

The Ecosystem Approach to Coastal Fisheries and Aquaculture in Pacific Island Countries and Territories

Part 1: A review of the current status

Part 2: Principles and approaches
for strategic implementation



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**Part 2: Principles and approaches
for strategic implementation**

Report to the Secretariat of the Pacific Community
and
The Nature Conservancy

Prepared by Garry Preston

Gillett Preston and Associates



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Original text: English

Secretariat of the Pacific Community Cataloguing-in-publication data

The Ecosystem Approach to Coastal fisheries and Aquaculture in Pacific Island Countries and Territories – Part 1: A review of the current status – Part 2: Principles and approaches for strategic implementation/ report to the Secretariat of the Pacific Community and The Nature Conservancy prepared by Garry Preston, Gillett, Preston and Associates.

1. Ecosystem management – Islands of the Pacific 2. Fisheries – Islands of the Pacific 3. Aquaculture – Islands of the Pacific

I. Gillett, Preston and Associates. II. Title. III. Secretariat of the Pacific Community IV. The Nature Conservancy

333.952 09

AACR2

ISBN: 978-982-00-0302-6

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BP D5

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Prepared for publication at
Secretariat of the Pacific Community, Noumea, New Caledonia
and printed by Stredder Print Ltd., Takapuna, New Zealand



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Part 1: A review of the current status



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ACRONYMS

CBM	community-based management
CCRF	FAO Code of Conduct for Responsible Fisheries
CFP	SPC Coastal Fisheries Programme
CI	Conservation International
CMT	customary marine tenure
CRISP	Coral Reef Initiative in the Pacific
CROP	Council of Regional Organisations in the Pacific
EACFA	ecosystem approach to coastal fisheries and aquaculture
EAF	ecosystem approach to fisheries
EBM	ecosystem-based management
EIA	environmental impact assessment
FAO	Food and Agriculture Organization of the United Nations
FEP	fishery ecosystem plan
FFA	Pacific Islands Forum Fisheries Agency
FMP	fishery management plan
FSA	“Fish Stocks Agreement” (Full title: Agreement for the Implementation of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (1995))
FSPI	Foundation of the Peoples of the South Pacific International
GCRMN	Global Coral Reef Monitoring Network
GEF	Global Environment Facility
GPA	UNEP Global Plan of Action on Land-based Sources of Marine Pollution
ICM	integrated coastal management
ICRAN	International Coral Reef Action Network
ICRI	International Coral Reef Initiative
IGO	international governmental organisation
IMR	USP Institute of Marine Resources
IUCN	International Union for Conservation of Nature
KPI	key performance indicator
LRFF	live reef food fish
MCS	monitoring, control and surveillance

Acronyms

MMA	marine managed area
MPA	marine protected area
MSY	maximum sustainable yield
NGO	non-governmental organisation
PICTs	Pacific Island countries and territories
PIROP	Pacific Islands Regional Ocean Policy
SOPAC	Pacific Islands Applied Geoscience Commission
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Programme
TNC	The Nature Conservancy
UN	United Nations
UNCED	United Nations Convention on Environment and Development, 1992
UNCLOS	United Nations Convention on the Law of the Sea, 1982
UNEP	United Nations Environment Programme
USP	University of the South Pacific
WCPFC	Western and Central Pacific Fisheries Commission/Convention, 2004
WCPO	western and central Pacific Ocean
WSSD	World Summit on Sustainable Development, Johannesburg, 2002
WWF	World Wide Fund for Nature



EXECUTIVE SUMMARY

1. A wide range of international treaties and conventions commit Pacific Island Countries and Territories (PICTs) to the adoption and implementation of the ecosystem approach to fisheries (EAF). The Implementation Plan for the World Symposium on Sustainable Development urges United Nations member countries to make significant progress in implementing the EAF by 2010.
2. This report reviews the current status of implementation of the ecosystem approach to coastal fisheries and aquaculture in the region, covering initiatives by governments, regional and international agencies, and non-governmental organisations. A companion report—The Ecosystem Approach to Coastal Fisheries and Aquaculture in Pacific Island Countries and Territories—Part 2: Principles and approaches for strategic implementation—explores options for accelerating and improving implementation of the EAF.
3. The present report concludes that implementing the ecosystem approach to coastal fisheries and aquaculture is progressing in the region, but only at a moderate pace. At present, few if any PICTs have enacted laws or declared policies that commit them to implementing the EAF. To do this would require revision of legislation in most PICTs. Strategic planning and policy development in support of the EAF is weak, and many countries experience problems such as insufficient political interest or will, lack of relevant technical knowledge, poor inter-agency collaboration, and institutional inertia.
4. Despite this, however, many PICTs have implemented fisheries and aquaculture management measures that are compliant with the EAF, and which are assisting in its implementation in a *de facto* manner. Such measures include the promotion of community-based management (CBM) or co-management arrangements, establishment of marine protected areas (MPAs) and marine managed areas (MMAs), fishery development activities that divert fishing pressure away from overexploited resources, and technical measures intended to protect and conserve fish stocks.
5. Further progress in implementing the EAF will require strengthening and expanding these activities, developing better research and data collection systems to ensure that management is monitored and adapted as needed, and improving human and institutional capacities in support of these changes. Continued emphasis will need to be placed on the use of CBM, co-management and other participatory management arrangements, use of MMAs or other mechanisms for enhancing ecosystem resilience, and scaling back ambitious expectations in regard to fishery harvests and development prospects.
6. Land-based development is a major issue and its impacts on coastal environments are widespread and growing. Many factors that negatively affect marine ecosystems are under the control of government bodies other than fisheries agencies. In some countries, attempts are being made to mitigate the degradation of the marine environment by coastal development, and to overcome institutional barriers to better coastal management by establishing inter-agency committees and working groups. However, there is a need to adopt stronger integrated coastal management (ICM) approaches in most cases, and this should go hand-in-hand with implementing the EAF. The two approaches are complementary and, if implemented together, will greatly assist in the move towards sustainable management and use of coastal ecosystems. Both approaches will necessarily involve a wide range of stakeholders, including many government agencies.
7. Implementing the EAF will continue to present challenges for many PICTs, but these challenges are far from insurmountable, and can be addressed progressively, one step at a time. Many of the difficulties the EAF presents are not new, and already apply to a wide range of governance improvements that require changes in government agencies, policies and management arrangements, particularly where stakeholders may feel their interests are being threatened. There is a strong parallel between the EAF and the ICM process, in that a major challenge is the need to bring together a wide range of stakeholders with conflicting mandates or interests, and persuade them to agree on mutually acceptable goals and management approaches.

8. The EAF nevertheless provides an opportunity for PICTs to break away from more conventional and perhaps outdated single-species oriented approaches to fisheries management. It permits PICTs to move towards coastal fishery and aquaculture ecosystem management arrangements that are more compatible with the “Pacific Way”, contributing more effectively to the maintenance of livelihoods, lifestyles and ecosystem services than conventional fishery management systems have done. Many EAF principles are in line with traditional and customary ways of doing things in the Pacific, such as avoidance of sectoral specialisations, greater local participation in decision-making, and recognition of the non-commercial values and benefits that coastal resources and ecosystems can yield.

9. There will be significant differences between the way that the EAF is implemented in PICTs and in developed countries. Limitations of human capacity and financial and technical resources will mean that the EAF in PICTs will probably be based on adaptive approaches that aim to maintain habitat health, trophic levels or other pre-determined measures, rather than comprehensive ecosystem science. Although much of the literature on EAF emphasises the need for strong ecosystem science and fishery data, many EAF principles can be, and have been, applied in the absence of such science and data. This is particularly true in the case of artisanal or community fisheries, where management decisions can be made based on other forms of information and knowledge. The SPC Workshop on the EAF, held in November 2007, noted that the EAF should be a management process, not a research process. In that context, the EAF represents an opportunity for PICTs to progress towards significantly improved coastal fishery and ecosystem management arrangements for the benefit of all stakeholders.

10. Implementing the EAF in the region will take place progressively, perhaps in very small steps, and perhaps over a relatively long period of time. Eventually, however, a “tipping point” will be reached where the EAF becomes the norm rather than the exception. A parallel exists in the trend that has been observed over the past 20 years from the “get more fish” approach of fisheries development, to the focus on improved fisheries management, CBM and MMAs that dominates the fisheries scene today. Implementing the EAF is a continuation of the same trend towards achieving sustainable fisheries development.

11. All the major regional organisations, as well as several international agencies and a number of NGOs are actively encouraging the adoption of the EAF, and are able to provide PICTs with support, assistance and resources in its implementation. The methods through which this might be achieved are discussed in detail in Part 2 report of this study.



1. BACKGROUND INFORMATION

1.1. The study

12. This is the first of two reports produced as a result of a study on “Implementing the Ecosystem Approach to Coastal Fisheries and Aquaculture in Pacific Island countries”. The second report, which should be read in conjunction with the present document, is entitled “The Ecosystem Approach to Coastal Fisheries and Aquaculture in Pacific Island Countries. Part 2: Principles and approaches for strategic implementation”. That report provides information on current management issues affecting coastal fisheries and aquaculture in the region, and suggests principles, strategies and processes that might be used to address these issues in a manner consistent with the ecosystem approach to fisheries (EAF).

13. The study was carried out by the Secretariat of the Pacific Community (SPC), with funding from The Nature Conservancy (TNC). The study aims to assess implementation progress to date in the Pacific Islands region, develop common principles for in-country application of the EAF, and define the types of assistance and support that might be provided by regional organisations, institutions and key non-governmental partners.

14. Through the World Summit on Sustainable Development and other mechanisms described in section 3 of this report, PICTs have committed themselves to implementing the ecosystem approach to fisheries in regard to management of oceanic and coastal fisheries and aquaculture. The goal of SPC’s Coastal Fisheries Programme, as stated in its Strategic Plan 2007–2009, is “to assist SPC members in their commitment to implement the Ecosystem Approach to Coastal Fisheries and Aquaculture by 2010” so as to contribute to the regionally shared vision of “A healthy ocean that sustains the livelihoods and aspirations of Pacific Island communities”. TNC has decided to align its coastal fisheries/marine resource management programme to support the EAF in the Asia-Pacific region. Both organisations will adopt and support the common principles and approaches identified by the study.

1.2. Terminology

15. There are several terms and acronyms used in literature and discussions on the EAF, some of which are overlapping, or which represent variations or interpretations of the basic EAF philosophy. The phrase *ecosystem approach to fisheries* is used throughout this report, in line with FAO parlance, which draws a parallel between EAF and the precautionary approach to fisheries. As is clear from the title, the focus of the report is on coastal fisheries and aquaculture, but the phrase *ecosystem approach to coastal fisheries and aquaculture (EACFA)* used in an earlier draft has been abandoned as being too unwieldy and inelegant. When *ecosystem approach to fisheries* or *EAF* is used in the text it refers to coastal fisheries and aquaculture, unless the context clearly indicates otherwise.

1.3. Acknowledgement

16. The author would like to thank the following individuals who provided valuable comment and insight on various drafts of this report: Vera Agostini, Gordon Anderson, Michael Beck, Michel Blanc, Lindsay Chapman, Pepe Clark, Paul Eastwood, Rick Fletcher, Simon Foale, Lynne Zeitlin Hale, Ursula Kaly, Jeffrey Kinch, Maruia Kamatie, Michael King, Padma Narsey Lal, Trina Leberer, Warwick Nash, Kelvin Passfield, Ben Ponia, Andrew Smith and Alan White. Any errors or faults that still persist, despite the attentions of the reviewers, are entirely the responsibility of the author.

2. DEVELOPMENT OF THE ECOSYSTEM APPROACH TO FISHERIES

17. This section provides a brief historical summary of the development of the EAF, and attempts to clarify some of the terminology and conceptual background.

2.1. Fisheries management and the precautionary approach

18. Modern fisheries management has been practised since the 1940s. In inland waters, which were affected earlier and more severely by environmental issues, fisheries management evolved as an extension of wildlife management, and often involved direct interventions that affected the habitat, species mix, and other aspects of the ecosystem in which the resource occurs. In marine fisheries, however, the possibility of direct intervention in the ecosystem (through habitat modification, feeding, restocking, removal of predator species, etc.) has traditionally been more limited, and fisheries management strategies concentrate mostly on controlling human activity (Garcia et al. 2003).

19. Conventional approaches to fisheries management have typically focussed on optimising some aspect of fishery production, often from a single fishery species or small group. Some sample definitions of this kind of fisheries management (and the sources of those definitions) include:

- *“The effort to regulate where, when and how people fish, and how many fish they catch. The intent is usually to protect fish populations so that people can continue to fish. Most fisheries management is done by government agencies.”* www.reefed.edu.au/glossary/f.html
- *“Marine resource management, which has as its goal the optimization of fisheries yield, traditionally operates through generalized regulations such as gear restrictions, maximum take, bag limits, etc.”* www.ianclasbey.com/portfolio/nmfs/glossary.php
- *“Fisheries management is today often referred to as a governmental system of management rules based on defined objectives and a mix of management means to implement the rules, which is put in place by a system of monitoring, control and surveillance (MCS). Modern fisheries management is most often based on biological arguments where the idea is to protect the resource in order to make a sustainable exploitation possible.”* www.en.wikipedia.org/wiki/Fisheries_management

20. The FAO Code of Conduct for Responsible Fisheries (CCRF) defines fisheries management as, *“The integrated process of information gathering, analysis, planning, decision-making, allocation of resources and formulation and enforcement of fishery regulations by which the fisheries management authority controls the present and future behaviours of the interested parties in the fishery, in order to ensure the continued productivity of the living resources”* (FAO 1995a).

21. This type of fisheries management is generally based on scientific and analytical approaches that have been evolving for 50 or 60 years, but there is an increasing recognition that conventional approaches often fail to prevent overfishing or ecosystem damage. This has led to generalised acceptance of the need for a precautionary approach to managing fisheries, in which risks to resource sustainability are minimised. The essence of the precautionary approach is expressed in Principle 15 of the Rio Declaration on Environment and Development, which states *“Where there are threats of serious or irreversible damage, lack of scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”* (United Nations 1993). The precautionary approach therefore aims to avoid uncertainty (i.e. risk that has not been or cannot be assessed).

22. Growing recognition of the failure of conventional fisheries management has also led to increasing use of rights-based management systems, in which resource users own or control the resource; or co-management arrangements, in which fishery stakeholders participate fully in the decision-making process. These systems attempt to give resource users a vested interest in ensuring that the resource is exploited sustainably, in order to remove competitive pressures associated with open-access fisheries and the race to fish. In many PICTs community rights to fish, or to control particular fishing methods or areas, are embedded in long-established systems of customary marine tenure (CMT). Fishery management failures can of course occur under the CMT system, particularly where social cohesion is low, local leadership is weak, or the limits to resources are either not perceived or only partially understood. CMT nevertheless provides fishery management tools and mechanisms that are socially and culturally acceptable, and do not need the levels of centralised legislation, enforcement and management bureaucracy that conventional fisheries management requires.

2.2. Ecosystem management

23. Ecosystem management derives from the land-based disciplines of range management and forestry, and aims at maintaining ecosystems in the sustainable condition necessary to achieve desired social benefits. It is area-based, and boundaries must be clearly and formally defined. To be effective, it requires scientific information to support decision-making processes that may involve directly manipulating the environment as well as managing human activity in order to optimise long-term returns to humans.

24. Ecosystem management should not be confused with environmental management, which is the management of man's interaction with and impact on the environment. Environmental management is not the conservation of the environment solely for the environment's sake, but for humankind's sake. Environmental management standards (ISO 14000) exist to help organisations minimise how their operations negatively affect the environment (such as by causing adverse changes to air, water, or land) and comply with applicable laws and regulations.

25. There are various overlapping definitions of ecosystem management, but a precise, universally accepted one has yet to emerge. Some recent definitions used in the academic and practitioner community (not necessarily in regard to fisheries, but concerning broader concepts of ecosystem management) include the following:

- *“The use of an ecological approach to achieve productive resource management by blending social, physical, economic and biological needs and values to provide healthy ecosystems.”* www.for.gov.bc.ca/hfd/library/documents/glossary/Glossary.pdf
- *“Resource management systems designed to produce essential commodities and other values to meet human needs and desires, and to maintain or enhance soil productivity, gene conservation, biodiversity, landscape patterns, and the array of ecological processes common to healthy ecosystems.”* www.sfrf.ufl.edu/Extension/ssfor11.htm
- *“A strategy or plan to manage ecosystems to provide for all associated organisms, as opposed to a strategy or plan for managing individual species.”* www.streamnet.org/pub-ed/ff/Glossary/glossaryhabitat.html
- *“The process of sustaining ecosystem integrity through partnerships and interdisciplinary teamwork. Ecosystem-based management focuses on three interacting dimensions: the economy, the social community, and the environment. Ecosystem-based management seeks to sustain ecological health while meeting economic needs and human uses.”* www.great-lakes.net/humanhealth/about/words_e.html
- *“The concept of resource management that considers land, water, air, plants, and animals to be an entire system that should be managed as a whole. All of these elements are interrelated (including man).”* www.ces.ncsu.edu/forestry/pdf/www/www13.pdf

- “Management designed to maintain the interactions between all of the species in a given area and their non-living environment.” www.cfs.nrcan.gc.ca/subsite/guidelines/glossary
- “A management process which, rather than considering natural resources only as commodities (such as timber or fuel) for human use, focuses instead on the ecosystem processes of population (plants, animals), community (a grouping of different organisms living together) and biogeochemical interactions to maintain the condition and function of a site as a whole”. www.texasep.org/html/wld/wld_2esa_def.html

26. Irrespective of the precise definition, Garcia et al. (2003) cite literature which indicates that the aims of ecosystem management are:

- maintaining viable populations of native species in situ;
- representing within protected areas all native ecosystem types across their natural range;
- maintaining evolutionary and ecological processes;
- managing over periods of time of sufficient duration to maintain the evolutionary potential of species and ecosystems; and
- accommodating human use and occupancy within these constraints.

27. The same authors provide a helpful comparison of conventional fisheries management and ecosystem management, shown in Table 1 below.

Table 1: Comparison of fisheries and ecosystem management (Garcia et al. 2003).

Criteria		Fisheries management	Ecosystem management
Paradigm		Sector-based. Vertically integrated. Focusing on target resources and people.	Area-based. Holistic. Loosely cross-sectoral. Focusing on habitats and ecosystem integrity.
Governance	Objectives	Not always coherent or transparent. “Optimal” system output. Social peace.	A desired state of the ecosystem (health, integrity)
	Scientific input	Formalised (particularly in regional commissions). Variable impact.	Less formalised. Less operational. Often insufficient. Stronger role of advocacy science.
	Decision making	Most often top-down. Strongly influenced by industry lobbying. Growing role of environmental NGOs.	Highly variable. Often more participative. Strongly influenced by environmental lobbies. Stronger use of tribunals.
	Role of the media	Historically limited. Growing as fisheries crisis spreads.	Stronger use of the media.
	Regional and global institutions	Central role of FAO and regional fishery bodies	Central role of UNEP and the Regional Seas Conventions
Geographical basis		A process of overlapping and cascading subdivision of the oceans for allocation of resources and responsibilities.	A progressive consideration of larger-scale ecosystems for more comprehensive management; e.g. from specific areas to entire coastal zones and large marine ecosystems.
Stakeholder and political base		Narrow. Essentially fishery stakeholders. Progressively opening to other interests.	Much broader. Society-wide. Often with support from small-scale and recreational fishers.
Global instruments		1982 Law of the Sea Convention, UN Fish Stock Agreement, and FAO Code of Conduct.	Ramsar Convention, UN Conference on Environment and Development and 1992 Agenda 21, Convention on Biological Diversity and Jakarta Mandate.
Measures		Regulation of human activity inputs (gear, effort, capacity) or outputs (removals, quotas) and trade.	Protection of specified areas and habitats, including limitation or exclusion of extractive activities. Total or partial ban on some human activities.

28. The authors acknowledge that the table is somewhat simplistic in its approach, and that the comparison is complicated by the large variability observed in the application of these concepts, depending on the geographic area, the governance level (local, national, regional, global) and the institutions concerned. The authors argue that the future of the EAF (and of fisheries) will depend on the degree to which the fundamental concepts of fisheries management and ecosystem management succeed or fail in joining forces.

2.3. The ecosystem approach

29. The ecosystem approach is considered one of the most important principles of sustainable management. Essentially, the ecosystem approach requires taking into consideration the effects of human actions on every element of an ecosystem, based on the recognition that they are all linked. There are various definitions of what ecosystems actually are: one of the most useful is that of the US National Oceanic and Atmospheric Administration (NOAA), which states that *“An ecosystem is a geographically specified system of organisms, including humans, the environment, and the processes that control its dynamics”* (NOAA 2005).

30. Although it is common, and often useful, to apply the term “ecosystem” to particular entities, such as coral reef ecosystems or estuarine ecosystems, it must be realised that these are not isolated units. Ecosystems are linked to one another by biological and physical processes. In marine ecosystems, these linking processes include biological factors, such as migration and food chains, as well as physical ones, such as ocean currents and tides. Pursuing these linking factors, it becomes apparent that the entire planet can be regarded as an ecosystem, and is sometimes referred to as a biosphere. However, a more restricted view of an ecosystem, as the plants, animals and environment of a particular type of habitat, such as a coral reef, provides a more manageable entity for study and management.

31. The ecosystem approach has been defined or interpreted in a wide variety of ways, some of which are listed below.

- *“An approach to management that recognizes the complexity of ecosystems and the interconnections among component parts.”*
www.cos-soc.gc.ca/doc/im-gi/appendix2_e.asp
- *“A comprehensive and holistic approach to understanding and anticipating ecological change, assessing the full range of consequences, and developing appropriate management responses. The goal of the ecosystem approach is to restore and maintain the health, sustainability, and biological diversity of ecosystems while supporting sustainable economies and communities...A holistic approach that recognizes the interconnectedness of and addresses the linkages occurring among air, water, land, and living things.”*
www.great-lakes.net/humanhealth/about/words_e.html



- *“The ecosystem approach is commonly defined as ‘the comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity.’ The ecosystem approach is based on a multi-species framework, where emphasis is on long-term sustainability, integrating human activities and conservation of nature, including political, economic and social values, and should propose solutions which are socially acceptable. It is also important to recognise that it is human activities that we are able to manage, not ecosystems per se.”* www.helcom.fi/projects/on_going/details/ecoqo/en_GB/definitions/

32. The Sixth Conference of the Parties to the Convention on Biological Diversity (Nairobi, May 2000) defined the Ecosystem Approach in Decision V/6, Annex A, section 1 as, *“A strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way”*. The text of the decision goes on to say, *“Application of the ecosystem approach will help to reach a balance of conservation, sustainable use and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organization, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It recognises that humans, with their cultural diversity, are an integral component of many ecosystems.”* The full definition and supporting text, which is quite long, is shown at Appendix 1.

33. Ecosystems may occur at almost any scale *“from a drop of morning dew to an ocean... from a pebble to a planet”* (Lackey 1998). While mapping ecosystems is one of the prerequisites of their management, their geographical boundaries may be difficult to determine. The boundaries themselves depend on the scale being considered, and may never fully encompass all the relevant processes affecting the ecosystem in question.

2.4. The ecosystem approach to fisheries

34. The ecosystem approach as applied to fisheries has been discussed for several years, and there has been a progressive move towards its adoption as a key element of fisheries management. This became more formalised after the Reykjavik Conference on Sustainable Fisheries in the Marine Ecosystem, which took place in Iceland in 2001 (FAO 2001). In his opening statement to the Conference, the then Director General of the Food and Agriculture Organization of the United Nations (FAO), M. Jacques Diouf, stated: *“An ecosystem approach recognizes that man is part of the ecosystem and that taking food from a natural ecosystem carries with it clear obligations as well as rights. Moreover, in the long run, an ecosystem-based approach to management is likely to increase productivity of the oceans and thus increase the amount and quality of food production available to man in a sustainable manner. It also recognizes that we should limit, as far as possible, the harmful effects that human activities can have on the living ocean resources. The task at hand is to examine how to manage the fisheries with a view to ensuring sustainable utilization of the food available in the oceans for the benefit of present and future generations without harming the ecosystem’s capacity to support human life”* (FAO 2001).

35. The Reykjavik conference resulted in a declaration in which FAO member countries committed to the principles underlying an ecosystem approach, stating that *“in an effort to reinforce responsible and sustainable fisheries in the marine ecosystem, we will individually and collectively work on incorporating ecosystem considerations into that management.”* The declaration recognises the EAF as a governance framework that takes its conceptual principles and operational instruments from both conventional fisheries management and ecosystem management. The full text of the Reykjavik Declaration is provided in Appendix 2.

36. In discussing the evolution of the main concepts and terminology relating to this topic, Garcia et al. (2003) note that the expression “ecosystem approach to fisheries” (EAF) was adopted by the FAO Expert Consultation on Ecosystem-Based Fisheries Management (Reykjavik, 16–19 Sept 2002) for the following reasons:

- unwillingness by the Reykjavik Conference to use terminology that included the word *management*, because some countries took this to mean that the “ecosystem” would become the new “foundation” of fisheries management, and take precedence over socioeconomic and cultural considerations;
- the parallel that the term offers with the “precautionary approach to fisheries”; and
- not being narrowly limited to management, EAF can also cover development, planning, food safety, etc., thus matching the breadth of the FAO Code of Conduct for Responsible Fisheries.

37. The EAF is defined by (Ward et al. 2002) as “an extension of conventional fisheries management recognising more explicitly the interdependence between human well-being and ecosystem health and the need to maintain the productivity of ecosystems for present and future generations, e.g. conserving critical habitats, reducing pollution and degradation, minimising waste, and protecting endangered species.” The Reykjavik FAO Expert Consultation agreed that “the purpose of an ecosystem approach to fisheries is to plan, develop and manage fisheries in a manner that addresses the multiplicity of societal needs and desires, without jeopardising the options for future generations to benefit from a full range of goods and services provided by the marine ecosystem.” Therefore, “an ecosystem approach to fisheries strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries” (FAO 2002).

38. As noted earlier, “conventional” approaches to the management of commercial fisheries have generally focussed on maximising fishery yields or economic benefits from fish stocks made up of one or only a few species. However these objectives are often in conflict—maximising employment, for instance, calls for the highest sustainable fishing effort, whereas maximising fishery yields calls for lower effort levels, and maximising fishery profitability requires still lower levels. These conflicting goals result in the definition of a typical management “target zone” as shown in Figure 1a.

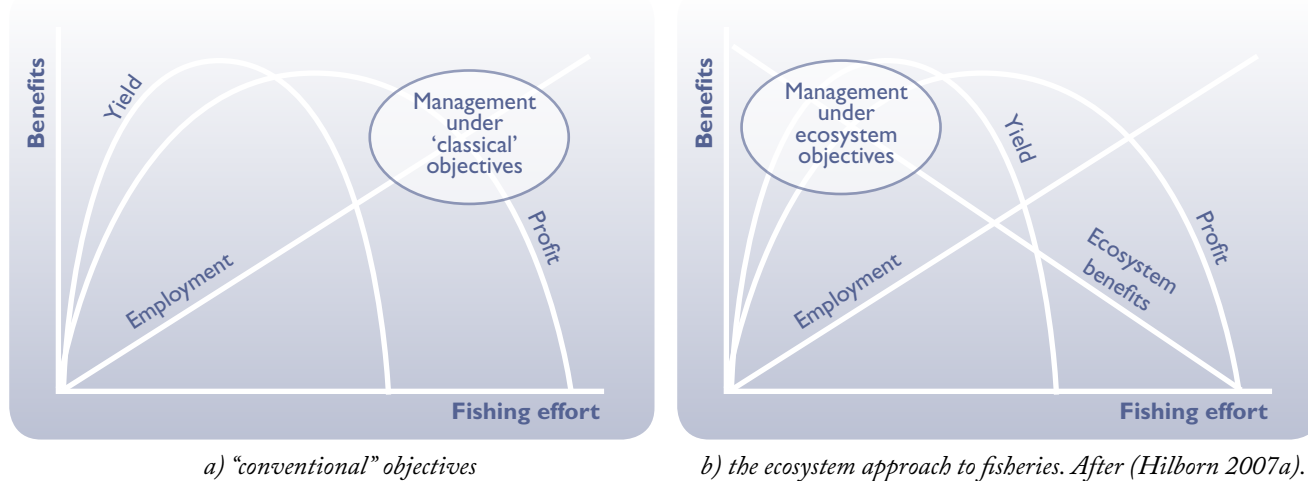


Figure 1: Fisheries management “target zones”

39. Maximising ecosystem benefits, however, necessitates only limited fishing mortality, implying that stocks should be maintained at close to unexploited levels. If ecosystem considerations are to be taken into account, the fisheries management “target zone” needs to move to the left of the graph, where fishing effort levels are lower (Figure 1b). Such a change would typically result in similar levels of fishery yield and higher levels of profitability, but lower levels of employment or participation in the fishery.

40. According to (Hilborn 2007b), “The divide between ecologists and fisheries scientists is spelled out in these objectives. Ecological training places a high value on intact ecosystems, which leads to the push by ecologists for marine protected areas. The fisheries community has traditionally been legislated to use MSY as an objective, while political pressure has often pushed fishing efforts even higher to preserve and create jobs and maintain fishing communities.”

2.5. What the EAF actually is

41. In practice, the EAF amounts to introducing a series of modifications to conventional fisheries management and governance in order to improve its poor performance (Sutinen and Soboi 2003). The EAF is a system for improving on conventional fisheries management, which typically has focussed on maximising or optimising some aspect of fishery productivity, often by considering only single species or small groups of species. The EAF specifically recognises that fisheries are not distinct from an ecosystem, but are an integral part of it: extraction of target and non-target species may result in changed biological interactions, use of certain gear types may cause habitat change, discharge of wastes and contaminants from fishing operations may cause pollution-induced changes, etc., all of which may have long-term environmental consequences. Conversely, pollution from land-based sources, changing land-use practices or climate change may have environmental consequences that impact on fisheries.

42. The EAF thus attempts to take a broader view than conventional fisheries management approaches, in which fisheries have generally been viewed independently from wider environmental or ecosystem-scale developments. The EAF recognises the broader economic and social interests of stakeholders, and involves the setting of economic and social goals based on a comprehensive consideration of ecological values and constraints. This in turn requires a greater stakeholder base, increased participation, and improved linkages of fisheries management with coastal planning and management activities.

43. Various international agreements, and especially the FAO CCRF, contain a large number of principles and conceptual objectives relevant to the EAF. While the CCRF does not specifically mention the EAF, it offers a synthesis of the requirements of all the major international fisheries instruments and provides conceptual and institutional bases for a range of EAF-compliant measures and processes, including:

- ecosystem and habitat protection;
- accounting for environmental factors and natural variability;
- reducing impacts of fishing and other activities;
- biodiversity conservation;
- multi-species management;
- protection of endangered species;
- accounting for relationships between populations;
- reducing land-based impacts and pollution;
- integration of fisheries into coastal area management;
- elimination of ghost fishing;
- reduction of waste and discards;
- applying the precautionary approach;
- delimitation of ecosystem boundaries and jurisdictions;
- institutional and governance frameworks.



44. These measures and processes need to be “operationalised” (i.e. translated into more operational objectives relevant to a given fishery or ecosystem) before specific targets, limits and measures can be developed. Additional specifications will be required in most cases, adapting EAF principles to local conditions, developing consensus among stakeholders and resolving possible conflicts between them in order to arrive at an EAF implementation strategy and management plan for a specific subsector or fishery.

2.6. Operationalising the EAF

45. One major difficulty in defining the EAF lies in turning all available concepts and principles into operational objectives from which an EAF management plan can be developed. Francis et al. (2007) described the EAF in terms of a paradigm shift from the traditional single-species mindset to a broadened approach that could be facilitated using “ten commandments” focusing on principles of adaptation, questioning assumptions, understanding population and habitat structures, maintaining resilience and food web connections and encouraging integrated interdisciplinary approaches. The ten commandments, which are seen as bridging the gap between general principles and specific actions, are:

1. Keep a perspective that is holistic, risk-averse, and adaptive;
2. Question key assumptions, no matter how basic;
3. Maintain old-growth age structure in fish populations;
4. Characterise and maintain the natural spatial structure of fish stocks;
5. Characterise and maintain viable fish habitats;
6. Characterise and maintain ecosystem resilience;
7. Identify and maintain critical food web connections;
8. Account for ecosystem change through time;
9. Account for evolutionary change caused by fishing;
10. Implement an approach that is integrated, interdisciplinary, and inclusive.

46. Garcia et al. (2003) state that the general aim of introducing the EAF is to improve the performance of fisheries management in relation to both human and ecological well-being. In order to do so, the best practices of conventional fisheries management (e.g. control on fishing capacity) need to be more effectively implemented, and new ecosystem-based considerations need to be introduced. Suggested approaches or measures, depending on circumstances, include the following.

Improving conventional fisheries management:

- limiting fishing pressure to ensure sufficient survival until spawning age;
- directly protecting spawning aggregations from directed fishing;
- controlling fishing through effective enforcement of mesh-size regulations, bycatch limitations, minimum size limits, prohibiting trade of larval or juvenile fish, zoning to protect growing areas;
- prohibiting destructive fishing practices;

- ensuring availability of food for growth to adulthood (through protecting stocks of prey);
- reducing bycatch and improving its survival through gear and other regulations;
- adopting reactive (adaptive) management schemes;
- introducing rights-based management.

Ecosystem-based considerations:

- integrating fisheries into coastal area management plans;
- actively campaigning against land-based pollution (in the context of integrated coastal area management);
- developing preventative measures to combat habitat degradation;
- establishing habitat reserves or marine protected areas (MPAs);
- rebuilding of depleted populations through restocking and introduction of artificial habitats (which assumes reduction of over-capacity);
- protecting endangered species.

47. As can be seen, there is a wide range of ways that the EAF can be implemented and will vary depending on the fishery/ecosystem concerned and local economic and other circumstances. In general terms, in the Pacific Islands, key elements of the EAF may include scaling back over-ambitious expectations of how much fish a given area can produce; applying the precautionary approach; using limits rather than target reference points (that is, setting limits on how much can be fished, rather than catch targets to be achieved); and setting aside reserves or managed areas to improve ecosystem resilience against long-term cyclic changes and external shocks; FAO has produced a set of technical guidelines (FAO 2003) as well as a more simplified abridged version (FAO 2005), both of which provide detailed advice on adapting the EAF approach to different conditions and circumstances.

2.7. EAF and integrated coastal management

48. Fisheries may have negative impacts on ecosystems and the environment. Trawling and dredging are known to have caused significant and permanent habitat changes in some areas, affecting the species composition of the ecosystem and the structure of abiotic elements. Fisheries that take large quantities of bycatch can alter the structure of the ecosystem. Discarding unwanted catch or processing waste can alter the food supply within the ecosystem, favouring certain species and again causing species shifts. Gear loss or discard can lead to ghost fishing and entanglement of non-target species, as also can garbage disposal from fishing vessels. Oil, bilge and other forms of pollution from fishing vessels can contaminate coastal waters and affect the viability of other sectors, particularly tourism. By and large, however, these are impacts of large-scale commercial or industrial fishing operations, or of artisanal activities in areas of very high coastal population density. In the Pacific Islands region, the main victims of irresponsible or unsustainable inshore fishing activities—which may include destructive fishing practices such as coral breakage, mangrove deforestation, fishing with *Derris* root and other poisons, and blast fishing—are not other sectors of the economy, or the public at large, but the fishers themselves.

49. On the other hand non-fishing activities, whether coastal or continental, may have major impacts on aquatic ecosystems through contamination, habitat modification and alteration of freshwater inflows (FAO 1995b). Examples in the Pacific Islands are widespread and include coastal development such as housing and road-building, destruction of coastal mangroves, disposal of sewage into coastal waters, runoff from coastal plantations and farming, sand and coral-mining for construction, pollution from industry and shipping, leaching from garbage dumps on the coast, construction of seawalls and a host of other usually shore-based activities. Waste from pig farms along the coast is an issue in some Polynesian countries.

50. The relevance to the EAF stems from the fact that most of these impacts will threaten fisheries sustainability, either reducing resource productivity, stability or resilience to fishing, or reducing the quality of the fish as food through contamination. Non-fishery impacts on resource abundance result in a reduction of fishery resources available to resource users and consumers. While they may not be perceived as such by the fisheries sector, this represents a *de facto* forced, non-negotiated, non-transparent and potentially non-sustainable allocation of aquatic space and resources to non-fishing activities, sometimes located far inshore (e.g. distant sources of riverine pollution) (Garcia et al. 2003). The EAF requires that this problem be dealt with in a balanced and transparent way.

51. Integrated coastal management (ICM) (also variously referred to as coastal zone management, integrated coastal zone management, coastal area management, and integrated coastal area management) attempts to resolve some of these issues by promoting greater collaboration among government agencies and private interests involved in the wide range of activities that take place in the coastal zone (which in the case of many PICTs comprises the whole country, or a large part of it) and establishing institutional arrangements that allow dialogue and consensus-building among stakeholders who may have opposing views and interests.

