An aerial photograph of a coral reef system. The left side shows a dense, vibrant blue and green coral reef. The right side shows a shallow, sandy lagoon with a small wooden boat anchored. The background is a soft, hazy sky with a palm tree silhouette in the top right corner.

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



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

Prepared by Garry Preston  
Gillett Preston and Associates



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# Acronyms and abbreviations

<b>CBM</b>	Community-based management
<b>CMT</b>	Customary marine tenure
<b>EAF</b>	Ecosystem approach to fisheries
<b>EBM</b>	Ecosystem-based management
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>FEP</b>	Fishery ecosystem plan
<b>FMP</b>	Fishery management plan
<b>ICM</b>	Integrated coastal management
<b>LMMA</b>	Locally managed marine area
<b>MMA</b>	Marine managed area
<b>MPA</b>	Marine protected area
<b>NGO</b>	Non-government organisation
<b>PICTs</b>	Pacific Island countries and territories
<b>PNG</b>	Papua New Guinea
<b>SPC</b>	Secretariat of the Pacific Community
<b>TNC</b>	The Nature Conservancy
<b>UN</b>	United Nations
<b>WSSD</b>	World Summit on Sustainable Development, Johannesburg, 2002

# 1. Introduction

The Ecosystem Approach to Fisheries (EAF) is an improved approach to developing and managing coastal fisheries and aquaculture. It takes into account the broader effects of fishing on the environment, as well as the effects of other sectors on fisheries and the ecosystems within which they occur.

Conventional fisheries management aims to manage human activity in a way that maximises fisheries production, economic benefits, employment or national revenues. The EAF focuses not only on these aspects, but also on ensuring a broader range of ecosystem services and functions. This in turn provides a greater array of human benefits, maintains alternative development options, guarantees long-term resource sustainability, and ensures that coastal ecosystems are resilient enough to withstand other stresses.

The Plan of Implementation of the World Summit on Sustainable Development (WSSD) urges UN member countries to make significant progress on implementing the EAF by the year 2010. Through the WSSD, as well as other international treaties and conventions, all Pacific Island countries and territories (PICTs) have endorsed the EAF and committed themselves to implementing it.

So far, however, progress in the region has been slow. Although some countries have implemented coastal fishery and aquaculture management measures that are consistent with the EAF, practically none have incorporated the EAF into their national policies or legislation.

Many aspects of the EAF are highly appropriate to the Pacific, and fit better than 'conventional' fisheries management into the 'Pacific way', which emphasises the roles of communities, custom, area-based management and user rights.

The EAF is not inconsistent with current fisheries management approaches or a replacement for them. Instead it represents an improvement that takes into account the impacts of fisheries on the broader environment and, conversely, the impacts of other sectors on fisheries. It is not a goal in itself. Rather the EAF is a set of policies and tools intended to provide improved management of fisheries and ecosystems.

## 2. EAF principles

Important principles in applying 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 healthy and resilient so that they can endure unexpected environmental and other shocks;
- improving compliance with fishery management measures through greater stakeholder engagement;
- recognising that marine resources have alternative values (such as recreation and tourism) in addition to extractive ones.

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, often without the benefit of fishery information;
- set aside reserves or protected areas to increase ecosystem resilience;
- promote more stakeholder participation in the fishery management process;
- establish rights-based methods of fishery management, instead of open-access 'free for all' arrangements;
- establish integrated coastal management mechanisms that involve many sectors, not just fisheries.

This booklet aims to raise awareness of what the EAF means and why it is useful, and provides suggestions and guidelines for its implementation. It describes the steps and activities needed to implement the EAF, and provides background information on relevant technical areas.

The booklet is based on a more detailed study carried out in 2008 by the Secretariat of the Pacific Community and The Nature Conservancy. The study also produced a full report, workshop report, and summary. The final section of this booklet provides information on where to find these documents or obtain additional advice and information on the EAF.

