improve their understanding of and strengthen their capacities to respond to human-induced climate change, natural climate variability and sea-level rise. Island policy-makers and planners require answers to critical questions relating to their vulnerability and their

sustainable development — for a future that is intimately linked to the continuum of weather, climate variability and longer-term climate change. Future efforts should not focus solely on studies, but rather on the implementation of the developed policies and plans, and on identifying the means to ensure that these efforts are harmonized and mainstreamed in the National Development Plans (NDPs) of each PICT. Climate change adaptation options need to be built into decision making at all levels of planning.

Under the Pacific Island Climate Change Assistance Programme 1996–2002, national climate change country teams and coordinating mechanisms across sectors were established and ten Pacific island countries produced initial national communications. This included initial greenhouse gas inventories, identification of mitigation options, vulnerability and adaptation assessments and the completion of some national implementation strategies.

There has been regional support for national efforts to develop adaptation measures and technical guidelines and methodologies to facilitate adequate adaptation. Support has also been received from the international community to assist the region with research, technical studies, capacity building, planning and the development of policy-relevant advice. A Pacific Island Global Climate Observing System (PI-GCOS) implementation plan for the region has been drawn up along with the establishment of the Pacific Islands Global Ocean Observing System (PI-GOOS).

Capacity-building programmes have commenced aiming to ensure that meteorological services in the region will be better equipped to provide climate-sensitive sectors, such as agriculture, water resources and fisheries, with information about upcoming seasonal conditions and longer-term climate trends. The challenge in the coming period is to ensure that there is an integrated approach between statutory land use planning, environmental/natural resource use planning and infrastructure planning to accommodate climate change adaptation options. Some capacity has been built in this regard over the last decade. This is reflected in the considerable efforts by PICTs in recent years to prepare national technical studies and the development of policy-relevant guidance for key sectors.

NATURAL AND ENVIRONMENTAL DISASTERS

Pacific island economies are at the mercy of natural disasters, which pose a major threat to marine and coastal ecosystems, tourism assets, human settlements and infrastructure (IPCC 1998). In many ways, the Pacific islands carry the largest disaster burden of any world region, including Africa, Asia, the Americas and Europe. From 1990 to 1999, the Pacific led the entire world in

rates of disaster-related mortality, percentage of population affected and disaster damage costs per capita gross national product (GNP) (University of Hawaii 2004). Despite significant development in the region over the last decade, natural and environmental disasters continue to pose an enormous threat to sustainable development in the region. Table 7 shows

Table 7 Average number of tropical cyclone events and risk forecast

	AVERAGE OVER ALL YEARS	AVERAGE OVER WEAK TO MODERATE ENSO YEARS	COMMENT
AUSTRAL ISLANDS	0.3	0.4	AVERAGE RISK
FIJI	1.1	0.8	REDUCED RISK
NEW CALEDONIA	1.4	1.1	REDUCED RISK
NIUE	0.9	1.2	INCREASED RISK
NORTHERN COOK ISLANDS	0.4	0.4	AVERAGE RISK
NORTHERN NEW ZEALAND	0.4	0.2	AVERAGE RISK
PITCAIRN ISLAND	0.1	Less than 0.1	CYCLONES UNLIKELY
SAMOA	0.8	1.2	INCREASED RISK
SOCIETY ISLANDS/TAHITI	0.3	0.2	AVERAGE RISK
SOLOMON ISLANDS	0.5	0.3	AVERAGE RISK
SOUTHERN COOK ISLANDS	0.7	1.4	INCREASED RISK
SOUTHERN PNG	0.1	Less than 0.1	CYCLONES UNLIKELY
TOKELAU	0.5	0.8	INCREASED RISK
TONGA	0.9	0.8	AVERAGE RISK
TUAMOTU	0.2	Less than 0.1	CYCLONES UNLIKELY
TUVALU	0.7	0.9	AVERAGE RISK
VANUATU	1.6	1.1	REDUCED RISK
WALLIS AND FUTUNA	0.9	1.4	INCREASED RISK

Source: NIWA 2002



Cyclone Heta, which struck Niue in January 2004, was a category 5 cyclone. This duplex building was 85 m landward of the cliff face. Severe damage also occurred in Samoa, Tokelau and Tonga

Source: Matt McIntyre

the average number of tropical cyclones with winds over 34 knots occurring within 100 km² for the main Pacific island groups during the cyclone period November–January, based on 31 years of data. This statistical appraisal was undertaken simultaneously with climate change assessment work, and predicts an increased risk for Wallis and Futuna, Samoa, Tokelau, Niue and Cook Islands, each of which felt the devastating effects of the super-cyclone Heta in 2004.

Cyclone Heta, which hit Niue in January 2004, brought wave action that breached 25–30 m cliffs and caused damage up to 200 m inland. With winds in excess of 300 km/h and waves estimated to have reached a height of 40 m, Heta was classed as a super-cyclone. The violent wind, salt spray and wave action wiped out agricultural crops and gardens, caused extensive damage to over 200 homes, completely

destroying over 20; the overall damage was estimated at US\$47 million. Also in early 2004, a typhoon hit Chuuk and Yap States of the Federated States of Micronesia, destroying crops, homes and public buildings, leaving damage estimated at US\$7 million. Thirty-three per cent of the world's cyclones develop in the immediate area around Guam. From 1900 to 2002, this island was affected by approximately 109 tropical cyclones. Typhoon Paka (1997), Typhoon Chata'an (2002) and Supertyphoon Pongsona (2002) each resulted in damage estimated at approximately US\$500 million on Guam (Government of Guam 2003).

Table 8 presents the best available aggregated information on the estimated level of vulnerability to specific natural hazards of various PICTs. The larger volcanic island groups of Fiji, PNG, Solomon Islands, Tonga and Vanuatu are the most vulnerable to the

range of events; their steep slopes provide the added risks of landslides and floods. Many are also located on the 'Pacific rim of fire' where the occurrence of earthquakes is very high. Cook Islands, the Republic of the Marshall Islands, Niue, Palau, Samoa, Tokelau, Tonga and Tuvalu feature strongly in disaster statistics as they are highly vulnerable to cyclones and associated flooding, storm surges and landslides.

On a smaller, but equally important, scale are the threats of disasters from the poor management of chemicals, hazardous materials and wastes in agricultural stores, rural areas, utility service compounds and laboratories (particularly in schools). The threats are aggravated by the absence of

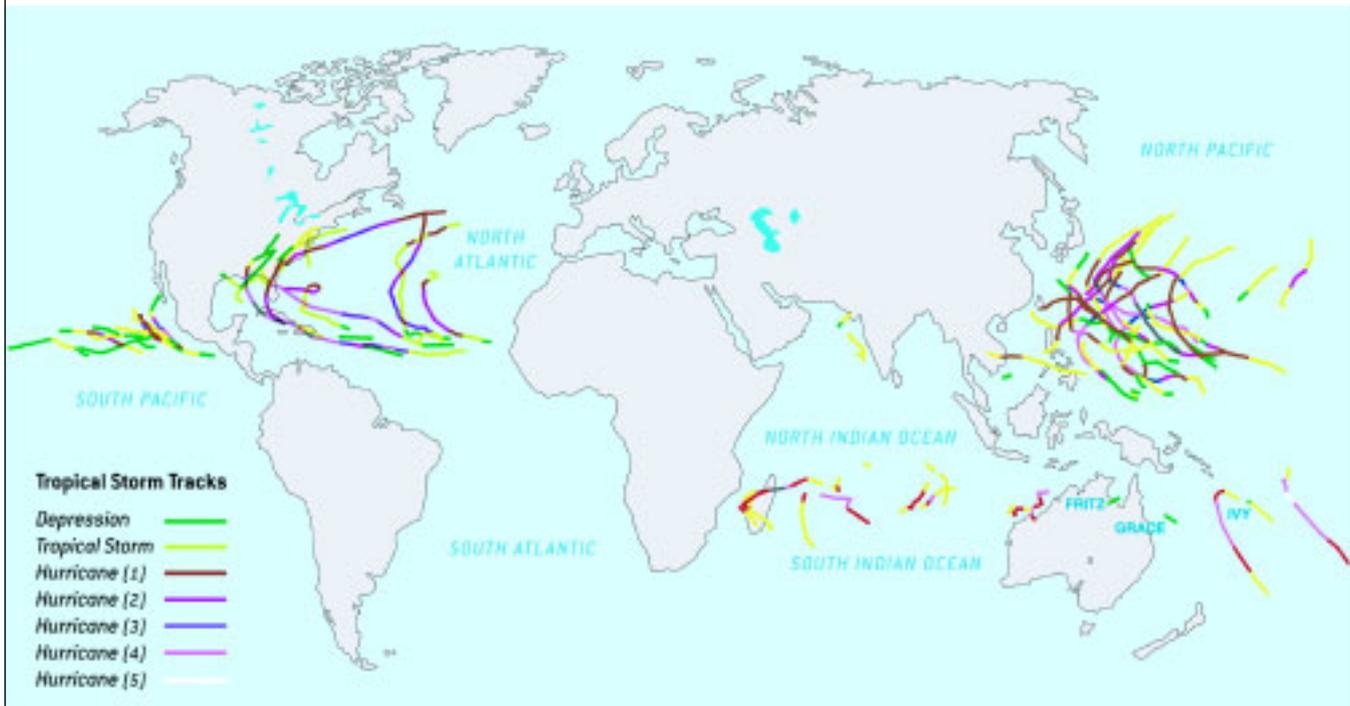
occupational health and safety guidelines, and a lack of cost-efficient disaster management technology for spills, fires and chemical leaks. In combination with a natural hazard, the potential for disastrous consequences is magnified.

There is a need for greater awareness and commitment to national disaster risk management planning, and capacity building at the national level. There is a lack of information on the complex nature of disasters, models of good practice for disaster preparedness and response, as well as a lack of building codes and regulatory frameworks to support more effective urban planning processes. There is a need to improve disaster communication, early

Table 8 Estimated level of vulnerability of PICTs to specific natural hazards

	TROPICAL CYCLONE	STORM SURGE	COASTAL FLOOD	RIVER FLOOD	DROUGHT	EARTHQUAKE	LANDSLIDE	TSUNAMI	VOLCANIC ERUPTION
COOK ISLANDS	H	H	M	L	H	L	L	M	–
FIJI ISLANDS	H	H	H	H	H	H	H	H	L
FSM	M	M	H	–	H	L	L	M	–
KIRIBATI	L	M	H	–	H	L	L	L	–
MARSHALL ISLANDS	H	H	H	–	H	L	L	L	–
NAURU	L	L	L	–	H	L	L	L	–
NIUE	H	H	L	–	H	M	L	M	–
PALAU	H	H	M	–	H	L	L	M	–
PNG	H	H	H	H	H	H	H	H	H
SAMOA	H	H	H	M	L	M	H	H	M
SOLOMON ISLANDS	H	H	H	H	H	H	H	H	H
TOKELAU	H	H	H	–	M	L	L	M	–
TONGA	H	H	H	L	H	H	L	H	H
TUVALU	H	M	H	–	H	L	L	M	–
VANUATU	H	H	H	H	H	H	H	H	H

Source: UNDP South Pacific Office 2002
 H = high; M = medium; L = low level of vulnerability

Table 9 Tropical storms and hurricanes in 2004

The colours of the lines indicate intensity (category based on Saffir–Simpson scale):

TYPE	CATEGORY	PRESSURE (mb)	WINDS (knots)	WINDS (kmh)	SURGE (m)	LINE COLOUR
Depression	TD	–	<34	<63		Green
Tropical Storm	TS	–	34–63	63–117		Yellow
Hurricane	1	>980	64–82	118–153	1.2–1.6	Red
Hurricane	2	965–980	83–95	154–177	1.7–2.5	Light red
Hurricane	3	945–965	96–112	178–209	2.6–3.8	Magenta
Hurricane	4	920–945	113–135	210–249	3.9–5.5	Light magenta
Hurricane	5	<920	>135	>249	>5.5	White

TD = Tropical Depression TS = Tropical Storm

Source: Unisys 2004 Map compiled by UNEP/DEWA, GRID Africa

warning systems, coordination systems and practices including in outer island communities.

Emergency and response funding are critical to increasing the resilience of PICTs to the effects of disasters. Emergency funds need to be allocated by the governments of PICTs. Access to affordable insurance and reinsurance schemes is also considered crucial to infrastructure and building resilience in disaster-prone

areas. Some Pacific SIDS do not have any insurance schemes because of the high costs incurred in previous disasters, in particular due to tropical cyclones.

In the past decade a number of international and regional initiatives have supported the capacity-building process in the Pacific for reducing community vulnerability to the impacts of natural and human-induced disasters. The South Pacific Applied Geoscience

Commission (SOPAC) has been mandated to improve the coordination of disaster management efforts in the region, and is doing so through a number of programmes at the regional and national levels. Most Pacific SIDS have national focal points for disaster management and preparedness, and are building on their national disaster plans.

In response to concerns about the environmental vulnerability of SIDS, SOPAC commenced development

of the Environment Vulnerability Index (EVI) in 1999. This index reflects the vulnerability of a country to environmental damage and degradation. The first functional results of the EVI for several countries have been released (Kaly and others 2002) and the project has been extended to become a global model. Results show that SIDS represent four out of five of the most vulnerable countries in the world.

WASTE AND POLLUTION

Pollution from solid, hazardous and toxic wastes is now widely recognized as one of the major threats to sustainable development in the PICTs and has a direct influence on the quality of people’s lives. The characteristics of PICTs make them highly vulnerable to

contamination by solid and hazardous wastes and chemicals, as well as by radioactive materials. Many PICTs lack the capacity for waste management, including adequate mechanisms, technologies and legislation together with suitable land for waste

Table 10 Composition of solid waste (% wet weight) in selected countries 1990–1994

WASTE CLASSIFICATION	HONIARA (SOLOMON ISLANDS)	NUKUALOFA (TONGA)	LAUTOKA (FIJI ISLANDS)	PORT VILA (VANUATU)	AVERAGE % wt
PAPER	5.9	31.3	14.7	11.4	15.8
PLASTIC	16.8	5.2	8.1	7.7	9.5
GLASS	4.5	3.3	2.7	3.3	3.5
METALS	6.1	8	3.2	3.6	5.2
BIODEGRADABLE	64.6	47.2	67.8	71.0	62.7
TEXTILES	1.8	3.7	3.0	1.6	2.5
POTENTIALLY HAZARDOUS	0.1	<1	0.2	0.7	0.5
CONSTRUCTION AND DEMOLITION	0.1	1	0.0	0.7	0.5
OTHER	0.0	0.3	0.2	0.0	0.1
AVERAGE BULK DENSITY (kg/m ³)	209	159	169	158	174
GENERATION RATE (kg per capita/day)	0.62	0.82	0.94	0.65	0.76

Source: Raj 2000

disposal sites. Without adequate measures to address the growing sources and extent of waste and pollution, the Pacific islands' efforts to maintain buoyant and healthy societies, to stimulate development and new investment, and build a sustainable future for its people may be permanently undermined.

Prior to the 1970s most wastes were biodegradable and the concentration of populations not sufficiently high to warrant concern for waste management. However, growing urbanization and urban populations, the increasing imports of non-biodegradable material and industrial and agricultural chemicals, and changes in consumption patterns have created problems of waste and toxic/hazardous substances management. Solid waste, which is composed of both non-biodegradable and biodegradable materials (Table 9), is of particular concern for the region. Over the last decade there have been dramatic shifts in the waste composition in some countries, with plastics, cardboard,

paper and metals increasing in significance. Plastics, in particular, can be harmful and even deadly to a number of marine animals, including threatened species such as green turtles, blue whales and albatrosses.

Significant increases in per capita waste generation may be expected over the next few decades as the GDP of countries such as Fiji, Samoa and PNG increases. This growth will also lead to increased volumes of electronic and automotive wastes. Much of this waste may also be hazardous. For instance, electronic waste, including personal computers, monitors and televisions, contain toxic chemicals such as lead and brominated fire retardants, while automotive wastes include used lead-acid batteries, used oil and possibly gaskets and brake pads containing asbestos.

Inadequate sanitation systems for the disposal or treatment of liquid wastes have resulted in coliform contamination of rivers, coastal waters and groundwater near urban areas. This has severe health



Growing urbanization and changes in consumption patterns have created problems of waste management

Source: SPREP

Table 11 Quantity of, and contamination by, persistent organic pollutants in PICTs

CATEGORY	ESTIMATED QUANTITY AND NUMBER OF SITES
AGRICULTURAL CHEMICALS, DDT	10.4 tonnes
BURIED DDT SITES	2
POTENTIALLY PCB-CONTAMINATED TRANSFORMER OIL	43.072 tonnes
PCBs TOTAL	131 tonnes
PCB-CONTAMINATED SITES	3
PESTICIDES	54.439 tonnes
BURIED PESTICIDE SITES	3
PESTICIDE STORAGE SITES	13
TIMBER TREATMENT CHEMICALS	11.15 tonnes
TIMBER TREATMENT SITES	4
BITUMEN	330 tonnes
CONTAMINATED SITES, PESTICIDES	21
BITUMEN-CONTAMINATED SITES	8
OIL AND DIESEL-CONTAMINATED SITES	21
CCA-CONTAMINATED SITES	7
POTENTIALLY CONTAMINATED SOLID WASTE DISPOSAL SITES	18

Source: SPREP 2001a, 2003a

and environmental implications, with adverse effects on recreational and fishing activities. The increased nutrient load to the marine environment from liquid waste also threatens the coral reef ecosystems by weakening the reef carbonate skeleton and promoting the growth of algae that smother the reef. Point source pollution from industrial wastes and sewage, inappropriately sited and poorly managed garbage dumps and disposal of toxic chemicals are also significant contributors to coastal pollution. Industrial activities increased dramatically in the 1980s leading to pollution from solid and liquid wastes, some very toxic, in the larger urban centres. Overcrowding also has serious consequences for pollution and environmental contamination in some islands, not only from sewage, but also from the

disposal of animal waste (especially from pigs) and household garbage. The limited supply of freshwater exacerbates this situation.

The use of a range of chemicals for agriculture, mining and manufacturing has increased over the past ten years. This has sometimes been driven by governments and development assistance agencies aiming to expand the agricultural base of the PICTs. A recent study of persistent organic pollutants (POPs) in the region found that considerable stockpiles of chemicals and obsolete pesticides exist in some countries (Table 10) and that a number of sites had been contaminated through past disposal or storage of these chemicals (SPREP/AusAID 1999). An Australian-supported project is currently collecting stockpiles of POPs for destruction in Australia.

Activities in the 1950s and 1960s, which led to widespread radioactive and chemical contamination of land, continued through to the 1980s in northern Polynesia (albeit at a lower intensity) and into the 1990s in the French Territories. The challenge includes rehabilitation of sites, disposal in another country and the means to ensure adequate chemicals management in the future, in particular for school laboratory and medical chemicals. Many northern PICTs have significant concerns over military materials remaining from World War II. Military nuclear testing has made some islands in the Marshall Islands permanently uninhabitable. World War II shipwrecks in the Pacific include 3 855 military ships and civilian merchant vessels with a total tonnage of 13 547 019. Oil, fuel and other pollutants from these wrecks still pose significant problems for reef and coastal areas of Melanesia and Micronesia.

The region generally has little capacity for monitoring and dealing with pollution from toxic or hazardous substances, although there is increasing awareness of the impacts and magnitude of the problem. The existing stockpiles of solid and hazardous waste that are jeopardizing human health and environmental quality should be appropriately disposed of along with consolidation of investments to improve landfill design and management across all PICTs. Innovative methods for reducing, re-using or recycling waste need to be adopted by PICTs: for example, the potential for using biodegradable wastes for the production of mulch, topsoil and fertilizer should be explored. Additional advantages will include reduced expenditure, and benefits to tourism and public health.

COASTAL AND MARINE RESOURCES

The coastal and marine environment and resources of PICTs offer enormous development benefits and continue to provide the foundation of subsistence economies, lifestyles and traditions in PICTs. A vast majority of Pacific islanders (excluding PNG) live in the coastal zone. For the smaller, low-lying islands and some volcanic islands, most of the islands' land mass can be considered as the coastal zone because of their small size. Urban and major village extension in the coastal zone and changes in population density combined with new technology and changing development priorities have had a particular impact on coastal environments. Changes to ocean and coastal ecosystems caused by multifarious influences continue unabated. Higher levels of population growth, density and economic development in coastal areas since the late 1980s are expected to continue to place pressure on wetlands and mangroves, increase land-based sources of pollution, and increase subsistence and cash demand for living marine resources.