52. ICM has a very mixed history worldwide. Large numbers of agencies are involved in a wide range of activities at the land-water interface. In the majority of cases the challenges of improving inter-agency collaboration and resolving conflicts among stakeholders have proven too great and ICM arrangements have not been sustained. For the EAF to be successful, however, there will need to be a renewed focus on overcoming these challenges so that the negative impacts that other sectors have on fisheries and marine resources are addressed and overcome.

2.8. Impediments to implementing the EAF

53. The impediments to the EAF can be considerable, and include a lack of clear or agreed definitions, knowledge of what the EAF entails, or how to proceed (Marasco et al. 2007). Experience in EAF implementation is still quite limited but some issues, such as added complexity, insufficient capacity, slow implementation, need for a pragmatic approach, etc. are already evident. (Garcia et al. 2003) note that implementation remains the “acid test” for any approach to management, including the EAF, which faces and needs to resolve a number of difficulties, many of which are already hampering the effectiveness of more conventional fisheries management. These include:

- lack of information;
- lack of scientific assessment;
- non-matching of ecosystem and jurisdictional boundaries;
- insufficient appreciation of the role of protected areas;
- unclear or conflicting objectives;
- lack of consensus about eco-labelling;

- insufficient collaboration between institutions in charge of fisheries and environmental management at national or regional levels;
- lack of integration of fisheries in coastal area management;
- need for more transparency and participation;
- lack of capacity for decentralisation;
- redefinition and strengthening of the role of science;
- relations between trade and the environment (and the role of the World Trade Organization); and
- the potentially large socioeconomic and political costs of transition.

A major issue is that the EAF is largely meant to be a response to the failure of conventional fishery management approaches to achieve the goal of sustainable resource use. But if those conventional fisheries management practices have largely failed, then the EAF, which may be technically and scientifically more demanding, may suffer similar failures. A recent review of the application of maximum sustainable yield (MSY) as a fisheries management tool noted that *“The case studies have shown that MSY is either not estimated, or where states are supplied with MSY-based recommended catch limits, these recommendations are not followed. Furthermore, although EAF has not been a focus of this study, it is apparent that if the case-study states are struggling with the application of MSY to a single species, there is not much hope for them to assess fisheries within an ecosystem context.”* (Lugten and Andrew 2008).

54. A further issue is that the EAF, at least in the way that it is presented in current literature, is highly science-based. It requires study and knowledge of all the various components of the ecosystem that we are trying to manage, and integration of this information into the planning process. Quite apart from the cost and difficulty to PICTs of carrying out ecosystem research and acquiring the necessary information, the reality is that the processes for integrating scientific information into decision-making are quite weak in the Pacific. Many PICTs do not have a strong history of integrating science into the management decision-making process. Morrison and Kaly (2008) provide three examples where scientific data were available and could have been used to mitigate severe coastal degradation in PICTs, but were not taken into account because of the lack of appropriate institutional mechanisms and processes. The EAF thus presents the significant risk that an inordinate amount of effort is spent on describing and analysing the scientific dimensions of management problems but fails to bring about a lasting improvement in institutional and human capacities and performances that are needed for effective management (Martosubroto and Willmann 2003).

55. In the Pacific Islands, however, there may be another way. Johannes (1998) has argued convincingly that data-less management of small-scale Pacific Island fisheries is often feasible and in many cases probably the only option, given the cost and impracticality of collecting useful data in many locations. Data-less or data-limited approaches may be the most appropriate for small fisheries or areas managed under CBM or traditional arrangements, where technical skills are limited and management decisions can be made based on relatively simple indicators (such as catch rates) rather than detailed monitoring. This issue is discussed in more detail in the second volume of the present report, *“The Ecosystem Approach to Coastal Fisheries and Aquaculture in Pacific Island Countries and Territories—Part 2: Principles and approaches for strategic implementation”*.

56. As noted in the preceding section, an important aspect of the EAF in the Pacific Islands context will be a renewed focus on integrated coastal management, because of the multiple upstream effects that other (mostly land-based) activities have on fisheries and marine resources. Successful ICM arrangements to date are very limited, although there are promising signs that some PICTs are now making progress in this area.

3. INTERNATIONAL AND REGIONAL COMMITMENTS TO THE EAF

57. This section summarises the main international fora through which the countries of the world, including PICTs, have voiced a commitment to the EAF.

3.1. World Summit on Sustainable Development

58. The World Summit on Sustainable Development (WSSD), held in Johannesburg in 2002, led to the formulation of a Plan of Implementation, which contains numerous references to the sustainable development and management of coastal areas and resources (United Nations 2003). For the purposes of the present study, paragraph 30d is highly relevant, stating as it does that *“Ensuring the sustainable development of the oceans requires effective coordination and cooperation, including at the global and regional levels, between relevant bodies, and actions at all levels to...encourage the application by 2010 of the ecosystem approach, noting the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem, and Decision V/6 of the Convention on Biological Diversity.”*

59. This is one of about 30 direct references to fisheries management, and a similar number of indirect references, contained in the WSSD Plan of Implementation, including:

- Promote integrated, multidisciplinary and multi-sectoral coastal and ocean management at the national level and encourage and assist coastal States in developing ocean policies and mechanisms on integrated coastal management (30e);
- Maintain or restore (fish) stocks to levels that can produce the maximum sustainable yield with the aim of achieving these goals for depleted stocks on an urgent basis and where possible not later than 2015 (31a);
- Implement the 1995 Code of Conduct for Responsible Fisheries, taking note of the special requirements of developing countries as noted in its article 5, and the relevant international plans of action and technical guidelines of the Food and Agriculture Organization of the United Nations (31c);
- Support the sustainable development of aquaculture, including small-scale aquaculture, given its growing importance for food security and economic development (31h);
- Maintain the productivity and biodiversity of important and vulnerable marine and coastal areas, including in areas within and beyond national jurisdiction (32a);
- Develop and facilitate the use of diverse approaches and tools, including the ecosystem approach, the elimination of destructive fishing practices, the establishment of MPAs consistent with international law and based on scientific information, including representative networks by 2012 and time/area closures for the protection of nursery grounds and periods, proper coastal land use and watershed planning and the integration of marine and coastal areas management into key sectors (32c);
- Develop national, regional and international programmes for halting the loss of marine biodiversity, including in coral reefs and wetlands (32d);
- Accelerate the development of measures to address invasive alien species in ballast water (34b);
- Promote the effective participation of indigenous and local communities in decision- and policy-making concerning the use of their traditional knowledge (44l).

60. The directions provided by the Plan of Implementation are not always entirely consistent with each other. For example, paragraph 31a, which encourages nations to restore fish stocks to levels that can produce MSY, and paragraph 31h, which encourages the further development of small-scale fisheries and aquaculture, may in some cases be inconsistent with the EAF.

61. The WSSD and its outputs form part of a guiding process for the United Nations and its organisations, as well as for UN member countries. The WSSD did not lead to a formal treaty or declaration for countries to ratify on an individual basis, but rather was adopted by the UN through Decision 59/227 of its General Assembly no 59 in February 2005. Through its articles 3 and 4 the Decision:

- *calls upon* governments, all relevant international and regional organizations, the Economic and Social Council, the United Nations funds and programmes, the regional commissions and specialized agencies, the international financial institutions, the Global Environment Facility and other intergovernmental organizations, in accordance with their respective mandates, as well as major groups, to take action to ensure the effective implementation of and follow-up to the commitments, programmes and time-bound targets adopted at the World Summit on Sustainable Development, and encourages them to report on concrete progress in that regard; and
- *calls for* the implementation of the commitments, programmes and time-bound targets adopted at the Summit and, to that end, for the fulfilment of the provisions relating to the means of implementation, as contained in the Johannesburg Plan of Implementation.

62. The provisions of the WSSD therefore represent principles or guidelines that have been adopted by the UN and its member countries, rather than legally binding requirements. In this sense, the WSSD goal of implementing the EAF by 2010 is something that PICTs aspire to do, but is not enforced by any legal obligation.

63. Extracts from the WSSD relevant to sustainable fisheries management and the EAF are given in Appendix 3.

3.2. Other international instruments

64. Most of the principles and conceptual elements of the EAF are already contained in a range of binding or voluntary agreements, conventions (global or regional), and codes, which are of direct or indirect relevance to fisheries. These instruments range from the 1982 UN Convention on the Law of the Sea (UNCLOS) to the 1995 FAO Code of Conduct For Responsible Fisheries (CCRF), and from the 1971 Ramsar Convention on Wetlands of International Importance to the 1992 United Nations Conventions on Environment and Development (UNCED) and on Biological Diversity (CBD), including the 1995 Jakarta Mandate on Marine and Coastal Biological Diversity. FAO's Committee on Fisheries formally endorsed the EAF in early 2003. Appendix 4 provides a select list of treaties, conventions and other instruments relevant to the EAF in PICTs. A number of these instruments give more attention to the ecosystem, and in many cases have a stronger legal basis than the WSSD.

3.3. Pacific Islands Regional Ocean Policy

65. The Council of Regional Organisations in the Pacific (CROP) is an ad-hoc committee that comprises the heads of several Pacific Island intergovernmental organisations. CROP members are:

- Pacific Islands Forum Secretariat (Chair);
- Pacific Islands Forum Fisheries Agency;
- Secretariat of the Pacific Community;

- Secretariat of the Pacific Regional Environment Programme;
- Pacific Islands Applied Geoscience Commission;
- South Pacific Tourism Organisation;
- University of the South Pacific; and
- Pacific Islands Development Programme.

66. The Fiji School of Medicine and the South Pacific Board for Educational Assessment are CROP observers.

67. CROP was established as a formal mechanism to improve cooperation and coordination among the various regional intergovernmental organisations in the Pacific. It aims to facilitate a more cost-effective use of resources, and minimise the potential for negative duplication and overlaps in regional programming. It also encourages closer collaboration between CROP organisations in trying to achieve their mutual goal of promoting sustainable development in the region. Its purpose, according to its charter, is to discuss and coordinate the work programmes and policies of the different regional agencies in order to avoid either duplication or gaps in the provision of services to member countries.

68. One of CROP's functions is the establishment of working groups to conduct in-depth sectoral analysis of development issues from the regional perspective, and provide recommendations for addressing important policy and operational issues in the various sectors. These CROP working groups are not permanent structures, but are established to address particular issues. Once this is accomplished, the relevant working group ceases to operate.

69. The Marine Sector Working Group is coordinating efforts to implement the Pacific Islands Regional Ocean Policy (PIROP). PIROP was approved by Pacific Island leaders in 2002, and underscores the importance of the ocean to Pacific Island nations and communities. PIROP serves to unify a number of existing regional initiatives that address issues relevant to management and development of ocean and coastal resources and environments.

70. PIROP stems from *"a regional effort to achieve responsible ocean governance."* The vision of the region's leaders, as embodied in the policy, is a *"healthy ocean that sustains the livelihoods and aspirations of Pacific Island communities"*. PIROP's goal is to ensure the future sustainable use of the ocean and its resources by both Pacific Island communities and their external partners. PIROP views the ocean broadly, defining it *"to include the waters of the ocean, the living and non-living elements within, the seabed beneath and the ocean-atmosphere and ocean-island interfaces."*

71. Although PIROP does not specifically mention the ecosystem approach, its principles are entirely consistent with the EAF, and include:

- Improving our understanding of the ocean;
- Sustainably developing and managing the use of ocean resources;
- Maintaining the health of the ocean;
- Promoting the peaceful use of the ocean;
- Creating partnerships and promoting cooperation.

72. The relationship between PIROP's vision, goal and principles is shown in Figure 2.

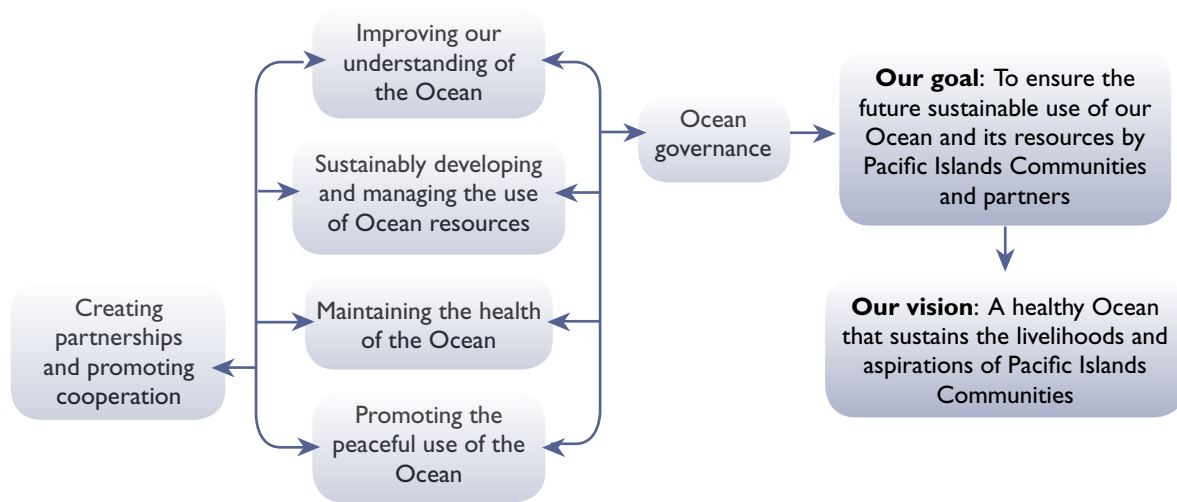


Figure 2: Pacific Islands Regional Ocean Framework for Integrated Strategic Action.

73. Twenty-two PICTs were involved in the development of the PIROP, and have agreed to work together to implement it through the Pacific Islands Regional Ocean Framework for Integrated Strategic Action. The policy contains guiding principles that are central to the goal of sustainable use of ocean resources, and these principles provide the framework that guides the policy's implementation. Each principle is associated with a number of initiatives and actions. Some of the actions relevant to implementation of the EAF are:

- 3.1.1 Promote the adoption of a precautionary approach to management of ocean resources;
- 3.1.2 Strengthen processes that support integrated or ecosystems-based management, and assist PICTs in developing capacity to undertake integrated management that is responsive to local conditions;
- 3.1.3 Identify and enhance mechanisms that promote the use of traditional knowledge in management, policy and decision-making;
- 3.1.4 Build capacity to undertake environmental and socioeconomic assessment and monitoring of the impacts of policy and development initiatives;
- 3.1.5 Incorporate impact assessment into decision making (through environmental and socioeconomic impact assessments or similar mechanisms);
- 3.1.6 Adopt and implement Codes of Best Practices for activities (e.g. tourism, shipping, fishing) impacting on marine resources resource management;
- 3.1.7 Promote community-initiated resource management activities and empower local communities and stakeholders to undertake resource management;
- 3.1.8 Sustainably develop and manage inshore marine resources within an integrated coastal management framework;
- 3.1.9 Assist PICTs to develop integrated management plans and strategies for inshore areas.

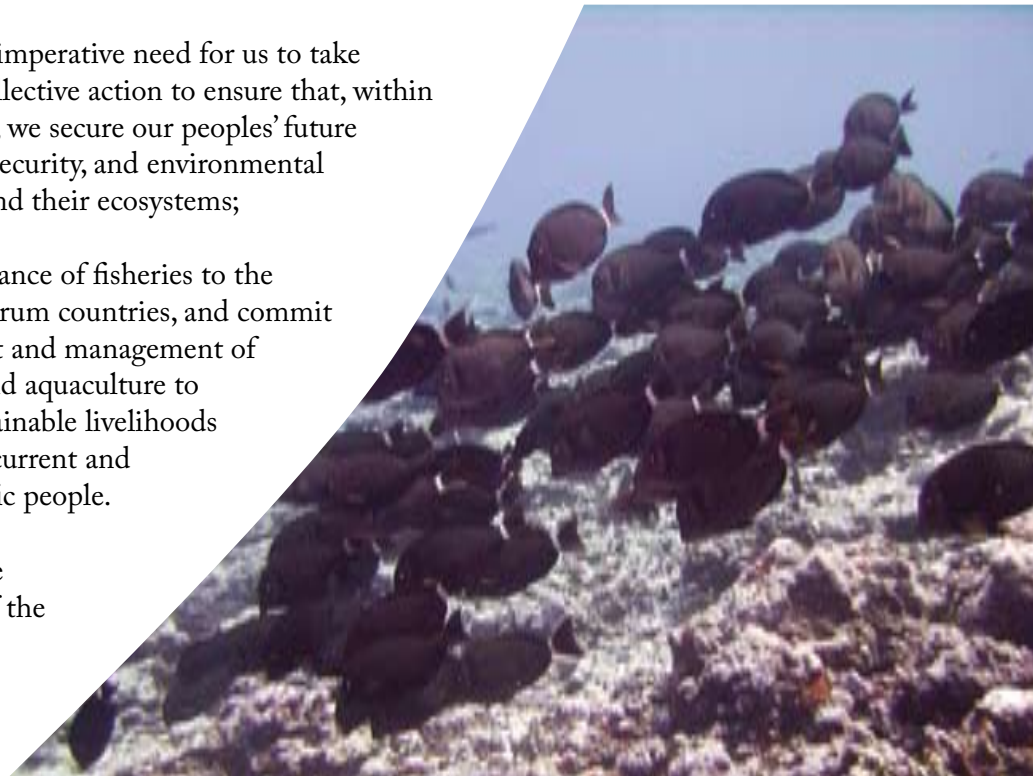
74. While PIROP does not explicitly refer to the ecosystems approach, its implementation plan prescribes actions and requirements that are very clearly in line with the EAF, and these principles have been formally adopted by all PICTs.

3.4. 38th Forum Communiqué and Vava'u Declaration (Our Fish, Our Future)

75. The 38th Pacific Islands Forum was held in Tonga from 16–17 October 2007 and was attended by Heads of State and Government of Forum member countries and observers¹. Following the Forum Retreat, held at Vava'u, the Forum Leaders released the Forum Communiqué and the Vava'u Declaration (entitled “Our Fish, Our Future”), which forms Annex B of the communiqué. The communiqué emphasises the importance of the region’s fishery resources, and reaffirms existing commitments to their sustainable development and management. While much of the communiqué focussed on oceanic fisheries, Forum Leaders agreed to an amendment of the Pacific Plan, through which they expressed themselves as “committed to the development and management of coastal/ inshore fisheries and aquaculture to support food security, sustainable livelihoods and economic growth for current and future generations of Pacific people.” Similarly the Vava'u Declaration, while emphasising economic growth and development, recognises the need for sustainability and an ecosystem approach to fisheries in the following terms:

- recognising that our regional fisheries resources remain a key driver for sustainable economic growth in the region, especially for small island states, and that they must as a consequence be supported by responsible and effective stewardship;
- recalling the commitment by leaders under the Pacific Plan to maximise sustainable returns from fisheries by developing an ecosystem based fisheries management planning framework; encouraging effective fisheries development, including value-adding activities; and collaboration to ensure legislation and access frameworks are harmonised;
- also recognising the aspirations of Pacific Islands countries to strengthen their engagement in sustainable fisheries and to maximise the flow on benefits from both domestic fisheries and foreign fishing operations in the region;
- conscious therefore of the imperative need for us to take immediate and decisive collective action to ensure that, within the next three to five years, we secure our peoples’ future livelihoods, regional food security, and environmental sustainability of our seas and their ecosystems;
- hereby reaffirm the importance of fisheries to the economies of all Pacific Forum countries, and commit ourselves to...development and management of coastal/inshore fisheries and aquaculture to support food security, sustainable livelihoods and economic growth for current and future generations of Pacific people.

76. Relevant excerpts from the communiqué, and the full text of the Vava'u Declaration, are shown in Appendix 5.



¹ Forum member countries are Australia, Cook Islands, Federated States of Micronesia, Fiji, Nauru, New Zealand, Niue, Papua New Guinea, Samoa, Tonga, Tuvalu and Vanuatu, Kiribati, Palau, Marshall Islands and Solomon Islands. New Caledonia, French Polynesia attended the formal session as Associate Members and Tokelau, and Wallis and Futuna as observers.

4. FINDINGS OF THE SPC EAF QUESTIONNAIRE SURVEY

77. In September 2007, prior to the commencement of the present study, SPC Coastal Fisheries Programme (CFP) circulated a questionnaire on the EAF (see Appendix 6) to relevant government agencies (national or provincial fisheries and/or environment departments) in its member countries and territories. Twenty-four responses were received from 21 PICTs. For most countries a single response was received from the national fisheries agency. For Kiribati, separate responses were received from the fisheries and environment ministries, while three responses (representing the Northern, Southern and Islands provinces) were received from New Caledonia.

78. The survey provided information on the progress that PICTs have made in implementing the EAF. Many PICTs already have at least some fisheries management measures in place that are considered to be largely compliant or consistent with the EAF, including:

- inter-sectoral committees that coordinate coastal management issues. In some cases these are formal structures that are legally mandated to report to government. In others, they are largely voluntary working arrangements put in place by concerned government officers;
- increasing numbers of MPAs or MMAs where fishing access is restricted to a limited group of rights-holders, there is a focus on not disturbing ecosystems excessively, and the needs of different user groups are taken into consideration;
- a growing number of community-based management (CBM) arrangements, of varying types with different purposes, and with a range of legal foundations and powers;
- national development strategies, sector strategies, fishery management plans and or coastal area management plans.

79. Few PICTs have put these in place because of any officially-stated commitment to EAF—the connection with the EAF is largely coincidental. Few if any PICTs have high-level instruments (laws, policies or formal processes) that officially recognise and adopt the EAF or require its implementation. In addition, there are questions in many cases about the practical effectiveness of fishery management measures that may exist mainly as legal texts but which are widely unknown to, or ignored by, the general public.

80. The SPC questionnaire consisted of six free-form text questions. Answers to these contained only limited quantitative data, which made it difficult to use the questionnaire responses to produce summaries or identify important themes. In addition, some of the questionnaire responses were unclear or difficult to understand and a good deal of interpretation was required.

81. In order to assist with the analysis, a simple database was constructed and the questionnaire information entered into it. This allowed the production of summary tables for each question, which permitted the further categorisation, ranking and analysis of common ideas. Responses to each of the questions posed in the questionnaire are summarised in the following sections.

4.1. Government departments and coastal resource management

82. Question 1 of the SPC questionnaire was: *Please list all government departments and local authorities in your country or territory that have responsibilities that involve coastal fisheries or other coastal marine-related activities or issues (include any with responsibilities or activities that affect the coastal marine environment).* In total, 306 agencies were identified as being involved in the sector, and 238 as having legal mandates in coastal fisheries or other relevant areas.

Table 2: List of government departments with responsibilities and/or a legal mandate in coastal fisheries or other marine-related activities.

Government Department	Involved					Legally mandated				
	Yes	Part	Not sure	No	N/A	Yes	Part	Not sure	No	N/A
National Fisheries Dept	21					20				
National Environment/Conservation Dept	20			2		18				
Police Dept	17			3		15			1	
Quarantine	17			3		16			2	
Ports & Marine Authority	15			5	1	14			2	
Customs & Excise Dept	14			4		13			3	
Tourism Dept	13			6		10			2	
Agriculture Dept	13			5		13			3	
Health Dept	12			6		11			2	
Govt Training Facility (Fisheries/Marine)	11			4	1	10			1	
Provincial/State/Local Environment/Conservation	11			3	2	9			2	
Provincial/State/Local Fisheries	10			4	3	9			3	
Traditional "Marine Species Management" Authority	10		1	3	2	9		1	2	
Lands/Mineral Resources Dept	10			5	1	9			1	
Island Council/Other General Local Govt	9	1		5	2	9	1		1	
Military	7			4	3	7				2
Local NGOs	2					2				
Local Community	1					1				
Ministère chargé de l'Environnement, FP	1					1				
Local Fishers' Association	1					1				
Natural Resources Conservation service	1					1				
Planning	1					1				
Dept Commerce	1					1				
Investment Authority	1					1				
Ministère chargé de la Perliculture, FP	1					1				
Taupulega (Local Authorities) Tokelau	1					1				
Ministère chargé de la pêche et de l'aquaculture, FP	1					1				
Service de la Perliculture, FP	1					1				
Ministère chargé de l'équipement, de l'aménagement et de l'urbanisme, FP	1					1				
Ministry of Works, Infrastructure & Transport	1					1				
Village Councils	1					1				
Ministre coutumier de la pêche (Uluimonua), Wallis & Futuna	1					1				
Total responses	227	1	1	62	15	209	1	1	25	2

Values show the frequency of each type of response given across all questionnaires for each of the generic government department types. In some cases the government department type did not fit into an existing category and is listed separately. (NGOs were also sometimes recorded in responses to this question.)

83. As might be expected, the government departments most often involved and legally mandated in regard to coastal fisheries and marine-related activities were national fisheries and environment departments. A second tier was formed by countries' main policing bodies (police, quarantine, ports and marine, and customs). In general, provincial and lower levels of government were less often involved and mandated. All countries, however, have a multiplicity of agencies (average 10.5) with responsibilities, legal or informal, in regard to coastal fisheries and the inshore marine environment.

4.2. IGO and NGO coastal and marine project activity

84. Question 2 of the questionnaire was: *What inter-governmental organisations (IGOs) and non-governmental organisations (NGOs) are based, or have carried out projects in the last 5 years, in your country/territory on coastal fisheries or coastal marine-related activities or issues?*

85. IGO and NGO activity in countries was highly variable in terms of being based in-country and in terms of projects undertaken over the past five years (Tables 3–5).

Table 3: Relative IGO and NGO activity in responding countries and territories based on the presence of projects undertaken over the last five years.

	RMI	Solomons	Kiribati	Cook Islands	FSM	Tonga	French Polynesia	Palau	Samoa	Marianas	Nauru	New Caledonia	Tuvalu	Wallis & Futuna	Fiji	Niue	PNG	Guam	Tokelau	Vanuatu	
ACIAR						*															
AICEM	*																				
AusAid						*															
Canada SPOD II											*										
CCS					*																
CI		*	*	*								*					*				
CIANGO				*																	
Cousteau Foundation							*														
CRISP														*							
CSP					*																
ECANSI		*																			
FAO	*	*	*	*	*	*		*			*										
FFA									*												
FSPI		*	*			*							*								*
FSPK			*																		
GCRMN													*								
GEF						*		*													
Greenpeace		*	*																		
ICDF	*																				
IFRECOR														*							
Ipukarea Taporoporo				*																	
IRD														*							
IUCN							*														
IWP, SPREP				*												*					
JICA	*				*	*			*												
KCSO					*																
Mariana Is. Nature Alliance										*											
Matuaileoo									*												
New England Aquarium			*																		
NMFS	*																				
OFCF	*				*																



	RMI	Solomons	Kiribati	Cook Islands	FSM	Tonga	French Polynesia	Palau	Samoa	Marianas	Nauru	New Caledonia	Tuvalu	Wallis & Futuna	Fiji	Niue	PNG	Guam	Tokelau	Vanuatu	
Palau Conservation Society								*													
PGEM, Moorea							*														
RMC's					*																
RMI Conservation Society	*																				
RMI National Resource Assessment Surveys	*																				
RNHP	*																				
SIDT		*																			
SOPAC	*	*	*	*	*	*		*					*		*						
SPC									*		*		*			*					
SPREP	*	*	*	*	*	*	*	*	*	*	*									*	
TCA Takitumu Conservation Area				*																	
TDA		*																			
TDF		*																			
Te Honu Tea							*														
Te Mana o te Mana							*														
TNC	*	*		*	*			*		*							*	*			
UNC												*									
UNDP-GEF/SGP									*												
USCRTF	*																				
WCPFC	*	*	*	*				*		*	*										
WorldFish Center		*										*									
WPRFMC										*											
WUTMI	*																				
WWF		*		*		*	*					*	*		*						
YAPCAP					*																
NGO's with project last 5 years	15	14	12	11	11	9	7	7	6	5	5	5	5	3	2	2	2	1	1	1	1

See Table 5 for a listing and explanation of acronyms.

86. The countries reporting the most IGO and NGO activity in the areas of coastal fisheries and marine-related activities were Marshall Islands, Solomon Islands and Kiribati. Guam, Tokelau and Vanuatu each reported the activities of only one NGO in their country over the past five years. In total, 64 agencies were identified, some with activities in multiple countries (Tables 5–7). The most active were the World Wide Fund for Nature (WWF) and the South Pacific Regional Environment Programme (SPREP).

Table 4: Summary of IGO and NGO activity in responding countries

	Based in country		Projects last 5 years	
	Yes	No	Yes	No
FSPI	7	12	5	9
SPREP	7	10	7	8
WWF	9	7	8	6
SOPAC	5	10	5	7
FAO	6	9	5	6
TNC	5	10	5	7
WCPFC	5	9	5	6
CI	5	8	4	7
Green Peace	4	9	4	7
WorldFish Center	3	8	3	6
JICA	4	1	3	1
SPC	3	1	3	1
IRD	1	1	1	1
OFCE	2		2	
FFA	1	1	1	
GEF	1	1	1	1
IWP, SPREP	1	1	1	1
Siosiomaga Society	1			
AusAid		1		1
VANGO	1			
FSP Vanuatu	1			
RMI Conservation Society	1		1	
Canada SPOD II	1		1	
UNC	1		1	
FSPK	1		1	
NIWA	1			
GCRMN	1		1	
PGEM, Moorea	1		1	
Environmental Protection Association	1			
RNHP		1		1
CCS	1		1	
ECANSI	1		1	
ICDF	1		1	
University of French Polynesia	1		1	

	Based in country		Projects last 5 years	
	Yes	No	Yes	No
IFRECOR	1		1	
CRISP		1		1
IFREMER	1		1	
NMFS		1		1
Ipukarea Taporoporo	1		1	
Palau Conservation Society	1		1	
Fa'asao Savaii Society	1			
RMC's	1		1	
IUCN		1		1
RMI National Resource Assessment Surveys	1		1	
Cousteau Foundation		1		1
SIDT	1		1	
TCA Takitumu Conservation Area	1		1	
CIMRIS	1			
CSP	1		1	
Fishers Groups	1			
TLMP Takitumu Lagoon Management Project	1			
TDA	1		1	
TDF	1		1	
TeHonu Tea	1		1	
Temana o te Mana	1		1	
AICEM	1		1	
CRIOBE	1		1	
WPRFMC		1		1
UNDP-GEF/SGP	1		1	
CIANGO			1	
USCRTF		1		1
ACIAR		1		1
Wan Smol Bag Theatre	1			
NCAPN	1			
New England Aquarium		1		1
KCSO	1		1	
WUTMI	1		1	
Mariana Islands Nature alliance	1		1	
YAPCAP	1		1	
Matuaileoo	1		1	
Natural Heritage				
Grand total	112	108	95	84

Values are numbers of responses across all questionnaires and countries. See Table 5 for a listing and explanation of acronyms.

Table 5: List of IGOs and NGOs recorded in responses to Question 2.

Name	Type	Full name
ACIAR	IGO	Australian Centre for International Agricultural Research
AICEM	INGO	Australian International Centre for Environment Management
AusAID	Bilateral	Australian Aid
Canada SPOD II	Bilateral	Canada
CCS	LNGO	FSM
CI	INGO	Conservation International
CIANGO	LNGO	Cook Islands Association of Non-government Organisations
CIMRIS	Bilateral project	Cook Islands Marine Resources Institutional Strengthening—NZAID & AusAID
Cousteau Foundation	INGO	Cousteau Foundation
CRIOBE	???	???
CRISP	INGO	
CSP	LNGO	Conservation Society of Pohnpei, FSM
ECANSI	IGO	Solomon Is.
Environmental Protection Association	INGO	
Faasao Savaii Society	NGO	Faasao Savaii Society
FAO	IGO	Food & Agriculture Organisation of the United Nations
FFA	INGO	Forum Fisheries Agency
Fishers Groups	NGO	
FSP Vanuatu	LNGO	FSP Vanuatu
FSPI	INGO	Foundation of the Peoples of the South Pacific International
FSPK	NGO	Foundation of the Peoples of the South Pacific Kiribati
GCRMN	IGO	Global Coral Reef Monitoring Network
GEF	IGO	Global Environment Facility
Greenpeace	INGO	Greenpeace
ICDF	Bilateral	Taiwan
IFRECOR	Government	???
IFREMER	Government	Institut Francais pour la Recherche en Mer
Ipukarea Taporoporo	LNGO	Cook Islands
IRD	Government	Institut Pour la Recherche en Développement
IUCN	INGO	World Conservation Union
IWP, SPREP	INGO	International Waters Programme
JICA	Bilateral	Japan Aid
KCSO	LNGO	FSM

Name	type	Full name
Mariana Islands Nature Alliance	LNGO	Mariana Islands Nature Alliance
Matuaileoo	LNGO	Matuaileoo Environment Trust Incorporated
Natural Heritage	??	Cook Islands
NCAPN	LNGO	New Caledonian Association for the Protection of Nature
New England Aquarium	INGO	New England Aquarium, Boston
NIWA	Foreign agency	
NMFS	?? RMI/US	
OFCF	Bilateral	Japan
Palau Conservation Society	LNGO	Palau Conservation Society
PGEM, Moorrea	LNGO	Marine Spaces Management Plan Association of Moorea, French Polynesia
RMC's	LNGO	FSM
RMI Conservation Society	LNGO	Marshall Islands Conservation Society
RMI National Resource Assessment Surveys	?	RMI
RNHP	?? RMI	
SIDT	??	Solomon Is.
Siosiomaga Society	LNGO	Siosiomaga Society
SOPAC	IGO	South Pacific Applied Geoscience Commission
SPC	IGO	Secretariat of the Pacific Community
SPREP	IGO	Secretariat of the Pacific Regional Environment Programme
TCA Takitumu Conservation Area	??	Cook Islands
TDA	??	Solomon Is.
TDF	??	Solomon Is.
Te Honu Tea	LNGO	Te Honu Tea—Turtle protection, French Polynesia
Te mana o te Mana	LNGO	Te Mana o te Mana—Marine Environmental Protection, French Polynesia
TLMP Takitumu Lagoon Management Project	Project	Cook Islands
TNC	INGO	The Nature Conservancy
UNC	University	University of New Caledonia
UNDP-GEF/SGP	INGO	United Nations Development Programme, GEF/SGP
University of French Polynesia	University	University of French Polynesia
USCRTF	?? RMI/US	
VANGO	LNGO	Vanuatu Association of Non-government Organisations

Note that for some IGOs and NGOs listed, an explanation of the acronym used was not provided. In a few cases government bodies were mistakenly recorded as NGOs.

4.3. Stakeholder groups

87. Question 3 of the SPC questionnaire was: *Is there any national or local mechanism(s) or committee(s) or group(s) (formal or informal) in your country or territory that allows different stakeholders to collaborate on coastal fisheries or coastal marine-related activities or issues? If yes, what is the name of the group(s) or mechanism(s) and what stakeholders are involved (government department(s), NGO(s), IGO (s), communities, fishing companies, other stakeholders).*

88. Of the responding 21 countries and territories, 18 reported that they had in-country stakeholder groups that met and collaborated on issues relating to coastal fisheries or marine-related activities, as shown in Table 6. The largest numbers of groups were reported in New Caledonia and French Polynesia, but this may not be indicative of the real number as the question suggests a limit to information on four groups (see Appendix 5 for the full form of the question). Respondents from American Samoa, Papua New Guinea (PNG) and Tokelau reported the absence of groups concerned with coastal fisheries and marine-related activities.

89. Membership of the groups varied greatly, with some including representatives of government departments, NGOs, private companies and fishers associations, as well as individuals. Membership of groups varied between 1 and 11 of these types of members, with “individuals” being counted as just one member group type. This means that where individuals are included as members, they could indicate quite large associations. For example, in Kiribati, the Betio Fishers Association has 135 individual members. For many of the responses given, the number of individuals was not indicated.

Table 6: Summary of stakeholder groups identified by respondents.

Counts are numbers of members of each group, and include a range of stakeholder types (government departments, NGOs, associations, individuals).