# 3. Approaches to implementing the EAF

Bearing in mind that each PICT is at a different stage in implementing the EAF and has different goals, priorities and resources, the methods that are likely to be needed to encourage uptake of the EAF include:

- promoting coordination and collaboration between sectors—integrating 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 that have functions relevant to coastal ecosystem maintenance;
- identifying all the relevant areas or issues (fisheries and non-fisheries) that affect the marine environment, along with the government departments or stakeholder groups responsible for addressing these issues, so that they can be taken into consideration in management arrangements;
- applying environmental impact assessment procedures to all activities and processes that may have an impact on marine ecosystems (including fishery, aquaculture and seafood processing projects);
- broadening 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, thus alleviating enforcement problems;
- allocating user rights to marine resources through community-based management, customary marine tenure or co-management arrangements, or via licences or quotas;
- applying the precautionary approach—where there is a risk of damage to economic, social or environmental values. 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 effects on ecosystems;

- ensuring compatibility of fishery management measures at local, national and international levels;
- reducing fisheries impacts—fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of ecosystems;
- avoiding overfishing—fishery management measures such as maximum sustainable yield should be considered as limits to be avoided and not targets to be reached;
- considering species interactions by taking the interdependence of stocks into account and protecting populations whose reproductive potential is seriously threatened;
- maintaining ecosystem integrity through: (i) maintenance of biodiversity at biological community, habitat, species and genetic levels; and (ii) maintenance of the ecological processes that support both biodiversity and the productivity of fishery resources;
- ensuring reversibility and rebuilding—especially in regard to changes to the marine ecosystem that are not potentially reversible over two or three decades.

These key principles can guide managers and policy makers in implementing the EAF. However, formally adopting them is likely to require reviewing and amending relevant legislation and government policies. In some cases there may be inconsistencies between different legislative instruments concerning the marine environment (especially environmental and fisheries legislation or regulations), which may need to be reconciled or aligned.

It is important to note that 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.

## 4. Strategies for fisheries managers

Although all PICTs are different, there are useful strategies that national fisheries and other relevant agencies can adopt in applying the EAF, e.g.:

- 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 a 'downstream' sector that is impacted by many other activities, fisheries agencies have both a right and responsibility to be pro-active in pushing for better inter-sectoral cooperation;
- develop environmental impact assessment (EIA) processes for all activities that may affect the coastal environment, and provide 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 opportunities to require modifications to the proposed development, or, if necessary, prevent it;
- where they do not exist, develop fishery management plans (FMPs) for major coastal fisheries and, where appropriate, for aquaculture;
- establish appropriate stakeholder consultative processes for each FMP. Stakeholders typically involve the fisheries agency, industry and resource users;
- promote community-based fisheries management or co-management approaches wherever feasible. Community-based management (CBM) can be identified as a primary ecosystem management tool within FMPs. Community-level management plans can flow from the FMP, illustrating the need for and usefulness of managing ecosystems at different scales;
- gather information. Information requirements, and the way the information will be used, should be specified in the FMP;

- establish marine protected or managed areas, preferably through community-based arrangements, with clear fisheries and/or ecosystem management objectives, backed up by appropriate legislation and regulation;
- consider alternative livelihood or income-generating strategies, which 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 be aware of the high cost and complexity of such research). Obtain relevant research results from other countries where possible. Use research results to progressively improve FMPs;
- review FMPs periodically, progressively introducing ecosystem considerations, non-conventional management problems and a wider range of stakeholders in line with the needs of the fishery, and the capacity of the fisheries administration;
- through this process, progressively transform FMPs into Fishery Ecosystem Plans (FEPs), which are FMPs that have been expanded to cover a broader range of ecosystem considerations.

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 the EAF is a management process, not an argument for complex and costly research. It should also be understood that moving towards the EAF will be an incremental process, sometimes requiring numerous small steps. Implementing the Ecosystem Approach to Fisheries will be 'evolutionary, not revolutionary'.

The next sections in this booklet provide background information on Pacific Island fisheries and coastal resources, giving good reasons for using the EAF and outlining its benefits.

## 5. Coastal fisheries and overfishing

Fishing in coastal waters has been practised by Pacific Islanders since the region was first inhabited. A wide range of techniques are used including nets, hooks and lines, spears, traps and poisoning. Fish provides high-quality nutrition for coastal dwellers and in some islands is the main source of protein. Coastal fishing also provides income for many Pacific Island communities, as well being a source of recreation and sport and an integral part of many Pacific cultures.