There are very few data on the overall condition and historical pressures on the marine and coastal

environment in the Pacific. Nevertheless, some trends are evident: declining fishery productivity due to over-harvesting; destructive fishing; reduced access of traditional users and practices; habitat damage from shoreline development, uncontrolled sand mining, land and marine-based pollution and global climate change; introduction of invasive species; and decline in migratory transboundary species such as whales, turtles and dolphins. These impacts are exacerbated by: fragmented laws, mismanagement, lack of coordination, serious information gaps and poor institutional frameworks; lack of awareness of better coastal and ocean management practices; limited technical expertise, knowledge and equipment; and the cumulative breakdown in traditional protection mechanisms.

The expansion of tourism is expected to contribute to the pressures on the coastal areas. From 1991 to 1996, total tourist arrivals to PICTs increased by 17 per cent (South Pacific Tourism Organization 2004). Studies on global tourism trends predict that the number of visitors to the Pacific region as a whole will double over



A beach on the north coast of Upolu, Samoa
 Source: Ilan Kelman (reprinted with permission from www.islandvulnerability.org)

the next decade. It is more than likely that most of the tourism development will occur in the coastal areas of PICTs. Care must be taken to ensure that this does not directly or indirectly destroy the very qualities that draw tourists to the islands: the unique, pristine coastal landscapes.

REEFS

Pacific coral reefs are among the most biologically diverse ecosystems on the planet. Most of the reefs support an exceptional diversity of fish, marine invertebrates and corals. However, in the last few decades, many of these ecosystems have been destroyed by human activities, and have suffered additional impacts from climate change and sea-level rise (Bryant and others 1998).

During World War II, hundreds of vessels and their armaments were deposited on these reefs or on nearby lagoons and atolls. While for some there appears to have been limited long-term deleterious effects, in parts of FSM the explosives from the munitions dumps have been used to harvest fish (Bryant and others 1998). Blasting has now killed 10 per cent of the reefs in some of the lagoons (Bryant and others 1998). The use of a toxic plant (*Derris* sp., commonly known as 'PNG weed') for fishing is destroying reefs in much of the rest of the Pacific. Bryant and others (1998) assessed that 31 per cent of Pacific reefs were at medium risk and 10 per cent at high risk of further degradation (Table 12). The assessment criteria included proximity to coastal development, marine pollution, overexploitation, destructive fishing, inland pollution and erosion. The fact that information and assessment of only six PICTs are available following Bryant's original study supports the call for additional scientific and management studies on coral reefs.

Table 12 Reefs at risk by region and country

REGION	PERCENTAGE AT RISK			MARINE PROTECTED AREAS	
	LOW	MEDIUM	HIGH	NUMBER	AREA (km ²)
REGION	59	31	10	92	372 809
FIJI	33	48	19	1	1
FRENCH POLYNESIA	82	18	0	1	124
MARSHALL ISLANDS	97	3	0	2	163
NEW CALEDONIA	83	13	4	5	530
PNG	50	38	12	8	2 149
SOLOMON ISLANDS	50	42	8	na	na

Source: Bryant and others 1998 na = data not available

COASTAL FISHERIES

Coastal fisheries are the primary source of protein for local communities. They are also important for customary and lifestyle pursuits and are a major source

of employment in many PICTs. Table 13 shows the estimated annual production of the coastal fisheries industry. The World Bank report on coastal management

Table 13 Estimated annual coastal fisheries production (tonnes) in PICTs

	SUBSISTENCE	COMMERCIAL	TOTAL	% SUBSISTENCE	% COMMERCIAL
AMERICAN SAMOA	215	52	267	80.5	19.5
COOK ISLANDS	858	124	982	87.4	12.6
FIJI	16 600	6 653	23 253	71.4	28.6
FRENCH POLYNESIA	3 691	2 352	6 043	61.1	38.9
FSM	6 243	637	6 880	90.7	9.3
GUAM	472	118	591	80.0	20.0
KIRIBATI	9 084	3 240	12 324	73.7	26.3
MARSHALL ISLANDS	2000	369	2369	84.4	15.6
NAURU	98	279	376	26.0	74.0
NEW CALEDONIA	2 500	981	3 481	71.8	28.2
NIUE	103	12	115	89.6	10.4
NORTHERN MARIANAS	2 825	141	2 966	95.2	4.8
PALAU	750	736	1 485	50.5	49.5
PITCAIRN ISLAND	8	0	8	100.0	0.0
PNG	20 588	4 966	25 554	80.6	19.4
SAMOA	3 281	208	3 489	94.0	6.0
SOLOMON ISLANDS	10 000	1 150	11 150	89.7	10.3
TOKELAU	191	0	191	100.0	0.0
TONGA	933	1 429	2 362	30.5	60.5
TUVALU	807	120	927	87.1	12.9
VANUATU	2 045	467	2 512	81.4	18.6
WALLIS AND FUTUNA	621	296	917	68.0	32.0
TOTAL	83 913	24 330	108 242	77.0	23.0

Source: Adams and others 1996

in the Pacific (1999) revealed that overfishing poses the most significant threat to many PICTs.

The management of fisheries in PICTs is constrained by a number of challenges, including high 'open access' to the resource, limited scientific data, poor awareness of the impacts from overexploitation by national and international stakeholders, limited funds for research, and poor capacity to monitor the EEZ.

There have been minimal consistent and holistic interventions aimed at the recovery of overexploited fisheries. The re-emergence of traditional fisheries protection strategies such as closed seasons and areas (tapus and fonos), restrictions on fishing gear and on species caught, and access to resources has also occurred (Johannes 1982). It is recognized that many communities have limited capacity to control their own fishing practices and pollution sources. SPREP programmes over the last decade have aimed at capacity building through marine science training and community conservation area implementation. Further capacity development is required to adequately address the rising pressures and impacts on coastal fisheries.

OCEANIC FISHERIES

The oceanic fisheries resource represents a major focus for long-term economic development in the region, especially for the atoll states such as the Marshall Islands, Kiribati, Niue and Tuvalu. It has the capacity to finance consolidated revenue with flow-on benefits for environmental areas not currently receiving attention. The commercial exploitation of oceanic resources is dominated by high-technology tuna operations and is undertaken predominately by the fishing fleets of distant nations. Economic returns to PICTs through fishing access fees represent an insignificant proportion

of an industry valued at approximately US\$1.7 billion (Preston 1997). The Western and Central Pacific region supports the world's largest tuna fishery, which has been increasing steadily over the past two decades (Table 14). The total catch rose to over 1 million tonnes in 1991 and has since fluctuated slightly about this level (Preston 1997). This represents an increase of approximately 230 per cent over a 20-year period from 1976. The challenge in terms of the oceanic environment is to ensure that the problems of overcapacity and overexploitation are not repeated in this region.

Information from the Forum Fisheries Agency (FFA) and the SPC captured by Adams and others (1996) and the ADB (2002) indicates that skipjack tuna stocks are currently in good condition, with high biomass and recruitment level. This has been attributed to reduced harvesting pressures together with favourable ecological conditions over the recent past. There is, however, a high degree of uncertainty due to incomplete knowledge of the fishery and inadequate technical data. The albacore harvest appears to be within sustainable limits, with production relatively constant over the last 40 years. The El Niño of 1997–1998 significantly affected catches in the southeast Pacific and, to a lesser extent, the eastern central Pacific. Most of the recent changes in total global landings are attributed to the rapid decline then rapid recovery in biomass and production volumes that followed the El Niño. The yellowfin tuna stocks are close to their full exploitation potential and there is concern also for the bigeye tuna stock, overfishing of which might have been prevented only because of above-average recruitment in the past decade. With expected high fishing mortality and high catch levels, the stock will eventually become overfished, unless conditions for above-average recruitment continue.

Table 14 Tuna catch by major species in the Central and Western Pacific tuna fisheries

YEAR	CATCH (000s tonnes)				TOTAL
	SKIPJACK	YELLOWFIN	ALBACORE	BIGEYE	
1976	168	62	30	43	302
1977	200	74	36	41	351
1978	230	86	30	28	374
1979	186	83	25	39	334
1980	212	105	40	42	398
1981	255	110	31	28	424
1982	267	111	29	29	436
1983	426	141	20	27	614
1984	435	129	20	32	616
1985	367	125	27	41	560
1986	431	126	33	35	624
1987	407	183	24	41	655
1988	542	128	33	36	738
1989	531	181	48	34	794
1990	589	203	31	52	875
1991	759	229	25	37	1 050
1992	686	275	41	44	1 047
1993	536	284	34	49	904
1994	663	263	39	59	1 024
1995	667	216	38	37	958
1996	672	149	37	50	908
1997	535	276	43	66	921
1998	785	273	53	68	1 179
1999	707	214	47	73	1 040
2000	728	213	46	69	1 056
2001	558	185	50	47	840
2002	667	158	49	59	933

Source: Lawson 1996

WATER RESOURCES

There is relatively little historic or real-time data within the Pacific region on water resource quality or quantity. Apart from some urban areas on most islands, the piped water supply and storage systems, such as water tanks and reservoirs, are recent developments since the 1980s and, for some, the late 1990s. Severe water shortages have been experienced on the atolls and raised limestone islands that lack rivers, and where inhabitants must rely on the groundwater lens floating on the saltwater. The ability of the smaller atolls to sustain an exploitable freshwater lens has determined whether these islands have been able to sustain permanent habitation. Water shortage in PICTs is associated with changes in the hydrological cycle resulting from global change, pollution of existing supplies and changes in the water table as a result of human activities, rather than reductions in stream flow.

Water-related issues continued to be reported as a major problem in 1992 (Thistlethwaite and Votaw 1992), with two-thirds of SPREP members recording problems of supply/storage and an even higher number reporting groundwater pollution. In their National Assessment Reports for WSSD, some PICTs expressed the view that the available data on access to safe water were overly optimistic. However, there is no doubt that the picture of water access is bleak, given the size of the islands, the variable rainfall patterns, and expected impacts of climate change. There is concern about the inefficient use and leakage of water. The region-wide drought in 1998 and the resulting water shortages have highlighted the urgency for PICTs to reduce their water consumption. A summary of sustainable access to potable water sources in selected countries is provided in Table 15.

In the high islands, despite high levels of total rainfall, localized pollution, excessive sedimentation due to uncontrolled watershed development and water wastage are common problems. Pollution and nutrient enrichment of water occur to varying degrees throughout the region. Groundwater is highly susceptible to contamination because of poor waste disposal and inadequate well-head protection. In some

atoll communities where water shortages may force the use of polluted groundwater for drinking and cooking, health problems such as diarrhoea and hepatitis are prevalent with occasional outbreaks of typhoid and, in Kiribati, Tuvalu and the Marshall Islands, even rare occurrences of cholera. Poor access to water in PNG, the most populous island (4 million people), stands out as the hotspot for addressing water resource access in the Pacific.

Water quality in the high islands is usually acceptable by World Health Organization (WHO) standards, although some problems occur in villages near flooded riverine and estuarine environments. Over-pumping of the water lens has resulted in increasing chloride concentrations as a result of saline intrusion, and increasing anthropogenic contamination of aquifers is demonstrated by the increasing nitrate levels (GEPA 1998). If the freshwater lenses are contaminated with saltwater or other pollutants, particularly from pesticides or leachates, the problem of poor water quality may persist for longer periods.

Rapidly growing settlements with inadequate water supply and sanitation, especially on the periphery of established towns, as well as in many rural areas, are not only the result of rapid and uncontrolled population growth, but also of inadequate government investment in utility services. Urban centres have an increasingly high demand for water. In Tonga, demand for water has risen because of the higher standard of living and on Tongatapu it is estimated that potable water consumption increased almost tenfold during the 1970s and 1980s: the average daily consumption in Nuku'alofa is now about 80 litres per person (Tonga NEMS 1993). In Fiji, although no data exist, there is a potential problem of diminishing groundwater and river water quality caused by the long-term use of fertilizers and pesticides in the many sugar cane plantations. The impact on groundwater recharge and storage caused by the introduction of non-indigenous agriculture (pine forests, for example) is another activity the impact of which has not been fully assessed.

Table 15 Proportion of households with sustainable access to a potable water source

	URBAN		RURAL		TOTAL		MAIN WATER SOURCES
	1990	2000	1990	2000	1990	2000	
COOK ISLANDS	100	99	71	87	na	na	SW, GW, RW
FIJI	91	96	33	na	51	72	SW, GW, RW, D (tourist resort only)
FSM	94	94	88	92	79	87	SW, GW, RW
KIRIBATI	54	60	25	42	35	49	GW, RW, D (limited)
MARSHALL ISLANDS	97	83	85	87	93	85	RW (from airport catchment and buildings), GW, D (emergency)
NAURU	na	na	na	na	72	82	D (regular use), RW, GW (limited)
NIUE	99	100	na	100	na	100	GW, RW
PALAU	84	78	97	95	89	84	SW, GW, RW
PNG	na	na	na	30	88	na	SW, GW, RW
SAMOA	99	92	89	88	91	89	SW, GW, RW
SOLOMON ISLANDS	na	81	na	44	na	30	SW, GW, RW
TOKELAU	na	na	82	90	na	na	GW, RW
TONGA	97	97	90	na	92	na	GW, RW
TUVALU	93	94	98	98	90	93	RW (primary) GW (limited)
VANUATU	96	91	71	71	76	75	SW, GW, RW

Sources: ESCAP 1995; UNDP 1996; SPC 2004

SW = surface water; GW = groundwater; RW = rainwater; D = desalination; na = data not available

Industrial use of water, though limited in the Pacific, may be of more concern because of the waste generated in the processes and often expelled with wastewater, rather than the quantity consumed. Beer making, soft drink manufacture, fish processing and sugar refining are some of the largest users of water as are activities associated with the tourism industry. In some PICTs there is a growing number of light industries and commercial agricultural practices placing further demands on water supplies. In Fiji water bottling and hydroponics are two new industrial users.

The status of information on access to safe water sources has improved through work associated with the Millennium Development Goals (MDGs); however, much still needs to be done to get a complete picture of the status within PICTs. The lack of water resource data in most island countries often means that major development is implemented without knowledge of the practical implications for the environment and the water resource. Provision of expert water quality monitoring and analytical services is expensive and difficult for the widely separated islands of the Pacific. Therefore, water resources are not monitored in many

PICTs for saltwater intrusion, bacterial contamination, chemical residues and total dissolved salts.

In many PICTs, management of the existing water resources is a greater challenge than identifying new sources. Improvement in water resource management will require a coordinated effort across many sectors including: improvements in watershed management; reductions in deforestation rates; raising public awareness of wise water use and management; controls over agricultural activities; and improvements in waste disposal, especially sewage disposal facilities.

A management structure or regime is often difficult to put in place when there is a policy vacuum, outdated legislation, insufficient budgetary provisions, absence of technical capacity and perennial problems of land ownership. The UN Water Decade of the 1980s helped to focus many of the regional concerns in the water and sanitation sector. This also resulted in the instigation of a regional mechanism focusing on capacity building, sharing technology, coordination and avoidance of duplication of effort.

LAND RESOURCES

For most Pacific societies, land resources are the basis for the majority of subsistence and commercial production. Nevertheless, these resources are being affected by socio-economic pressures created principally by high population growth rates and/or density, displacement of traditional land and resource management systems, introduced agricultural systems, land shortage, land tenure conflict, mining, deforestation and poor development practices. The results include loss of vegetation cover, reduced use of fallow periods, extension of agriculture into marginal lands, excessive use of chemical fertilizers, overgrazing and introduction of invasive species. The indirect impacts are also important: reduced vegetation cover affects the soil moisture regime, often increasing leaching and loss of nutrients, and reducing the recycling of organic matter from leaf litter. This in turn affects the biological composition and productivity of soils. Erosion of degraded and exposed soils leads to loss of topsoil, affecting the water quality of inland water bodies and eventually coastal waters. To address reduced soil fertility farmers often use synthetic fertilizers, which are leached into drainage systems and often contaminate potable water sources. The loss of land cover in catchment areas threatens water supplies and results in reduced flood control. Climate change could exacerbate land degradation over the coming period with the possibility of more frequent droughts

in some PICTs. PNG, FSM, Marshall Islands and Fiji in particular, suffered from the intensity of the 1997–1998 El Niño event. Prolonged drought led to severe reduction of crop yields and, in some cases, famine. A recurrence of such events and catastrophic cyclones would bring the additional threat of serious erosion and loss of cultivable land.

Land degradation is now repeatedly listed by PICTs as one of their primary environmental concerns (ADB 1992; SPREP 1996). According to the Global Assessment of Soil Degradation (GLASOD), the area of degraded soil in the Pacific is extensive (Oldeman and others 1990), with significant implications for sustainable development and economic activity: food security is threatened and reliance on imported food increases; food quality decreases and crops become non-viable; and rural labour opportunities are diminished. Where land degradation through massive soil fertility and structural decline occurs or invasive species are prominent, land is often abandoned, triggering additional pressures. Abandoned lands become havens for invasive species, sources of sediment, or lead to additional tenure disputes — worsening already bad scenarios for sustainable land and water management.

These trends are particularly serious on smaller islands, especially atolls with limited land and poor soil profiles and few other land resources. Land degradation is most evident where population density and

economic activity are concentrated together, particularly around towns, and where resources such as timber and minerals are being extracted. Localized population density increased in the late 1980s from internal migration, and high urbanization levels caused widespread land degradation in the 1990s. The most serious effects were in peri-urban areas of the larger centres or over whole atoll and low-lying islands such as Tarawa in Kiribati. In the late 1980s and 1990s infrastructure development and urban sprawl began to make significant contributions to land degradation. For instance, in Guam major road building on steep slopes has caused erosion and the resulting sedimentation has killed coral colonies on fringing reefs (GEPA 1998).

The pressures and driving forces behind the land exploitation are numerous and complicated. The customary communities have unique inheritance and limited redistribution mechanisms with land and resources managed through village and family units. However, rising individualism results in increasing land and resource conflict as it is inconsistent with community mechanisms where communal sharing, reciprocity and community status are linked to agriculture and food production and consensus decisions are the norm. Many PICTs have constitutional provisions that restrict the alienation of land and other natural resources. Conflict over land usually results in its fragmentation and there are few or no mechanisms to reconsolidate fragmented land. Fragmentation reduces

the utility of land resources for subsistence agriculture, cash cropping or other economic activities because of questionable security and certainty of tenure, or insufficient size for adequate returns on investment.

To avoid conflict, families reduce the shifting nature of land use, shortening fallow periods and placing a heavier reliance on the use of fertilizers, leading to land degradation. Alternatively, they shift their efforts to family land which is invariably primary forested areas. The result is increased clearance of forests rich in biodiversity or ecological value. Primary forested areas usually have poorer soils, with potential for accelerated soil erosion when deforested. Agricultural use of marginal lands for farming can also result in soil structure decline. There is continuing pressure on the land cover of the islands from forestry activities (see the section on 'Forests'). Forest conversion can adversely affect biodiversity, the residual vegetation, the local microclimate, local water quality, crop yield and the soil fertility of these areas. Despite support at the regional and national level for codes of conduct for logging, instituting these outside the mainstream planning and development processes has led to continuation of unsustainable forestry activities.

Land degradation problems of the 1960s and 1970s were exacerbated by population growth, agronomic restructuring and poorly designed development assistance programmes. In the 1970s and early 1980s land resource development focused on market-oriented cash cropping. Many agricultural programmes aimed at creating more intensive cash crops and extensive market production, such as palm oil plantations, have resulted in more extensive land clearing, intensification of use, increased mechanical means of farming, new road networks in remote areas and heavy reliance on fertilizers. Disc ploughing of soils in Niue destroyed up to 8 per cent of the flatter, more productive lands. Little has been done to alleviate the degradation over the ensuing years caused by bringing calcium carbonate into the topsoils, limiting the uptake of other nutrients essential for plant growth.

Transnational corporations' involvement had been in large-scale, capital-intensive developments such as logging, mining and plantation development. These activities added to the sediment load of rivers, and in



A local grass (*Vetiver* sp.) is still planted to stabilize the hill slopes which suffer the effects of soil erosion after land clearance

Source: Government of Vanatu Country Report, 2002

some countries the effects on the reef systems were extensive (Smith 1993). On Upolu Island in Samoa, for example, recorded declines in inshore fish catches have been linked to sedimentation of reefs as a result of deforestation and agricultural activities in watersheds (Zann 1992).

The region boasts some of the world's largest mining operations and mineral deposits. PNG has a number of porphyry-copper, silver and gold mines and a large nickel mine in the planning stages. New Caledonia has significant nickel deposits and mines. Fiji has one of the largest porphyry-copper deposits in the region, as well as two gold mines. The Solomon Islands has opened its first gold mine and has significant mineral deposits. The economic significance of mineral exploitation in some PICTs is reflected in the related export earnings. For example on PNG the mineral sector (without oil and gas) accounted for 32 per cent of export earnings (1997), the Solomon Islands nearly 30 per cent (1998), and Fiji an estimated 8.6 per cent (1998). However countries and territories have been slow to move towards ensuring that environmental management practices and standards are incorporated in the

economic planning and decisions concerning mines.