		No
Cook Islands	Kootu nui, Traditional leaders for the Raul MPA	4
	Takitumu Growers Association	4
	Takitumu Lagoon Management plan	7
	Tuna Industry Association, Cook Islands	8
Federated States of Micronesia	College of Micronesia, FSM	1
	TNC The Nature Conservancy	1
	USDA NRCS	1
	USDA US Forest Service	1
Fiji	FLMMA Fiji Locally Managed Marine Areas	1
	Pacific Communities (formerly FSP Fiji)	1
	USP University of the South Pacific	1
French Polynesia	Carte d'agriculteur et de pêcheur lagonaire (CAPL)	2
	Comité permanent des PGEM	9
	Comités de surveillance des pêches de trocas et burgaux	8
	Commission Consultative d'Occupation du Domaine Public	10
	Commission Consultative d'Occupation du Domaine Public Maritime (pêche)	11
	Commission Consultative d'Occupation du Domaine Public Maritime (periculture)	8
Guam	Commission Consultative de la Pêche Hauturière	6
	Guam Administration Adjudication Act	4
	Guam Fishermen's Cooperative	2
	Public Meetings	4

Kiribati	Betio Fishermen's Association	1
	Kiritimati Petfish Divers Association	1
	Kirimati Petfish Exporter's Association	1
	Outer islands Fishermen's Association	5
Marianas	Marianas Coral Reef Initiative Coordinating Committee	2
	Marianas Fisherman's forum	1
	Marianas Local Scientific Advisory Committee	2
	Marianas Watershed Group	2
Marshall Islands	Coastal Management Advisory Council	5
	Others	1
	RMI EIA Regulations	1
Nauru	Nauru District Executive Committees	2
	Nauru NFMRA Coastal Fisheries Section	2
	Nauru NIANGO	1
New Caledonia	Committee for the Protection of the Environment of South Province	5
	Drehu Area Council, NC	1
	Fisheries Committee	2
	Iaai Area Council, NC	1
	IFRECOR	3
	Lifou Fishers Association, NC	1
	Maré Fishers Association, NC	1
	NC Territorial Government Marine Resources Commission	4
	Nengone Area Council, NC	1
	North Province Committee for Fisheries Management, NC	10
	Ouvea Fishers Association, NC	1
	UNESCO World Heritage Site Committee	8
	ZONECO	2
Niue	Niue Fishermen's Association	1
	Niue Tourism Association	1
	Niue Vaka Association	1
	Village Councils	2
Palau	National Environment Protection Council	1
	Palau Aquaculture Cooperative Association	1
	Palau Boaters Association	1
	Palau Federation of Fishing Association	1
Samoa	CFMAC Commercial Fishing Advisory Committee	10
	VFMAC Village Fisheries Management Advisory Committees (about 48)	6
Solomon Islands	SILMMA Solomon Is. Locally Managed Marine Areas	9
Tonga	Fishers Association	5
	Fishing companies	8
	Government Departments	4
	Special Management Area-Remote Island Communities	6
Tuvalu	Community-based management Programme	4
Vanuatu	Vanuatu Aquaculture Association	5
	Vanuatu Fishermen's Association	4
	Vanuatu Grace of the Sea Project Committee	5
	Vanuatu Landholders Conservation Initiative Project Advisory	10
Wallis & Futuna	Government Council, Wallis & Futuna	2
	Territorial Assembly Fisheries Commission, Wallis & Futuna	4

4.4. Understanding of the EAF

90. Question 4 of the questionnaire was: *What does the “Ecosystem Approach to Coastal Fisheries and Aquaculture” mean to you in terms of your country or territory’s management of fisheries?*

91. The responses included a wide range of concepts used to try and indicate the meaning of EAF in terms of fisheries management. Each response was interpreted and recorded as one or more conceptual fragments so that the frequency of the most common elements could be examined (Table 7).

92. All respondents (24 questionnaires from 21 countries and/or territories) provided a definition of the EAF. The most common element of those definitions was that it was a “holistic approach” (11 questionnaires, 46% of responses), with many respondent defining it as aiming for sustainable outcomes (38% of responses) leading to improved human welfare (25%). A large number of responses also focused on cooperation among stakeholders, taking the risks of development into account and involving communities.

4.5. EAF challenges and opportunities

93. Question 5 was: *List at least 3 opportunities, issues, concerns or challenges you see to adopting and implementing the EAF in your country or territory.* Responses to this question were provided in all but one questionnaire.

94. The questionnaire did not provide guidance on the definitions of the terms “issue”, “concern” or “challenge” and this led to inconsistent use of the terms among respondents. Some respondents nominated whether a topic was a challenge, concern, issue or opportunity, but most did not. Text results thus had to be interpreted and classified to match these groupings according to the following definitions; “challenge” was taken to be an issue that could result in resistance; “concern” was one that most likely already presented problems for adopting the approach; and “issue” was seen as relatively neutral. “Opportunity”, which unlike the other three terms embodies a positive concept, was taken to be a factor likely to lead to some advantage.

Table 7: Summary and frequency of main elements described in responses to question 4.

Definition fragments	No.	%
Holistic (ecosystems/people)	11	46
Sustainable use/function	9	38
Fisheries management	8	33
Cooperation among stakeholders	8	33
Development risks	6	25
Community involvement	6	25
Human welfare	6	25
Awareness raising	5	21
Human activity managed	5	21
Management/plans	4	17
Environmental impacts considered	4	17
For the future	4	17
Connectivity among factors managed	4	17
Legislation	3	13
Resources managed	3	13
Habitats managed	3	13
Alternatives/tools(aquaculture, stock enhancement)	3	13
Issue focused	3	13
ICM approaches/cooperation	3	13
Adaptive management	2	8
Policies addressed	2	8
Land managed	2	8
Uncertainties of ecosystems considered	1	4
Actions	1	4
Preventing damage to non-target ecosystems	1	4
Enforcement	1	4
Fisheries resources	1	4
Local governments	1	4
Consultative	1	4
Customary approaches utilised	1	4
Research required to ensure sustainability	1	4
Management groups/committees	1	4
Site-specific management	1	4
Managing organisms through lifecycle	1	4
Targeted resources considered	1	4
National framework	1	4
Fishers’ rights considered	1	4
Aquaculture managed	1	4
Political will	1	4
Total definition fragments	121	

Data were derived by reading each definition supplied and recording the ideas contained separately. Commonly-expressed ideas mentioned in responses appear as higher frequencies in the “No.” column. The % column refers to the percentage of questionnaires in which an idea was expressed (not the % of countries).

95. The result of this classification was not very satisfactory, and led to some factors (such as “enforcement”) appearing under multiple headings. Responses were therefore summarised further so that “challenges”, “concerns” and “issues” were grouped together to represent negative concepts, and these contrasted against “opportunities”, which represented positive concepts (Table 8).

Table 8: Challenges, concerns, issues and opportunities related to adopting the EAF in respondents’ countries.

“Challenges”, “concerns”, and “issues” have been grouped as representing negative concepts, while opportunities are separated as representing positive concepts.

Challenges/Issues/Concerns	84
Conflict with development objectives	10
Legal	8
Enforcement	8
Capacity/building	7
Cooperation among stakeholders	5
Lack scientific information	4
Political will	3
Environmental capacity	3
Funding	2
Other	2
Broadened stakeholders	2
Traditional land ownership	2
Political obligations in return for aid	2
Cost implications	2
Broadened complexity/systems to manage	2
Traditional & customary rights	2
Differing perceptions of problems	1
Overharvesting	1
Open access	1
EAF not understood	1
Implementing capacity	1
Lack of management plans	1
Natural disasters	1
Alternatives for overexploited areas	1
Competition small-scale vs large-scale fisheries	1
Community engagement	1
Policy	1
May not manage all species of interest	1
Population growth	1
Measuring outcomes	1
Monitoring & assessment	1

Inflexible bureaucracy	1
Unrealistic/too good to be true	1
Lack of coordination in government	1
Alternatives & incentives required	1
Lack of indicators	1
Opportunities	23
Cooperation among stakeholders	3
Strengthen CBM	2
Recognises interdependence ecological, socio-economic factors	2
Inclusive of different species	1
Partnerships with existing activities	1
Monitoring & assessment	1
Better ecosystems information	1
Awareness programmes	1
Cross-cutting issues discussed & considered	1
Information exchange	1
Enhancing existing resource management programs	1
Opportunities for sustainable development	1
Public awareness	1
Broadened stakeholders	1
Better management	1
Human wellbeing	1
Capacity/building	1
Identification of risks of development	1
Inclusive of different habitats	1
Total	107

96. Responses to factors likely to affect adoption of the EAF in countries and territories varied widely, with only limited overlap among the questionnaires. Overall, there tended to be more challenges, issues and concerns (84 instances of 36 different topics raised) to the adoption of the EAF than opportunities (23 instances of 19 topics raised). The main challenges to adoption were seen as conflicts with development objectives, legal arrangements, problems of enforcement, insufficient human and infrastructural capacity, cooperation among stakeholders, lack of scientific information, and lack of political will. The most common opportunities reported were for increasing cooperation among stakeholders; recognising the interrelationships between social, economic and ecological factors; and strengthening community approaches to fisheries management.

4.6. Implementation of EAF-compatible measures

97. Question 6 of the questionnaire was formulated in two parts, as follows:

- *What do you consider to be EAF-compatible measures, and are such measures applied in your country or territory?* (This part of the question was followed by a table containing a list of possible measures, as shown in Appendix 5).
- *From the above table, can you please provide a brief description of any measures you consider to be EAF-compatible that are currently being implemented (marked yes) in your country or territory.*

98. All 24 respondents provided answers to the first part of this question on whether certain approaches were consistent with the EAF and whether they had been implemented in the PICT concerned. Nineteen respondents providing more detailed information on the measures being implemented. Those measures most often considered compatible with the EAF were controls on destructive fishing, use of management plans, MPAs and pollution control (Table 9).

99. Research and monitoring and the use of environmental impact assessment were only rarely considered part of the EAF. The majority of those measures considered important were being implemented in most of the countries that agreed they were important.

100. Figure 3 and Table 10 show that most PICTs have implemented measures concerning destructive fishing, fish aggregating devices (FADs), MPAs, gear restrictions and management plans of some types. These measures may not have been designed specifically with the EAF in mind, but they are compliant with it.

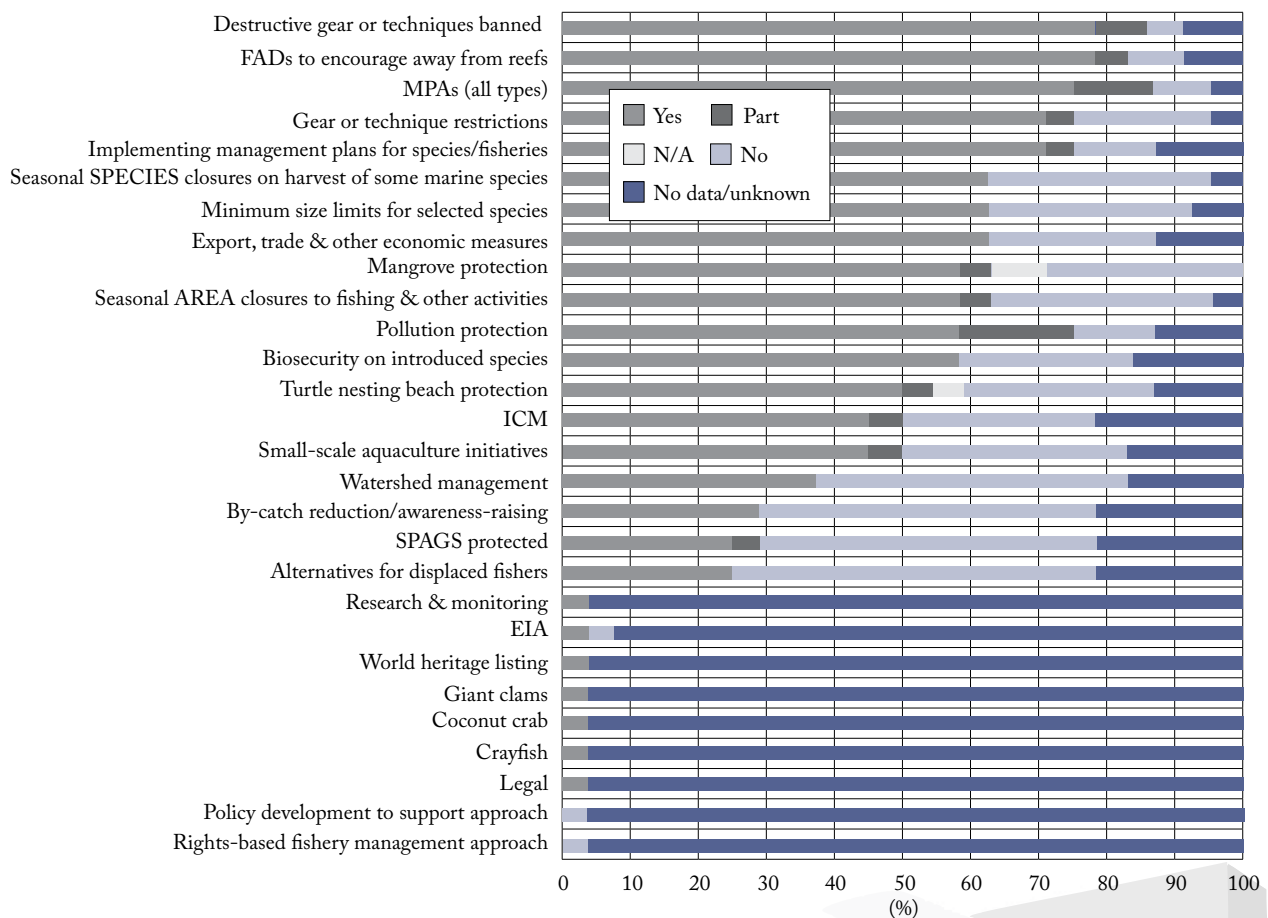


Figure 3: Implementation status of EAF-compatible measures by country/territory as indicated by respondents to Question 6 of the SPC questionnaire. Graph is based on data shown in Table 10.

Table 9: Summary of approaches considered compatible with the EAF and whether they have been implemented in member countries and territories.

	Compatible					Implemented				
	Yes	Part	Not sure	No	NA	Yes	Part	Not sure	No	NA
Destructive gear or techniques banned	23					19	2	1	1	
Implementing management plans for species/fisheries	23					17	1	1	4	
Mangrove protection	23				1	14	1		7	2
MPAs (all types)	23		1			18	3	1	2	
Pollution protection	23		1			14	4		4	
Minimum size limits for selected species	23			1		15			7	
Seasonal SPECIES closures on harvest of some marine species	22					15			8	
Turtle nesting beach protection	22			1	1	12	1	2	7	1
Biosecurity on introduced species	21					13		2	7	
Gear or technique restrictions	21		1			17	1		5	
ICM	21			1		11	1	1	7	
Seasonal AREA closures to fishing & other activities	21			1		14	1		8	
SPAGS protected	21			1		6	2		13	
Small-scale aquaculture initiatives	20		1	1		11	1		8	
Watershed management	20			1		9			11	
FADs to encourage away from reefs	19		2	2		19	1		2	
Export, trade & other economic measures	17		1	2		15			6	
By-catch reduction/awareness-raising	16			4		7		1	12	
Alternatives for displaced fishers	15	1		6		6		2	13	
Research & monitoring	2					2				
Coconut crab	1					1				
Crayfish	1					1				
EIA	1			1		1			1	
Giant clams	1					1				
Legal	1					1				
Rights-based fishery management approach	1								1	
World Heritage Listing	1					1				
Policy development to support approach				1					1	
Totals	402	1	7	23	2	260	19	11	135	3

101. More recent measures, such as reducing bycatch, protecting spawning aggregations and working with displaced fishers, have been implemented by several members. Implementing measures such as these is likely to require more effort in capacity building, public awareness and governance just because there are few existing mechanisms in place.

102. It must be recalled, of course, that passing legislation and creating rules is quite different from enforcing those measures on a day-to-day basis. While some PICTs still need to develop or improve their coastal fisheries and aquaculture management legislation, others have regulations or management plans in place, which are not being effectively implemented. The good news, however, is that adapting and extending many existing measures in order to progress towards the EAF is likely to be relatively easy.

Table 10: Implementation status of EAF-compatible measures by country/territory as indicated by respondents to question 6 of the SPC questionnaire.

	ASM	CAL			CNMI	COO	FIJ	FSM	GUM	KIR		NIU	NRU	PLW	PNG	PYF	RMI	SLB	TKL	TON	TUV	VAN	WLF	WSM
		N	S	I						F	E													
Destructive gear or techniques banned	Y	Y	Y	P	Y	Y	Y	Y	P	Y		Y	?	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
FADs to encourage away from reefs	Y	N	Y	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y	N	Y	P	Y	Y	Y	Y	Y	Y
MPAs (all types)	Y	Y	Y	P	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	?	Y	Y	Y	Y	N	Y	Y	P	P
Gear or technique restrictions	Y	Y	Y	P	Y	Y	Y	Y	Y	N		Y	N	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y
Implementing management plans for species/fisheries	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	?	Y	N	P	Y	Y	N	Y	N	Y
Seasonal closures on harvest of some marine species	N	Y	Y	N	N	Y	Y	Y	N	N		Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y
Minimum size limits for selected species	Y	Y	Y	Y		N	Y	Y	Y	Y		Y	N	Y	Y	Y	N	N	N	Y	N	Y	N	Y
Export, trade & other economic measures	N	Y	Y		N	Y	Y	Y	Y	Y		Y	N	Y		Y	N	Y	N	Y	N	Y	Y	Y
Mangrove protection	Y	Y	Y	NA	N	N	Y	Y	P	Y	Y	NA	N	Y	Y	N	Y	N	N	Y	N	Y	Y	Y
Seasonal area closures to fishing & other activities	N	Y	Y	Y	N	Y	Y	Y	N	N		Y	N	Y	Y	N	Y	P	Y	Y	N	Y	N	Y
Pollution protection	Y	Y	P	N	N	Y	N	Y	Y	Y	Y		N	Y		Y	Y	P	Y	Y	P	Y	Y	P
Biosecurity on introduced species	N	Y	?	N	N	Y		Y	Y	N	Y		N	Y	?	Y	Y	Y	Y	Y	N	Y	N	Y
Turtle nesting beach protection	Y	Y	Y	N	N	?	Y	Y	P	Y	Y	NA	N	Y	?	Y	N	Y	N		N	Y	N	Y
ICM	Y	Y	N		N	Y	Y	Y	Y				N	Y	N	N	Y	P	N	Y	N	Y	Y	?
Small-scale aquaculture initiatives	N	N	N	N		Y	Y	Y	Y	Y		N	Y	Y	Y		Y	P	N		N	Y	N	Y
Watershed management	Y	N	N		N	Y	N	Y	Y				N	Y	N	N	Y	Y	N	N	N	Y	N	Y
By-catch reduction/awareness-raising	Y	Y	N	N		N	N	?	Y	N		N	N	Y		Y	N	N	N		N	Y	N	Y
SPAGS protected	N		Y	N	N		Y	Y	P	Y		N	N	Y	N	N	N	N	N		N	Y	N	N
Alternatives for displaced fishers	N	N	N	Y		Y	?	?	Y	N		N	N	Y	N	N	N	N	N		N	Y	N	Y
Research & monitoring			Y																					
EIA			Y										N											
World Heritage Listing			Y																					
Giant clams						Y																		
Coconut crab						Y																		
Crayfish						Y																		
Legal			Y																					
Policy development to support approach													N											
Rights-based Fishery management approach																	N							
Total implemented measures (Y & P)	12	14	15	4	4	17	14	17	13	16	5	9	3	19	8	11	11	6	7	12	5	19	7	15

Y=measure is currently being implemented; N=Not; P=Partially implemented/in progress/in some areas; ?=Not sure; NA=Not applicable (e.g. mangroves are absent). Note data are shown separately for the three provinces of New Caledonia (N=North, S=South; I=Islands) and for the two responses received from Kiribati (F=Fisheries; E=Environment). Measures are listed in rank order based on the number of PICTs implementing them.

4.7. Summary

103. Responses from the questionnaire survey suggest that implementing at least some measures consistent with the EAF has begun in many PICTs and is well underway in some. However, this is not because there has been a particular focus on the EAF in SPC member countries. Rather, many of the measures reported in the questionnaire responses are conventional fisheries managers' tools that have been available for many years, or are those more recently implemented for environmental or ICM purposes. Only a few are "new" to fisheries management, coming to attention as a result of the EAF. If developed aptly in the Pacific, EAF will often not be a case of applying "new tools", but rather a "new framework" using many of the existing tools more appropriately and efficiently.

104. While many PICTs have already implemented at least some of the measures understood as required for the EAF to be effective, there is little qualitative information on the purpose and way that measures have been applied. That is, gear restrictions per se may not be sufficient for effectively implementing the EAF. Depending on circumstances, the ecosystem approach may require gear restrictions tailored for the purposes of managing not only their target species, but also their supporting ecosystems and the impacts they have on other non-target species. That is, current approaches to applying well-known fisheries management measures may need to be changed qualitatively and in conjunction with other measures, or to take place within a broader management framework that gives recognition to the wider range of ecosystem issues and concerns.



5. FINDINGS OF THE SPC EAF WORKSHOP

105. The SPC Workshop on the Ecosystem Approach to Coastal Fisheries and Aquaculture and Aquatic Biosecurity (28 October – 2 November 2007) was attended by 46 representatives of PICTs, 25 agency representatives and resource persons, and about 25 technical staff of SPC's CFP. Following a series of technical presentations, workshop participants broke into four working groups in order to discuss aspects of the definition, understanding and implementation of the EAF in the Pacific Islands region. These are described in the following sections.

5.1. Common principles

106. The first discussion topic was: *What common principles do you extract from the various presentations as defining the "ecosystem approach" in respect of coastal fisheries management? Also, are any of these principles in conflict with your own national understanding or interpretation of the "ecosystem approach"?*

107. Each working group reported the conclusions of its deliberations back to the workshop. Based on these verbal presentations, an initial list of those findings that appeared most common was compiled, as follows:

- implementation of the EAF requires a participatory approach that involves all stakeholders;
- traditional knowledge should be incorporated into the process wherever possible;
- absence of scientific information should not be used as a reason for not commencing to implement the EAF. Science is a tool, not a principle, and waiting for enough scientific data may mean that the process never starts;
- a holistic approach is needed when planning and implementing the EAF;
- principles of sustainable development need to underlie the EAF;
- the EAF, like all forms of resource management, is based on controlling and influencing human activity rather than directly changing the ecosystem;
- it is not possible to address all issues, so the processes of risk assessment and prioritisation are critical.

108. The workshop briefly discussed these broad conclusions. It was pointed out that climate change is now a major environmental issue for the region and should be borne in mind when considering the EAF.

109. Subsequently, a more detailed analysis of the working groups' written reports revealed several additional principles that were commonly identified but had not been apparent from the verbal presentations, because of the different formats and wording used to express them. Of the 16 principles identified by the groups, those most commonly thought to be of highest relevance to the Pacific Islands region were as follows (numbers in parentheses indicate the number of groups that reported a particular theme or issue):

- the EAF requires broad stakeholder engagement—community, fisheries, environment, NGOs, industry (4);
- the EAF must recognise the interdependence between people and environment, and focus on managing people and their activities (4);
- there is a need to recognise and incorporate traditional knowledge and management practices into the EAF (3);

- the EAF will benefit from a spatial planning approach (“ridge to reef”) to address terrigenous effects on marine spaces (2);
- the EAF requires a holistic approach involving environmental, sociocultural and economic issues (2);
- the EAF aims to maintain ecosystem services and functions for fisheries and other uses (2);
- fisheries (and other sectors) must be managed to avoid unsustainable development and minimise environmental impact (2);
- the EAF requires a shared vision and a common goal among participating stakeholders and agencies (2).

110. In addition to these EAF principles, many groups provided comment on the challenges and opportunities that the EAF presents. Of the 19 challenges identified, those most commonly mentioned were:

- inadequate inter-agency collaboration, and conflicting agency remits and mandates (3);
- political interference and lack of high-level commitment to the EAF and broader environmental issues (2);
- partitioning the roles and responsibilities of different levels of government (national, state/province, local) (2);

111. Of the 11 opportunities that the working groups identified as being presented by the EAF, those most commonly mentioned were:

- the EAF can commence now—there is no need to wait (2);
- inter-agency collaboration can be improved through formal working arrangements such as committees, memoranda of understanding, etc. (2);
- policy can be favourably influenced by public advocacy or prominent personalities, as well as through initiatives such as the Micronesian Challenge (2).

112. In general, there was less agreement among groups on challenges and opportunities than there was on general concepts and principles.

5.2. Existing EAF-compliant management measures

113. The second discussion topic was: *Bearing in mind the principles of the ecosystem approach agreed above, what existing elements of coastal fisheries management in your country can be considered already “EAF-compliant”? Also, what existing coastal fisheries management measures or traditions are not “EAF-compliant” or work against the implementation of the EAF?*

114. Most groups reported on specific situations in each country represented in the group, without analysing common themes. The information presented on individual countries was quite detailed but summarising the information for the purposes of the workshop report was difficult as many of the issues identified related to only one country, were different among countries, or concerned several of the identified EAF principles.

115. Bearing these caveats in mind, Table 11 below summarises some of the common ideas that emerged from the working group presentations.

Table 11: Working group findings on discussion topic 2.

Principle	What is compliant	What is not compliant
Implementation of the EAF requires a participatory approach that involves all stakeholders.	Inter-agency boards/committees that must sign off on development projects. Stakeholder engagement through advisory committees and MOU. Partnerships with national and local NGOs. Area management plans Fishery legislation that provides for management planning through consultation. Formal public hearings on projects and proposals. Informal task forces, communication/information-sharing among public agencies	Exclusion of important sectors from committees or other working arrangements. Poor inter-agency coordination. Lack of regulation of local fishers and markets Live rock and aquarium trade Translocation of marine species. Conflicts between user/interest groups Varying expectations among communities with different levels of development. Decisions made without proper consultation
Traditional knowledge should be incorporated into the process wherever possible.	Conservation area planning. Community-based fisheries management plans Traditional gear restrictions and closed seasons Review of legislation and proposals by customary authorities. Community representation through agencies or bodies formed for that purpose.	Community structure in Melanesian countries may make CBM more difficult Traditional ownership conflicts. Traditional fishing activities or user rights not always in line with the EAF (e.g. turtles, destructive fishing methods). Lack of enforcement authority by traditional bodies or local communities.
Absence of scientific information should not be used as a reason for not commencing to implement the EAF.	Implementation of plans and strategies, including CBM plans. Use of scientific information where it is available\ Precautionary measures that preclude fishing. Activities in the absence of scientific information.	Inadequate monitoring of human impacts. Inadequate review and adjustment of plans to adapt to changing circumstances Pressure by interest groups to require scientific justification for government decisions on resource management. Requirement for MSY to be used in fishery management plans.
A holistic approach is needed when planning and implementing the EAF.	High level environmental or other policies and mandates. Regional mechanisms for integration/regional agencies. National integrated coastal management frameworks(e.g. ridge to reef). Aquaculture development/ management plans. Rehabilitation of mine and earthwork sites. Water discharge/waste management regulations.	Limited policy activity coordination by national government. Poor donor harmonisation. Single-species management frameworks. Differing scales required for different management actions. Most outer island developments.
Principles of sustainable development need to underlie the EAF.	Requirements for environmental impact assessments. Existing fisheries management arrangements based on precautionary approach. Planning processes which require environmental, social and economic issues to be addressed.	Distortion of management arrangements by economic or commercial factors/priorities. Little buy-in to the EAF by large commercial entities, especially in mining sector Insufficient regulation of coastal development
The EAF, like all forms of resource management, is based on controlling and influencing human activity rather than directly changing the ecosystem.	Community based management programmes. Education and public awareness programmes. Fishery input controls (licensing/permitting).	Inconsistent/changing government policies, political agendas. Monitoring of small-scale fisheries difficult and costly (easier/more cost-effective for large-scale).
It is not possible to address all issues, so the processes of risk assessment and prioritisation are critical.	National development strategies. Sector strategies (fisheries and others). National Biodiversity Strategy Action Plan (under CBD). Community management plans Protection plans for sharks and other sensitive groups.	Plans often not implemented No prioritisation of coastal/management issues by government. Decisions made primarily on economic development grounds. Lack of resource allocation.

5.3. Achieving EAF compliance

116. The third discussion topic was: *What measures need to be implemented before your country can be considered to be fully applying the ecosystem approach to coastal fisheries and aquaculture?*

117. Each working group reported the conclusions of its deliberations back to the workshop, again in some cases by presenting specific situations in each country represented in the group, rather than by analysing common themes. A subsequent analysis revealed that the most common themes were as shown in Box 1 below.

Box 1: Measures that need to be implemented in support of the EAF

Governance and policy

- harmonise government policy/legislation to improve consistency, clarify overlapping mandates, ensure consistency with international treaties;
- establish high-level cross-sectoral bodies with strong mandates and leadership to ensure integrated decision-making;
- establish mechanisms to agree on common goals;
- establish integrated coastal management policy and legislation, with long-term horizons and periodic review;
- ensure good recording of decision-making processes so that decisions can be reviewed and understood in the future;
- apply the precautionary approach.

Legislation and management

- examine legislation to identify and remove impediments to EAF;
- strengthen EIA legislation;
- develop legislation and management plans for aquaculture, which is relatively new in most countries;
- improve enforcement of existing regulations and other management measures—identify and eliminate weaknesses in compliance systems;
- provide incentives/ support to fishery and aquaculture activities that are ecologically sensitive/ responsible, and discourage/ prevent those that are not.

Stakeholder participation

- establish national stakeholder forums involving government, industry, NGOs etc. in various sectors;
- establish formal and informal education and awareness-raising programmes, at all levels but especially for communities;
- extension of community-based management programmes;
- prioritise locations/areas that are most in need of management attention/ support;
- identify alternative income generation activities that provide alternatives to marine resources.

Technical measures

- make managers more familiar (capacity-building) with how EAF will affect the way they carry out their activities
- establish models for EAF implementation, and determine when these will be of benefit to management and decision-making;
- identify case studies of successful implementation—start with easy ones, then expand/ replicate; resource and habitat mapping/ characterisation through large-scale assessment tools (remote sensing, geographic information systems)
- undertake risk assessments to identify key priorities for management research;
- build agency capacity to undertake broader ecosystem assessments and monitoring;
- ensure that monitoring is done at appropriate scales, intervals and degrees of accuracy;
- establish systems to monitor progress, with realistic implementation targets and regular review;
- identify appropriate, cost-effective ecological, social and economic indicators.

Funding and support

- increase visibility of EAF and identify incentives or ways to make EAF attractive, in order to influence budget/ donor processes;
- investigate sustainable financing models;
- impose levies on tourism, fishing, etc. to support EAF;
- establish funding and technical support partnerships with relevant national and international agencies;
- use SPC and other regional organisations to help countries meet the additional responsibilities that will flow from the EAF.

118. Numerous additional comments were made and issues identified by the working groups, many of which queried whether PICTs have the human capacity to take on the additional responsibilities that the EAF requires. The need to generate political will was noted, through the use of economic valuation of coastal fisheries and subsistence benefits to the national and local economies, and a clear demonstration of the advantages of using the EAF. Although fisheries agencies obviously have a part to play in promoting the EAF, it was not always clear that the fisheries agency should necessarily be the main driver in the process, given that the EAF involves many sectors. However it was also recognised that, if fisheries departments did not take the lead, in most cases no other agency would.

5.4. Summary

119. During the workshop's final session, participants discussed in plenary the challenges, opportunities, areas of compliance and non-compliance, and future requirements that the EAF might introduce, as well as the means through which fisheries and other agencies might respond to the challenges that the EAF presents. These included:

- taking a more active advocacy role in promoting inter-agency collaboration and raising official awareness of the impacts that other sectors have on fisheries;
- identifying fisheries where ecosystem impacts can be observed, and improving management of these fisheries;
- considering opportunities for non-extractive use of marine resources, and promoting these where they provide economic benefits as well as clearer compliance with the EAF;
- in considering overall management approaches, trying to set management goals that maximise fishery profitability and ecosystem services, even though this might be at the expense of greater levels of participation in fisheries;
- promoting customary and traditional systems that allocate marine resource usage rights to limited numbers of users.

120. The upstream (impacts of other sectors on fisheries) and downstream (impact of fisheries on other sectors) aspects of the EAF were discussed. It was noted that a recent SPC questionnaire survey among fishery managers (King and Fa'asili 2008) identified sewage pollution, garbage disposal and siltation as being significant issues in many localities. Environmental impact assessments of new projects can help mitigate their impacts, but do little to alleviate existing problems. Examples were given of mitigation options for sewage pollution which ranged from the very costly treatment of centralised sewage processing facilities, to the cheaper, low-technology approach of mangrove replanting by coastal communities.

121. There was a discussion on whether MPAs and restocking reefs with juveniles of important fishery species were useful approaches to management. Some participants felt that both approaches could be useful fishery management tools, but that neither would solve fishery management problems on its own. MPAs can provide refugia for animals of reproductive age, but the overspill and recruitment benefits of these to the broader fishery have yet to be quantified, and management of fisheries outside of MPAs is still necessary. As regards reef reseeded, this may be valuable in specialised situations, such as restoring depleted stocks or populating areas that are devoid of suitable habitat for juveniles. However if restocking is not done within a management framework, then fisheries productivity, yields and profitability may continue to be held down to sub-optimal levels, and the government may find itself in a costly open-ended commitment to continue financing costly hatcheries. Some participants expressed the view that, despite these reservations, MPAs and reseeded programmes raise awareness and have a positive impact on attitudes to marine resource management, and that it is better to establish MPAs than to do nothing.

122. Workshop participants noted that in some countries there are already inter-agency committees or other collaborative mechanisms to discuss multi-sectoral issues such as climate change. Where they exist these mechanisms could be adapted to promote collaboration in regard to the EAF, rather than establishing new mechanisms for this purpose. It was also noted that, as well as promoting inter-agency collaboration at the national level, there is a need for better coordination of the activities of Pacific regional organisations, several of whom are involved in issues relating to the EAF.

123. It was recognised that the application of the EAF does not necessarily involve any major new activities or directions. The EAF can be implemented in large part by fisheries agencies, making sure that environmental, social and economic issues are integrated into the fishery decision-making process. A good approach is to start dealing with fishery issues first, while also attempting to broaden the stakeholder base to other sectors, rather than waiting for multi-sector approaches to become effective. Fisheries managers will always have to deal with uncertainty, but risk assessment can reduce the likelihood of wrong decisions. Countries were advised to take the initiative of determining their own priorities and presenting these to donors and partner agencies, rather than letting others set the agenda for funding and technical support interventions.



6. REGIONAL AND INTERNATIONAL SUPPORT TO THE EAF

6.1. General

124. A number of regional and international agencies, both government and non-government, are involved in supporting PICTs in their efforts to sustainably manage coastal resources, spaces and biodiversity. The main regional agencies supporting the EAF in PICTs, either directly or indirectly, are:

- **SPC:** the CFP undertakes resource and socioeconomic assessments and provides PICTs with fishery management advice, especially in relation to community-based marine resource management. Other components of the CFP assist with aspects of fisheries development, training and information, and are emphasising EAF-compliant fishery development activities. The CFP's Strategic Plan for 2006–2009 focuses on helping PICTs to implement the EAF, including through assessing resources and the way they are governed, helping to develop or adapt cross-sectoral consultation processes, and assisting in the development EAF policies, plans or legislation;
- **FFA:** is actively promoting the EAF in regard to managing large-scale tuna fisheries. This is contributing to awareness raising on the topic, which will flow into the coastal fisheries arena. The processes and procedures being developed by FFA can be modified for application to coastal fisheries and aquaculture;
- **SPREP:** has been active for many years in trying to promote concepts of integrated coastal management in PICTs, including through demonstration projects run under the Global Environment Facility (GEF)-funded International Waters Project;
- **Pacific Islands Applied Geoscience Commission (SOPAC):** advises countries on the use of non-living coastal resources (aggregates, placer minerals) and on the impacts of “hard” development (sand-mining, construction of coastal roads and seawalls) on coastal processes (erosion, hydrography, etc).
- **University of the South Pacific (USP):** provides tertiary training and undertakes studies and research on coastal water quality, chemical oceanography, ecosystem assemblages in selected PICT locations.

125. FAO has been the main international agency driving the adoption of the EAF globally, and is supporting its uptake in the Pacific Islands region. A pilot project to examine the integration of the EAF into PNG's Tuna Management Plan was carried out in 2005, and an international workshop on “Capacity Building for Ecosystem Approach: Considering Interactions, including with Marine Mammals” is planned to be held in late 2008.

126. A number of international non-governmental organisations are also active in promoting sustainable marine resource use in the region, sometimes in several countries, sometimes in just one or two. These include Conservation International (CI), Foundation of the Peoples of the South Pacific—International (FSPI), TNC and WWF, which variously support marine biodiversity conservation initiatives, promote greater adoption of community-based marine resource management, help to establish MPAs, and lobby for greater recognition of the need for sustainable management of marine species at the policy level. The International Union for Conservation of Nature (IUCN) has also recently opened a regional office for Oceania in Suva, Fiji, and will be developing a marine programme that is expected to include support for implementing the EAF in the region.

127. Some of the most relevant organisations and programmes are described in the following sections. This does not pretend to be a comprehensive listing. As already noted in section 4.2, a plethora of agencies, programmes and projects are currently active (average 10.5 per PICT, with at least 64 NGOs identified), and not all have been captured in this report.

6.2. Secretariat of the Pacific Community (SPC)

128. SPC's CFP comprises several sections that focus on coastal fisheries assessment, development, management, training, information and aquaculture. These complement other departments within SPC, which deal with agriculture, health, demography, women, youth, media and other disciplines. To improve both internal and external coordination, SPC has begun to develop "Joint Country Strategies" for individual member countries, in which inputs from all SPC programmes (not just fisheries) will be delivered in an integrated manner that is coordinated with the activities of relevant national agencies and other regional organisations.