Unfortunately, stocks of fish and seafood are not endless. Like all natural resources, there are limits to the amount that can be harvested before resources are damaged and become less productive. In the past, when human populations were smaller and technology was less sophisticated, people lacked the ability or incentive to overharvest fish resources. Today, however, more efficient fishing methods, the availability of freezers, cold stores and other seafood preservation methods, and transportation links to lucrative export markets all combine to increase the pressures on coastal fishery resources.

As a result, many species in the Pacific Islands have been overfished and are no longer able to maintain their productive potential. There are two broad types of overfishing:

- o **Growth overfishing**, in which the fishery no longer produces as much catch as it should, because the fish in the exploited population do not have the chance to grow to maturity before being caught. In such a case, less fishing would result in bigger catches (something that is generally hard for people to understand or believe);
- o **Recruitment overfishing**, in which the exploited population is so heavily fished that it is no longer able to produce enough juveniles—or ‘recruits’—to ensure the survival of the next generation. This is the more severe type of overfishing and may require drastic action, such as complete closure of the fishery until the fish population recovers—which can take many years.

Certain types of invertebrates, such as giant clam, sea cucumber, trochus and pearl oyster, are especially susceptible to overfishing. All these species are overfished in many parts of the region, resulting in hardship and unnecessary economic loss for coastal people.



Some types of fin-fish are also locally overexploited, especially around large towns and cities. Some fishing operations, such as for live reef fish, target just a handful of valuable species and can quickly result in their localised depletion. Overfishing is not always reversible—the target species may be replaced by another one, usually of lower economic value, that occupies a similar ecological niche.

Where fishery resources are insufficient to meet the demand, a system of **fisheries management** is needed to control the level of fishing. Fisheries management arrangements are usually more successful if they are developed while the fishery is still in a healthy condition, rather than waiting until there is a crisis.

## 6. Managing coastal fisheries

Fisheries management is actually about managing people, not the resources themselves. ‘Conventional’ fisheries management uses rules, combined with monitoring, control and surveillance systems, to set limits on what resource users can and cannot do. Conventional management typically includes:

- limits on the amount of catch that can be taken;
- minimum or maximum size limits for the species being fished;
- closed seasons or areas;
- controls on the types of fishing gear used;
- licences or quotas to limit entry to the fishery;

Making conventional fisheries management approaches work requires good information about the biology and life history of the species being fished, and the types and amounts being caught. This enables fishery scientists to recommend appropriate levels of catch or fishing effort, and to assess the effectiveness of different management approaches.

The benefits of a fishery—such as yield, profits, and employment—change with different levels of fishing activity, or ‘effort’. The purpose of fisheries management is usually to optimise two or more of these benefits, while also ensuring that overfishing—which will reduce the benefits—does not occur.

Unfortunately, ‘conventional’ fisheries management is often ineffective in the Pacific Islands. Coastal fisheries involve hundreds of different species and the biology of many of them is poorly understood. Fishing is carried out by thousands of people in widely dispersed and often remote locations, and gathering information on their fishing activities is very difficult in terms of logistics and costs, especially compared to the value of some fisheries. Fishery law is complex, and is further complicated by the existence of customary fishing rights in many Pacific Islands. When fishery offences are successfully prosecuted, the penalties are often relatively minor and are therefore not a deterrent.

The Ecosystem Approach to Fisheries provides opportunities for PICTs to improve the management of coastal fisheries and increase the benefits that people get from them.

# 7. Ecosystem impacts of fisheries

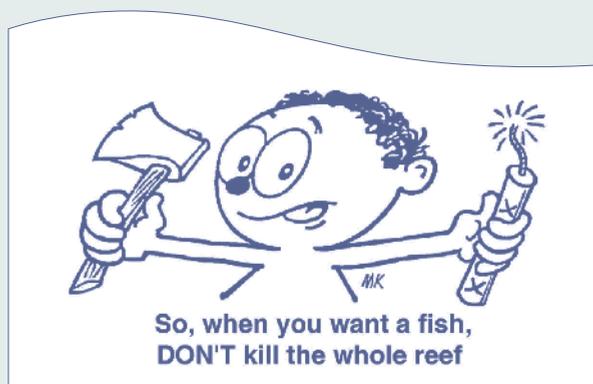
Much of the rationale for the EAF worldwide is based on the damaging effects that fishing activities can have on the environment. This is especially true of industrial fisheries, which use gear that can physically modify the habitat or generate large volumes of processing waste, by-catch and discards that pollute the environment. Trawling and dredging are most commonly associated with physical damage to habitats, while shrimp trawling and tuna longlining produce the highest proportion of discards.