Responses to land degradation have been limited to spasmodic scientific research and agricultural extension projects with meagre efforts by governments handicapped by a lack of human and capital resources. Responsibility for the problem does not lie only with PICT governments, as overseas development assistance programmes have also contributed. While the Food and Agriculture Organization (FAO) has had a presence in the Pacific since the 1960s, membership and availability of funds have restricted rehabilitation initiatives. SPC has been active in resource use science and policy planning but again suffers from a lack of resources. The resolution of sustainable land management must deal with communal tenure systems, traditional land use practices, cultural values and the integration of environmental and development decision making. The importance of local knowledge and management systems has been strongly stated by PICTs (SPREP 2001b). Research that has focused on indigenous knowledge and natural resource management practices is received enthusiastically in the Pacific.

FORESTS

Forests are of ecological, social, cultural and commercial importance in most PICTs. In the larger island countries, such as Fiji, PNG, Solomon Islands and Vanuatu, forests and trees play a significant role in the national economy by generating employment, income opportunities and export earnings. The total value of forests and trees, including biodiversity, is immense, with current immeasurable potential in pharmaceutical products alone. Forest timber and non-timber products constitute a very large percentage of the real cash and non-cash incomes of most rural communities in these Pacific islands.

For some of the PICTs the limited areas of remaining forest constitute the last refuges for many

economically and culturally important plants and animals, and provide protection from some of the predicted adverse impacts of climate change-related sea-level rises. Despite their importance, forested areas have diminished in PICTs from a combination of population pressures, loss of traditional controls, shifting cultivation, pasture development, mining and logging activities. In several countries (for example, Fiji, Cook Islands and Guam) significant areas of forests are lost annually to fire, caused either by natural events or by human activities. Although deforestation and forest degradation on most islands has accelerated rapidly over the last 30 years, this was not a political issue until relatively recently, even though large-scale

transnational corporations have exploited forests extensively in some PICTs over most of the past century. While this may not have been the sole activity that led to extensive conversion of land, forest degradation and eventual deforestation did occur over large areas as logging roads opened up remote areas and selective extraction of species upset ecological balance.

The main direct cause of forest loss in PICTs has been the clearing of land for permanent or shifting agriculture (FAO 1997). Slash-and-burn techniques were prevalent until the mid-1970s. Since then, as bulldozers became more prevalent, clearance of land and access to areas previously protected by localized geographic features increased. The loss of forest as a result of agro-deforestation is also an issue in those countries with substantial population densities: for example, Cook Islands, FSM, Kiribati, Marshall Islands, Tokelau, Tonga, Tuvalu and Samoa.

In the 1970s coastal and lowland forests were converted to large-scale commercial coconut, cocoa and banana plantations on many islands. This process was facilitated by the introduction of new technologies such as steel tools and mechanized transport over wider areas. This process of forest conversion accelerated over the last 15 years as populations have increased, as more efficient methods and tools for removing forest, such as chainsaws, have become more widely available, and as commercial imperatives, such as timber and the development of commercial agriculture, have become more important.

From the limited but best available information, deforestation ranges from close to zero in Kiribati, Palau and Tonga to over 2 per cent per annum in Samoa (FAO 2003). Most of the deforestation is related to agricultural activities such as swidden agriculture and commercial cash cropping of kava, taro, copra and cocoa. Commercial logging is an issue on some of the larger volcanic islands such as Savaii in Samoa, Solomon Islands and the Fijian islands, and the rate of reforestation is inadequate. Furthermore, the limited reforestation that has occurred has tended to use exotic species; these do not bear fruits eaten by native birds and bats, have limited ecological value and in some cases become invasive.

Table 16 represents the best available aggregated information on forest cover; however, it also confirms the inconsistencies that exist.

Pressure on forests from logging operations and development of bush gardens is a continuing issue in Vanuatu, Fiji, PNG, Solomon Islands, FSM, Niue, Samoa and Tonga. In some countries of the region, such as Samoa, rates of deforestation in recent years have approached 2 per cent per annum (Conservation International and SPREP 2004), which is higher than the estimated rate at which tropical forests are being cleared throughout the world (0.8 per cent per annum between 1980 and 1990) and in tropical Asia (1.2 per cent per annum [FAO 1997]). In FSM, aerial photography of Pohnpei taken in November 1995 showed that only 15 per cent of the land was under undisturbed forest, compared with 42 per cent in 1976 (FSM Country Report 1996). Logging in the Solomon Islands for export started in 1961, and has accelerated over the past few years. Half the viable (non-steep-sloped) resource has now been logged, extraction rates having almost doubled between 1991 and 1992.

Loss of forest habitat reduces the availability of medicinal plants and gathered foodstuffs and wildlife, and can have a negative impact on family nutrition, with the result that women are faced with more health care responsibilities. When forests are logged and land is allowed to be degraded, subsistence gardens must be moved further from villages and fuelwood must be carried longer distances. Additional social problems can result from medium and large-scale forest development including breakdown of traditional systems of social sanctions and an increase in alcohol consumption as men gain income, which can lead to increasing violence against women.

Since the mid-1990s the development of non-wood forest products as alternative income-generating activities has been given more attention, especially through the initiatives of a number of non-governmental organizations (NGOs). Among the forest products being promoted are forest tree nuts (for example, Ngali nut), traditional medicinal plants, beekeeping, *Morinda citrifolia* (noni or nonu) juice and leaves, and butterfly farming.

Table 16 Forest cover details for selected PICTs

	TOTAL LAND AREA (ha)	FOREST AREA (ha)	FOREST COVER %	FOREST AREA PER CAPITA (ha/person)	1990–2000 % CHANGE
AMERICAN SAMOA	20 000	12 000	60	0.2	–
COOK ISLANDS	23 000	15 860	66 (61)	0.85	–
FIJI	1 827 600	935 000	51 (45)	1.25	–0.2
FRENCH POLYNESIA	366 000	105 000	29	0.5	–
FSM	70100	15 000	22	0.1	–4.5
GUAM	54100	21 000	38	0.1	–
KIRIBATI	81 100	28 000	39	0.3	–
MARSHALL ISLANDS	18 100	–	–	–	–
NAURU	2 100	–	–	–	–
NEW CALEDONIA	1 910 300	372 000	20	1.8	–
NIUE	25 90	18 20	70 (79)	1.0	–
NORTHERN MARIANA ISLAND	47 100	14 000	30	0.2	–
PALAU	48 800	35 000	76	1.8	–
PNG	46 224 300	39 752 900	86	6.5	–0.4
SAMOA	29 350	103 000	37 (35)	0.6	–2.1
SOLOMON ISLANDS	2 837 000	2 536 000	89 (88)	5.9	–0.2
TOKELAU	1200	–	–	–	–
TONGA	68 800	8 000	6	0.08	–
TUVALU	2600	–	(43)	–	–
VANUATU	1 219 900	447 000	37	2.4	–
WALLIS AND FUTUNA	2 550	–	–	–	–

Source: FAO 2003; SPC 2004

The figures in square brackets are from SPC 2004, from the Millenium Development Goals (MDGs). The discrepancies highlight the problem of conflicting statistics.

Although the establishment of conservation areas has increased since the late 1980s, few, if any, have legislation or institutionalized programmes prohibiting the cutting-down of trees and forests. Nor is there promotion of the replanting, on a significant scale, of endangered tree species or the rehabilitation

of biodiverse areas which constitute the economic and cultural backbone of many Pacific peoples.

The Code of Conduct for Logging of Indigenous Forests in Selected South Pacific Countries was endorsed by the South Pacific Forum in September 1995. National codes of logging practice have been

established in Fiji, PNG, Vanuatu, Niue and the Solomon Islands and are at various stages of implementation. Measures introduced include proper planning, monitoring and control systems for harvesting and road-building operations, best logging practices and reduced environmental impacts, management of water catchments, and community agroforestry practices.

Despite the general acceptance of the code of conduct for logging, there continues to be external and internal pressure for forestry activities, with many cases over the past five years of uncontrolled activity under the guise of other forms of development. Some PICTs have significant and valuable stands of hardwood species which are no longer available for commercial

exploitation in the wider Asia-Pacific region. The potential economic value of these remnants means there are continuing pressures for their exploitation.

The code of conduct for logging often comes under the administration of forest resource institutions, supported by legal forest resource management legislation or policies of government. There is a need to link these resource management frameworks to the development planning processes to ensure the effective implementation of the codes. Integrated planning systems that link national economic planning with physical resource development use represent a way to achieve this.

BIODIVERSITY RESOURCES

The Pacific region is one of the world's centres of biological diversity. The western Pacific has the highest marine diversity in the world; up to 3 000 species have been recorded from a single reef (SPREP 1993). This region has the most extensive coral reef system in the world and the healthiest remaining global populations of many marine species such as whales and sea turtles (UNESCO 2003). While there are limited numbers and density of terrestrial mammalian fauna, the marine mammalian fauna is very rich (Allison and Eldredge 1999). The nature of island biogeography has led to a high level of endemism in terrestrial species. In the Pacific, the islands that tend to have the largest and most varied biodiversity are the bigger, higher, older, volcanic and westernmost islands close to large land masses. Such islands have a far greater range of habitats and niches for colonization and speciation than the low coral islands. Similarly, elevated atolls have greater biodiversity than reef islands at sea level (Dahl 1980). However, although highly oceanic islands may have fewer biological groups, those that managed to colonize such islands

have often undergone intense speciation to form many new species (SPREP 1992).

Species on islands are predisposed to genetic drift and natural selection towards endemism, because of their isolation and reduced opportunities for mixing with other (mainland) populations. The Pacific islands are ideally situated to exhibit this phenomenon and thus the distribution of the plants and animals in the region provides unparalleled insights into biological and biogeographical characteristics of evolution, natural selection, and patterns of migration and establishment.

Birds, in particular, illustrate the outstanding biological uniqueness of the Pacific islands. The Pacific harbours 24 per cent of the world's globally threatened birds. Ninety per cent of bird species that have become extinct since 1800 were island species, most the victims of introduced species of other animals. A global study by BirdLife International shows that the Pacific region has 408 restricted-range (a historical geographical range of less than 50 000 km²) bird species (127 of them globally threatened with extinction) and 30

Endemic Bird Areas (where two or more restricted-range bird species are entirely confined); a disproportionately high representation of endemism when compared with 2 700 restricted-range bird species and 218 Endemic Bird Areas globally.

Other animal groups also exhibit unusually high levels of speciation in the Pacific. For example, the Solomon Islands mammalian fauna is one of the most diverse to be found on oceanic islands anywhere on Earth: there are 52 species of native mammals, half of which are endemic (Flannery 1995). Many plant and animal groups remain incompletely studied so it is likely that figures for biodiversity and endemism for this region will continue to rise.

A further issue of global significance relates to the connection between biodiversity and people. The Pacific islands are home to a great number of indigenous family groups, who have retained robust cultures, over a thousand distinct languages, and strong traditional attachments to the land, sea and natural resources. There is a high cultural and economic dependence on marine and terrestrial resources for daily needs such as food, water, shelter and medicine. Biodiversity conservation is therefore critical for social and economic development as well as for the maintenance of essential ecosystem function. This powerful social and cultural reality adds weight to the focus on community-based conservation and mainstreaming initiatives in the region.

While the search for new genetic material of commercial value may not increase the rate of extinctions, it may have implications for the cultural and economic uses and management of biological resources in island countries. Biogenetic resources are therefore an issue for PICTs, as are concerns over biosafety given the vulnerability of the islands and their peoples.

The extreme vulnerability of island biodiversity means that the flora and fauna of the Pacific are among the most endangered in the world. The extent of Pacific island biodiversity can only be estimated for both marine and terrestrial systems because detailed biological inventories are lacking. It has been estimated that only 10 per cent of tropical species have been described (SPREP 1992). Species extinction rates have been among the highest in the world, especially for

birds (Given 1992; Steadman 1995). Furthermore, a recent analysis of global biodiversity hotspots indicates that the Polynesia–Micronesia hotspot (see Table 16 for a summary of the numbers of native and endemic species) is among those that can least afford additional habitat loss because of prior destruction and fragility of ecosystems and species (Brooks and others 2002). Between 1982 and 1991, the proportion of PICTs reporting biodiversity loss as a serious problem rose from 67 to 75 per cent (ADB 1992). A terrestrial biodiversity review by the South Pacific Biodiversity Conservation Programme (SPBCP, SPREP 1993) cited birds 'as an outstanding example of depletion resulting from the impact of human actions on Pacific island environments' (Given 1992). Worldwide, the largest number of documented extinctions (28 between 1600 and 1899) has occurred on islands of Oceania, which now have more threatened species (110) than any other region (Given 1992). Dahl (1984) estimates that there are roughly seven times more endangered bird species per capita in the South Pacific than in the Caribbean, 50 times more than in South America, and a hundred times more than in North America or Africa.

In a number of countries the use of community conservation areas is gaining momentum; there has been a significant increase in the total area of ecosystems brought under conservation management and a shift towards community-based conservation management methods. Table 17 presents a summary of the extent of protected areas in PICTs. The declaration by five PICTs of their exclusive economic zones (EEZs), covering some 10.9 million km² of the Pacific Ocean, as whale sanctuaries represents a region-wide vision that could not have been realized a decade ago. However, invariably, there are issues with land disputes and demarcation of boundaries, especially with coastal waters. Many conservation areas therefore do not have legal or formal government status. As with forests, data and information are not comprehensive enough to distinguish the extent of land and marine areas set aside for biological diversity protection and management through various customary and formal means.

The pressures on biodiversity in the region include large-scale forest logging, commercial agriculture, associated land clearing and fires, clearance of wetlands

Table 17 Summary of numbers of native and endemic species in major taxonomic groups by country for the Polynesia–Micronesia hotspot

	NATIVE VASCULAR PLANTS		BREEDING BIRDS		NATIVE MAMMALS		NATIVE REPTILES		NATIVE AMPHIBIANS		NATIVE LAND SNAILS	
	SPECIES KNOWN	PERCENTAGE ENDEMIC	SPECIES KNOWN	PERCENTAGE ENDEMIC	SPECIES KNOWN	PERCENTAGE ENDEMIC	SPECIES KNOWN	PERCENTAGE ENDEMIC	SPECIES KNOWN	PERCENTAGE ENDEMIC	SPECIES KNOWN	PERCENTAGE ENDEMIC
AMERICAN SAMOA	373	3	34	0	3	0	11	0	0	0	47	na
CNMI	221	37	28	7	2	0	11	0	0	0	na	na
COOK ISLANDS	284	12	27	26	1	0	na	na	0	0	na	na
EASTER ISLAND	na	na	na	na	0	0	na	na	0	0	0	0
FIJI	1 628	50	74	35	6	17	25	36	2	100	na	na
FRENCH POLYNESIA	959	58	60	43	0	0	10	0	0	0	>160*	na
FSM	782	24	40	45	6	83	na	na	0	0	na	na
GUAM	330	21	18	11	2	na	11	9	0	0	27	na
HAWAII	1 200	83	112	55	1	0	na	1	0	0	763	98
KIRIBATI	22	9	26	4	0	0	na	0	0	0	na	na
MARSHALL ISLANDS	100	5	17	0	0	0	7	0	0	0	na	na
NAURU	54	2	9	11	na	na	na	0	0	0	na	na
NIUE	178	1	15	0	1	0	4	0	0	0	na	na
PALAU	175	na	45	22	2	50	22	5	1	100	68	na
PITCAIRN ISLAND	76	18	na	na	0	0	na	na	0	0	~30	~15
SAMOA	770	15	40	20	3	0	8	0	0	0	64	na
TOKELAU	32	0	5	0	0	0	7	0	0	0	na	na
TONGA	463	5	37	5	2	0	6	17	0	0	na	na
TUVALU	44	0	9	0	0	0	na	0	0	0	na	na
US MINOR ISLANDS	na	na	na	na	0	0	na	na	0	0	na	na
WALLIS AND FUTUNA	475	15	25	0	1	0	na	0	0	0	na	na
HOTSPOT TOTAL	~6,500	50	254	60	16	56	69	54	3	100	na	na

Sources: Conservation International and SPREP 2004

na = data not available CNMI = Commonwealth of the Northern Mariana Islands

* Society Islands only; note that species totals do not always add up because some species are distributed in more than one country

Table 18 Summary of protected areas by country and territory

	NUMBER OF PROTECTED AREAS	TERRESTRIAL PROTECTED AREAS	LAND AREA PROTECTED [ha]
MICRONESIA	106	56	18 328
FSM	31	9	5 500
GUAM	16	10	4 933
KIRIBATI	14	14	2 000
MARSHALL ISLANDS	7	5	1 126
NAURU	na	na	na
NORTH MARIANA ISLANDS	12	8	2 318
PALAU	22	9	1 067
US MINOR ISLANDS	4	1	1 384
POLYNESIA	182	61	374 689
AMERICAN SAMOA	13	11	3 959
COOK ISLANDS	15	13	3 885
EASTER ISLAND	1	1	6 700
FRENCH POLYNESIA	9	8	9 370
HAWAII	105	na	309 500
NIUE	3	2	604
PITCAIRN ISLAND	1	1	3 730
SAMOA	14	11	11 852
TOKELAU	1	na	na
TONGA	16	11	19 634
TUVALU	2	1	na
WALLIS AND FUTUNA	2	2	30
MELANESIA	na	na	na
FIJI	65	38	39 641
PNG	na	na	na
SOLOMON ISLANDS	na	na	na
VANUATU	na	na	na
TOTAL HOTSPOT	353	155	432 658

Sources: Conservation International and SPREP 2004; SPC 2003–2004

na = data not available

Note: The figures in this table represent available information for each of the countries, states and territories at the time of compilation. The accuracy of the data is unknown at this stage and may not necessarily be representative of actual areas protected. The information should therefore be treated with extreme caution and should not be used as a guide to compare country coverage or to assess general Protected Area coverage within the hotspot.

and mangroves, sedimentation and nutrient flows, and urbanization. Mining has occurred on a large scale in some countries and whole ecosystems have been destroyed (for example, in Nauru). Land-based sources of marine pollution (for example, eroded soils, pesticides, heavy metals, nitrates and chlorinated hydrocarbons) are considered to be one of the four greatest threats to marine biodiversity along with habitat destruction and degradation (including dynamiting), overexploitation of living resources and invasive species. Of these threats, invasive species are considered to be the most serious (Sherley and Lowe 2000).

INVASIVE AND ALIEN SPECIES

Invasive and alien species are highlighted as the major threat to biodiversity conservation in many of the National Assessment Reports to the WSSD completed by PICTs. In the relatively simple ecologies of island ecosystems, invasive alien species have already had devastating consequences, causing extinctions and extensive modification of habitats and ecological relationships. It is not known exactly how many invasive species there are on PICTs, but it could run into the hundreds. The IUCN Invasive Species Specialist Group (2004) currently lists 34 invasive species for the Pacific region, but up to 80 more species will be added in the near future including many with Pacific distributions (Michael Brown, personal communication).

A Regional Invasive Species Programme was established in 1998 and has led to the development of a regional invasive species strategy, which called for action to strengthen national capacity to prevent new introductions. Efforts are under way to develop a major project that will access the resources required to address the urgent regional needs. Growing cross-sectoral collaboration at the regional, national and international levels is leading to increasingly integrated efforts. An invasives training project has been developed to support national efforts to address invasive species.

Box 3 Demonstration projects for invasive species control

A recent trial rat eradication pilot project on Maninita Island, one of a cluster of small, important seabird nesting islands in the Vavau Archipelago of Tonga, used New Zealand and Pacific expertise to train local people in rat eradication and monitoring techniques that are now being applied to other islands of the same group. Through sound project design and close collaboration with indigenous resource owners, these field sites provide opportunities to expand control and eradication techniques throughout the Pacific. The site-based work will proceed at two levels. First, eradication and control initiatives will focus on a selected number of sites comprising ecosystems and species of global importance. These projects will be known as Island Ecosystem Restoration Projects. As techniques, technology and skills improve, and their application becomes more efficient and therefore more sustainable, the number of globally significant sites included in the process will expand.

Source: SPREP 2004c

HABITAT ALTERATION AND LOSS

Habitat alteration and loss result from the conversion of native ecosystems to non-native ecosystems for economic activities such as agriculture and logging and, to a lesser extent, infrastructure development. Habitat degradation contributes to the direct impoverishment of biodiversity as well as a number of subsidiary problems including the influx of invasive weeds and browsing animals, soil erosion, reduced water quality and the sedimentation of lagoon and coastal areas. Such impacts can seriously affect the livelihoods of the rural majority.

In most countries it is the coastal and lowland ecosystems that have been the most severely degraded because they are the closest to fast-growing population centres. Intact altitudinal belts of forest on

the larger volcanic islands are also being lost and this is affecting species such as parrots, pigeons, doves and fruit bats that move seasonally or less predictably between lowland and montane forests in response to fruiting and flowering patterns.