129. Because of its mandate, staff complement and existing strategic direction, the CFP is likely to be the lead regional agency in promoting the ecosystem approach to coastal fisheries and aquaculture. The programme's Strategic Plan for 2006–2009 (SPC 2005) states that *"the new challenge is to manage not just coastal fisheries, but the entire ecosystem on which coastal fisheries and aquaculture depend. Fisheries managers need to drive this new Ecosystem Approach to coastal management because fisheries are heavily dependent on the integrity of coastal ecosystems, and fishers are still the primary user group impacted by land-based and other developments."* As a result, *"rather than continuing to try to develop management plans for individual fisheries—plans that can control only the activity of fishers and that are helpless to control or even predict other impacts on coastal ecosystems—SPC intends to assist the Pacific Islands to 'skip' the next step in conventional fisheries management and start implementing the more holistic EAF through the development of coastal ecosystem management plans... For coastal fisheries the main requirement at this stage is to build institutional systems that can consider all of the human impacts on coastal ecosystems and get different agencies working together to achieve a common vision of how the coastal ecosystems that currently support fisheries should be maintained, and how usage should be allocated and controlled."*

130. The plan goes on to describe several pragmatic measures that are being or will be used to promote and mainstream the EAF within SPC's CFP. These include:

- integrative programme leadership (already achieved through the appointment of a CFP Manager);
- establishing a Regional Fisheries Ecosystem Council, probably as a committee or sub-group of the Heads of Fisheries meeting, allowing countries to share experiences, develop common mechanisms and consult on cross-boundary fishery ecosystem issues;
- strengthening the CFP in several key areas, including coastal legislation, economic evaluation of aquatic development issues, assessment of land-based impacts, mariculture and non-extractive use of coastal resources;
- organising the programme so that more multidisciplinary country missions can be made, involving several staff in joint activities to help countries develop coastal fisheries ecosystem management approaches, and multi-sectoral assessments, moving away from the request-driven single-specialist missions that are the current modus operandi;

131. The overall goal of the CFP, in contributing to the regionally shared PIROP vision of *"A healthy ocean that sustains the livelihoods and aspirations of Pacific Island communities"* is *"to assist SPC members in their commitment to apply the Ecosystem Approach to coastal fisheries and aquaculture by 2010."* The CFP Strategic Plan indicates that this will be done by focussing on the following three objectives:

1. assisting governments and administrations in developing scientifically informed and socially achievable coastal ecosystem management systems, including coastal living resource components of national ocean policies;

2. consolidating a regional framework for economically, socially and environmentally sustainable aquaculture planning, research and development by Pacific Island governments and private enterprises; and
3. assisting governments and administrations in developing and managing of domestic near-shore commercial fisheries within a sustainable ecosystem context.

132. All sections of the CFP will contribute to Objective 1, particularly the current Coastal Fisheries Management Section and the Reef Fisheries Observatory, while Objective 2 will remain the primary focus of the Aquaculture Section and Objective 3 the Nearshore Fisheries Development and Training Section. Delivery of the objectives will also involve inputs and support by other agencies, particularly the CROP members and external agencies such as the US Western Pacific Regional Fisheries Management Council.

133. The CFP Strategic Plan outlines three major outputs to be delivered under Objective 1, and provides a key performance indicator (KPI) for each of these, as follows:

- Output 1.1 – assessments of the status of national coastal living marine resource user groups, impacts on resources, existing impact management systems, and the current status of resources themselves:

KPI – 21 national coastal fishery ecosystem governance baseline assessments produced over the plan period using the best knowledge available. (NB: It is assumed that the main need here will be from countries rather than territories, some of which already have related processes under way);

- Output 1.2 – assistance to member countries in developing or adapting cross-sectoral consultation processes to produce a scientifically and socially realistic national vision, or island visions, of the desired state and balance of usage of their coastal areas:

KPI – 14 national ocean policy social consultations supported over the course of the plan period. (NB —it is assumed that there will be a CROP-wide multi-agency process involved in developing ocean policy applications);

- Output 1.3 – practical assistance to members, as necessary, in designing and implementing adaptive frameworks for the application of the EAF.

KPI – every SPC island member has EAF policies, plans or legislation in place by 2010.



134. While a number of studies, assessments and advisory missions have been carried out in line with these objectives, the plan remains ambitious, including as it does the conduct of 35 national studies or consultations and the establishment of EAF policies or legislation in all 21 PICTs, in a four-year period. At the present time, halfway through the plan period, none of the above activities have so far been completed. Fortunately, *“the plan is a ‘living document’ and may change during its course, with the approval of SPC members”* (SPC 2005). The plan could possibly be amended to identify some less ambitious and more achievable targets, such as a limited number of high-priority studies and plans, coupled with the conduct of demonstration or pilot activities in selected locations.

135. As well as the overall CFP Strategic Plan, a Strategic Plan has also been formulated for the CFP’s Fisheries Management Section. This was initially endorsed by PICT heads of fisheries in 2003, and then reviewed in 2007 prior to being re-launched as a “Pacific Islands Regional Coastal Fisheries Management Policy and Strategic Actions”. The goal of the policy is “to ensure the optimal and sustainable use of fisheries and their ecosystems by Pacific Island communities”, through six key principles, which are summarised as follows:

- Improving our understanding of important fisheries species and of the ecosystems on which they depend;
- Sustainably managing coastal fisheries, reducing their impacts on coastal ecosystems and optimising production to meet local nutritional needs and contribute to economic development;
- Creating community partnerships to support the customary and traditional management of nearby ecosystems and fish stocks;
- Creating stakeholder collaborations to manage ecosystems and reduce the negative environmental impacts of non-fisheries activities, including those causing high levels of silt and nutrients in coastal waters;
- Promoting the participation of women and youth in all fisheries-related activities;
- Enhancing the regional exchange and sharing of information regarding common interests relating to the management of ecosystems and fisheries.

136. The policy was endorsed by the Special Session of the SPC Heads of Fisheries meeting in Apia in February 2008, and further endorsed by the Ministerial Meeting of the Forum Fisheries Committee in Palau in May 2008, and is now referred to as the Apia Policy. It will be used as a document both to guide the activities of the Fisheries Management Section of SPC’s CFP, and to raise funding for the strategic actions contained within.

137. Some of the principles of the Apia Policy will be addressed if SPC’s proposal for a Regional Coastal Ecosystem Science Initiative is successful. This initiative envisages a multi-donor, multi-partner, regional scientific support framework, managed by SPC under the oversight of its member governments and administrations, and implemented through the SPC Marine Resources Division and other institutions as appropriate. The purpose of the initiative is to provide PICTs, according to their current capacities and requirements, with regional scientific support (biological, ecological and social) to diagnose, develop, monitor, maintain and review evidence-based coastal fisheries and aquaculture ecosystem management policies and plans. It is anticipated that the initiative will be managed by SPC, with participation by a range of partners, including regional research agencies and NGOs. The overall theme of the initiative is to develop national capacity in coastal fisheries ecosystem science and monitoring, and to respond flexibly and rapidly to the specific needs of PICTs for support and assistance in implementation of the EAF. Funding for the initiative has not yet been secured, but SPC is hopeful that the proposal will be viewed favourably by the donor community.

138. SPC has also proposed to establish a Pacific Regional Aquatic Biosecurity Unit, which will: assist PICTs to develop national policy and planning for aquatic animal biosecurity; provide technical guidance, advice and assistance; and build national capacity through training, improved information access and increased regional and international awareness and linkages. This is in line with WSSD and PIROP principles in regard to the ecosystem approach to sustainably developing and managing the use of ocean resources, including aquaculture. The EAF will necessitate the full implementation of a precautionary approach to the translocation of live aquatic animals. This in turn will require sound biosecurity policy and measures across the region and the adoption of a high level of protection (a low level of risk tolerance) so as to avoid the potential for negative pathogen and ecological impacts associated with the introduction or transfer of an aquatic animal species.

139. The overall objective of the SPC Aquatic Biosecurity Unit proposal is to promote the development and effective implementation of PICT policies in support of food security and sustainable economic development, through the improvement of biosecurity frameworks for the aquaculture and fisheries sector. Specific objectives of the proposed project are to:

- assist SPC member countries to develop and adopt science-based, internationally accepted practices for the safe movement of live aquatic animals and their products;
- improve national and regional planning for disease prevention and management, including methods for disease surveillance and monitoring, diagnostics, preparedness reporting etc;
- improve interagency coordination for disease prevention and response, intra-nationally, regionally and internationally;
- facilitate regional and international trade in live aquatic animals and their products through advancing the capability of countries to provide trading partners with meaningful guarantees of the health status of commodities originating their national territory; and
- protect the existing aquaculture, fisheries and biodiversity of the Pacific, and the people who depend on them for their livelihoods, from negative impacts due to aquatic animal diseases and pests.

140. The proposal seeks funding for an initial two-year programme that will be carried out in collaboration with SPREP and other relevant international agencies. Due to the technical complexity of aquatic animal health and the lack of capacity, capability and infrastructure in many countries, there is likely to be a long-term need for such a regional activity. If the project is initially successful then additional, longer-term and more permanent funding arrangements will be explored. The target is for operation of an effective and self-sustaining Unit, with full regional coverage, by 2010, in line with the provisions of WSSD.

141. In November 2007, the 5th Pacific Community Conference was held, with the theme of “The future of Pacific fisheries”. In closing on 17 November, the conference endorsed recommendations contained in the thematic presentation “The future of Pacific fisheries: Planning and managing for economic growth, food security and sustainable livelihoods” (Bell et al. in press). Through its decision, the conference authorised SPC, in partnership with FFA, to carry out a study of the future of Pacific fisheries. The study will look at the most sustainable ways of harnessing the contribution of tuna to national and regional economic growth, of providing access to the fish needed for food security to 2030, and of optimising the contributions of coastal fisheries to livelihoods and food security.

142. Finally, although not primarily concerned with coastal fisheries and aquaculture, SPC’s Oceanic Fisheries Programme is also promoting the implementation of the EAF for oceanic fisheries, and has recently appointed an ecological risk assessment specialist to work with the WCPFC and FFA on bycatch issues in the regional tuna fishery.

6.3. Pacific Islands Forum Fisheries Agency (FFA)

143. Since 2005, FFA has advocated the ecosystem approach to the management of tuna fisheries by its 17 member countries and territories within the western and central Pacific Ocean (WCPO) (Sauni and Amos 2007). This is being done to help sustainably manage tuna resources within national waters, consistent with the relevant articles and provisions outlined in various international conventions and instruments, including the UNCLOS, the Fish Stocks Agreement (FSA), the UNCED, and the WCPFC.

144. To assist member countries implement the EAF in regard to tuna fisheries, FFA has developed its own EAF Framework, which has now been through several iterations and is currently in its fifth version (Fletcher 2008). The framework is used to guide the EAF planning process through which stakeholders define and agree on the scope and content of the EAF plan. The planning process has five stages:

- determining the scope of the assessment or management system;
- identifying issues and agreeing on values;
- using risk analysis to prioritise issues;
- developing management systems; and
- developing operational and implementation arrangements.

145. The approach looks at impacts on the environment by tuna fisheries, and impacts on tuna fisheries by other environmental factors, as well as taking into account economic and social goals. FFA has run a number of EAF workshops in its member countries to help incorporate EAF considerations into tuna fishery management and development plans and strategies (FFA 2007). These workshops are raising awareness of EAF considerations among the Pacific fisheries community, and will assist the development of EAF approaches to coastal fisheries and aquaculture, although some modification and adaptation may be required, because:

- the regional tuna fishery is a multinational operation in which science and monitoring are relatively well developed, and in which primary management responsibility lies with national governments. Management issues (e.g. bycatch and discards, impacts of FADs, capacity limitation, maximisation of resource rents) and to a certain degree ecosystem concerns are already identified and reasonably well understood;
- in contrast, national coastal fisheries and the ecosystems in which they exist suffer from a lack of research and monitoring, may involve management at several different levels of government and society, and are characterised by social and economic complexity and a limited understanding of ecosystem issues.

146. As a result, implementation of the EAF for the regional tuna fishery and for local coastal fisheries may require somewhat different approaches. The FFA approach provides a good model on which EAF processes for coastal fisheries and aquaculture can be built. This topic is developed further in the companion report to the present document, “The Ecosystem Approach to Coastal Fisheries and Aquaculture in Pacific Island Countries and Territories—Part 2: Principles and approaches for strategic implementation”.



6.4. Other CROP agencies

147. The **Pacific Islands Applied Geoscience Commission (SOPAC)** provides assistance to its member countries in three key programme areas:

- Ocean and Islands is an integrated programme focused on research, development and management of non-living resources in ocean and island systems, addressing issues relating to seabed resources (e.g. sand, aggregates, minerals), energy, maritime boundary delimitation and monitoring of ocean processes;
- Community Lifelines is a diversified programme that strengthens national capacities in energy, water and sanitation, information and communications technologies;
- Community Risk is a comprehensive programme aimed at reducing community vulnerability through improved hazard assessment, risk management and responses to natural disasters.

148. Within its mandate and expertise, SOPAC endeavours to contribute to sustainable development in the Pacific by addressing a number of fundamental issues, including the high dependence on the direct use of natural resources, and degradation of the natural environment. The goal of the Ocean and Islands programme area is to “To improve scientific knowledge of ocean and island ecosystems for the sustainable management of natural resources”. In this context, the ecosystem-based approach is understood to include all physical, chemical and biological attributes together with living and non-living resources. SOPAC’s role is focused on the physical and chemical attributes of ecosystems and assessment of their non-living components (www.sopac.org).

149. SOPAC has recently taken the lead in a proposed multi-agency project for funding under the EU programme “Environment and sustainable management of natural resources, including energy”, which aims to “integrate environmental protection requirements into the (European) Community’s development and other external policies as well as to help promote the Community’s environmental and energy policies abroad in the common interest of the Community and partner countries and regions”. The proposal, which will be implemented in collaboration with SPC, SPREP, USP and a range of other potential partners, is entitled “Building Essential Capacity to Strengthen Access to Marine Biodiversity Information in the Pacific Islands Region”. The project aims to:

- implement a data management and assessment framework for the effective stewardship and delivery of marine biodiversity data (species, habitats, and ecosystems) for the Pacific Islands region; and
- build the human resource capacity to make use of the data management framework to ensure that data and information products are used effectively for marine biodiversity conservation, such as for the design, implementation, and monitoring of MPAs, and reporting of agreed targets for biodiversity conservation in accord with national, regional, and international commitments.

150. The overall goal of the project is thus to strengthen national and regional technical and human capacity to access, share, and use information on marine biodiversity (species, habitats and ecosystems) and management interventions (e.g. MPAs). By building mechanisms that will strengthen access to marine biodiversity data and information, the project is expected to lead to improved sustainable management of biodiversity resources, improved management of protected areas, and increased cross-border collaboration and networking. All of these outcomes are highly relevant to implementation of the EAF.

151. The **Secretariat of the Pacific Regional Environment Programme (SPREP)** carries out its activities through two main programme areas:

- Pacific Futures deals with pollution and waste management, climate change, environmental management and sustainable development; and

- Island Ecosystems, covers biodiversity and nature conservation, coastal and marine ecosystems and species, invasive species, capacity development, education and knowledge management.

152. The objective of the Coastal and marine ecosystems component of the Island Ecosystems programme is to promote and support the sustainable management and conservation of coastal and marine ecosystems. The main focus to date has been on promoting CBM approaches, fostering sustainable livelihoods, building capacity in resource assessment and monitoring, and providing training in management best practice through a train-the-trainers approach. This component of SPREP's work programme has been funded and carried out in partnership with a range of collaborating agencies, including the United Nations Environment Programme (UNEP), United Nations Development Programme, the MacArthur and Packard Foundations, the recent GEF-funded International Waters Project, and Coral Reef Initiatives in the Pacific (CRISP) (SPREP internal document, December 2007).

153. Some specific activities carried out under this programme area include:

- an integrated coastal management project, called the "Ridge to Reef" project, in Vanuatu. The project is being funded through UNEP Global Plan of Action on Land-Based Sources of Marine Pollution and supported by SOPAC;
- a project to assess and manage the impacts of climate change on marine and terrestrial biodiversity in Melanesia. The project is a joint initiative of the Bishop Museum in Hawai'i and SPREP, and is funded by the MacArthur Foundation;
- a pilot project (with FSPI) in Vanuatu to demonstrate the use of good management practices to maintain ecosystem services provided by coastal/marine environments as insurance against future impacts, funded by the MacArthur Foundation.

154. Community-based initiatives, including understanding the social and economic driving factors in community decision-making on resource use and conservation, and empowering local communities through co-management of projects, will continue to be the basis for this programme in the future (www.sprep.org).

155. SPREP has also facilitated the development of a regional framework for marine managed areas (MMAs) as a strategic response to strengthen marine conservation efforts in the region, and this was endorsed by the 17th SPREP meeting in 2006. Subsequently, in partnership with Conservation International, UNESCO and NOAA, SPREP organised in late 2007 a "Regional Forum for Oceania on Marine Managed Areas". This has led to the preparation of a concept note for a follow-up regional meeting on MMA policy and administration. Additional support for capacity building in support of MMA network planning and management will be sought under the 10th European Development Fund, which should commence in early 2009. It is hoped that this will provide the means to incorporate MMA networks into integrated coastal management arrangements (SPREP internal document, December 2007).

156. The **University of the South Pacific (USP)** provides tertiary education in the Pacific region and undertakes research and consulting on aspects of Pacific life, primarily for its 12 member countries (Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu). A number of USP programmes and facilities undertake teaching and research of direct or indirect relevance to coastal ecosystem management:

- within the Faculty of Science and Technology, the School of Biological, Chemical and Environmental Sciences offers various courses on coral reef biology and ecology, geology, hydrology, oceanography, and climatic issues;

- also within the Faculty of Science and Technology, the Institute of Applied Science Environment Unit conducts environmental impact assessments, and works with communities to assist them in the development and implementation of resource management plans. Major projects of the unit are the Locally Managed Marine Area (LMMA) Project, which focuses on CBM of marine resources in a number of sites around Fiji, and the Integrated Coastal Management (ICM) Project, which has a pilot site on Fiji's Coral Coast. The unit is also the Pacific focal point for the LMMA Network, a learning portfolio of community-based marine conservation projects in Asia and the Pacific. A short (1-week) MPA Management Capacity Building Course will be run in September 2008, in partnership with the International Ocean Institute (IOI)—Australia and the US National Marine Fisheries Service (NMFS). A longer (6-week) MMA course is provisionally scheduled for November 2008;
- within the Faculty of Islands and Oceans, the Pacific Centre for Environment and Sustainable Development undertakes teaching, training and research-based capacity building for environment and sustainable development;
- also within the Faculty of Islands and Oceans, the School of Marine Studies (SMS) assists island countries understand, develop and sustainably use their marine resources. SMS offers a range of courses that focus on the coastal and marine resources of the Pacific Islands and their management. The school offers diploma, certificate, graduate and post-graduate programmes in Marine Science, Marine Affairs and Sustainable Fisheries. SMS also supports marine programmes in other sections of the Faculty of Islands and Oceans, and other faculties in the university;
- as part of the SMS, the Institute of Marine Resources (IMR) undertakes research, consultancy and training in aspects of marine resource science and management. IMR receives only limited funding from the university and the focus of its work is externally funded research and consultancies on the region's marine environment and resources. Current activities centre on aquaculture, on coral reef monitoring, and on fisheries socioeconomics. IMR coordinates the southwest Pacific node of the Global Coral Reef Monitoring Network, and during 2007–2008 began hosting a WorldFish Center-managed project, ReefBase Pacific, which is part of the French-funded CRISP project (see section 6.6).

157. After being initially based in Fiji, IMR was relocated to Solomon Islands in 1995, until civil tensions forced its move back to Fiji in 2000. It is expected that the IMR will return to Solomon Islands at some appropriate time in the future (www.usp.ac.fj).

6.5. Non-governmental organisations

158. A wide range of NGOs are active in the conservation and management of marine resources, spaces and biodiversity in the Pacific Islands region. NGOs often have effective systems and networks for accessing communities and other marine sector stakeholders, and can be valuable partners for certain type of projects or activities, provided that the goals of all partners are convergent. In some situations this is not the case, and conflicts or misunderstandings can arise because governments are following national policies and priorities while NGOs are adhering to their own global goals (see for example Foale 2007). As a result, the attitudes of PICT government agency representatives to NGOs can be ambivalent, with some considering that NGOs build their own capacity at the expense of government, draining government resources in the process, while others are happy to work with NGOs as advisors and implementers.

159. Section 4.2 gives an overview of NGO locations and activities in SPC member countries based on the SPC questionnaire survey. The following paragraphs deal with those larger international NGOs that have bases in more than one PICT, and which operate regional or multi-country programmes and projects.

160. **Conservation International (CI)** has been present in the Pacific Islands region since 1991, and now has offices in Fiji, Samoa, New Caledonia, PNG and Solomon Islands as well as the Papuan province of Indonesia, all of which are managed through CI's Indo-Pacific Division based in North Queensland, Australia. CI works to foster the conservation of Melanesia's native biodiversity, natural ecosystems, and traditional cultures, particularly through projects in "biodiversity hotspots" identified in Fiji, New Caledonia, PNG, Solomon Islands and Vanuatu. Threats to marine ecosystems recognised by CI in these areas include coral bleaching, overharvesting of pelagic fisheries, destruction of mangrove ecosystems, the live reef fish trade, shark-finning, the overharvesting of sedentary species such as beche-de-mer, giant clam and trochus, and unsustainable harvesting of other commercially valuable species.

161. For several years CI managed a major marine biodiversity and resource conservation and management programme in PNG's Milne Bay Province, but this closed prematurely in October 2006 following disagreement between project partners and donors over programme management arrangements. The majority of current CI projects focus on terrestrial ecosystem conservation.

162. The **Foundation for Peoples of the South Pacific International (FSPI)** is based in Fiji, with projects and offices in Kiribati, Solomon Islands, Tuvalu and Vanuatu. FSPI operates under five main programme areas: Governance; Communities and Coasts; Health; Disaster Preparedness; and Mainstreaming Rural Development Innovations. The Communities and Coasts programme works "towards self reliant coastal communities securing their quality of life through sustainable and integrated resource management" through three strategic action areas:

- Capacity building to enable national NGOs and governments to facilitate and support community-based coastal management processes;
- Research and development—applied research on the technical and socioeconomic aspects of coastal resource use and management, and development of community appropriate awareness raising materials and other tools;
- Policy development and advocacy activities to support and promote community-based approaches and appropriate legal frameworks.

163. FSPI's aim is to improve resource management policy by ensuring community-based approaches are incorporated into national, regional and international policy frameworks. FSPI believes that community-based coastal resource management is a powerful development tool for reducing poverty, implementing biodiversity conservation and promoting sustainable economic development in the Pacific. It focuses on enhancing environmental governance skills to enable communities to interact more effectively with government, and ensure that community issues are reflected at the national, regional and international level.



164. The mission of **The Nature Conservancy (TNC)** is “to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive”. TNC’s work is guided by a framework called Conservation by Design, which marries a collaborative, science-based approach with key analytical methods in order to determine the organisation’s conservation targets and strategies.

165. TNC’s marine programme aims to protect and restore the most resilient examples of ocean and coastal habitats in ways that benefit marine life, local communities and economies by building resilience into protected areas; applying market-based strategies; protecting and restoring oceans and coasts; and setting priorities with science. TNC has provided long-term support to PNG’s Kimbe Bay Marine Protected Area and the Arnavon Community Marine Conservation Area in Solomon Islands, both of which are based on the establishment of community-run MMAs. TNC has also carried out a marine biological inventory and helped set up a mooring buoy programme to protect coral reefs in Palau, and is helping strengthen the organisational and technical skills of conservation leaders in the Federated States of Micronesia (FSM), as well as carrying out rapid ecological assessments in PNG, Solomon Islands and other PICTs.

166. TNC’s marine work in the Pacific aims to: establish resilient networks of MPAs; protect watersheds, associated marine ecosystems and the ecosystem services they provide—the Ridge to Reef approach; combat the threat of invasive species; model ecosystem-based approaches to sustainable fisheries management; apply new knowledge gained from research on climate change to marine and island conservation strategies and projects around the Pacific; build strong learning and leadership networks, and establish model sustainable financing plans and mechanisms. TNC works with governments, non-government organisations, businesses and local communities to achieve these goals.

167. TNC works in seven Pacific Island jurisdictions: PNG, Solomon Islands, Palau, FSM, Guam, Northern Marianas and Marshall Islands. In Kimbe Bay, PNG, TNC is working with local communities and governments to implement a resilient network of MPAs. Experience and lessons learned from Kimbe Bay have laid the framework for expanding marine conservation efforts to the larger Bismarck Sea, initially with a focus on Manus and Kavieng. In Solomon Islands TNC has had a long-term commitment to the Arnavon Community Marine Conservation Area and has recently helped secure long-term funding for a conservation endowment. TNC is also supporting local partners to assist the communities of Choiseul and Isabel provinces in establishing new LMMAs.

168. TNC is also working to support implementation of the goals set forth by the Micronesia Challenge, a commitment by the chief executives of Palau, FSM, Guam, Northern Marianas and Marshall Islands to effectively conserve at least 30% of nearshore marine resources and 20% of terrestrial resources by 2020. TNC is a) providing technical assistance in the establishment of Palau’s Protected Area Network; b) supporting rapid ecological assessments across the region; c) targeting conservation efforts and research on important spawning aggregation sites; d) supporting partners in applying conservation action planning approaches; e) building sustainable finance mechanisms for protected area networks; and f) helping to strengthen the organisational and technical skills of conservation leaders.

169. The work of the **World Wide Fund for Nature (WWF)** focuses globally on several thematic areas. Forests, Marine, and Freshwater programmes are concentrated in the parts of the world considered to be the highest priority areas for conservation attention. A key focus of these programmes is the establishment of new protected areas, improved management of protected areas, and more sustainable uses of natural resources. The WWF Species Programme focuses on the conservation of charismatic species and their habitats. The Climate Change Programme aims to reduce emissions of climate changing gases that are causing global warming and to develop strategies to reduce vulnerabilities to climate change. As well as protecting plants, animals and the environment, local livelihoods and governance are central to WWF’s day-to-day work.

170. The WWF South Pacific Programme Office (WWF-SPPO) was established in 1990 as part of WWF's endeavour to work locally in the region. The programme is managed from a regional base in Suva, Fiji and organises conservation field projects, policy reviews and campaigns in different Pacific Island countries on behalf of the WWF network. Country programme offices have been established in Cook Islands, Fiji, Solomon Islands and PNG. WWF-SPPO also works closely with WWF France on projects in New Caledonia and French Polynesia. In 2004, WWF SPPO had more than 100 staff. The goal of the WWF-SPPO is to "support Pacific Island people to conserve and sustainably manage our natural inheritance for present and future generations".

171. Given the importance of the sea to the livelihoods of many Pacific peoples, WWF works with communities to enable them to earn money sustainably from marine resources, without excessive and irreversible damage to the marine environment. For example:

- in Solomon Islands the WorldFish Center and WWF are currently helping to develop sustainable culture of marine ornamental fish and invertebrates as a village-based industry;
- in the Bismarck-Solomons Sea Eco-region, which straddles Solomon Islands and PNG, WWF and its partners have identified 48 sites, including 6 considered to be of global significance, that will be the targets of CBM and conservation approaches;
- in Fiji, WWF is helping to establish MPAs, has carried out a strategic environment assessment of Fiji's tourism trade, and is currently identifying candidate fisheries for certification by the Marine Stewardship Council;
- in Cook Islands WWF has assisted in the formulation of management plans for marine areas that are being brought back under the control of a revived system of traditional management. Work in Cook Islands has led to the production of a draft ecoregion reconnaissance report for eastern Polynesia, and this will be expanded through the collection of similar information from French Polynesia.

172. WWF's work in the Pacific region centres around community-based approaches to conservation, based on the premise that the communities' livelihoods, customs and traditions are intertwined with natural resources. The organisation's view is that sustainable livelihood, development and conservation efforts are most successful when community groups adopt conservation initiatives and make their own management choices.

6.6. Coral reef conservation initiatives

173. A particular concern both in the region and worldwide is the conservation of coral reefs, which are increasingly being recognised as sensitive habitats that are susceptible to degradation from local human activities as well as larger scale issues such as global warming, ocean acidification and sea level rise. There now exists a quite complex web of inter-related projects, programmes and networks dedicated to coral reef conservation, and some of these are profiled in Box 2. Many coral reef conservation and management activities are carried out jointly between subsets of these programmes working in partnership with regional and international agencies, research organisations and members of the NGO community.



Box 2: Selected multilateral coral reef initiatives in the Pacific Islands region**International Coral Reef Initiative (ICRI)**

ICRI is a partnership of governments, NGOs and experts working on coral reef management. Pacific Island government members include Fiji, Palau, PNG, Samoa and Solomon Islands. ICRI is hosted by two governments at a time for periods of two years. The current secretariat is with the US and Mexico, the previous secretariat was with Palau and Japan. ICRI operates through two networks, the International Coral Reef Action Network (ICRAN) and the Global Coral Reef Monitoring Network (GCRMN). While ICRI passes resolutions, they do not constitute decisions in a UN sense. However ICRI is well placed to influence the UN process and for the past ten years has been actively and successfully lobbying for coral reef conservation. Recent resolutions have concerned establishing the International Year of the Coral Reef (2008), climate change, ocean acidification and mangrove conservation.

Every four years ICRI runs the International Tropical Marine Ecosystem Management Symposium which brings together coral reef managers, researchers, governments and NGOs. The main purpose of the forum is to set the agenda for ICRI for the next four years. At the 2006 symposium SPREP co-convened a session on coastal fisheries and aquaculture, focussing on CBM approaches and sustainable livelihoods. (Proceedings of the meeting can be found on the ICRI website, www.icriforum.org). As a result of its 10-year review, ICRI has resolved to hold regional symposia every two years, to ensure the work of ICRI is responsive to the needs of coral reef management practitioners. A Pacific symposium is planned although dates have not yet been finalised.

US Coral Reef Task Force (USCRTF)

The USCRTF is co-chaired by the US Departments of Commerce and of the Interior, and includes leaders of 12 federal agencies, seven US states and three freely associated states. The task force provides a forum for coordinated planning and action among federal agencies, state and territorial governments and nongovernmental partners, and has developed national strategies, targeted initiatives and new partnerships to strengthen stewardship of coral reef ecosystems in the US, territories, commonwealths and internationally. The USCRTF is an important forum particularly for the US territories and freely-associated states of the region and helps facilitate funding for projects in PICTs from US agencies (e.g. NOAA international coral grant program).

US All Islands Coral Reef Committee (USAIC)

The USAIC is a collaboration of marine resource managers from state, commonwealth, territorial and freely-associated state agencies working together with federal agencies to conserve and protect coral reefs in the US. It includes representatives from American Samoa, Northern Marianas, Guam, Puerto Rico and the US Virgin Islands as well as Hawaii and other US states, while FSM, Marshall Islands and Palau are affiliate members. The committee aims to promote greater collaboration among participants through information exchange, training and cooperative projects. One such activity is the Two Samoas project, which will promote collaboration in both terrestrial and marine conservation between Samoa and American Samoa, and which has been mediated through the USAIC. The committee usually meets immediately before the USCRTF.

International French Coral Reef Initiative (IFRECOR)

IFRECOR is a joint initiative among French overseas territories (including New Caledonia and French Polynesia) established on the instructions of France's Prime Minister. The initiative encompasses all actions and measure concerning reefs and its main concerns are the protection and sustainable management of coral reefs of overseas territories. Local IFRECOR activities are overseen by territorial committees in New Caledonia and French Polynesia, which aim to develop action frameworks and establish networks across the territories. The IFRECOR Secretariat is in Paris.

Coral Reef Initiatives for the Pacific (CRISP)

CRISP is a French-funded initiative with a wide range of technical and institutional partners (including ICRAN, IFRECOR, WorldFish Center, SPREP and SPC and many international conservation NGOs) that aims to improve understanding and management of coral reefs, including through the establishment of MPAs and the promotion of ICM. Component 1 aims specifically "to link community-based marine management, marine resource conservation strategic planning and coastal zone (watershed and coastal reef) management to contribute to sustainable South Pacific Coral reef development", while components 2 and 3 focus on "Knowledge, Management, Rehabilitation and Development of Coral Ecosystems" and "Institutional and Technical Support, Communication, Coordination and Extension", respectively. The CRISP Coordination Unit is hosted by SPC in Noumea.

Coral Triangle Initiative (CTI) on coral reefs, fisheries and food security

In August 2007 President Yudhoyono of Indonesia wrote to a group of other leaders proposing a new Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security—a multilateral partnership centred around high-level political commitments and follow-up action by six governments to safeguard the region's marine and coastal biological resources. The "CT6" governments are Indonesia, Malaysia, Philippines, PNG, Solomon Islands and Timor-Leste. In December 2007, senior officials from the CT6 governments agreed on five broad goals to be included in a plan of action for managing the Coral Triangle, including implementation of the ecosystem approach to managing their fisheries. Subsequently, the GEF committed USD 20–25 million and the US government about USD 4 million in support of the initiative, with additional major funding commitments expected in future. In May 2008, an updated plan of action further committed participating governments to "institutionalise the EAF within the government" and "engage the fishing industry in supporting the EAF" by 2012.

7. CONCLUSIONS

174. A wide range of international treaties and conventions commit PICTs to the adoption and implementation of the EAF. The WSSD urges UN member countries to make significant progress by the year 2010.

175. Implementing the ecosystem approach to coastal fisheries and aquaculture is progressing at a moderate pace in PICTs. Some countries have adapted their fisheries management arrangements to include EAF-compliant measures such as CBM or co-management, and the establishment of MMAs, often with NGO support and assistance. Fishery development activities may include targeting pelagic resources, deploying FADs, developing pond aquaculture and other approaches that will relieve fishing pressure on coastal ecosystems. In some countries attempts are being made to manage land-based activities that result in degradation of coastal environments, and to overcome institutional barriers to integrated coastal management by establishing inter-agency committees and working groups.

176. In general, however, these measures have not been applied within an EAF framework, and few if any countries have enshrined a commitment to the EAF in their legislation or official policies. Strategic planning and policy development in support of the EAF is weak, and many countries experience problems of political will, poor inter-agency collaboration, and institutional inertia. This situation seems nevertheless to be changing, with major multi-country, multi-partner initiatives such as the Micronesian Challenge and the Coral Triangle Initiative engaging governments, NGOs and the donor community in strong public commitments and actions to implement the EAF.

177. A more complete implementation of the EAF would require strengthened ICM arrangements to mitigate the impacts of non-fishery activities, development of better research and data collection systems to ensure that management is monitored and adapted as needed, and the improvement of human and institutional capacities in support of these changes. Continued emphasis will need to be placed on the use of CBM, co-management and other participatory management arrangements, more use of MMAs or other mechanisms for enhancing ecosystem resilience, and scaling back ambitious expectations in regard to fishery production and development prospects.

178. Implementing the EAF will continue to present challenges for many PICTs, but these challenges are far from insurmountable, and can be addressed progressively, one step at a time. Many of the difficulties the EAF presents are not new, and already apply to a wide range of governance improvements that require changes in departments, policies and management arrangements, particularly where stakeholders may feel the need to protect their interests. There is a strong parallel between the EAF and the ICM process, in that a major challenge is the need to bring together a wide range of stakeholders with conflicting mandates or interests, and persuade them to agree on mutually acceptable goals and management approaches. A plethora of regional and international agencies, NGOs and donors are well-positioned to support national efforts and bring significant resources to bear in doing so.

179. More important than the challenges are the opportunities that the EAF presents to establish fishery and coastal ecosystem management arrangements that are in line with the Pacific Way, and contribute more effectively to the maintenance of livelihoods, lifestyles and ecosystem services than conventional fishery management systems have done. Introduction of the EAF will take place progressively, perhaps in very small steps, but will eventually reach a tipping point where the EAF will become the norm rather than the exception. A parallel exists in the trend that has been observed over the past 20 years from the "get more fish" approach of fisheries development, to the focus on improved fisheries management, CBM and MMAs that dominates the fisheries scene today. Implementation of the EAF is a continuation of the same trend towards achieving sustainable fisheries development.

180. Many EAF principles are in line with traditional and customary ways of doing things in the Pacific, such as avoidance of sectoral specialisations, greater local participation in decision-making, and recognition of the non-commercial values and benefits that coastal resources and ecosystems can yield. Although much of the literature on the EAF emphasises the need for strong science and data, many EAF principles can be—and have been—applied in their absence of such science and data. This is particularly true in the case of artisanal or community fisheries, where management decisions can be made based on other forms of information and knowledge. The SPC workshop on the EAF, held in November 2007, noted that the EAF should be a management process, not a research process. In that context the EAF stands as an opportunity for PICTs to progress towards significantly improved coastal fishery and ecosystem management arrangements for the benefit of all stakeholders.