Fortunately, these fishing methods and the problems they create are uncommon in the Pacific Islands. Most coastal fisheries in the region are small-scale and artisanal or subsistence in nature. However, even these fisheries can have negative environmental impacts, including:

- altering the structure of fish communities by selectively fishing down certain species or groups. This is a particular feature of fisheries for live reef food fish and aquarium fish, and of spear fishing;
- causing suspected changes to inshore sediments and the abundance of micro-algae by removing sea cucumbers, which normally oxygenate sediments and remove bacteria through their burrowing and feeding activity;
- damaging corals and marine plants through walking on reefs, or trampling and breaking coral while fishing;
- killing large numbers of juveniles, as well as corals and other habitat-forming organisms through the use of fish poisons;
- removing sea urchins and herbivorous fish, which may cause algal overgrowth;
- removing fish that prey on bioeroders such as sea urchins, which may allow populations to explode, resulting in increased reef erosion.

Fishing activities that cause changes in the composition of the reef community 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, poisoning and sometimes blast fishing, are still in widespread use among subsistence and artisanal fishers in some locations.

Despite the examples above, there is a perception among Pacific Island fishery managers that fishing activities are not especially damaging to coastal environments. This may be true compared to situations in other parts of the world. However the distinction is still only relative—Pacific Island fishers and communities are quite capable of overfishing, trampling, poisoning, dynamiting and otherwise damaging the resources they depend on. The damage caused to ecosystems by such activities not only reduces the prospects of restoring those fisheries, but may also change habitat structures and limit other ecosystem services and development options.



This situation is likely to worsen in the future. A recent study says 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”<sup>1</sup>. The growth in pressure on coastal resources likely to occur over the next couple of decades will further increase the stresses from fishing and associated activities on coastal ecosystems. Implementation of the EAF provides fishery managers and resource users with opportunities to address these issues.

<sup>1</sup> Bell, J. D., Kronen, M., Vunisea, A., Nash, W.J., Keeble, G., Demmke, A., Pontifex, S. and Andrefouet, S. 2009. Planning the use of fish for food security in the Pacific. *Marine Policy* 33: 64-76.

# 8. Aquaculture

Aquaculture activities are well-established in some PICTs and developing in others. The principal types of aquaculture are:

- **open systems**, in which the farmed species (such as pearl oysters, giant clams and seaweed) 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;
- marine and brackish-water **closed systems**, in which the cultured species (such as penaeid prawns and milkfish, as well as hatcheries for a range of species, and algal culture facilities used to provide food for the larvae of 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 straight back into the sea. Exchange with the coastal ecosystem is thus less than in open systems, but there is still the possibility of unwanted transfer of biological material, pathogens and waste products between the two;
- brackish or freshwater **pond culture** is used in some countries for farming of 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.

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 which may find their way into the coastal environment.

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

- introduction of alien and invasive species into coastal waters;

- introduction of diseases, parasites, or other unwanted species along with imported broodstock used in aquaculture;
- poor husbandry practices, such as overstocking, which can cause diseases or parasitic infections that then infect wild populations;
- pollution of coastal waters by pesticides, antibiotics or other chemicals used in aquaculture, 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.

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 in many PICTs has been relatively lax in the past, and various species have been transferred to and among Pacific Island countries with little regard or concern for possible ecosystem effects. Awareness is growing now 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 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.

# 9. Customary marine tenure and community-based management

'Modern' or conventional fishery management arrangements in PICTs often overlay a background of customary marine tenure (CMT) and patterns of traditional use rights over living marine resources that may be enshrined in common law and even in the constitution. Although CMT is generally breaking down in urban areas, it remains strong in many rural areas and outer islands. Customary practices such as closed areas and seasons, species taboos, user rights 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. There may also be ways to combine elements of both systems to produce results that are not achievable by either system on its own.