Fragmentation of natural ecosystems from logging roads and agricultural plantations is a serious threat to many island species, particularly those with a limited range, such as land snails and many invertebrates, while research in Fiji shows that invasive predators are more able to travel into remote forests along roads (D. Olson, personal communication). Thus even where forests remain, the forest biodiversity is impoverished because of the reduction in native species and the increase in weeds and cultivated plants (the so-called 'empty forest' syndrome).

OVEREXPLOITATION OF NATURAL RESOURCES AND DESTRUCTIVE HARVEST TECHNIQUES

Overharvesting of natural resources often goes hand in hand with the use of destructive harvesting techniques. Examples include the use of bulldozers to clear land and dredge sand, or dynamite and poisons to catch fish.

On some islands hunting is a threat to many species, some of which are traditional food sources in many parts of the Pacific. Fruit bats in Samoa and Palau have been particularly susceptible to overexploitation because of the export trade to Guam, where they are a highly desired delicacy. Legal trade in fruit bats was terminated following a 1989 ban by the Convention on International Trade in Endangered Species (CITES), except in Palau, which has now become the major supplier of fruit bats (Allison and Eldredge 1999). Most countries in the Pacific are not signatories to CITES.

The overharvesting of animal species such as pigeons and fruit bats can be a serious ecological problem because both are important pollinators and/or dispersers of seeds in native ecosystems and are thus critically important to the regeneration of the forest (Whistler 2002). In Samoa, for example, it is estimated that up to 30 per cent of primary rain forest trees may depend on flying foxes for pollination and/or seed dispersal (Elmqvist and others 1998).

Some plant species are also in serious decline due to unsustainable harvesting. *Intsia bijuga*, a formerly widespread tree, is highly valued for its timber in many countries, but is now threatened because of its usefulness for carving, for example for kava bowls in Samoa and Fiji. In Samoa the tree (called ifilele) has been extirpated from many places and even in forest conservation areas is being harvested at an unsustainable rate (Martel and Atherton 1997).

NATURAL PHENOMENA

The impact of natural phenomena, such as cyclones, floods, drought and fire, on native biodiversity should not be ignored, despite the fact that, in most cases, little can be done about them. Such events are a major contributing factor to the accidental destruction of isolated populations of many species. Cyclones in particular have had a devastating impact on faunal populations and the health of habitats and ecosystems throughout the Pacific. In Samoa, for example, cyclones Ofa (1990) and Val (1991) defoliated up to 90 per cent of all trees and may have caused a dramatic population decline of some species such as the insectivorous sheath-tailed bat (*Emballonura semicaudata*) (Goldin 2002).

Fire has shaped ecosystems in many countries, especially where it has been traditionally used to clear land such as in parts of Fiji, Melanesia and Micronesia. When forests are burned, especially in dry zones, a savannah dominated by grasslands emerges (Allison and Eldredge 1999). This ecosystem is ecologically impoverished compared with what preceded it. During the dry season, and especially during droughts, these areas are often set on fire again, an action that perpetuates the savannah and demonstrates how the effect of natural phenomena can be magnified by human actions.

Droughts and floods are a localized and ephemeral problem often related to the ENSO phenomenon. While native forests are somewhat immune to flood damage, rainfall runs off much more rapidly from degraded forest, often resulting in soil erosion and flooding downstream with impacts on coastal and lagoon ecosystems. Droughts in themselves are not generally



Wild fires, such as those captured above by satellite in New Guinea, have shaped ecosystems in many countries in the region

Source: Jeff Schmaltz, MODIS Rapid Response Team at NASA GSFC

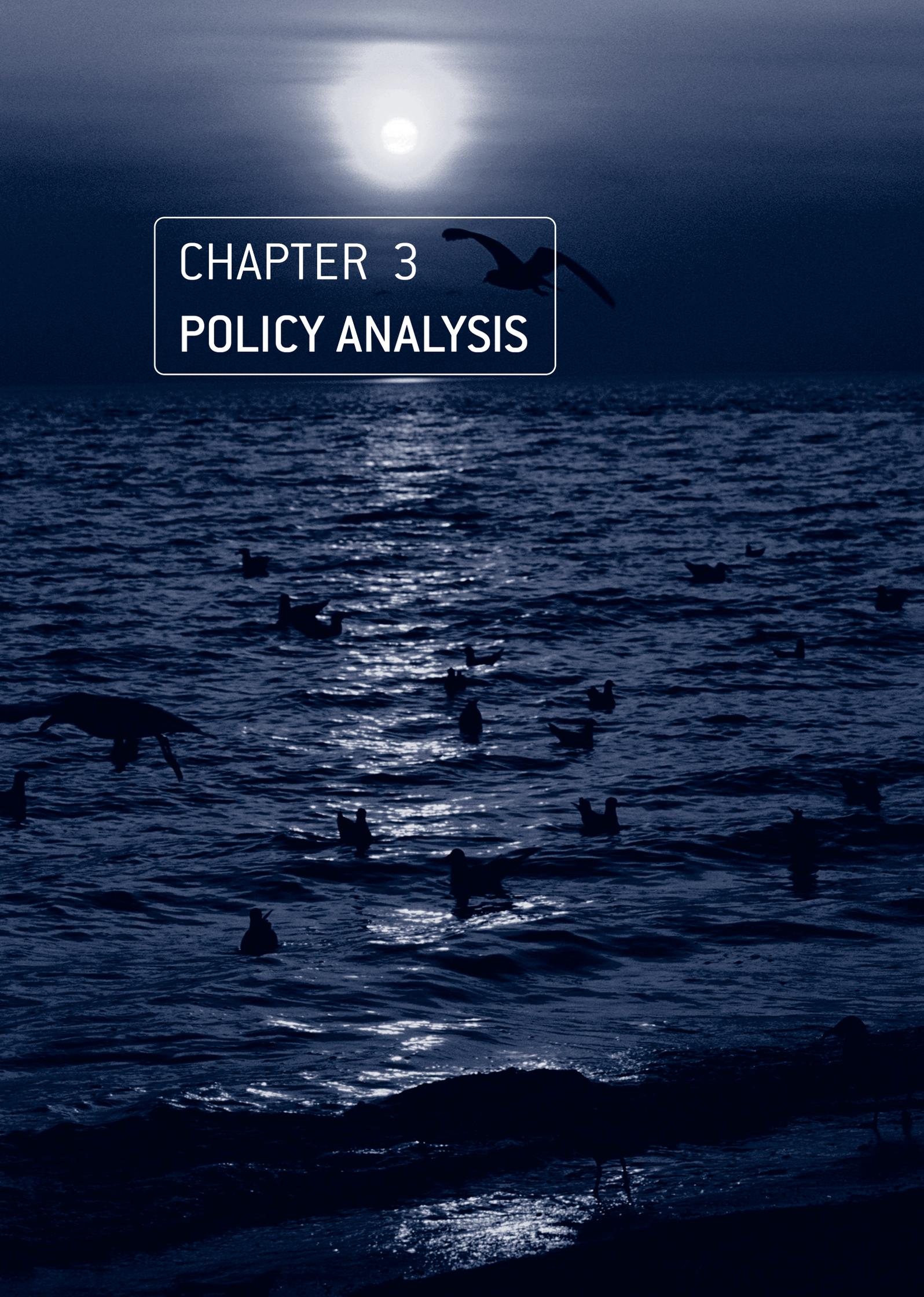
of long enough duration to be a serious problem to biodiversity, but may have an impact on biodiversity by creating the conditions necessary for fires.

Since the impacts of natural phenomena are part of the natural pattern in the Pacific, native species are adapted to such events and will recover. However, there are reasons for concern: the reduction of the available refugia for recovery; the increase in non-native animal and plant species after such events; and finally the potential increase in such events as a result of anticipated global climate change. Additionally, stressed or reduced populations (through overexploitation or habitat destruction) are more vulnerable to further reduction or extinction from natural events; that is, they have reduced resistance or chances of recovery.

Public information over the last decade has raised awareness of the critical role biodiversity plays in subsistence and cultural systems. Pacific island communities have traditional systems of 'setting areas

aside'. These areas form part of the community's culture, customs and traditional resource management practices and include areas such as 'Mo' areas in RMI, 'ra'ui' areas in the Cook Islands, 'tabu' areas in Fiji and 'tapu' and 'fono' areas in Niue. These customary mechanisms on land and coastal resources provide effective protection regimes where communities maintain strong traditional practices. The advantage of many of these is that boundaries are not specifically delineated. In modern natural resource management practice, this in itself is a powerful tool, in that it does not result in the 'edge effect' of creeping degradation close to conservation area boundaries.

Further capacity development is required, however, to give some legal recognition to these initiatives and to ensure that integrated environmental laws and practical guides assist with mainstreaming biodiversity in development planning.



CHAPTER 3
POLICY ANALYSIS

POLICY RESPONSES AT THE NATIONAL AND REGIONAL LEVEL

INSTITUTIONAL FRAMEWORKS

There are a large number and variety of national and regional institutions involved in various aspects of environmental management in the Pacific. However, in general, PICTs still lack efficient institutional and legal arrangements at the national level to protect and mainstream the environment in development processes. This is exacerbated by limited human resources and capability as well as inadequate financial resources. There has been relatively little improvement in national institutional capacity beyond documenting policy directions. While a more enduring institutional framework exists at the regional level, the major challenge is improving national actions guided by the regional frameworks (ADB 2004).

NATIONAL INSTITUTIONAL FRAMEWORKS

In many PICTs much of the environmental planning and management functions are conducted by a range of government institutions including departments of agriculture, forestry and fisheries, and health or economic affairs. A dedicated environmental unit, as part of a larger resource management agency or department, usually coordinates the leading international environmental management policy. In current or former US territories, environmental policy and management is usually coordinated by the local environmental protection agency (EPA), while in most French Territories it is coordinated by an environment delegation under a ministry of the environment.

Environmental departments and units were strengthened in many countries in the 1990s. Nevertheless, throughout the Pacific most environment departments are still constrained by limited human and financial resources and institutional capacity, but face rapidly increasing workloads.

Despite the poor performance in addressing institutional inadequacies, some positive trends are evident. There is an increasing recognition of the

importance of 'mainstreaming' environmental considerations into national development and financial planning. Mainstreaming has become the key theme of the work on sustainable development as well as for biodiversity conservation at both the national and the regional level. There are trends towards more participatory and collaborative approaches by government with local communities, NGOs, civil society and the private sector (ADB 2004).

The use of conservation trust funds at the national and sub-national level is growing in some countries to stimulate community-based actions and impacts. In FSM the Micronesia Conservation Trust (MCT) was used to mobilize funding for natural resource management. Since this development The Nature Conservancy (TNC) has sponsored the setting-up of the Micronesia Leaders in Island Conservation (MLIC) peer-learning network. It aims to strengthen the organizational and technical skills of leaders and their organizations so they can better protect important natural areas of Micronesia (Conservation International and SPREP 2004).

REGIONAL INSTITUTIONAL FRAMEWORKS

There are a large number of regional intergovernmental organizations (IGOs) in the Pacific, which deal with a range of social, economic, environmental and political governance matters in PICTs. A growing number of regional agencies are now involved in some form of environmental management. IGOs enable small, dispersed and remote PICTs to gain some 'economies of scale' in attracting expertise and resources, as well as a means to develop and negotiate on common platforms or positions. This has also assisted with leveraging of funds and support for national actions, some of which have required some degree of regional coordination. Although most of the regional agencies operate at the regional and



Building sea defences on Tongatapu, Tonga

Source: Ilan Kelman (reprinted with permission from www.islandvulnerability.org)

international level, they have at times been instrumental in supporting national activities, achieved through technical advisory services, pilot projects or case studies.

SPREP is the major Pacific regional IGO dealing with environmental protection and sustainable development. While SPREP's focus has traditionally been on capacity building in biodiversity conservation, there is increasing emphasis on mainstreaming the environment in development processes. The work of SPREP is guided by a 4–5-yearly Action Plan, which is approved by SPREP members. The SPREP member countries include the governments and administrations of 21 PICTs and four developed countries with direct interests in the Pacific islands region. SPREP's current Action Plan is organized under five key areas: natural resource management (species protection, ecosystem management, and development and management of conservation areas), pollution prevention (marine pollution, hazardous and solid waste, and sewage pollution), climate change and variability, economic development (integrating environment and development, and trade, investment and environment) and processes (including legal, institutional capacity building, human resource development and environmental information services) (SPREP 2003a).

SOPAC is the other major regional agency dealing with environmental issues, primarily focusing on the

sustainable development of non-living resources, in particular mineral, water and energy resources. Its programmes also cover physical coastal management, hazard assessment, ocean management and geosciences. SOPAC recently concluded the development of the Environmental Vulnerability Index. Coordination among these organizations has been strengthened within the last decade by the formation of the Council of the Regional Organizations of the Pacific (CROP), which is chaired by the Pacific Islands Forum Secretariat (PIFS). CROP provides an important framework to ensure that regional institutions collaborate and coordinate their activities with international stakeholders.

In recognition of the importance of an integrated, multisectoral approach to environmental management, CROP has effectively developed and used administrative working groups that are formed and maintained as needed. There are currently eight working groups covering sustainable development; energy; health and population; human resource development; information and communications technology; land resources; marine sector; and tourism. In addition CROP participates in associated meetings under the PIFS on gender focal points network, remuneration and Millennium Development Goals.

Complementing the work of the CROP agencies is a growing number of international, regional and national NGOs. Most of them, however, are still operating in the social development (education, gender and youth affairs) and health arenas. Although there are around 1 000 NGOs in the region (Crocombe 2001), very few PICTs have stable, well-organized and well-equipped environmental groups. At the regional level the more prominent NGOs include the Pacific Concerns Resource Centre (PCRC) and the Pacific Island Association of NGOs (PIANGO). Both are based in Fiji and represent more than 100 affiliated Pacific NGOs and civil society groups. Other active regional NGOs include the Pacific Youth Caucus for the Environment (PYCE) and the Pacific Youth Environment Network (PYEN). The PYEN is a voluntary network in its development stage, currently active in seeking resources to offer more effective education and awareness across the region. UNEP has been active at the regional level in promoting PYEN,

and most recently in promoting civil society. The Pacific Congress of Churches is a broader-based regional NGO that has recently joined efforts at the national and regional level to improve environmental awareness and management at the community level. The international environmental NGOs (BINGOs) operating in PICTs include Conservation International (CI), the WWF South Pacific Programme (WWF-SPP), The Nature Conservancy (TNC) Pacific Programme and Birdlife International. These BINGOs are most active in Melanesia and Micronesia with little, but growing, activity in Polynesia. Their efforts have concentrated on building capacity at the community level to improve community conservation and natural resource management.

Traditionally there has been poor coordination and information sharing between international and regional NGOs and development agencies in the Pacific. The barriers to better collaboration stem from a number of

situations: lack of systematic and consistent models for regional state of the environment reporting; poor national to regional institutional mechanisms; different agendas; lack of regional coordinated policy; poor information infrastructure and lack of emphasis on underpinning institutional systems, including knowledge management and integrated planning systems. Recognition of these impediments to sustainable development has led to strengthening of regional networking and dialogue systems such as the Pacific Islands Roundtable for Nature Conservation (commenced in 1998), and the Climate Change Roundtable (2000). The Roundtables are fora where major international and regional environmental experts, donors and NGOs exchange information on projects, initiatives, research, capacity gaps and develop ideas on direction of policy to address the major regional conservation issues.

GLOBAL AND REGIONAL MULTILATERAL ENVIRONMENTAL AGREEMENTS

INTERNATIONAL AGREEMENTS

PICTs have signed up to most global and regional multilateral environmental agreements (MEAs), as shown in Table 18. For example, most independent states have signed the UN Convention on the Law of the Sea (UNCLOS), the UN Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), and the Kyoto Protocol, to name a few. PICTs are active participants in conferences linked to these MEAs and to the related fora including the World Summit on Sustainable Development (WSSD), the Barbados Programme of Action for Small Island Developing States (BPOA), and the UN Conference on Environment and Development (UNCED). A notable exception, however, is the Convention on International Trade in Endangered Species (CITES), to which only Fiji, PNG and Vanuatu have acceded (although it is applicable to all US, French and NZ territories).

CONVENTION ON BIOLOGICAL DIVERSITY

The Convention on Biological Diversity (CBD) is the most important global MEA for biodiversity conservation in the Pacific. It focuses primarily on the conservation of biodiversity but covers many related aspects: invasive species, habitat loss, access to genetic resources and the associated issues of benefit sharing and intellectual property rights. Twelve PICTs have ratified the CBD and many are now working on fulfilling Convention obligations such as the preparation of National Biodiversity Strategies and Action Plans (NBSAPs). Seven PICTs have completed their NBSAPs and are now implementing them, five countries are currently developing their NBSAPs and two more are yet to commence NBSAP development (SPREP 2004a).

Progress with biodiversity conservation over the past decade, steered by the CBD, has been modest given the overall deterioration in Pacific island biodiversity. However, there have been significant

contributions and potentially far-reaching gains in some areas.

PICTs are developing conservation tools that are gaining recognition regionally and internationally. They

Table 19 Pacific country status with respect to multilateral environmental agreements

PACIFIC DEVELOPING MEMBER COUNTRY	GLOBAL AGREEMENTS OR CONVENTIONS														REGIONAL AGREEMENTS OR CONVENTIONS						
	Ramsar	World Heritage Convention	MARPOL	CITES	Migratory Species	UNCLOS	Vienna Convention	Montreal Protocol	Basel Convention	Rotterdam Convention	UNFCCC	Kyoto Protocol	CBD	Cartagena Biosafety	UNCCD	POPs (Stockholm)	Waigani Convention	SPREP Convention	Whaling Treaty	Apia Convention	Pacific Tuna Convention
COOK ISLANDS						R	A	A**			R	R	R	S	A		R	R		R	S
FIJI ISLANDS		R		A		R	A	A*			R	R	R	R	A	R	R	R		R	S
FSM		R				R	A	A**	A		R	R	R		R	S	R	R			S
KIRIBATI		R					A	A**	A		R	A	R	S	A	S	R	R			S
MARSHALL IS.	A	R	R			R	A	A**	A	A	R		R	A	A	A	R	R			S
NAURU						R	A	A**	A		R	R	R	A	A	R	R	R			
NIUE							A	A**													
PALAU	R							A**													
PNG	R	R	R	A		R	A	A*	A		R	R	R		A	S	R	R		R	
SAMOA		R				R	A	A**	A	A	R	R	R	R	A	R	R	R		R	S
SOLOMON IS.		R				R	A	A*			R	A	R		A		R	R	R		
TONGA			R			R	A	A**			A		R		A	S	R				
TUVALU			R			R	A	A**			R	R	R		A		A	R			S
VANUATU		R	R	A		R	A	A*			R	A	R		R	S	R	R			S

R = Ratified S = Signed A = Acceded

Apia Convention = Convention on the Conservation of Nature in the South Pacific; Cartagena Biosafety = CBD, Cartagena Protocol on Biosafety; CBD = Convention on Biological Diversity; CITES = Convention on International Trade in Endangered Species of Wild Fauna and Flora; Kyoto Protocol = Kyoto Protocol to the UNFCCC; MARPOL = International Convention for the Prevention of Pollution from Ships; Migratory Species = Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Species; Montreal Protocol = Montreal Protocol on Substances that Deplete the Ozone Layer; Pacific Tuna Convention = Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean; POPs (Stockholm) = Stockholm Convention on Persistent Organic Pollutants; Ramsar = Convention on Wetlands of International Importance Especially as Waterfowl Habitat; Rotterdam Convention = Rotterdam Convention on the Prior Informed Consent for Hazardous Chemicals and Pesticides in International Trade; SPREP Convention = Convention for the Protection of the Natural Resources and Environment of the South Pacific Region; UNCCD = United Nations Convention to Combat Desertification; UNCLOS = United Nations Convention on the Law of the Sea; UNFCCC = United Nations Framework Convention on Climate Change; Vienna Convention = Vienna Convention for the Protection of the Ozone Layer; Waigani Convention = Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific Region.

** Acceded or accepted or ratified all amendments to the Montreal Protocol (London, Copenhagen, Montreal, Beijing).

* Acceded or accepted or ratified part of the amendments to the Montreal Protocol.

are tailored to suit the unique demands of subsistence livelihoods, communal ownership of resources, environment-based cultural values and customs, and a growing need for cash incomes, and include:

- **Community-based conservation areas.** While endeavours existed among SIDS to stimulate conservation through community-based efforts, the South Pacific Biodiversity Conservation Programme enabled the pioneering of approaches to gain acceptance by villages. Case studies, pilot projects and sponsored conservation area projects show alternative ways to institute conservation based on community participation and partnerships;
- **Conservation enterprises.** There has been a gradual growth of sustainable income-generating activities designed to promote conservation while providing cash incomes for participating families. These conservation enterprises provide, at the operational level, a classic example of conservation–economic integration, with tourism-related activities the most popular;
- **Traditional resource management methods.** Empowerment of communities to play leading roles in biodiversity conservation has revived the use of traditional methods of resource conservation such as setting aside areas from use. They have been used for the introduction of no-take regimes in critical spawning, nesting and roosting areas for many species. Their success is based on traditional beliefs and respect for village elders.