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CBD COP NAIROBI (2000)—DECISION V/6**The Conference of the Parties,**

1. Endorses the description of the ecosystem approach and operational guidance contained in sections A and C of the annex to the present decision, recommends the application of the principles contained in section B of the annex, as reflecting the present level of common understanding, and encourages further conceptual elaboration, and practical verification;
2. Calls upon Parties, other Governments, and international organizations to apply, as appropriate, the ecosystem approach, giving consideration to the principles and guidance contained in the annex to the present decision, and to develop practical expressions of the approach for national policies and legislation and for appropriate implementation activities, with adaptation to local, national, and, as appropriate, regional conditions, in particular in the context of activities developed within the thematic areas of the Convention;
3. Invites Parties, other Governments and relevant bodies to identify case-studies and implement pilot projects, and to organize, as appropriate, regional, national and local workshops, and consultations aiming to enhance awareness, share experiences, including through the clearing-house mechanism, and strengthen regional, national and local capacities on the ecosystem approach;
4. Requests the Executive Secretary to collect, analyse and compare the case-studies referred to in paragraph 3 above, and prepare a synthesis of case-studies and lessons learned for presentation to the Subsidiary Body on Scientific, Technical and Technological Advice prior to the seventh meeting of the Conference of the Parties;
5. Requests the Subsidiary Body on Scientific, Technical and Technological Advice, at a meeting prior to the seventh meeting of the Conference of the Parties, to review the principles and guidelines of the ecosystem approach, to prepare guidelines for its implementation, on the basis of case-studies and lessons learned, and to review the incorporation of the ecosystem approach into various programmes of work of the Convention;
6. Recognizes the need for support for capacity-building to implement the ecosystem approach, and invites Parties, Governments and relevant organizations to provide technical and financial support for this purpose;
7. Encourages Parties and Governments to promote regional cooperation, for example through the establishment of joint declarations or memoranda of understanding in applying the ecosystem approach across national borders.

ANNEX A**DESCRIPTION OF THE ECOSYSTEM APPROACH**

1. The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Thus, the application of the ecosystem approach will help to reach a balance of the three objectives of the Convention: conservation; sustainable use; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

2. An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organization, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of many ecosystems.

3. This focus on structure, processes, functions and interactions is consistent with the definition of “ecosystem” provided in Article 2 of the Convention on Biological Diversity: “Ecosystem” means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.” This definition does not specify any particular spatial unit or scale, in contrast to the Convention definition of “habitat”. Thus, the term “ecosystem” does not, necessarily, correspond to the terms “biome” or “ecological zone”, but can refer to any functioning unit at any scale. Indeed, the scale of analysis and action should be determined by the problem being addressed. It could, for example, be a grain of soil, a pond, a forest, a biome or the entire biosphere.

4. The ecosystem approach requires adaptive management to deal with the complex and dynamic nature of ecosystems and the absence of complete knowledge or understanding of their functioning. Ecosystem processes are often non-linear, and the outcome of such processes often shows time-lags. The result is discontinuities, leading to surprise and uncertainty. Management must be adaptive in order to be able to respond to such uncertainties and contain elements of “learning-by-doing” or research feedback. Measures may need to be taken even when some cause-and-effect relationships are not yet fully established scientifically.

5. The ecosystem approach does not preclude other management and conservation approaches, such as biosphere reserves, protected areas, and single-species conservation programmes, as well as other approaches carried out under existing national policy and legislative frameworks, but could, rather, integrate all these approaches and other methodologies to deal with complex situations. There is no single way to implement the ecosystem approach, as it depends on local, provincial, national, regional or global conditions. Indeed, there are many ways in which ecosystem approaches may be used as the framework for delivering the objectives of the Convention in practice.

ANNEX B

PRINCIPLES OF THE ECOSYSTEM APPROACH

6. The following 12 principles are complementary and interlinked:

Principle 1: The objectives of management of land, water and living resources are a matter of societal choice.

Rationale: Different sectors of society view ecosystems in terms of their own economic, cultural and societal needs. Indigenous peoples and other local communities living on the land are important stakeholders and their rights and interests should be recognized. Both cultural and biological diversity are central components of the ecosystem approach, and management should take this into account. Societal choices should be expressed as clearly as possible. Ecosystems should be managed for their intrinsic values and for the tangible or intangible benefits for humans, in a fair and equitable way.

Principle 2: Management should be decentralized to the lowest appropriate level.

Rationale: Decentralized systems may lead to greater efficiency, effectiveness and equity. Management should involve all stakeholders and balance local interests with the wider public interest. The closer management is to the ecosystem, the greater the responsibility, ownership, accountability, participation, and use of local knowledge.

Principle 3: Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.

Rationale: Management interventions in ecosystems often have unknown or unpredictable effects on other ecosystems; therefore, possible impacts need careful consideration and analysis. This may require new arrangements or ways of organization for institutions involved in decision-making to make, if necessary, appropriate compromises.

Principle 4: Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should:

- (a) Reduce those market distortions that adversely affect biological diversity;*
- (b) Align incentives to promote biodiversity conservation and sustainable use;*
- (c) Internalize costs and benefits in the given ecosystem to the extent feasible.*

Rationale: The greatest threat to biological diversity lies in its replacement by alternative systems of land use. This often arises through market distortions, which undervalue natural systems and populations and provide perverse incentives and subsidies to favour the conversion of land to less diverse systems.

Often those who benefit from conservation do not pay the costs associated with conservation and, similarly, those who generate environmental costs (e.g. pollution) escape responsibility. Alignment of incentives allows those who control the resource to benefit and ensures that those who generate environmental costs will pay.

Principle 5: Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.

Rationale: Ecosystem functioning and resilience depends on a dynamic relationship within species, among species and between species and their abiotic environment, as well as the physical and chemical interactions within the environment. The conservation and, where appropriate, restoration of these interactions and processes is of greater significance for the long-term maintenance of biological diversity than simply protection of species.

Principle 6: Ecosystems must be managed within the limits of their functioning.

Rationale: In considering the likelihood or ease of attaining the management objectives, attention should be given to the environmental conditions that limit natural productivity, ecosystem structure, functioning and diversity. The limits to ecosystem functioning may be affected to different degrees by temporary, unpredictable or artificially maintained conditions and, accordingly, management should be appropriately cautious.

Principle 7: The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.

Rationale: The approach should be bounded by spatial and temporal scales that are appropriate to the objectives. Boundaries for management will be defined operationally by users, managers, scientists and indigenous and local peoples. Connectivity between areas should be promoted where necessary. The ecosystem approach is based upon the hierarchical nature of biological diversity characterized by the interaction and integration of genes, species and ecosystems.

Principle 8: Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.

Rationale: Ecosystem processes are characterized by varying temporal scales and lag-effects. This inherently conflicts with the tendency of humans to favour short-term gains and immediate benefits over future ones.

Principle 9: Management must recognize that change is inevitable.

Rationale: Ecosystems change, including species composition and population abundance. Hence, management should adapt to the changes. Apart from their inherent dynamics of change, ecosystems are beset by a complex of uncertainties and potential “surprises” in the human, biological and environmental realms. Traditional disturbance regimes may be important for ecosystem structure and functioning, and may need to be maintained or restored. The ecosystem approach must utilize adaptive management in order to anticipate and cater for such changes and events and should be cautious in making any decision that may foreclose options, but, at the same time, consider mitigating actions to cope with long-term changes such as climate change

Principle 10: The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.

Rationale: Biological diversity is critical both for its intrinsic value and because of the key role it plays in providing the ecosystem and other services upon which we all ultimately depend. There has been a tendency in the past to manage components of biological diversity either as protected or non-protected. There is a need for a shift to more flexible situations, where conservation and use are seen in context and the full range of measures is applied in a continuum from strictly protected to human-made ecosystems.

Principle 11: The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.

Rationale: Information from all sources is critical to arriving at effective ecosystem management strategies. A much better knowledge of ecosystem functions and the impact of human use is desirable. All relevant information from any concerned area should be shared with all stakeholders and actors, taking into account, inter alia, any decision to be taken under Article 8(j) of the Convention on Biological Diversity. Assumptions behind proposed management decisions should be made explicit and checked against available knowledge and views of stakeholders.

Principle 12: The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

Rationale: Most problems of biological-diversity management are complex, with many interactions, side-effects and implications, and therefore should involve the necessary expertise and stakeholders at the local, national, regional and international level, as appropriate.

ANNEX C

OPERATIONAL GUIDANCE FOR APPLICATION OF THE ECOSYSTEM APPROACH

7. In applying the 12 principles of the ecosystem approach, the following five points are proposed as operational guidance.

1. Focus on the functional relationships and processes within ecosystems

8. The many components of biodiversity control the stores and flows of energy, water and nutrients within ecosystems, and provide resistance to major perturbations. A much better knowledge of ecosystem functions and structure, and the roles of the components of biological diversity in ecosystems, is required, especially to understand: (i) ecosystem resilience and the effects of biodiversity loss (species and genetic levels) and habitat fragmentation; (ii) underlying causes of biodiversity loss; and (iii) determinants of local biological diversity in management decisions. Functional biodiversity in ecosystems provides many goods and services of economic and social importance. While there is a need to accelerate efforts to gain new knowledge about functional biodiversity, ecosystem management has to be carried out even in the absence of such knowledge. The ecosystem approach can facilitate practical management by ecosystem managers (whether local communities or national policy makers).

2. Enhance benefit-sharing

9. Benefits that flow from the array of functions provided by biological diversity at the ecosystem level provide the basis of human environmental security and sustainability. The ecosystem approach seeks that the benefits derived from these functions are maintained or restored. In particular, these functions should benefit the stakeholders responsible for their production and management. This requires, inter alia: capacity-building, especially at the level of local communities managing biological diversity in ecosystems; the proper valuation of ecosystem goods and services; the removal of perverse incentives that devalue ecosystem goods and services; and, consistent with the provisions of the Convention on Biological Diversity, where appropriate, their replacement with local incentives for good management practices.

3. Use adaptive management practices

10. Ecosystem processes and functions are complex and variable. Their level of uncertainty is increased by the interaction with social constructs, which need to be better understood. Therefore, ecosystem management must involve a learning process, which helps to adapt methodologies and practices to the ways in which these systems are being managed and monitored. Implementation programmes should be designed to adjust to the unexpected, rather than to act on the basis of a belief in certainties. Ecosystem management needs to recognize the diversity of social and cultural factors affecting natural-resource use. Similarly, there is a need for flexibility in policy-making and implementation. Long-term, inflexible decisions are likely to be inadequate or even destructive. Ecosystem management should be envisaged as a long-term experiment that builds on its results as it progresses. This “learning-by-doing” will also serve as an important source of information to gain knowledge of how best to monitor the results of management and evaluate whether established goals are being attained. In this respect, it would be desirable to establish or strengthen capacities of Parties for monitoring.

4. Carry out management actions at the scale appropriate for the issue being addressed, with decentralization to lowest level, as appropriate

11. As noted in section A above, an ecosystem is a functioning unit that can operate at any scale, depending upon the problem or issue being addressed. This understanding should define the appropriate level for management decisions and actions. Often, this approach will imply decentralization to the level of local communities. Effective decentralization requires proper empowerment, which implies that the stakeholder both has the opportunity to assume responsibility and the capacity to carry out the appropriate action, and needs to be supported by enabling policy and legislative frameworks. Where common property resources are involved, the most appropriate scale for management decisions and actions would necessarily be large enough to encompass the effects of practices by all the relevant stakeholders. Appropriate institutions would be required for such decision-making and, where necessary, for conflict resolution. Some problems and issues may require action at still higher levels, through, for example, transboundary cooperation, or even cooperation at global levels.

5. Ensure intersectoral cooperation

12. As the primary framework of action to be taken under the Convention, the ecosystem approach should be fully taken into account in developing and reviewing national biodiversity strategies and action plans. There is also a need to integrate the ecosystem approach into agriculture, fisheries, forestry and other production systems that have an effect on biodiversity. Management of natural resources, according to the ecosystem approach, calls for increased intersectoral communication and cooperation at a range of levels (government ministries, management agencies, etc.). This might be promoted through, for example, the formation of inter-ministerial bodies within the Government or the creation of networks for sharing information and experience.

REYKJAVIK DECLARATION—RESPONSIBLE FISHERIES IN THE MARINE ECOSYSTEM

Having met at the Reykjavik Conference on Responsible Fisheries in the Marine Ecosystem from 1 to 4 October 2001,

Appreciating the initiative taken by the Government of Iceland and the Food and Agriculture Organization of the United Nations (FAO) to organize the Conference with the co-sponsorship of the Government of Norway,

Recalling that this initiative was endorsed at the Twenty-fourth Session of the FAO Committee on Fisheries (26 February – 2 March 2001) and at the One Hundred and Twentieth Session of the FAO Council (June 2001),

Reaffirming that the 1982 United Nations Convention on the Law of the Sea (the Convention) sets out the rights and duties of States with respect to the use and conservation of the ocean and its resources, including the conservation and management of living marine resources,

Recalling that in recent years the world community has agreed on several additional legal and political commitments that supplement the provisions of the Convention, including the Rio Declaration on Environment and Development and Agenda 21 (Chapter 17),

Reaffirming the principles of the FAO Code of Conduct for Responsible Fisheries,

Recalling further the four International Plans of Action formulated in accordance with the Code of Conduct, namely for the Management of Fishing Capacity, for the Conservation and Management of Sharks, for Reducing Incidental Catch of Seabirds in Longline Fisheries, and to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing,

Reaffirming that the FAO Council during its One Hundred and Twentieth Session recommended that ecosystem-based fisheries management studies to be conducted by FAO as agreed in paragraph 39 of the Report at the Twenty-fourth Session of the FAO Committee on Fisheries should be balanced and holistic in approach,

Welcoming and taking into account the discussion in the scientific symposium of the Conference,

Recognizing that sustainable fisheries management incorporating ecosystem considerations entails taking into account the impacts of fisheries on the marine ecosystem and the impacts of the marine ecosystem on fisheries,

Confirming that the objective of including ecosystem considerations in fisheries management is to contribute to long-term food security and to human development and to assure the effective conservation and sustainable use of the ecosystem and its resources,

Appreciating that the Conference represented an important opportunity for all fisheries stakeholders to jointly assess the means for including ecosystem considerations in fisheries management,

Aware that the sustainable use of living marine resources contributes substantially to human food security, as well as dietary variety, provides for the livelihood of millions of people and is a central pillar of many national economies, especially low-income food-deficit countries and small island developing States,

Recognizing the complex inter-relationship between fisheries and other components of the marine ecosystems,

Convinced that including ecosystem considerations in fisheries management provides a framework within which States and fisheries management organizations would enhance management performance,

Affirming that incorporation of ecosystem considerations implies more effective conservation of the ecosystem and sustainable use and an increased attention to interactions, such as predator-prey relationships, among different stocks and species of living marine resources; furthermore that it entails an understanding of the impact of human activities on the ecosystem, including the possible structural distortions they can cause in the ecosystem,

Recognizing the need to strengthen and sustain management capacity, including scientific, legal and institutional frameworks with the aim of incorporating among other things ecosystem considerations,

Emphasizing that the scientific basis for including ecosystem considerations in fisheries management needs further development and that there is incomplete scientific knowledge about the structure, functioning, components and properties of the ecosystem as well as about the ecological impact of fishing,

Recognizing that certain non-fishery activities have an impact on the marine ecosystem and have consequences for management. These include land-based and sea-based activities which affect habitat, water quality, fisheries productivity, and food quality and safety,

Recognizing also that the majority of developing countries face major challenges in incorporating ecosystem considerations into fisheries management and that international cooperation and support are necessary,

Declare that, in an effort to reinforce responsible and sustainable fisheries in the marine ecosystem, we will individually and collectively work on incorporating ecosystem considerations into that management to that aim.

Towards this end, we further declare:

1. Our determination to continue effective implementation of the FAO Code of Conduct, which is our common and agreed guide in strengthening and building fisheries management systems, as well as the International Plans of Action as formulated in accordance with the Code, and the Kyoto Declaration and Plan of Action on the Contribution of Fisheries to Food Security.
2. There is a clear need to introduce immediately effective management plans with incentives that encourage responsible fisheries and sustainable use of marine ecosystems, including mechanisms for reducing excessive fishing efforts to sustainable levels.
3. It is important to strengthen, improve, and where appropriate establish, regional and international fisheries management organizations and incorporate in their work ecosystem considerations and improve cooperation between those bodies and regional bodies in charge of managing and conserving the marine environment.
4. Prevention of adverse effects of non-fisheries activities on the marine ecosystems and fisheries requires action by relevant authorities and other stakeholders.
5. While it is necessary to take immediate action to address particularly urgent problems on the basis of the precautionary approach, it is important to advance the scientific basis for incorporating ecosystem considerations, building on existing and future available scientific knowledge. Towards this end we will undertake to:

- (a) advance the scientific basis for developing and implementing management strategies that incorporate ecosystem considerations and which will ensure sustainable yields while conserving stocks and maintaining the integrity of ecosystems and habitats on which they depend;
 - (b) identify and describe the structure, components and functioning of relevant marine ecosystems, diet composition and food webs, species interactions and predator-prey relationships, the role of habitat and the biological, physical and oceanographic factors affecting ecosystem stability and resilience;
 - (c) build or enhance systematic monitoring of natural variability and its relations to ecosystem productivity;
 - (d) improve the monitoring of by-catch and discards in all fisheries to obtain better knowledge of the amount of fish actually taken;
 - (e) support research and technology developments of fishing gear and practices to improve gear selectivity and reduce adverse impacts of fishing practices on habitat and biological diversity;
 - (f) assess adverse human impacts of non-fisheries activities on the marine environment as well as the consequences of these impacts for sustainable use.
6. The interaction between aquaculture development in the marine environment and capture fisheries should be monitored through relevant institutional and regulatory arrangements.
7. Our determination to strengthen international cooperation with the aim of supporting developing countries in incorporating ecosystem considerations into fisheries management, in particular in building their expertise through education and training for collecting and processing the biological, oceanographic, ecological and fisheries data needed for designing, implementing and upgrading management strategies.
8. We resolve to improve the enabling environment by encouraging technology transfer contributing to sustainable management where appropriate, introducing sound regulatory frameworks, examining and where necessary removing trade distortions, and promoting transparency.
9. We urge relevant technical and financial international organizations and FAO to cooperate in providing States with access to technical advice and information about effective management regimes and about the experience from such arrangements, and other support, devoting special attention to developing countries.
10. We would encourage FAO to work with scientific and technical experts from all different regions to develop technical guidelines for best practices with regard to introducing ecosystem considerations into fisheries management. These technical guidelines should be presented at the next session of the FAO Committee on Fisheries.

AND REQUEST that the Government of Iceland convey this Declaration to the Secretary-General of the United Nations, the Director-General of the Food and Agriculture Organization of the United Nations, the Chairman of the World Summit on Sustainable Development to be held in Johannesburg in September 2002 and relevant fisheries management organizations for their consideration.

EXTRACTS FROM WSSD RELEVANT TO FISHERIES AND EAF

Paragraph 30

Oceans, seas, islands and coastal areas form an integrated and essential component of the Earth's ecosystem and are critical for global food security and for sustaining economic prosperity and the well-being of many national economies, particularly in developing countries. Ensuring the sustainable development of the oceans requires effective coordination and cooperation, including at the global and regional levels, between relevant bodies, and actions at all levels to:

- (a) Invite States to ratify or accede to and implement the United Nations Convention on the Law of the Sea of 1982, which provides the overall legal framework for ocean activities;
- (b) Promote the implementation of chapter 17 of Agenda 21, which provides the programme of action for achieving the sustainable development of oceans, coastal areas and seas through its programme areas of integrated management and sustainable development of coastal areas, including exclusive economic zones; marine environmental protection; sustainable use and conservation of marine living resources; addressing critical uncertainties for the management of the marine environment and climate change; strengthening international, including regional, cooperation and coordination; and sustainable development of small islands;
- (c) Establish an effective, transparent and regular inter-agency coordination mechanism on ocean and coastal issues within the United Nations system;
- (d) Encourage the application by 2010 of the ecosystem approach, noting the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem and decision V/6 of the Conference of Parties to the Convention on Biological Diversity;
- (e) Promote integrated, multidisciplinary and multisectoral coastal and ocean management at the national level and encourage and assist coastal States in developing ocean policies and mechanisms on integrated coastal management;
- (f) Strengthen regional cooperation and coordination between the relevant regional organizations and programmes, the regional seas programmes of the United Nations Environment Programme, regional fisheries management organizations and other regional science, health and development organizations;
- (g) Assist developing countries in coordinating policies and programmes at the regional and subregional levels aimed at the conservation and sustainable management of fishery resources and implement integrated coastal area management plans, including through the promotion of sustainable coastal and small-scale fishing activities and, where appropriate, the development of related infrastructure;
- (h) Take note of the work of the open-ended informal consultative process established by the United Nations General Assembly in its resolution 54/33 in order to facilitate the annual review by the Assembly of developments in ocean affairs and the upcoming review of its effectiveness and utility to be held at its fifty-seventh session under the terms of the above-mentioned resolution.

Paragraph 31

To achieve sustainable fisheries, the following actions are required at all levels:

- (a) Maintain or restore stocks to levels that can produce the maximum sustainable yield with the aim of achieving these goals for depleted stocks on an urgent basis and where possible not later than 2015;
- (b) Ratify or accede to and effectively implement the relevant United Nations and, where appropriate, associated regional fisheries agreements or arrangements, noting in particular the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks 17 and the 1993 Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas;¹⁸
- (c) Implement the 1995 Code of Conduct for Responsible Fisheries,¹⁹ taking note of the special requirements of developing countries as noted in its article 5, and the relevant international plans of action and technical guidelines of the Food and Agriculture Organization of the United Nations;
- (d) Urgently develop and implement national and, where appropriate, regional plans of action, to put into effect the international plans of action of the Food and Agriculture Organization of the United Nations, in particular the International Plan of Action for the Management of Fishing Capacity 20 by 2005 and the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing 21 by 2004. Establish effective monitoring, reporting and enforcement, and control of fishing vessels, including by flag States, to further the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing;
- (e) Encourage relevant regional fisheries management organizations and arrangements to give due consideration to the rights, duties and interests of coastal States and the special requirements of developing States when addressing the issue of the allocation of share of fishery resources for straddling stocks and highly migratory fish stocks, mindful of the provisions of the United Nations Convention on the Law of the Sea and the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, on the high seas and within exclusive economic zones;
- (f) Eliminate subsidies that contribute to illegal, unreported and unregulated fishing and to over-capacity, while completing the efforts undertaken at the World Trade Organization to clarify and improve its disciplines on fisheries subsidies, taking into account the importance of this sector to developing countries;
- (g) Strengthen donor coordination and partnerships between international financial institutions, bilateral agencies and other relevant stakeholders to enable developing countries, in particular the least developed countries and small island developing States and countries with economies in transition, to develop their national, regional and sub-regional capacities for infrastructure and integrated management and the sustainable use of fisheries;
- (h) Support the sustainable development of aquaculture, including small-scale aquaculture, given its growing importance for food security and economic development.

Paragraph 32

In accordance with chapter 17 of Agenda 21, promote the conservation and management of the oceans through actions at all levels, giving due regard to the relevant international instruments to:

- (a) Maintain the productivity and biodiversity of important and vulnerable marine and coastal areas, including in areas within and beyond national jurisdiction;
- (b) Implement the work programme arising from the Jakarta Mandate on the Conservation and Sustainable Use of Marine and Coastal Biological Diversity of the Convention on Biological Diversity, including through the urgent mobilization of financial resources and technological assistance and the development of human and institutional capacity, particularly in developing countries;
- (c) Develop and facilitate the use of diverse approaches and tools, including the ecosystem approach, the elimination of destructive fishing practices, the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012 and time/area closures for the protection of nursery grounds and periods, proper coastal land use and watershed planning and the integration of marine and coastal areas management into key sectors;
- (d) Develop national, regional and international programmes for halting the loss of marine biodiversity, including in coral reefs and wetlands;
- (e) Implement the Ramsar Convention, including its joint work programme with the Convention on Biological Diversity, and the programme of action called for by the International Coral Reef Initiative to strengthen joint management plans and international networking for wetland ecosystems in coastal zones, including coral reefs, mangroves, seaweed beds and tidal mud flats.

Paragraph 33

Advance implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities 25 and the Montreal Declaration on the Protection of the Marine Environment from Land-based Activities 26 with particular emphasis during the period from 2002 to 2006 on municipal wastewater, the physical alteration and destruction of habitats, and nutrients, by actions at all levels to:

- (a) Facilitate partnerships, scientific research and diffusion of technical knowledge; mobilize domestic, regional and international resources; and promote human and institutional capacity building, paying particular attention to the needs of developing countries;
- (b) Strengthen the capacity of developing countries in the development of their national and regional programmes and mechanisms to mainstream the objectives of the Global Programme of Action and to manage the risks and impacts of ocean pollution;
- (c) Elaborate regional programmes of action and improve the links with strategic plans for the sustainable development of coastal and marine resources, noting in particular areas that are subject to accelerated environmental changes and development pressures;
- (d) Make every effort to achieve substantial progress by the next Global Programme of Action conference in 2006 to protect the marine environment from land-based activities.

Paragraph 34

Enhance maritime safety and protection of the marine environment from pollution by actions at all levels to:

- (a) Invite States to ratify or accede to and implement the conventions and protocols and other relevant instruments of the International Maritime Organization relating to the enhancement of maritime safety and protection of the marine environment from marine pollution and environmental damage caused by ships, including the use of toxic anti-fouling paints, and urge the International Maritime Organization (IMO) to consider stronger mechanisms to secure the implementation of IMO instruments by flag States;
- (b) Accelerate the development of measures to address invasive alien species in ballast water. Urge the International Maritime Organization to finalize its draft International Convention on the Control and Management of Ships' Ballast Water and Sediments.

Paragraph 44

Biodiversity, which plays a critical role in overall sustainable development and poverty eradication, is essential to our planet, human well-being and to the livelihood and cultural integrity of people. However, biodiversity is currently being lost at unprecedented rates due to human activities; this trend can only be reversed if the local people benefit from the conservation and sustainable use of biological diversity, in particular in countries of origin of genetic resources, in accordance with article 15 of the Convention on Biological Diversity. The Convention is the key instrument for the conservation and sustainable use of biological diversity and the fair and equitable sharing of benefits arising from use of genetic resources. A more efficient and coherent implementation of the three objectives of the Convention and the achievement by 2010 of a significant reduction in the current rate of loss of biological diversity will require the provision of new and additional financial and technical resources to developing countries, and includes actions at all levels to:

- (a) Integrate the objectives of the Convention into global, regional and national sectoral and cross-sectoral programmes and policies, in particular in the programmes and policies of the economic sectors of countries and international financial institutions;
- (b) Promote the ongoing work under the Convention on the sustainable use on biological diversity, including on sustainable tourism, as a cross-cutting issue relevant to different ecosystems, sectors and thematic areas;
- (c) Encourage effective synergies between the Convention and other multilateral environmental agreements, inter alia, through the development of joint plans and programmes, with due regard to their respective mandates, regarding common responsibilities and concerns;
- (d) Implement the Convention and its provisions, including active follow-up of its work programmes and decisions through national, regional and global action programmes, in particular the national biodiversity strategies and action plans, and strengthen their integration into relevant cross-sectoral strategies, programmes and policies, including those related to sustainable development and poverty eradication, including initiatives which promote community-based sustainable use of biological diversity;
- (e) Promote the wide implementation and further development of the ecosystem approach, as being elaborated in the ongoing work of the Convention;

- (f) Promote concrete international support and partnership for the conservation and sustainable use of biodiversity, including in ecosystems, at World Heritage sites and for the protection of endangered species, in particular through the appropriate channelling of financial resources and technology to developing countries and countries with economies in transition;
- (g) To effectively conserve and sustainably use biodiversity, promote and support initiatives for hot spot areas and other areas essential for biodiversity and promote the development of national and regional ecological networks and corridors;
- (h) Provide financial and technical support to developing countries, including capacity-building, in order to enhance indigenous and community-based biodiversity conservation efforts;
- (i) Strengthen national, regional and international efforts to control invasive alien species, which are one of the main causes of biodiversity loss, and encourage the development of effective work programme on invasive alien species at all levels;
- (j) Subject to national legislation, recognize the rights of local and indigenous communities who are holders of traditional knowledge, innovations and practices, and, with the approval and involvement of the holders of such knowledge, innovations and practices, develop and implement benefit-sharing mechanisms on mutually agreed terms for the use of such knowledge, innovations and practices;
- (k) Encourage and enable all stake holders to contribute to the implementation of the objectives of the Convention and, in particular, recognize the specific role of youth, women and indigenous and local communities in conserving and using biodiversity in a sustainable way;
- (l) Promote the effective participation of indigenous and local communities in decision and policy-making concerning the use of their traditional knowledge;
- (m) Encourage technical and financial support to developing countries and countries with economies in transition in their efforts to develop and implement, as appropriate, inter alia, national sui generis systems and traditional systems according to national priorities and legislation, with a view to conserving and the sustainable use of biodiversity;
- (n) Promote the wide implementation of and continued work on the Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of Benefits arising out of their Utilization, as an input to assist the Parties when developing and drafting legislative, administrative or policy measures on access and benefit-sharing as well as contract and other arrangements under mutually agreed terms for access and benefit-sharing;
- (o) Negotiate within the framework of the Convention on Biological Diversity, bearing in mind the Bonn Guidelines, an international regime to promote and safeguard the fair and equitable sharing of benefits arising out of the utilization of genetic resources;
- (p) Encourage successful conclusion of existing processes under the auspices of the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore of the World Intellectual Property Organization, and in the ad hoc open-ended working group on article 8(j) and related provisions of the Convention;
- (q) Promote practicable measures for access to the results and benefits arising from biotechnologies based upon genetic resources, in accordance with articles 15 and 19 of the Convention, including through enhanced scientific and technical cooperation on biotechnology and biosafety, including the exchange of experts, training human resources and developing research-oriented institutional capacities;

- (r) With a view to enhancing synergy and mutual supportiveness, taking into account the decisions under the relevant agreements, promote the discussions, without prejudging their outcome, with regard to the relationships between the Convention and agreements related to international trade and intellectual property rights, as outlined in the Doha Ministerial Declaration;
- (s) Promote the implementation of the programme of work of the Global Taxonomy Initiative;
- (t) Invite all States that have not already done so to ratify the Convention, the Cartagena Protocol on Biosafety to the Convention 33 and other biodiversity-related agreements, and invite those that have done so to promote their effective implementation at the national, regional and international levels and to support developing countries and countries with economies in transition technically and financially in this regard.

Paragraph 58

Small island developing States are a special case both for environment and development. Although they continue to take the lead in the path towards sustainable development in their countries, they are increasingly constrained by the interplay of adverse factors clearly underlined in Agenda 21, the Programme of Action for the Sustainable Development of Small Island Developing States 35 and the decisions adopted at the twenty-second special session of the General Assembly. This would include actions at all levels to:

- (a) Accelerate national and regional implementation of the Programme of Action, with adequate financial resources, including through Global Environment Facility focal areas, transfer of environmentally sound technologies and assistance for capacity-building from the international community;
- (b) Implement further sustainable fisheries management and improve financial returns from fisheries by supporting and strengthening relevant regional fisheries management organizations, as appropriate, such as the recently established Caribbean Regional Fisheries Mechanism and such agreements as the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean;
- (c) Assist small island developing States, including through the elaboration of specific initiatives, in delimiting and managing in a sustainable manner their coastal areas and exclusive economic zones and the continental shelf, including, where appropriate, the continental shelf areas beyond 200 miles from coastal baselines, as well as relevant regional management initiatives within the context of the United Nations Convention on the Law of the Sea and the regional seas programmes of the United Nations Environment Programme;
- (d) Provide support, including for capacity-building, for the development and further implementation of:
 - (i) Small island developing States—specific components within programmes of work on marine and coastal biological diversity;
 - (ii) Freshwater programmes for small island developing States, including through the Global Environment Facility focal areas;
- (e) Effectively reduce, prevent and control waste and pollution and their health-related impacts by undertaking initiatives by 2004 aimed at implementing the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities in small island developing States.

APPENDIX 4

TREATIES RELEVANT TO THE EAF IN PICTS

International treaties are shown for “Signatory” and “Party” status for all countries and territories. For those territories that have not independently signed treaties, signature by France, New Zealand or USA is shown. The table is not exhaustive, and includes only those instruments having direct or indirect relevance to fisheries.

Treaty	COK	FJI	FSM	KIR	NAU	NIU	PAL	PNG	RMI	SAM	SOL	TOK	TON	TUV	VAN	FRA	NZL	USA
Charter of the United Nations (San Francisco, 1945)		*	*				*	*		*	*				*	*	*	*
Constitution of the Food and Agriculture Organization of the United Nations (Quebec, 1945)	*	*						*	*	*	*		*		*	*	*	*
Constitution of the United Nations Educational Scientific and Cultural Organization (London, 1945)	*	*		*		*		*	*	*	*		*		*	*	*	*
International Convention for the Regulation of Whaling (Washington, 1946)										*	*					*	*	*
Agreement Establishing the South Pacific Commission (Canberra, 1947)	*	*			*	*		*		*	*			*		*	*	*
Convention for the Establishment of an Inter-American Tropical Tuna Commission (Washington, 1949)															*			*
Agreement Extending the Territorial Scope of the South Pacific Commission (Noumea, 1951)	*	*			*	*		*		*	*			*		*	*	*
Protocol to the International Convention for the Regulation of Whaling (Washington, 1956)											*					*	*	*
Convention on the Continental Shelf (Geneva, 1958)		*									*		*			*	*	*
Convention on the Territorial Sea and the Contiguous Zone (Geneva, 1958)		*									*		*			*	*	*
Convention on Fishing and Conservation of the Living Resources of the High Seas (Geneva, 1958)		*									*		*			*	*	*
The Antarctic Treaty (Washington, 1959)								*			*		*			*	*	*
Agreement amending the Agreement Establishing the South Pacific Commission	*	*			*	*		*		*	*		*			*	*	*
Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)								*			*		*			*	*	*

Convention concerning the Protection of the World Cultural and Natural Heritage (Paris, 1972)	*									*											*	*	*	*	*	*
Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington, 1973)	*									*											*	*	*	*	*	*
Convention on Conservation of Nature in the South Pacific (Apia, 1976)	*									*											*	*	*	*	*	*
South Pacific Forum Fisheries Agency Convention (Honiara, 1979)	*									*	*										*	*	*	*	*	*
Amendment to the Convention on International Trade in Endangered Species of Wild Fauna																										
United Nations Convention on the Law of the Sea (Montego Bay, 1982)	*									*	*										*	*	*	*	*	*
Nauru Agreement Concerning Cooperation in the Management of Fisheries of Common Interest (Nauru, 1982)										*	*															
Protocol to amend the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Paris, 1982)										*	*															*
Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (SPREP Convention) (Nouméa, 1986)	*									*	*										*	*	*	*	*	*
South Pacific Fisheries Treaty (Port Moresby, 1987)	*									*	*										*	*	*	*	*	*
Wellington Convention for the Prohibition of Fishing with Large Driftnets (Wellington, 1989)	*									*	*										*	*	*	*	*	*
Convention on Biological Diversity (Rio de Janeiro, 1992)	*									*	*										*	*	*	*	*	*
United Nations Framework Convention on Climate Change (New York, 1992)	*									*	*										*	*	*	*	*	*
Niue Treaty on Cooperation in Fisheries Surveillance and Law Enforcement (Honiara, 1992)	*									*	*										*	*	*	*	*	*
Agreement establishing the South Pacific Regional Environment Programme (Apia, 1993)	*									*	*										*	*	*	*	*	*
Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982 (New York, 1994)	*									*	*										*	*	*	*	*	*
Federated States of Micronesia Arrangement for Regional Fisheries Access (Honiara, 1994)										*	*										*	*	*	*	*	*
Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and highly Migratory Fish Stocks (New York, 1995)	*									*	*										*	*	*	*	*	*
Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (Honolulu, 2000)	*									*	*										*	*	*	*	*	*

EXTRACTS FROM THE 38TH PACIFIC ISLANDS FORUM COMMUNIQUÉ RELEVANT TO FISHERIES

THIRTY-EIGHTH PACIFIC ISLANDS FORUM
NUKU'ALOFA, TONGA
16–17 OCTOBER 2007

FORUM COMMUNIQUÉ

1. The Thirty-Eighth Pacific Islands Forum was held in Tonga from 16–17 October 2007 and was attended by Heads of State and Government of the Cook Islands, Federated States of Micronesia, Fiji, Nauru, New Zealand, Niue, Papua New Guinea, Samoa, Tonga, Tuvalu and Vanuatu, and representatives of Australia, Kiribati, Palau, the Republic of the Marshall Islands and Solomon Islands. New Caledonia and French Polynesia also attended the formal session as Associate Members and Timor-Leste, Tokelau and Wallis & Futuna as observers. The Forum Retreat was held at Vava'u, Tonga.
2. Leaders expressed their deep appreciation to the Government and people of Tonga for hosting the 2007 meeting, for the warm and generous manner in which they had been welcomed and for the arrangements made for the meetings.