The difficulty of enforcing centralised fishery management arrangements is behind the trend to promote local, community-based management (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 agreed measures. In some cases, these arrangements have been initiated by government agencies, while in others, non-government organisations (NGOs) or communities themselves have taken the lead role. Where 'modern' or conventional fishery management measures can be incorporated into community-based management plans, it is likely that CMT or social pressure will encourage greater compliance.

A workshop on the EAF run by SPC in late 2007 revealed that three of the most important EAF measures are already being implemented in some PICTs through:

- participatory approaches that involve all stakeholders;
- support for community-based management arrangements;
- incorporation of traditional knowledge into the management process.

Further promotion of CBM, whether or not it is based on CMT, is likely to be a key element in future implementation of the EAF.

# 10. Marine managed areas

A prominent feature of recent management initiatives in the region has been efforts to establish marine managed areas (MMAs)—sometimes called marine protected areas (MPAs) or locally managed marine areas (LMMAs)—often together with CBM arrangements. Depending on the purpose of the MMA, there may be zones where extractive activities based on living and non-living resources are prohibited, and others where they are allowed.

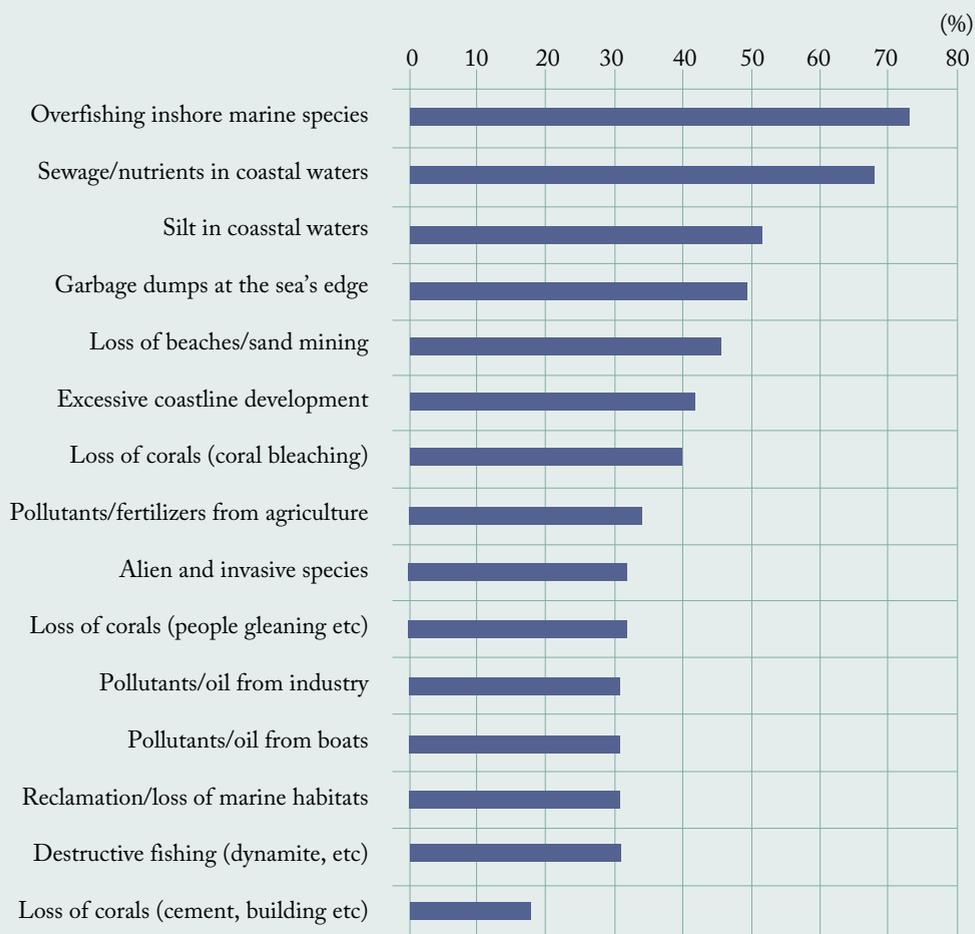
Successful MMAs have been demonstrated to increase populations of fish and invertebrates within the reserve boundaries and, in some cases, fish catches in adjacent areas. An extensive network of small community-owned fish reserves may provide multiple sources of recruitment and insurance against localised depletion and environmental fluctuations. However, many MMAs have been established with unclear or conflicting purposes, or in areas where the prospects of success are poor. Often, because of poor planning and lack of clear objectives, MMAs have been opposed by fishers and other affected user groups, and have had little support or goodwill from the broader group of stakeholders (including fisheries managers).