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC)

The UNFCCC has been ratified by 12 PICTs and, with the Alliance of Small Island States (AOSIS), the Pacific has played a pivotal role in international climate change negotiations since 1992. Chapter 17 of Agenda 21 first recognized the vulnerability of SIDS, which was then echoed in the preambular paragraphs of the UNFCCC.

The Convention's regional activities were launched in ten countries under the Pacific Island Climate Change Assistance Programme (PICCAP) in 1997 and later in 11 countries under the South Pacific Sea Level and Climate Monitoring Project. These two programmes, with efforts by UNDP/UNITAR and UNEP, have enabled the region to make some progress in strengthening technical and scientific capacity and in collecting oceanic, sea-level and weather data to meet international obligations. Some countries were early in their incorporation of climate change objectives and principles in national policy, led by Kiribati, which commenced such activities in 1990.

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA (UNCLOS)

Fifteen PICTs have ratified UNCLOS, which has significant implications for PICTs, and have been swift to ratify subsequent international agreements: for example, the 1995 Agreement under UNCLOS relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Species. Commitment to UNCLOS has attracted the political commitment for an effective platform for fisheries protection and development and implementation of base management laws. UNCLOS will also be important for the Pacific as economic activities venture into new areas, such as seabed mineral resources.

Assisted by involvement with UNCLOS, many countries have begun to pass marine-related legislation, including legislation to control pollution of the marine environment. However the most significant development continues to be in fisheries management. While some have developed legislation (for example, PNG's Fisheries Act, 1994; Solomon Islands Fisheries Act, 1998), others have successfully combined this approach with village fishery reserves by drawing on local community knowledge (Samoa). These efforts have assisted with enforcement, which continues to be the major hurdle for many PICTs. The more successful cases, however, have been instituted through large, capital-intensive projects.

AGREEMENTS COVERING WASTE AND POLLUTION

Waste management is not covered by any one specific agreement. This creates a problem in coordinating action and leveraging financial assistance for countries for their national work programmes. There is scope for implementation of the Basel Convention, the International Convention for Prevention of Pollution from Ships (MARPOL) and the London Dumping Convention through the SPREP (Noumea) Convention (see below). While the Basel Convention is not well supported, the majority of PICTs have signed the Waigani Convention which was concluded under Article 11 of the Basel Convention. The Pacific Regional Centre for Training and Technology Transfer for the Joint Implementation of the Basel and Waigani Conventions, integrated within SPREP, was initiated in late 2003. The overall purpose of the Centre is to strengthen the capacity of PICTs that are parties to the Basel and

Waigani conventions in complying with the technical requirements for the environmentally sound management of hazardous wastes as well as with the legal and institutional aspects of the implementation of both conventions.

There are a number of ongoing regional collaborative partnerships to address waste management and pollution. These include efforts in: the collection and removal of persistent organic pollutants (POPs) and hazardous waste; awareness campaigns on waste minimization; assessment and proposed control of transboundary marine pollution; response measures for oil spills; and databases on World War II shipwrecks.

SPREP's Pollution Prevention and Waste Management programme assists countries in preventing, reducing and managing pollution and wastes, including the development and maintenance of national and regional emergency response and planning capabilities. The programme has also assisted



Growing piles of garbage that include medical waste are common in the Pacific. Syringes are evident in the centre of this photograph of the Apia, Samoa waste dump before rehabilitation in 2003–2004

Source: SPREP

countries in framing legislation for marine pollution as well as for solid and hazardous waste management.

SPREP and the International Maritime Organization (IMO) have developed a Strategy and Workplan for the Protection of the Marine Environment in the South Pacific. The Strategy is assisting with technical, legal and scientific cooperation between PICTs for the protection of the marine environment from pollution from ships and related activities, and the mitigation of the environmental impacts of such pollution. Through SPREP, PICTs are also participants in the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA). SPREP's Management of Persistent Organic Pollutants in Pacific Island Countries project aims at identification of and removal of stocks of unwanted and waste chemicals and clean-up of contaminated sites. SPREP will produce a comprehensive database on types, quantities and locations of waste chemicals and unused pesticides in the region.

An EU-funded Regional Waste Education and Awareness Programme began in 1998 to improve public knowledge and awareness of the problems of solid wastes. Another initiative being implemented is the JICA/SPREP programme on solid waste management (Miyuzaki Initiative, 2000–2004).

UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION (UNCCD)

Since 1999, 14 PICTs have become members of the UNCCD. Response to reporting and positive action for full accession to this MEA has been the most successful, reflecting the significance of land resources to PICTs.

Many principles and objectives of the UNCCD are important to PICTs in terms of addressing extant land resource degradation and drought relief, as well as the cross-linkages with water resource management, biodiversity protection and climate change. Investment in the implementation of the Convention by international stakeholders including the UNCCD Secretariat has been slow. Countries have yet to receive funding to complete their National Action Plans or a Regional Action Plan to address land degradation.

PACIFIC REGIONAL AGREEMENTS

Two regional MEAs form a particularly strong legal foundation on which regional cooperation on environmental matters continues to be built. The first is the Convention on the Conservation of Nature in the South Pacific (the Apia Convention), adopted in 1976 and coming into force in 1990. This provides the basic structure for regional cooperation on biological conservation and the use of protection areas. The second is the Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (the SPREP or Noumea Convention), adopted in 1986 and coming into force in 1990. This Convention deals with pollution and the protection of marine resources. Both have linkages to the mandate of SPREP, instituted through the SPREP Agreement 1993.

IMPLEMENTATION OF MEAs

Success in the implementation of MEAs, including the SPREP and Apia conventions, varies across the region. There is a perceived overlap in the objectives of these regional conventions with those of international MEAs such as the CBD and Basel Convention. There has been progress in building awareness and capacity in monitoring MEAs, largely due to funding from the Global Environment Facility (GEF). Case studies in the Pacific on MEA synergies and inter-linkages have found that the development of effective environmental management processes has been constrained by weaknesses of national policies, legal and institutional arrangements, information and human resource capacity (SPREP 2003b). Poor coordination and information sharing between NGOs, donors, regional organizations and development agencies in the Pacific is another constraint to MEA implementation (ADB 2004).

While most PICTs have ratified a range of MEAs, and some have generated legislation to implement policy, much progress has been on a sectoral basis. There has been little concerted action at the national level for the update and integration of existing legislative platforms. Many PICTs have inherited numerous outdated colonial laws, regulations and Western administrative procedures.

Table 20 Reports containing national priorities for sustainable development

	UNCED country report	NEMS	UNFCCC national report	CBD NBSAP	WSSD/BPOA +10 national assessment	UNCCD country report	Civil society report
COOK ISLANDS	✓	✓	✓	✓	✓	✓	✓
FIJI ISLANDS	✓	✓	✓	✓	✓	✓	✓
FSM	✓	✓	✓	✓	✓	✓	✓
KIRIBATI	✓	✓	✓	✓	✓	✓	✓
MARSHALL ISLANDS	✓	✓	✓	✓	✓	✓	
NAURU	✓						✓
NIUE	✓	✓	✓	✓	✓	✓	
PALAU	✓	✓	✓			✓	✓
PNG	✓		✓		✓	✓	
SAMOA	✓	✓	✓	✓	✓	✓	
SOLOMON ISLANDS	✓	✓	✓		✓	✓	✓
TONGA	✓	✓			✓	✓	✓
TUVALU	✓	✓	✓			✓	
VANUATU		✓	✓			✓	✓

Source: Conservation International and SPREP 2004

NEMS = National Environment Management Strategy; civil society reports were conducted by the Pacific Concerns Resource Centre using support from the Earth Council and SPREP in the lead-up to WSSD.

Enacting legislation to incorporate MEA provisions would in many instances exacerbate confusing legislative platforms leading to further discord. Holistic approaches and roadmaps are needed to guide the integration of legal platforms. This iterative approach nurtures capacity development (McIntyre and Wilson in ADB 2004) and enables the community to adapt to changes and identify opportunities. Capacity building targeting the development of legislation to include MEA principles, objectives and provisions may be best packaged with advice on means to integrate existing statutes covering natural resource use with environmental management and development planning.

The National Capacity Self Assessment (NCSA) initiated by GEF and coordinated through SPREP and UNDP will enable countries to assess the progress and

barriers to the national implementation of the CBD, UNFCCC and the UNCCD. While the focus is on these MEAs, the NCSA promotes the consideration of cross-linkages and holistic implementation for sustainable development. As such the NCSAs present countries with an ability to dictate the means for implementation of MEA objectives, as an alternative to the top-down processes of the past. The use of National Sustainable Development Strategies (NSDSs) will be advocated as a means to provide the delivery platform for the NCSA. While providing the underpinning policy framework for NCSA, the NSDSs should become the pivotal national policy link between various MEAs and other environmental best practice.

Table 20 shows reports containing national priorities for sustainable development.

NON-BINDING AGREEMENTS AND INSTRUMENTS

The four key non-binding agreements that are of particular importance to the Pacific are: the UN Conference on Environment and Development (UNCED) and Agenda 21 (1992); the Barbados Programme of Action for Small Island Developing States (BPOA 1994); the Millennium Development Declaration and Goals (MDGs, 2000); and the World Summit on Sustainable Development and Johannesburg Plan of Implementation (WSSD, JPOI, 2002). At the global level, a number of high-level conferences and summits of relevance to environmental protection and sustainable development have been conducted over the last five years, each one to some extent building on internationally agreed commitments and providing blueprints for action. These include the annual Commission for Sustainable Development (CSD) sessions; GEF Council meetings; the Monterrey Consensus on Finance for Development, 2001; and the Asia-Pacific Ministerial Convention for Environment and Development held in Kitakyushu, Japan, in 2000.

AGENDA 21

Since UNCED the Pacific region endorsed Agenda 21 at the highest level (Pacific Islands Forum, 1992). Its objectives and activities have become an integral part of the region's action strategies, primarily through the SPREP Action Plan. Chapter 17 of Agenda 21 (Protection of Oceans, Seas and Coastal Areas) presented the special case of the PICTs in an international framework. Since then the PICTs have continued their interest in ocean and coastal resources through their involvement in the negotiation for the implementation agreement under UNCLOS, participation in the World Oceans Forum and more lately the generation of the Pacific Islands Region Oceans Policy endorsed by Pacific Islands Leaders in 2002.

BARBADOS PROGRAMME OF ACTION

The Barbados Programme of Action for the Sustainable Development of Small Island Developing States (BPOA 1994) established a specific blueprint for the sustainable development of SIDS. Over the last ten years, the BPOA has become the Pacific's Agenda 21. The BPOA has, however, received limited funding or recognition in development arenas and has no specific funding mechanisms under the UN. Although some resources have been leveraged for specific actions from GEF (ADB 2003), most of the implementation to date has been fully funded by PICTs. Efforts have been in certain sectors, concentrating on building technical skill capacity, developing policy and plans, coordinating national and regional actions, undertaking sub-national environmental assessments, with substantial efforts undertaken in international negotiations. The ten-year review of the BPOA (BPOA +10) is to be held in Mauritius in January 2005. It will conclude assessment of the progress in the implementation of the BPOA and make recommendations for further initiatives and actions to pursue increased international recognition and financing of the BPOA.

MILLENNIUM DEVELOPMENT GOALS

The Millennium Development Goals (MDGs) agreed at the Millennium Summit in September 2000 influence regional and national policy in the Pacific region. MDG number 7, 'Ensure Environmental Sustainability', is of significance to environmental management and sustainable development, but is also the least developed in terms of suitable targets and indicators for national implementation. Many of the targets and indicators of the MDGs require national tailoring and harmonization in PICTs. This could be done through regional and national efforts through reporting to MDGs (PIFS) and capacity development in State of the Environment reporting (SPREP), bearing in mind agreed



Tree kill on Tonga from Cyclone Heta which hit in January 2004
 Source: Ilan Kelman (reprinted with permission from www.islandvulnerability.org)

international development and environmental goals and objectives.

JOHANNESBURG PLAN OF IMPLEMENTATION

The Johannesburg Declaration on Sustainable Development and the Johannesburg Plan of Implementation (JPOI) are the most recent statements of global sustainable development priorities. Of significance for PICTs was the success in broadening the scope of the special case of SIDS from an oceans perspective to cover a wide range of challenges from vulnerability to climate change to the need for a specific programme of work on island biodiversity (JPOI and SBSTTA 8, 2002). The thematic and cross-sectoral issues covered in the JPOI have been restated in PICTs' preparations for BPOA +10. Pacific SIDS were instrumental in advocating the cross-cutting 'implementation' components contained in the JPOI.

NETWORK AND PARTNERSHIP MECHANISMS

PICTs recognize that multi-stakeholder partnerships are essential to achieving sustainable development in the region (PIFS 2002). Pacific leaders introduced a suite of Pacific Type II Partnerships Initiatives at the WSSD in 2002. The 14 Pacific Umbrella Initiatives provide the impetus for new partners and resources for sustainable development and environmental management within the Pacific. These partnerships are a supplementary means of implementing Agenda 21, the BPOA and the JPOI. They are expected to increase the efficiency and effectiveness of programmes and projects by facilitating networks, improving coordination between stakeholders, adding clarity through visibility, sharing of knowledge, attracting new partners and leveraging suitable resources. Some Type II partnerships are discussed in the section on 'Regional action strategies, plans and frameworks', below.

The Pacific region is involved in several networks such as the Global Network for Biodiversity Research

(PABITRA), network for Taxonomy (BioNET and PACINET) and the Pacific Biodiversity Information Forum (PBIF). The Pacific Island Roundtable for Nature Conservation is the most important regional partnership for biodiversity conservation.

COLLABORATION WITH YOUTH

The Pacific youth are important catalysts for action regarding sustainable development. Youth groups are able to bridge gaps between adults and young children, thus drawing on indigenous knowledge and cultural practices as well as the 'new ways' of doing business. Greater support by regional agencies and the UN is required for the Pacific Youth Environment Network (PYEN). This network has the potential to link all youth in the region, building on similar networks and providing a 'clearinghouse' of curricula and other information from international networks.

REGIONAL ACTION STRATEGIES, PLANS AND FRAMEWORKS

The Regional Synthesis Report on Sustainable Development in the Pacific, generated for the WSSD (McIntyre 2002a), and its successor, the Pacific Regional Assessment on Sustainable Development (SPREP 2004b), are the foundation documents from which regional and national stakeholders promote the integration of environmental considerations in national and regional development plans, policies and strategies. The Pacific Plan called for by Pacific Leaders in April 2004 has utilized much of the argument and momentum from the WSSD and BPOA +10 efforts. The SPREP Action Plan for Managing the Environment in the Pacific Islands Region (SPREP 2001b) contains a key area focusing on sustainable economic development, and the Governing Council of SOPAC has recently adopted a sustainable development strategy to help guide its work.

A number of regional strategies have been developed or strengthened:

- **Action Strategy for Nature Conservation (2002–2007).** Stimulated by the 7th Pacific Islands Conference on Nature Conservation and Protected Areas, Cook Islands, 2002, this represents the most effective regional response for biodiversity conservation. It is collaboratively implemented by the Round Table for Nature Conservation with support from SPREP. It is the driving mechanism for the Pacific Type II Umbrella Partnership on Mainstreaming Nature Conservation, which, with the existence of the Round Table, is one of the best practices for voluntary regional multi-stakeholder partnerships. This Action Strategy provides 30-year goals along with achievable 5-year targets under the environmental, economic and social pillars of sustainable development;
- **Pacific Islands Framework for Action on Climate Change, Climate Variability and Sea-level Rise for 2000–2004.** Collaboration on climate change at the international level has been through collective negotiations in processes under the UNFCCC. This framework has provided the basis for collaboration in the region, and is currently being reviewed to further strengthen regional and international collaboration. It is the driving mechanism for climate change related issues under the Pacific Type II Umbrella Initiatives for Adaptation and Energy;
- **Pacific Regional Action Plan for Disaster Risk Reduction (draft).** Managed under SOPAC's Community Risk Programme, this plan will pull together a number of regional initiatives to address: strengthening resilience to disasters; mitigating the effects of hazards; mainstreaming disaster risk management; and application of the EVI. This Action Plan addresses the issues of: governance; hazard identification, assessment, monitoring and early warning systems; knowledge management and education; risk reduction tools; and preparedness for effective response.
- **Pacific Regional Waste Management Strategy (in development).** In the past, regional collaboration for pollution prevention has been through instruments such as the Basel and Waigani conventions and the pollution prevention programmes of SPREP. A more coordinated and sustainable Regional Waste Management Programme is now being proposed to assist PICTs in dealing with the drivers and impacts of waste and pollution. This programme will be managed by SPREP in collaboration with various regional and international partners, and facilitated through the Type II Umbrella Partnership on Waste Management;
- **Pacific Islands Regional Ocean Policy (2002).** The PIROP was generated through comprehensive expert involvement facilitated by CROP over a number of years. It was developed as a guiding document to enable the implementation of policies such as the Pacific Islands Regional Ocean Framework — Integrated Strategic Action Plan (PIROF-ISA) supported at the Pacific Islands

Regional Oceans Forum, February 2004. The PIROF-ISA aims to bring together regional coordination for the integrated management of water catchment areas and coastal and marine environments;

- **Environmental Education and Awareness Action Strategy, 2004–2009.** The 2000–2004 Strategy is being updated for the five-year period 2005–2009. The draft received preliminary approval at the 14th SPREP Meeting, September 2003. This Strategy brings together regional efforts of CROP agencies led by SPREP, SOPAC and the University of the South Pacific (USP). It also incorporates support for networking and capacity development for NGOs including youth networks;
- **Pacific Regional Action Plan on Sustainable Water Management (2002).** Consultations carried out in the Pacific throughout 2002 as part of the preparation for the 3rd World Water Forum held in 2003 led to the development of a regional strategy to promote the sustainable management of water resources in the Pacific. The Pacific Regional Action Plan on Sustainable Water Management, along with the associated Communiqué, Ministerial Declaration, and a supporting WSSD Type II Partnership, were formally endorsed by ministers from 14 PICTs and subsequently by Australia and New Zealand at the Pacific Island Forum officials meeting in New Zealand in August 2003.



The Mindima Water Supply Project in PNG
Source: Peter Kuglo

SPREP manages a number of additional regional action strategies and plans of relevance to environmental conservation in the Pacific. They deal mainly with particular thematic conservation areas: Invasive Species Strategy (2000), the Bird Conservation Strategy (2001) and the Wetlands Action Plan (1999). Regional species-specific Action Plans have been prepared for marine turtles, whales, dolphins and dugongs.

The Pacific Type II Partnership Initiatives should provide the stimulus for additional regional plans and strategies in the following areas:

- **Mining and Mineral Exploration (land and marine).** There is a growing demand for better coordination of development and environmental protection with extractive industries. The intent is first to develop model policy/management guidelines in areas that enhance sustainable development practices and to encourage deeper regional cooperation;
- **Integrated Regional Mineral Database.** Related to the above, a database and clearinghouse is needed to address the current paucity of reliable data on mining, use of aggregates and related costs. This would greatly assist in the efficient management of these resources;
- **Proprietary Rights for Genetic Resources.** There are calls for model legislation and support regulations for PICTs to regulate the protection, utilization and sharing of their plant and forest genetic resources;
- **Integrated Land Use and Environmental Planning.** The call for integrated planning systems to extend resource use and land planning beyond static economic planning has been a feature of national assessment reports to WSSD and BPOA +10. It was prominent in the implementation components of the Pacific Position for the BPOA +10, supported by Pacific delegates at the Bahamas preparatory meeting for BPOA +10 in January 2004. It has also been included in the AOSIS 'SIDS Strategy', the current negotiated preparatory document for BPOA +10 in January 2005.

REGIONAL SUSTAINABLE DEVELOPMENT COORDINATION

The CROP Sustainable Development Working Group will complete the Pacific Regional Sustainable Development Strategy (Pacific RSDS) for the BPOA +10 Meeting in January 2005. This Strategy will draw on National Assessment Reports, the Regional Synthesis Report on Sustainable Development in the Pacific (McIntyre 2002a) and the Pacific Regional Assessment on Sustainable Development (SPREP 2004b).

It is intended that in the future the Pacific RSDS will guide all regional sustainable development policy and initiatives, with individual CROP Action Plans providing the details on means for implementation and coordination. This will ensure that duplication, high transaction costs and administrative bureaucracy, which are usually the features of multiple plans and strategies, are avoided.