Pacific Plan

3. Leaders noted that two years after its launch, considerable progress has been made in the implementation of initiatives across all four of the Pacific Plan's pillars. Challenges, however, remain. These include the maintenance of timely reporting to support ongoing assessment of the Plan's progress, and continuing human and financial capacity constraints in the implementation of some initiatives.
4. Leaders agreed on a number of key commitments in order to move the Plan forward in the next twelve months. Priority areas for attention under the Pacific Plan are listed below and at Annex A.

Fisheries

5. Despite the considerable work undertaken to date to strengthen the region's management of its highly migratory fish stocks, Leaders believe urgent supplementary work is needed in specific areas. Fisheries represent one of the region's strongest drivers for sustainable economic growth. As a source of both export revenue and food security, efforts must continue to maintain regional solidarity among Forum Members in their management of these fish stocks, particularly tuna. Greater effort to foster a long-term strategic approach to ensuring these resources are effectively managed will provide enduring benefits for all Forum Member countries. This approach must include the upholding and strengthening of existing regional arrangements, agreements and conservation measures that protect this essential resource in the face of threatened stock levels and intensifying global interest, particularly from distant water fishing nations. Leaders adopted a Declaration on Pacific Fisheries Resources (attached as Annex B).

ANNEX A

VAVA'U DECISIONS ON THE PACIFIC PLAN

International Context of the Pacific Plan

The Pacific Plan reflects the region's priorities which are in line with and support the implementation of international frameworks such as the Barbados Programme of Action and The Mauritius Strategy

of Implementation. As such, the Pacific Plan provides a solid platform for regional cooperation guiding collective positions through the Commission on Sustainable Development and other international forums that advocate the 'special case' of Small Island Developing States (SIDS). The collective position of Pacific Islands Forum members in the international arena is a significant tool in garnering support for Pacific Island Countries individually and as a group and is recognised and valued by other United Nation members.

In order to advance the Pacific Plan over the next twelve months, Leaders: endorsed the following amendment to the Pacific Plan:

Fisheries

reaffirmed the importance of fisheries to the economies of all Pacific Forum countries, and committed themselves to promoting domestic fisheries, in particular the development of national tuna industries, in the context of a phased introduction of rights-based management arrangements supported by an appropriate management and regulatory framework;

committed to: maintaining regional solidarity among Forum member countries in managing the region's tuna stocks; strengthening their support for the Pacific Islands Forum Fisheries Agency, the Secretariat of the Pacific Community and other regional fisheries bodies as they intensify their efforts in applying a long-term strategic approach to Pacific fisheries, and in tuna species in particular, to ensure that these resources are effectively managed so as to provide enduring economic, social and cultural benefits; and upholding and strengthening the existing regional and national arrangements, agreements and conservation measures that protect this essential resource;

committed themselves and their governments to the conservation and sustainable management of highly migratory tuna resources by: fully implementing without delay the conservation and management measures developed and endorsed by the Western and Central Pacific Fisheries Commission (WCPFC); seeking the urgent adoption of additional measures by the WCPFC to address over-fishing of bigeye and yellowfin, including a reduction in longline catches and addressing purse seine fishing, and specific steps to reduce the catch of juvenile bigeye and yellowfin; developing and implementing, with the assistance of the FFA, a comprehensive regional Monitoring, Control and Surveillance (MCS) strategy; and continuing support as appropriate for the current tuna tagging initiative of the Secretariat of the Pacific Community, including the aspiration that it expand to cover the rest of the Pacific;

reaffirmed the Declaration on Deep Sea Bottom Trawling adopted at the 2006 Nadi Forum, welcomed the subsequent UNGA Resolution 61/105 which called for strong measures to regulate and manage deep sea bottom trawling, and committed to the protection of high seas biodiversity and the conservation and management of non-highly migratory fish stocks in the Pacific Ocean;

encouraged effective participation in the negotiations to deliver a best-practice South Pacific Regional Fisheries Management Organisation in view of the longer-term strategic significance to Members and the possible interaction of the high seas pelagic stocks with tuna resources governed by the WCPFC;

committed to the development and management of coastal/inshore fisheries and aquaculture to support food security, sustainable livelihoods and economic growth for current and future generations of Pacific people;

agreed to raise these deep concerns as a matter of urgency with Distant Water Fishing Nations and regional coastal states participating in the Post-Forum Dialogue, and urge their close cooperation with our efforts;

THE VAVA'U DECLARATION ON PACIFIC FISHERIES RESOURCES “OUR FISH, OUR FUTURE”

We, the Leaders of the Pacific Islands Forum, meeting at Vava'u in the Kingdom of Tonga:

RECOGNISING that our regional fisheries resources remain a key driver for sustainable economic growth in the region, especially for small island states, and that they must as a consequence be supported by responsible and effective stewardship;

RECALLING the commitment by Leaders under the Pacific Plan to maximise sustainable returns from fisheries by developing an ecosystem based fisheries management planning framework; encouraging effective fisheries development, including value-adding activities; and collaboration to ensure legislation and access frameworks are harmonised;

ALSO RECOGNISING the aspirations of Pacific Islands countries to strengthen their engagement in sustainable fisheries and to maximise the flow on benefits from both domestic fisheries and foreign fishing operations in the region;

RECALLING in this context our 2004 call for closer Ministerial oversight of Pacific fisheries issues;

NOTING with appreciation and deep concern the report on the current state of Pacific fisheries provided to us by the current Chair of the Forum Fisheries Committee, at the request of the Committee's 64th Meeting, held at Ministerial level;

COGNISANT of the significant economic opportunities which the regional fisheries resource offers to all our members, and of the comparatively low returns on the resource being achieved by countries in the region;

SEIZED by the scientific advice that over-fishing of two key regional tuna species—bigeye and yellowfin tuna—now places stock levels in jeopardy;

CONSCIOUS therefore of the imperative need for us to take immediate and decisive collective action to ensure that, within the next three to five years, we secure our peoples' future livelihoods, regional food security, and environmental sustainability of our seas and their ecosystems;

HEREBY reaffirm the importance of fisheries to the economies of all Pacific Forum countries, and commit ourselves to:

- **PROMOTING DOMESTIC FISHERIES**, in particular the development of national tuna industries, in the context of a phased introduction of rights-based management arrangements supported by an appropriate management and regulatory framework;
- **DEVELOPMENT AND MANAGEMENT OF COASTAL/INSHORE FISHERIES** and aquaculture to support food security, sustainable livelihoods and economic growth for current and future generations of Pacific people;
- **MAINTAINING REGIONAL SOLIDARITY** among Forum member countries in managing the region's tuna stocks;
- **STRENGTHENING OUR SUPPORT** for the Forum Fisheries Agency, the Secretariat of the Pacific Community and other regional fisheries bodies as they intensify their efforts in applying a long-term strategic approach to Pacific fisheries, and in tuna species in particular, to ensure that these resources are effectively managed so as to provide enduring economic, social and cultural benefits;

- UPHOLDING AND STRENGTHENING the existing regional and national arrangements, agreements and conservation measures that protect this essential resource; and

CONSISTENT with our earlier calls for the sustainable utilisation of fisheries resources, and with our concerns regarding food security for future generations, we further solemnly COMMIT ourselves and our governments to the conservation and sustainable management of highly migratory tuna resources by:

- FULLY IMPLEMENTING without delay the conservation and management measures developed and endorsed by the Western and Central Pacific Fisheries Commission (WCPFC);
- SEEKING THE URGENT ADOPTION OF ADDITIONAL MEASURES by the WCPFC to address over-fishing of bigeye and yellowfin, including a reduction in longline catches and addressing purse seine fishing, and specific steps to reduce the catch of juvenile bigeye and yellowfin;
- RECOGNISING THE ASPIRATIONS OF SMALL ISLANDS DEVELOPING STATES to develop their domestic fisheries and CALLING ON DEVELOPED MEMBER COUNTRIES of the Commission to implement measures to support such endeavours;
- DEVELOPING AND IMPLEMENTING, with the assistance of the Forum Fisheries Agency, a comprehensive regional Monitoring, Control and Surveillance (MCS) strategy;
- INVESTIGATING AND TAKING APPROPRIATE STEPS as a matter of priority to strengthen, simplify and give full transparency to our national fisheries governance and licensing arrangements;
- CONTINUING SUPPORT as appropriate for the current tuna tagging initiative of the Secretariat of the Pacific Community, including the aspiration that it expand to cover the rest of the Pacific; and,
- SUPPORTING AND ENDORSING efforts by the Forum Fisheries Agency, supported by the Forum Secretariat, to take forward as a matter of urgency work to examine the potential for new multilateral Pacific regional arrangements patterned on the Niue Treaty Subsidiary Agreement model for exchange of fisheries law enforcement data, cross-vesting of enforcement powers, and use of fisheries data for other law enforcement activities; and

CONSISTENT with our previous deliberations, REAFFIRM the Declaration on Deep Sea Bottom Trawling adopted at the 2006 Nadi Forum and WELCOME the subsequent UNGA Resolution 61/105 which called for strong measures to regulate and manage deep sea bottom trawling;

COMMIT to the protection of high seas biodiversity and the conservation and management of non-highly migratory fish stocks in the Pacific Ocean;

ENCOURAGE effective participation in the negotiations to deliver a best-practice South Pacific Regional Fisheries Management Organisation in view of the longer-term strategic significance to Members and the possible interaction of the high seas pelagic stocks with tuna resources governed by the WCPFC;

AGREE TO RAISE THESE DEEP CONCERNS as a matter of urgency with Distant Water Fishing Nations (DWFNs) and regional coastal states participating in the Post-Forum Dialogue, and urge their close cooperation with our efforts; and,

REQUEST the Forum Fisheries Agency, the Secretariat of the Pacific Community, the Forum Secretariat and the Western and Central Pacific Fisheries Commission to jointly monitor progress in implementing these commitments, and reporting on this—especially progress in regional tuna management—under the Pacific Plan to Forum Fisheries Ministers and our next Leaders' Meeting for further consideration.

SPC EAF QUESTIONNAIRE

Questionnaire on the implementation and needs of member countries and territories in regard to the ecosystem approach to coastal fisheries and aquaculture (EACFA)

In preparation for the workshop on “Implementing the ecosystem approach to coastal fisheries and aquaculture (EACFA), and aquatic biosecurity”, we want to collect the basic information from individual member countries and territories through this questionnaire that will provide you collectively with information necessary to make decisions during the meeting. All national representatives (Fisheries and Conservation Departments) are being asked to complete the questionnaire and return it to the SPC Coastal Fisheries Programme Manager, Lindsay Chapman (lindsayc@spc.int) by 15 October 2007, so that the information can be collated before the workshop. The national fisheries and conservation representatives to the meeting can either complete this together (provide a single joint response), or complete this separately (two separate responses), as appropriate.

Please note that this questionnaire is focused on coastal or inshore fisheries (including inland waters). This includes fishing for deep-water snappers, and small-scale tuna fishing activities (trolling, handlining, vertical longlining, and small-scale longlining doing trips of one day or less on vessels of less than 12 metres in length). Medium-scale and large scale, or foreign, tuna fishing activities are excluded from this survey.

Question 1: Please list all government departments and local authorities in your country or territory that have responsibilities that involve coastal fisheries or other coastal marine-related activities or issues (include any with responsibilities or activities that affect the coastal marine environment).

[The following list is provided as a guide. Please provide the exact name of the department, organisation or authority next to any “yes” answers if the generic name listed below is incorrect. Include all state/provincial government departments in the listing.]

Government Departments, organisation or authority involved in coastal fisheries/marine-related issues	Yes/No	Legally mandated responsibility? Yes/No
National Fisheries Department		
National Conservation or Environment Department		
Ports and Marine Authority or equivalent		
Quarantine Department		
Provincial/State/Local Fisheries Departments		
Provincial/State/Local Conservation or Environment Departments		
Island Council or other generalist local government unit		
Traditional “marine spaces management” authority		
Agriculture Department		
Customs & Excise Department		
Health Department		
Police Department		
Military		
Lands or Mineral Resources Department		
Tourism Department		
Government training facility (fisheries or marine)		
Others (please specify below)		
1.		
2.		
3.		
4.		

Question 2: What Inter-Governmental Organisations (IGOs) and Non-Governmental Organisations (NGOs) are based, or have carried out projects in the last 5 years, in your country/territory on coastal fisheries or coastal marine-related activities or issues?

	NGOs/IGOs involved in coastal fisheries/ marine-related issues	Based in country/ territory	Projects in last 5 years
International/ Regional NGOs	Greenpeace		
	World Wide Fund for Nature (WWF)		
	The Nature Conservancy (TNC)		
	Conservation International (CI)		
	Foundation of the Peoples of the South Pacific International (FSPI)		
	WorldFish Center		
	Others (please specify below)		
	1.		
	2.		
International/ Regional IGOs	Food and Agricultural Organisation (FAO)		
	Western and Central Pacific Tuna Commission (WCPFC)		
	Pacific Islands Applied Geoscience Commission (SOPAC)		
	Secretariat of Pacific Regional Environment Programme (SPREP)		
	Others (please specify below)		
	1.		
	2.		
	3.		
National/Local NGOs (please specify below)	1.		
	2.		
	3.		

Question 3: Is there any national or local mechanism(s) or committee(s) or group(s) (formal or informal) in your country or territory that allows different stakeholders to collaborate on coastal fisheries or coastal marine-related activities or issues?

YES _____ or NO _____

If yes, what is the name of the group(s) or mechanism(s) and what stakeholders are involved, please list below:

Name of Group 1: _____

Name of Group 2: _____

Name of Group 3: _____

Name of Group 4: _____

Membership (Government Department(s), NGO(s), IGO(s), communities, fishing companies, other stakeholders)

Group 1: 1. _____ Group 2: 1. _____

2. _____ 2. _____

3. _____ 3. _____

Group 3: 1. _____ Group 4: 1. _____

2. _____ 2. _____

3. _____ 3. _____

Question 4: What does the “Ecosystem Approach to Coastal Fisheries and Aquaculture (EACFA)” mean to you in terms of your country or territory’s management of fisheries?

Add more lines if necessary.

Question 5: List at least 3 opportunities, issues, concerns or challenges you see to adopting and implementing EACFA in your country or territory.

1. _____

2. _____

3. _____

Add more items if necessary

Question 6: What do you consider to be Ecosystem Approach to Coastal Fisheries and Aquaculture (EACFA) compatible measures, and are such measures applied in your country or territory?

Measures	EACFA compatible (Yes/No)	Implemented (Yes/No)
Seasonal closures of areas to fishing or other activities		
Seasonal closures on the harvest of some marine species		
Marine protected areas (MPAs) (including all types from managed areas through to closed areas)		
Protection of spawning aggregations		
Restrictions on fishing gears or techniques		
Banning of destructive fishing gears or techniques		
Measures to reduce or raise awareness of bycatch		
Minimum sizes for selected marine species		
Providing alternatives for fishers displaced from normal fishing areas		
Provide FADs to encourage fishers away from reef fisheries		
Encourage small-scale aquaculture initiatives		
Protection of mangroves		
Protection of nesting beaches for sea turtles		
Protection of marine environment from pollution		
Biosecurity controls on introduced species		
Implementing management arrangements/plans for species/fisheries		
Integrated coastal management		
Watershed management		
Export, trade and other economic measures		
Others (please specify below)		
1.		
2.		
3.		
4.		

From the above table, can you please provide a brief description of any measures you consider to be EACFA compatible that are currently being implemented (marked yes) in your country or territory.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Add more lines if necessary.

Thank you for completing this questionnaire. Your answers will provide important background information to the meeting, as we all work towards a common approach and goal to implement the ecosystem approach in coastal fisheries and aquaculture across the region.



The Ecosystem Approach to Coastal Fisheries and Aquaculture in Pacific Island Countries and Territories

Part 2: Principles and approaches for strategic implementation



EXECUTIVE SUMMARY

1. This report explores possible options and strategies for accelerating and improving implementation of the ecosystem approach to coastal fisheries and aquaculture in the region, in line with commitments by Pacific Island countries and territories (PICTs) to do this by the year 2010. A companion report (*The Ecosystem Approach to Coastal Fisheries and Aquaculture in Pacific Island Countries and Territories—Part 1: A review of the current status*) discusses implementation progress of the EAF to date.

2. The report notes a general perception in PICTs that fishing activities are relatively benign and have fewer ecosystem impacts on coastal ecosystems than land-based development. This is not always true, and instances are cited where fishing activities are having clear (if unquantified) negative effects of coastal ecosystems. These include the live reef fish fishery, the beche-de-mer fishery, the use of destructive fishing methods, and generalised overfishing. The possible impacts of aquaculture development on coastal ecosystems are also reviewed. The conclusion is that many fishery and aquaculture activities have the potential to cause broad ecosystem damage or negative impacts, and these have already occurred in some cases.

3. Conventional fisheries management aims to manage human activity in order to maximise fisheries production, economic benefits, employment or national revenues. The EAF focuses not only on these aspects, but also on maximising a broader range of ecosystem services and functions, in order to provide a greater array of human benefits, maintain alternative development options, ensure that coastal ecosystems are sufficiently resilient to withstand other stresses, and guarantee long-term resource sustainability. Some important principles in the application of the ecosystem approach to fisheries (EAF) include:

- not allowing fishing operations to cause undue disruption or damage to ecosystems through overfishing, depletion of non-target species, habitat damage or pollution;
- ensuring ecosystems are kept in a healthy and resilient state so that they can endure unexpected environmental and other shocks;
- improving compliance with fishery management measures through greater stakeholder engagement;
- recognising alternative values of marine resources (such as recreation and tourism) other than extractive ones.

4. In practice, implementation of the EAF will require PICTs to:

- scale back unrealistic expectations of the amounts that coastal fisheries can produce;
- apply a conservative, precautionary approach to fisheries management;
- set aside reserves or protected areas to increase ecosystem resilience;
- promote more stakeholder participation in fishery management arrangements;
- establish rights-based methods of fishery management, instead of open-access “free for all” arrangements;
- establish integrated coastal management arrangements that involve many sectors, not just fisheries.

5. The EAF is not necessarily inconsistent with, or a replacement for, current fisheries management approaches in PICTs, but represents an improvement that takes into account the impacts of fisheries on the broader environment and, conversely, the impacts of other sectors on fisheries. Nor is it a goal in itself: the EAF is basically a set of policies and tools intended to result in improved management of fisheries and ecosystems.

6. Coastal development is a major issue and its impacts on inshore environments and the fisheries they contain are widespread and growing. Land-based causes of damage to coastal ecosystems include construction of buildings, roads and seawalls, sewage and waste disposal, pollutants from industry and agriculture, sedimentation and freshwater influx due to poor land management, and other sources. There is a need to adopt integrated coastal management (ICM) approaches in many situations in order to reduce these impacts on coastal habitats and the fisheries they support. Important features of ICM arrangements—some of which are now being put in place in some countries—will include:

- policy initiatives at the higher levels of local and national government;
- improved integration (“horizontal coordination”) between sectors and disciplines;
- geographically oriented site management programmes that take account of all sectors impacting on coastal environments.

7. ICM must go hand-in-hand with implementing the EAF. The two approaches are complementary and if implemented together will greatly assist in the move towards sustainable management and use of coastal ecosystems. Both approaches will necessarily involve a wide range of stakeholders, including a range of government agencies.

8. Procedures and approaches are described that may help PICTs to accelerate and improve on the implementation of the ecosystem approach to coastal fisheries and aquaculture. Possible actions that can be taken by fisheries and other agencies, at several different levels, are described, including:

- policy and legislative development—formal inclusion of EAF principles and approaches into national policies and legislation, and the broad adoption of these by government and other agencies;
- fishery management planning, which identifies and characterises the species and ecosystems to be managed and the stakeholders in the fishery, establishes consultative processes, and determines the mechanisms that will be used to resolve problems and conflicts;
- improved stakeholder consultation, aimed at identifying fishery management problems and solutions, gathering and promulgating information, creating ownership among fishery stakeholders, and promoting better compliance with fishery management measures;
- risk assessment, which estimates the costs and benefits of various management actions, and the probability of management objectives being met, and uses this information to determine those areas most in need of attention;
- formulation of fishery management measures that take into account broader ecosystem considerations, such as the impact of fishing on non-target species, and habitat degradation. Measures might include conventional fishery management approaches (e.g. size limits, gear restrictions, limited entry), as well as more innovative steps such as fiscal management instruments, support to community-based management or co-management arrangements, and establishment of marine protected areas with clearly understood goals and objectives;
- improved enforcement of coastal fishery management measures;
- monitoring and performance assessment of the management approaches selected, backed up by appropriate research and data collection, and modification of management measures where needed;
- improved inter-agency coordination, particularly in regard to integrated coastal management.

9. The combination of approaches to be followed will depend on the specific circumstances, goals and resources of the country or territory in question.
10. There will be significant differences between the way that the EAF is implemented in PICTs and in developed countries. Limitations of human capacity and financial and technical resources will mean that the EAF in PICTs will probably be based on adaptive approaches that aim to maintain fishery productivity, habitat health and ecosystem resilience, rather than comprehensive ecosystem science. Current systems of coastal fisheries management in PICTs will need to move towards the EAF in a progressive, step-by-step manner over a relatively long period. The EAF nevertheless provides an opportunity for PICTs to break away from more conventional single-species oriented approaches to fisheries management, and move towards systems that are more in line with the “Pacific Way”. The report provides suggestions on how PICTs might move further along the track to EAF implementation, while recognising the great differences that exist between the countries themselves, and their inherent capacity to manage coastal ecosystems.
11. Several regional organisations, international agencies and non-governmental organisations (NGOs) are already encouraging adoption of the EAF, and are able to provide PICTs with support and assistance in its implementation. The report proposes a number of broad areas where further assistance might be directed to support PICT efforts to implement both the EAF and ICM.



1. BACKGROUND INFORMATION

1.1. The study

12. This is the second of two reports produced as a result of a study on “Implementing the Ecosystem Approach to Coastal Fisheries and Aquaculture in Pacific Island countries”. The first report, which should be read in conjunction with the present document, is entitled “The Ecosystem Approach to Coastal Fisheries and Aquaculture in Pacific Island Countries and Territories—Part 1: A review of the current status”. As well as providing information on the degree to which the ecosystem approach to fisheries (EAF) has been taken up in the region, that report also provides information on the development of the EAF concept and the wide range of possible forms the EAF can take.

13. The study was carried out by the Secretariat of the Pacific Community (SPC), with funding from The Nature Conservancy (TNC). The study aims to assess implementation progress to date in the Pacific Island region, develop common principles for in-country application of the EAF, and define the types of assistance and support that might be provided by regional organisations, institutions and key non-governmental partners.

14. PICTs have committed themselves to implementing the EAF in regard to management of oceanic and coastal fisheries and aquaculture. The goal of SPC’s Coastal Fisheries Programme, as stated in its Strategic Plan 2007–2009, is “to assist SPC members in their commitment to implement the Ecosystem Approach to Coastal Fisheries and Aquaculture by 2010”, so as to contribute to the regionally shared vision of “a healthy ocean that sustains the livelihoods and aspirations of Pacific Island communities”. TNC has decided to align its coastal fisheries/marine resource management programme to support the EAF in the Asia-Pacific region. Both organisations have indicated their intentions to adopt and support the common principles and approaches identified by this study.

1.2. Terminology

15. There are several terms and acronyms used in literature and discussions on the EAF, some of which are overlapping, or which represent variations or interpretations of the basic EAF philosophy. The phrase *ecosystem approach to fisheries* is used throughout this report, in line with FAO parlance, which draws a parallel between EAF and the precautionary approach to fisheries. As is clear from the title, the focus of the report is on coastal fisheries and aquaculture, but the phrase *ecosystem approach to coastal fisheries and aquaculture (EACFA)* used in an earlier draft has been abandoned as being too unwieldy and inelegant. When ecosystem approach to fisheries or EAF is used in the text it refers to coastal fisheries and aquaculture unless the context clearly indicates otherwise.

1.3. Acknowledgement

16. The author would like to thank the following individuals who provided valuable comment and insight on various drafts of this report: Vera Agostini, Gordon Anderson, Michael Beck, Michel Blanc, Lindsay Chapman, Pepe Clark, Paul Eastwood, Rick Fletcher, Simon Foale, Lynne Zeitlin Hale, Ursula Kaly, Maruia Kamatie, Jeffrey Kinch, Michael King, Padma Narsey Lal, Trina Leberer, Warwick Nash, Kelvin Passfield, Ben Ponia, Andrew Smith and Alan White. Any errors or faults that still persist despite the attentions of the reviewers are entirely the responsibility of the author.

2. RELEVANCE OF THE EAF TO THE PACIFIC ISLANDS

2.1. What the EAF is

17. Ecosystem-based management (EBM) is an approach to managing natural resources (whether on land or in the sea) that takes into account the broader ecosystem impacts of human activities. The goal is to maximise a broad range of human benefits by maintaining an ecosystem in a healthy condition so that it delivers a full range of services to individuals and communities. Ecosystems are defined as functioning assemblages of living and non-living components, and may exist at a range of scales, from the bacterial assemblage in a handful of sand, to a coastal lagoon, to an entire ocean, or the whole planet. A more restricted view of an ecosystem, as the plants, animals and environment of a particular type of habitat, such as a coral reef, provides a more manageable entity for study and management. EBM can take place at whatever scale seems to be most appropriate and do-able.

18. The EAF applies this thinking to the management of fisheries. Instead of considering only the species being targeted by the fishery, and trying to manage human activity to maximise production, economic benefits or employment, the EAF looks more broadly at the ecosystem in which the fishery exists. Primary aims of the EAF include:

- not allowing fishing operations to cause undue disruption or damage to ecosystems through overfishing, depletion of non-target species, habitat damage or pollution;
- ensuring ecosystems are kept in a healthy and resilient state so that they can endure unexpected environmental and other shocks;
- improving compliance with fishery management measures through greater stakeholder engagement;
- recognising alternative values of marine resources (such as recreation and tourism) other than extractive ones.

19. The EAF also tries to account for the effects of other sectors, such as coastal development and agriculture, on fishing. Where possible, the EAF requires that activities in these sectors that may be harmful to fishery resources and coastal ecosystems be better managed. This is particularly important in the Pacific Islands because of the importance of fishing to so many people's livelihoods and lifestyles.

20. In practice, implementation of the EAF means that many PICTs may have to:

- scale back unrealistic expectations of the amounts that coastal fisheries can produce;
- apply a conservative, precautionary approach to fisheries management;
- set aside reserves or protected areas to increase ecosystem resilience;
- promote more stakeholder participation in fishery management arrangements;
- establish rights-based methods of fishery management, instead of open-access 'free for all' arrangements; and
- establish integrated coastal management arrangements that involve many sectors, not just fisheries.

21. The EAF is not necessarily inconsistent with, or a replacement for, current fisheries management approaches in PICTs. Conventional best practice of planning; setting objectives; implementing strategies and measures to meet the objectives; and performance monitoring and assessment, if conducted to a satisfactory standard, would still provide a sound basis for implementing the EAF. Indeed, rigorously applying conventional fisheries management methods (with appropriate emphasis on the precautionary approach and rights-based allocation) would help solve many of the problems currently being faced.

22. The EAF is not a goal in itself, but a framework or set of policies and tools intended to result in improved management of fisheries and of ecosystems. Neither is there a “common approach” or “one size fits all” that can be standardised among PICTs, although there may be common issues, principles or actions that they share. Implementation of the EAF will assume a different priority depending on the circumstances of the country or fishery. However many EAF-compliant measures, such as community-based management (CBM) and the use of traditional management systems, are embedded in the “Pacific Way” of doing things. A move towards EAF will, in many cases, make fisheries management “fit better” into PICTs national social and economic contexts.

23. The following sections discuss some of the fisheries and coastal management issues in PICTs that would benefit from an ecosystem approach.

2.2. Pacific Islands marine ecosystems and the services they provide

24. In general, ecosystem scales relevant to coastal fisheries management in the Pacific Islands range from a few tens of kilometres to a couple of thousand. Ecosystem boundaries often do not correspond to political or jurisdictional boundaries and this can complicate management. An example is the tuna fishery of the western and central Pacific Ocean (WCPO), where the ecosystem in which the fishery is located (the Western Pacific Warm Pool) not only straddles many exclusive economic zones (EEZs) and high seas areas, but also shifts from one year to the next, depending on the dynamics of the El Niño- Southern Oscillation.

25. Fortunately, coastal ecosystems in the Pacific are more static. In many countries individual atolls or islands can be considered and managed as discrete ecosystems, even though they may be interconnected through larger-scale ocean currents that affect larval dispersal and the “marine climate”. Coastal waters around larger land masses may also be considered as discrete ecosystems, and for management purposes can be divided into units that may correspond to provincial, municipal or customary jurisdictions. In Papua New Guinea (PNG), the Pacific Islands region’s largest country, there are several larger-scale ecosystems in the south, east and northern parts of the mainland, and more around the larger islands. These cascade into greater numbers of smaller, but still reasonably discrete ecosystems as one moves further down the scale. In the other direction, PNG forms part of the coral triangle, a zone of high coral biodiversity that stretches from Solomon Islands to Indonesia. The coral triangle is now the focus of large-scale marine and coastal conservation efforts (including a commitment to introducing the EAF) by the “CT6” group of governments (Indonesia, Malaysia, Philippines, PNG, Solomon Islands and Timor-Leste), supported by a consortium of donors, NGOs and international organisations.

26. A Pacific atoll is an example of a reasonably discrete coastal ecosystem, and provides a good illustration of ecosystem functions and services. The atoll ecosystem is made up of a range of living components that include corals, algae, bacteria, microorganisms, invertebrates, fish, seabirds, mangroves, coastal plants, marine vertebrates (turtles, whales, dolphins, perhaps dugong), and of course humans. The non-living components of the ecosystem include bedrock and foundation minerals, beach-rock, coralline structures, sands from coral and algae, organic sediments, suspended organic and inorganic particles, dissolved oxygen, nutrients, freshwater from rain and runoff, pollutants and other chemicals, debris, refuse and surface films of oils, fats and waxes, some of which may be natural and others human-made. Water quality is thus an integral part of the ecosystem, as also are processes such as currents, climate and weather, which greatly influence ecosystem functioning, for instance by affecting whether a particular year is good for recruitment of a given species, or through extreme weather events.

27. The services that atoll ecosystems have historically delivered to humans are very wide-ranging. As well as providing human nutrition in the form of fish, invertebrates and plants, the coastal ecosystem builds and maintains the islands themselves by producing coralline and algal sand which is transported onto land during periods of heavy weather. Mangroves have provided firewood, construction timber, medicines and dyes, and nursery grounds for reef and lagoon fish. Atoll ecosystems have also provided sinks for organic refuse and waste from humans and agriculture, contributing to health and hygiene. For many generations of atoll dwellers, the ecosystem has provided cultural and recreational services—a place for children to play, for sport and competition, for the learning of navigation and fishing skills, and for traditional ceremonies and customary practices. Successful EBM of an atoll would ensure that all these aspects of the ecosystem remained healthy so that the full range of functions would continue to be delivered, not only now but also in the future. A key principle of EBM is that what we do today should not close off options for future generations.

28. Unfortunately, there are many cases where atoll ecosystem functions are being lost because of poor resource use or management practices. For instance, some atolls have seen extensive construction of seawalls in order to protect or reclaim waterfront land. The seawalls often do not withstand heavy weather, and so fail to achieve their purpose, but they interfere with the ecosystem's island-maintenance function by preventing waves from depositing sand onto the island. This impedes replenishment of the land, and leads to erosion, subsidence and localised flooding, especially during high tides. Where lagoon sand-mining or aggregate extraction is carried out to provide construction materials, the problem might be made worse. Disposal of large amounts of toxic or non-degradable waste, usually from imported materials, may be beyond the capacity of the ecosystem to absorb, while sewage from growing urban populations can saturate the ecosystem with excess nutrients that may lead to algal blooms, red tides and fish kills. The consequence may be declines in the abundance of the species that are responsible for key functions such as food production or creation of the sand needed for island-building. Outbreaks of ciguatera fish poisoning, which are thought to result in part from human impacts on coastal ecosystems, are becoming more common in some locations.

29. Examples of activities in the Pacific Islands that generally have a negative impact on coastal ecosystems are widespread and include coastal development such as housing and road-building, destruction of mangroves, discharge of sewage into coastal waters, runoff from plantations and farming, sand- and coral-mining for construction, pollution from industry and shipping, leaching from garbage dumps, construction of seawalls and a host of other (usually) shore-based activities. Waste from pig farms along the coast or close to rivers is an issue in some PICTs. The relevance to the EAF is that most of these impacts will threaten fisheries sustainability, either reducing resource productivity, stability or resilience to fishing, or reducing the quality of food fish through contamination. Of course, overfishing and destructive activities such as blast fishing, poison fishing and physically breaking corals may also contribute to the generalised degradation of coastal ecosystems, and to a loss of resilience, which makes ecosystems less able to accommodate additional stresses.

2.3. Impacts of fisheries on the environment

30. Much of the rationale for the EAF worldwide is based on the damaging effects that fisheries can have on the environment. This is especially true of industrial fisheries, which may use gear that physically modify the habitat or generate large volumes of processing waste, bycatch and discards that pollute the environment. Trawls and dredges are the gear most commonly associated with physical habitat damage, while shrimp trawling and tuna longlining are the fisheries that produce the greatest proportions of discards (FAO 2004). Both of these fisheries exist in the Pacific Islands region. Shrimp trawling, although restricted to the southern coast of PNG, gathers large volumes of benthic organisms, including corals, invertebrates and fish, as bycatch, and also reduces the catch in the artisanal rock-lobster fishery. Locally based tuna longline and purse-seine fleets operate in several PICTs, where they are an acknowledged threat to endangered species of sea turtles, as well as impacting to an unknown extent on the catches of artisanal fishermen operating closer inshore.

31. Perhaps more important from the viewpoint of this study are the small-scale subsistence and artisanal fisheries found in all Pacific Island countries. These tend to be community fisheries rather than truly commercial ones, and there is a school of thought that says they are likely to be more environmentally benign than larger-scale or commercial operations. Misund et al. (2002) cited in King and Fa'asili (2008) state that "the species composition in tropical fisheries often resembles the structure found in ecosystems which, therefore, may be less affected by the removal of sizes and species from many different trophic levels". This conclusion, that the fishery harvests fairly evenly across all ecosystem levels, may be true in cases where exploitation pressure is relatively low, and distributed among a wide range of ecosystem components. However, in situations where fishing pressure is higher (such as in areas of high population density or few land-based alternatives), the result can be a reduction in abundance of many key components of the fish and invertebrate community. Andrew Smith (Director, Pacific Coastal Marine programme, The Nature Conservancy pers. comm.), referring to Yap State in the Federated States of Micronesia, suggests:

This may have been the case with "traditional" fisheries, but as spearfishing, and especially flashlight spearfishing, have become the fishing method of choice in many areas, fishers have selectively targeted key species groups. For example scarids, large wrasses and unicorn fish are often selectively fished out, causing a noticeable structure change. In Yap outer atolls it probably was the case that trophic structure was largely maintained, as most atolls had over 110 named fishing techniques that used different methods to target different species in different locations at different times, with no one method being dominant. However, now in those same atolls only about 10–20 techniques are being regularly used, and spearfishing is now the dominant method targeting the same species in the same areas throughout the year. In response to this issue, some community leaders in Samoa have banned the use of underwater lights for spearfishing (Mike King, fisheries consultant, pers. comm.).

32. An often-neglected feature of subsistence fisheries is their ability to drive resources to very low levels, because even when catches are low there is little economic incentive to stop fishing, unlike commercial operations. The owner of a commercial fishing boat must cover the costs of fuel, crew, bait, ice, boat loan and a host of other expenses, and needs to catch enough fish to pay for these. Continued poor catches mean the operation will eventually go broke and cease operating, giving the resource some relief and a chance to recover. Commercial fishing operations therefore have a built-in self-correction system, although this can be distorted by external factors such as subsidies. Subsistence fishers have no such expenses, and often few opportunity costs; they may not have economic options that allow them to use their time more productively than by fishing, even when fishing is poor. A subsistence fisher who needs to feed a family will keep on fishing for as long as is necessary to get the required catch, even if it takes 10 times longer now than in the past. As a result, subsistence fisheries can keep on operating even when resources are at such low levels that commercial fishing would be impossible. The author has observed situations in PNG where fringing coastal reefs are gleaned by scores of people at every low tide, and where a given person's catch might be a plastic bag containing a handful of fish and invertebrates, almost all of which are juveniles. In those same locations, fishing expeditions and dive observations yield few or no large individuals of edible fish or invertebrates in shallow (< 25m) coastal waters¹.

33. There are examples in which community-operated fisheries can have strong negative impacts on coastal ecosystems. An obvious case is that of the live reef food fish (LRFF) fishery, which has depleted stocks of apex predators in many Pacific Island reefs and lagoons, in some cases eliminating spawning aggregations of certain groupers, snappers and other valuable and charismatic species. In addition to having largely unquantified impacts on the environment and on future resource productivity, the LRFF fishery may have led to reduced development options in locations where marine-based tourism is being promoted, based on the same resources as those exploited by the fishery. Indeed the LRFF fishery is considered so environmentally unsound that major campaigns have been launched by SPC and several international NGOs, including TNC, to regulate and better manage it.