A key factor in the success of an MMA is a set of clearly defined management objectives. The MMA must also be designed and managed to achieve those objectives. It cannot be assumed that an MPA/MMA set up for biodiversity or habitat protection will automatically improve fisheries management. Similarly, it should not be thought that an MMA established for fisheries management purposes will adequately protect the range of biodiversity in an area.

In terms of fisheries management, MMAs are one tool that should be applied in conjunction with other appropriate fisheries management methods and within a broader management framework. When they are used in this way, MMAs can provide areas of protection for spawning adults of many fishery species, conserve biodiversity or rare species, and control the geographical distribution of fishing effort. MMAs will thus be an important and valuable part of implementing the ecosystem approach to coastal fisheries and aquaculture in the region.

# 11. Impacts of other sectors on fisheries

In a recent survey<sup>2</sup>, fisheries managers in 13 PICTs identified 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.



<sup>2</sup> King, M. and U. Fa'asili (2008). Extending the management base for an ecosystem approach to coastal fisheries in Pacific Island countries. Regional Workshop on the Ecosystem Approach to Coastal Fisheries and Aquaculture and Aquatic Biosecurity, 28 October – 2 November 2007. Secretariat of the Pacific Community, Noumea, New Caledonia.

Of the 15 types of impact reported, only 3 were related to fishing activities (overfishing of inshore marine species; loss of corals due to people walking on reefs while gleaning; and use of destructive fishing methods). The other 12 negative 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.

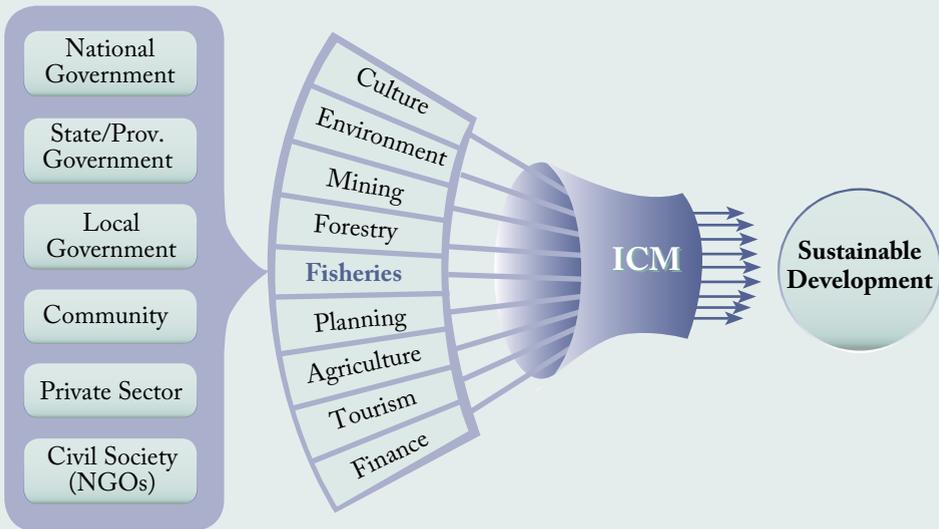
The types of degradation described above are typically chronic in nature, with gradual effects that accumulate almost imperceptibly over time. The impacts of progressive coastal construction, or changes in levels of sewage or pollutants, occur slowly over many years or even generations. They are thus difficult to measure and may not be noticed until they are quite severe. This leads to the 'shifting baseline' situation in which people notice minor deterioration relative to the last few years, but do not perceive the major degradation that has happened over a decade or more. Early books about the Pacific Islands written over 100 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 inconceivable to us now. Coastal systems that once supported thriving local fisheries have gradually become degraded in many Pacific Island locations.