While there have been some achievements on the advocacy side, by the end of the 1990s it was recognized that success for SPREP would only come through involving stakeholders from economic and finance ministries. In 1998 the Forum of Economic Ministers Meeting (FEMM) adopted guidelines for sustainable tourism that included a number of environmental matters. In 2001 there was a substantial shift in policy evolution with FEMM considering the issue of integrating environment and economics more openly. This has now entrenched joint initiatives of SPREP and PIFS in pursuing the integration of environment and development in national policy endeavours, facilitated through the Forum Economic Action Plan, which is updated annually at the FEMM.

NETWORK AND PARTNERSHIP MECHANISMS

At a national level, most PICTs began the preparation of National Environmental Management Strategies (NEMS) in the early 1990s. These drew on the national assessments generated in preparation for UNCED. The NEMS were generated along with State of Environment Reports for many PICTs, the latter providing the review and assessment component. Most NEMS incorporate strategies to strengthen environmental institutions, support environmental legislation and policy, and suggested means for countries to implement MEAs to raise environmental awareness.

What has been foreseen by PICTs over a number of years has been the challenge of integrating at the national level the various plans and strategies

stimulated by external obligations. Completion of policies, plans and strategies for thematic areas is a significant achievement. However, without the corresponding institutional enabling environments, holistic implementation of the various initiatives is beyond the capacity of most PICTs.

There has been some progress made towards sustainable development in the Pacific region (see Box 4), although these achievements have been mainly restricted to strategic processes in the international arena. Such advances have been consistent with the objectives of global mechanisms such as Agenda 21 and the BPOA although not necessarily triggered by them.

Box 4 Achievements in environmental management and sustainable development**Regional/international level**

- Entrenching the 'special case for islands in environment and development' through UNCED;
- Inputs to the BPOA;
- Leveraging of financial resources of over US\$60 million through the GEF;
- Regional assessments of critical waste management issues, including the identification of hazardous waste stockpiles (including POPs) and actions to improve landfill management;
- Completion of the Pacific Regional Programme of Action for the GPA, agreed to at the Washington Conference in 1995;
- Development of the EVI for SIDS, expanding the understanding of vulnerability and risk management particularly to islands;
- A dedicated chapter on SIDS in the WSSD, JPOI;
- Direct involvement of CROP agencies in a wider range of environmental management and sustainable development programmes;
- Engagement of PICTs missions to the UN in environmental and sustainable development networks;
- Facilitation of the Alliance of Small Island States (AOSIS) as a strong negotiation group within the UN system; and
- Special consideration of island priorities within the work programme of the Convention on Biological Diversity in 2005.

National/regional level

- Production of National Environmental Management Strategies, and associated State of Environment Reports for 13 PICTs in the early to mid-1990s;
- Networks of locally managed marine areas (for example in Fiji);
- Inception of EIA procedures by statute or policy in most PICTs;
- Growing number of conservation protection areas established;
- Environmental units progressed towards department status;
- Environment and planning agencies established in larger urban centres;
- The generation of sector policies and strategies; and
- Formulation of environmental law for environmental management, waste management, coastal fishing, species protection.

ENVIRONMENTAL LEGISLATION

Environmental management legislation has been drafted and enacted in many countries and territories over the last decade. In most PICTs there is legislation incorporating provisions for environmental impact assessment and regulating natural resource extraction activities such as forestry, fisheries and agricultural development. There are many that have established laws for managing protected areas, protecting endangered species and controlling disposal of solid waste and other pollutants. Engagement in MEAs over the last decade has inspired new environmental laws, although often with little synthesis with existing laws and instruments.

However, many PICTs still lack legal frameworks that integrate environmental management and development processes. In addition, despite existing laws, many legislative frameworks are constrained by lack of information upon which to base decisions and resources for adequate implementation, monitoring and enforcement. In addition, the plethora of legal statutes and instruments that relate to the environment, natural resources, development and the management of land, often with a colonial legacy, is not conducive to coordination or certainty in decision making.

Poor implementation of environmental legislation also often stems from conflicts between the Pacific tradition of local customary authority and contemporary Western-style legal frameworks. A consequence of this conflict is poor adjudication and enforcement of laws at the local level. One positive trend in PICTs is the renewed appreciation of the need to consult with stakeholders and to take into account customary practices and tenure in regulatory frameworks.

INTEGRATED PLANNING SYSTEMS

Many PICTs are at the stage in their climate change, biodiversity, waste management, community conservation and environmental impact assessment (EIA) programmes where they recognize the need to pull together haphazard resource use, conservation and economic development. PICTs have called for assistance in instituting integrated planning systems as a means to improve national and sub-national enabling environments for sustainable development (SPREP 2004b). Integrated land and resource use or environmental planning systems can provide mechanisms to manage competing demands and uses in a manner that respects customary use. Many PICTs, in recognition of the advantage of having planning capacity, have commenced the integration of decision making by instituting advanced EIA provisions (Cook Islands) or developing commensurate environmental planning laws and institutional processes (Samoa).

ENVIRONMENTAL IMPACT ASSESSMENT

Most PICTs have instituted some legislative or policy processes for the completion of EIA for significant developments. EIAs are inhibited by human and capital resource shortfalls, and lack of expertise and information. Capacity building has been spasmodic and resources for national development and regional guidance limited.

Application of EIA principles to area-wide, multiple use and resource use policy choices is a means to demonstrate the positives of environmental assessment. This extended use of EIA principles is often referred to as strategic environmental assessment (SEA), and has many features suited to the customary and subsistence cultures of the Pacific islands.

ENVIRONMENTAL INFORMATION

As previously mentioned, there are significant gaps in adequate and suitably characterized environment and development information in the Pacific. Where data do exist, efforts in aggregation have been driven by sector approaches, diminishing the multi-use potential of information systems. Efforts in geographic information systems (GIS) development have been spasmodic and often linked to discordant project work. McIntyre (2002b) identified the following additional problems and needs:

- Lack of coordinated baseline data systems for environmental assessment and state of the environment monitoring (including data collection, interpretation, updating, storage and retrieval, and user-dissemination mechanisms);
- Lack of tools to ensure data capture, generation, aggregation, enhancement, extrapolation and maintenance of quality; and
- Need to recognize uses and applications of environmental data that extend beyond EIA.

PICTs need investments in:

- Identifying and addressing gaps in data, as well as the characterization of information for decision making;
- Developing databases, GIS and other information systems;
- Establishing a regional information/database centre;
- Analysis and evaluation of data;
- Improving the accessibility of spatial and tabular data/information;
- Developing indicators that are practical, harmonized to Pacific needs and consistent with the MDGs and other international development goals (IDGs), including those of the JPOI and BPOA; and
- Establishing effective monitoring systems.

SCIENCE AND TECHNOLOGY

PICTs have limited capacity to access and utilize developments in science and technology. Specific areas of priority include biodiversity assessment, land capability, water quality analysis, coastal and marine science, energy, climate change, land use planning, transport and sustainable development.

There has been greater adoption of technology for improved market-based energy management than for

any other sector. However, efforts to develop or adopt renewable energy technologies remain weak. PICTs need to ensure that the Pacific is not the receptacle for obsolete technology or new technologies that require large maintenance burdens. Cost-benefit analysis should come as part of EIA and sustainability assessments (including social impact) prior to inception of technological initiatives.

FINANCING THE ENVIRONMENT

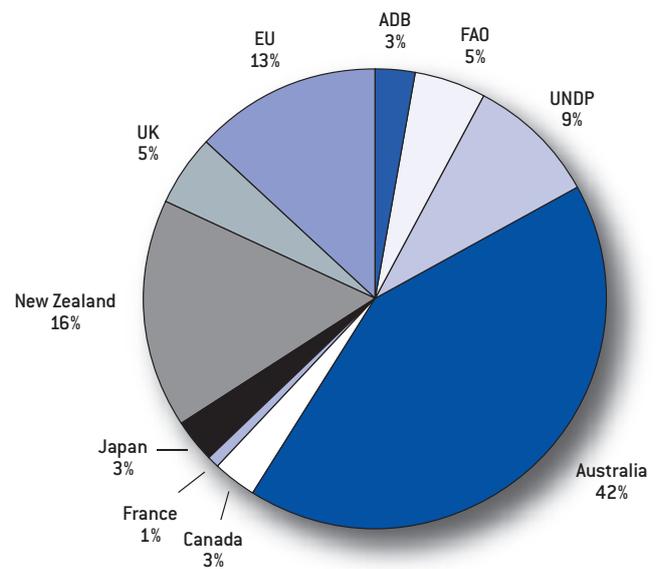
Most funding for implementation of the BPOA over the last decade has come from domestic sources, with little or spasmodic support from the international community (SPREP 2004b). Figure 1 shows the sources of international aid to PICTs.

Over 90 per cent of SPREP's funding comes from donors. As shown in Figure 2, the major donors are Australia, Canada, GEF/UNDP, New Zealand, UNEP and, more lately, Japan. Figure 3 shows the gradual increase in SPREP's project expenditures, which continue to outstrip income. This increase in expenditure has primarily been maintained by mega-region GEF projects since the mid-1990s.

In an environment of declining aid flows, ensuring effective development assistance and reducing the transaction costs involved are vital. Regional organizations have endeavoured to do this but are often thwarted by international organizations' preference for UN mega-region or sub-regional programmes or projects. These are often designed outside the Pacific and can involve top-down approaches with much bureaucracy in delivery. Even when projects have involved Pacific stakeholders in their design, the terms and conditions associated with them may influence the planning or implementation, injuriously affecting their success or value to the communities targeted.

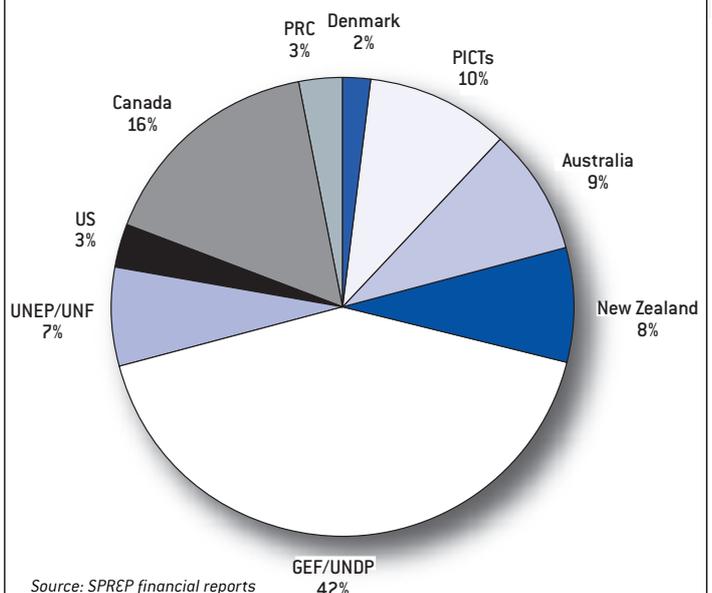
The Pacific needs to take better advantage of funds available for the environment from the GEF, as well as other significant sources such as the EU. For instance, the relatively new Operational Programme 15 of the GEF for Sustainable Land Management should provide significant financial resources for PICTs to address the much reported land degradation and drought issues consistent with the UNCCD. PICTs, with assistance from the CROP agencies, should place some focus on emerging GEF Operational Programme components to instigate strategic and proactive responses as funding conduits become available. The GEF Small Grants Programme provides a good opportunity for PICTs to leverage financial resources and may also open up

Figure 1 Average annual regional aid receipts from donors



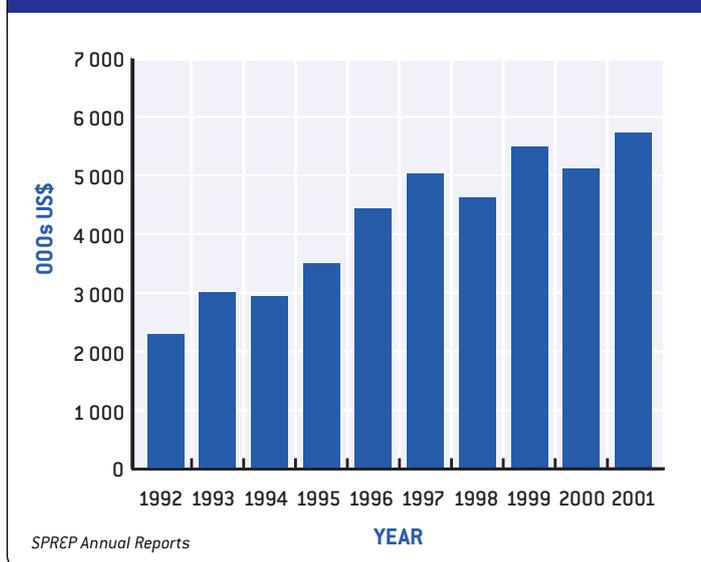
Source: PIFS 2002

Figure 2 Sources of SPREP's programme funds



Source: SPREP financial reports 2002 and 2003

Figure 3 SPREP's annual project expenditure



opportunities for regional networking initiatives such as the PYEN. While the PICTs have obtained significant funding from the GEF, it has been estimated that the region has used only 40 per cent of total GEF funding for which it is eligible. Apart from the administrative and bureaucratic issues of working through the Implementing Agencies (IAs), the GEF processes, including development of project proposals, are themselves time-consuming and resource-demanding. IAs have attempted to address this through Country Dialogue Workshops. However, these have not provided the capacity to ease the demands of accessing funds.

CAPACITY BUILDING

PICTs' preparations for WSSD and the BPOA +10 have seen growing calls for capacity development plans to be a feature of all national and regional projects, and to be adequately funded. The following have been called for, with an emphasis on in-region delivery:

- National capacity assessments and priorities;
- National and regional capacity-building frameworks;
- Inventories of training activities and resources in the region;
- Increased opportunities for Pacific islanders to have access to training and research opportunities; and
- Strengthened capacity of and collaboration between regional centres of excellence.

The region has responded to national demands through the generation and augmentation of a Type II Initiative, Regional Capacity Building Framework for Research and Training. This promotes synergies,

partnerships and collaborative delivery at all levels, and identifies and prioritizes capacity needs, agreed levels and types of capacity-building activities and programmes derived from needs assessments. It will also develop an inventory of existing and proposed training activities in the region, a database of training undertaken, establish training pathways, develop strategies to support research work, train-the-trainer initiatives and postgraduate-level training delivery mechanisms. The emphasis will be on a holistic approach to human resource development aligned with separate technical and policy initiatives.

GENDER EQUALITY AND EMPOWERMENT OF WOMEN

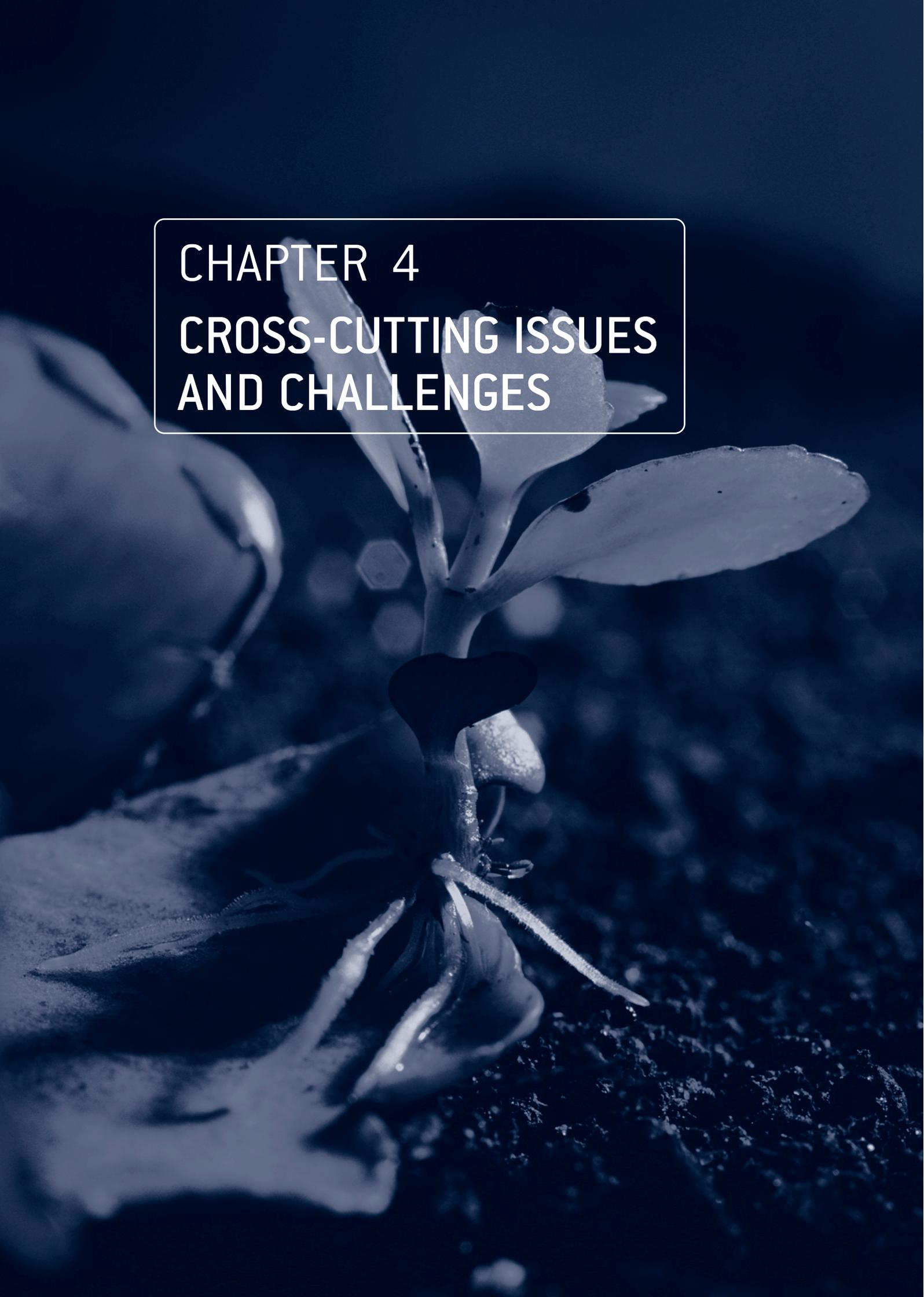
Over the past decade there has been considerable progress towards gender equality in the PICTs, with increasing recognition of the need for gender equity as well as the need for integration of gender into key environmental policy and planning processes.

There are strong interconnections between inequitable development, increasing poverty and entrenched social and cultural attitudes to women in the region, which specifically limit women's economic and social development.

The Secretariat for the Pacific Community (SPC) Women's Pacific Bureau provides technical support for gender equality, especially to facilitate ratification, in the implementation and reporting of the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) and the Pacific Platform for Action (through the Pacific Women's Triennial Conference) which is a sub-regional offshoot of the Beijing Platform for Action. Guided by this regional institutional framework and traditional practices, many regional and national local community environmental programmes, projects and initiatives target the capacity development of women.

AWARENESS AND COMMUNICATIONS

Over the last decade, PICTs, with support from CROP, have run successful environmental awareness campaigns. These have been based on thematic approaches. However, coverage has been limited by inconsistent funding. Awareness and communications in PICTs will need to centre on the wider sustainable development framework. There is a need to enhance the awareness and understanding of Pacific communities and political leaders about the common threads the BPOA presents as a blueprint for the Pacific SIDS.



CHAPTER 4
CROSS-CUTTING ISSUES
AND CHALLENGES

There are a number of cross-cutting issues that affect the environment and sustainable development in PICTs. Attention to these issues as part of sustainable development strategies would help to reduce environmental degradation and human vulnerability.

INTEGRATION OF ENVIRONMENT AND DEVELOPMENT

Effective and sustained integration of environment and development is essential for sustainable development in PICTs. Despite this, integration of environmental issues in development planning and decision making in the Pacific as a whole has been poor. Much effort has been spent on international debate and policy formulation with overwhelming emphasis on reporting. By comparison few resources and little effort has been directed to the national level to provide better enabling environments for the implementation of pragmatic initiatives for sustainable development. Efforts must be made to sustain Pacific livelihoods and economies while maintaining essential ecosystem functions. There is a new emphasis on mainstreaming the environment into decision making adopted as the strategic focus of the Action Strategy for Nature Conservation (SPREP 2004a).

POPULATION

PICTs are among the most densely populated places in the world. This exerts significant pressures on the environment and natural resources.