¹ This may suggest a need to promote alternative food sources from agriculture and aquaculture, although caution needs to be taken here too. A recent study of alternative income generating activities set up with the specific purpose of alleviating fishing pressure on overexploited coastal resources found no evidence that any of them had been successful (Gillett et al. 2008).

34. A further widespread example of ecosystem impacts from fishing activities in PICTs relates to sea cucumber fisheries. Sea cucumbers have been exploited in the region for over a century to produce dried beche-de-mer for export to east and Southeast Asia, notably China, Hong Kong, Singapore, Malaysia and other countries with large ethnic Chinese communities. Recent increases in demand for this product, caused by the growing affluence of mainland China coupled with resource depletion in other areas of the world, has led to ever-increasing pressures on sea cucumber stocks in PICTs. Sea cucumber resources are now severely overexploited in most PICTs, with standing stocks and resource productivity at a small fraction of earlier levels. For example, a 2006 survey of sea cucumber resources in PNG's New Ireland Province (Kaly et al. 2007) indicated that stocks had fallen to about 13% of levels recorded 12 years previously—at which time the fishery was already considered seriously overexploited.

35. Similar situations have been experienced in other coastal provinces in PNG, and in other Pacific Island countries. In 1990, a survey of the Tonga sea cucumber fishery reported such low stock densities (Preston and Lokani 1990) that the government subsequently closed the fishery completely for 10 years to allow its recovery. In Solomon Islands, the April 2007 earthquake and tsunami led directly to the re-opening of the sea cucumber fishery in an attempt to provide people affected by the disaster with an opportunity to make money for reconstruction and repairs. The fishery, which had been closed four months earlier due to over-fishing, operated in an uncontrolled manner for the rest of 2007. By early 2008, sea cucumbers were reported to have been wiped out from many areas of Solomon Islands, and the moratorium was re-introduced in April 2008. In Kiribati, sea cucumbers have effectively been eradicated from Tarawa Lagoon and the government Fisheries Department has established a hatchery that it hopes will enable repopulation of sea cucumber stocks (Preston 2008). Such a goal is unlikely to be met, however, without accompanying measures to manage the fishery and ensure that it is used sustainably in the future (Kinch et al. 2008; Bell et al. 2008).

36. Apart from the economic loss this represents, there are also ecosystem impacts from sea cucumber fishing, although these are poorly studied and understood. It has been estimated that it takes 10 tonnes of firewood to smoke one tonne of beche-de-mer (Preston 1993). The firewood often comes from coastal mangroves, hence the sea cucumber fishery has probably contributed to mangrove deforestation in some areas. Coastal erosion has also been observed as a result of the removal of vegetation for sea cucumber processing (Jeff Kinch, Coastal Management Adviser, SPREP pers. comm.). Boiling sea cucumbers during first processing usually takes place on the beach and produces toxic “stick-water”, which is generally dumped straight into the sea and has been known to cause localised fish kills (Fao 1990). The role of sea cucumbers in coastal ecosystems is not fully understood, but they are known to be responsible for a significant amount of bioturbation—burrowing and aerating sediments, and digesting some of the bacteria and organic material within them, somewhat like earthworms in soil. Socioeconomic surveys of coastal communities in PNG gathered considerable anecdotal evidence that large-scale removal of beche-de-mer had been accompanied by widespread environmental changes, including the development of anoxic sediments, increases in areas of seafloor covered with blue-green algae and macro-algae, and reductions in coral cover (Kaly et al. 2005). Similar observations were also recorded from interviews with fishermen in PNG's Milne Bay Province (Foale 2005), and in Rodrigues, a small island in the Indian Ocean where uncontrolled sea cucumber removal has taken place in recent years (Preston 2007).

37. There is no scientific evidence that these ecosystem effects are a direct result of the decimation of sea cucumber stocks, but coastal communities in PNG are convinced that this is so. Little is known about what further impacts these effects may have on other marine species or resources, or on the ability of coastal ecosystems to cope with additional stresses from land-based sources of damage. However, some communities in PNG's New Ireland and Morobe provinces have taken matters into their own hands by putting in place local sea cucumber fishery closures to try to restore stocks and mitigate environmental impacts that official management plans have so far failed to do.

38. The sea cucumber fishery is probably the Pacific Islands' biggest coastal fisheries management failure, both in terms of economic losses to PICTs (especially to rural communities with limited alternative livelihood options), and in regard to largely unknown but potentially significant ecosystem impacts of sea cucumber harvesting. On a localised basis, however, there are many other examples of negative ecosystem effects caused by other types of fishing activity. In 2006, a case was reported in PNG's Milne Bay Province in which a local trading company was asked by a remote outer island community to stop supplying torches and batteries to community residents, as these were being used for night fishing, and the coral reef was now littered with dead and rusting batteries, causing concern to the community about pollution and reef damage (Cartwright and Preston 2006b). The removal of some fish, including triggerfish and wrasses that prey on bio-eroders such as sea urchins, may allow sea urchin populations to increase to the extent that they erode corals faster than the corals can grow. On the other hand, the removal of urchins and herbivorous fish, such as parrotfish, may allow algae to grow over and smother corals (King and Fa'asili 2008). Either case may have far-reaching effects, such as causing coastal erosion by reducing the ability of reef- and island-building corals to dissipate wave energy. And of course, destructive fishing practices, such as coral breakage, Derris root and other poison fishing, and sometimes blast fishing, are still in widespread use among subsistence and artisanal fishers in some locations.



39. Despite the examples cited above, there is a perception among Pacific Island fishery managers that fishing activities have a relatively small impact on coastal environments. This may be true compared with situations in other parts of the world, where decades of trawling has caused extensive habitat damage, industrial fisheries have driven major stocks to the point of collapse, oil spills have decimated coastal ecosystems, and urban populations have polluted coastal waters and fished down food webs to the point that all that remains are small fish and invertebrates low on the trophic chain. However, the distinction is still only relative—Pacific Island fishers and communities are perfectly capable of overfishing, trampling, poisoning, dynamiting and otherwise damaging the resources that they depend on, and of harming ecosystems in ways that affect not only the prospects of restoring those fisheries, but may also limit other ecosystem services and development pathways.

40. The situation is only likely to worsen in the future. Bell et al. (in press) state that, “forecasts of the fish required in 2030 to maintain current per capita fish consumption indicate that even well-managed coastal fisheries will only be able to meet the demand in a minority of PICTs. Governments of many PICTs will need to increase access to tuna, and develop small pond aquaculture, to provide food security.” The increased pressure on coastal resources that is likely to occur over the next couple of decades will further increase the stresses from fishing and associated activities on coastal ecosystems. Implementing the EAF provides fishery managers and resource users with opportunities to address these issues.

2.4. Aquaculture

41. Aquaculture activities are well-established in some PICTs and developing in others. Aquaculture in the region is practised in several ways:

- **open systems**, in which the farmed species grows on lines or in nets or cages situated in coastal waters. Such systems allow free interchange of nutrients, waste products, diseases, parasites and reproductive products between the farmed species and the coastal ecosystem. The main species currently being farmed in open systems are pearl oysters (*Pinctada margaritifera* and *P. maxima*), giant clams (mostly *Tridacna maxima*) and carrageenan-bearing seaweeds (*Kappaphycus alvarezii*). Sponges have also been cultured in open systems in the past;
- marine and brackish-water **closed systems**, in which the cultured species is essentially isolated from the natural environment. Coastal water is pumped into the system, usually through filters and non-chemical (ultra-violet or ozonation) purification systems, and effluent is usually discharged into a sump on land rather than directly into the sea. Exchange with the coastal ecosystem is less than in open systems, but there is still the possibility of unwanted transfer of biological material, pathogens and waste products between the two. Closed systems are currently used for farming penaeid prawns and milkfish, for hatcheries producing giant clams, trochus, sea cucumbers and other invertebrates, and for the culture of algae needed to feed larvae of these species;
- brackish or freshwater **pond culture** is used in some countries for farming milkfish and tilapia, often for subsistence or livelihood purposes. As with closed systems, there is limited exchange between culture ponds and coastal ecosystems, although effluent waters and overspill may enter coastal waters, especially at times of flooding. Pond management systems are usually much lower-technology than closed systems, and do not generally involve water pumping or treatment.

42. Several other prospective aquaculture species are under investigation, including sea cucumbers, partly for purposes of restocking depleted natural populations. Experimental trials are being carried out to assess the feasibility of capturing larval marine ornamental fish and invertebrates for grow-out in open or closed systems, and in Solomon Islands these are now moving towards commercialisation. Commercial culture operations for barramundi cod are being established in New Caledonia and Marshall Islands, and for rabbitfish in New Caledonia.

43. Aquaculture presents its own particular set of EAF-related concerns, which relate primarily to the following areas:

- introduction of alien aquaculture species into coastal ecosystems;
- introduction of diseases, parasites, or unwanted associated species along with imported broodstock of species used in aquaculture;
- poor husbandry practices, such as overstocking, which can result in diseases or parasitic infections in cultured organisms which then infect wild populations;
- pollution of coastal waters by pesticides, antibiotics or other chemicals used in aquaculture, as well as by metabolic waste products from the farmed animals, and decay products of uneaten feed;
- genetic pollution resulting from reproduction between wild organisms and cultured organisms that may have been selectively bred or genetically modified, and which may affect the genetic structure of the wild population. This is a special concern affecting restocking programmes;
- where juveniles of wild species are captured for on-growing, overfishing of those species and consequent depletion of wild stocks or reduced production from capture fisheries;

- destruction of mangroves and other coastal habitats to allow development of aquaculture sites;
- many aquaculture species are carnivores, and eat fish or other marine organisms. Development of aquaculture can therefore lead to increased fishing pressure on wild resources, and changes to patterns of fishing or to the species being targeted.

44. Open aquaculture systems have the greatest potential to negatively affect the coastal environment because they are fully integrated with it. While closed systems are more isolated, there is still a risk of negative impacts from them, especially where alien species are being farmed, or where the operation involves heavy use of pesticides, antibiotics or other chemicals that may find their way into the coastal environment.

45. Introduction of unwanted species, including parasites and diseases, needs to be addressed through improved aquatic biosecurity practices and regulations, which ensure adequate quarantine, inspection and disease testing and prevention protocols. Aquatic biosecurity not only concerns aquaculture, but is also needed in regard to other methods of transferring aquatic organisms, such as discharging ships' ballast water into coastal areas.

46. Aquatic biosecurity in many PICTs has been relatively lax in the past. Various species have been transferred to and among Pacific Island countries with little regard or concern for possible ecosystem effects. Trochus shells, *Trochus niloticus*, have been transferred among more than 100 Pacific Island locations. There are few observations of the environmental impacts of these introductions, but they are generally thought to be limited. *Tilapia mossambica* was widely introduced to many Pacific Island countries in the 1950s and subsequently, with more significant impacts, since this species has become a pest in most PICTs, and has impeded the development of alternative forms of aquaculture in some. In recent times, the seaweed *Kappahycus alvarezii* has been introduced to at least three Pacific Island countries from the Philippines, and widely distributed among them. Impacts of this species are thought to be quite limited since it does not propagate easily in the wild, but there are anecdotal reports of small pockets of this seaweed becoming established on selected reef areas.

47. Awareness is growing of the need for more care when making international transfers, but biological material continues to be moved freely from island to island within many individual PICTs. In the case of countries with large ocean areas and widely dispersed islands, domestic transfers between distant parts of the same country may carry greater risks than international transfers from nearby countries.

48. Among other agencies, SPC has been active in recent years in raising awareness of biosecurity risks, and is currently seeking funding to establish a regional biosecurity project to raise awareness of these issues and help PICTs improve their responses to them. When operational, the project will assist with impact risk analyses, establish coordinated regional disease testing and certification programmes, produce regional guidelines and codes of conduct, and promote interagency collaboration between fishery, veterinary and quarantine services. These and other aquaculture-related initiatives are described in SPC's Aquaculture Development Plan (SPC 2007).



2.5. Impacts of other sectors on fisheries

49. Many Pacific Island fisheries managers believe that other sectors have impacts on coastal environments and fisheries that are similar in importance to those of fishing. A recent survey (King and Fa'asili 2008) reported that fisheries managers in 13 PICTs considered a range of non-fishery activities as having significant effects on coastal environments, in some cases nearly as strong as those resulting from the activities of fishers, as shown below.

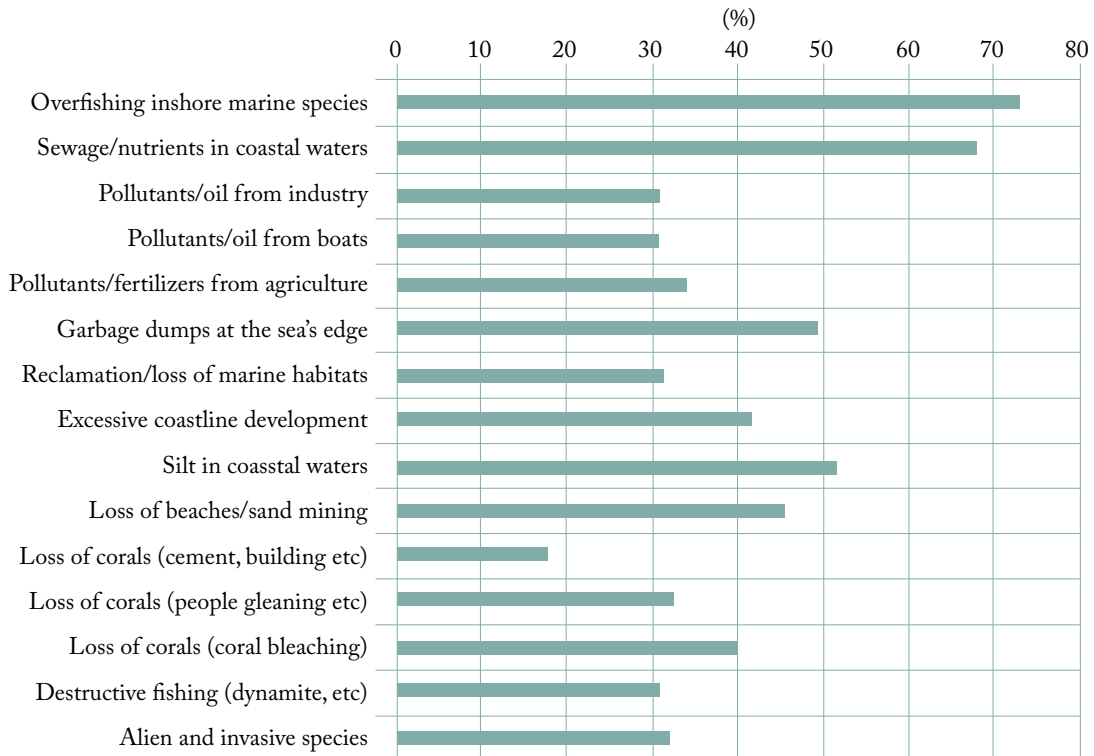


Figure 1: Environmental impacts identified by fisheries managers in Pacific Island countries. Total mean impact given from 0% (no effect) through to 100% (severe effect). Based on questionnaires received from 13 out of 21 countries. Source: King and Fa'asili 2008.

50. Of the 15 types of impacts reported, only three were related to fishing activities (overfishing of inshore marine species; loss of corals due to people walking on them while reef gleaning; and use of destructive fishing methods). The other 12 deleterious effects recorded included contamination of coastal waters by sewage, oil, fertilisers, agricultural pollutants, and coastal garbage dumps; siltation (usually due to poor land management); land reclamation and coastal development; sand mining and the extraction of coral for cement making; coral bleaching; and the presence of alien and invasive species.

51. The types of degradation reported in Figure 1 are typically chronic in nature, with gradually accumulating effects that are added to almost imperceptibly over time. The impacts of progressive coastal construction, or changes in levels of sewage or pollutants, often occur slowly over many years or even generations, so they can be very difficult to measure and may go un-noticed until they are quite severe. This leads to the "shifting baseline" situation in which people often notice the minor deterioration relative to the last few years, but may not perceive the major degradation that has taken a decade or more to occur. Early books about the Pacific Islands written 100 or more years ago describe high densities of marine resources, such as giant clams, pearl oysters and rock lobsters, that have not been observed for generations and which are utterly inconceivable to us now. Coastal systems that once supported thriving local fisheries have gradually become highly degraded. A good example is Suva Lagoon in Fiji, once a productive fishing ground but which now has the distinction of having the highest levels of the anti-fouling pollutant tributyl tin (TBT) ever published (Maata and Koshy 2001).

52. Apart from the chronic effects of coastal degradation, there is also the potential for spectacular “flips”, in which the stresses on an ecosystem accumulate to the point where it is “pushed over the edge” and changes substantially and permanently. An example is Fanga’uta Lagoon, one of the most important water bodies in Tonga and a dominant natural feature of Tongatapu, the Kingdom’s main island. Morrison and Kaly (2008) state that, “Aerial photographs taken in 1992 showed Fanga’uta Lagoon with relatively clear waters where it was possible to see areas of seagrasses, coral rubble and patch reefs to depths of at least 2 m. Information was coming out by this time that the lagoon was occasionally turning green, that turbidity was increasing, and that fish catches continued to decline. Then during 1993 the lagoon ‘flipped’ (changed for good). It lost its clear waters, fish kills started to occur and foam was often seen forming on its narrow muddy beaches. The many species of seagrasses in the lagoon became covered in algae and more and more mangrove areas were being cut and damaged. Many of the beaches were by that time converted to seawalls and sewage was a common component of storm water entering through drains.” It seems that the progressive pollution and overbuilding of Fanga’uta Lagoon eventually resulted in a drastic change of state, which would now require significant cost and usage changes to rehabilitate.

2.6. Coastal fisheries management

53. Management of coastal fisheries in PICTs is not generally based on a strict scientific approach, or on the assessment of maximum or economic sustainable yields. With one or two notable exceptions (the PNG prawn trawl fishery, and some of the region’s deep-water snapper fisheries) such approaches have been considered too technically complex and costly to be applied in small fisheries involving dozens of species and numerous widely-dispersed resource users, many of whom are fishing for subsistence or livelihood purposes. A regulatory scheme involving vessel numbers, gear restrictions, size limits and quotas may be appropriate for commercial fishing activities such as prawn trawling, deep-water snapper drop-lining or tuna longlining, but is more difficult to devise and enforce in a community situation where subsistence or livelihoods are at stake. There are exceptions to this generalisation however—the Aitutaki trochus fishery in Cook Islands is an example of management by size limits and total allowable catch (TAC), the latter based on simple rules and easily gathered abundance estimates (Nash et al. 1995)—but they are few and far between.

54. Small-scale subsistence and artisanal fisheries therefore require different management approaches. Where they exist, coastal fishery management measures in the Pacific Islands have tended to focus on non-quantitative approaches intended to protect stocks, especially juveniles and spawning adults, in a generalised way. These include size limits (both minimum and maximum), gear restrictions (minimum mesh sizes for nets, bans on torch fishing at night), prohibitions on using destructive fishing methods (blast fishing, poisons), prohibitions on taking berried female crustaceans, and seasonal or area closures. Unfortunately, enforcement of such management measures tends to be poor or non-existent. Gathering legally sound evidence is very difficult, it may be culturally unacceptable for enforcement officers to be tough on fishers who are members of their own communities, and in the rare cases where a prosecution takes place the courts often impose trivial penalties that make the whole process a waste of time and effort.

55. “Modern” or conventional fishery management arrangements in PICTs are often overlaid on a background of customary marine tenure (CMT) and patterns of traditional user rights over living marine resources, which may be enshrined in common law and even in the constitutions of some countries. Although CMT is generally breaking down in urban or peri-urban areas, it remains strong in many rural and outer island locations. In such situations, customary practices such as closed areas and seasons, species taboos and other rules may still play an important role in controlling the way living marine resources are exploited. Traditional mechanisms for enforcing community-sanctioned measures may succeed in situations where enforcement of modern fishery regulations is difficult or impossible, or there may be ways in which elements of both systems can be combined to produce results that are not achievable by either system on its own.

56. The difficulty of enforcing centralised fishery management arrangements underpins a growing trend in recent years towards the promotion of local, CBM of fisheries, or co-management arrangements in which resource users play an active part in identifying fishery management problems and solutions, and monitoring the implementation of measures that have been agreed to. In some cases, these arrangements have been the initiative of government agencies, while in others, NGOs or communities themselves have taken the lead role. Where modern or conventional fishery management measures can be incorporated into CBM plans, there is the prospect that CMT or social pressures will encourage greater compliance.

57. A prominent feature of recent marine resource management initiatives in the region has been efforts to establish marine protected areas (MPAs) or marine managed areas (MMAs), often in conjunction with CBM arrangements (see Box 1 for a discussion of the differences between MPAs and MMAs)².

Box 1: Where are marine protected areas?

There is often a lack of clarity surrounding the use of the term ‘Marine Protected Areas’ (MPAs). Many countries have their own specific definition, but the most commonly used international definition is the one developed by the International Union for Conservation of Nature (IUCN), which defines an MPA as:

Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.

This means that:

- An MPA always includes the marine environment but may also include coastal land areas and islands. It is commonly called an MPA when the total area of sea it encompasses exceeds the area of land within its boundaries, or the marine part of a large protected area is sufficient in size to be classified as an MPA in its own right;
- The MPA has some form of protection, usually but not necessarily legislative. In the Pacific Islands region many MPAs are established by customary or traditional means;
- The degree of protection is not necessarily the same throughout the area; most large MPAs are of necessity zoned into areas of different impact and usage;
- The MPA—and also the provisions for its management—should cover not only the seabed but also at least some of the water column above with its flora and fauna;
- MPAs are not just relevant for natural features but also for protecting cultural features such as wrecks, historic lighthouses and jetties.

Within MPAs some areas may exclude all extractive activities of living and non-living resources. While commonly referred to as a “no-take area”, the internationally accepted terms for such areas are either “marine reserve” or “strict nature preserve”. These form a sub-set of MPAs.

Due to the confusion surrounding the term “marine protected area” and its frequent mis-representation as a no take area only, the term “marine managed area” (MMA) has gained increasing acceptance as it emphasises the potential range of management regimes for the area, even though it is often used synonymously with the term MPA.

(Box 1 continued)

² At the time that this report was being finalised, the International Union for Conservation of Nature (IUCN) adopted a new definition of protected areas, which also encompasses MPAs: “A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values” (Dudley 2008, available at www.iucn.org/dbtw-wpd/edocs/2008-028.pdf). This definition now supersedes the official IUCN definition for marine protected area used since 1999 and shown in Box 1. The report acknowledges that switching to the new generic protected area definition will lose the old MPA definition’s specific reference to the marine environment. However, IUCN says that the switch ensures “a clearer demarcation between conservation-focused sites and those where the primary purpose is extractive uses, such as fisheries management areas”. It does not preclude the inclusion of relevant fishery protection zones but they need to be consistent with the new definition to be included as an MPA by IUCN.

Locally managed marine areas (LMMAs) are a further sub-set of MMAs and are defined as:

An area of nearshore waters and coastal resources that is largely or wholly managed at a local level by the coastal communities, land-owning groups, partner organizations, and/or collaborative government representatives who reside or are based in the immediate area. (LMMA Network: www.lmmanetwork.org)

The key to success for any MPA/MMA is for there to be clearly defined management objectives, and for it to be designed and managed for those objectives. It is not appropriate to assume that an MPA/MMA set up for biodiversity or habitat protection will automatically improve fisheries management. Similarly it should not be assumed that an MPA/MMA established for fisheries management purposes will adequately protect the range of biodiversity in an area.

In terms of fisheries management, MPAs/MMAs are one management tool that should be applied in conjunction with other appropriate fisheries management methods and within a broader management framework.

Marine reserves are a promising tool for fisheries management and conservation of biodiversity, but they are not a panacea for fisheries management problems. Hilborn et al. (2004) state: *“For fisheries that target highly mobile single species with little or no by-catch or habitat impact, marine reserves provide few benefits compared to conventional fishery management tools. For fisheries that are multi-species or on more sedentary stocks, or for which broader ecological impacts of fishing are an issue, marine reserves have some potential advantages. Their successful use requires a case-by-case understanding of the spatial structure of impacted fisheries, ecosystems and human communities. Marine reserves, together with other fishery management tools, can help achieve broad fishery and biodiversity objectives, but their use will require careful planning and evaluation. Mistakes will be made, and without planning, monitoring and evaluation, we will not learn what worked, what did not, and why. If marine reserves are implemented without case by case evaluation and appropriate monitoring programs, there is a risk of unfulfilled expectations, the creation of disincentives, and a loss of credibility of what potentially is a valuable management tool”.*

While this change is important, the basic concepts discussed in Box1 relating to MPAs and MMAs are still relevant. The information in Box 1 still refers to the old IUCN definition, as the full implications of the new definition are not yet fully understood.

58. Successful MPAs have been demonstrated to increase population sizes of fish and invertebrates within the reserve boundaries and, in some cases, fish catches in adjacent areas (e.g. Alcala et al. 2005). However many MPAs have been established with unclear or conflicting purposes, or in areas where the prospects of success are poor. Halpern and Warner (2003) state that MPAs around the world *“were set aside because they happened to be located adjacent to military installations, sub-tidal anthropogenic structures (oil rigs, communication cables, etc.) or dramatic natural features... other reserves were established because local fisheries began to collapse or because scientists wanted a small patch of ‘natural’ area to study. Briefly, most reserve locations and boundaries were chosen by a political process that focused on economics, logistics or public acceptance, while largely overlooking or ignoring how the complex ecology and biology of an area might be affected by reserve protection”.* Poor planning and unclear objectives of MPAs has in many cases led to opposition against them by fishers and other affected user groups, and a general lack of support or goodwill among the broader set of stakeholders.

59. Nevertheless, the same authors state that *“a single general design of a network of reserves of moderate size and variable spacing can meet the needs and goals of most stakeholders interested in marine resources. Given the high fecundity of most marine organisms and recent evidence for limited distance of larval dispersal, it is likely that reserves can both maintain their own biodiversity and service nearby non-reserve areas. In particular, spillover of larger organisms and dispersal of larvae to areas outside reserves can lead to reserves sustaining or even increasing local fisheries”.* An extensive network of small community-owned fish reserves, such as exists in Samoa, may provide multiple sources of recruitment and a hedge against localised depletion and environmental fluctuations (King and Fa’asili 1998; King 2007).

60. Not all fishery managers believe that MPAs are a panacea, however. Hilborn (2007) states that *“Ecologists almost universally prescribe protected areas as the central tool in moving to sustainability. Fisheries scientists are very suspicious of this prescription, foremost because protected areas are not a central feature of successful fisheries, and because protected areas are simply a patch to the problem of overexploitation that does not address the basic causes, including the race to fish”*. Similarly, Beddington et al. (2007) state: *“In recent years, there have been many calls for much wider use of Marine Protected Areas to address the need for ecosystem-based management. We see these as a useful part of fishery regulation, but they are not a universal solution because unless the basic issues of capacity, regulation, and rights are solved, protected areas will simply displace the problem elsewhere. In this we concur with recent reviews that emphasize the primary importance of conventional measures to control fishing mortality and the secondary but essential role that marine protected areas (or other area-based management, such as local prohibitions on particular gears such as bottom trawls) have in dealing with specific issues of ecosystem conservation, such as by-catch and habitat damage.”*

61. The above discussion leads to the general conclusion that MPAs, or MMAs, may have an important role to play in the future management of fisheries in the Pacific Islands region, but that to do so they need to be established in locations where they can be biologically useful, have clear objectives that are agreed on by all stakeholders, and be subject to proper performance evaluation. MPAs will not, on their own, solve all the problems of fisheries management in a given area, but if properly designed and implemented they can make an important contribution. According to Hilborn (2007) *“Fisheries scientists certainly see protected areas as an important part of the toolkit and have used closures of spawning and juvenile rearing areas as a common element of traditional fisheries management... It is almost universally recognized that the future of sustainable fisheries lies with much less fishing effort, lower exploitation rates, larger fish stocks, dramatic reduction in by-catch, increased concern about ecosystem impacts of exploitation, elimination of destructive fishing practices, and much more spatial management of fisheries, including a significant portion of marine ecosystems protected from exploitation.”*

62. Economic tools for fishery management are not widely used in the Pacific Islands, but could provide the basis for useful additional coastal resource management measures. Historically, the fishing industry has successfully lobbied against the imposition of export levies, arguing that this reduces international competitiveness of domestic fishing fleets and processing operations. This may be true in regard to the tuna fishery, which is international in its nature, but is not very relevant to resource-limited coastal fisheries. There would seem to be scope for the application of fiscal measures appropriate to coastal fishery export products, which would contribute meaningfully to resource management, would generate additional revenue for national or local government, and would be relatively easy to enforce.

63. A possible example is the imposition of a per-piece levy on exports of selected products, such as aquarium fish and sea cucumbers. The result of such a measure would be to reduce the attractiveness to exporters of selling low-value products, and encourage them to focus on the high value component of the catch. In the case of aquarium fish and sea cucumbers, the larger individuals are worth far more than smaller sizes, hence there would be a preference for these products, which would lead to reduced capture of smaller sizes, a generally desirable management outcome. The levy would be payable to national or local government, or apportioned between them. In the case of local governments, such an arrangement could be used to provide financing for other fishery management initiatives, such as collection of statistics or local enforcement activities. Fixed export levies are currently imposed on the export of pearls from French Polynesia as a means of discouraging the marketing of low-grade product (Justin Hunter, Justin Hunter Pearls pers. comm.), and Preston (2008) has proposed that fiscal management options for coastal export resources be investigated as part of a fisheries institutional strengthening project planned for Kiribati

64. Essentially, coastal fisheries management in many PICTs is coming full circle. Customary systems of marine resource management were primarily rights-based and area-based. With the advent of Western contact and commercialisation “modern” species-focused fishery management tools and principles of more open access to resources were introduced to at least some fisheries, if not all. Now, in the light of a generalised failure of these approaches, there is a shift back to rights-based and area-based approaches through CBM and the establishment of MPAs and MMAs, often on a very localised basis. This shift is being accompanied by a greater degree of stakeholder participation in deciding what fishery management measures will be used and how they will be regulated and enforced. All these developments are highly consistent with the principles of the EAF, and their adoption will take PICTs further down the path towards managing coastal fisheries more responsibly, sustainably, and with broader ecosystem considerations in mind.

2.7. Integrated coastal management

65. As King and Fa’asili (2008) have noted, it is pointless to address the problem of depleted fish stocks by reducing fishing effort or restricting catches if the key threats to their recovery are from land-based development or environmental degradation. Unfortunately, fisheries managers in the Pacific Islands are often not in a position to influence developments outside their own sector, even where these may have an impact on fisheries or marine resources. The effective implementation of the EAF therefore requires the development of mechanisms and approaches through which these external factors can be assessed and addressed—essentially a re-focussing on the process of integrated coastal management, or ICM (also variously referred to as coastal zone management, integrated coastal zone management, coastal area management, and integrated coastal area management). As illustrated in Figure 2 below, ICM attempts to bring together a wide range of disciplines and stakeholders, including government agencies, private sector interests and members of civil society, whose goals and interests may be in opposition.

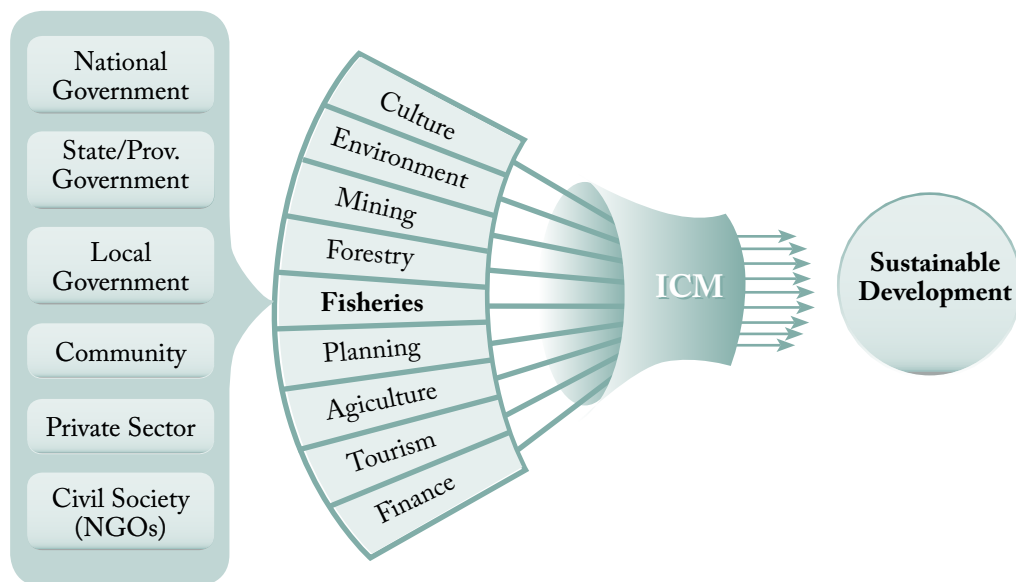


Figure 2: Conceptual schematic of the relationship between integrated coastal management (ICM) and sustainable development (drawing provided by The Nature Conservancy).

66. Attempts to promote ICM in the Pacific Islands region have been undertaken on a somewhat patchy basis for at least 20 years, notably through periodic activities of the Secretariat of the Pacific Regional Environment Programme (SPREP), and projects such as the GEF International Waters Project associated with it, as well as through bilateral technical assistance programmes. As in other parts of the world, these have often met with limited success due to the difficulties of achieving collaboration among a wide range of agencies and stakeholders with unclear or overlapping mandates and divergent objectives. Although there are numerous benefits to governments in adopting ICM—not only in terms of improved ecosystem-based management, but also in regard to efficiency and cost-effectiveness in carrying out activities and delivering programmes—the institutional and human barriers all too often appear insurmountable. Sale et al. (2008) state, *“Three critical needs can be identified, without which improvement in the management of coastal environments is very unlikely. The first is to improve the integration of management, both geographically and across administrative departments and management targets. The second is to build better understanding of the true value of the goods and services provided by sustainably managed coastal environments, and to promulgate knowledge of this value so that communities recognize what is at stake when their coastal ecosystems become degraded. The third is to tackle the many reasons for failure of management effort that are encompassed by the phrase ‘lack of political will’.”*

67. In an atoll or small island system, EBM is more or less synonymous with ICM, in which stakeholders in the various sectors collaborate and cooperate to ensure that activities in one area do not have negative impacts on another. In larger countries with bigger land masses where there may be large rivers and coastal wetlands as well as more extensive agriculture, logging, mining or industry, the process will be more akin to integrated watershed management. In either case coastal ecosystems are usually on the downstream or receiving end of any negative impacts from land-based activities, and these need to be considered and managed through a coordinated process if ecosystem damage is to be avoided. Without improved ICM, fisheries and coastal areas will continue to degrade. To protect them, fisheries agencies will need to take a more active role in promoting improved coordination among agencies and resource users operating in the coastal zone. Promoting better ICM will lead to improvements in the condition of coastal ecosystems and the resources they contain, and will parallel and complement the adoption of the EAF.

68. Rather than cooperate with each other, in many countries government agencies responsible for different aspects of the coastal environment often compete for limited national funds and external donor resources. External donor funding is often earmarked for particular sectors (e.g. fisheries or environment) and does not allow for multi-sectoral efforts to address ICM. One notable exception, which might provide a model for future interventions, is a recent project in Cook Islands where aid funds ostensibly for a fisheries institutional strengthening project were used to address non-fisheries impacts (e.g. inadequate sewage treatment) on the marine environment, and to build capacity in government health and environment ministries, as well as the Ministry for Fisheries.



3. IMPLEMENTING THE EAF IN THE PACIFIC ISLANDS REGION

3.1. Current status of the EAF in Pacific Island countries

69. The companion report to the present document, “The Ecosystem Approach to Coastal Fisheries and Aquaculture in Pacific Island Countries Territories—Part 1: A review of the current status”, provides a detailed assessment of the range of EAF-compliant measures and actions that many PICTs have already put in place.

70. The move towards more formal community-based systems of management (often complementing or even replacing traditional systems) in some countries is consistent with the principles of the EAF that encourage broader stakeholder participation and decentralisation of decision-making to better take account of all sectoral and community interests and promote compliance with management measures. The establishment of increasing numbers of MPAs or MMAs as a means of enhancing ecosystem resilience is also consistent with the principles of the EAF, even if direct fishery benefits may not always be obvious (see section 2.6). Some PICTs are also taking steps towards establishing ICM arrangements, which are EAF-compliant, although these are, in the main, quite rudimentary, generally involving informal committees or voluntary arrangements between government agencies and stakeholders rather than formal mechanisms for collaboration.