Apart from the long-term process 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. In such cases, progressive pollution, overbuilding and resource extraction can combine to result in a drastic change of state, in which the basic nature of the ecosystem is altered. As a result, at least one relatively clear, productive coastal lagoon has become an overnutrified, algal-rich system in which oxygen deficiency periodically kills fish.

# 12. Integrated coastal management

Reducing fishing effort or restricting catches will not address the problem of depleted fish stocks if the key threats to their recovery come 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 affect fisheries or marine resources.

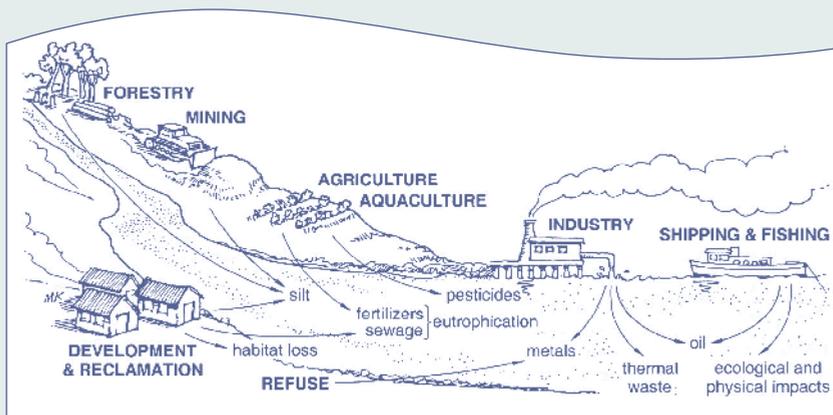
The effective implementation of the EAF may therefore require the development of integrated coastal management (ICM) systems that address these external factors. ICM attempts to bring together a wide range of disciplines and stakeholders, including government agencies, the private sector and members of civil society, whose goals and interests may be divergent or even in opposition.



Attempts to promote ICM in the Pacific Islands region have been undertaken on a somewhat patchy basis for at least 20 years. As in other parts of the world, these efforts have 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 differing objectives. Although there are numerous benefits for 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 often seem insurmountable.

In an atoll or small island system, the entire land area is effectively in the coastal zone, and ICM is synonymous with whole-island development and management processes. In 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 involve programmes of land and watershed management in specific areas.

In either case, coastal ecosystems are usually on the downstream or receiving end of 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 coordination among agencies and resource users operating in coastal areas and watersheds.



Rather than cooperate with each other, government agencies responsible for different aspects of the coastal environment often compete for national funds and donor resources. External funding may be earmarked for particular sectors (e.g. fisheries or environment) and not allow for multi-sectoral ICM efforts. Where feasible, projects should be established that include consideration of the impacts of non-fisheries activities (e.g. inadequate sewage treatment) on the marine environment and capacity building in the full range of relevant government ministries.

# 13. Learning more

This booklet presents key information on aspects of the Ecosystem Approach to Coastal Fisheries and Aquaculture, based on a study carried out by the Secretariat of the Pacific Community (SPC) and The Nature Conservancy (TNC). The full report provides more detailed information on the current status of EAF implementation, guidelines for its advancement, and an extensive bibliography of useful literature and further reading. It is available in PDF format at <http://conserveonline.org> and [www.spc.int](http://www.spc.int). Hard copies can be obtained from SPC Publications Section ([PublicationsSection@spc.int](mailto:PublicationsSection@spc.int)).

The Food and Agriculture Organization of the United Nations (FAO) has produced a range of publications on the EAF. These can be obtained from the FAO Fisheries Department website, at [www.fao.org/fishery](http://www.fao.org/fishery).

Technical advice and assistance on EAF implementation can also be provided by these agencies to appropriate institutions in Pacific Island countries and territories. These institutions may include government departments, NGOs, research agencies and others. For further information, please contact:

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### **The Nature Conservancy**

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### **Food and Agriculture Organization of the United Nations**

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The South Pacific Forum Fisheries Agency has also been promoting the application of the EAF to the Western Pacific tuna fishery, using methodology developed in Western Australia. More information on this approach can be found at [www.ffa.int](http://www.ffa.int).