It is expected that population growth will continue for at least the next three decades in most countries, and finding a balance between population and natural resources is an 'unprecedented challenge' (SPC 2002). As highlighted by the Pacific Regional Environment Strategy (ADB 2004):

Perhaps the most urgent concern across the region is how to better meet the needs and aspirations of the upcoming generation. The UNDP notes that 20 per cent of the region's population is aged between 15 and 24 years — a total of 1.4

million, which is expected to rise by a further 300 000 by the year 2010. Many school leavers find they have inadequate or inappropriate skills for the few waged jobs that are available, for agricultural work or for other types of livelihood. Most lack opportunities to upgrade their skills because too few non-formal training programmes are available.

(ADB 2004)

PICTs, in reporting to BPOA +10 through their National Assessment Reports (NARs), are calling for the issue of population growth to receive attention in its own right, given the already high population and associated problems in the Pacific.

DETERIORATION OF TRADITIONAL SYSTEMS

Deterioration of traditional land and sea tenure systems and loss of traditional knowledge are occurring as a result of Western influences, industrialization, urbanization and alienation of the youth from their traditions. Although conservation has not always been the objective of these traditional systems, they are nevertheless practical management tools developed over time to ensure ownership, reciprocation and sharing of resources or the benefits that accrue from them. The corrosion and loss of traditional governance systems and knowledge has been detrimental to natural resources and human welfare in PICTs. Respect for elders and village leaders is usually instrumental in the success of traditional systems. However, often Western influences and development regulations usurp the respected role of elders.

As aspirations for Western-style livelihoods and demands for material products increase, cash economies are supplanting the traditional subsistence

economies of PICTs. This change in socio-economic system has contributed to overharvesting of natural resources and ecosystem modification and degradation. Traditional controls are important mechanisms to guide resource use and development.

Documentation of traditional practices is often resisted by communities who have seen foreign investors capitalize on this knowledge, especially with regard to unique foods and medicines. Future initiatives should target institutional capacity building to establish conduits for the use of traditional knowledge in environmental management and development planning and decision making. Often there has been a concentration on the 'product' approach to traditional practices, rather than the 'process-product' approach that enables the sharing of traditional knowledge.

POOR ENVIRONMENTAL AWARENESS

Poor environmental awareness is a major constraint to dealing with environmental problems at a regional and national level. Pacific islanders have the most to gain, and to lose, by their behaviour with respect to the environment. Much more emphasis needs to be placed on raising awareness of the impacts of those behaviours and improving the knowledge base for economic growth and sound environmental management.

The following constraints to improving environmental awareness have been identified (SPREP 2001b):

- Lack of trained and experienced personnel dedicated to the task of environmental education and awareness;
- Inadequate national budget allocations to environmental education and awareness; and
- The perception that education and awareness is the responsibility of a select few.

While significant progress has been made at the regional level through the Action Strategy for Environmental Education and Training in the Pacific Region (1998–2003), much work is still required to develop and implement national-level strategies.

INADEQUATE INFORMATION ON THE PACIFIC ENVIRONMENT

Poor knowledge of much of the region's ecological and biophysical systems is a serious constraint to the development of environmental management strategies and actions. Effective environmental decision making requires scientifically credible data and information, baselines and indicators that are systematically upgraded, monitored and disseminated.

Information on the current population trends and status of endangered species and characterization of ecosystems is particularly lacking. Taxonomic data for fish, plants and invertebrates is of poor quality. There are serious gaps in geographic data, particularly for the more isolated islands in the archipelagic countries.

Standardized indicators and monitoring methods for ecosystems and natural resources are needed. Regular 'state of the environment' reports need to be prepared to document environmental trends, institutional changes, disseminate lessons learned, identify research needs, and reveal the data and knowledge gaps.

Another important requirement is the integration and consolidation of existing environmental data and information. Simple GIS and database systems are required at the national and regional level to aggregate data and simplify the means to disseminate it throughout the Pacific. The intention should be to design these systems in a manner that reduces the burden of reporting to MEAs and international development goals (IDGs).

LACK OF CAPACITY TO DEAL WITH ENVIRONMENTAL PROBLEMS

Human resource development is critical for sustainable development of the Pacific region. Inadequate human, technical and financial resources are among the constraints to dealing effectively with environmental problems in PICTs. Despite the strengthening of environment units since the early 1990s, inadequate staff to perform the expanding range of environmental management functions is a major constraint.

A range of priority activities is required to build

human and institutional capacity to address environmental problems, and include strengthening education, sharing and preserving traditional knowledge, and empowering NGOs, civil society and women.

POVERTY AND IDGs

While abject poverty does not exist in the Pacific due to the predominance of subsistence livelihoods, the lack of access to economic resources, employment, education, health services, housing and social protection results in deprivation and the 'poverty of opportunity' of communities. Women and children are often the most disadvantaged in Pacific societies, along with marginalized groups such as people with disabilities.

Limited economies of scale increase the cost of provision of infrastructure and services necessary to alleviate poverty. Vulnerability to risk factors is high in the Pacific. In addition there are growing social pressures stemming from population growth, a young age structure, inequalities in resource sharing, few social protection measures, and the tension between cultural obligations and changing social structures. The migration of people to urban centres to seek out opportunities for lifestyle improvements is a growing trend in PICTs. In the urban areas, people suffer from the cumulative impacts of poor environmental management and lack of basic services. Limited water supply and sanitation systems, pollution and toxic wastes, overcrowding, unplanned living areas and lack of health and community services diminish opportunities for people to improve their quality of life.

MEAs, multilateral social agreements (MSAs) and international development goals (IDGs), including the World Trade Organization, Monterrey and Millennium Development Goals (MDGs), collectively set the agenda and provide the policy basis for national actions to address poverty and sustainable development. There have been initiatives to integrate these collective IDGs, the most recent being the WSSD through the JPOI, itself setting targets and objectives.

Prompted by the need to generate NSDSs by 2005, and growing commitment to the IDGs, the Pacific nations are focusing on integrating these goals and



Upolu road, Samoa

Source: Ilan Kelman (reprinted with permission from www.islandvulnerability.org)

indicators in national planning processes. Much more needs to be done to ensure that the natural environmental capital makes a significant contribution to poverty alleviation in PICTs.

ENVIRONMENT, POVERTY AND INEQUITY

There is no doubt that there are direct linkages between environmental degradation, natural resource depletion and poverty. Strategic economic and physical development systems, plans and/or strategies should include the equitable distribution of economic development opportunity. Poor coordination and planning of development in the Pacific has led to financial 'leakages' from communities to multinational or foreign companies/individuals, through direct financial losses, community costs of development or inheritance of substantial damage. Contemporary environmental/resource use planning systems offer a means to introduce 'user pays' systems and mechanisms that could ensure better equity of opportunity and sharing of costs and benefits from development.

URBANIZATION

Urbanization and the resulting change in the nature of human settlements in the Pacific represents one of the major challenges facing PICTs within the next decade. Already, the urban population is close to or above 40 per cent in 14 PICTs and close to or above 60 per cent in 8 PICTs. For the larger countries with adequate untapped productive land resources such as PNG, the Solomon Islands and Vanuatu, the proportion of people living in urban centres is still low; hence the problems of urbanization are less severe.

Urban sprawl is most problematic in larger urban centres or very small islands where tourism-related dispersed development represents a form of uncontrolled sprawl.

Rapidly expanding urban populations place large demands on PICTs for utility and infrastructure services, especially water supply and sanitation. A growing number of urban areas in PICTs are characterized by overcrowding and substandard and informal housing. In addition, there is a high incidence of disease related to unsanitary living conditions, contaminated water supply, and inadequate treatment and disposal of human waste. The urban hotspots are Suva and Nadi (Fiji), Nuku'alofa (Tonga), Port Moresby (PNG), Port Vila (Vanuatu), Majuro (Marshall Islands), Tarawa (Kiribati) and Funafuti (Tuvalu).

The major problems facing urban centres in the Pacific include:

- Serious shortage of land and conflicts with traditional land tenure;
- Falling standards of infrastructure;
- An increase in the number of squatter settlements and informal housing;
- Poverty, vulnerability and environmental degradation;
- Geographic constraints to urban extension; and
- Increased pollutant flows damaging sensitive mangrove, estuary and reef environments.

Many of these problems can be addressed in part through strategic physical and environmental planning and management. However, the socio-economic drivers for urbanization are often nationally oriented and cannot be solved through geographically based solutions. Decentralization and increasing job opportunities in the rural areas are also required.

ENERGY

Energy has a vital role to play in sustainable development and economic growth in the Pacific. Despite some positive developments in the region, PICTs still face unique challenges with regard to energy, including: the increased pressure of tourism developments and urbanization on current energy infrastructure and energy supply; high cost of and dependence on imported fossil fuels for electricity and transport; widely distributed and isolated small population centres; limited awareness and acceptance of suitable alternative sources of energy; lack of financially sustainable renewable energy installations on the ground; and the high initial capital costs for most renewable energy technology. There is limited awareness of the benefits of energy efficiency and conservation measures, and misconceptions over the capability of renewable energy because of the failures of earlier pilot projects.

The constraints to sustainable energy development are characterized by the following issues:

- Only 30 per cent of the people of the region have access to electricity;
- There is heavy reliance on imported fossil fuel;
- There is a lack of comprehensive adopted energy policies and plans; and
- There is a lack of qualified, experienced and committed island nationals.

Institutional structures for the maintenance of renewable energy systems in remote areas are weak. There are limited incentives for private sector involvement and investments in both renewable

energy and energy efficiency. Despite these constraints there remains a great potential in the region for renewable energy given the abundance of biomass, solar, wind, ocean, geothermal and hydro resources. However, while there is funding available from the international community to support renewable energy and energy efficiency projects, these countries often do not qualify because the scale of involvement and management required by donors is at times beyond the capacity of the SIDS.

The CROP Energy Working Group (EWG) has increased regional awareness of the importance of energy and has seen the development of projects and programmes of relevance to the PICTs. The biannual Regional Energy Meetings have allowed the priorities of the PICTs to be elaborated and integrated into regional development plans and supported national development plans.

This has led to the development of partnerships through the Energy Type II Initiatives, in particular those with the European Union/Denmark and with NZAid, since the launch of the initiatives in Johannesburg in 2002. Of specific note is the acceptance of the Pacific Islands Greenhouse Gas Abatement through Renewable Energy Programme (PIGGAREP) included in the International Action Programme approved by the June 2004 International Conference on Renewable Energy in Bonn. The implementation of the Pacific Islands Energy Policies and Strategic Action Planning (PIEPSAP) project through the UNDP with the Government of Denmark under the European Union Type II partnerships has commenced and links very closely to the PIGGAREP. Supply Side Energy Efficiency with the Pacific Power Association (PPA) is currently being finalized with the EU.

TOURISM

The Pacific environment is the foundation for successful tourism development, which cannot be sustained without effective conservation and management. Its richness and diversity, however, are fragile and extremely vulnerable to human-induced and natural threats. Since the emergence of ecotourism, the sector



Samoa has opted for low-key but growing alternative tourism. Simple accommodation is found on many popular beaches and is run by local families

Source: Matt McIntyre

has made use of the natural and cultural assets that are thought to be attractive. The conservation of nature was a function conveniently assigned to natural resources and environmental management agencies. This attitude needs to change. Ecotourism operators and agencies should be more proactive in nature conservation. In many PICTs they enjoy higher political profiles than their environmental counterparts. They should use this prominent position to lobby in support of nature conservation and should work closely with nature conservation agencies in promoting awareness, appreciation and management of the sustainable tourism value of natural areas.

Tourism agencies and operators also need to review their perspective on the natural and cultural tourism assets. The natural environment is not simply the pocket of accessible beach, reef or forest that receives tourists, nor the species of kakerori or hawksbill turtle or whales that ecotourists pay to see in nature; the natural environment is the total package. Fauna cannot be protected in isolation from their habitats and the larger ecosystems of which they are an integral part. This implies the protection of large natural areas rather than the small pockets that are the main attractions. This ecosystem-based approach requires public and local community involvement in design and management, and is inclusive of other economic, social and cultural initiatives that are ecologically sustainable.

The World Conservation Union's Red List of Threatened Species (IUCN 2003) identifies the major threats worldwide to flora and fauna, and notes development as the third major threat category for loss of habitat. Under this 'development threat' category, tourism is ranked third behind industry and human settlement and ahead of infrastructure development. IUCN (2003) places recreation/tourism as the number one source of human-induced indirect effects that threaten biodiversity.

Tourism is a key tool to achieve government and civil society objectives including poverty reduction, addressing gender issues, rural development, reduction of unemployment, and increasing foreign exchange earnings. Tourism provides economic opportunities for all status levels, and can have a multiplier effect for poverty alleviation from community-level service operators through to private sector and management levels, boosting skills and capacities. However, if not well planned and managed, tourism can increase gender disparities and cultural erosion.

Much of the wealth from the tourism sector does not trickle down to the community level, although it shows a positive impact on GDP per capita. Service providers involved in the tourism industry are often employed on very low wages, which have not significantly increased over the last decade. Both women and men play a significant role in the tourism industry, although women are mainly concentrated in the unskilled and semi-skilled levels. There needs to be equal opportunities and support (in the form of child care, equal employment opportunities and paid leave) available for men, women and youth to access training and the full spectrum of employment opportunities.

Many tourism initiatives have considered environmental aspects, but less frequently the benefits to and participation of the host communities. Use of environmental and social impact assessments are encouraged and in some PICTs are a prerequisite to the development of a tourism operation. Sustainable tourism ensures that natural and cultural resources are developed for tourism in a manner that does not destroy them for future generations. This involves a diversity of activities, including plant and wildlife protection, waste management, land use planning,

community capacity building, visitor and tourism industry education, building regulation, soil and water management, and controls over activities (for example, erosion prevention as well as waterfront preservation).

Sustainable tourism ensures long-term profitability and protection of natural and cultural assets, whereas unsustainable practices offer short-term gains at the cost of culture and the environment. 'Alternative' forms of tourism, such as low-key beach developments, have brought smaller but more equitable distribution of gains to many communities. However, the more mainstream forms of unsustainable tourism are often in the same vicinities, threatening the long-term sustainability of the alternative community-based tourism initiatives.

There is inadequate data upon which to review the holistic economic, social and cultural impacts of tourism development in the Pacific. If PICTs are to develop sustainable tourism in a manner that adequately protects the ecosystems they so heavily rely upon, essential information across the region needs to be aggregated and land use planning introduced to ensure a balance between the utility of resources for attracting tourists and the environmental sensitivities. The dominance of multinational firms in tourism industry development may result in profit multipliers accruing offshore with no increase in real incomes for tourism service industries.

HEALTH

Resolving health issues is among the sustainable development priorities in PICTs. The NARs highlight poor waste management practices, poor water quality, free-ranging domestic animals and the excessive use of fertilizers and pesticides as serious health threats in the region. Also highlighted was the concern over the continual breakdown of traditional medicine systems. Modern medicine is expensive and not always available to all sectors of the population.

Fundamental environmental health requirements such as the provision of safe drinking water, food safety, hygiene and sanitation have been overlooked in national economic planning, with significant gaps in

Table 21 Percentage of households with access to improved sanitation

COUNTRY	1990	2000
FIJI	98	99
FSM	34	44
KIRIBATI	24	31
MARSHALL ISLANDS	74	80
NAURU	na	97
NIUE	100	100
PALAU	98	99
PNG	na	83
SAMOA	98	100
SOLOMON ISLANDS	na	23
TUVALU	77	86
VANUATU	90	95

Source: SPC 2004
na = data not available

their provision in many PICTs. Nevertheless, access to satisfactory sanitation services among PICTs has improved from 1990 to 2000 (Table 21).

Although the overall health of the people of PICTs has improved, they are faced with threats from HIV/AIDS and a resurgence of infectious and vector-borne diseases such as malaria, dengue fever and leptospirosis. The number of people who are HIV-positive is growing (SPREP and ESCAP 1996).

Illnesses related to inadequate water supply and unsanitary conditions are prevalent, especially in informal settlements in marginal locations. Diarrhoeal diseases and acute respiratory infections continue to be a major cause of mortality in young children. This is exacerbated by the structural weaknesses of health services, the demand for which continues to grow (PIFS 2002). Medical and dental services are limited and hospitals understaffed and under-equipped.

There is an unequivocal link between the change in diets from traditional indigenous foods to less nutritious, generally imported foods and the increase in

the incidence of lifestyle diseases throughout PICTs. Cardiac diseases, diabetes and other non-communicable diseases are the leading causes of death in the region, particularly in those PICTs with the highest urban populations. There is an increasing number of deaths from suicide and accidents, a growing incidence of substance abuse and crime (SPC 1998), and increasing problems from excessive alcohol consumption in PICTs.

TRADE, INVESTMENT AND THE ENVIRONMENT

The trade and investment situation of PICTs is changing rapidly, with the signing of regional trade agreements such as the Pacific Island Countries Trade Agreement (PICTA) and Pacific Area Closer Economic Relations Agreement (PACER), the membership of and accession to the WTO, and the interest of large economies such as Japan, the EU and the United States. Trade and

investment in PICTs need to be steered by the following:

- The capture, maximization and retention of benefits presented by trade and investment opportunities and protection of Pacific lifestyles through environmental planning methods;
- The effective management of environmental risks associated with increased liberalization of trade and investment regimes at global and regional level; and
- Building recognition and appreciation of the multi-dimensional nature of trade, investment and environment linkages.

For PICTs, the actual implications of trade liberalization on the environment are not yet known, but new trade regimes are not yet fully in place. Therefore timely action is required to ensure that trade and the environment are mutually supportive. Integrated environment/development assessment processes can be used to introduce simple 'user pays' systems to capture financial multipliers in-country. Better policing of development can also ensure that investment incentive instruments adequately capture benefits in time to cover 'deferred community costs', and/or maintain obligations for rehabilitation beyond an investor's presence. Integrated government policy on environment and development should also enable PICTs to contend with pressures coming from the greater mobility of international capital, the increasing power of transnational corporations and international agencies. Limited human resources and skills, however, are a constraint to effective participation in regional and multilateral trade policy issues and trade negotiations.

PICTs will require contemporary legislative structures and provisions in order to take full advantage of trade liberalization opportunities as well as to guard against the potential negative consequences of investments. Lack of laws or ineffective links between land, environmental and investment laws and trading regimes will place PICTs in conflict with sound trade and investment practices. Appropriate legislative

frameworks need to be supported by national objectives, data/information, consistent standards of practices and due process, implementation mechanisms (including good incentives), equitable regimes of penalties and means for enforcement. Ineffective and compromising or competing laws and policies will need to be curbed and perverse subsidies (for example, for logging and fisheries) eliminated. In addition to these key elements, PICTs also need to update associated domestic laws that cover, for example, employment, land use and allocation and consumer protection. Arrangements establishing certainty in tenure over land and marine resources are paramount in establishing a confident basis for investment, whether local or foreign, and for determining responsibilities for environmental management.

FOOD SECURITY AND THE ENVIRONMENT

Food security of PICTs is highly dependent on their environment and natural resources. Agriculture remains the single largest sector in many PICTs, accounting for over 85 per cent of foreign exchange and contributing substantially to total employment (40–80 per cent). It represents 20–40 per cent of GDP and over 50 per cent of exports. Subsistence agriculture is still the main source of income and the main insurance against poverty for the majority of rural, and many urban, communities.

Land degradation, limited water supply and the impacts of drought and other extreme climatic events will have a major impact on food security in PICTs. Biodiversity loss will also threaten agricultural yield through the loss of insects and other animals that are essential for the pollination and hence the productivity of some crops. Marine fisheries are also a major source of food for the population of PICTs. Declining fish catches as a consequence of overexploitation and coastal habitat degradation will also threaten food security in these countries.



Fishing as a livelihood along the north coast of Tongatapu, Tonga
 Source: Ilan Kelman (reprinted with permission from www.islandvulnerability.org)

VULNERABILITY OF PICTs

Some of the environmental vulnerabilities of PICTs are intrinsic and cannot be influenced by human actions, while others could be managed at least in part by the governments and people of PICTs. There is an urgent need to identify and measure all aspects of the special vulnerabilities of SIDS to ensure that development priorities and approaches are appropriate and that these special vulnerabilities are taken into account in international processes.

Vulnerability and resilience and response mechanisms, including adaptation measures for climate change and sea-level rise, need to be incorporated into development planning systems at the national and sub-national level in PICTs.

INTEGRATED CATCHMENT AND COASTAL AREA MANAGEMENT

Implementing integrated catchment and coastal area management would help PICTs to address a range of issues including disaster management, land degradation, water resources, biodiversity loss, climate change, pollution and coastal area degradation. This approach is particularly important to PICTs since their generally small land masses mean that entire islands could be considered as the coastal zone.

OPPORTUNITIES AND CHALLENGES

While attending to basic human needs is often the immediate priority for PICTs, transforming the environment and conservation into national and regional priorities is a great challenge. Addressing this challenge, however, is difficult because of the numerous gaps between regional positions, national

priorities and capacities, provincial capacities, the inequitable distribution of support from the international community, sector-based approaches, poor vertical and horizontal linkages in governance, and lack of basic information. NSDSs and National Sustainable Development Committees can pull together discordant policies or improve coordination across government departments.