71. On the other hand, few countries have fulfilled their stated commitment to the implementation of the EAF by adopting enabling policies or legislation. Where EAF-compliant measures have been introduced, this is largely coincidental, and independent of any broader considerations of EAF implementation. According to FFA (2007), several Pacific Island countries have fisheries management plans that may include policies regarding general ecosystem related issues, but few, if any, have reached the stage of actually implementing or formalising ecosystem provisions in their fisheries management arrangements. In many cases there are questions about whether fisheries management measures are being effectively enforced by regulatory authorities, or followed by resource users. In general, the quality of fishery monitoring and the amount of fishery research being undertaken in PICTs is insufficient, even for the needs of conventional fisheries management, and falls further short of the requirements of the EAF.

72. In order to move from conventional fisheries management to the EAF, a step-wise approach will be needed to ensure the development of human capacity and sound technical approaches. This has already been seen in regard to the shift from fisheries development to fisheries management in PICTs over the past 20 years or so. In practice, therefore, the EAF is likely to develop as an incremental progression of current fisheries management practices and approaches.

73. There is considerable guidance and advice available in the literature on how to implement the EAF in a wide range of circumstances. Not all of this guidance is strictly relevant to PICTs, given that it deals with fisheries, situations or problems that are rare or non-existent in PICTs. In addition, the special circumstances of many PICTs in regard to their reliance on the marine sector, widely dispersed and often inaccessible small-scale fisheries, limited human capacity and financial resources, and remoteness from markets combine to dictate an adaptation of the EAF to local circumstances.

74. Bearing in mind that each PICT is at a different stage in regard to EAF implementation, and has different goals, priorities and resources, the steps that are likely to be needed are described in the following sections.



3.2. Adoption of EAF principles by PICTs

75. Under the World Summit on Sustainable Development (WSSD), Pacific Island countries have committed to implementing the EAF by 2010. Some PICTs have more EAF-compliant fishery management arrangements in place than others, but none have really embraced the concept and adopted it wholeheartedly. In order to meet their commitments under WSSD and other instruments, PICTs need to formally and unequivocally embrace the principles of the EAF in regard to oceanic fisheries, coastal fisheries and aquaculture. In formally adopting the EAF, countries will need to adhere to some or all of the following EAF principles expressed in the FAO Code of Conduct for Responsible Fisheries (FAO 1995) and related documentation on the implementation of the EAF (FAO 2003), including the following:

- promote sectoral integration—integrate management of fisheries and other uses of coastal areas through policy, legal and institutional frameworks. This requires functional connections between fisheries management organisations, other sectoral agencies, and institutions whose functions are relevant to coastal ecosystem maintenance;
- use environmental impact assessment procedures on all activities and processes that may have an impact on marine ecosystems (including fishery, aquaculture and seafood processing projects);
- broaden stakeholder participation—dealing with fisheries in an ecosystem context implies a broader participatory process. This may be combined with decentralising decision-making to better take account of all sectoral and community interests. This process can improve compliance with regulations, alleviating enforcement problems;
- allocate user rights to marine resources through community-based management, customary marine tenure or co-management arrangements, or via licences or quotas;
- apply the precautionary approach—where there is a risk of damage to economic, social or environmental values, or where such risk cannot be assessed, lack of scientific certainty should not be used as a reason for postponing mitigation measures. The burden of proof should be on resource users to demonstrate that existing or proposed new activities will not cause negative ecosystem effects;
- ensure compatibility of fishery management measures at local, national and international levels;
- reduce fisheries impacts—fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of ecosystems;
- avoid overfishing—fishery management measures such as maximum sustainable yield should be considered as limits to be avoided and not targets to be reached;
- consider species interactions by taking account of the interdependence of stocks and protecting populations whose reproductive potential is seriously threatened;
- sustain ecosystem integrity through the maintenance of (i) biodiversity at biological community, habitat, species and genetic levels; and (ii) ecological processes that support both biodiversity and the productivity of fishery resources;
- ensure reversibility and rebuilding—especially in regard to changes to the marine ecosystem that are not potentially reversible over two or three decades.

76. These are key principles that can guide managers in implementing the EAF. PICTs are not usually in a position to gather the detailed scientific information needed to accurately gauge the ecosystem impacts of a particular fishery or aquaculture activity. In such situations, precautionary rules of thumb such as the above can ultimately be the guide for establishing management arrangements that will help countries meet their EAF commitments, until such time as monitoring and data collection programmes can be put in place.

77. Formally adopting these principles is likely to require reviewing and amending relevant legislation and government policies. In some cases there may be inconsistencies among different legislative instruments that concern the marine environment (especially environmental and fisheries legislation and regulations), which may need to be reconciled or aligned. In most countries the review and revision of fisheries and other legislation and policies is something that happens on an intermittent basis anyway, so this is not a new requirement. It is important to note, however, that the absence of legislation does not need to prevent PICTs from moving forward with the introduction of EAF-compliant measures, and should not be used as a reason for delaying its implementation.

3.3. Strategies for national fisheries agencies

78. Bearing in mind that all PICTs are different, some possible strategies that national fisheries and other relevant agencies can adopt to apply the EAF include the following:

- encourage and lobby for changes to legislation, regulations or policy, which formally adopt the principles of the EAF;
- promote integrated coastal management by establishing inter-sectoral committees to discuss and address the impacts of non-fishing activities on marine resources. Informal committees or memoranda of agreement are a good starting point and can be progressively formalised. Because fisheries is the “downstream” sector, being impacted by many other activities, fisheries agencies have both a right and a responsibility to be pro-active in pushing for better inter-sectoral cooperation. (The ICM process is discussed in more detail in section 4.1);
- develop processes of environmental impact assessment (EIA) for all activities that may have an effect on the coastal environment, including appropriate capacity building and training programmes. Establish legal requirements for EIA on all such activities. Ensure that fisheries agencies are involved in carrying out or reviewing the EIA, and have the opportunity to require modifications to the proposed development, or prevent it, if necessary;
- where they do not exist, develop fishery management plans (FMPs)³ for major coastal fisheries and, where appropriate, for aquaculture. An FMP tends to focus on conventional fishery management approaches, although ecosystem considerations may sometimes be taken into account. Stakeholders typically involve the fisheries agency, industry and resource users;
- establish appropriate stakeholder consultative processes for each FMP;
- promote community-based fisheries management or co-management approaches wherever feasible. CBM can be identified as a primary ecosystem management tool within FMPs. Community-level management plans can flow from the FMP, illustrating the need/ usefulness of managing ecosystems at different scales;
- review FMPs periodically, progressively introducing ecosystem considerations in line with the needs of the fishery, the stakeholder base and the capacity of the fisheries administration;

³ Some countries, such as the USA, have begun the development of fishery ecosystem plans (FEPs), which are FMPs that have been expanded to take into account a broader range of ecosystem considerations. In this report, the acronym FMP is used throughout to ensure clarity, but it is recognised that, with the implementation of the EAF, FMPs will progressively evolve into FEPs.

- FMPs should progressively begin to address non-conventional management problems and involve a wider range of stakeholders. (The fishery management planning process is discussed in more detail in section 4.2);
- gather information. Information requirements, and the way the information will be used, should be specified in the FMP. (Data collection and analysis is discussed in more detail in section 4.3);
- establish marine protected or managed areas, preferably through community-based arrangements, with clear fisheries and/or ecosystem management objectives, and backed up by appropriate legislation and regulation;
- consider alternative livelihood or income generating strategies that may be needed to support fishers whose short-term interests may suffer as a result of management actions;
- undertake or commission research to characterise and describe the components of the ecosystem being managed, and their inter-relationships (but noting the high cost and complexity of such research). Obtain relevant research results from other countries where possible. Use research results to progressively improve FMPs.

79. Many PICTs have already taken some of these steps. Even where this is not the case, most PICTs should be able to implement at least some of the above measures by 2010. It should be remembered that moving towards the EAF will be an incremental process, taken in steps which may at times be small and slow. “Evolution, not revolution”.

3.4. The EAF implementation process

80. The specific process followed in implementing the EAF will vary from place to place and fishery to fishery, but in general will involve a number of stages and actions at several levels, including:

- gathering of preliminary information on fisheries and ecosystem;
- identifying the stakeholder base;
- discussions and consultations as appropriate, probably over an extended period;
- establishing management plans and measures;
- monitoring, researching and assessing management performance.

81. Different processes have been used in different situations, and there is no right or wrong way to proceed. In the Pacific Islands region, however, the Pacific Islands Forum Fisheries Agency (FFA) has developed its own EAF framework in regard to the tuna fishery of the western and central Pacific Ocean. This is being used to promote an ecosystem approach to tuna fishery management, and guide the EAF planning process through which stakeholders define and agree on the scope and content of the EAF plan. The procedural guide for this process has been used in a number of workshops and fishery planning exercises in FFA member countries and is regularly being improved on the basis of experience, to the point that it is now in its fifth version (Fletcher 2008).

82. FFA's approach provides a good model on which the EAF processes for coastal fisheries and aquaculture can be built. Some modification is likely to be required because of the inherent differences between a large-scale, multi-country tuna fishery in which science and monitoring are relatively well developed, and where primary management responsibility lies with national governments; and small-scale coastal fisheries, which suffer from a lack of data, research and monitoring, may involve management at several different levels of government and society, and are characterised by social and economic complexity and a limited understanding of ecosystem issues. However it is preferable to adapt and build on the approach already initiated by FFA, rather than develop an alternative process that may use scarce resources and risks causing confusion among stakeholders within PICTs.

83. The planning process developed by FFA has five broad stages, as follows:

- determining the scope of the assessment or management system (determining what needs to be managed, defining management values and setting high level objectives);
- identifying issues, including those relating to retained species, bycatch and non-retained species, ecosystem effects, economic aspects, community well-being, and fishery administration;
- using risk analysis to prioritise issues. Risk analysis is a means of estimating the probability that management objectives will not be met, and the consequences thereof, and then using the assessment to determine those areas most in need of attention or action;
- developing management systems, which describe the processes that the management agency will use (for instance target or limit reference points, gear restrictions, limited entry or fiscal measures), and the responses to each of the issues identified;
- developing operational and implementation arrangements to deliver the overall objectives of the plan and fishery.

84. More details of FFA's methodology are provided in Fletcher (2008). The ways in which this methodology might be adapted to implementing the EAF are discussed in more detail in section 4.2.

3.5. Support from external agencies

85. Several international and regional agencies and NGOs have been active in supporting PICTs' efforts to implement the EAF, and are keen to continue, but in some cases are still contemplating their strategies for doing so. Possible ways in which these agencies could contribute to the process depends on the specific needs of each country, but could include:

- national workshops to introduce EAF concepts to fishery stakeholders, and explore initial approaches to EAF and ICM implementation in selected fisheries/situations. These could be modelled on the approach already taken by FFA in regard to national tuna fishery management planning;
- technical assistance and training in the fields of legislation/policy formulation, development of FMPs, resource assessment, ecosystem monitoring, water quality monitoring, establishment of consultative mechanisms, identification and establishment of MPAs, and ecosystem-based spatial planning;
- support to the establishment of national or local committees or working groups covering all stakeholders and looking at coastal management issues, including fisheries, in a holistic manner;
- development of EIA and/or initial environmental examination templates and procedures specifically for activities having an impact on coastal fisheries and ecosystems, and supported by appropriate training;

- independent audit of fishery management policies and plans to ensure EAF compliance;
- support to pilot/demonstration projects in selected situations to demonstrate the process and applications of the EAF. The critical state of the sea cucumber resource in many PICTs makes it an ideal candidate for a multi-country project aimed at restoring the economic, social and ecosystem benefits from this fishery;
- advice, training and capacity building in regard to coastal fishery and ecosystem data collection and monitoring arrangements;
- develop and run tertiary courses on the EAF and ICM within universities servicing PICTs, and where possible incorporating them into fisheries training diplomas and degrees;
- establish a “meta-database” of coastal fisheries and ecosystem monitoring and research information—publicly available repository of shared information which could be accessed by EAF practitioners in the region – supported by appropriate training in its application and in-country use;
- establish a regional policy and technical working group on EAF to allow senior-level information exchange, sharing of common problems, and collaborative approaches to fund-raising;
- continued promotion of CBM arrangements;
- assist with the design and establishment of MPAs and MMAs specifically for fisheries management purposes.

86. This does not pretend to be an exhaustive list of options, but a set of possible approaches each of which might be applicable to several PICTs. Some of these initiatives are already embodied in the plans of different regional and international agencies and NGOs. For example, funding proposals being developed by SPC, the Pacific Islands Geoscience Commission (SOPAC) and other Council of Regional Organisations in the Pacific (CROP) agencies encompass the idea of a data repository on coastal fisheries and ecosystems, while SPC’s Coastal Fisheries Programme Strategic Plan 2006–2009 indicates that a regional fisheries ecosystem council could be established as a committee or sub-group of the SPC Heads of Fisheries meeting. This latter initiative would be a very useful high level mechanism for raising awareness on the EAF, and could be used as a forum for setting regional targets for EAF implementation, such as placing 20% or more of coastal fisheries or coastal ecosystems under EAF-compliant management arrangements by a certain date. Since broad stakeholder participation is a cornerstone of the EAF, it would be important to ensure that any such regional fisheries ecosystem council include not only government officials, but also representatives of civil society and the private sector.



4. ADDITIONAL CONSIDERATIONS FOR EAF IMPLEMENTATION

4.1. Promoting integrated coastal management

87. Many of the problems facing fisheries managers fall outside of their control and may include issues of broader ICM (e.g. agricultural run-off, coastal development, sewage pollution). This makes fisheries managers important stakeholders in ICM, to the point where they of all people have the greatest interest in taking a lead role in the ICM process.

88. SPREP, which has been the lead regional agency promoting ICM in the region, recommends a “three-track” approach to ICM implementation:

- local-level, geographically oriented, site-management programmes—a “bottom-up” approach that emphasises activities at the local community level that may catalyse action within the rest of the system, such as community-based coastal resource management;
- framework policy initiatives at the higher levels of local and national government—a “top-down” approach reflecting the focus of national government along with its institutions and procedures and the need for national policy reform;
- integration between sectors and disciplines—“horizontal coordination” to combat the fragmented nature of government and other institutions. It would be unusual for one agency alone to have all the expertise necessary to meet the challenges of complex coastal or aquatic resource management and biodiversity issues given the number of overlapping interests and institutional jurisdictions.

89. Success in ICM requires collaboration and partnerships between various government institutions, user groups, universities, NGOs, communities and those with financial and technical resources. The three-track strategy combines these approaches by simultaneously building capacity both within government and at sites, and creating dialogue that promotes a common vision and shared purpose. Involving coastal users and understanding their perceptions of management actions helps to make the decision-making process more efficient. Engaging local communities gives them a sense of ownership, and also provides continuity, since there is less susceptibility to the continuous changes in personnel and political agenda within national governments.

90. Key requirements to create an enabling environment for integrated coastal management and community-based coastal resource management include:

- simple and clear regulations that are relevant to communities and are adopted in local ordinances;
- enabling a framework to facilitate the adoption and enforcement of local rules;
- awareness programmes aimed at local and national leaders as well as resource owners, especially where marine tenure is strong;
- assistance on technical aspects of resource management;
- inter-sectoral collaboration to address land-based threats to coastal habitats

91. According to SPREP, other factors that will contribute to ICM are alternative income-generating programmes, the use of marine protected or managed areas and adoption of an EBM approach (www.sprep.org).

92. One of the challenges facing proponents of ICM is the fear of directors of government departments, and other leaders, that they may lose control of their agencies or domains if they share information or work collaboratively with other departments or ministries. In reality, however, most individuals in this position could actually enhance their role if they proactively adopt and champion ICM, rather than resisting or obstructing the ICM process. Promoting this line of reasoning is thus an obvious strategy that can be adopted by proponents of ICM.

4.2. Fishery management planning

93. Where there are no existing management plans for coastal fisheries, the EAF requires that these be developed and then progressively upgraded to incorporate EAF principles⁴. Wherever possible, FMPs should be formulated or upgraded to correspond to identifiable ecosystems. In the case of small island countries, these would probably correspond with individual islands or atolls, or groups of similar islands and atolls. In the case of larger countries, some work may need to be done to determine appropriate ecosystem scales and boundaries. It should be recalled that ecosystems interleave at different scales. Some of these may correspond to jurisdictional boundaries (such as island councils or provincial governments), while others may not, or may overlap multiple jurisdictions. Where coherent ecosystems can be identified that correspond to political or jurisdictional boundaries, the job of management will be made easier (see for example Foale and Manele 2004).

94. Prior to establishing an FMP, the characteristics and boundaries of the fishery and ecosystem in question need to be identified and documented, as do the stakeholders whose activities have an effect on the ecosystem. Steps in this process might include:

- describe and, if possible, quantify the fishing activities to be managed, as well as any negative effects that fishing may have on the ecosystem;
- identify the major coastal ecosystems to be managed, and determine their boundaries;
- characterise other key aspects of the ecosystem that the fishery occupies (e.g. associated species, bycatch, predator/prey complexes, important land-based influences);
- describe and, if possible, quantify the non-fishery activities that are occurring within the ecosystem that affect fisheries and marine resources;
- identify stakeholders in all activities that have an impact on marine resources;
- undertake a risk assessment that estimates the costs and benefits of various management actions (including no action).

95. This sequence of events assumes that the management focus is on fisheries and the EAF. If the focus involves multiple objectives (such as controlling pollution or limiting impacts of coastal construction) for an area, and fisheries is just one of these, then steps 1 and 2 (the first two bullet points above) might be reversed (i.e. first identify the ecosystem “boundaries”, and then the fishery or fisheries that are to be managed within them).

⁴ As noted earlier, some of the EAF literature refers to fishery ecosystem plans, or FEPs. An FEP is an FMP that has evolved to the point where most key ecosystem considerations are being catered for.

96. Once the fishery or ecosystem has been characterised, the next steps in the planning process should include:

- establish a consultative process to bring stakeholders together and discuss problem areas;
- identify mechanisms, either voluntary or compulsory, that can be used to resolve problems occurring as a result of stakeholder activities;
- where possible, promote CBM or co-management as a means of addressing these problems;
- each agreement on objectives, issues and values;
- identify food security and livelihood issues that may be affected by the management process, and appropriate responses to these, especially where management measures may result in short-term reductions in fishery production;
- develop indices of fishery performance, governance and where possible ecosystem health as targets for management;
- describe monitoring arrangements that will be used to assess the performance of the FMP;
- develop precautionary reference points that trigger predetermined agreed management actions;
- schedule and undertake periodic reviews of the FMP, where possible, progressively broadening its scope to encompass a greater range of ecosystem considerations.

97. An FMP should document all the agreed management measures, as well as means of monitoring their effects and results. Where upstream factors are known to affect coastal ecosystems, these should if possible be documented, along with the appropriate organisation or department responsible for regulating or managing that factor. This will allow progress to be monitored and other departments held accountable, just as the fisheries department or management authority should be accountable in regard to downstream affects. Depending on the circumstances, the FMP may need to address questions of: conflict resolution; priority setting; political interference; jurisdictional issues; monitoring, control and surveillance arrangements; and other issues, and develop mechanisms for dealing with these.

98. Fisheries management plans can be developed at various levels, and may nest within each other. For instance in PNG, a relatively large country, national management plans exist for coastal fisheries and provide a framework or “umbrella” for provincial fishery management plans, or plans made at lower levels of government (districts, local-level governments, wards and communities). In a country with many separate islands, it might be appropriate to develop island-based fishery management plans, nested within the framework of a national plan FMPs may also be developed by communities themselves, and may or may not correspond fully to government subdivisions (for instance, in PNG, some community fishery management plans cover two or more adjacent wards, while others cover just one village, or a handful of villages that straddle several wards). Community or political unity is a key factor in determining the areas or issues to be covered by an FMP, since a wide disparity in aspirations or goals is likely to prevent effective implementation of the plan.

99. An important consideration in fishery management planning is the question of who pays for any research, monitoring or enforcement activities that may be agreed. For large-scale fisheries the costs of fishery management are usually transferred back to industry through licence fees, levies and taxes. Such arrangements are not yet found in small-scale fisheries in PICTs, but effective management can have a significant cost. In particular the cost of supporting CBM or co-management arrangements can be high due to the extensive process of consultation required.

4.3. Data collection and analysis

100. Some progress has been made in advancing EAF-compatible mechanisms in some aspects of coastal fisheries management in the region, particularly in regard to CBM and MPAs. However there remains a major gap in regional and national capacity for “evidence-based decision-making”—the information to make these mechanisms work in a way that can be objectively shown to truly promote sustainable utilisation of ecosystems while maintaining their integrity. Scientific knowledge and monitoring of artisanal coastal fisheries lags far behind the region’s understanding of industrial oceanic fisheries. Unlike oceanic fisheries there is little prospect for user-pays arrangements underwriting the understanding of artisanal fisheries, and most PICTs are not able to divert sufficient national resources from current priorities in health, education and other immediate social development needs. In addition to being comparatively little-known biologically and socioeconomically, coastal fisheries in PICTs are also considerably more ecologically complex than oceanic fisheries.

101. Information is critical to implementing the EAF, and is required for formulating policy, creating management plans, evaluating direct and indirect effects of the fishery on species and habitats, and evaluating management progress (FAO 2005). Because the EAF involves broadening current fisheries management practices, it also requires broadening the information necessary for good management. Typically, a fisheries management plan makes use of data on fishery performance: catch, effort, species composition, size composition, fecundity, reproductive seasonality and gut contents are all basic pieces of statistical or biological information that can be collected by fisheries agencies from fish landing sites, experimental fishing trips or, in some cases, published literature. As the FMP becomes more EAF-compliant it may require additional data on (i) other species that characterise the ecosystem, (ii) key ecosystem relationships, and (iii) aspects of water quality (dissolved oxygen, biological oxygen demand, suspended solids, chemical analysis, depending on the relevant ecosystem concerns), which may be obtained through collaborative arrangements with other government agencies or stakeholders. The information being collected should relate to targets and reference points established by the FMP.

102. Unfortunately, many of the approaches and tools being suggested for the EAF, even in developed countries, are complex and require costly modelling, risk assessment and complex management strategies. Plagányi (2007) reviewed the models available for assessing the impacts of interactions between species and fisheries and their implications for the EAF, examining no less than 24 models and model types, all of which would require input data and capacity currently far beyond what is available in most PICTs. Even in Australia, a “big science” country with well-funded research programmes carried out by a cadre of highly skilled and qualified scientists, implementing the EAF has lagged far behind policy development (Smith et al. 2007). Therefore, in addition to improving scientific understanding of coastal marine ecosystems, there may also be a need to develop less complex assessment and management tools that are more appropriate to data-poor situations.

103. The scientific and data capacity of PICTs in regard to coastal fisheries has not been comprehensively reviewed in recent years, but relevant information can be obtained from several studies carried out in regard to oceanic fisheries management. SPC (2003) reported on the capacity of its members to meet the data requirements of the WCPFC at the Commission’s first meeting. The findings of this study were updated during the formulation of the GEF-funded Oceanic Fisheries Management Project (OFMP), and a revised summary of science- and data-related requirements presented to the 58th meeting of the Forum Fisheries Committee (Lewis 2004). This paper summarised current needs as follows (figures in brackets refer to the number of FFA island member countries in which this topic is considered to be an issue):

- enhance national capacity to analyse and report national data (14);
- establish or expand observer programmes (14);
- build capacity to interpret regional analyses and stock assessments (14);

- establish or expand port sampling programmes (12);
- enhance capacity to interpret oceanographic data, in conjunction with fishery data (11); and
- strengthen statistical and database capacity (9).

104. Although formulated in regard to oceanic fisheries assessment and management, these findings are also relevant to the coastal fisheries arena. Many PICT fisheries agencies have weak, fragmented or non-existent arrangements for collecting statistical data on coastal fisheries, despite multiple attempts by FAO, SPC and other agencies to help establish such systems. Mechanisms for analysing and utilising such data are also weak, and this may in fact be the main reason why fishery statistics programmes tend not to be sustained over time. As noted earlier, existing decision-making processes in PICTs may not in general be strongly science-based (Morrison and Kaly 2008). However, implementation of the EAF requires that appropriate data be both collected and used to ensure that fishery management arrangements are effective.

105. The key probably lies in the word “appropriate”. Johannes (1998) argued convincingly that data-less management of small-scale Pacific Island fisheries is often feasible and in many cases probably the only option, given the cost and impracticality of collecting useful data in many locations. Data-less or data-limited approaches may be the most appropriate for small fisheries or areas managed under CBM or traditional arrangements, where technical skills are limited and management decisions can be made based on relatively simple indicators (such as catch rates, gathered in conjunction with spatial data⁵) rather than detailed monitoring. In the case of a province or district, simple but useful coastal fishery data can be collected easily and cheaply from fish markets, buyers and fishers. In fact, data collection is one of the few things that rural fisheries officers can do with very little funding and resources. In the case of export-based fisheries for products such as beche-de-mer and trochus, there may be a need or justification for more stringent and comprehensive data collection activities, in order to ensure that management of the most valuable and significant coastal fisheries is adaptive and effective. The power in information required for fisheries management comes primarily from long data series and judicious use of indicators. However periodic resource assessments or socioeconomic “snapshots” achieved through field surveys and dedicated research cruises can also play an important role.

106. As with many aspects of the EAF, the approach to be taken will depend on local circumstances and conditions—there is no “one size fits all”. Data requirements, and how data will be used to assess effectiveness and progress, need to be considered in the formulation of an FMP. The challenge is to ensure that these measures are realistic and targeted. No matter what the situation, there is a need not only to determine what data will be needed for management purposes, but to ensure that it really is used in the management decision-making process. Countries should continue to develop and improve their existing information processes in collaboration with regional and international partners and in alignment with EAF principles. This does not need to happen overnight with a complete overhaul of existing data mechanisms, but through gradual additions of the information required.

107. The other area of data needs relates to coastal ecosystems themselves. In recent years, the environment and conservation sectors (governments, academia and NGOs) have made considerable advances in acquiring and developing ecological and ecosystem data layers for both terrestrial and coastal/marine systems (e.g. remote sensing, mapping, establishment of geographic information systems [GIS]) and developing spatial planning tools that could greatly assist with implementing the EAF in PICTs. This is a key reason for the fisheries sector to improve collaboration with the environmental and other domains. Large commercial fishing companies are using similar data sets to identify potential fishing areas, and are frequently willing to share this information with fisheries management agencies.

⁵ Catch rates can be a biased and insensitive indicator of stock declines unless fishing area and species captured are also considered.

108. The foregoing discussion indicates that data collection and analysis will be an area of weakness in regard to PICT implementation of the EAF. Although coastal fisheries are national responsibilities in terms of international law, there is a continued need for capacity building support to PICTS in the area of fisheries data and science. There is also merit in the concept of establishing meta-databases to bring together existing research information and data from PICTs and make it more accessible for use in developing EAF-compliant FMPs for coastal fisheries. Both of these activities—fishery science and data capacity building, and improving access to coastal fisheries data—are proposed in projects being developed by SPC, SOPAC and other CROP partners as described in the companion document to this report. (The Ecosystem Approach to Coastal Fisheries and Aquaculture in Pacific Island Countries and Territories—Part 1: A review of the current status).

4.4. Building national capacity to implement the EAF

109. Many of the options above relate to capacity building in regard to the EAF. This is such a fundamental issue that it deserves more detailed discussion in its own right.

110. As noted earlier, there has been no recent assessment of the human or institutional capacities within PICTs to plan for or implement the EAF, or to carry out the various activities it will require. However, section 4.3 described recent studies that have been carried out on the capacity of PICTs in regard to the scientific and data requirements of tuna fisheries management, and information from these studies is relevant to implementation of the EAF. Cartwright and Preston (2006a) reviewed the costs and benefits of various forms of capacity building activities as shown in Table 1 below. They suggested that interventions to build tuna-related scientific and data capacity in PICTs would be best focused on human resource development through activities such as scholarships for tertiary education (graduate or post-graduate), workshops and training courses (national or multi-country), and fellowships for attachments or internships at national or regional organisations.

111. These authors also suggested other possible support activities, including:

- country diagnostic missions and risk assessments, advisory visits or studies by experts;
- support for attendance by trainees or upcoming staff at relevant meetings as a capacity building exercise within the framework of a formal training or HRD programme;
- production of best-practice manuals and instruction books (hard-copy and electronic format), where possible tailored specifically to national situations and requirements;
- targeted or generalised public information and awareness campaigns on fishery management issues, primarily through regional or national print media, but not excluding other media (e.g. radio, TV, targeted information documents); and
- provision of goods, supplies and support funding to ensure that those undertaking training are not prevented from putting their newly-acquired skills into use because of a lack of operational resources.

112. As noted, many of these considerations are not confined to the scientific and data aspects of tuna fishery management, but are equally applicable to coastal fisheries management and the application of the EAF. However the question of insufficient staff numbers can be a constraint in some fishery departments. With the wide range of responsibilities now placed on fisheries administrations, extensive training can be a burden in that it takes staff away from performing their duties, sometimes for long periods of time. Public service recruitment systems may make it difficult to hire replacement staff to stand in, even if skilled substitutes are available, which is often not the case.

Table 1: Comparison of capacity building mechanisms (adapted from Cartwright and Preston 2006b).

Mechanism	Costs and implementation	Application, sustainability, other comments
Scholarships at tertiary institutions and organisations (Diploma, BSc and post graduate studies)	Relatively high cost—typically USD 30,000 per annum. Relatively high administrative burden in regard to student supervision, management and support. Best delivered through collaboration with existing bilateral or multilateral studentship schemes.	Develops national analytical capacity to enable scientific and technical information to be translated into management actions. Over time will enable more effective participation in scientific and technical meetings. Long-term. Likely to remain with key donors (AusAID, NZAID and others). Relatively high attrition rate through failure and “poaching” of qualified people by other sectors.
Fellowship programmes with FFA, SPC, other relevant science, technical and policy bodies (e.g. national fishery agencies in developed or other developing countries).	USD 7,700–10,000 per month (airfare and DSA, assumes salary continues to be paid by trainee’s employer). Relatively light administrative burden—most day-to-day admin is handled by organisation hosting the attachment.	Allows participants to get practical hands-on experience of technical fishery issues. Good for developing in-country capacity to meet national and regional obligations. Particularly useful for focused activities (e.g. compliance functions; data collection and interpretation). Can be longer (1–3 months) to work on a specific topic (e.g. a management plan) with regional agency (SPC or FFA support).
Regional workshops and training courses.	USD 4,000–5,000 per participant for a one week workshop. FFA allows USD 60,000 for a one-week meeting with one participant from each island country member.	Useful for promoting exchange and cross-seeding of ideas which can then be amplified by subsequent in-country workshops. For small administrations, absence of key staff at overseas workshops can impede proper departmental functioning.
National workshops and training courses.	Variable—typically USD 10,000–15,000 for one to two-week workshop (including travel costs of tutors/facilitators), but can be much higher in larger countries where many participants have to travel from out-stations.	Good for developing in-country capacity to meet national and regional obligations. May facilitate communication between government departments and with industry and other stakeholders. For small administrations, less disruptive to functioning of participating departments.
Trainee participation in regional and international meetings	Travel and accommodation costs USD 2,000–5,000 depending on venue and duration.	Essential for transferring experience of procedures and issues to next generation of country representatives, but must take place within framework of formal training/capacity building programme. Travel costs in the region are notoriously high, and funding could easily be depleted if some cap is not placed on this category of expenditure, which is also open to misuse.
Production of hard copy and electronic manuals and instruction books, possibly tailored to specific national needs/ circumstances	Highly variable, typically USD 20,000–50,000 but depends on personnel inputs, printing and distribution costs.	High impact, long duration, promotes project and agency visibility, contributes to improved and harmonised standards, may contribute to improved public awareness of technical fishery management issues. Need to be focused and regularly updated.
Diagnostic analyses, risk assessments, studies and advisory missions by visiting experts.	Typically USD 20,000–25,000 per month (staff/consultant travel, fees, DSA, misc.).	Addresses performance and sustainability issues providing beneficiary government is committed to accepting recommendations and implementing changes. Can have a strong capacity building function where the expert shepherds local staff through complex issues or runs workshops.
Hardware, software, operational funding support.	Variable	May add value to HRD activities by providing mechanisms and resources whereby trained individuals can utilise their new skills. Danger that funding sources could become a “slush fund”.

113. A number of ongoing or planned initiatives may address some of these issues. The Micronesia Challenge, which encompasses the Federated States of Micronesia, Marshall Islands, Palau, Guam and the Northern Mariana Islands, is building capacity and establishing mechanisms to meet the goal of effectively conserving 30% of nearshore resources and 20% of terrestrial resources in these countries. The Coral Triangle Initiative similarly has capacity building goals aimed at coastal resource conservation in Solomon Islands, PNG and four Asian countries. Two fishery-sector institutional strengthening projects currently underway in Cook Islands and Solomon Islands are supporting the development of human and infrastructure resources in those countries. Additional institutional strengthening projects being planned for the fishery-dependent small island states of Nauru, Kiribati and Tuvalu, and will present further opportunities to address some of the above issues in those countries.

4.5. Other issues

114. FAO literature on the EAF encourages measures that will prevent habitat degradation, such as prohibiting certain types of fishing in sensitive habitats and reducing fishing intensity to ensure that habitat-forming non-target species (such as corals) are not excessively prejudiced. FAO also encourages measures to restore habitats where damage has occurred, through restocking/stock enhancement, culling of the predators or competitors of target species, and intentional introductions (FAO 2003; FAO 2005).

115. These measures often carry the danger of being expensive, controversial, of questionable benefit in fisheries management, and with significant risk of unpredictable and potentially damaging ecosystem impacts. In the past, deliberate introductions of alien species into PICTs have resulted in far-reaching and irreversible ecosystem damage (e.g. widespread introduction of *Tilapia mossambicus* in the 1950s onwards), such that they definitely form part of the divide between traditional fisheries management (focused only on target species and production) and ecosystem management, which involves environmental manipulation and modification. As mentioned earlier, SPC is seeking to establish a Pacific Regional Aquatic Biosecurity Unit that will help PICTs strengthen biosecurity arrangements for aquatic species in order to prevent deliberate or accidental introduction of alien species into PICT coastal ecosystems.

116. Similarly, proactive habitat rehabilitation is usually very costly and is rarely completely effective unless the original conditions leading to damage have been addressed. Artificial habitats used to concentrate target species, increase settlement and recruitment of naturally spawned larvae and juveniles, and contribute to stock enhancement programmes, should also be used with caution. These could lead to increased catchability of vulnerable resources, recruitment shadows and other ecosystem effects such as the accumulation of rubbish and wholesale changes in the trophic relationships and habitat distributions. The best form of rehabilitation is to allow habitats to recover through natural recruitment. It is far more cost effective to prevent degradation and species loss in the first place than to rehabilitate after the event.



5. CONCLUSIONS

117. At present, conventional fisheries management is failing in many Pacific Island countries. Current fisheries management arrangements are not protecting stocks from overexploitation or the effects of destructive fishing, and generally do not take into account the serious and growing impacts that land-based development and other non-fishery activities are having on coastal ecosystems and the resources they contain.

118. Some countries have adapted their fisheries management arrangements to include CBM or co-management and the establishment of MPAs, often with NGO support and assistance. Like CMT, taboos and other traditional management arrangements, these measures are often more closely aligned to national sustainable development approaches, common and sometimes constitutional law, and the Pacific Way than are conventional fishery management arrangements. They are also consistent with the EAF, although they have not generally been applied within an EAF framework, and on their own they will not achieve EAF compliance, as PICTs have committed themselves to do, through various international instruments, by the year 2010.

119. Procedures and approaches are described in this report that can help PICTs accelerate and improve on implementing the EAF. A range of possible actions are described that can be taken by fisheries and other agencies, at several different levels, ranging from research and information-gathering, stakeholder consultation, formulation of management measures, risk assessment, enforcement, monitoring and performance assessment, to policy and legislative development and inter-agency coordination. The combination of approaches to be followed will depend on the specific circumstances, goals and resources of the country or territory in question.

120. The principles of the EAF are more in line with traditional and customary ways of doing things in the Pacific than conventional fisheries management. The EAF embraces concepts such as avoidance of sectoral specialisations, greater local involvement in decision-making as a means of encouraging ownership and compliance, and recognition of the non-commercial values and benefits that coastal resources and ecosystems can yield. Although the rigorous application of the EAF requires strong science and data to back it up, many EAF principles can be, and have been, applied in the absence of such information. Sensible rules of thumb, guided by precautionary principles and a target of maintaining ecosystem resilience, can be used. This is particularly true in the case of artisanal or community fisheries where, as long as local governance is strong and coherent, management decisions can be made based on other forms of information and knowledge.

121. The EAF provides PICTs with opportunities to improve the management of coastal fisheries and aquaculture, correct some of the past management failures, restore those fisheries that are not being carried out sustainably, and ensure that any negative effects of fishing on the broader coastal environment are minimised. As the FAO Director General stated at the opening of the Reykjavik Conference on Sustainable Fisheries in the Marine Ecosystem in 2001: "... in the long run, an ecosystem-based approach to management is likely to increase productivity of the oceans and thus increase the amount and quality of food production available to man in a sustainable manner" (FAO 2001). By further integrating the EAF process into a broader programme of integrated coastal management, PICTs can help to ensure that coastal communities benefit from the full range of services and benefits that coastal ecosystems can provide.

6. REFERENCES

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