People-centred responses delivered through community development frameworks are required to address poverty, population growth, health issues and urban expansion as well as the issues of governance, human resource development and the involvement of civil society in sustainable development planning and decision making. A philosophy of building partnerships, with a balance of people-oriented actions and institution-centred development, should prevail.

There is considerable momentum at the regional and national level for 'mainstreaming the environment', evident in the Pacific position for BPOA +10 in its call

for integrated planning systems. PICTs should continue to take advantage of this momentum to achieve full integration of the environment and development.

CRITICAL CHALLENGES FOR SUSTAINABLE DEVELOPMENT

Refocusing Pacific environmental and sustainable development programming has in part been accomplished through reviews for the WSSD and BPOA +10. Since early 2001 regular regional ministerial and high-level official meetings have been used to consider key issues and barriers to implementing actions for sustainable development. These needs and actions, which are consistent with PICTs' National Assessment Reports prepared for the WSSD and BPOA +10, have been identified (Box 5).

Box 5 Key needs and actions for sustainable development in PICTs

Institutional

- State of the environment systems to monitor environment and development trends;
- Integrated planning systems for land use, resource activities and environmental management;
- Means to obtain and use pricing of natural resources to recover all development costs and ensure equitable benefit sharing;
- Institutional development to provide better community participation in decision making;
- Community-based planning approaches to mainstream local/traditional knowledge in decision making to empower communities and strengthen their resilience;
- Improved information, characterized to suit decision making;
- Innovative finance mechanisms for environment protection, planning and management;
- Regional and national coordination mechanisms in policy and programming;
- Awareness and training, targeting government, business, NGOs and communities; and
- Innovative means to address land tenure and resource access issues to instil confidence and certainty in planning and investment.

Natural resource management

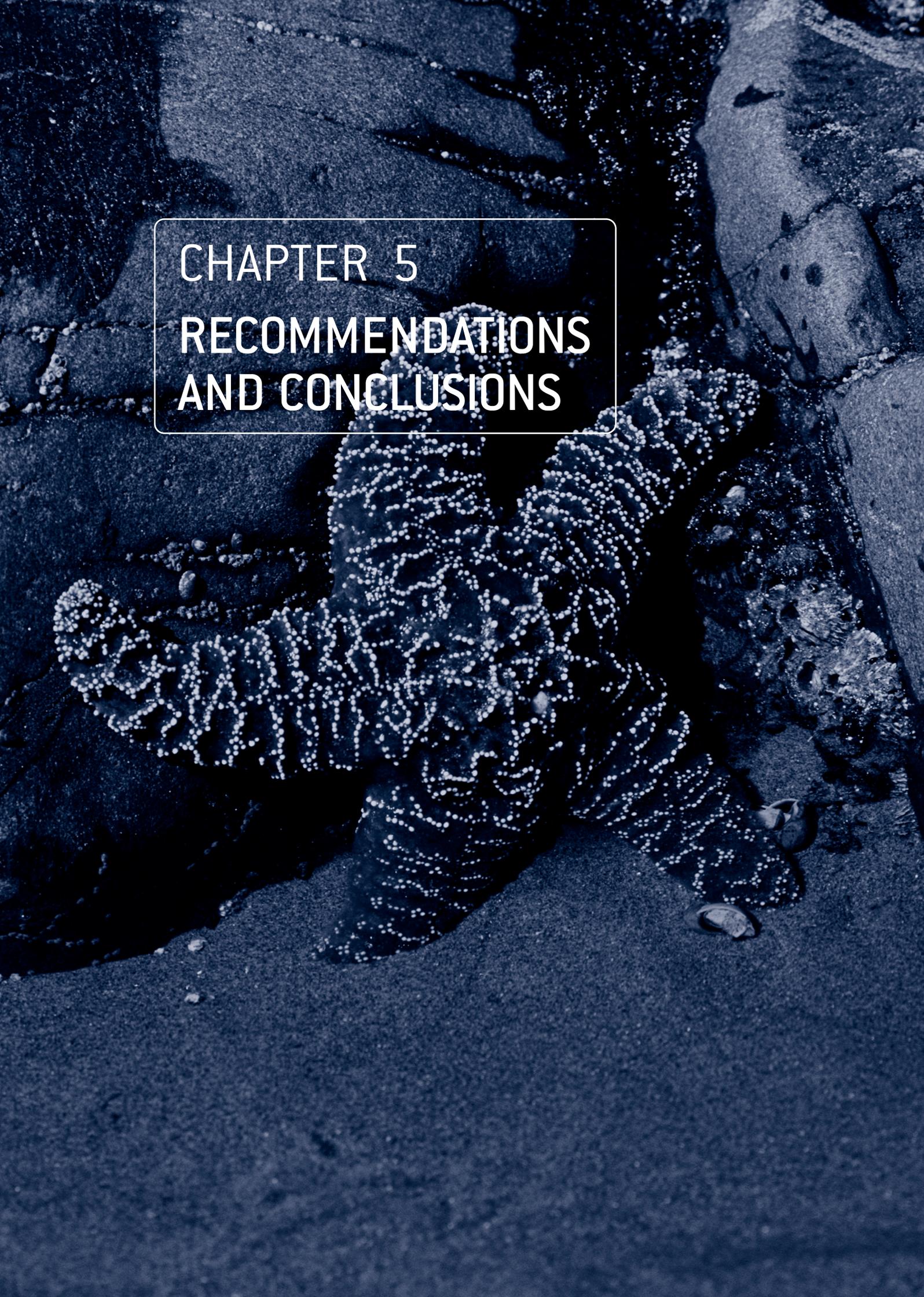
- Strengthened conservation networks and partnerships; institutional development for communities and NGOs;
- Resource science, planning and management targeting the empowerment of local people, communities and institutions;
- Increased awareness and promotion of conservation values;
- Increased number of areas under effective conservation management, targeting ecological communities;
- Safeguard and restore threatened species of ecological or cultural significance;
- Control the spread of invasive species and prevent new introductions;
- Improved knowledge and understanding of the state of the Pacific's environment and biodiversity; and
- Use of community-based methods in integrated catchment and coastal management.

Risk assessment and management

- Mainstreaming of UNFCCC adaptation and disaster risk management methods in development planning processes, using an ecosystems management approach wherever practicable;
- Multi-focus programmes and projects initiated to address coastal erosion, coastal resource management, hazards management, flooding, conservation and infrastructure management, incorporating means to address climate change;
- Merging of relevant prediction methods, response options and development performance criteria to assist integration in development assessment and building control; and
- Undertake technology assessment and capacity building for transfer, tailored to human resource capacity, with emphasis on renewable energy and risk mitigation.

Waste streams

- Address the critical issue of mounting stockpiles of solid waste, with support for the removal of existing stockpiles where necessary and improving landfill design and management;
- Undertake characterization assessments of waste streams to prioritize hotspot areas for critical actions, including trade and legislative provisions to address 'waste at source' approaches;
- Initiate means for overall reduction of the waste stream including the identification of environmentally sound and affordable alternatives;
- Maximize options for recycling, and use of alternative biodegradable packaging and products;
- Institute national plans and strategies to guide legislation, institutional development for waste management; with an emphasis on reducing impacts and costs to tourism and public health;
- Introduce community-based monitoring processes targeting water quality, as a means to protect communities against health problems;
- Instigate land use planning approaches for site selection and controls for solid waste sites;
- Address pollution sources from land-based activities, targeting means to instil quality controls after development;
- Implement re-use and recycling of waste, use of biodegradable waste for compost, fertilizer and soil production (possibly involving effluent use); and
- Address pollution and invasive species from ship and maritime sources, including shipwrecks.

The background is a dark, textured surface, possibly a rock or a piece of fabric, with a prominent white starfish-like pattern in the center. The pattern consists of numerous small, white, circular dots arranged in a star-like shape. The overall color palette is dark, with shades of black and dark blue, and the text is in a bright, white, sans-serif font.

CHAPTER 5
RECOMMENDATIONS
AND CONCLUSIONS

THE WAY FORWARD

As emphasized throughout this report, the integration of environmental considerations into national development planning and decision-making processes is considered to be the most important step for SIDS to achieve sustainable development (BPOA Clause 46). This was echoed in the NARs completed by PICTs for the WSSD, which also identified the lack of integrated environment and development planning as the key impediment to sustainable development. The BPOA also advocates an interdisciplinary approach for planning and decision making as well as community participation from the outset of development processes (BPOA Clauses 47 and 73).

The need for community development planning approaches, which incorporate use of traditional information and practices, was also emphasized in many regional reports (SPREP 2002). The BPOA therefore remains the foremost international framework to guide PICTs in their sustainable development endeavours.

PRIORITIES FOR THE WAY FORWARD

There have been considerable strategic gains for the Pacific as a whole at the international level. The achievements in international recognition need to be translated into benefits at the regional, national and local levels. Focus needs to be placed on the following priority areas:

GOOD GOVERNANCE

The environment outlook of the PICTs is reliant upon good environmental governance. Good national and global governance needs to encompass the vertical and horizontal coordination required in development and environmental planning, natural resource management, and to maximize opportunities to improve people's quality of life.

IMPROVING COORDINATION

There is a need for better coordination between key national policy and plans, existing regional organizational strategies and thematic strategic action plans. The alignment of these with UN programmes and activities is a major challenge. Strengthened links

are also required between regional governance and NGOs to ensure that civil society views are considered in programme development and implementation.

NATIONAL SUSTAINABLE DEVELOPMENT STRATEGIES

Technical support for NSDS production will be necessary to ensure that effective strategies are generated by the end of 2005 and incorporate the following:

- Identification of all stakeholders and their roles, with emphasis on integrative efforts;
- Integration of cross-sectoral programmes;
- Policy analysis to identify gaps in policy, institutional frameworks, data and actions;
- Increase in NGO/civil society involvement (partnerships) in policy development and implementation;
- Improved administrative procedures/institutional arrangements (including government restructuring where effective across governments) to ensure sound environmental responsibility incorporated

from corporate plans through to programme/extension delivery processes;

- Improved conduits of communication between government agencies, and between government and civil society (knowledge management and networks);
- Implementation of resource use planning and management; and
- Advances in training for integrated resource management.

ESSENTIAL INVESTMENTS IN ENVIRONMENTAL PROGRAMMES

Investment in the following areas is required by PICTs:

STRATEGIC PROGRAMMES

The project-oriented environmental assistance of the past often does not yield sustainable results. Long-term planning and design (10–15 years) is necessary to cater for multi-donor support and capacity development. However, there are likely to be significant challenges in securing long-term funding. Nevertheless, strategic programmes will at least bring previously disconnected efforts together, reduce duplication of efforts, and optimize the use of financial and human resources. Investment in bottom-up approaches building on the priorities and information within NARs is also required for PICTs.

BASIC SKILLS

Investment in basic skills, methods and techniques is needed especially in the areas of EIA, related strategic environmental assessments, land use planning, information systems development (for example, GIS), natural resource survey and environmental monitoring. It is essential that these requirements are addressed in future programmes. Any programme strategy should also include project design and project management training.

COMMUNITY DEVELOPMENT FOCUS

Community development frameworks are critical for community-based conservation actions that address poverty alleviation as well as achieve conservation objectives. Such frameworks were called for by PICTs at a 2002 regional meeting of high-level government officials on preparations for the WSSD. The calls for capacity building were underpinned by the need to empower local communities, for them to address their own issues in partnerships with government, through mainstreaming and integrating environment and development at the local level.

Over the last decade the design and implementation of environmental programmes has featured strong community involvement. In addition, the inclusion of NGOs in programme design and delivery has been growing over the last five years. Continued engagement of stakeholders leads to significant and often longer-lasting local benefits, through empowerment, ownership and visualization of financial and other benefits. Introducing community development frameworks, with local community planning processes, requires comprehensive community participation.

MONITORING AND PERFORMANCE REPORTING

Monitoring baselines and performance measures are important in establishing priorities, as early warning indicators, and for planning as well as for programme management. Targets, indicators and benchmarks will need to, as far as practicable, relate to the MDGs and other IDGs. However, it is important that the targets and indicators suit local situations to ensure universal

acceptance and applicability of the goals. While the Pacific region as a whole is committed to the achievement of the MDGs and MEAs, it is essential that the reporting burden on PICTs for the MDGs, MEAs and non-binding instruments is reduced through combined efforts.

CONCLUSIONS

The environment and natural resources are the foundation for social and economic development in PICTs. Nevertheless, the natural capital of PICTs continues to be degraded and depleted through human actions, threatening human well-being and sustainable development. PICTs have made significant efforts to address environmental degradation.

Regional plans and agreements are in place for a number of sectors, covering a wide range of issues relevant to the sustainable development of the region. The translation of these strategies and plans into benefits at the national and local levels has not been quick. Many PICTs have also developed their own environmental strategies and plans. There is also strong involvement in regional and international initiatives and increased international commitment.

Despite these efforts, progress has not been sufficient to reverse or halt environmental degradation and depletion of natural resources in PICTs. This could be mainly attributed to the limited mainstreaming of environmental considerations into development planning and decision making. In addition, several cross-cutting issues such as poverty, urbanization, loss of traditional resource tenure systems, trade and energy affect the environment and sustainable development in PICTs. Attention to these issues, as well as the aspirations and values of the communities, must be integrated with environmental management in PICTs.

The use of community development frameworks to guide the mainstreaming of environment and development, and integrated planning systems to coordinate decision making, are consistent with the emergence of related key objectives in the JPOI. There is a disconnect between national economic development planning, governance at the provisional/outer island level and the community development projects that have been successfully implemented at the local level. The lack of linkage between levels of governance in PICTs may be a reflection of fundamental shortcomings in local enabling environments and the concentration over the last decade on thematic environmental issues, without the corresponding development of institutional processes for implementation. Confidence in investment for environmental management is as important as that for economic development.

To ensure that the rate of progress in the management of the environment is greater than that of its degradation, PICTs need to focus on three key endeavours:

- Setting priorities, targets and means to evaluate and monitor progress;
- Developing partnerships; and
- Allocating adequate resources for sustainable development, through attracting additional resources (technical and financial) using existing resources efficiently.



The breathtaking Upolu view in Samoa reinforces the non-use value of some of the landscapes in the Pacific

Source: Ilan Kelman (reprinted with permission from www.islandvulnerability.org)

The creation of local enabling environments through the inception of community development frameworks and integrated planning systems is also important. However, these measures will require significant investment and experimentation over the coming decade. Improving coordination and collaboration through partnerships, including with civil society, is essential for progress. The involvement of civil society accompanied by community development and integrated planning would yield the following benefits:

- Empowerment of people and communities;
- Strengthened ability to manage local and traditional knowledge;
- Improved ability and procedures for community planning (ownership of problems and solutions);
- Development of effective process and product links between local and national levels of government;

- Positive influences on resources flows; and
- Valuing of environment assets and capturing of financial leakage.

While the environmental issues and driving forces in PICTs may be similar to those of SIDS in other regions, PICTs also possess some unique biogeographical and socio-economic features. The important message is that approaches to environmental management and sustainable development in PICTs must be appropriate for their unique situation.

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ACRONYMS AND ABBREVIATIONS

AOSIS	Alliance of Small Island States	GEF	Global Environment Facility
ADB	Asian Development Bank	GIS	geographic information system
AIDS	acquired immuno-deficiency syndrome	GISD	Global Invasive Species Database
APN	Asia Pacific Network for Global Change Research	GISP	Global Invasive Species Programme
AusAID	Australian Agency for International Development	GLASOD	Global Assessment of Soil Degradation
BINGO	big international non-governmental organization	GNP	gross national product
BPOA	Barbados Programme of Action for Sustainable Development of Small Island Developing States	GOOS	Global Ocean Observing System
CBD	Convention on Biological Diversity	GPA	Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities
CBO	community-based organization	GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
CCA	chromated copper arsenate	HDI	Human Development Index
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women	HIV	human immunodeficiency virus
CEPF	Critical Ecosystem Partnership Fund	HRD	human resource development
CFC	chlorofluorocarbon	IA	Implementing Agency
CI	Conservation International	ICRAN	International Coral Reef Action Network
CITES	Convention on International Trade in Endangered Species	IDG	international development goal
CNMI	Commonwealth of the Northern Mariana Islands	IGO	intergovernmental organization
CO ₂	carbon dioxide	IMO	International Maritime Organization
CROP	Council of Regional Organizations of the Pacific	IPCC	Intergovernmental Panel on Climate Change
CSD	Commission for Sustainable Development	IRD	Institut de recherche pour le développement
DDT	dichlorodiphenyltrichloroethane	ISDR	United Nations International Strategy for Disaster Reduction
DFID	Department for International Development (UK)	IUCN	World Conservation Union
EEZ	exclusive economic zone	JICA	Japanese International Cooperation Agency
EIA	environmental impact assessment	JPOI	Johannesburg Plan of Implementation
ENSO	El Niño/Southern Oscillation	LMMA	Locally Managed Marine Area Network
EP	ecosystem profile	MAB	Man and the Biosphere Reserve
EPA	Environmental Protection Agency	MARPOL	International Convention for the Prevention of Pollution from Ships
EU	European Union	MCT	Micronesia Conservation Trust
EVI	Environmental Vulnerability Index	MDGs	Millennium Development Goals
EWG	Energy Working Group (CROP)	MEA	multilateral environmental agreement
FAO	Food and Agriculture Organization of the UN	MLIC	Micronesia Leaders in Island Conservation
FEMM	Forum of Economic Ministers Meeting	MSA	multilateral social agreement
FFA	Forum Fisheries Agency	NAR	National Assessment Report
FS	Forum Secretariat	NBSAP	National Biodiversity Strategy and Action Plan
FSM	Federated States of Micronesia	NCSA	National Capacity Self Assessment
FSP	Foundation for the Peoples of the South Pacific	NDP	National Development Plans
GDP	gross domestic product	NEMS	National Environmental Management Strategy
		NGO	non-governmental organization

NIWA	National Institute of Water and Atmospheric Research (New Zealand)	SOPAC	South Pacific Applied Geoscience Commission
NSDS	National Sustainable Development Strategy	SPBCP	South Pacific Biodiversity Conservation Programme
NTF	National Trust for Fiji	SPREP	South Pacific Regional Environment Programme
NZAID	New Zealand Agency for International Development	SPTO	South Pacific Tourism Organization
OECD	Organization for Economic Cooperation and Development	TNC	The Nature Conservancy
PABITRA	Global Network for Biodiversity Research	TTPI	Trust Territories of the Pacific Islands
PACER	Pacific Area Closer Economic Relations Agreement	UNCCD	United Nations Convention to Combat Desertification
PBIF	Pacific Biodiversity Information Forum	UNCED	United Nations Conference on Environment and Development
PCB	polychlorinated biphenyl	UNCLOS	United Nations Convention on the Law of the Sea
PCS	Palau Conservation Society	UNDESA	United Nations Division for Economic and Social Affairs
PCRC	Pacific Concerns Resource Centre	UNDP	United Nations Development Programme
PI-GCOS	Pacific Island Global Climate Observing System	UNEP	United Nations Environment Programme
PIANGO	Pacific Islands Association of Non Governmental Organizations	UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
PICCAP	Pacific Island Climate Change Assistance Programme	UNESCO	United Nations Educational, Scientific and Cultural Organization
PICTA	Pacific Island Countries Trade Agreement	UNFCCC	United Nations Framework Convention on Climate Change
PICTs	Pacific Island Countries and Territories	UNGA	United Nations General Assembly
PIDP	Pacific Islands Development Programme	UNITAR	United Nations Institute for Training and Research
PIEPSAP	Pacific Islands Energy Policies and Strategic Action Planning	UoH	University of Hawaii
PIF	Pacific Islands Forum	USP	University of the South Pacific
PIFS	Pacific Islands Forum Secretariat	USAID	United States Agency for International Development
PIGGAREP	Pacific Islands Greenhouse Gas Abatement through Renewable Energy Programme	WCS	Wildlife Conservation Society
PIROF-ISA	Pacific Islands Regional Ocean Framework — Integrated Strategic Action Plan	WHO	World Health Organization
PIRPO	Pacific Islands Regional Ocean Policy	WHS	World Heritage Site
PNG	Papua New Guinea	WSSD	World Summit on Sustainable Development
POP	persistent organic pollutant	WTO	World Trade Organization
PPA	Pacific Power Association	WWF-SPP	WWF South Pacific Programme
PRISM	Pacific Regional Information System		
PYCE	Pacific Youth Caucus for the Environment		
PYEN	Pacific Youth Environment Network		
RMI	Republic of the Marshall Islands		
RSDS	Regional Sustainable Development Strategy		
SEA	strategic environmental assessment		
SIDS	Small Island Developing States		
SPC	Secretariat for the Pacific Community		